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December 13, 2017

***VIA ELECTRONIC FILING***

The Honorable Lisa R. Barton
Secretary
U.S. International Trade Commission
500 E Street, S.W.
Washington, D.C. 20436

Inv. Nos. 701-TA-578
& 731-TA-1368
(Final Investigation)
Number of pages: 793

**PUBLIC VERSION**

Business Proprietary Information deleted from Brief Pages: 7-9, 11, 14-15, 19-20, 23-35, 37-39, 41-43, 45-50, 52-57, 60-63, 65, 70-72, 74-77, 79-94

Attachments C, D, E; and
Exhibits 3, 4, 48–54, and 70

***Re: 100 – 150 Seat Large Civil Aircraft from Canada —Inv. Nos. 701-TA-578 & 731-TA-1368 (Final): Pre-Hearing Brief***

Dear Secretary Barton:

On behalf of Bombardier Inc. and C Series Aircraft Limited Partnership ("CSALP," collectively "Bombardier"), we hereby submit the public version of Bombardier's Pre-Hearing Brief in the above-captioned proceeding.

The public version deleted the business proprietary information contained in the confidential version. Disclosure of that information, which is not otherwise publicly available, would cause substantial harm to the competitive position of respondents and parties. It has not

been possible to prepare meaningful public summaries of the redacted materials. *See* §19 U.S.C. 1677f(b)(1)(A)(i).

Please do not hesitate to contact me if you have any questions.

Respectfully submitted,

Shara L. Aranoff

Shara L. Aranoff
*Counsel to Bombardier Inc. and C Series Aircraft Limited Partnership*

**COMPANY CERTIFICATION**

**U.S. International Trade Commission**

**Investigation Nos. 701-TA-578 & 731-TA-1368 (Final)**

**100- to 150-Seat Large Civil Aircraft from Canada**

In accordance with the certification requirements of Sections 206.8(a) and 207.3(a) of the Commission's Regulations, I, Prakash Narayanan, Director of Contracts and Legal Services at Bombardier Commercial Aircraft, hereby certify on behalf of Bombardier Inc. and C Series Aircraft Limited Partnership that (1) I have read the attached submission, and (2) the information contained in the submission is, to the best of my knowledge, accurate and complete.

Prakash Narayanan
Director, Contracts and Legal Services
Bombardier Commercial Aircraft
Bombardier Inc.

Date: December 12, 2017

**COUNSEL CERTIFICATION**

**U.S. International Trade Commission**

**Investigation Nos. 701-TA-578 & 731-TA-1368 (Final)**

**100- to 150-Seat Large Civil Aircraft from Canada**

I, Shara L. Aranoff, of Covington & Burling LLP, counsel to Bombardier Inc. and C Series Aircraft Limited Partnership, having been duly sworn on this 12th day of December, 2017, do hereby certify, pursuant to 19 C.F.R. § 201.6(b)(3)(iii), that to the best of my knowledge and belief, information for which proprietary treatment has been requested in this submission is not available to the general public.

Further, in accordance with 19 C.F.R. § 207.3(a), I hereby certify that (1) I have read the attached submission, and (2) to the best of my knowledge, the information contained in this document is accurate and complete.

Shara L. Aranoff

Shara L. Aranoff
Covington & Burling LLP
One City Center
850 Tenth Street, NW
Washington, DC 20001

District of Columbia: SS

Subscribed and sworn before me this

12th day of December, 2017

LUCY V. SPEARS NOTARY PUBLIC DISTRICT OF COLUMBIA MY COMM. EXP. MARCH 31, 2021

Lucy V. Spears

Notary Public

My Commission expires: 03/31/2021

## CERTIFICATE OF SERVICE

**100- to 150-Seat Large Civil Aircraft from Canada**
Public Service List:
Inv. Nos. 701-TA-578 and 731-TA-1368 (Final)

I, James M. Smith, hereby certify that on the 13th day of December 2017, copies of the foregoing document were served on the following parties by First Class Mail:

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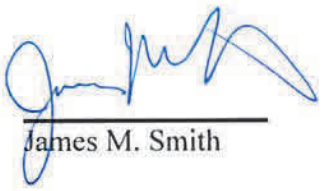

James M. Smith

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**BEFORE THE**

**UNITED STATES INTERNATIONAL TRADE COMMISSION**

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**IN THE MATTER OF**

**100- TO 150-SEAT LARGE CIVIL AIRCRAFT FROM CANADA**

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# PRE-HEARING BRIEF OF RESPONDENTS BOMBARDIER INC. AND C SERIES AIRCRAFT LIMITED PARTNERSHIP

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*Counsel to Respondents Bombardier Inc. and C Series Aircraft Limited Partnership*

December 13, 2017

## Table of Contents

## I. Introduction

During the preliminary phase of this investigation, The Boeing Company's highly engineered allegations of an imminent threat of material injury by reason of C Series imports from Canada rested on obviously shaky foundations. Not one subject aircraft had been imported. Boeing's only asserted "lost sale" was to Delta, but Boeing had never offered Delta a new aircraft in its requested configuration or on its required timetable. Boeing had *won* a sale to United for its dated 737-700 at what it complained was an unduly low price, but a Boeing executive admitted that the price was designed to prevent validation of the C Series—and in any event, United soon converted all of its orders to 737 MAX aircraft far larger than any C Series. Boeing aimed to create an illusion of competition with Bombardier by jerry-rigging the scope to exclude Embraer E-Jets, the chief rival of the C Series, based on an entirely artificial range criterion. Meanwhile, given Boeing's success in the single-aisle market, the company could not suffer imminent injury: with a backlog stretching years into the future, its CEO admitted that the 737 family skyline was "oversold" for the rest of the decade.

In the intervening months, the bases for Boeing's already implausible claims of imminent injury have only deteriorated. There still have been no U.S. imports of C Series from Canada. Nor have there been any new orders for C Series by U.S. purchasers. Boeing's backlog of current 737 orders remains exceedingly strong, and has recently strengthened. Going forward, as a result of Bombardier's partnership with Airbus SE to build C Series in Alabama, there is no longer any prospect of an imminent threat of imports from Canada. Even before this game-changing announcement, Boeing's Petition was premature, but now its threat claims are entirely without foundation. Delta, for example, has made clear to investors that it has no plans to import C Series into the United States, and that there may be a delay in its deliveries as it works through issues with Bombardier.

If despite concrete and ongoing plans to produce C Series for U.S. customers in Alabama, C Series imports from Canada somehow become imminent in the future, Boeing can always file a new case. Given the long lag time between orders and deliveries of large civil aircraft ("LCA"), Boeing would have ample opportunity to respond to any *bona fide* threat of imminent material injury presented by imports from Canada. No such threat exists today, and the Commission should rule in Bombardier's favor by issuing a negative determination on any of the multiple, independent grounds on which Boeing's case fails.

First, as Part II explains, the factual landscape has radically shifted since the preliminary phase. In the wake of the partnership of Bombardier and Airbus to construct a new final assembly line ("FAL") for the C Series at the existing Airbus facility in Mobile, Alabama, there are no plans for future imports of C Series from Canada into the United States. As a result, future imports from Canada will qualify as negligible under the statute, requiring the Commission to terminate the investigation. Likewise, there can be no threat of material injury by reason of imports that are no longer planned. Accordingly, these significant new factual developments—which promise to bring new investment, jobs, and production to the United States, strengthening the domestic aerospace industry—compel a negative determination.

Second, as discussed in Part III, Boeing has defined an artificially narrow like product limited to the smallest, and by far least successful, models in its family of 737 single-aisle aircraft. This closely related family of aircraft constitutes a product continuum with no clear dividing line. Given its multi-year backlog of orders and high profits, the 737 family has an overwhelmingly secure position in the U.S. market and cannot plausibly be threatened with material injury by the C Series program.

Third, as the survey of conditions of competition in Part IV makes clear, competition between the C Series and the Boeing 737 MAX 7 and 737-700 is highly attenuated, such that any difficulties these Boeing aircraft have encountered in the market cannot be attributed to Bombardier. The C Series is a clean sheet design optimized for uses and missions distinct from those of the smallest 737 models, which are shrunken versions of a derivative design that was optimized for a larger aircraft. As a new platform, the C Series has carried standard "launch" and "marquee" pricing to compensate for the intrinsic risks of entry into service. Such pricing sets no reference point for future sales, once the program matures. While customers may cross-shop across all four major manufacturers at the start of a campaign as they seek to refine their requirements, the 737 competes with the Airbus A320 family, while the C Series competes principally with the Embraer E-Jet family. In other words, the 737 MAX 7 and 737-700 have struggled to win acceptance in the marketplace not because of competition from the C Series, but rather because of fundamental problems with the design and operating economics of the smallest Boeing 737 aircraft. These intrinsic problems will not go away regardless of how this case is resolved.

Finally, as Part V details, even with Boeing's absurdly narrow like product, and even if there were no plan for a U.S. FAL and Bombardier intended to deliver C Series to U.S. customers from Canada, there *still* would be no imminent threat of material injury to Boeing. Given Boeing's multi-year backlog of current orders, the long lead time between orders and deliveries in the industry, and the many flexibilities that are built into purchase contracts, Boeing cannot conjure any threat of imminent injury without relying impermissibly on speculation and conjecture. Moreover, Boeing has asked the Commission to speculate across a future time frame far longer than its cases have utilized in the past. The statutory threat factors confirm that

Boeing faces no threat of imminent injury even in the absence of a U.S. FAL. For example, Bombardier has no inventory of C Series, minimal unused production capacity in Canada, and no ability to increase that capacity substantially; neither the volume nor the market penetration of C Series imports is increasing or likely to increase; the C Series is not exerting, and is not likely to exert, a significant depressing or suppressing effect on the prices of domestic 100- to 150-seat LCA; and, given Boeing's financial resources, the C Series will not have any effect on Boeing's ability to fund its development and production efforts.

On any one of these alternative and case-dispositive grounds, the Commission should reject Boeing's premature and contrived claims of imminent threat by issuing a negative determination and bringing this unwarranted proceeding to a close, to the benefit of U.S. airlines and their passengers.

## II. Developments Since the ITC's Preliminary Determination Eliminate The Possibility of Imminent Injury from Imports from Canada and Therefore Compel a Negative Determination as a Matter of Law

At the time of the preliminary determination, because there had been zero imports of C Series from Canada during the period of investigation, the Commission concluded that subject imports were negligible for purposes of present injury.[1] Nonetheless, the fact that Delta had placed one order for future deliveries, with 15 aircraft to be delivered in 2018 starting mid-year, persuaded the Commission that there was a potential that subject imports from Canada will imminently account for more than 3 percent of all imports of 100- to 150-seat LCA into the United States.[2] On the basis of that single order, the Commission concluded that imports from Canada were non-negligible for threat purposes.

