

Who will buy the C Series?

October 2017

History of the program

Airbus recently paid one Canadian dollar for a 50.01% stake in Bombardier's CSeries. This paper examines the addressable market for the aircraft.

Entry into service was not smooth for the CSeries with various reports of overrunning costs. However, some financial assistance from the Canadian government and two landmark orders from Delta for 75 aircraft and from Air Canada for 45 aircraft, secured the immediate future of the program.

Today, both the CS100 and the CS300 variants are now in service with launch customers Swiss (CS100) and Air Baltic (CS300). Swiss has now also accepted the larger CS300 variant into its fleet.

Further challenges followed. Despite the reprieve of those large orders, Embraer challenged the support afforded to Bombardier by its home government as anti-competitive and sought to challenge Bombardier through the WTO.

More recently, the US Department of Commerce (DoC) has levied a tariff on the import of the CSeries aircraft, essentially tripling its price, again citing anti-competitive practice in relation to pricing.

The decision surprised many, including Delta Air Lines, the CSeries' biggest customer. On one hand the DoC was protecting Boeing, but only to hurt one of its major carriers. Delta Chief Exec, Ed Bastion, was clear on Delta's stance, refusing to pay the tariff.

In what many are calling a coup, Airbus took control of the CSeries program and committed to build the aircraft at its Alabama plant to potentially swerve the tariffs. Others might argue Boeing is still the long term winner assuming it will still only face one competitor in the sub 140 seat market as Airbus is unlikely to support two aircraft.

Putting aside any competitive manoeuvring, just what is the market for the CSeries and how will the Airbus deal increase sales.

The 100-150 seat market

According to IBA.iQ, there are currently around 4,600 aircraft with typical seating for 100-150 passengers. Aircraft in this category comprise both narrowbody and regional jet aircraft types. With their respective A320 and 737 families of narrowbody aircraft, Airbus and Boeing share around 70% of this market. Boeing has the largest share in terms of installed fleet, due to the former success of its older 737 Classics generation of aircraft. As such, 40% or around 1,840 aircraft of typical 100-150 seat configuration are Boeing products. Airbus has a 31% share of this market in terms of installed fleet. This goes some way to explain the reason Boeing has been so protective of this market of late, as it appears it has the most to lose.

Airbus and Boeing have both been successful in the 100-150 seat capacity segment. The current total fleet size of Boeing 737-700s, including active and parked aircraft, is 1,090 according to IBA.iQ and the Airbus A319-100 has a current fleet size of 1,363.

Looking forward to the new generation families of narrowbody aircraft from Airbus and Boeing, the Airbus A319neo and Boeing 737 MAX 7 have attracted little attention in the market compared to their

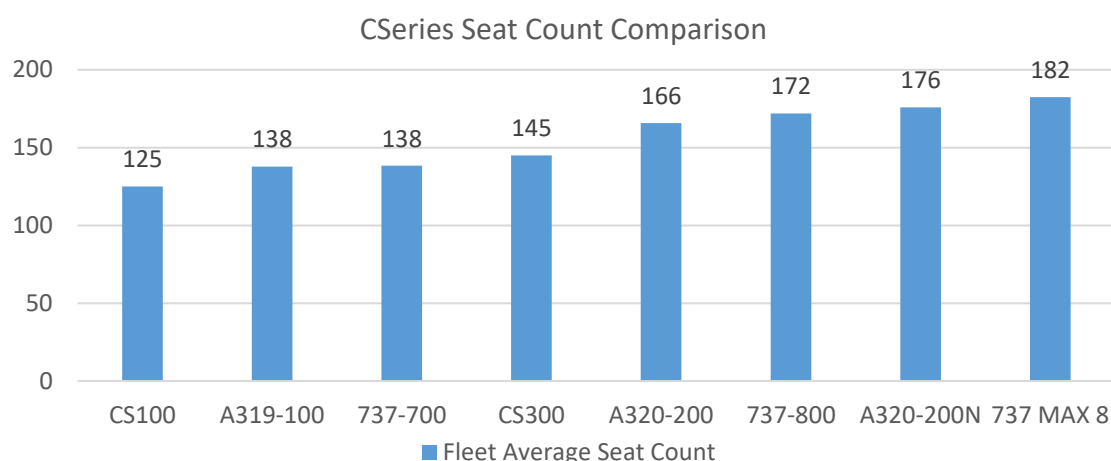
predecessors and sales figures have been lacklustre. Boeing has stretched the 737-700 to make the MAX 7, yet this has failed to translate into more orders.

