

Bombardier's CSeries After EIS Regaining Momentum



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I. EXECUTIVE SUMMARY

We remain upbeat on the long-term prospects for the CSeries, despite initial difficulties with the program. The 787 experienced much more challenging difficulties, and has emerged as a viable and successful program. The CSeries will recover from its initial delays as well.

The program is gaining momentum from Air Canada and Delta orders. Combined with the confidence of the Quebec government that has invested in the program and expects a positive return on investment, the CSeries program appears poised to turn the corner.

But additional orders will be required to turn the program around, and the new management team must execute its new strategy of gaining key customers in the Americas, Europe, and Asia to generate the success it requires. While the jury remains out, the performance of the aircraft is superb, and with an uneventful EIS, should provide customers the confidence and incentive needed to place further orders. Those orders will need to be garnered during a period in which order levels have been decreasing for the industry amidst increasing economic uncertainty.

A smooth entry into service with Swiss will be critical for the success of the program. Bombardier and Swiss have been carefully planning EIS for some time, and it appears that all the key elements are in place for success.

Further supply chain delays from Pratt & Whitney are negatively impacting Bombardier. Bombardier will be able to deliver only 7 of 15 planned aircraft in 2016, and Pratt & Whitney may not be back on schedule until the 4th quarter of 2017.

We believe that the CSeries will still be successful, despite prior missteps. We project sales of between 1,900 and 2,400 CSeries aircraft over the next 20 years. There is a large replacement market to be filled, as well as new demand that should generate more than 5,500 orders in the 100-149 seats segment. We believe Bombardier and Embraer will dominate the orders in that segment, as their offerings are economically superior to those from Airbus and Boeing.

The new management team's strategy appears to be working. Despite the myriad of missed opportunities, the new team understands how to build, sell and support the CSeries. The aircraft, which is technologically more advanced than its

competition, should be the “right aircraft” for several airlines if aggressively marketed, which the new management team is undertaking.

ANALYSIS

In 2010 AirInsight published "The Business Case for the Bombardier CSeries". It was upbeat on the prospects of the aircraft. In 2012 AirInsight updated our 2010 report looking at the entire spectrum of aircraft in the 100-seat class. Once again AirInsight was upbeat on the prospects of the C Series.

In this 2016 analysis, we are perhaps a bit more sanguine. We remain upbeat regarding the potential for the aircraft. But in monitoring the Bombardier CSeries program over the past eight years we have witnessed a series of stumbles and missteps by the company and previous management teams, resulting in a more difficult financial and market position to overcome.

The CSeries is a very capable aircraft, but Bombardier’s multiple errors cost the company “first mover advantage against” its re-engined competition. The current challenge faced by the CSeries program is not the aircraft itself, but the slow initial market acceptance and a lack of orders from key airlines at this point in its life cycle. While recent orders from Air Canada and Delta have turned-around the situation somewhat, one or two major additional orders would change market perception of the aircraft and fill the delivery skyline beyond 2019.

AN UPHILL CLIMB

To date, the CSeries program has faced an uphill climb to overcome the unfavorable position in which the program was placed. Other aircraft, the 787-8 in particular, faced even worse challenges, and Boeing successfully overcame a series of mistakes that even included a temporary grounding of the aircraft for reasons. That proves that recovery, after initial failures, can still be achieved. We believe that will also be the case for CSeries.

The keys to a turnaround for the CSeries aircraft program today are generating additional orders and the new management team being able to fully execute their turnaround plan now that Quebec government investment in the program has been secured. At this writing, additional financing from the federal government in Ottawa remains undecided, and the subject of negotiations.

That turnaround plan includes securing large orders with major airlines. In 2016, orders for 45 aircraft from Air Canada and for 75 from Delta have breathed new life into the program, which now seems to be regaining some momentum. But additional orders are needed to continue that momentum.

SUPERB TECHNOLOGY

The Bombardier CSeries is a great airplane, and virtually everyone involved in commercial aviation agrees. Even perennial critic and Airbus COO, John Leahy thinks it's a "[nice little plane](#)."¹ The CSeries is modern, efficient, comfortable, and has performance and range that enable it to be a category leader in the market between 100 and 149 seats.

However, until this year, the aircraft had not sold particularly well, despite having the sixth largest number of orders in history for a commercial aircraft at first flight. While Bombardier has met its goal of 300 firm orders by entry into service², program delays have resulted in a longer time to achieve those orders, with appropriately higher expectations by the market and the financial community.

Despite the order shortfall, a market does exist for aircraft of this size, as evidenced by the Air Canada and Delta orders, and United Airlines order of 25 737-700 aircraft in the same size class. These orders demonstrate that not all airline single aisle orders are moving up to the 150-180 seats size, despite recent record orders and a trend towards upsizing at Airbus and Boeing. We believe, with EIS of the CSeries, renewed attention to the 100-149 seats market will result in additional orders.

THE MARKET AND CHANGING REQUIREMENTS

We foresee a market for 1,900 to 2,400 CS 100 and CS300 models, between 33% and 40% of a market of 5,500 to 6,000 aircraft in the 100-149 seats class over the next 20 years. While we do not expect demand to reach the 7,000 units that Bombardier forecasts during the same period, AirInsight's assessment indicates that there will be adequate demand for a successful program. We believe that two competitors, Bombardier and Embraer, will dominate this segment. Airbus and Boeing offerings, even neo and MAX models in this size range, are simply uncompetitive with their aircraft absent massive discounting.

Times are changing in the airline industry. Fuel costs have coming down, and are stabilizing, with forecasts for lower volatility in pricing. Thus, airlines are now looking to "right size" aircraft for specific markets³. Airlines are reintroducing service to smaller cities that were culled during periods of high fuel costs and difficult profitability.

Airlines are now looking beyond the seat-mile cost metric that has produced a glut of larger narrow-body aircraft orders. The CSeries, and its E2 Jets competition from Embraer, offer right sized aircraft, with economics that remain compelling

¹ <http://www.theglobeandmail.com/report-on-business/international-business/european-business/airbus-executive-calls-bombardiers-c-series-jet-an-orphan/article28133795/>

² Air Canada finalizing its recent LOI brought the total to 370 prior to EIS

³ A position long espoused by Embraer

when compared with larger models from Airbus and Boeing on both an aircraft mile and seat mile basis.

OVERCOMING ADVERSITY

Today, building an all-new technology aircraft almost always entails a delay. Historically, new aircraft were routinely announced by Boeing and McDonnell Douglas and rolled into service 48 months later, like clockwork. The design and engineering processes were straightforward and well understood.

New aircraft are no longer designed by a single company as they were in the past. Instead, major systems and subsystems responsibilities are outsourced to members of what has become a global supply chain. Coordination, and the growing importance of software as aircraft become more advanced, has moved the time frame out from 48 to 72 months for typical programs today.

With a longer development cycle, OEMs require more capital and put more at risk when they design new aircraft. Deferred cash flow from deliveries, combined with the 50% increase in the average time to develop an aircraft, places a financial burden on aircraft OEMs when they develop a new airplane. The Airbus A380, Boeing 787, and Bombardier CSeries are all aircraft that have suffered from major development delays. Similar delays have already been incurred for forthcoming aircraft, including COMACs' ARJ-21 and C919, Irkut's MC-21, and the Mitsubishi Regional Jet. While delays have become commonplace, they result in red ink and can burn cash quickly, making it difficult for some programs to reach break-even.

The Boeing 787 is perhaps the strongest example, with estimates of more than \$30 billion spend in development, and some analysts believing that despite commercial success, it will never break-even. The CSeries, with a more modest overrun, can become profitable with additional sales, and should do so over the next five years.

CHANGING MARKET REALITIES

The delays in the CSeries program have added difficulties to the task of selling the aircraft. Some key advantages that the aircraft presented when first conceived, if it had been on time, are less compelling today as its competitive position, vis-à-vis Airbus, Boeing, and Embraer continues to change. The two-and-a-half-year program delays cost Bombardier first mover advantage, and Airbus, with its A320neo program beat the CSeries into service and became the first application for the Pratt & Whitney GTF engine. The CSeries, with A320neo in service and

Boeing MAX and Embraer E2 just around the corner, is no longer the first player to introduce advanced technologies.

Nonetheless, the CSeries program does retain key advantages:

- North American trans-continental range provides an advantage over the competing Embraer E2, but is not an advantage when competing against Airbus and Boeing models, which offer equal or better range capability.
- Low fuel burn is important, but no longer as crucial an element for new orders. Competitive re-engined aircraft offer closer to equivalent performance than today's models, but at lower capital costs per seat. Today, fuel is inexpensive and, given industry changes, may remain so for a while.
- The CSeries low noise footprint has been nearly matched by the competition, especially A320neo using the GTF engine.
- Low NOx and other emissions are nearly matched by the competition using new technology engines.
- Many key marketing messages from Bombardier have lost a bit of their luster without first mover advantage. While the CSeries remains the only new aircraft in its class to be optimized for new technology engines and incorporates several innovative technologies into its design, re-engined competitors have narrowed the economic gap significantly, and have shown they will aggressively compete on price.
- Competition has been fierce as Airbus and Boeing have each declared war on Bombardier and are doing everything they can to deny the CSeries a solid foothold in the market. Bombardier has invaded their turf, which they plan to defend at all costs.

In summary, our upbeat assessment of the aircraft has given way to a more realistic viewpoint – the CSeries is a technically superb product but faces cut throat competition on every campaign. While the CSeries remains the leading product in its class, the two questions being asked are whether the CSeries can effectively compete against Airbus and Boeing, and whether the 100-149 seat market has been dormant or is disappearing.

COMPETING AGAINST AIRBUS AND BOEING

Airbus and Boeing have retained two models in the 100-149 seats category, the A319neo and 737 MAX7, but neither is selling well. In fact, the CS300 is outselling

both, combined. We believe that Bombardier's competition in this segment is not Airbus or Boeing, but Embraer.

While Airbus and Boeing will aggressively defend existing customers, and try to steer them into larger aircraft, the new economic realities will have many looking at "right-sizing" aircraft in the 100 to 149 seats class, and that there is ample opportunity for the CSeries to be successful.

IS THIS A DORMANT OR DISAPPEARING MARKET?

Orders in the 100-149 seats market have slowed in recent years, as airlines have upsized aircraft in a high fuel cost environment. With lower fuel prices and recessionary trends indicating that airlines may not be able to fill larger aircraft on many routes, airlines are once again examining the segment in which the CSeries competes. With 4,491 aircraft in this category scheduled for replacement in the next 20 years, not to mention growth as regional routes grow into mainline routes, we believe the market has been dormant waiting for new economic aircraft. The CSeries is the first new technology aircraft to arrive in that segment.

ASSESSING THE PROGRAM AT EIS

As we look towards EIS, it is important to review how Bombardier got to its current position. To better understand the thinking and decision processes behind the program, we spoke with several current and former Bombardier executives and industry experts. They were candid in their assessments of how and why the CSeries program endured an extended gestation period that dug a substantial hole from which Bombardier will need to climb.

The Good

The aircraft has demonstrated its ability to deliver on promised performance and economics. Its flight test program was uneventful, but for a partially contained engine failure. This caused a six-month delay and hobbled the program just as some positive momentum was beginning to build. The aircraft flew through the remainder of its test program without a hitch.

After accomplishing the required 2,400 hours, Bombardier decided to extend its tests. We were told this was due to "an abundance of caution". During these Function and Reliability tests, the aircraft operated at 100% of flight schedule. It performed similarly during the route tests at launch customer Swiss. Bombardier can be proud of its test performance and especially proud that their CSeries is the

first commercial aircraft in recent history to actually “beat the brochure⁴” in terms of fuel burn and economic performance prior to entry into service.

The CSeries is a great airplane, and remains better than other aircraft in its class. Bombardier has apparently managed to sell all but one of its FTV models. Considering how long it took Boeing to sell its “terrible teens” 787s, The CSeries is clearly attractive.

The Bad

A problem today is that the CSeries is struggling with market (as opposed to technical) expectations. The aircraft is sized directly between two existing market segments, the regional market, for which the aircraft is too large, and the mainline market, for which the aircraft is perceived to be on the small end of the scale⁵. The key question for Bombardier is whether that market segment is robust enough to support both the CSeries family and its competitors today, and how quickly it will develop in the future.

With 803 commitments⁶ for the aircraft at the time of writing, there is clearly a market for the aircraft. But with mainline carriers replacing 737-700s with 737 MAX 8, and A319neos with A320neos, there has been a strong shift in demand away from this segment, and the big duopoly have received more than 8,000 firm orders for the larger neo and MAX models.

We believe Bombardier overestimated the size of the 100-149 seats market, and that its forecast for 7,000 aircraft over the next 20 years is a bit optimistic. We independently forecast 5,500 to 6,000 aircraft in this sector, clearly enough to produce a profitable program, even when that market is shared with Embraer.

Bombardier faces a tough competitor in the forthcoming Embraer E2 family that will be economically competitive with CSeries. While this aircraft lacks the range of the CSeries, Embraer has the advantage of a 1,140-aircraft customer base for existing E-Jet models to trade-up.

As one evaluates the CSeries program today, focus has moved away from the aircraft, landing squarely on the new marketing team. After multiple delays, and slower than expected sales, the program has a long path to achieve success. Maintaining momentum from the Air Canada and Delta orders to climb this path will be the major challenge for the current management team.

⁴ The initial brochure

⁵ Delta Air Lines and British Airways, among others, previously expressed interest in a stretched model

⁶ 370 firm and 212 options and 10 purchase rights, plus 211 letters of intent.

The Ugly

Possibly the lowest moment for the program was news that Bombardier was in talks with Airbus about acquiring the CSeries⁷. Clearly the nature of such talks should have never have reached the public eye. But the news unfortunately leaked, somewhat undermining industry confidence in Bombardier's capability to deliver on and support the aircraft.

An Airbus official assured us that they did not leak the news, despite the fact once it leaked, Airbus was placed in a far better position with respect to future competitive campaigns.

For Bombardier, the leak was extremely damaging. It sent a message to the market that Bombardier could not effectively market and sell the aircraft without help. The new management team, which had been speaking with confidence about the aircraft and their plans for it, was undermined. The uphill climb for the CSeries grew much steeper and more difficult.