[1] *See* Prelim. Det. (Public Version), at 14.

[2] *Id.* at 14-15.

The Commission's preliminary determination in June 2017 regarding potential imports has been overtaken by events. Given the announced partnership of Bombardier and Airbus to construct a new final assembly line ("FAL") for the C Series at the existing Airbus facility in Mobile, Alabama, there are no plans for imminent future imports of C Series from Canada into the United States. As a result, imminent future imports from Canada will be negligible—and, obviously, there can be no threat of material injury by reason of imports that will no longer occur. Accordingly, these significant new factual developments compel a negative determination in the final phase.

### A. Bombardier and Airbus are Building a U.S. FAL to Produce C Series for the U.S. Market

On October 16, 2017, Bombardier and Airbus signed an agreement through which Airbus is acquiring a majority stake in the C Series Aircraft Limited Partnership ("CSALP"), the entity that manufactures and sells the CS100 and CS300.[3] Airbus will control 50.01% of CSALP, with Bombardier retaining approximately 31% and Investissement Québec 19%.[4] This new partnership brings together two aircraft manufacturers with complementary strengths. According to both firms, the global reach and scale of the Airbus family will support Bombardier's state-of-the-art aircraft technology, unlocking the full value of the C Series platform.[5]

The strategic rationale for the combination is clear. Airbus acquires a controlling stake in a breakthrough technology that complements its existing single-aisle offerings, which focus on

[3] Press Release, Bombardier Inc. Inv'r Relations, Airbus and Bombardier Announce C Series Partnership (Oct. 16, 2017) (**Exhibit 1**). Assets relating to the C Series program are held by C Series Aircraft Limited Partnership acting through its managing general partner C Series Aircraft Managing GP Inc. The financials of CSALP are consolidated into the financials of Bombardier Inc.

[4] The details of the legal entity that will produce the C Series in Alabama remains to be determined.

[5] Press Release, Bombardier Inc. Inv'r Relations, Airbus and Bombardier Announce C Series Partnership (Oct. 16, 2017) (**Exhibit 1**).

larger models. The result will be to strengthen the product portfolio of Airbus at a point when the C Series program is fully mature, as Bombardier has nearly completed all development spending. Bombardier, for its part, gains access to the Airbus global supply chain, driving down production costs; exposes the C Series to Airbus customers worldwide, with new resources for sales and marketing; leverages the customer support expertise of Airbus; and demonstrates to prospective purchasers that long-term confidence in the future of the C Series is justified. As the Boeing / McDonnell Douglas merger indicates, consolidation is not uncommon in the aircraft industry, and can add significant value to LCA producers.[6] Bombardier expects the long-term value of the C Series program to more than double as a direct result of this strategic partnership with Airbus.[7]

**1. Plans for a New Final Assembly Line in the United States**

While the headquarters and primary assembly line of CSALP will remain in Québec, Airbus and Bombardier—following the closing of the transaction—will establish a second FAL for the C Series in the United States as part of the existing Airbus manufacturing facility in Mobile, Alabama. As Boeing has acknowledged in the Petition, the existing Airbus facility in Mobile will be a full member of the domestic industry once it produces an aircraft in the 100- to 150-seat segment.[8] The same logic applies to the new C Series FAL that will be established at

[6] *Petition*, at Ex. 46 (analysis of Boeing/McDonnell Douglas merger describing, *inter alia*, that consolidation provides airline customers with confidence in the long-term viability of purchased aircraft).

[7] Press Release, Bombardier Inc. Inv'r Relations, Airbus and Bombardier Announce C Series Partnership (Oct. 16, 2017) (**Exhibit 1**).

[8] *Petition*, at n.89, n.109 & n.140. This concession is no surprise, given that the Airbus production process in Mobile mirrors what Boeing does when it "produces Aircraft at final assembly facilities in Renton, Washington," where it acknowledges that single-aisle aircraft are assembled "from parts sourced worldwide." *Id.* at 26 & Ex. 58.

the Mobile site, which will serve U.S. customers and provide all C Series aircraft for the U.S. market.

The planned C Series FAL will be a large-scale, high-tech manufacturing facility. Based on Bombardier estimates, an investment of more than $300 million will be made to establish the U.S. FAL.[9] Once operational, the new U.S. FAL will contribute more than 2,000 permanent new jobs in Alabama.[10] In addition, another 6,000 person year jobs will be created, once construction and other activities are taken into account.[11] At the existing C Series production line in Québec, more than half of the total supplier spend already goes to U.S. suppliers.[12] With the establishment of the new U.S. FAL in Mobile, [

].[13]

The upside for the U.S. aerospace industry is substantial. As industry analysts have emphasized, "{m}ore aerospace companies across the country will have the opportunity to work on the aircraft once production of C Series jets bound for U.S. airlines transitions to the Mobile assembly line, boosting U.S. content even higher and effectively making the C Series a bona fide American-made product."[14]

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[9] [ ] Affidavit, ¶ 10 (reporting a Bombardier estimate for the investment that will be required in Mobile) (**Attachment E**).

[10] *Id.* ¶¶ 7-8 (analyzing the projected number of permanent jobs to be created) (**Attachment E**).

[11] *Id.* ¶¶ 7, 9 (analyzing the projected number of person-year jobs to be created) (**Attachment E**).

[12] *Id.* ¶ 5 (**Attachment E**).

[13] *See* Prehearing Staff Report, at III-4.

[14] Anthony L. Velocci, Jr., *Enough with the Hypocrisy, Boeing*, Aviation Week & Space Tech. (Dec. 8, 2017) (emphasizing that U.S. suppliers already "provide 52% of the content for the C Series and account for more than 22,500 existing jobs") (**Exhibit 2**).

The investment agreement between Airbus and Bombardier is subject to regulatory approvals. [

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Once operational, the new CSALP facility in Alabama will be a significant contributor to the domestic industry. The level of production-related activity planned for the new U.S. FAL far exceeds what the Commission has counted as domestic production in other cases. Among many examples, the Commission has rejected arguments that activities such as processing—or even *cooking*—shrimp, or cutting grooves and teeth in unfinished iron drive components, are too simple to qualify as domestic production.[20] In light of such examples, assembling high-technology large civil aircraft qualifies as involving sufficient production-related activities based on the traditional factors—(1) source and extent of the firm's capital investment; (2) technical expertise involved in U.S. production activities; (3) value added to the product in the United States; (4) employment levels; (5) quantity and type of parts sourced in the United States; and (6) any other costs and activities in the United States directly leading to production of the like product.. Extensive capital investment is required for the new U.S. FAL, where the production process will require enormous technical expertise and a sizable work force. The value-added will be high, and the [

] These facts are simply nothing like

[20] *See, e.g.*, *Certain Frozen or Canned Warmwater Shrimp & Prawns from Brazil, China, Ecuador, India, Thailand, & Vietnam*, USITC Inv. Nos. 731-TA-1063-1068 (Final), USITC Pub. 3748 (Jan. 2005) (rejecting arguments that processing and cooking shrimp do not qualify as domestic production); *Certain Iron Mechanical Transfer Drive Components From Canada & China*, USITC Inv. Nos. 701-TA-550 and 731-TA-1304-1305 (Final), USITC Pub. 4652 (Dec. 2016) (rejecting arguments that machining grooves or teeth and applying surface treatments fail to qualify as domestic production).

the activities—e.g., marinating shrimp, polishing floors, and mounting tires—that the Commission has found to fail the domestic production test.[21]

### 2. The New FAL Is a Clear Win for U.S. Production and Employment

Once the new U.S. FAL is complete, this new addition to the domestic aerospace industry will represent a significant victory for U.S. production and U.S. workers. Bombardier and Airbus will both be expanding their global production footprint within the United States. Their strategic combination will bring new foreign direct investment and new jobs to Alabama. Production and employment levels in the domestic industry are both poised to increase. And any prospect of future imports from Canada will accordingly diminish.[22]

Boeing has aggressively questioned the Bombardier-Airbus partnership, alleging that its substantial investment in and expansion of the domestic industry would somehow constitute an improper "circumvention scheme" designed to avoid U.S. trade remedy duties."[23] Boeing further claims that "absent antidumping and countervailing duly orders, the purported plan to assemble the C Series in the United States will never materialize," and that plans to establish a C Series assembly line in Alabama "would make no economic sense."[24] Such allegations are

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[21] *See, e.g.*, *Certain Frozen or Canned Warmwater Shrimp & Prawns from Brazil, China, Equador, India, Thailand, & Vietnam*, Inv. Nos. 731-TA-1063-1068 (Final), USITC Pub. 3748 (Jan. 2005); *Multilayered Wood Flooring from China*, Inv. Nos. 701-TA-476 and 731-TA-1179 (Final), USITC Pub. 4278 (Nov. 2011); and *Certain New Pneumatic Off-the-Rd.-Tires from China, India, & Sri Lanka*, USITC Inv. Nos. 701-TA-551 and 731-TA-1307-1308 (Final), USITC Pub. 4594 (Mar. 1, 2016).

[22] The Commission has previously relied on a respondent's planned investment in the United States to issue a negative determination. *See Stainless Steel Plate from Belgium, Italy, Korea, South Africa, and Taiwan*, Inv. Nos. 701-TA-379 and 731-TA-788, 790-793 (Second Review), USITC Pub. 4248 (Aug. 2011), at 12-13, 33 (revoking antidumping duty order on Italy because Italian producer ThyssenKrupp has a "local supply strategy {that} will likely restrain the volume and pricing of subject imports from Italy" and "is in the process of localizing its production . . . for the North American market so that the U.S. market will be served almost exclusively by" a "new greenfield integrated production facility in Calvert, Alabama. . . , which will commence operations in three phases").

[23] *See* Boeing, Brief on the Announced Airbus-Bombardier C Series Partnership (Nov. 13, 2017), at 7-8 (**Exhibit 6**).

[24] *Id.* at 2, 8 (**Exhibit 6**).

absurd, and reveal that Boeing's real objective must be to end the C Series program, not to ensure a level playing field for U.S. production that competes with imports of single-aisle aircraft.