IBA has seen an upswing trend in the narrowbody market in recent years, particularly in terms of new orders. The larger Airbus A321-200 has grown in popularity and the established Airbus A320-200/A320neo and Boeing 737-800/MAX 8 aircraft remain the most commonly ordered models. However, carriers which employed the smaller 150 seat Airbus A319-100 and Boeing 737-700 have upgauged to the A320-200/B737-800 sized aircraft.

Looking at the incoming generation of narrowbodies, both the A320neo and 737 MAX families are focussed on the A320neo / 737 MAX 8 size and upwards. So considering the CS100 and CS300 models from Bombardier, which are very much in the 100-150 seat space, they do not appear to be competing head on with the mainstay of Airbus and Boeing’s product ranges.

IBA.iQ records that both Swiss and Air Baltic have each configured their CS300 aircraft with 145 seats. Swiss has opted for a 115 seat economy class at 31” pitch, with 30 business seats at 34” pitch. Air Baltic has a single class layout however at 32” pitch. These seat counts are very much in 737-700 and A319-100 territory. The average seat count for an Airbus A319-100 or Boeing 737-700 is around 138 seats according to IBA.iQ.

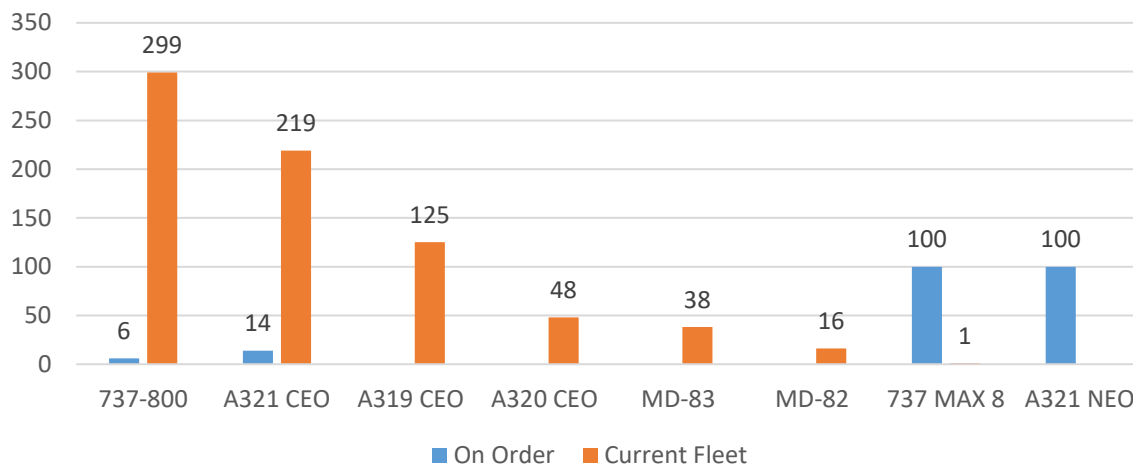
Comparing these figures with the Airbus A320ceo and the Boeing 737-800, we find a much higher average seat count of around 166 for the A320ceo and 172 for the Boeing 737-800. Considering the shift in demand toward the A321neo in recent years alongside the launch of the Boeing 737 MAX 10, it is difficult to see the CSeries as a direct competitor to the heart of the Boeing 737 MAX family or the Airbus A320neo family in its current form. This is particularly true as the early deliveries of the A320neo and 737 MAX 8 appear to be pushing the average seat counts higher still. It is still early in the program however and many of the early neo and MAX deliveries have been to LCC customers.



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The operators with the largest fleets of A319ceo aircraft are easyJet and American Airlines. Although there is a large fleet with United Airlines of 63 units. None of these carriers have a backlog in the traditional 100-150 seat market segment.