The consensus of opinion, among the people we spoke with, that were "in the know" concurs with our assessment. One dissenting voice suggested the idea of speaking to Airbus was good because Airbus is struggling to sell its A319neo and the CSeries would have offered an excellent solution. The decision to speak with Airbus would have been approved at the highest levels within Bombardier and, in essence, appears to speak to a sense of desperation.

THE ROAD FORWARD

The recovery from this morass began more quickly than one might have expected. Bombardier found a risk-sharing partner in the Quebec government⁸. While views on this deal were not unanimously positive⁹, the deal provides Bombardier with the much-needed cash to maintain the CSeries program through the remainder of the development period (which will be short) and the initial learning curve for the aircraft in production, helping stem the losses from high cost initial aircraft.

The surest way out of this unfortunate situation is to sell aircraft. The recent sale to Air Canada was a crucial response to the generally negative reactions to the Airbus talks. Not only is Air Canada a marquee customer, it also placed the largest order for the CSeries to date when finalized. The follow-on deal with Delta Air Lines, for an even larger order, was a tremendous boost. This brings the CSeries to four marquee customers, Lufthansa for Swiss, Korean Air, Air Canada and Delta.

⁷ <http://www.reuters.com/article/us-bombardier-airbus-group-idUSKCN0S02MF20151007>

⁸ <http://business.financialpost.com/investing/global-investor/bombardier-inc-to-get-1-billion-from-quebec-government-to-rescue-troubled-cseries>

⁹ <http://www.richardabouafia.com/shownote.asp?id=457>

The CSeries deal at Air Canada constitutes the reversal of a great embarrassment Bombardier suffered at the hands of Embraer nearly a decade ago. Bombardier is effectively winning back Air Canada from Embraer. The CS300 should do what the E-190 is unable to do for Air Canada - which falls short on range for certain routes from Toronto to the West Coast, and improve operational reliability and rising maintenance costs. The recent deal with Delta removes the E-190s (ex-Air Canada) from Delta's fleet plan.

Bombardier needs to continue to build the order book for CSeries, and to begin to deliver aircraft on time and rapidly progress down the learning curve to reduce production costs. The recent delays from Pratt & Whitney are not helpful in this regard.

The program has promise, and building market confidence after a series of setbacks is important. Bombardier cannot afford any additional missteps as the CSeries enters service.

II. THE RECOVERY - FEASIBLE AND UNDERWAY

Most observers indicate that the CSeries program began to recover after the program reached a nadir in early 2015. The recovery began with a new management team in place and certification of the CS100. It is continuing with two major orders in early 2016, and several other campaigns underway. With success, expectations are also rising for Bombardier to make-up for lost ground and increase the backlog for the program.

A NEW MANAGEMENT TEAM

Bombardier strengthened its management team in 2015 by bringing in three seasoned aerospace leaders. Their roles include executive leadership, marketing and sales. Crucially, they have the necessary industry experience and understand the commercial aircraft markets well from their prior experience. These changes were viewed as long overdue and necessary for Bombardier to turn the CSeries program in the right direction.

These new leaders needed to spend a lot of time rebuilding their internal team and instilling confidence with the marketplace. Shortly thereafter, Bombardier added another key leader with experience in airline and OEM fleet management to manage the supply chain.

The frayed leadership at Bombardier was pulled together with the hiring of Alain Bellemare as President. His experience at United Technologies, and being a native French-Canadian, made him an ideal candidate for a leadership position.

Fred Cromer was appointed President, Bombardier Commercial Aircraft on April 2015. With more than 23 years of experience in aviation, he has an unparalleled network of contacts in the airline industry.

Prior to joining Bombardier, Mr. Cromer spent six years at International Lease Finance Corporation. Earlier in his career, he held various executive positions in the airline industry, such as Chief Financial Officer, ExpressJet, Vice President and Chief Financial Officer, Continental Express, Vice President Fleet Planning, Continental Airlines and Director of Fleet Planning, Northwest Airlines.

Colin Bole was brought in as new Senior Vice President, Sales and Asset Management, in May 2015. Prior to joining Bombardier, Mr. Bole was Chief Commercial Officer at Intrepid Aviation and spent four years at International Lease Finance Corporation (ILFC). Earlier in his career, he held various executive positions in marketing such as Executive Vice President and Head, Marketing, Macquarie AirFinance, Managing Director & Head, Marketing, as well as Vice

President, Marketing, GATX Air, Technical Marketing Manager and Regional Sales Director, Airbus.

Nico Buchholz joined Bombardier on August 2015 as Senior Vice President and Chief Procurement Officer in Montréal. In this position, Mr. Buchholz has overall responsibility for procurement across Bombardier's four business segments. Prior to joining Bombardier, Mr. Buchholz was Executive Vice President, Lufthansa Group Fleet Management for nearly 15 years in Frankfurt. Aside from fleet strategy and aircraft evaluation for a fleet of approximately 700 aircraft, his role encompassed aircraft procurement and marketing for Lufthansa, as a whole. His team was instrumental in the development of various aircraft from major OEMs, including the CSeries.

A NEW STRATEGY

In 2011, Bombardier's strategy was to acquire 20 customers on five continents to generate a "critical mass" of customers worldwide. At that time, the company believed it could obtain a premium price for the aircraft.

Today that strategy has changed, and is focused on landing new bellwether or marquee customers on each continent in addition to the ones it already had – Swiss and Korean Air. In 2016, that strategy proved successful with Air Canada and Delta in North America. The next step is securing another major customer in Europe and Asia as quickly as possible. That will push out the skyline to 2020 at current projected rates, and remove the pressure to offer what essentially are substantial "launch customer" discounts.

The new management team understands changing market dynamics, including pricing, and the importance of timing in narrow-body sales campaigns. Since the launch of the A320neo and 737MAX families, they have generated more than 7,000 orders. Those campaigns, not decided in Bombardier's favor, represent some of the missed opportunities that the current management team does not want to miss in the future.

TIMING IS CRITICAL

The CSeries program background is painful reading. But it is crucial to understand how Bombardier got to where it is today. The missed opportunities are not always recoverable because the number of customers is finite, and when they place an order for a competitor's aircraft, that sales opportunity disappears for two decades. The frequency of sales campaigns is also finite. Consequently, getting timing right is critical. Aircraft programs are sensitive to timing from the start when the concept is floated, all through development and flight test and finally

delivery. Airlines run businesses that are based on schedules and timing really, is everything.

The example of Delta Air Lines is apropos. In 2011 Delta was a buyer at the right price. Instead, once the campaign fell through, Delta acquired used Boeing 717s. Delta is now back as a customer, but four years later. Had a deal been struck with a marquee customer like Delta in 2012, other target airlines would have stepped forward knowing that a major carrier had confidence in the program. While all is well that ended well, in this case, the opportunity cost for the program and its momentum was significant. But Delta, who also purchase used as well as new aircraft, may not be the typical airline example, as often a revisit to a campaign lost is infeasible.

A PROMISING OUTLOOK

Bombardier understands how good the CSeries aircraft is better than anyone, especially after successful operational testing. The challenge is now convincing others that they need to add the aircraft to their fleets. We understand that several campaigns with major airlines are underway. There were no customers announced at the Farnborough Air Show, and we do not expect further major CSeries order in 2016 because of the Pratt & Whitney delays. Nonetheless, 2016 is likely to be viewed as the year in which the market image of the aircraft changed from uncertain to positive. After the good start to 2016 with Air Canada and Delta orders, Bombardier efforts have focused on maintaining positive momentum while introducing the CS300 in the fourth quarter.

Potential customers now understand that the aircraft is meeting its specifications as of day one, and that the flight test program and initial dispatch reliability with Swiss have been very good. Confidence in the product is building in the marketplace.

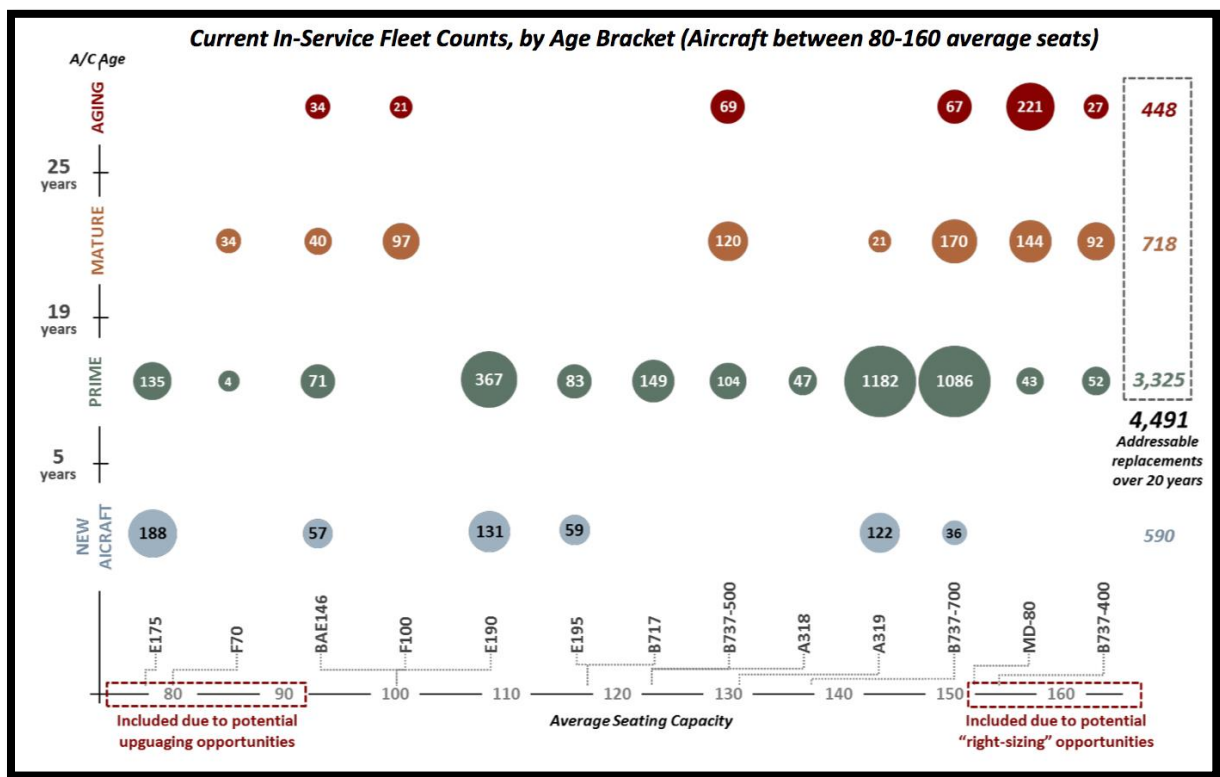
While some in the press characterize the Quebec investment in the CSeries program as a bailout, those with knowledge of the transaction indicate that it is just that, an investment for which the government expects a positive return.

Bombardier believes it is in a sweet spot in the market. Airbus and Boeing offerings in the 100-149 seats category are not competitive with Bombardier and Embraer, and there is a substantial replacement market over the next 20 years. The chart below illustrates that replacement market, which shows 4,491 aircraft that will need replacement.

448 of those aircraft are over 25 years old and candidates for rapid replacement. The BAe146/Avro RJs at Swiss are, in fact, being replaced by CSeries. Replacement of other aircraft models is currently being pursued by Bombardier and Embraer.

An additional 718 aircraft are maturing, and will be replaced in the 2020-2025 timeframe. The aircraft currently in their prime include several A319 and 737-700 aircraft that will need replacement over the next two decades. For these aircraft, the battle will be between upsizing and right sizing. Airbus and Boeing, whose products are uncompetitive economically for this sector, will try to upsize their clients to larger aircraft. Bombardier and Embraer will try to “right-size” aircraft for specific routes, and demonstrate how a smaller aircraft can generate higher profits.

Exhibit 1 In-Service Fleet Counts



Source: Avascent

When growth is added, AirInsight forecasts a market of 5,500 to 6,000 aircraft over the next 20 years.

STRATEGIC DIRECTIONS

Bombardier is in a difficult position. While it has a superior product when compared with others similarly sized options, larger aircraft models can provide lower seat-mile cost advantages through higher capacity. Airbus and Boeing have

been aggressively upselling their narrow-body customers into larger aircraft. How will Bombardier buck the trend towards larger aircraft, or will they need to invest in a stretched model to extend their product family?

Bombardier believes that, in a low fuel cost environment, the market is returning to right-sizing rather than up-sizing aircraft. They are seeing more customer interest and activity in the 100-149 seats category than previously, and more importantly a difference in the questions asked by fleet planners. The CSeries has great aircraft mile economics, seat mile economics that are competitive with larger aircraft, and has availability in the near term, as opposed to the seven year backlogs at Airbus and Boeing that preclude early deliveries of their re-engined models. There is an opportunity to be exploited, and the Bombardier team is working the issue aggressively.

One of the key differentiators for the CSeries is ease of maintenance. Bombardier has invited technical representatives of potential customers to join fleet planners in their evaluation process and see the aircraft up close. The CSeries is unique in that every line replaceable component has easy mechanic access, often through a door built specifically for ease of maintenance. This enables changing a part more quickly without as much disruption to the flight schedule.

When this is combined with the aircraft health management system on board the aircraft, which monitors the condition of components and alerts to potential failures, preventive maintenance actions can be taken to avoid cancellations and maintain high levels of dispatch reliability. As one of the first aircraft to enter the new age of big data and health management, the CSeries offer unique advantages against the legacy products of Airbus and Boeing.

Bombardier is utilizing Pratt & Whitney and Tech Mahindra in India to manage its big data offerings. With Pratt & Whitney already having its own system for the GTF engines, the integrated offering will provide a single interface for customers for both the engine and airframe.

Bombardier has several letters of intent from small customers that are growing older by the day, and may be stale. Management is still trying to finalize those deals, but if they do not occur, have indicated that it could free up a portion of the production skyline for options that will likely be exercised by Lufthansa Group, Air Canada and Delta. In the near and intermediate term, there is no concern about filling the skyline, which is essentially sold out through 2019 but has a few slots held open for new customers.

Delta's CEO has indicated that they are interested in a larger CS500 model. That model, if launched, would provide stiff competition to the A320neo and Boeing's

rumored 737 MAX 7¹⁰ in the 150-seat category. It would also provide a perfect replacement for more than 100 MD-88s at Delta.