As an initial matter, the mutual interest of Bombardier and Airbus in a strategic C Series partnership began long before—and for reasons entirely independent of—the pending investigations. As Boeing itself acknowledges in the Petition, Bombardier and Airbus engaged in talks regarding a possible partnership in 2015.[25] [

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Moreover, contrary to Boeing's assertions, Bombardier plans to move forward with the new Airbus partnership regardless of what happens in the pending AD/CVD investigations. As noted, there are compelling business reasons for this merger unrelated to the Title VII case. For Bombardier, the partnership will help the company realize the full potential of the C Series program, capitalizing on the expertise and resources of Airbus. This is a critical consideration

[25] *Petition*, at 84-85 & Ex. 20.

given the immense opportunity for future sales in the market for single-aisle LCA. For example, Boeing's own forecast calls for 28,140 single-aisle aircraft deliveries over the next two decades, which translates to more than 1,400 aircraft per year.[26] In the 100- to 150-seat segment, Flight Ascend projects deliveries of 5,787 aircraft over the next five years, from 2018 to 2022.[27]

Given strong forecasts of global demand for the C Series and other single-aisle aircraft, Bombardier and Airbus plan to supply the U.S. market with C Series from the new U.S. FAL, while the rest of the world will be supplied from the existing production line in Québec. Avitas projects that the United States will continue to represent 20-30% of all new narrowbody aircraft deliveries worldwide.[28]

### B. Bombardier Will Supply the U.S. Market from a U.S. FAL

The new partnership with Airbus is a highly significant and positive development for C Series customers in the United States. As a result of their combination, Bombardier and Airbus will provide U.S. purchasers of the C Series with aircraft manufactured at the new U.S. FAL. Customers outside of the United States, such as recent purchasers from Europe and the Middle East, will receive C Series aircraft from the existing production line in Québec.

With regard to the Delta order, Delta CEO Ed Bastian stated publicly in October 2017 that Delta "will not pay those tariffs and that is very clear," but also that "{w}e intend to take the aircraft."[29] According to Mr. Bastian, "{t}here may be a delay in us taking the aircraft as we

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[26] *See* Zacks Equity Research, *20-Year Market Outlook for Jetliners: Airbus vs. Boeing*, Nasdaq (June 12, 2017), at 3 (**Exhibit 7**).

[27] Flight Ascend Expert Report at 35-36 (**Attachment A**).

[28] Expert Report of Avitas, at 6 (**Attachment B**).

[29] Ross Marowits, *Delta CEO says 'We will not pay those tariffs' on Bombardier CSeries order*, The Canadian Press (Oct. 11, 2017) (**Exhibit 8**).

work through the issues with Bombardier, who is being a great partner in this," but he emphasized that "{w}e're not going to be forced to pay tariffs or anything of the ilk, so there should not be any concerns on our investors' minds in that regard."[30] Mr. Bastian added that in his view the C Series "needs to come to market in the United States."[31] His statement came a few days before the announcement of the U.S. FAL, which has now opened a path for the C Series to reach the U.S. market—as a domestically produced aircraft.

For Delta, as its chief executive made clear to investors, paying duties in excess of 300% on imported C Series would not be commercially feasible. This cost is prohibitive not only for Delta, but also for any other U.S. airline that places an order for C Series manufactured in Canada. No U.S. airline has placed a single C Series order since the Petition was filed. Two recent orders by non-U.S. airlines during the Dubai Air Show make clear that there is demand for the C Series outside the United States.[32] The announcement of the Airbus deal has strengthened the C Series program and given prospective purchasers—who fear orphan aircraft and low residual values—credible assurance of the program's longevity.[33] Nonetheless, the Airbus partnership is not yet helping in the U.S. market because of the Boeing effect. The prospect of facing insurmountable duties has been a clear deterrent for U.S. airlines.

The threat of duties on C Series imports, moreover, is not limited to the pending investigations. Even if the Commission were to issue a negative determination in this proceeding, prudent U.S. airlines will likely remain extremely reluctant to place any orders for C

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[30] *Id*. (**Exhibit 8**).

[31] *Id*. (**Exhibit 8**).

[32] *Egyptair signs for up to 24 CS300s at Dubai Air Show*, Leeham News (Nov. 14, 2017) (reporting that after the Airbus deal, which "appears to have given sufficient comfort" to purchasers, "Bombardier has since landed two important deals for its C Series," one by an unidentified European airline and the other by Egyptair) (**Exhibit 9**).

[33] *Id*.

Series manufactured in Canada. The entire industry understands that Boeing can simply file a new petition if firm orders are placed and C Series deliveries from Canada become imminent. As a matter of law, a negative determination in this proceeding would not ensure the same result in future investigations. And given the substantial lead time between orders and deliveries, Boeing would have ample time to prepare and file a new case—blocking C Series deliveries yet again—on the basis of new facts.

Given the unique importance of the U.S. market, the ongoing risk of prohibitive duties on imports into the United States from Canada regardless of what happens in this case, and the refusal of U.S. customers to be exposed to any present or future duties, serving the U.S. market through the establishment of a U.S. FAL for the C Series is essential for Bombardier. This strategic priority is hardly surprising. The production of aircraft is a global industry, serving a global market. No manufacturer of LCAs can expect to build a successful program without access to the United States.

### C. Because Imminent Imports from Canada Will be Negligible, and There is No Threat of Material Injury to the Domestic Industry, A Negative Determination is Mandatory

Since the Commission's preliminary determination, the Airbus transaction and the resultant negotiations with Delta have radically transformed the factual landscape of this case. As before, there have been zero imports of C Series into the United States. And as before, there is only a single challenged C Series order by a U.S. purchaser, Delta.[34] But in the wake of the partnership with Airbus to build a U.S. FAL, there is no longer a credible prospect—let alone an

[34] While Republic Airways placed a C Series order previously, in 2010, Boeing has indicated that it does not regard that order as injurious. Conf. Tr. at 130 (Mr. Novick) (noting with respect to Republic that for "many, many years, {Bombardier} seemed to be operating in the market, trying to sell at a commercially reasonable price"). Delivery under that order, moreover, [ ] Bombardier Foreign Producer Questionnaire, at II-12g.

imminent threat—of future U.S. deliveries of C Series aircraft manufactured in Canada. No additional orders have been placed in the United States since the Petition was filed, despite orders by purchasers outside the United States. Once the new FAL is operational, future C Series ordered by a U.S. purchaser will be supplied from Alabama, not Québec. With regard to the existing Delta order, [

]. The projections for U.S. deliveries from Québec that Bombardier provided in its Foreign Producer Questionnaire were based on the company's expectations *before* the Airbus deal. In light of the Airbus deal, Bombardier is no longer planning to make future deliveries from Québec to the United States.

These new facts point inescapably to a legal conclusion: the Commission must render a negative determination in this case. This result is compulsory for either of two independent reasons. First, under the statute, if the Commission determines that imports of the subject aircraft are and will remain negligible, the investigation must be terminated. In particular, if the Commission does not find a potential that imports of C Series from Canada will imminently account for more than 3 percent of all 100- to 150-seat LCA imported into the United States, it must terminate the investigation against imports from Canada.[35] Because there are no current plans or orders for imminent C Series imports from Canada into the United States, and because Bombardier and Airbus plan to supply U.S. customers from the new U.S. FAL in the future, a finding of negligibility is mandatory. Second, because no imminent deliveries into the United States from Québec are currently planned, there can obviously be no threat of material injury to the domestic industry by reason of C Series imports. On either ground, the Commission should

[35] Tariff Act of 1930, 19 U.S.C. § 1677(24)(A)(iv).

reject as entirely unwarranted Boeing's claim that it faces a real and imminent threat of material injury by reason of imports.

## III. The Commission Should Define the "Domestic Like Product" as All Single-Aisle LCA with Capacity for at least 100 Seats and Find No Threat of Injury to That Industry

In this investigation, Petitioner's proposed like product definition is arbitrarily narrow, focusing solely on the Boeing 737-700 and 737 MAX 7, its smallest and least successful variants. In its Preliminary Determination, the Commission defined the like product as Boeing requested, but expressed its intent to reconsider this issue in the final phase of the investigation.[36] The record before the Commission now provides extensive additional support for rejecting Boeing's arbitrary 150-seat dividing line and defining the like product to include the entire 737 family of aircraft. This expanded like product definition more accurately reflects both Boeing's unified production and marketing activities for all 737 aircraft and the lack of any clear dividing line based on seat count, class configuration, or range among the 737 family of aircraft.

Moreover, through the diligent work of the staff, the Commission has complete data with which to assess whether this broader domestic industry is threatened with material injury. It is not. The data collected in Table C-3 to the Prehearing Staff Report leave little doubt that the domestic industry producing single aisle LCA with capacity for at least 100 seats is in robust health and insulated from injury by reason of subject imports from Canada (if any).

[36] Prelim. Det. at 13.

### A. The Commission may define the domestic like product more broadly than Petitioner's proposed scope of investigation to capture a continuum of similar products

In its Notice of Initiation, Commerce defined the scope of investigation as "aircraft, regardless of seating configuration, that have a standard 100- to 150-seat two-class seating capacity and a minimum 2,900 nautical mile range."[37] It is well-established, however, that in defining the domestic like product the Commission is not limited by either the scope or Petitioner's proposed like product definition.[38]

Expansion of the domestic like product is particularly appropriate where, as here, Petitioner's proposed like product is part of a continuum with no clear dividing lines. In *Carbon & Certain Alloy Steel Wire Rod from China, Germany, & Turkey*, the Commission reexamined whether all carbon and certain alloy steel wire rod goods constitute a "continuum of products comprising a single domestic like product with only minor variations between types of wire rod and no clear dividing lines within the product group."[39] It found a continuum of products,

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[37] *Notice of Initiation of Less-Than-Fair-Value Investigation: 100- To 150-Seat Large Civil Aircraft from Canada*, 82 Fed. Reg. 24296 (May 17, 2017). The scope language for these investigations further states that it includes "all aircraft covered by the description above, regardless of whether they enter the United States fully or partially assembled . . ." Boeing's petition is focused on imports of aircraft from Canada. However, shortly after Bombardier and Airbus announced their partnership to produce C Series aircraft in Alabama, Boeing for the first time urged the Department of Commerce to treat "sections," "large components," and "parts" of 100- to 150-seat LCA imported for U.S. assembly as within-scope products. *See* Boeing, Brief on the Announced Airbus-Bombardier C-Series Partnership (Nov. 13, 2017), at 9-12 (**Exhibit 6**); Bombardier, Rebuttal Brief on the Proposed Transaction (Nov. 17, 2017) (**Exhibit 10**). A change in scope at this late point in the investigation will prevent the Commission from conducting an adequate investigation and undermine any threat determination premised on future imports of sections, components or parts.

[38] *See, e.g.*, *Carbon and Certain Alloy Steel Wire Rod from Brazil, Canada, Germany, Indonesia, Mexico, Moldova, Trinidad and Tobago, Turkey, and Ukraine*, Inv. Nos. 701-TA-417-421 and 731-TA-953 (Final), USITC Pub. 3546 (Oct. 2002), at 7 (defining the like product to include certain wire rod excluded from Commerce's scope) (hereinafter "*Wire Rod from Brazil*").