American Airlines Narrowbody Fleet - Current Active and On Order

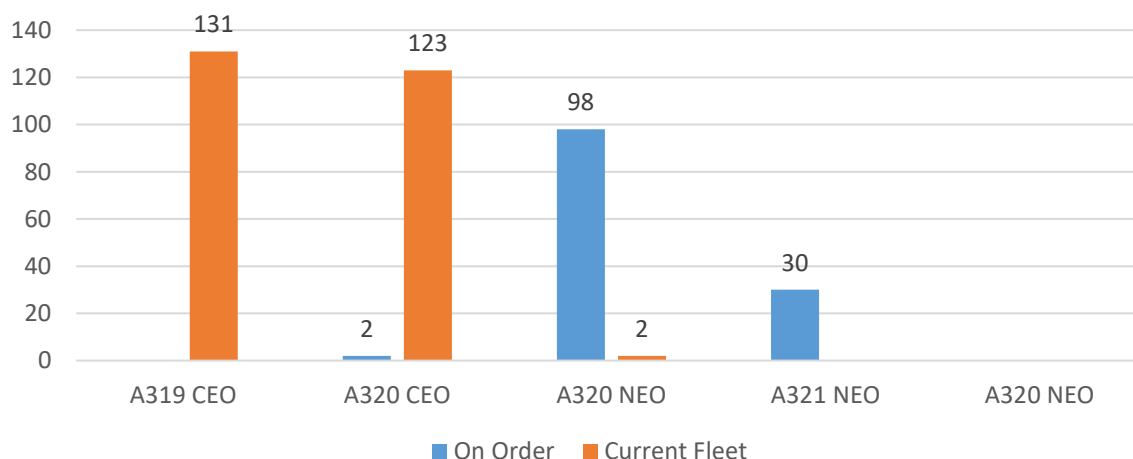


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Although American Airlines has a significant fleet of Airbus A319 aircraft, these were inherited from US Airways and American has not opted for the A319neo variant. Instead, as shown in the chart, the future fleet strategy is centred on the Boeing 737 MAX 8 and Airbus A321neo aircraft.

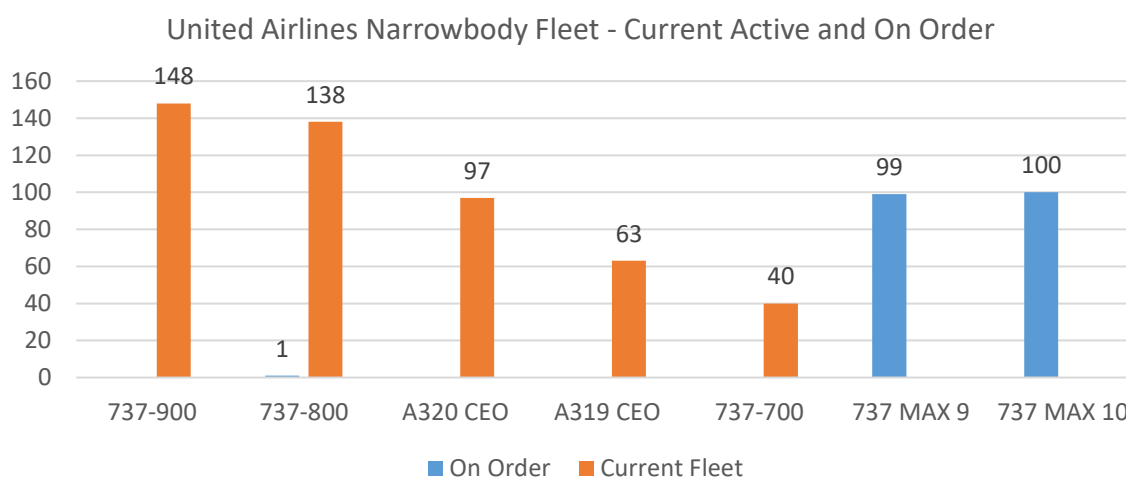
Likewise easyJet, the largest A319ceo operator, has moved up into larger capacity aircraft with orders for A320neo and A321neo aircraft to supplement and eventually replace its A319ceo and A320ceo fleets.

easyJet Narrowbody Fleet - Current Active and On Order



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United also has a sizeable fleet of A319ceo aircraft and until fairly recently had a backlog of Boeing 737-700 aircraft. United was reportedly due to acquire these aircraft at a significant discount in an apparently successful move by Boeing to price out the prospect of a C Series order. Despite the reported low figures United was said to be paying, the order no longer appears in Boeing’s order book and most likely accounts for some of the MAX 10 aircraft on order. Perhaps United could represent a source of future demand for the C Series? Considering the chart below, the backlog is focused largely on the upper end of the narrowbody capacity spectrum and there could be a gap at the lower end for some smaller capacity aircraft for thinner routes that could be more profitably served by the C Series.