The Quebec investors have also indicated that they would be favorably disposed to a CS500 offering. Today, Bombardier is not ready to launch a stretch program, as the company has focused on a flawless EIS for the CS100 at Swiss and will continue that for the CS300 at Air Baltic later this year.

The competition in the marketplace is fierce. Both major competitors have stated that they cannot allow Bombardier a foothold in this market, and are aggressively pricing against the CSeries. So far, they have often been successful, most recently at United Airlines, where Boeing offered the 737-700NG at bargain prices, reported with discounts near 70% of list price. How can Bombardier compete with competitors whose aircraft are priced less than what it currently costs Bombardier to make an aircraft?

The answer is achieving critical mass for CSeries production. The current plan is to gradually increase production to a rate of 10 aircraft per month. At that level, economies of scale reach a plateau that should enable Bombardier to reduce the cost of aircraft substantially, and become competitive with Airbus and Boeing. Unfortunately, delays from Pratt & Whitney will further stretch the timeframe for Bombardier to achieve its goals until 2018.

Of course, with Airbus and Boeing producing 50-60 aircraft per month each, they can afford to amortize development costs over a larger number of aircraft. This places Bombardier at a disadvantage financially, as they cannot recover development costs at the same level as Airbus and Boeing.

Bombardier, while smaller than Airbus and Boeing, still provides strong support to its turboprop, regional jet, and business aircraft customers worldwide. It has sophisticated parts management programs and solutions for airlines, and the company has invested substantially in improving its facilities and management team. The company is confident that the reliability of the CSeries, combined with its customer support network, will provide the support customers need and require. The extensive EIS planning with Swiss reflects how closely Bombardier is working with its customers.

If there is a benefit of being late with a program, it is that this afforded Bombardier's manufacturing management team the time to hone its manufacturing technologies and develop a state of the art production facility in Mirabel. The shop floor in Mirabel resembles the shop floor in Toulouse – a

¹⁰ Boeing has stretched the poor selling MAX7, replacing the initial design with one 12 seats larger that now utilizes the MAX 8 wing. This enables Boeing to bracket the 150 seat A320 with the 138 seat MAX7 and 162 seat MAX8.

modern facility with strong automation and fewer personnel than traditional aircraft manufacturing facilities. Thus, Bombardier should be able to advance down the learning curve rapidly and bring the aircraft in at projected costs within the first 18 to 24 months after first delivery.

Bombardier's strategy is, fundamentally, to exploit the characteristics of the CSeries, which make it the right airplane for several operators. Delta wouldn't have purchase the CS100 if it were not the right airplane for their needs, as they could have certainly received favorable deals from the competition. Similarly, Air Canada determined that the CS300 was the right aircraft for their narrow-body markets. If the aircraft didn't work on the projected routes, neither airline would have acquired the aircraft.

The company is continuing to work with leasing companies, including Macquarie, LCI, Falco Leasing and Ilyushin Finance to support specific campaigns and include them as leasing options on campaigns it is pursuing.

The outlook in Mirabel is more positive than we've seen it in several years, buoyed by the initial success of the new management team with two bellwether airlines and the knowledge that Quebec financing will provide adequate cash flow to bring the program down the learning curve into profitability.

III. A TECHNICALLY SUPERB AIRCRAFT

The CSeries is a technically superb aircraft. It combines the latest aerodynamics with advanced materials and new generation engines to deliver 20% better economics than the current competitive generation of aircraft in service, and 10-11% better than similar sized re-engined aircraft from Airbus and Boeing. The following table compares the competition in the narrow-body market:

Exhibit 2 Comparative Aircraft Data

Comparative Aircraft Data				
	Seats	Seats	Seats	MTOW
	Maximum	1 Class 32"	2 Class	lbs
CS100	125	110	100	134,001
A318	132	129	114	149,914
737-600	129	126	112	143,501
E190	108	106	97	114,199
E190-E2	108	106	97	123,902
E195LR	120	118	111	115,280
E195-E2	136	132	118	129,411
CS300	150	130	122	149,001
A319	144	136	124	166,502
A319neoPW	144	136	124	166,449
A319neoCFM	144	136	124	166,449
737-700	147	137	126	176,323
737MAX7	179	150	138	177,000
A320	177	162	150	171,960
A320neo PW	177	162	150	174,165
A320neo CFM	177	162	150	174,165
737-800	189	178	162	174,200
737MAX8	189	178	162	181,198

ECONOMICS: STILL LEADING THE PACK

While the competition has developed re-engined aircraft, they have not managed to completely close the gap in performance vis-à-vis CSeries. But Airbus and Boeing each are expert in pricing to the point of economic indifference, and understand well the comparative economics. With volume advantages for their narrow-body fleets, they can price their aircraft lower to negate the CSeries advantage. A part of that advantage is fleet commonality for many operators,

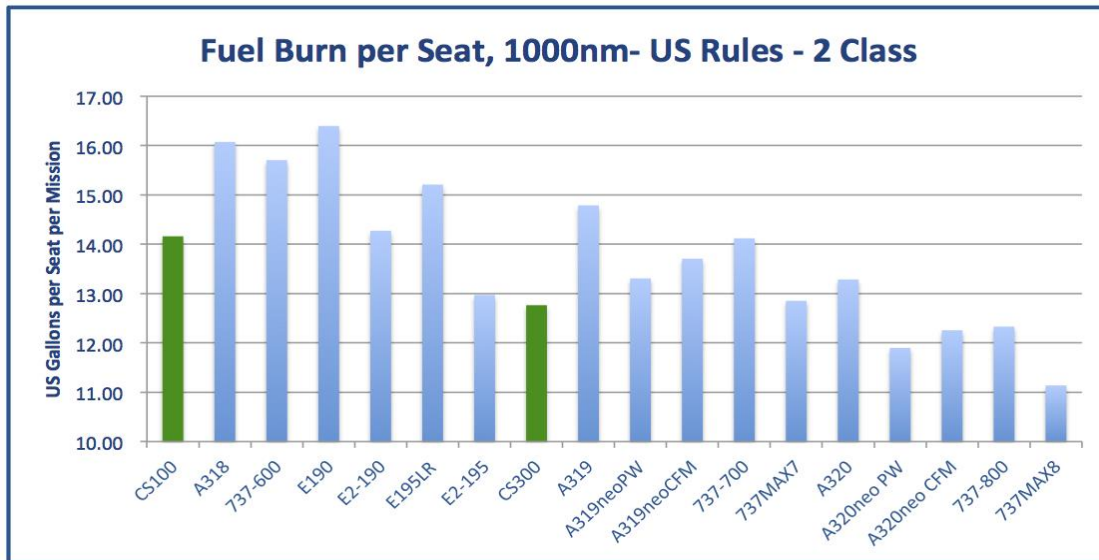
who would require no new pilot training and substantially lower initial provisioning of spares.

The advantage of the “clean-sheet” design of the CSeries is that going forward it has an upgrade and update path with more options. There is a limit to how far one can update or upgrade an older aircraft. Thus, Bombardier, with continuous improvements, should be able to sustain a performance gap.

Airbus and Boeing made it clear they were going to limit the amount of development on their re-engined aircraft. Airbus set a goal of keeping the A320neo within 95% of parts commonality on the A320ceo it replaces.

The following chart illustrates how the CSeries remains, in our estimate, the leader in its segment, and should for another 10-12 years until all new narrow-body aircraft are developed, by Airbus and Boeing in the 2025-2030 timeframe. Its selection of the Pratt & Whitney GTF engine means it will see ongoing technical benefits as the engine is improved. Since initial operation of the engine Pratt & Whitney has already offered a 2% improved fuel burn update. Pratt & Whitney has told us they think a 2% improvement could come every few years as they continuously improve the engine.

Exhibit 3 Fuel Burn 1,000NM



While Airbus, also employing this engine, benefits from such progress, its A320neo design was not optimized for the GTF, which did not exist at that time. The CSeries is optimized for the GTF and will likely extract more value from each update, as the airframe was optimized for the GTF. This should allow the CSeries to slowly improve the gap against the competition over the next decade.

COMPARATIVE ECONOMICS

The CS100 and CS300, as new technology aircraft, compare favorably to both existing and re-engined models from the competition. In this section, we will detail the economic differences between aircraft in a head to head comparison based on data using the same set of assumptions provided by each manufacturer.

Operating economics¹¹ are one of the most compelling features of the CSeries, as this aircraft was designed around new technology engines and incorporates a composite wing, aluminum-lithium fuselage, and advanced aerodynamics and systems, all of which enable the aircraft to be lighter and more fuel efficient than its competition.

The CSeries was also designed for maintenance, with every line replaceable unit on the aircraft having either direct access or a maintenance door to facilitate easy line maintenance. Today's advanced electronic systems should prove more reliable than older-technologies, further contributing to lower maintenance costs. In addition, the CSeries will incorporate a health management system to provide early warning of potentially failing parts, reducing costly aircraft down time.

The CSeries is the first truly new technology narrow-body aircraft in the 110-150 seats range since the introduction of the A320 family in 1988. As such, it has more advanced technology than the A320neo, which matches the existing technologies of that time with new technology engines to only partially close the performance gap.

OPERATING ECONOMICS

The CSeries provides a "step-change" in economics for narrow-body aircraft, and significantly "moved the line" from existing aircraft at the time of its announcement. With program delays, and the A320neo beating the CSeries into operation, some of the advantage disappeared. However, a significant advantage remains with all the new technologies incorporated into the CSeries.

Fuel consumption benefits only account for about half of the improvements in CSeries, the other half come from new technologies, materials, and aerodynamic improvements that differentiate CSeries from its competition.

The economics of the CSeries are favorable when compared to similarly sized models from Airbus and Boeing, even their new re-engined neo and MAX

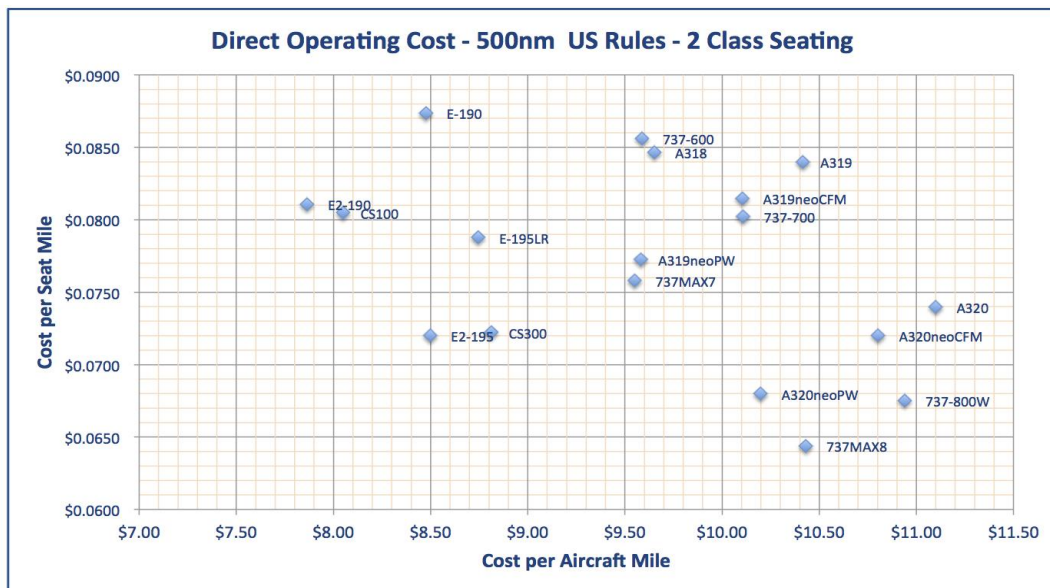
¹¹ Airlines are also compelled by cash costs; Airbus had to sell the A340-600 at 55% of the cost of a Boeing 777-300ER to offset fuel burn costs.

programs. The CS300 remains competitive on a seat-mile basis with their larger A320 and 737-800 models, but has higher seat-mile costs than the re-engined A320neo and 737 MAX8.

The C Series, originally designed for full transcontinental range, also competes against the shorter-range E-Jets and with the forthcoming E2 from Embraer, both designed for regional operations. With more limited range, these aircraft cannot fly transcontinental routes non-stop, and do not as directly compete with models from Airbus and Boeing, which can fly those routes.

The table below compares cost per aircraft mile and cost per seat mile for a 500nm mission. The E2 numbers are for the improved higher gross weight version.

Exhibit 4 Direct Operating Costs 500NM

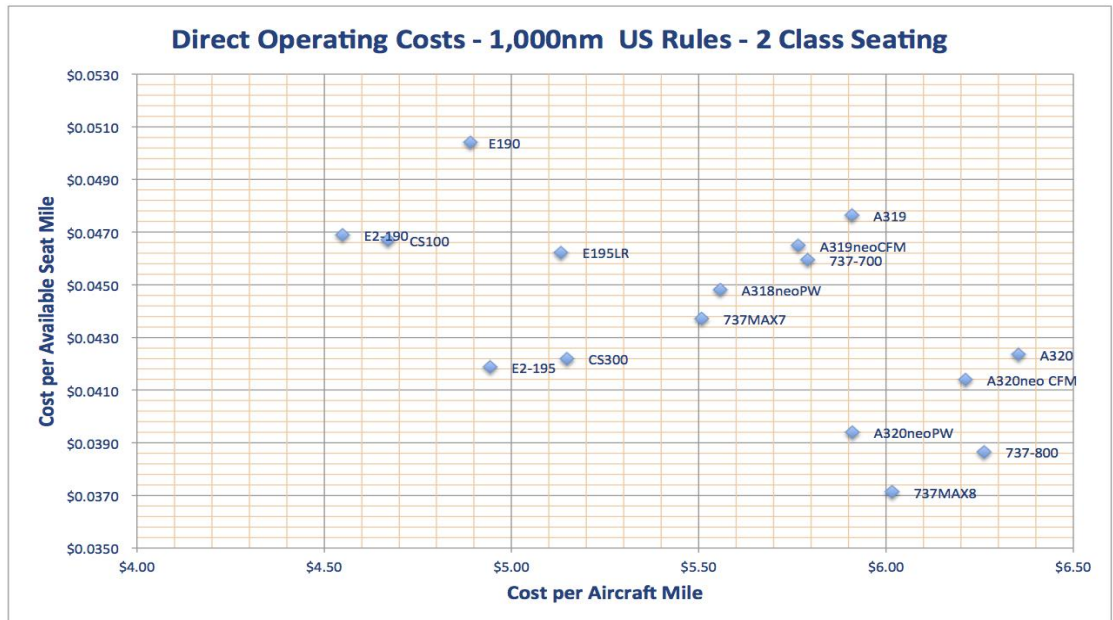


Compared to the A319neo and 737MAX7, the similarly sized CS300 provides better seat-mile costs and lower aircraft mile costs, with roughly 6-7% better economics.