[39] *See Carbon & Certain Alloy Steel Wire Rod from China, Germany, & Turkey*, Inv. No. 731-TA-1099 (Final), USITC Pub. 3832 (Jan. 2006) ("While these two types of high-end specialized product may have certain unique characteristics and be made using specialized processes to specific customer requirements and standards, the same is

including tire cord quality wire rod and CHQ quality wire rod—two products outside the scope.[40] The only clear dividing line the Commission found was between steel wire rod and other steel products.[41] The Commission should reach a similar result in this case, finding that the continuum of single-aisle LCAs comprises a single domestic like product with only minor variations in size and no clear dividing lines within the group.

In determining the appropriate like product, the Commission considers: (1) physical characteristics and uses; (2) interchangeability; (3) common manufacturing facilities, production processes, and production employees; (4) channels of distribution; (5) customer and producer perceptions; and (6) price. The Commission looks for clear dividing lines, is skeptical of arbitrary divisions within a continuum of similar products, and disregards minor variations.[42]

To determine whether 150 seats is an arbitrary dividing line among a continuum of similar products, the Commission must use its six factor test to compare the 737-700 and 737 MAX 7 to Boeing's larger 737 variants, not to Bombardier's products or products made by other foreign producers. This inquiry, which the Commission acknowledged in its Preliminary

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true for many other types of high-end specialized wire rod.) (hereinafter "*Carbon & Certain Alloy Steel Wire Rod (2006)*").

[40] *Id*.

[41] *Id*.

[42] *See, e.g.*, *Wire Rod from Brazil?*, at 10 (deciding that "{i}n cases such as the present one, where the domestically manufactured merchandise consists of a broad continuum of similar products, the Commission does not consider each item of merchandise to be a separate like product that is only 'like' its counterpart in the scope, but considers the continuum itself to constitute the domestic like product"). *Carbon & Alloy Steel Cut-to-Length Plate from Brazil, S. Africa, & Turkey*, Inv. Nos. 731-TA-1319 and 731-TA-1326, 731-TA-1328 (Final), USITC Pub. 4664 (Jan. 2017) (confirming that "in investigations where "domestically manufactured" merchandise is made up of a grouping of similar products or involves niche products, the Commission does not consider each item of merchandise to be a separate like product that is only 'like' its identical counterpart in the scope, but considers the grouping itself to constitute the domestic like product and "disregards minor variations," absent a "clear dividing line" between particular products in the group.").

Determination,[43] is entirely separate from the extent of competition in the market between Petitioner's domestic products and imported products produced by Bombardier or Embraer, which is discussed in Part IV. The question, moreover, is not whether there are differences between the 737-700/MAX 7 and larger 737 variants, but whether any such differences are decisively more significant than differences among the rest of the models in the family.[44] When the six-factor test is applied to the products manufactured by the Petitioner, the evidence shows that the Boeing's 737 family has no clear dividing lines between models, but rather represents a continuum of products.[45] Accordingly, the Commission should define the domestic like product as all single-aisle LCA with the capacity for at least 100 seats.[46]

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[43] Prelim. Det. at 13.

[44] *See Certain Lined Paper Sch. Supplies from China, India, & Indonesia*, Inv. Nos. 701-TA-442-443 and 731-TA-1095-1097 (Final), USITC Pub. 3884 (Sept. 2006) ("The differences between {lined paper products (LPP)} and outsized lined paper products . . . also exist among the products within LPP and outsized lined paper products, respectively.") (hereafter *Lined Paper School Supplies*); *see also Carbon & Certain Alloy Steel Wire Rod* (2006) (finding that certain high-end specialized wire rod product with "unique characteristics" are not separate domestic like product, because "the same is true for many other types of high-end specialized wire rod").

[45] The foregoing analysis presumes domestic product of the 737-700 or MAX 7 during the POI. In fact, there were [ ] of the like product, as defined by Boeing, during the POI. [ ]. *See* [ ] Questionnaire, question II-7 . Moreover, the first 737 MAX 7 has yet to be produced. *See* Production on 737 MAX 7, the newest MAX airplane, gets underway: A new first: Boeing begins building MAX airplanes on two Renton production lines (Oct. 5, 2017), http://www.boeing.com/company/about-bca/washington/737-max7-production-10-05-17.page. **(Exhibit 11)** Where there is no domestic product that is "like" the subject imports, the Commission must, as a matter of law, define the domestic like product as the next most similar product produced by the domestic industry. *See Artists Canvas from China*, Inv. No. 731-TA-1091 (Preliminary), USITC Pub. 3777 (May 2005), at 5-6 (finding that since artist canvas kits are included within the scope, even if there were no domestic production the Commission would still have to find the next "most similar" article to such kits that is domestically produced); *Carbon & Certain Alloy Steel Wire Rod from China, Germany, and Turkey*, Inv. Nos. 731-TA-1099-1101 (Preliminary), USITC Pub. 3832 (Jan. 2006), at 10-11 (concluding that "when a type of imported subject merchandise is not made domestically, the Commission defines the domestic product in terms of the product most similar to the imported merchandise"). In this case, that product would be one or more larger variants of the 737.

[46] When viewed in the context of the global market for LCA, Petitioner's 100-seat lower-end limit for the scope makes just as little sense as its 150-seat upper limit. For purposes of defining the domestic like product, however, the lower-end limit is not subject to dispute, since no U.S. producer makes an LCA or regional jet with fewer than

### B. Boeing's 737 Family is a continuum with no clear dividing lines

Each time Boeing designs a new 737 derivative, it develops and optimizes a design for one aircraft, then creates a family by shrinking or expanding the length of the fuselage and making other adjustments. For the MAX, Boeing optimized a design for the MAX 8, then shrank the design for the MAX 7 and expanded it for the 9 and 10.[47] The MAX variants are not four distinct aircraft, the way the 747 and 787 are distinct twin aisle widebodies. Rather, they are four sizes of one aircraft, much the way a single T-shirt design can be produced in small, medium, large and extra-large. It should come as no surprise, therefore, that U.S. importer/purchaser questionnaire responses were [

] among 737 variants.[48]

#### 1. Physical Characteristics and Uses

Because Boeing's 737 family shares the same basic physical characteristics and general uses, differing only in size, they comprise the same like product. In *Lined Paper School Supplies*, petitioner proposed a domestic like product limited to lined paper products with a width of between 6 inches and 15 inches and a length of between 8-3/4 inches and 15 inches.[49] Finding that there were both smaller and larger lined paper products serving the same end uses as school supplies or office products, the Commission defined the domestic like product as all lined paper products of any dimension. In so concluding, the Commission highlighted that lined paper

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100 seats. Competition between the C Series and Embraer is, however, an important condition of competition in the U.S. market that is discussed further *infra*.

[47] *See* Flight Ascend Expert Report at 13 (**Attachment A**). *See also* Boeing 737 Technical Site at http://www.b737.org.uk/737max.htm (last visited December 10, 2017) (describing MAX 8 as "the baseline MAX").

[48] *See* Prehearing Report at I-23.

[49] *See Lined Paper School Supplies.*

products come in a continuum of sizes below, within, and above the range identified by petitioner. Similarly in this case, the Commission should find that for aircraft that share a common design and have the same general uses, variations in seat count (i.e. size), and range are not an appropriate basis for defining the domestic like product.[50]

In its Preliminary Determination, the Commission found that "{a}ll types of domestically produced single-aisle LCA, including 100- to 150- seat LCA, possess the same general physical characteristics and uses. All can be configured to transport 100 or more passengers and cargo at least 2,900 miles."[51] The record on the final phase provides additional support for this conclusion.

Boeing's 737s all seat 6 passengers abreast and exceed 2,900 nautical mile in minimum range.[52] All the NGs use the same engines, as do all the MAX variants.[53] While Boeing posits a number of physical differences between smaller and larger 737s, they all come down to one thing: size. Each successive model has a longer fuselage, which translates into higher weight and more seats.[54] Higher weight, in turn, can dictate requirements for certain parts, like wings and landing gear. It is particularly noteworthy, therefore, that when Boeing upsized its design

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[50] *See also Transfer Presses from Japan*, at 3 (finding one like product consisting of all U.S. produced mechanical transfer presses "{d}espite variations in design and size due to technical specifications" because they otherwise "have the same physical characteristics and are used for the same general purpose, that is, forming metal parts"); *Certain Seamless Carbon and Alloy Steel Standard, Line, and Pressure Pipe from China*, Inv. Nos. 701-TA-469 and 731-TA-1168 (Final), USITC Pub. 4190 (Nov. 2010), at 6 (finding that although "small diameter seamless SLP pipe may be used more intensively in higher pressure applications than large diameter seamless SLP pipe, the record does not demonstrate that 4.5 inches represents a clear dividing line between end uses") (hereafter "*Seamless Pipe from China*").

[51] *See* Prelim. Det. at 8.

[52] *See* Product Comparison Chart (**Exhibit 12**)

[53] *Id*.

[54] *Id*.

for the MAX 7 in 2016, it replaced the original MAX 7 wing and landing gear with the MAX 8 wing and landing gear, making the MAX 7 even more physically similar to the MAX 8.[55] Within this series of successively larger and heavier 737 variants, the difference between a MAX 7 and a MAX 8 is no more distinct than that between a MAX 8 and a MAX 9, or a MAX 9 and a MAX 10.

Nor is there a clear dividing line based on seat count. In the U.S. market, the Federal Aviation Administration (FAA) limits the maximum number of seats for each 737 variant, and within that limit each airline decides how many seats it wants on its aircraft, how they will be spaced, and how many classes of service it wishes to offer (e.g., economy, economy plus, business or first class). This means that each 737 variant can accommodate a range of seat counts. Boeing produces its 737 aircraft in a range of seat counts that increases incrementally.[56] In general, a 737 would have more seats in a one-class configuration (such as used by a budget airline) and fewer in a three-class configuration (as is typical for many U.S. domestic flights).

With this degree of flexibility for seat count variations, there is no logical dividing line within the 737 family at 150 seats.[57] For example, American Airlines has configured its 737-800s, which Boeing does not include in its definition of the domestic like product, with a seat count from 150 (within scope) to 160 (out of scope).[58] Similarly, the 737 MAX 7, which Boeing places within the 100-150 seat like product, can seat up to a maximum of 172 passengers.[59]

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[55] *See* Flight Ascend Expert Report at 10-11 (**Attachment A**). *See also* Boeing, *A family first: 737 MAX 8 awarded FAA certification: 737 MAX 8 on track for delivery later this year* (Mar. 10, 2017), http://www.boeing.com/company/about-bca/washington/737-max8-certification-03-09-17.page (**Exhibit 13**).