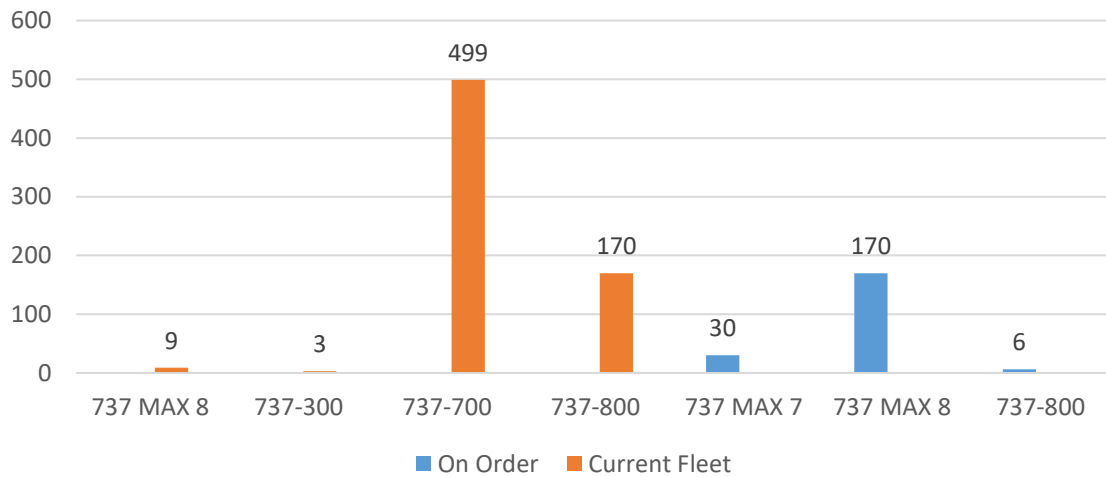
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There is a much greater fleet concentration if you look at the 737-700 market, with 505 aircraft operated by Southwest Airlines, almost 10 times the number of the second largest carrier WestJet.

When you look at the future fleet plans of the top Boeing 737-700 and Airbus A319-100 operators, the upsizing trend is very clear.

Southwest Airlines has the largest fleet of Boeing 737-700 aircraft by far with 499 active aircraft at the time of writing and six parked. Whilst the carrier has ordered 30 737 MAX 7 aircraft, the majority of Southwest’s order book is made up of MAX 8 aircraft.

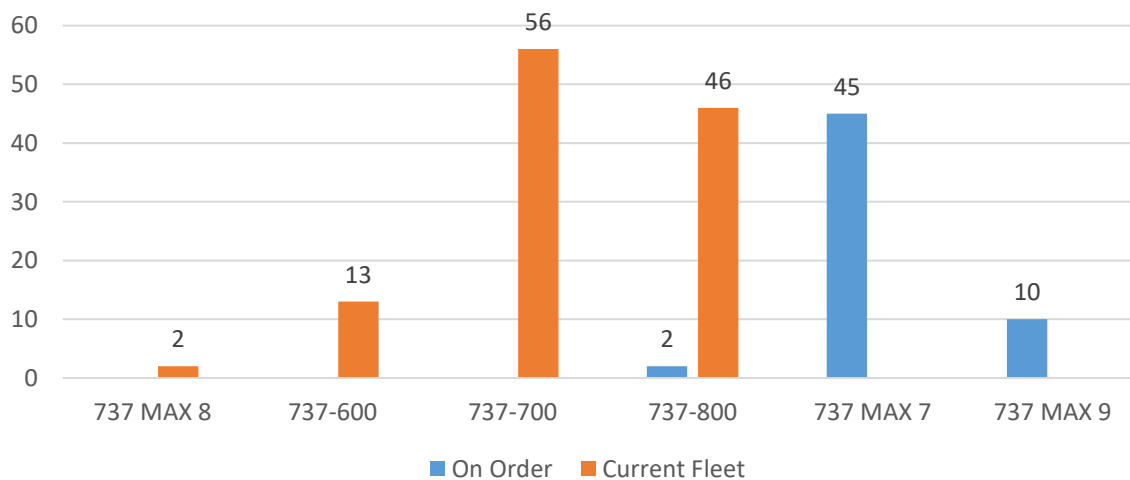
Southwest Airlines Narrowbody Fleet - Current Active and On Order



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However, WestJet bucks the trend having ordered a far greater number of Boeing 737 MAX 7 aircraft for its future fleet strategy, with orders for 45 aircraft compared with just ten of the 737 MAX 9.