It is notable that the E2 from Embraer are competitive with the C Series, particularly the E195-E2, which in a two-class configuration has slightly better seat-mile and aircraft mile costs when compared with the CS300, which would be expected given its lighter weight and more limited range.

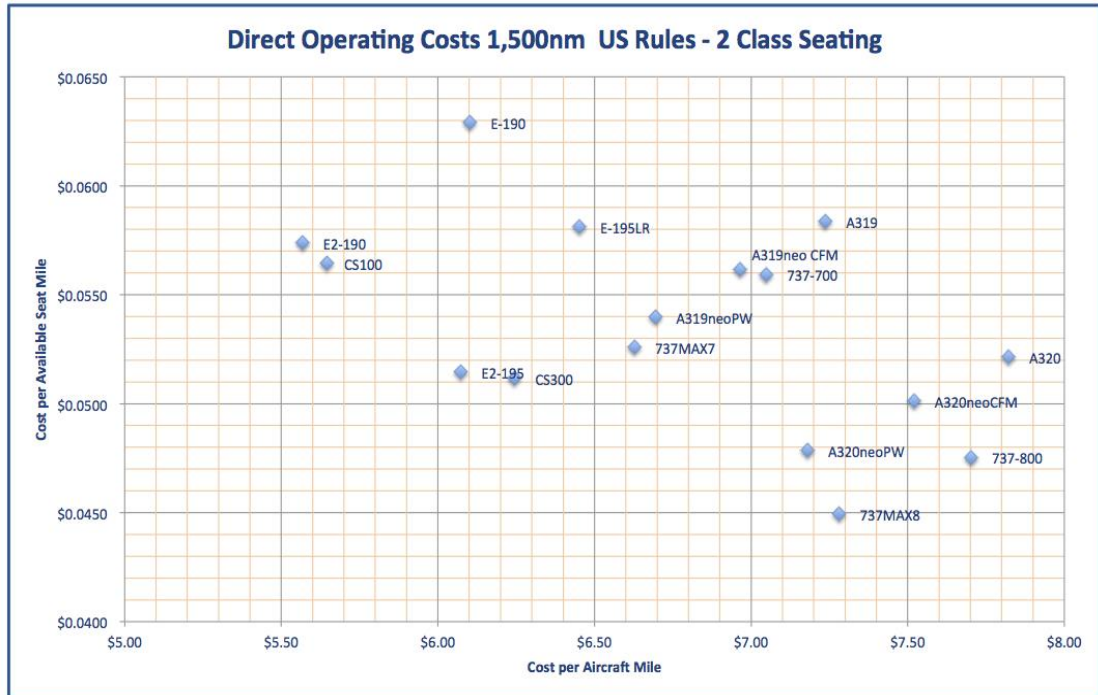
As range extends to 1,000nm, the C Series maintains strong economics. It retains its lead over the A319neo and 737 MAX7, and remains competitive with the E2 from Embraer.

Exhibit 5 Direct Operating Costs - 1,000NM



As range increases to 1,500nm, the relative economics remain similar, with the CS300 gaining a seat-mile cost advantage over the E195-E2, reversing the advantage on shorter routes, as shown in the chart below:

Exhibit 6 Direct Operating Costs - 1,500NM



Airbus and Boeing correctly worried that the C Series could take some of their mainline aircraft business. The CS300 handily beats the A319neo and 737 MAX7, and remains within 6.5% of the A320neo (P&W powered) and within 12.2% of the larger 737 MAX8 on a seat-mile basis, while beating them on an aircraft mile basis by 14.9% and 16.6% respectively.

HOW WE BUILT OUR ECONOMIC ASSUMPTIONS

We included four key elements of operating cost in our assessment: fuel consumption, maintenance cost, crew cost, and landing and other operational fees.

Fuel Cost

While fuel consumption is not the driving force it once was when fuel prices were more than \$100 per barrel, fuel use remains a key consideration in the economics of a new aircraft. The following table estimates fuel usage for the CSeries and competing aircraft for 500, 1,000, and 1,500 nautical mile missions as shown in the table below:

Exhibit 7 Fuel Cost

Fuel Cost per Mission - \$2 US per gallon			
Aircraft/Range	500nm	1000nm	1500nm
CS100	\$ 1,601.80	\$ 2,832.44	\$ 4,101.25
A318	\$ 2,068.39	\$ 3,664.93	\$ 5,328.60
737-600	\$ 2,007.85	\$ 3,518.18	\$ 5,089.71
E190	\$ 1,773.57	\$ 3,181.23	\$ 4,646.15
E2-190	\$ 1,567.58	\$ 2,769.27	\$ 4,018.33
E195LR	\$ 1,854.51	\$ 3,376.69	\$ 4,965.99
E2-195	\$ 1,705.13	\$ 3,061.46	\$ 4,465.84
CS300	\$ 1,739.35	\$ 3,114.77	\$ 4,536.91
A319	\$ 2,067.08	\$ 3,667.57	\$ 5,334.52
A319neoPW	\$ 1,867.02	\$ 3,300.35	\$ 4,786.99
A319neoCFM	\$ 1,929.80	\$ 3,399.36	\$ 4,930.60
737-700	\$ 2,026.28	\$ 3,558.32	\$ 5,166.05
737MAX7	\$ 1,840.69	\$ 3,239.15	\$ 4,681.69
A320	\$ 2,229.63	\$ 3,986.08	\$ 5,816.91
A320neo PW	\$ 2,003.24	\$ 3,570.17	\$ 5,191.72
A320neo CFM	\$ 2,063.34	\$ 3,677.27	\$ 5,347.47
737-800	\$ 2,257.27	\$ 3,995.30	\$ 5,797.82
737MAX8	\$ 2,027.59	\$ 3,609.00	\$ 5,250.94

The CS300 and E195-E2 models have a substantial lead over the comparably sized A319 and 737-700 and MAX7 models from Airbus and Boeing, and as one would expect. They are more fuel efficient than the larger A320 and 737 models. On a fuel per seat basis, the aircraft from Bombardier and Embraer are competitive with larger models from Airbus and Boeing.

The fears Airbus and Boeing had with the arrival of the CSeries appear well founded. Embraer’s successful evolution of the E-Jet to the E2 variant acts as an additional concern for Airbus and Boeing for the sub-130 seat segment.

Maintenance Cost

The CSeries was specifically designed to be easy to maintain, and its maintenance costs are competitive when compared with its contemporaries, as shown in the table below:

Exhibit 8 Maintenance Costs

MAINTENANCE COST PER MISSION			
Aircraft/Range	500nm	1000nm	1500nm
CS100	\$ 959.88	\$ 1,174.20	\$ 1,670.67
A318	\$ 1,238.98	\$ 1,536.76	\$ 2,223.73
737-600	\$ 1,275.18	\$ 1,572.79	\$ 2,285.19
E190	\$ 1,185.13	\$ 1,460.14	\$ 2,107.78
E2-190	\$ 1,037.57	\$ 1,276.82	\$ 1,884.08
E195LR	\$ 1,149.57	\$ 1,457.13	\$ 2,115.23
E2-195	\$ 1,115.22	\$ 1,366.58	\$ 1,980.51
CS300	\$ 1,054.40	\$ 1,306.21	\$ 1,870.94
A319	\$ 1,443.56	\$ 1,706.62	\$ 2,480.84
A319neoPW	\$ 1,246.08	\$ 1,556.82	\$ 2,231.84
A319neoCFM	\$ 1,444.25	\$ 1,710.55	\$ 2,482.55
737-700	\$ 1,291.64	\$ 1,603.52	\$ 2,330.03
737MAX7	\$ 1,277.76	\$ 1,559.67	\$ 2,255.63
A320	\$ 1,519.25	\$ 1,832.99	\$ 2,658.75
A320neo PW	\$ 1,303.87	\$ 1,603.47	\$ 2,328.24
A320neo CFM	\$ 1,525.55	\$ 1,840.83	\$ 2,671.08
737-800	\$ 1,399.64	\$ 1,723.22	\$ 2,489.96
737MAX8	\$ 1,349.49	\$ 1,645.46	\$ 2,379.07

The CSeries has a distinct advantage over its direct competitors from Embraer in maintenance costs, and a marked advantage over the offerings from Airbus and Boeing.

Crew Cost

Our crew cost analyses are based upon block times for each aircraft on specific routes. Our cost assumptions include \$400 per hour for flight deck personnel for smaller aircraft, and \$450 per hour for larger models. While costs vary by airline, utilizing the same assumptions provides an “apples to apples” comparison. For flight attendants, we utilized FAA requirements for the minimum number of flight attendants based on seating, and a cost of \$50 per hour.

The results are shown in the table below for a 500nm mission:

Exhibit 9 Crew Cost - 500NM

CREW COST - 500nm Mission							
	500nm	Flight Crew	FA's	FA Cost	500nm	500nm	500nm
	Block Time	per minute	required	per minute	Flt Crew	FA	Total
CS100	93.8	\$6.67	3	\$0.83	\$ 625.33	\$ 234.50	\$ 859.83
A318	92.0	\$6.67	3	\$0.83	\$ 613.33	\$ 230.00	\$ 843.33
737-600	94.4	\$6.67	3	\$0.83	\$ 629.33	\$ 236.00	\$ 865.33
E190	91.8	\$6.67	2	\$0.83	\$ 612.00	\$ 153.00	\$ 765.00
E2-190	92.3	\$6.67	2	\$0.83	\$ 615.33	\$ 153.83	\$ 769.17
E195LR	92.7	\$6.67	3	\$0.83	\$ 618.00	\$ 231.75	\$ 849.75
E2-195	92.3	\$6.67	3	\$0.83	\$ 615.33	\$ 230.75	\$ 846.08
CS300	94.2	\$7.50	3	\$0.83	\$ 706.50	\$ 235.50	\$ 942.00
A319	94.8	\$7.50	3	\$0.83	\$ 711.00	\$ 237.00	\$ 948.00
A319neoPW	92.9	\$7.50	3	\$0.83	\$ 696.75	\$ 232.25	\$ 929.00
A319neoCFM	92.9	\$7.50	3	\$0.83	\$ 696.75	\$ 232.25	\$ 929.00
737-700	94.3	\$7.50	3	\$0.83	\$ 707.25	\$ 235.75	\$ 943.00
737MAX7	93.9	\$7.50	3	\$0.83	\$ 704.25	\$ 234.75	\$ 939.00
A320	94.8	\$7.50	4	\$0.83	\$ 711.00	\$ 316.00	\$ 1,027.00
A320neo PW	93.1	\$7.50	4	\$0.83	\$ 698.25	\$ 310.33	\$ 1,008.58
A320neo CFM	95.0	\$7.50	4	\$0.83	\$ 712.50	\$ 316.67	\$ 1,029.17
737-800	95.0	\$7.50	4	\$0.83	\$ 712.50	\$ 316.67	\$ 1,029.17
737MAX8	94.4	\$7.50	4	\$0.83	\$ 708.00	\$ 314.67	\$ 1,022.67

Similarly, crew costs were estimated for a 1,000nm mission, as shown below:

Exhibit 10 Crew Costs - 1,000NM

CREW COST- 1,000nm Mission							
	1000nm	Flight Crew	FA's	FA Cost	1000nm	1000nm	1000nm
	Block Time	per minute	required	per minute	Flt Crew	FA	TOTAL
CS100	161.1	\$6.67	3	\$0.83	\$1,074.00	\$402.75	\$1,476.75
A318	159.5	\$6.67	3	\$0.83	\$1,063.33	\$398.75	\$1,462.08
737-600	161.6	\$6.67	3	\$0.83	\$1,077.33	\$404.00	\$1,481.33
E190	159.1	\$6.67	2	\$0.83	\$1,060.67	\$265.17	\$1,325.83
E2-190	159.6	\$6.67	2	\$0.83	\$1,064.00	\$266.00	\$1,330.00
E195LR	160.1	\$6.67	3	\$0.83	\$1,067.33	\$400.25	\$1,467.58
E2-195	159.6	\$6.67	3	\$0.83	\$1,064.00	\$399.00	\$1,463.00
CS300	161.4	\$7.50	3	\$0.83	\$1,210.50	\$403.50	\$1,614.00
A319	161.9	\$7.50	3	\$0.83	\$1,214.25	\$404.75	\$1,619.00
A319neoPW	160.1	\$7.50	3	\$0.83	\$1,200.75	\$400.25	\$1,601.00
A319neoCFM	160.6	\$7.50	3	\$0.83	\$1,204.50	\$401.50	\$1,606.00
737-700	161.5	\$7.50	3	\$0.83	\$1,211.25	\$403.75	\$1,615.00
737MAX7	161.1	\$7.50	3	\$0.83	\$1,208.25	\$402.75	\$1,611.00
A320	161.9	\$7.50	4	\$0.83	\$1,214.25	\$539.67	\$1,753.92
A320neo PW	160.4	\$7.50	4	\$0.83	\$1,203.00	\$534.67	\$1,737.67
A320neo CFM	161.4	\$7.50	4	\$0.83	\$1,210.50	\$538.00	\$1,748.50
737-800	162.2	\$7.50	4	\$0.83	\$1,216.50	\$540.67	\$1,757.17
737MAX8	161.6	\$7.50	4	\$0.83	\$1,212.00	\$538.67	\$1,750.67

For a 1,500nm trip, crew costs would be as follows:

Exhibit 11 Crew Costs - 1,500NM

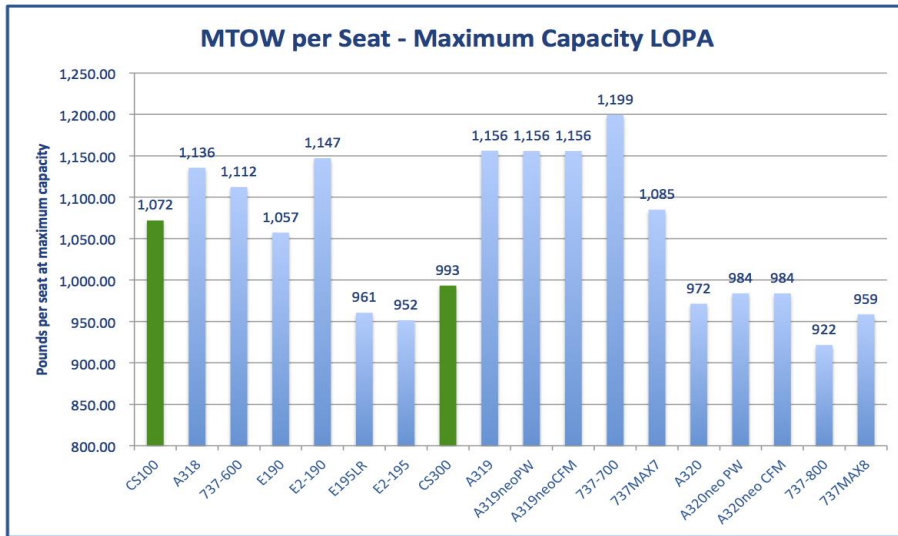
CREW COST - 1,500nm Mission							
	1500nm	Flight Crew	FA's	FA Cost	1500nm	1500nm	1500nm
	Block Time	per minute	required	per minute	Flt Crew	FA	TOTAL
CS100	228.4	\$6.67	3	\$0.83	\$1,522.67	\$571.00	\$2,093.67
A318	227.0	\$6.67	3	\$0.83	\$1,513.33	\$567.50	\$2,080.83
737-600	228.9	\$6.67	3	\$0.83	\$1,526.00	\$572.25	\$2,098.25
E190	226.2	\$6.67	3	\$0.83	\$1,508.00	\$377.00	\$1,885.00
E2-190	227.0	\$6.67	3	\$0.83	\$1,513.33	\$378.33	\$1,891.67
E195LR	226.7	\$6.67	3	\$0.83	\$1,511.33	\$566.75	\$2,078.08
E2-195	227.0	\$6.67	3	\$0.83	\$1,513.33	\$567.50	\$2,080.83
CS300	228.8	\$6.67	3	\$0.83	\$1,716.00	\$572.00	\$2,288.00
A319	229.1	\$6.67	3	\$0.83	\$1,718.25	\$572.75	\$2,291.00
A319neoPW	227.4	\$6.67	3	\$0.83	\$1,705.50	\$568.50	\$2,274.00
A319neoCFM	228.5	\$6.67	3	\$0.83	\$1,713.75	\$571.25	\$2,285.00
737-700	228.3	\$6.67	3	\$0.83	\$1,712.25	\$570.75	\$2,283.00
737MAX7	228.6	\$6.67	3	\$0.83	\$1,714.50	\$571.50	\$2,286.00
A320	229.2	\$6.67	3	\$0.83	\$1,719.00	\$764.00	\$2,483.00
A320neo PW	227.6	\$6.67	3	\$0.83	\$1,707.00	\$758.67	\$2,465.67
A320neo CFM	228.7	\$6.67	3	\$0.83	\$1,715.25	\$762.33	\$2,477.58
737-800	229.1	\$6.67	3	\$0.83	\$1,718.25	\$763.67	\$2,481.92
737MAX8	228.6	\$6.67	3	\$0.83	\$1,714.50	\$762.00	\$2,476.50

Landing, Navigation, Terminal and Environmental Fees

US and European airports differ substantially in terms of fees. European airlines pay additional fees for navigation and environmental compliance, in addition to the landing and terminal fees typically paid in the US.

Landing fees are typically based on aircraft weight. The following table compares the maximum take-off weight per seat for competing models, and shows the efficiency of the CSeries against its competitors in that regard.

Exhibit MTOW per seat



For landing fees, we utilized an average rate of \$4.50 per thousand pounds of Maximum Take Off Weight for both US and European airports. For navigation

fees, we utilized the standard Eurocontrol formula, and for environmental fees, \$.1 per US gallon of fuel burned in the European model. Our fees by aircraft for a 500nm trip are shown below:

Exhibit 12 Landings Fees - 500NM

LANDING, TERMINAL, NAVIGATION AND ENVIRONMENTAL FEES - 500nm - 2 Class						
Aircraft	Maximum	Landing &	Navigation	Environmental	US Rules	European
	Take Off	Terminal	Fees	Fees	Total	Rules
	Weight	Fees				Total
CS100	134,001.21	\$ 603.01	\$ 1,522.76	\$ 80.09	\$ 603.01	\$ 2,205.85
A318	149,914.16	\$ 674.61	\$ 1,610.64	\$ 103.42	\$ 674.61	\$ 2,388.67
737-600	143,500.92	\$ 645.75	\$ 1,575.81	\$ 100.39	\$ 645.75	\$ 2,321.96
E190	114,199.32	\$ 513.90	\$ 1,405.75	\$ 88.68	\$ 513.90	\$ 2,008.32
E2-190	123,901.85	\$ 557.56	\$ 1,464.25	\$ 78.38	\$ 557.56	\$ 2,100.19
E195LR	115,279.58	\$ 518.76	\$ 1,412.38	\$ 92.73	\$ 518.76	\$ 2,023.87
E2-195	129,411.19	\$ 582.35	\$ 1,496.45	\$ 85.26	\$ 582.35	\$ 2,164.06
CS300	149,001.45	\$ 670.51	\$ 1,605.73	\$ 86.97	\$ 670.51	\$ 2,363.20
A319	166,501.72	\$ 749.26	\$ 1,697.41	\$ 103.35	\$ 749.26	\$ 2,550.02
A319neoPW	166,448.81	\$ 749.02	\$ 1,697.14	\$ 93.35	\$ 749.02	\$ 2,539.51
A319neoCFM	166,448.81	\$ 749.02	\$ 1,697.14	\$ 96.49	\$ 749.02	\$ 2,542.65
737-700	176,323.30	\$ 793.45	\$ 1,635.08	\$ 101.31	\$ 793.45	\$ 2,529.85
737MAX7	159,497.64	\$ 717.74	\$ 1,661.32	\$ 92.03	\$ 717.74	\$ 2,471.09
A320	171,960.36	\$ 773.82	\$ 1,725.01	\$ 111.48	\$ 773.82	\$ 2,610.31
A320neo PW	174,164.98	\$ 783.74	\$ 1,736.03	\$ 100.16	\$ 783.74	\$ 2,619.93
A320neo CFM	174,164.98	\$ 783.74	\$ 1,736.03	\$ 103.17	\$ 783.74	\$ 2,622.94
737-800	174,200.25	\$ 783.90	\$ 1,736.20	\$ 112.86	\$ 783.90	\$ 2,632.97
737MAX8	181,197.72	\$ 815.39	\$ 1,770.73	\$ 101.38	\$ 815.39	\$ 2,687.50

Our overall comparative analyses are shown for US operations, in which only landing and terminal fees are included. For a European comparison, the data per 500nm can be multiplied for 1,000 and 1,500nm missions to reflect the higher rates and our tables adjusted appropriately.

CONCLUSION

The economics of the C Series are compelling. Along with the E2 from Embraer, these aircraft provide class-leading economic performance. Therefore, Airbus and Boeing have attempted to prevent Bombardier from getting a foothold in the market. The C Series is simply better than either the existing or re-engined models of similar size from Airbus and Boeing.

IV. HOW BOMBARDIER STUMBLER

No single issue or individual judgment created the deep financial hole that Bombardier must overcome. Rather, a combination of factors, including decisions by senior management, changes in the market, competitive reactions, market dynamics, failures in the supply chain, and low fuel prices changed the playing field. Each brought significant consequences for the CSeries program.

The good news is that the recent Air Canada and Delta orders have improved momentum for the program. The bad news is that, like the 787, the damage to Bombardier's reputation has been done and that only by selling airplanes will that damage be overcome.

Great airplanes normally do sell well, once operational quality is proven. The Boeing 787 is now performing well, and selling well after a difficult shake out period. We expect the CSeries to recover, though it too will take time and concerted effort.

Let's examine a few of the major factors, and what can be done to re-build confidence in the program.

PROGRAM DELAYS

Nothing kills customer confidence quicker than aircraft development programs delays, and the OEM denying it.¹² And nothing hobbles a program more than losing the first mover advantage.¹³ At the 2008 onset of the program, the CSeries was scheduled for EIS more than two years ahead of the A320neo. Airbus had not even launched the neo program. But the re-engined A320neo beat the CSeries into service.

At that time, Airbus and Boeing were trying to avoid doing anything to improve their cash-cow narrow-bodies, and airlines were encouraging Bombardier to go forward because they knew that the CSeries would be a catalyst for improvement all around. Airbus decided they could not stand still, and the fact that they could bring the neo to market by 2015 -- within the likely margin for error of the CSeries -- was a big reason for deciding for a re-engine over a clean sheet design.

In addition to narrowing, or even eliminating, the Bombardier first mover advantage, Airbus would catch Boeing off-guard and force it to reluctantly respond. Boeing were desperately trying to avoid doing anything to the 737 as

¹² Bombardier can be fairly criticized for poor management of expectations.

¹³ Industry sources confirm the Airbus neo program was a reaction to the CSeries.

they were in the throes of the 787 challenges and knew they would soon have to do something with the 777. It was a classic game theory play by Airbus and executed flawlessly.

While new aircraft program delays have become routine, the lower risk re-engining programs from Airbus, Boeing and Embraer that compete directly with the CSeries are on time, and in the case of Boeing, possibly a few months early.

The delays caused the CSeries program to miss its ideal entry into service, when oil prices were high and the competition was at least two years away from their own deliveries of updated aircraft. The delay caused crucial missed market opportunities.¹⁴

Some of the delay can be attributed to complications with the supply chain. This is the Achilles heel for any aerospace program. No OEM constructs all the parts for an aircraft in-house, and as complexity increases, Tier 1 suppliers take on larger roles in subsystem integration. The aviation supply chain is now global. The dual challenges are to ensure these vendors deliver their parts to exacting specifications, and that they are delivered precisely on time, both within the development period for certification and later at the measured pace of production.

There was clearly a management shortfall in Montréal. Bombardier's management and sales teams had been successful in regional and business aircraft, but trading in the mainline segment is vastly different. Bombardier's key decision makers believed the market would accept the CSeries as a vastly improved product and pay a premium. They thought that the aircraft would sell itself. The customers thought differently. Customer expectations among mainline airlines are different and far more demanding than among regional airlines.

The decision makers at Bombardier believed that they knew the market well. They did not, and they were not very open to listening to external voices that unsuccessfully tried to guide them. The senior leadership did not appreciate being challenged. Many members of the leadership team had insufficient aerospace experience. The sales and marketing team at Bombardier generally knew their target customers. But the leadership team believed that their own experience from other industries, the automobile industry in particular, would carry them through.

¹⁴ <http://www.independent.ie/business/irish/i-dont-buy-all-that-bullst-about-branson-iag-boss-willie-walsh-34439671.html>

THE PRICING ISSUE

It is worth taking a moment to discuss the original pricing of the CSeries. During the period the CSeries program was headed by Gary Scott there was an ongoing dialogue with the head office over pricing. Corporate leadership felt that the CSeries should be priced at a premium because the aircraft was a clean sheet design, was more efficient than the competition and thereby deserved a premium price. Accomplished aerospace people, like Gary Scott, did not believe this was going to work.

We understand that Scott repeatedly explained to Guy Hachey and Pierre Beaudoin that Airbus entered the market by “buying” its way in with aggressive deals – and he used the A320/319 sales campaign to Northwest Airlines as the example of how this deal upset that airline’s long relationship with McDonnell Douglas¹⁵. McDonnell Douglas never recovered from the loss of the airline as a customer.

In another example, Scott tried to explain the critical value of a deal with ILFC, which at that time was run by the highly respected Steven Udvar-Hazy. Once again the leadership did not comprehend the crucial value of winning a deal with ILFC and its downstream impact on future sales campaigns.

Sources indicate that this pricing debate cost the program considerable time and momentum. The small sales team had to sell the aircraft deals both internally and externally – and internal sales failures led directly to external failures, losing deals as a consequence. Early successful deals would have seen the program in a far better situation today in terms of order backlog and, crucially, momentum.

The company then hired¹⁶ Chet Fuller to lead its sales team. Fuller scattered the company’s small sales team across the globe, which reduced its ability to communicate internally. Rather than focus on a few highly influential sales, Fuller proposed CSeries sales to smaller airlines, as they would not demand big discounts. Fuller therefore played to the leadership’s desire for charging a premium price, which the market was unwilling, in most cases, to pay.

The corporate strategy to focus on geographically widespread smaller customers with high margins rather than key bellwether airlines at heavy discounting failed¹⁷. The consensus from people we spoke with was that a big marquee order was what the program needed (as Gary Scott had said more than two years before.) Lessors

¹⁵ One of this report’s authors played a role in that Airbus campaign.

¹⁶ This took 18 months after Gary Scott left the firm.

¹⁷ Smaller customers do not have the technical resources, making them high-risk customers.

want to see orders from marquee airlines, and are a key to building program momentum.

AIRBUS REACTS

Airbus naturally reacted¹⁸ to the arrival of the CSeries. Lufthansa's CSeries order shocked Airbus. We understand Lufthansa's selection of the CSeries led to talks with Airbus that started the process for the development of the neo, and selection of the Pratt & Whitney GTF engine for that program. Airbus listened to Lufthansa, and the airline went on to be the launch customer for the A320neo with the Pratt & Whitney GTF engine.

Bombardier officials spoke frequently during the CSeries development process that they had a good handle on the supply chain. After all, they said, their Q400 and Global Express business jets depended on global supply chains. They regarded themselves as leaders in managing global supply chains. Yet this became an area where the program encountered substantial delays.

Software integration, for example, was a key issue that resulted in multiple delays. Another was a partially contained engine failure that resulted in an additional six-month program delay just as other problems had been overcome.

Here again the failure rests on leadership. A false sense of security came from assuming Bombardier had learned from the 787 supply chain problems. Having an executive team with automotive experience focusing on lean manufacturing was inappropriate during the aircraft development timeframe, as there was no production line to make lean.