[56] *See* Seat Count Continuum (**Exhibit 14**).

[57] *See id*.

[58] *See* Examples of Seating Configuration - American (**Exhibit 15**).

[59] *See* Product Comparison Chart **(Exhibit 12)**.

Southwest Airlines, Boeing's launch customer for the MAX 7, reportedly plans to configure the plane to seat 155 passengers.[60] In sum, seat configuration is simply one of a few customizable features offered in the 737 family of products and whether a particular aircraft seats more or fewer than 150 passengers is often within the discretion of the purchaser.[61]

Nor do differences in seat count translate into meaningful differences in use. Indeed, it strains credulity to suggest that two 737 aircraft, one holding just under 150 passengers and one holding just over 150, are suited to meaningfully different uses based on seat count. Indeed, the only difference in use Boeing identifies is that its smaller 737s can serve "high/hot" airports, of which the United States has only [ ].[62] The ability to serve high/hot airports is a function of a high thrust to weight ratio, which exists specifically because the 737-700 and MAX 7 are shrunken versions of larger aircraft.[63] It is not related to seating capacity.

Consistent with the limited and incremental nature of these differences, almost all respondents to the U.S. Importer/Purchaser Questionnaire consider the 737 models at least

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[60] "The new MAX 7 will seat approximately 155 in a single class configuration for Southwest and about 138 in a two-class configuration, up from 126 for the 737-700." *See* Arvai, *Boeing Finalizes a Larger 737 MAX 7 Design*, AirInsight (2016) (**Exhibit 16**).

[61] *See* Flight Ascend Expert Report at 14-16 **(Attachment A)**. Boeing also suggests that crew requirements demonstrate a clear dividing line between the 737-700/MAX 7 and larger variants, because FAA regulations require an additional flight attendant on flights with more than 150 passengers. *See* Boeing Post-Conference Brief, at 12. In Southwest's planned configuration, the MAX 7 would require an extra flight attendant. Moreover, a MAX 10 configured for over 200 passengers would require one more flight attendant than a MAX 9 configured for between 150 and 200. *See* 14 C.F.R. §1 21.391(a)(4) (requiring airline companies to provide for airplanes having a seating capacity of more than 100 passengers at least two flight attendants plus one additional flight attendant for each unit (or part of a unit) of 50 passenger seats above a seating capacity of 100 passengers.)

[62] *See* Boeing Post-Conference Brief, at 11-12. Petitioner claimed that the 737-700 and MAX 7 occupy a unique market niche, because "certain U.S. airports are not suitable for the 737-800 and 737 MAX 8 due to a combination of short runway lengths, elevation, temperature, humidity, and other environmental conditions" and offered a list of [ ] such airports in the United States" *See id*. According to publicly available sources, however, in June 2017, Boeing 737-800s and 900s, and sometimes even Boeing 757s, regularly flew on routes to/from six out of these [ ] airports, and 737-700s did not fly to three of these airports at all. *See* Diio, U.S. Routes Analysis (**Exhibit 17**).

[63] *See* Delta Post-Conference Brief, at 16.

[ ], [ ] or even [ ] comparable in terms of their physical characteristics and uses.[64] [ ], which has purchased [ ]% of all 737-700s Boeing domestically sold since 2007[65] and calls itself [ ][66] responded that 737-700 and 737 MAX 7 are [ ] with 737-800 and 737 MAX 8.[67] In the narrative discussions of physical characteristics and uses, several respondents emphasized [ ][68] among Boeing's single-aisle LCA models and stressed that [ ].[69] Accordingly, the record contains abundant evidence that 150-seat capacity does not represent a clear, nor recognized, dividing line between the 737-700/7 and larger single-aisle LCA, because all single-aisle LCA have otherwise similar physical characteristics and uses.

**2. Interchangeability**

Boeing has produced multiple generations of 737 aircraft since the late 1960s, conceiving of each successive program using the "aircraft family" concept, also known as the "common type

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[64] *See* Prehearing Report at I-22 and I-24. However, the analysis presented in the Staff Report does not appear to reflect purchaser [ ] response that physical characteristics and uses are [ ] comparable between the 737-700 / Max 7 and the 737 / Max 8 and between the 737-900 / Max 9 and the Max 10. (**Attachment C, Chart 1**)

[65] [ ] Questionnaire at [ ].

[66] [ ] Importers/Purchasers Questionnaire at [ ].

[67] [ ] Importers/Purchasers Questionnaire at [ ].

[68] [ ] Questionnaire Response ([ ]).

[69] *See*, *e.g.*, [ ] Questionnaire Response ([ ]; [ ] Questionnaire Response ([ ]).

certificate." Type certificates, issued by national authorities like the FAA and Transport Canada, allow for crew and pilot interchangeability as well as maintenance interoperability within a product family. Boeing's common type certificate thus permits commonality in operational requirements and maintenance among the 737 family.[70]

In its Preliminary Determination, the Commission observed that there are economic limitations on the interchangeability of 100-to 150-seat LCA and larger single-aisle LCA, because airlines allocate planes to specific routes based on anticipated seat demand.[71] Indeed, there is less interchangeability between single-aisle LCA at the highest and lowest ends of the size or seat count, since, as the Commission observed, airlines "avoid using a larger single-aisle LCA on routes with lower seat demand because doing so might result in empty seats, higher costs and lower profits."[72] However, the Commission found that "evidence shows a degree of interchangeability, because single-aisle LCA can be configured differently."[73]

The record in the final phase confirms that the degree of interchangeability is even greater than was evident at the time of the preliminary determination. [ ] that airlines use aircraft with different seat counts on the same route at different times of day or in different seasons to accommodate demand fluctuations.[74] In fact, U.S. importer/purchasers were [ ] in viewing interchangeability of 100-to 150-seat LCA as [ ] comparable to other single aisle LCA. In their responses to the U.S.

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[70] See Dep't of Transp., FAA Type Certificate (**Exhibit 18**).

[71] Prelim. Det. at 14.

[72] *Id*.

[73] *Id.* at 15.

[74] *See* [ ] Questionnaire at [ ].

Importers/Purchasers questionnaire, [ ] and [ ], indicated that that 737-700 and 737 MAX 7 are [ ] with 737-800 and 737 MAX 8, 737-900 and 737 MAX 9, as well as 737 MAX 10. [ ] responded that they are [ ] interchangeable as [ ].[75] [ ] clarified that [ ],[76] while [ ] noted that [ ][77]

Numerous purchasers reported that such substitutions regularly occur below, above, and across an arbitrary 150 seat divide. For example, [ ] and [ ] stated that, in 2016, they substituted 100-to 150-seat LCA on [ ] and [ ] percent of routes, respectively, with aircrafts that have more than 150 seats, and on [ ] and [ ] percent of routes, respectively, they substituted 100- to 150-seat LCA with aircraft smaller than 100- to 150-seat LCA.[78] [ ] explained that [ ], as [

[75] [ ] Importers/Purchasers Questionnaire.

[76] [ ] Importers/Purchasers Questionnaire, at [ ].

[77] [ ] Importers/Purchasers Questionnaire.

[78] *See* [ ] U.S. Importers/Purchasers Questionnaire at [ ]; [ ] Importers/Purchasers Questionnaire, at [ ]. [ ] reported that it substitutes a 100- to 150-seat LCA with an aircraft with more than 150 seats on [ ] percent of routes.

].[79]

[ ] stated that, [

].[80]

[ ] also confirmed that [

].[81]

All parties agree that airlines generally seek to optimize their cost-per-seat and therefore aim to use aircraft which are no larger than necessary to meet demand.[82] This practice simply demonstrates why airlines substitute among different sized aircraft on the same routes at different times of the day or year. There is no magic about 150 seats that makes the 737-700 or MAX 7 either more or less interchangeable with the 737-800/MAX 8 than those aircraft are with their larger brethren the 737-900, MAX 9 and MAX 10.[83]

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[79] *See* [ ] U.S. Importers/Purchasers Questionnaire at [

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[80] *See* [ ] U.S. Importers/Purchasers Questionnaire at [ ].

[81] *See* [ ] U.S. Importers/Purchasers Questionnaire at [

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[82] *See* Boeing Post-Conference Brief. *See also* Delta Post-Conference Brief at 16-17 ("Delta seeks to optimize its fleet on at least two levels by (1) maximizing its aircraft utilization and (2) having 'the right sized aircraft for each flight' to avoid flying with empty seats."); Bombardier Post-Conference Brief at 17.

[83] *See Certain Lined Paper School Supplies*, USITC Pub. 3884 at 11 ("The differences between {lined paper products (LPP)} and outsized lined paper products . . . also exist among the products within LPP and outsized lined paper products, respectively."). In any event, the Commission has not found a lack of interchangeability to necessarily weigh in favor of finding a clear dividing line where limited interchangeability characterizes the entire continuum of products. In *Certain Iron Mechanical Transfer Drive Components from Canada and China*, the petitioner contested the inclusion of small-diameter iron mechanical transfer drive components (IMTDCs) in the Commission's preliminary like product definition, but the Commission determined that "{w}hile IMTDCs of different sizes necessarily have … a lack of substitutability, such differences apply to all IMTDCs of different sizes

### 3. Common Manufacturing Facilities, Production Processes, and Production Employees

[ ] U.S. importer/purchasers agree that larger and smaller single aisle LCA are manufactured in the same facilities with the same employees and with a high proportion of the same parts.[84] The record shows that Petitioner assembles all single-aisle LCA on the same production lines in Renton, Washington, using the same production processes and employees.[85]

While Petitioner claims that "specialized tooling" used in the manufacture of the smallest 737s demonstrates a meaningful distinction under this factor,[86] the only product-specific tooling identified in Boeing's U.S. producer questionnaire is [

].[87] These items [

] None of them [

]. Moreover, Boeing's questionnaire response makes clear that its product-specific

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regardless of the dividing line." Inv. Nos. 701-TA-550 and 731-TA-1304-1305 (Final), USITC Pub. 4652 (Dec. 2016), at 13

[84] *See* Prehearing Report at I-27 ("U.S. importer/purchasers [ ] reported that 100- to 150-seat LCA and other single-aisle LCA are generally manufactured in the same facilities with the same employees. U.S. importer/purchasers claim that the entire 737 family is manufactured in common facilities with the same employees and a high degree of the same parts because the 737 models all maintain the same basic design even if they increase incrementally in size."). *See also* [ ] Questionnaire at [ ]; [ ] Importers/Purchasers Questionnaire [

]; [ ] Importers/Purchasers Questionnaire, at [
]; [ ] Importers/Purchasers Questionnaire [

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[85] *See* Prehearing Report at I-15-17.

[86] *See* Prehearing Report at I-27.