WestJet Fleet - Current Active and On Order



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Southwest Airlines and WestJet account for the entire 737 MAX 7 backlog.

Delta Airlines is currently the largest customer of the CSeries and IBA expects the carrier will use the aircraft as an eventual replacement for its ageing MD-80 family aircraft. Air Canada, an A319-100 operator, is the second largest CSeries customer and appears to be pursuing an eventual replacement strategy for the smaller Airbus narrowbody long term. The current backlog and in service fleets of the CS100 and CS300 are illustrated in the table below.

| Operator | Aircraft Model | Backlog | In Service |
|------------------------------|----------------|------------|------------|
| Delta Air Lines | CS100 | 75 | 0 |
| Air Canada | CS300 | 45 | 0 |
| Macquarie Airfinance | CS300 | 40 | 0 |
| Ilyushin Finance Co | CS300 | 20 | 0 |
| Swiss Global Air Lines | CS300 | 17 | 4 |
| Lease Corp International Ltd | CS300 | 17 | 0 |
| Saudi Gulf | CS300 | 16 | 0 |
| Air Baltic | CS300 | 13 | 7 |
| Gulf Air | CS100 | 10 | 0 |
| Odyssey Airlines | CS100 | 10 | 0 |
| Korean Air | CS300 | 10 | 0 |
| Privatair | CS100 | 5 | 0 |
| Braathens Regional Airlines | CS100 | 5 | 0 |
| Iraq Airways | CS300 | 5 | 0 |
| Braathens Regional Airlines | CS300 | 5 | 0 |
| Lease Corp International Ltd | CS100 | 3 | 0 |
| Swiss Global Air Lines | CS100 | 2 | 8 |
| Air Tanzania | CS300 | 2 | 0 |
| Falcon Aviation Services | CS300 | 2 | 0 |
| | TOTAL | 302 | 19 |

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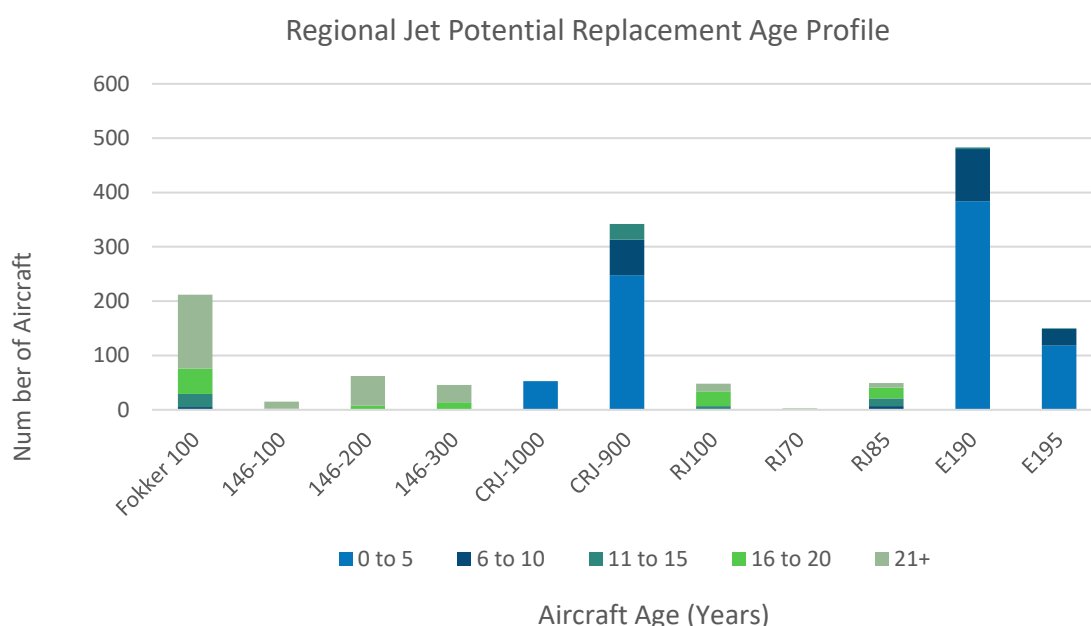
So the CSeries offers some degree of competition to the narrowbody aircraft from Airbus and Boeing, albeit to replace some of the outgoing generation A319 and 737-700 aircraft. For many carriers, the Airbus A320neo and Boeing 737 MAX 8 will replace their A319ceos and 737-700s, however there will still be a call for replacement aircraft with the right operating economics in the 100-150 seat space.