Moreover, senior leadership decided to start the Lear 85 and Global Express programs before the CSeries project was firmly established. This meant that personnel experienced in development and supply chain work were not available for the CSeries.

A tail wind in the regional and business jet sectors became a headwind for the CSeries going forward. The decision makers simply did not understand the market they were trading in. So, they did not understand how to tailor the supply chain.

In supply chain, failures tend to be highlighted and successes are considered normal. The fact that Bombardier was now working with a vastly more complex program, with new vendors and in a segment, that had far tighter margins of error

¹⁸ <http://www.theglobeandmail.com/report-on-business/international-business/european-business/airbus-executive-calls-bombardiers-c-series-jet-an-orphan/article28133795/>

meant that any slip up quickly mushroomed and caught the leadership by surprise. Bombardier was starting a new supply chain from scratch in many respects.

The demands were such that program management execution had to be perfect. If Airbus and Boeing failed with far larger and more complex programs, it was likely that Bombardier would, as well. Moreover, Bombardier did not understand fully how to capitalize on the leverage it held with vendors. The fragmentation of the company worked in favor of vendors who, in some cases, exploited Bombardier's naiveté.

Suppliers also understand where their bread is buttered, and their business volumes from Airbus and Boeing dwarf Bombardier. When push comes to shove, who is likely to have the lowest priority? That answer is the smaller and least important player.

Bombardier's confidence in its supply chain management was based on having key people in place that had automobile industry experience. Aerospace programs are not sufficiently like the automobile industry. Automotive executives were used to larger volumes, where small errors could be lost in the volume. Aerospace is different, and volumes are comparatively minuscule.

Michele Arcamone is one of the under-appreciated people in the story; he was a leader with automobile industry supply chain experience. His former colleagues indicate that he was the first program leader of the C Series to hold suppliers to their contracts.

CULTURE

Bombardier is Canadian and this is often overlooked as an issue. Canadians are typically not aggressive, outside of a hockey rink. Bombardier has a philosophy of treating its vendors as partners. This is normal "talk" for the industry.

But what was not normal was how the company dealt with vendor failure. Nothing was discussed publicly. The company was at pains to not "wash dirty laundry" in public. For a vendor, this provided excellent cover. But it meant every program delay reflected entirely, and exclusively, on Bombardier. It looked like the company could not manage its supply chain and inflict the necessary sanctions to improve performance. Bombardier took every hit, whether deserved or not, and refused to throw suppliers under the bus.

Current and former executives provided a range of views on this issue. One pointed out that Bombardier simply did not have the leverage of an Airbus or Boeing, who many of these vendors were used to trading with. A threat from Boeing that failure would disqualify a vendor from future work carries far greater

weight than one from Bombardier. Another pointed out that because sales were anemic, vendors were not sufficiently engaged. Yet another shared a more positive insight saying that washing dirty laundry in public and playing the blame game is a sign of weakness, so not doing it was the better option.

An example of how the vendor environment shifted is to note what happened after Airbus selected the Pratt & Whitney GTF for its A320neo program. The importance of Bombardier to Pratt & Whitney declined markedly. This was simply realpolitik. Airbus is a far larger customer than Bombardier. Bombardier did not have sufficient critical mass to force its way on vendors. This was a weakness that became apparent as delays grew and little information emerged about the cause, and solution, to those delays.

An example cited by several former senior Bombardier executives is how Pratt & Whitney related delays were poorly handled. Bombardier never stopped apologizing for the delays. Yet Airbus went through the 2015 Paris Air Show with their neo fleet grounded due to a similar issue with Pratt & Whitney and nobody said a word. The self-deprecating and “exceedingly polite” nature of the Canadian culture hurt Bombardier when contrasted with its competitor.

MANAGEMENT CHANGES

Bombardier regularly replaced key people in the marketing and sales roles. First there was Gary Scott¹⁹, then Chet Fuller and then Ray Jones before the current team that is now in place. Each individual had a unique style, but sales efforts became disrupted after each change. These changes caused consternation among customers who had to start new relationships during campaigns. The frequent management changes sent a message to the market that company management was in disarray. These changes also need to be viewed in the context of development delays, which exacerbated the perception of weakness.

The loss of Gary Scott (he retired due to a family member illness) came at a critical time for the program. He had the experience and gravitas the program needed to pull through on schedule. Senior Bombardier leadership could not credibly challenge him on anything in aerospace and production, though as we described earlier, they tried anyway.

For nearly two years after the launch of the CSeries, Bombardier did not appoint a "SVP Sales". Jim Daily had been the SVP for Bombardier Regional Aircraft (under Steve Ridolfi) but when Gary Scott took over the division, he retired. Gary Scott searched for a replacement, but the role stayed open for almost 18 months until the company brought in Chet Fuller in late 2010.

¹⁹ Jim Daily was the SVP Sales, but Gary Scott often took the role of chief salesman for the program

Kevin Smith served as an Interim SVP Sales for some time, but he never had a clear mandate and authority to do the deals Bombardier should have done at the time. Gary Scott was the closest thing Bombardier had to a sales leader, along with Ben Boehm, who was also heavily involved. Both were good at what they did - but they had a program to run and were not true commercial people who had battled in the sales trenches. Yet these two men bore the brunt of the challenge of selling, both internally and externally.

In the early days of the program, sales of the CSeries was run by competent and rational engineers who believed the product would sell itself - and thus deals were developed with a reluctance to take loss leaders. Bombardier seriously undervalued the "salesmanship" required to compete with Airbus' John Leahy, Boeing's Ray Conner and their very experienced teams.

Bombardier should have had an industry heavyweight in the sales leadership role from day one, but hindsight is 20-20. Things changed under Chet Fuller - he understood the market²⁰ - but he ended up at odds with the head office that did not believe him when he told them of the need to get more aggressive on pricing. This led to a breakdown in communications that was difficult to recover from, and Fuller left the company.

Ray Jones was then brought in to replace Chet Fuller, based on his track record with Bombardier Business Aircraft, but he was less in tune with the airline market. This was a step backwards for the CSeries program.

The CSeries program absorbed virtually all the experienced personnel and financial resources²¹ at Bombardier. The program, and the company, looked wobbly. The combination of these events and frequent leadership changes sent a signal of uncertainty to potential customers.

DISTURBING THE DUOPOLY

Bombardier undertook a daring project with CSeries. It disturbed the Airbus and Boeing duopoly. It did not matter what Bombardier thought or said about not being disruptive. Airbus (it took Boeing much longer) saw the threat and reacted strongly with all the tools at their disposal.

Disrupting the duopoly was a big risk. Any errors by Bombardier were going to be exploited to maximum effect by its competitors to inflict as much pain as possible.

²⁰ Bombardier won a surprise deal with Garuda, based on hard work by Trung Ngo, VP Sales Asia Pacific who spent four months visiting Garuda almost every day to close the deal.

²¹ Which negatively impacted the Lear 85 and other programs.

Bombardier made several unforced errors. These errors were typically made by leadership people who meant well, but did not understand the market and refused to listen to either their customers or colleagues who did.

Meanwhile Airbus and Boeing built their backlogs for competitive aircraft to records levels as skittish airlines, running from risk, ordered the neo and MAX in what became a race for delivery positions during a high fuel cost environment.

CHANGING MARKET DYNAMICS

When Bombardier first introduced the CSeries, its major competitors were the Airbus A319neo and the Boeing 737-700NG. Each of those programs sold well, as a part of a product family, as a robust market for aircraft in the 125-130 seats capacity existed. Bombardier believed it could enter that market, compete with Airbus and Boeing with a better aircraft at the low end of the market, and profitably sell the CSeries to a variety of legacy and low cost carriers around the world.

Shortly after moving forward with the program, Airbus changed the market dynamics in 2010, by introducing the A320neo family. Crucially, unlike the Bombardier leadership, they did this by listening to a key customer. This program re-engined the A320 family with new technology engines and reduced the relative advantage Bombardier had in operating economics from 22% to 11% instantly.

In addition, Airbus COO Customers, John Leahy, declared war on the CSeries, stating that Airbus would not make the same mistake that Boeing made when they let Airbus enter the market. He indicated that Airbus would compete aggressively to preclude Bombardier from getting a market foothold, and kept his word. In several campaigns in which Bombardier had gained traction, Airbus swooped in at the last minute with low price offers too good for the airline to refuse, effectively blocking Bombardier²².

Why would Airbus be afraid of competition from Bombardier? One reason is that Bombardier is expert at stretching aircraft. The CRJ, which began at 50 seats, grew to 70, 90, and finally 100 seat models. In addition, Bombardier trademarked the monikers CS500, CS700 and CS900, indicating interest in creating larger versions.

Airbus could have developed an all-new narrow-body design of its own. But with the A380 and A350 programs absorbing resources, Airbus decided to re-engine in reaction to the CSeries. It was a move unexpected by the market and, especially by Bombardier.

²² These campaigns included EasyJet and Vueling, among others

When Airbus won a large American Airlines order for the A320neo, Boeing was forced to react with its own re-engining program, the 737MAX. The narrow-body wars were on, and while Airbus and Boeing were competing with each other, Bombardier ended up in the crossfire.

A former Bombardier executive confirmed that it was the decision by Boeing, staring at a potential loss of a large order at American Airlines to Airbus, to develop the MAX that changed everything. Once Boeing decided to develop the MAX, Bombardier's strategy of avoiding Airbus and Boeing's marketing forces came undone²³. The re-engining of their aircraft was going to undermine Bombardier's plans and timeline. The CSeries competitive advantage, while still there, was cut in half and Bombardier's competitive position was threatened.

Given the efforts and scale of how Airbus and Boeing compete with each other, every target customer for the CSeries was now in play and being chased by the big duopoly. With better pricing power, greater production capacity and offering lower risk products, Bombardier was quickly eliminated from numerous competitions in which Airbus and Boeing could convince customers to upsize to larger aircraft.

UPSIZING TO COMPETE MORE EFFECTIVELY

Airbus' A319neo and Boeing's 737 MAX7 are both old-technology airplanes that do not compete well with the similarly sized CS300. With Boeing, having built the 737 since 1967 and Airbus the A320 since 1989, these two OEMs were far down the learning curve. With optimized production facilities and positive margins on their products, which they could not afford to lose, competition against Bombardier intensified. The A320 and 737 families are the "cash cows" for Airbus and Boeing.

The 150-seat A320ceo and neo has 15% more seats than the 130-seat CS300, and the 162-seat 737-800/MAX8 has a 24.6% advantage in capacity²⁴. With airlines focused on seat-mile economics, convincing airlines to upsize has been the primary modus operandi, and it has worked quite well. With higher capacity, Airbus and Boeing had airplanes to sell against the CS300 that were compelling on a seat-mile cost basis, and they offered those aircraft at low prices.

They also assured customers that for routes that would normally utilize an A319 or 737-700 the additional seats represented revenue potential and would

²³ Along with any chance of obtaining premium pricing.

²⁴ Bombardier did not effectively counter this strategy by talking about yield decline as airlines had to discount the extra seats in many markets where Airbus and Boeing aircraft were too large for certain markets.

accommodate future growth. Lower pricing typically won the day for Airbus primarily, and occasionally Boeing, in campaigns facing the CS300²⁵.

Bombardier is unable to discount the CSeries to the same level that Airbus and Boeing discount their programs. The recent Bombardier success at Air Canada and Delta demonstrates a new level of pricing aggressiveness, no doubt helped by the support of Quebec's pending investment. But this has come with a \$500 million write off to cover those lower prices on early deliveries and initial learning curve. The Air Canada order overturned Airbus and Embraer. After losing to Boeing at United, the win at Delta was especially sweet.

Program development costs need to be amortized over the fleet that will be sold, and Airbus and Boeing have long since amortized the development costs of their narrow-body aircraft families. The program costs required for a re-engining program are a fraction of those required for an all-new aircraft, and Bombardier struggled to compete on price. Moreover, Bombardier leadership thinking on pricing and the value marquee wins was, until recently, completely misguided.

We know of several campaigns, including EasyJet and Vueling, in which Bombardier was well positioned in the final stages of potential orders, only to have Airbus make the airline "an offer it couldn't refuse" – typically the larger A320 at a lower price.

It is important to point out that competition with Airbus and Boeing is not the same as competing with Embraer. If Bombardier can reposition the 100-149 seats segment as being a space that Airbus and Boeing have exited, they should do much better in a two-way competition with Embraer. The recent wins at Air Canada and Delta now place Bombardier in a position to credibly make this claim, as CSeries has outsold A319neo and 737MAX7 combined in its size class.

The performance and economics of the CSeries provide a much bigger competitive advantage against Embraer's existing E-Jets than with the MAX and neo. While the E2 comes close to matching CSeries economics, the E2 program is still in design and its E190, E195, and E175 models will not be delivered until 2018, 2019 and 2020 respectively.

Furthermore, the E2 still has challenges ahead, but as a re-engining is lower risk than a new design. Embraer is currently ahead of schedule, and does not appear to have the same schedule challenges that the other OEMs have had²⁶. Even if the E2 does well in execution - they will not beat the CSeries to production ramp up. Bombardier must to take advantage of the first mover advantage they still

²⁵ The recent order at United Airlines for 737-700s is a case in point.

²⁶ That said, Embraer has stayed on budget and on schedule. We believe they will achieve their goals.

have over the E2. Unfortunately, the current delay in obtaining an adequate number of Pratt & Whitney GTF engines to support production plans in 2016 and 2017 has slowed the ramp-up.

Embraer has a customer base with more than 750 E-190/195 models in service. Converting some of these customers, such as JetBlue and British Airways, is critical to Bombardier if it is to exploit the first mover advantage over Embraer.

MARKETING MISSTEPS

Beating the brochure is a big issue and the CSeries was the first commercial aircraft to actually beat its original brochure numbers at EIS. We were told the CSeries suffered from a “787 tax” (the program faced similar problems). Prospective customers were anticipating delays, and expected the aircraft to miss its brochure numbers. This is typically the case with an OEM, perhaps best demonstrated early in the Boeing 787 program, when the company fell well short of promised performance.

Oddly, Bombardier’s performance guarantees were significantly different to the performance numbers in marketing brochures. The guarantees were quite conservative compared to what Boeing and Airbus offered on competing products. This sent a signal that Bombardier had low confidence in the performance of its airplane, as it was unwilling to commit to the performance it was advertising. This again points to Bombardier leadership not having sufficient understanding what it took to win orders in the commercial marketplace.