[87] *See* Boeing U.S. Producer Questionnaire at [

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tooling represents [ ] of total assets used for production of the subject product.[88] Because [ ] fixed assets are not specific to Boeing 737-700 and MAX 7, the use of specialized tooling is [ ] and does not overcome the Commission's practice of treating a common production line as sufficient to satisfy this like product factor.

Aside from the tooling itself, Petitioner points to its desire to produce several of the same aircraft model in a row on the production line, to minimize inefficiency due to tooling changes.[89] Petitioner never quantifies these costs, however, and they appear minimal given the nature of the reported product-specific tooling. In any event, the Commission has generally not found that tooling changes or other product changeovers on a single production line prevent different types of steel, chemicals or other products from being considered a single like product.[90] For example, in *Color Picture Tubes from Canada, Japan, Korea, & Singapore*, the Commission found no clear dividing line between conventional color picture tubes (CPTs) and HD CPTs, which were made on the same production line, by the same production employees, and in the same facility,

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[88] *See* Value of Boeing's Dedicated and Other Fixed Assets Used to Produce 100- to 150-seat LCA (**Attachment C, Chart 2)**; Boeing U.S. Producer Questionnaire, at [ ]. While these numbers are [

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[89] Boeing Post-conference Brief at 13. *See also* USITC Staff Report?: Interviews and plant tour in Renton, Washington regarding 100- to 150-seat Large Civil Aircraft from Canada: Investigation Nos. 701-TA-578 and 737-TA-1368 (final) at 4.

[90] *See, e.g.*, *Cold-Drawn Mech. Tubing from China, Germany, India, Italy, Korea, & Switzerland*, USITC Inv. No. 701-TA-576 (June 1, 2017) (finding no clear dividing line between hydraulic tubing and other types of CDMT, since both are produced using overlapping manufacturing facilities, production processes, and employees, and are sold in the same channels of distribution). Petitioner's reliance on *Small Diameter Graphite Electrodes from China*, Boeing Postconference Brief at 13, is misplaced. In that case, the Commission found only "a limited overlap" in manufacturing facilities because only one of four manufacturers could produce both large and small electrodes on the same equipment with the same employees. The Commission also found very little overlap in end uses and total lack of substitutability due to different current capacity of graphite electrodes.

even though switching from the production of either conventional or HD CPTs to the other entailed a delay of about a day.[91]

Finally, Petitioner oints to its efforts to cross-train workers to produce all the 737 variants on a single production line.[92] This simply confirms that Petitioner is using the same workers across each 737 family.

**4. Channels of Distribution**

There is no dispute between the parties that all aircraft in the 737 family are sold by the same Boeing salesforce to U.S. and global airlines as well as leasing companies. In its response, [

].[93] U.S. importers and purchasers [ ].[94] This factor therefore supports defining the domestic like product in this case as a continuum consisting of all 737 aircraft.

**5. Customer and Producer Perceptions**

On this factor, Boeing is trying to have it both ways. Their marketing materials and marketing team tout the 737 as a single family of aircraft offering a high degree of commonality. Yet they are asking the Commission to ignore decades of 737 marketing experience and

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[91] *See Color Picture Tubes from Canada, Japan, Korea, & Singapore*, Inv. No. 731-TA-367 (Review), USITC Pub. 3291 (Apr. 2000). *See also Certain Biaxial Integral Geogrid Prod. from China*, USITC Inv. No. 701-TA-554 (Mar. 1, 2017) (concluding that substantial retooling and recalibration of machines used to produce biaxial or triaxial geogrids do not preclude finding of a single domestic like product because both are produced in the same facilities using much of the same machinery and employees.).

[92] *Id*.

[93] [ ] Questionnaire at [ ].

[94] *See, e.g.*, [ ] Importer/Purchaser Questionnaire [ ]; [ ] Importer/Purchaser Questionnaire [ ]; [ ] Importer/Purchaser Questionnaire, at [ ].

conclude that both producers (i.e. Boeing itself) and customers (airlines and leasing companies) perceive the 737-700 and MAX 7 to be different and apart from the rest of their respective families. The record provides no support for Boeing's rewrite of history.

Boeing's marketing materials define a unitary "single aisle market."[95] Its website describes the 737 MAX as a single interoperable family of aircraft and emphasizes the benefits of commonality in airline operations.[96] Moreover, all 737 aircraft are supported by the same customer support team and global parts distribution network.[97] Not surprisingly, importer/purchaser questionnaire responses make clear that [

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Despite this overwhelming evidence, Petitioner insists that [

][99] and that the 737-700 and MAX 7 [

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[95] *See*, e.g., Boeing 2016 Annual Report, at pp. 4, 12, and 122 (stating that the 737 Next Generation family "spans the entire 126- to 220-seat market") (**Exhibit 19)**; Boeing Current Market Outlook 2016-2035 at 47 (listing a "single aisle" category but distinguishing among "small, medium and large widebodies), 52 (chart titled "Airplane Market Sector Definitions" and listing all Boeing 737 models as "single aisle passenger airplanes") (**Exhibit 20**); Next Generation 737 Design Highlights: One Plane in Three Sizes (**Exhibit 21**)

[96] In its website description for 737 MAX, Boeing indicates that, "The MAX family is designed to offer the greatest flexibility, reliability and efficiency in the single-aisle market." at http://www.boeing.com/commercial/737max/# (last visited Dec. 6, 2017) (**Exhibit 22**).

[97] Boeing Support and Services Overview (**Exhibit 23**).

[98] [ ] Importer/Purchaser Questionnaire at [ ]. [ ], [ ], [ ], and [ ] indicated in their questionnaire responses that 737-700 and MAX 7 are [ ] comparable to larger single-aisle LCA produced by Boeing. [ ] and [ ] responded that they are [ ] comparable. Only [ ] responded that 737-700 and MAX 7 are [ ] comparable to any larger aircraft in the Boeing 737 family. *See* U.S. Importer/Purchaser Questionnaire by [ ].

[99] *See* [ ] Producer Questionnaire at [ ]. *See also* Prehearing Report at I-29 (same). Aside from its own assertions, the only supporting citations Boeing has provided were Bombardier marketing materials describing Bombardier's products. *See* Petition at 34; Boeing Postconference Brief at 7-8. These materials compare the C Series with other aircraft; they do not address similarities and differences between smaller and larger 737s. The Commission noted this distinction in its Preliminary Determination. Prelim Det. at 13. *See Torrington Co. v. United*

]100 Petitioner goes so far as to claim that it [

]101

Boeing's half-hearted attempt to turn this like product factor in its favor will not fly. First, industry analysts and market participants do not view the 100- to 150-seat LCA market segment as distinct. As discussed above, there is a widespread industry understanding that the market for single-aisle aircraft is a continuum, from which airlines choose a platform of the right size for a given route to optimize their operating economics and avoid flying planes with empty seats.[102] Petitioner itself never held this view of segmentation until after it filed the petition in this proceeding. [103] Second, Boeing's investment in the design and development of the MAX 7 as a shrink of the MAX 8 does not prove that aircraft is perceived as distinct from the rest of its

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*States*, 747 F. Supp. 744, 749 (Ct. Int'l Trade 1990), aff'd, 938 F.2d 1278 (Fed. Cir. 1991), and adhered to, 15 C.I.T. 435 (1991), and adhered to, 15 C.I.T. 437 (1991) (affirming that in determining the scope of domestic like product, the ITC finds distinctions "among the domestic products, not between domestic products and imported products.").

[100] *See* [ ] Producer Questionnaire at [ ].

[101] *Id*.

[102] *See, e.g.*, Ernest S. Arvai, *Making Boeing Great Again*, AirInsight (Nov. 30, 2017) ("Outside of the trade case, Boeing characterizes the market differently. In its Current Market Outlook, Boeing describes a market composed of regional aircraft, single-aisle aircraft, small to medium twin-aisle aircraft, and large twin-aisle aircraft. Reviewing Boeing's annual forecasts in our archives back to 2005, we find that Boeing's forecasts consistently reference the single-aisle market, not a market for aircraft with 100 to 150 seats.") (**Exhibit 24**). *See also* Doug Cameron & Robert Wall, *Budget Carriers Gird for Growth*, Wall Street Journal (Nov. 16, 2017) (discussing single-aisle market as a whole without distinguishing it by number of seats) (**Exhibit 25**). *See also* Importer/purchasers responses on customer perceptions supra note 113.

[103] *See, e.g.*, Boeing 737 MAX Family, at http://www.boeing.com/commercial/737max/# (last visited Dec. 6, 2017) (**Exhibit 22**). *See also* Boeing 2016 Annual Report, at pp. 4, 12, and 122 (stating that the 737 Next Generation family "spans the entire 126- to 220-seat market") (**Exhibit 19**); Boeing Current Market Outlook 2016-2035 at 47 (listing a "single aisle" category but distinguishing among "small, medium and large widebodies), 52 (chart titled "Airplane Market Sector Definitions" and listing all Boeing 737 models as "single aisle passenger airplanes") (**Exhibit 20**).

family by Boeing or anyone else. [ ] of the investment Boeing made into the MAX family went to design and development of its flagship MAX 8, with [ ] percent of its R&D spending directed towards the MAX 7.[104] Likewise, [ ] percent of its capital expenditures during the POI went towards the 100- to 150-seat LCA.[105] The investment data serve only to reinforce that the 737-700 and MAX 7 are variants of a single design.[106] The Commission should therefore find that this factor substantiates a continuum comprised of all Boeing 737 aircraft.

**6. Price**

Larger aircraft, like most larger, heavier items in a continuum, are priced higher than smaller aircraft. There is, however, no clear dividing line along the price continuum, especially because aircraft pricing is multi-dimensional and opaque.[107]

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[104] *See* [ ] Questionnaire Response, at [ ]. [ ] also noted in response to question III-13c that [

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[105] *See* [ ] Questionnaire Response, at [ ].

[106] Even when there have been mixed consumer and producer perceptions about certain products, the Commission has found a continuum of products. *See, e.g.*, *Large Power Transformers from Korea*, Inv. No. 731-TA-1189, USITC Pub. 4346 (Aug. 2012), at 7 (finding no clear dividing line on the basis of customer and producer perceptions of two categories of large power transformers (LPTs) because "there {was} no recognized industry standard distinguishing" both types) (hereinafter "*Power Transformers from Korea*"); *Seamless Pipe from China*, at 8 (finding a continuum of products even where customers and producers perceived small diameter pipe and large diameter pipe as different "insofar as they are not generally interchangeable" because customers and producers "do not perceive them to be two distinct product groups with a clear dividing line at 4.5 inches in outside diameter."). *See also Certain Seamless Carbon and Alloy Standard, Line, and Pressure Pipe from Japan and South Africa*, Inv. Nos. 731-TA-847 and 850, USITC Pub. 3311 (Jun. 2000), at 11 (although customers perceive alloy pipe "as a specialty product," those perceptions are "consistent with alloy pipe's small niche within the larger seamless carbon and alloy pipe market").