Whilst we see some carriers upsizing in the narrowbody market, we also see this in the regional jet market and there is a large fleet of aircraft which will require replacement over the coming years.

The Large Regional Jet Market

To date, we have seen an average retirement age for 50-100 seat regional jets of around 17 years. That is not to say that we expect all regional jet aircraft to retire around this age and many regional jet aircraft are already well over this age. However, historical data suggests a shorter economic life for regional jets than for narrowbody aircraft.

The following chart shows the age profile of regional jet aircraft of over 80 seats capacity. Many of these aircraft will require replacement over the next five years. We have already seen Swiss replacing Avro RJ aircraft with the CSeries CS100 and CS300 aircraft.



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There are over 400 regional jet aircraft amongst the Fokker 100 and combined BAe 146/Avro RJ aircraft which are already over 17 years old and will likely be due for replacement over the coming years. There will, of course, be fierce competition not only from established Regional Jet manufacturers such as Embraer and Sukhoi, but new entrants such as Mitsubishi Aircraft Corporation with its MRJ product.

The existing Bombardier regional jets, the CRJ900 and CRJ1000 are still a little young for replacement, however we could see these aircraft coming into the market in greater numbers over the next five years and the CSeries could offer a growth option for operators of these aircraft. There is a fleet of around 400 of these aircraft types.

With this in mind, not only is there potential for the CSeries to replace older 737 Classics aircraft and Next Generation Boeing 737-700 and Airbus A319ceo aircraft, but there is also an opportunity to take some share in the large regional space with the CS100. This is particularly true for carriers that have aspirations to move into larger narrowbodies.

What is in it for Airbus?

The benefits that this partnership bring to the CSeries program are immediately apparent. The strong financial backing of Airbus will bring confidence to airlines, investors and financiers that are considering the CSeries aircraft. Despite the large orders from Air Canada and Delta, there were still questions around Bombardier's financial staying power, adding an element of risk for anyone looking at ordering the CSeries. The partnership will bring economies of scale, access to Airbus's supplier network and will open up opportunities within Airbus's customer base. The ability for US deliveries to be manufactured at Airbus's facility in Mobile, Alabama, would also avoid the import tariff imposed on the CSeries.

The reports on the performance of the CSeries so far are very positive. The aircraft appears to be exhibiting excellent technical performance and the aircraft has exceeded the original expectations in terms of fuel efficiency.

Whilst Airbus already offers an aircraft in this segment, the A319neo, it is a shrink of the A320 and is not optimised for the capacity segment. The CSeries has been specifically designed for this market and, with the greater use of composite materials, is able to offer better operating economics than the A319neo.

The existing orders for Air Canada and increased US manufacturing presence at the Mobile site will likely help increase Airbus's market share in the region. Particularly in Canada, where Boeing has historically had a strong lead. In terms of current active and parked aircraft, Boeing leads Airbus two to one in Canada, according to IBA.iQ data.

The Pratt & Whitney GTF engine is also a powerplant choice for both the A320neo family and the CSeries, so there are some synergies there and it is likely that operators will see this as a benefit in the long-term.

It has been well reported that the Pratt and Whitney GTF engine has suffered EIS issues which continue to affect the on-wing performance of the installed fleet. Both Airbus and Bombardier have felt an impact on the delivery schedules of their respective A320neo and CSeries programs. Only recently, Korean Air announced that the delivery schedule of its CSeries aircraft has been pushed back, resulting in the first aircraft possibly being delivered in 2018 rather than this year.

A portion of new Pratt & Whitney GTF engine deliveries have been allocated to support the in-service fleet. This has restricted the supply of new engines to the delivery stream, causing significant delays to aircraft deliveries whilst the problems are resolved. The Pratt & Whitney GTF engine is the sole powerplant for not only the CSeries, but also the Mitsubishi MRJ and Embraer E2 as well as being one of two engine options for the A320neo.

IBA is confident that the problems will ultimately be resolved and that the engine will deliver the efficiency and durability characteristics with which it was designed. Performance and reliability issues are commonplace in the early phases of new engine programs and many programs require a number of performance improvement packages to achieve their advertised performance targets. IBA sees the Pratt & Whitney GTF program no differently and would not expect any significant long-term impact on the success of the GTF engine program, nor on any of the aircraft programs to which it provides power.

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