As a technical achievement, the CSeries is doing what it promised to do. But the world it was designed for has changed dramatically. When the CSeries was conceived, the world was entering an era of rising fuel prices and radically reduced fuel burn was the primary issue. Bombardier deployed the Pratt & Whitney GTF engine, which not only met this goal, but also provided much lower noise and much improved emissions.

To succeed, it is not just the Bombardier sales and marketing teams that need to execute flawlessly. The customer rollout team also must perform its work without the slightest hiccups. Working closely with launch customer, Swiss, this team must ensure flight operations experience ideally no, or minimal, operational delays.

A growing source of confidence for this will be the experience Bombardier had when it conducted its own F&T tests, during which no operational delays occurred. Similarly, the F&T tests at Swiss went off without any glitches, and to date, EIS has gone well, with strong dispatch reliability and only a handful of technical issues that have now been resolved.

This demonstrates the aircraft appears to be technically ready for its task. But real world airline operations do push the aircraft into yet uncharted territory. Bombardier's support teams, along with those from Pratt & Whitney, must ensure a dispatch reliability of 99% at minimum, and improving with time. This is the benchmark number to watch for in the period after EIS, and is currently being met.

V. MARKETS: IN OR BETWEEN SWEET SPOTS

Bombardier, which is well positioned in the regional jet market, decided to upsize and compete with the low end of the market dominated by Airbus and Boeing. This was not a poor decision, as Airbus and Boeing had aircraft in the segment that were seeing slowing sales. Moreover, the comparable Airbus and Boeing aircraft have a substantial performance gap vis-à-vis CSeries.

But during the time Bombardier envisioned for its own product development and first delivery, some two years late, the market moved and the competitive environment changed completely - leaving Bombardier with an aircraft that was larger than regional airlines needed and smaller than what made sense for many major airlines. We understand that several airlines had asked Bombardier for a larger CS500, and preferred a family of three models rather than two.

Do we believe this move is permanent, and that the CSeries will always be between two markets? No, we don't. But Bombardier missed a potential wave of orders when more than 7,000 narrow-body aircraft were ordered between Airbus neo and Boeing MAX models between 2010-2014. The big two OEMs upsized the market to better compete with new technology aircraft like the CSeries on seat-mile economics, and aggressively discounted those aircraft, with discounts routinely at or above 50% of list price.

Being "in between" these markets left Bombardier as a niche player in the short-term, finding customers who need specific capabilities, or those willing to risk investing in a new technology product. While Bombardier has secured orders from four marquee customers, the remainder of its customer base is a hodgepodge of carriers with unique requirements (e.g. Odyssey and Porter) and smaller, or new, carriers that bring different risks (Saudi Gulf, Atlas, Iraqi), and leasing companies, of which only Ilyushin Finance has announced potential customers, despite nearly seven years since the first lessor committed to the program. We should point out that another leasing company customer, Macquarie, indicated to us interest in acquiring more CSeries aircraft.

A list of CSeries current customers follows, listed by firm orders and letters of intent. It is telling that some letters of intent inked in 2011 and 2012 have not yet been converted to firm orders, but remain listed as commitments by Bombardier. That length of time to convert and LOI indicates to us that no commitment exists.

Unfortunately, only four large bellwether customers have firm orders, and many analysts perceive that Bombardier still lacks the critical mass it needs for success because of the risks associated with its customer mix. Commercial aerospace is all about economies of scale and critical mass. Our opinion is that the aircraft is well

positioned and that the new management team understands how to sell the aircraft, leading to positive results.

Exhibit 13 C Series Program Orders

BOMBARDIER CSERIES PROGRAM								
FIRM ORDERS								
Date	Airline	CS100	CS300	Undecided	TOTAL	Options	Purch Rts	Maximum
3/10/09	Lufthansa for Swiss	30	0	0	30	30	0	60
3/30/09	LCI	3	17	0	20	20	0	40
2/25/10	Republic	0	40	0	40	40	0	80
6/1/11	Brathens for Malmo	5	5	0	10	10	0	20
6/7/11	Undisclosed	3	0	0	3	3	0	6
6/20/11	Gulf Air	10	0	0	10	6	0	16
6/24/11	Odyssey Airlines	10	0	0	10	0	0	10
7/29/11	Korean Airlines	0	10	0	10	10	10	30
1/19/12	PrivatAir	5	0	0	5	5	0	10
12/20/12	airBaltic	0	10	0	10	0	10	20
3/31/13	Undisclosed	-3	0	0	-3	-3	0	-6
6/4/13	Ilyushin Finance Co.	0	32	0	32	10	0	42
12/4/13	Iraqi Airways	0	5	0	5	11	0	16
1/16/14	Al Qahtani for Saudi Gulf	0	16	0	16	10	0	26
2/9/14	airBaltic	0	3	0	3	0	-3	0
7/14/14	Falcon Aviation Services	0	2	0	2	0	0	2
9/26/14	Macquarie Air Finance	0	40	0	40	10	0	50
6/15/15	Lufthansa for Swiss	-10	10	0	0	0	0	0
4/12/16	airBaltic	0	7	0	7	0	-7	0
2/17/16	Air Canada	0	45	0	45	30	0	75
4/28/16	Delta Air Lines	75	0	0	75	50	0	125
TOTAL FIRM ORDERS		128	242	0	370	242	10	622
LETTERS OF INTENT NOT YET FINALIZED								
Date	Airline	CS100	CS300	Undecided	TOTAL	Options	Purch Rts	Maximum
11/5/11	Atlas Global	0	10	0	10	5	0	15
7/8/12	CDB Leasing Co	5	10	0	15	15	0	30
4/10/13	Porter Airlines-conditional order	12	0	0	12	18	0	30
7/12/14	Falko Regional Aircraft	24	0	0	24	0	0	24
7/14/14	Zhejiang Loong Airlines Co.	20	0	0	20	0	0	20
7/14/14	Air Arabia Jordan	2	0	0	2	2	0	4
7/16/14	Undisclosed African Airline	0	0	5	5	0	0	5
7/16/14	Undisclosed Existing Customer	0	7	0	7	0	6	13
3/17/15	flymojo	20	0	0	20	20	0	40
TOTAL LETTERS OF INTENT		83	27	5	115	60	6	181
GRAND TOTAL		211	269	5	485	302	16	803

Can Bombardier generate enough sales to break even? We believe they can, and have the potential to exceed that substantially. But will it happen during the next two to three years? Chances are it will take longer to generate the required number of orders needed, as Bombardier needs another bellwether customer²⁷. Financing the company through that period will be a difficult task.

Every aircraft program has a breakeven number, and the path to that aircraft is challenging. Airbus won't reach the real breakeven number on its A380 for a long

²⁷ The Delta Air Lines campaign was a crucial win, maintaining program momentum.

time, if ever. Boeing's breakeven number on the 787 is now well over 2,000. But Airbus and Boeing can afford that bet, given the strength of their balance sheets and broad range of aircraft. Bombardier has a more difficult time, with more limited resources.

Bombardier cannot change the environment to better the CSeries, but it can change its approach to marketing and sales. With a leadership team with the aerospace insight that understands what it takes to support and enable teams to win deals, it can work with airlines and lessors to develop a compelling offer.

An example of this is a target customer, like Air Lease Corporation (ALC). While Bombardier needs to win airline deals, an influential lessor like ALC wants to ensure that there is a lot of interest in the product from airlines. As one executive suggested, ALC's own leadership needs to see at least three marquee airlines as direct customers prior to making their own commitment²⁸. Marquee customers validate a program, which is why they are so valuable. With four marquee brands as customers, the CSeries is now in a far better position to attract more attention from key lessors like ALC.

Fortunately, Bombardier has already signed four leasing companies, LCI with 20 aircraft, Ilyushin Finance for 32, Macquarie for 40, Falco for 24, and CDB leasing for 15. While the latter remains an LOI, 92 of the 370 firm orders are with leasing companies, who need to be confident that they can place these aircraft with customers. These lessors clearly perceived a market for the CSeries or would not have ordered the aircraft.

²⁸ Once again reinforcing the importance of winning Delta.

VI. OUTLOOK FOR THE PROGRAM

Bombardier has a new management team in place. This new team has the depth and breadth in commercial aerospace experience to work through the challenges the program faces. While the difficulties have been formidable, they are known and understood by this team. Crucially, the new leadership has the industry relationships, and they have the credibility and resources to aggressively pursue deals. The recent wins at Air Canada and Delta reinforce this.

As explained by one of the new team leaders, Bombardier needs to “...create recognition and momentum through sales to respected and recognized airlines. While those orders do not have to be very large, unlike Boeing and Airbus, they must be to airlines that will generate confidence through their endorsement of the product, and could even often provide a significant maintenance and training presence.

Bombardier needs to find such airlines in all continents, beginning with the North America market (Air Canada + Delta), then Europe (Swiss + at least one other), then Asia and/or Middle East (Korean + 1 other). Ultimately Bombardier plans to add a recognized customer in each of Africa and Latin America should economic conditions permit. That means the sales team must make five sales to major customers in short order to build program momentum. That isn’t easy to do without the freedom to “buy” a few orders through exceptionally low pricing, which will likely be required in facing competition from Airbus and Boeing.

Following these conquests, Bombardier plans to build momentum by increasing penetration of the leasing company market to utilize those lessors as distribution channels to expand the operator base.”

The strategy is clear. There is a mission that is well defined and understood. The first two majors have been sold. The people who must execute on this strategy know whom the key players and executives are that they need to focus on.

At the 2015 ISTAT Americas event, ALC’s Steven Udvar-Hazy was asked about the CSeries. His reply was that Bombardier needed to focus on landing marquee airline customers. He was right, and the new management team both understands this and has incorporated it into their strategy.

OIL PRICES IMPACT THE MARKET

The prospects for the CSeries are not without challenges. With low fuel prices, the CSeries advantage over the re-engined models it competes with is diminished on a dollar, rather than fuel used, basis. The current low fuel prices provide airlines an incentive to keep older aircraft longer, and works against Bombardier in the short-term. But with a double-digit difference in fuel burn, even at low fuel prices the CSeries remains attractive. However, even the most optimistic forecasters anticipate current low oil prices to slowly rise after a multi-year period of stability. Rising oil prices will help one of the key value propositions for the CSeries.

COMPETITIVE ENVIRONMENT IS CHANGING

Airlines can obtain larger aircraft from Boeing and Airbus at what is essentially the same price of the smaller CSeries, this can be more profitable - if they can fill the seats²⁹. Across the industry, consolidation has led to record load factors, which means the likelihood of filling the larger aircraft are high. Bigger narrow-body aircraft have been popular, given record order levels for A320neo and 737MAX8. Yes, these aircraft are more expensive to operate. But a few million dollars in lower pricing can purchase a lot of fuel, and can easily make up the difference in operating costs.

In 2015 and 2016, orders of larger narrow-bodies slowed, and right sizing appears to be the newest metric in fleet planning. Nonetheless, while this favors Bombardier, Airbus and Boeing are experts at pricing to the point of economic indifference, and Bombardier is learning how sharp their pencils need to be. The win at Delta demonstrates Bombardier is now willing to match pricing for marquee deals.

Airbus and Boeing are sitting on record backlogs. There are rising expectations that the single-aisle aircraft market is headed for a bubble. If and when such a bubble bursts, what does this mean for Bombardier? Airbus and Boeing are still committed to production increases. It would appear to us that a bursting bubble will create negative market conditions for all OEMs, but will hit Airbus and Boeing much harder than Bombardier.

ORDERS AND DELIVERIES FOR 100-149 SEAT AIRCRAFT

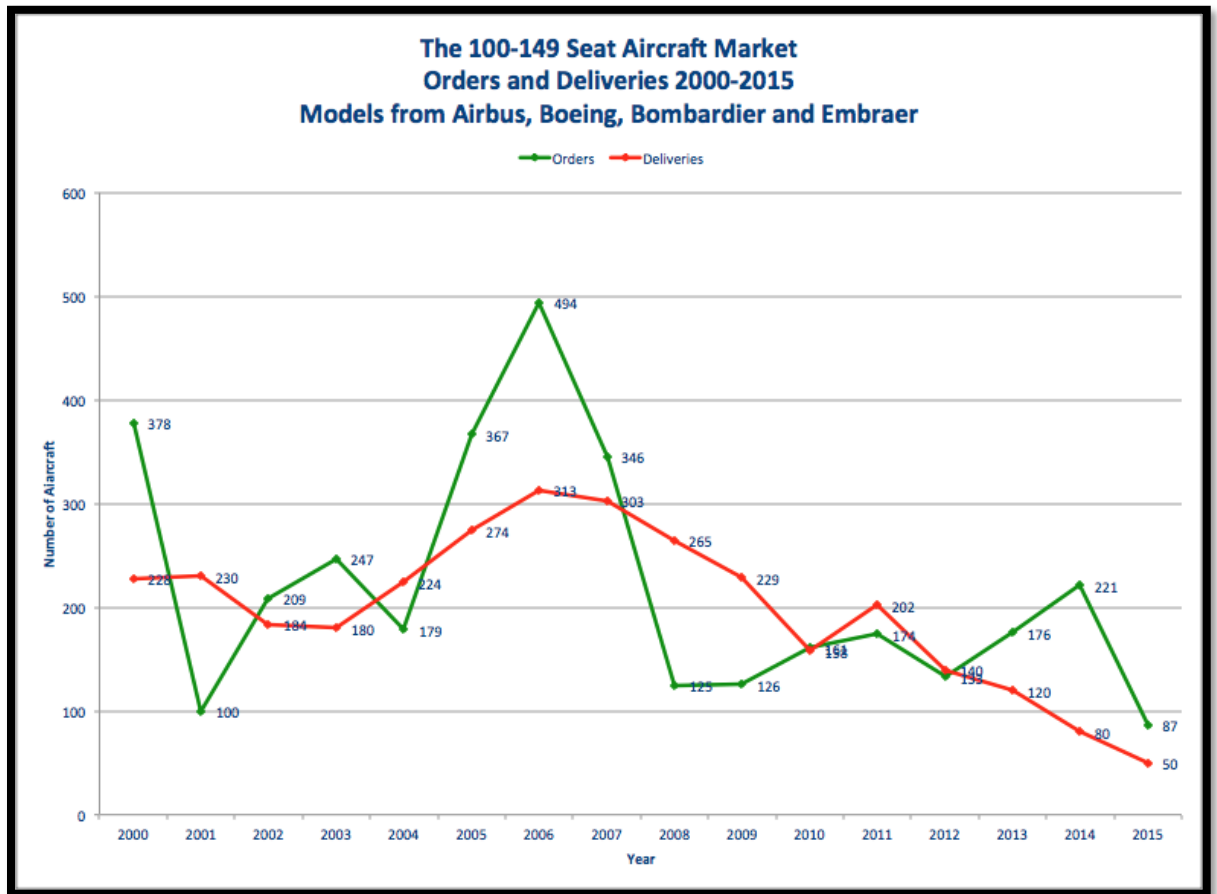
Over the past 15 years, the 100-149 seats aircraft market has seen a dramatic drop off in both orders and deliveries, as shown in the following chart. This has largely been a result of airlines moving up to larger models from Boeing and Airbus, with the 737-700 being supplanted by the 737-800 and MAX8, and the A319 and

²⁹ Load factor may be high, but as we increasingly seeing, many seats have been discounted, impacting overall yield.