[107] *See, e.g.*, [ ] Importer/Purchaser Questionnaire, at [

]; *See also* Delta Post-Conference Brief (explaining that the aircraft industry is marked by a high degree of price opacity which minimizes the probative

When considering purchases, airlines employ complex and proprietary lifetime operating cost calculations, to which price is merely a single input. In such calculations, despite a higher purchase price a larger plane could be cheaper to operate on certain routes than a smaller one on a seat mile basis, i.e., the cost per seat of operating the aircraft on a particular route.[108] Indeed. airlines responding to the questionnaire reported that they give [ ] to purchase prices in their net present value formulae.[109]

While Petitioner has [

],[110] Respondents respectfully submit that this is not a useful comparison because no one pays list price for an aircraft or finds comparing list prices to be useful in making product selections.[111] As noted in the Prehearing Report, U.S. Importers/purchasers [

] because [

].[112] For example, [ ] explained that

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value of price in defining the like product and that "{l}ist prices are useless as an indication of the actual purchase price.").

[108] *See* Prehearing Report at I-31.

[109] *See* Prehearing Report at I-31 [

]. *See also* Importer/Purchaser Questionnaire at [

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[110] Prehearing Report, at I-31.

[111] *See* Flight Ascend Report at 43 (**Attachment A**) ("Aircraft manufacturers' list prices are often referred to as being meaningless, given that all customers receive a discount, and discounts of more than 50% are commonplace. The only practical application of list prices is their use as the basis for calculating customer deposit placements.").

[112] Prehearing Report, at I-31.

[

].[113]

Furthermore, the Prehearing Report confirms that [

].[114] Since January 1, 2014, Boeing reported [

].[115] The [ ] of conversion of 737-700 and MAX 7 to larger and more expensive aircraft indicates that airlines do not consider different 737s as discretely priced items, but as options along a value continuum that generate different net present values as economic conditions change.[116] Moreover, Boeing now publicly lists many orders for the 737 MAX as

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[113] *See* [ ] Importer/Purchaser questionnaire. *See also id*. at [

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[114] Prehearing Report at 18-19. *See also* [ ] Importer/Producer Questionnaire at [

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[115] *See* Prehearing Report at V 18-19 [

]. *See also* Flight Ascend Report at 21, Table 3 (**Attachment A**) (737 NG cumulative firm orderbook 1993-2017) showing that since the 737-700 was launched, 605 original orders were swapped for a different model, typically for 737-800.

[116] Flight Ascend reports that some airline companies and lessors seek to place orders for a smaller version of an aircraft with flexibility to switch their order at a later date to the larger version. Because the pre-delivery payments are calculated based list prices, the customers have an incentive to place orders for smaller 737 MAX 7 and upgauge later. Boeing is also highly incentivized financially to sell larger variants on 737 because it estimates to realise additional revenue from larger aircraft. The built-in incentive to swap MAX 7 orders for larger variants confirms that both Boeing and its customers perceive all 737 MAX variants as a continuum product without clear dividing lines. *See* Flight Ascend Expert Report at 46-47 (**Attachment A)**.

model series TBD, indicating that Boeing sells and its customers buy the family and select the precise aircraft later.[117]

In any event, the Commission has acknowledged that price is not a particularly useful factor when prices vary by product specifications, nor are price differences alone sufficient to overcome the clear weight of the other like product factors that demonstrate a continuum. For example, in *New Steel Rails from Canada*, the Commission declined to find a clear dividing line between industrial and prime rail.[118] Particularly with respect to price, the Commission said, "…there is clearly a significant price difference between the prime and industrial rails. However, there are also significant price differences among other different types of rail."[119] Accordingly, the Commission said, "price differences would … support further subdivision of the like product," which the Commission found insufficient to warrant finding separate like products.[120] As in *Rails from Canada*, there are price differences between the 737-700/MAX 7 and larger single-aisle LCA, but such price differences vary considerably from customer to customer and in any event apply to all aircraft of different sizes and configurations with no distinctive dividing line at 150 seats.[121]

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[117] *See* Orders & Deliveries Report (**Exhibit 26**). *See also* Flight Ascend Expert Report at 25 **(Attachment A)** (explaining that Boeing's rational for this is that each MAX customer may have the ability to select or change the series until they make a final selection)

[118] *See New Steel Rails from Canada*, Inv. No. 701-TA-297 (Final), USITC Pub. 2217 (Sept. 1989) (hereinafter "*Rails from Canada*").

[119] *Id.* at 3.

[120] *Id.* 3-4.

[121] *See, e.g.*, *IMTDCs from Canada*, at 10 (finding no clear dividing line even though IMTDCs of difference sizes have price differences because "such differences apply to all IMTDCs regardless of the dividing line"); *Power Transformers*, at 8 (noting that "price is not a particularly useful factor in this investigation because LPT prices vary depending on the specifications").

### C. Even Without a U.S. FAL, the domestic industry producing single-aisle LCA with at least 100 seats is not threatened with material injury by reason of subject imports

The domestic industry is defined as the domestic "producers as a whole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product."[122] In this case, if the Commission agrees with Respondent that the domestic like product definition should be expanded to include the entire 737 family of aircraft, the Commission should find that the domestic industry is comprised of all Boeing 737 production as well as Airbus America's domestic production of the A320 and A321.

The strength or weakness of the domestic industry is relevant to a threat determination under the "other relevant economic factors" provision of the statute.[123] "A healthy industry can better withstand competition from future imports than one that is functioning close to a state of material injury."[124] Here, there can be no reasonable dispute that the domestic industry producing single aisle LCA seating at least 100 passengers is not vulnerable.[125] As demonstrated below, whether measured in terms of [ ], this domestic industry is performing [ ].

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[122] 19 U.S.C. § 1677(4)(A).

[123] *See Calabrian Corp. v. United States*, 794 F. Supp. 377, 387 (Ct. Int'l Trade 1992) (citing 19 U.S.C. § 1677(7)(F)).

[124] *Certain Ball Bearings and Parts Thereof from Japan and the United Kingdom*, Inv. Nos. 731-TA-394-A-399-A (Final), USITC Pub. 4131 (Jan. 2010), at 11.

[125] The CEO of Boeing sees no signs of upcoming vulnerability of the Company. *See* Press Release, Boeing Reports Fourth-Quarter Results and Provides 2017 Guidance, issued January 25, 2017 **(Exhibit 27)**.

The industry's operating margins were [ ] in 2014, 2015, and 2016, respectively.[126] Despite lumpy demand and economic fluctuations, these financial results are [

].[127] Public reports confirm that the 737 family, which accounts for most of domestic production, is financially healthy, driven by sustained high backlog for the aircraft family overwhelmingly comprised of 737-800 and 737-900 family members.[128] The 737 family represents 45% of Boeing's $424 billion commercial airplanes backlog, and the average profit margin across Boeing Commercial Airplanes for 2013-15 was 9.8%.[129] These outstanding financial results are consistent with, and further amplify, numerous structural advantages that Boeing enjoys in the LCA market, including economies of scale, the ability to amortize costs over a larger number of units, the ability to offset the low profitability of one product line with revenues from a more profitable line, and airlines' desire for commonality in their fleets, which incentivizes them to replace and expand their fleets through existing suppliers.[130]

Other factors reinforce this conclusion. During the POI, the domestic industry's U.S. market share rose from [ ] percent in 2014 to [ ] percent in 2016, and was [ ] in interim 2017 at [ ] percent.[131] Consistent with Boeing's enormous backlog and stated

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[126] Prehearing Report at Table C-3.

[127] "Boeing P&L Data for 100- to 150-Seat LCA and Other Single Aisle LCA" **(Attachment C, Chart 5)**.

[128] "737 aircraft family enjoys robust financial health" **(Exhibit 28)**.

[129] *Id*.

[130] *See, e.g.*, Ernest S. Arvai, Premium #327 – *Boeing's Trade Complaint Against Bombardier – Does It Hold Water?*, AirInsight (May 2, 2017) (**Exhibit 29**); Ernest S. Arvai, *Why are Airbus and Boeing Afraid of Bombardier?*, AirInsight (Feb. 23, 2017) (**Exhibit 30)**; AirInsight, *Bombardier's C Series at EIS: Regaining Momentum* at 20, 44-46 (July 2016) (**Exhibit 31**); Aircraft Value News, *United Airlines Buys B737700s for "$20-25 million":"Strategic Pricing" Still Evident Despite Record Backlog* (May 2, 2016) (**Exhibit 32**).

[131] Prehearing Staff Report at Table C-3.

intention to increase production, the industry's production/capacity rose from [ ] aircraft in 2014 to [ ] in 2016. U.S. shipments rose by almost [ ] percent in the same period. Consistent with the variety of aircraft sold and individual negotiations, average unit net sales values [ ].[132]

In light of Boeing's sold-out skyline and [ ], the tremendous success of its 737 program, and the solid performance of the domestic industry during the POI, it strains credulity to argue that Boeing will suffer an imminent reversal of fortune, sufficient to cause it material injury, due to a small number of future imports of C Series aircraft (even if such imports occurred, which as discussed above they will not). Even if the Commission were to conclude (erroneously, as explained below in Part IV) that there is meaningful competition between the C Series and the 737 MAX 7, the C Series presents no competitive threat whatsoever to the MAX 8, 9, and 10, which account for the vast majority of Boeing's MAX backlog and future sales prospects.

Furthermore, as discussed in Part IV, Boeing's lack of sales for the 737-700 over many years before the C Series was even on the market and the weak order book for the MAX 7 have nothing to do with Bombardier's C Series, which has not competed with the MAX 7, and much more to do with the aircraft being ill-adapted to the lower segment of the market for the 737 line of aircraft and Boeing's own strategy of encouraging airlines to purchase the larger MAX 8 and MAX 9 derivatives, which are more profitable for Boeing.

In sum, if the Commission agrees with Respondents that the appropriate like product includes all single aisle LCA seating at least 100 passengers, there is simply no basis to conclude

[132] *Id.*

that the domestic industry is threatened with imminent material injury by reason of subject imports.