A319neo being supplanted by the A320 and A320neo. An argument can be made that the shift was driven by rising oil prices.

The following chart shows orders and deliveries for aircraft in the 100-149 seats category from Airbus, Boeing, Bombardier and Embraer.

Exhibit 14 100-149 Seats Market



It is notable that while there is a sharp drop-off in deliveries from 2008-2015, orders exceeded deliveries in the last three years, as customers appear to be waiting for new technology aircraft, including the CSeries and E2 Jets, to be delivered. Plus, in early 2016, agreements for 75 CS100s from Delta Air Lines and 45 CS300s from Air Canada provide additional momentum to Bombardier, as orders for this segment already exceed those generated in 2015. During this quarter, United Airlines also ordered 65 737-700s that are older technology aircraft in this size category.

There are currently six new technology models in this segment from the major OEMs that have not yet delivered an aircraft: The Airbus A319neo, the Boeing 737

MAX7, Bombardier’s CS100 and CS300, and Embraer’s E2-190 and E2-195. The current order book and backlog for each program stands as follows:

Exhibit 15 OEM orders & market share

Aircraft	Firm Orders	Market Share
Airbus A319neo	50	8.2%
Boeing 737 MAX7	60	9.8%
Bombardier CS100	128	21.0%
Bombardier CS300	197	32.3%
Embraer E-190 E2	85	14.0%
Embraer E-195 E2	90	14.7%
Total	610	100.0%

The CSeries has the market share lead among the six new technology models from the big four manufacturers in this segment. We expect Bombardier and Embraer to continue to share the market lead, as the A319neo and 737 MAX7 are approximately 10% less efficient than the offerings from Bombardier and Embraer. Moreover, Boeing has decided its initial MAX 7 was ineffective and revised the design, adding 12 seats. We expect, long-term, that Bombardier and Embraer will share 75-80% of this segment (about 82% today) and that sales will be relatively equal between the two manufacturers.

GROWTH AND REPLACEMENT

Air traffic continues to grow globally at a rate close to 5% per year, which, when combined with replacements, provides a robust forecast for the aircraft market over the next 20 years. The 100-149 seat market is one that has historically been strong, then became weaker in recent years as new orders moved to larger aircraft, and is now seeing a resurgence as many 70-100 seat aircraft are being replaced with newer 100-110 seat models.

However, as airline competition intensifies, narrow-body operators will likely opt for the better seat-mile economics of larger aircraft for many routes currently served by 100-149 seat aircraft, in particular, those airlines flying A319 and 737-700 aircraft. Thus, we expect growth in this segment to be slower, at approximately 2.5%, as some operators migrate to larger aircraft. This would mean that today’s fleet of roughly 4,000 narrow-bodies from the four major OEMs in this segment will likely grow to approximately 5,500 to 6,000 aircraft by 2035.

Historically, the 100-149 seat market was the mainstay of major airlines. To date, 1,472 Airbus A319s and 1,147 Boeing 737-700s have been delivered and nearly all remain in operation with major airlines worldwide. However, most of those aircraft will need to be replaced over the next two decades. We believe that at

about 70% of those aircraft will be replaced by those of similar size, contributing 1,310 aircraft of the 5,000-6,000 total we project. Our projected aircraft delivery forecast by model in this segment is as follows:

Exhibit 16 AirInsight OEM Forecast

AirInsight Forecast							
100-149 Seats	Projected New Technology Aircraft Deliveries 2016-2035						
Year/Type	737 MAX7	A319neo	CSeries	E-190/195 E2	797-7	A360-800	TOTAL
2016	-	-	12	-	-	-	12
2017	-	10	30	-	-	-	40
2018	30	20	60	15	-	-	125
2019	30	20	90	45	-	-	185
2020	10	15	120	90	-	-	235
2021	15	20	120	120	-	-	275
2022	20	15	120	120	-	-	275
2023	15	20	120	120	-	-	275
2024	20	15	120	120	-	-	275
2025	15	20	120	120	-	-	275
2026	20	15	120	120	-	-	275
2027	15	20	120	120	-	-	275
2028	20	15	120	120	-	-	275
2029	15	20	120	120	-	-	275
2030	20	15	120	120	50	50	375
2031	-	-	100	90	75	75	340
2032	-	-	80	75	125	125	405
2033	-	-	75	70	150	150	445
2034	-	-	70	60	175	175	480
2035	-	-	65	50	200	200	515
Total	245	240	1,902	1,695	775	775	5,632

Our mid-point forecast calls for roughly 2,161 CSeries aircraft to be produced over the next two decades. This should provide the critical mass of aircraft necessary for the program to generate profitability assuming competitive conditions allow Bombardier to sell the aircraft at reasonable pricing.

PROVINCIAL INVESTMENT

The Quebec investment into the CSeries program was a creative win-win solution for Bombardier’s tightening cash position. It appears that federal Canadian

government support may also be forthcoming³⁰. The increased capital available to Bombardier should enable it to chase after orders far more aggressively than when the program began. The successful Air Canada and Delta campaigns are examples of that aggressiveness.

The CSeries team now must focus on every opportunity that comes its way. The team knows it must face off against Airbus and Boeing, and that Embraer's E2 has completed its rollout.

One of the lesser-discussed aspects of the government support is the Canadian concerns about losing Bombardier and its thousands of high-skilled jobs. Indeed, one of the executives we spoke with believes the capital structure of the company is an advantage for the governments. This ensures that no unfriendly takeover can occur. The primary concern here is China. Buying Bombardier would provide any of the large and growing Chinese aerospace firms with overnight access to tremendous aerospace IP. Finally, there are potential issues of facing WTO complaints when state and federal funding are provided. We know that Embraer is likely to file a protest.

MARKET OPPORTUNITIES

We have described how Bombardier is now clearly in open competition with the larger OEMs for every potential order. But where do the opportunities lie? Airlines and lessors come to the market on a regular basis to refresh fleets. But what happens when the demand for air travel is stable and global economies are growing?

The key to future travel demands is China and India. China is developing its own commercial aerospace industry and its airlines and leasing firms are encouraged to buy local. Fortunately for Bombardier, the Chinese aircraft are either uncompetitive (ARJ21) or larger (C919). The CSeries could fit between these two aircraft. The decision to use AVIC as a vendor was taken in part because it was thought this would open the market to orders. This has not happened. Whether China becomes a significant market for CSeries remains an open question.

India has no domestic commercial aerospace industry to protect. Both these countries are expected to offer robust demand for air travel. India could be a market given its many smaller airports. But India is a difficult market to trade in. Bombardier has seen some success with the Q400 at SpiceJet.

There are other areas of interest. Among the options for Bombardier are Iran and Russia. While Russia has the Sukhoi Superjet and Irkut MC-21 coming, the CSeries

³⁰ <http://www.theglobeandmail.com/news/politics/ottawa-mulls-options-to-give-bombardier-financial-boost/article28124937/>

could fit well between them, but Russian airlines lack the capital to invest due to sanctions over Crimea and low oil prices. This has also crimped plans at CSeries customer, Ilyushin Finance. The Russian options are limited for the foreseeable future. The Q400 production move to Russia was also interrupted by politics. Again, this is unfortunate timing for Bombardier.

Fortunately, as these emerging markets attract attention, there are other much closer markets that are worth more attention. Bombardier's current customer base is heavily focused on North America. The CSeries is the right aircraft for this market.

Bombardier should target E190 operators who are struggling with the aircraft, and develop some high visibility "take outs". Even though the E-Jet has sold well, ten years on, we know that there are some airlines that are unhappy with the way the aircraft is aging prematurely. We have heard reports of the high cost of maintenance - and with Embraer switching engines to Pratt & Whitney, GE will make the CF34-10 a cash cow and will not be giving any favors when it comes to engine overhaul costs³¹. Bombardier should strike hard at some early E-Jet customers. Suggestions include COPA, JetBlue, LOT, BA Cityflyer, and some of the Middle Eastern operators (Royal Jordanian, Saudia, Egypt).

For a niche operator, like Toronto-based Porter, the aircraft provides the best solution for an ambitious route expansion. However, politics seems to be crimping this as it is unclear that Toronto's Billy Bishop airport will see its runway extended. Were the runway to be extended, and Porter to take delivery of its CS100s, the aircraft's disruptive potential will be immediately clear for all to see.

Delta Air Lines was among the very first targets when its Northwest Airlines operations had to replace many aging DC-9s. Northwest was reported to be very interested in the CSeries³². Even though the DC-9s were retired and replaced by 717s, Delta remained a target. The recent order announcement was a momentum-changing event for the CSeries program.

Another operator of competitive replacement aircraft is American Airlines. While the airline is in the midst of a big fleet refresh, it might not replace all its MD-80s with 737s. Moreover, its A319s, most of which were acquired from the merger with US Airways, are unpopular with the airline's fleet management. The CSeries might be a contender for the 120-150 seat fleet replacement³³.

United Airlines did consider the CSeries. There are rumors that United has a deal with Boeing that limits its freedom when selecting single-aisle aircraft. The airline

³¹ Which also has implications for Bombardier's CRJ program.

³² Northwest Airlines, along with Lufthansa, was a major advisory airline to Bombardier on the CSeries.

³³ Though we also expect Boeing to be aggressively marketing its redefined MAX7.5 to the airline.

recently made a significant order for 737-700s. Boeing was not amenable³⁴ to allowing the CSeries in to the fleet at United. Boeing bought the United order and any objective review of this deal demonstrates Boeing's weak hand. It was a deal driven by desperation pricing.

In other marquee airline opportunities, we are aware that British Airways not only has considered the CSeries before, but still considers the aircraft a viable option. British Airways has several A319s and E-Jets that it will replace and is unlikely to select the A319neo, which has seen little market interest. Indeed, we would not be surprised to this airline as the next marquee customer.

Finally, another large A319 operator is Lufthansa³⁵. Having already selected the CSeries for its Swiss subsidiary, it is likely to look favorably on the CSeries when it starts to retire its fleet of A319s. Lufthansa has several airlines that fall under its management. Moreover, Lufthansa has 30 options it has yet to exercise. We believe these will be converted to orders to ensure the airline has favorable delivery slots after the large Delta order.

THE POTENTIAL IMPACT OF A STRETCHED CS500

Should Bombardier choose to offer a stretched CS500, it would place Bombardier in direct competition with Airbus and Boeing in the heart of the narrow-body market, and the 150-170 seats segment that has generated many aircraft sales in recent years. We believe that Bombardier could achieve an additional 800 plus sales were it to offer a CS500. That aircraft would likely be more efficient than either the A320neo or 737 MAX8. Our estimates are that a CS500 might provide economics approaching the A321neo with lower seating capacity. Given the lead time to develop an additional variant, we would expect a CS500 might have a realistic production run of approximately 10 years before new models from Airbus and Boeing are announced in the 2025 timeframe to enter service by 2030. These new models would take advantage of technology improvements and likely eclipse the CSeries in performance and economics at that time.

Currently, the A320neo and 737 MAX8 count 3,312 and 2,654 orders between them in backlog. The 5,966 aircraft on firm order are about the same size as our forecast for the entire 100-149 seats market through 2035. Penetrating this larger market sector, which is likely to see deliveries of 17,000 units through 2035, with even a 5% market share for Bombardier could yield 800 aircraft, and a 10% market share 1,600 aircraft.

³⁴ <http://www.wsj.com/articles/boeing-beats-out-bombardier-embraer-for-coveted-united-orders-1456160980>

³⁵ Lufthansa has not exercised all its 30 options on CSeries. Plus, it has several target replacements among its airline group.

We believe that Bombardier could achieve a 5% penetration in that market due to factors such as commonality for existing CSeries customers, and secure a niche for a larger aircraft that would achieve additional sales for a modest investment. It is our view that a CS500 would be an attractive aircraft against Boeing and Airbus, and provide a natural growth path for CSeries customers.

We understand that Delta Air Lines, among others, is interested in a CS500. If Bombardier is to move, they need to do so quickly, so that the aircraft would be available in the 2021 timeframe, providing ten years of potential production before being leapfrogged by new clean-sheet aircraft from Airbus and Boeing.

VII. CONCLUSIONS

AirInsight believes that the CSeries program has finally reached a position in which it is poised for success. The disappointments of the early history of the program have been replaced with optimism at Entry into Service, and the new management team appears capable of executing its strategy.

The road ahead for the CSeries and Bombardier will not be easy. The company faces tough competition, but with an investment from Quebec and the aircraft performing better than expected, we remain optimistic that many of the prior problems can now be overcome.

Our judgment is that the program can become a success, and should deliver between 1,900 and 2,400 aircraft over the next two decades, and potentially 800 to 1,600 more should a CS500 model be added.

The challenge for Bombardier has moved from aircraft development to sales and support. The new management team appears ready for the challenge. But execution needs to be on-point and excellent, which has not always been the case with the program.

But if the following events occur in 2016, the future will look bright:

- EIS at Swiss and Air Baltic go smoothly;
- Another bellwether customer is signed, in Europe or Asia;
- Leasing companies begin to sign new customers;
- Existing options begin to be executed to ensure delivery slots;
- The order book grows to more than 425 firm orders by year-end.