## IV. Even if the Like Product Remains Unchanged, Conditions of Competition Compel a Finding of No Threat of Injury

In assessing whether there is a threat of material injury to the domestic industry, the Commission takes into consideration "all relevant economic factors that bear on the state of the industry in the United States," including all "conditions of competition that are distinctive to the affected industry."[133] The market for single-aisle aircraft—even if defined in the exceedingly narrow and artificial manner proposed by Boeing—is characterized by several conditions of competition demonstrating that Boeing faces no threat of material injury by reason of subject imports from Canada. Most importantly:

- competition between Boeing and Bombardier is attenuated insofar as the C Series is a uniquely modern, clean-sheet, high-performance, and efficient option for airline routes with passenger counts in the lower part of the single-aisle size range, while Boeing relies on derivative aircraft and long ago all but abandoned the lower part of the single-aisle range;
- "launch pricing" and "marquee pricing" have facilitated the introduction of the C Series in the marketplace, consistent with industry practice, but will not have enduring price effects because pricing is opaque and there is no "lighthouse effect," as customers are well aware that pricing materially increases once the early adopter phase has passed; and
- any failure of the MAX 7 to gain "commercial momentum" and win acceptance in the marketplace is unrelated to the C Series.

### A. Boeing Mischaracterizes Conditions Of Competition In The Market For Single-Aisle Aircraft And Bombardier's Sale To Delta

In order to evaluate Boeing's allegations regarding an imminent threat of material injury by reason of C Series imports, it is important first to understand certain key conditions of competition in the single-aisle segment for 100- to 150-seat LCAs. In this section, we provide

[133] *See, e.g.*, *Truck and Bus Tires from China*, Inv. Nos. 701-TA-556 and 731-TA-1311 (Final), USITC Pub. 4673 (Mar. 2017), at 16, 31; *see also* 19 U.S.C. § 1677(7)(C)(iii).

factual background regarding supply, demand, and other factors that should inform the Commission's threat assessment.

### 1. Demand-side Factors

#### a) Sophisticated, customizable product

LCAs are far from a standardized commodity product. Airlines seek to meet highly specialized objectives when purchasing single-aisle aircraft. The airline's mission profile will define the aircraft it seeks to acquire.[134] [ ] affirmed that non-price factors such as [

].[135] Performance weight and thrust are just some of the features that an aircraft producer can customize according to the airline's requirements.[136] In addition, there are a range of other ancillary items that may be included in an aircraft purchase contract depending on the purchaser's specific needs, such as pilot training, ground crew training, ground support services, and spare parts.[137]

#### b) Airline fleet structure

Because passenger demand varies by route and over time, and because empty seats are extremely costly, airlines aim to acquire and deploy a fleet of aircraft that will enable them to match seat capacity to the demand for specific routes at specific times. [

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[134] Delta Post-Conference Brief, at 17.

[135][ ] Importers/Purchasers Response to Questionnaire at III-13a. For example, only a few aircraft have [ ] suitable to service airports with short runways at high altitudes or hot climates. *See* Prehearing Report at II-40, II-41; Delta Post-Conference Brief, at 16, 25; Boeing Post-Conference Brief, at 11.

[136] Conf. Tr. at 179 (Mr. May).

[137] Conf. Tr. at 63-64 (Mr. Conner).

]138 To optimize service and maximize revenues, airlines thus need a range of aircraft sizes in their fleet. Delta has explained that its strategy is to acquire regional and single-aisle aircraft based on "six-step functions of capacity," from 50 to 199 seats.139

One of Delta's target sizes is 100-110 seats, a segment of the continuum that has increasingly been underserved. Many models of that size have disappeared over the years, given the difficult economics caused by higher seat costs compared with seat costs for larger LCAs.140 Boeing, for example, has denied the viability of this segment. While Boeing once produced 717 and 737-600 aircraft in that size range, it abandoned both programs roughly a decade ago.141 Both Boeing and Airbus focused instead on larger single-aisle aircraft, which are more profitable for manufacturers and—so long as the airline can fill the seats—have more favorable seat costs

138 *See* Importers/Purchasers questionnaires at III-13a.

139 Conf. Tr. at 169-74 (Mr. Esposito); Delta Post-Conference Brief, at 17-19.

140 Flight Ascend Expert Report at 17 (**Attachment A**)("the 'shrink-of-a-shrink' 737-600 (the baseline size is the 737-800) was a heavyweight 100- seater" that "failed to generate significant market interest"; its final deliveries were in 2006).

141 Delta Post-Conference Brief, at 33 ("Boeing abandoned {the niche below the 737} market when it ceased production of the 717 and offered no alternative"); [ ] response to Importers/Purchasers Questionnaire at III-14 ([

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for airlines.[142] This left a sizable gap in the market for 100-125 seats, where Boeing has offered no product at all in the last 11 years.[143]

**c) Forecasted demand**

While Boeing and Airbus abandoned the low end of the single-aisle market, demand for such aircraft remained. With no new and economically viable replacement aircraft on the market, airlines extended the service lives of their existing fleet and acquired used planes. In this segment, U.S. airlines have had little choice but to rely heavily on outdated models such as the 717 and MD-80, and on larger Embraer aircraft such as the E190. As a result, the highest average aircraft age for U.S. carriers is at the low end of the single-aisle market.[144] The market even for used aircraft is tight.[145]

[142] *See also* [ ] response to questionnaire at III-16: [

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[143] Conf. Tr. at 207 (Mr. Baisburd); Delta Post-Conference Brief, at 24 ("Boeing had abandoned production of the 717 in 2006"); Arvai, *Making Boeing Great Again*, (**Exhibit 24**) ("Boeing last produced the 717-200 in 2006, and today offers no aircraft in the 100-seat category").

[144] *See* "Average age for in-service Boeing 737s and Airbus A320s" (**Exhibit 33**)

[145] *See* Benjamin Zhang, *How the Boeing Jet No One Wanted Became the Plane Airlines Scour the Planet For,* Business Insider (Dec. 3, 2017) (**Exhibit 34**) ("a decade after being axed from Boeing's lineup, airlines are scouring the planet looking for available Boeing 717s"); Delta Post-Conference Brief, at 24 (having "already acquired most of the available used 717 aircraft in the global supply," Delta found that "there was simply not enough additional available used 717s to meet Delta's demand," and that "the global supply of used E-190s was also limited"); [ ] Importers/Purchasers Questionnaire at III-3b ("[ ].").

### d) C Series fills gap

Given the absence of new models in this segment, and with the forecasted demand for new and replacement aircraft, Bombardier developed a plan in consultation with airline customers to meet their need.[146] The result was the C Series, whose clean sheet design—brand new from the ground up—combined advanced light materials and efficient propulsion systems in a way that solved the seat cost disadvantage faced by older models in this segment.[147] The older models were derivative designs, using wings and fuselage designed for larger models, making them too heavy for their seat capacity.[148] The C Series is unique among aircraft in this segment because, unlike the 737 MAX 7 or A319neo, its design is not derived from a larger or older model. The principal achievements of the C Series are its reduced fuel burn and enhanced operating efficiency. Without those technological breakthroughs, the C Series would not be viable economically for airlines in terms of seat cost. This is especially so at times of relatively low fuel prices, which allow less efficient older aircraft to remain in operation and to compete for sales as used models.

As discussed further below, the C Series does not primarily compete with Boeing's 737s. After ceasing production of the 717 and 737-600, Boeing does not produce any commercial aircraft for the 100- to 120-seat segment. In Bombardier's experience, the C Series primarily competes with the E190, but Boeing's artificial scope cut-off at 2,900 nautical miles obscures this fact from the conditions of competition in this investigation.

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[146] *Id.* For example, Mr. May and his colleagues at Delta previously conferred with Bombardier about development of the C Series while working at Northwest. Conf. Tr. at 199-200 (Mr. May).

[147] Flight Ascend Expert Report at 10 (**Attachment A**) (noting that the C Series' clean sheet design allows use of the most advanced weight-saving materials on the market; for example, the C Series' fuselage is manufactured using third generation aluminum-lithium, one of the most advanced aluminum alloys on the market).

[148] Arvai, *Making Boeing Great Again*, (**Exhibit 24**).

### 2. Supply-side Factors

#### a) Bombardier is a new entrant

There are very few manufacturers of LCA globally. The industry is both capital-intensive and technologically advanced. Bombardier began to explore entering the market around 2004; completed its first C Series design in 2006; substantially revised the design in 2008 to reach its target of a 15% cash operating cost improvement; and secured its first C Series order, from Lufthansa, in 2009.[149] In 2016, certifications from the FAA were received, and the first C Series deliveries were made to Europe.[150] Bombardier has yet to deliver a single C Series aircraft to the U.S. market and has delivered only [ ] worldwide.[151]

As a new entrant seeking to produce an entirely new aircraft, Bombardier faced and continues to confront a steep learning curve with the C Series, particularly with respect to supply chain optimization.[152] The clean sheet design and many components, including the Pratt & Whitney geared turbofan engine, are new, such that the C Series is the equivalent of an aircraft startup.[153] At the conference, Mr. Mullot estimated a minimum 18-month lag time between configuration launch and delivery.[154] Since then, [ ] Due to [

], Bombardier now estimates [

[149] Conf. Tr. at 156 (Mr. Mullot).

[150] *Id.*

[151] [ ] Foreign Producer Questionnaire Response, at II-9a.

[152] Conf. Tr. at 196-97 (Mr. Mullot & Mr. Mitchell).

[153] Conf. Tr. at 156-57 (Mr. Mullot).

[154] Conf. Tr. at 194 (Mr. Mullot).

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**b) Boeing is an established giant**

Together with Airbus, Boeing dominates the U.S. and global markets for civil aviation. Boeing argues that aircraft development is risky and capital intensive, but Boeing—unlike Bombardier—currently has a quite comfortable 7- to-8-year backlog of orders for the 737 program, meaning that Boeing is effectively "sold out" until 2022.[156] [

[157]

].[158] Furthermore, Boeing's 737 backlog is valued at roughly $190 billion, which comprises 45% of the $424 billion value of Boeing's total commercial aircraft backlog.[159]

According to Boeing, producers rely on profits generated by current production and pre-delivery payments in order to fund the development phases of new aircraft models.[160] In Boeing's case, it has less need to rely heavily on pre-delivery payments generated by the MAX 7 for its development phase funding, as Boeing can use the profits generated by the massive sales of other 737 family members (including orders for conversion) to cover the MAX 7 development

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[155] [ ] Foreign Producer Questionnaire at II-3c, II-11a.

[156] Flight Ascend Expert Report at 41 (**Attachment A**); Prehearing Report at II-10.

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[158] *Compare* [ ] Questionnaire Response at II-18, *and* [ ] Questionnaire Response at II-14 (**Attachment C, Chart 8**).

[159] *See* "737 aircraft family enjoys robust financial health" **(Exhibit 28 )**; *see also* [ ] U.S. Producer Questionnaire at [

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[160] Boeing Post-Conference Brief, at 18.

costs.[161] Given that the optimal design point for the 737 family's engines are for larger members of the MAX family, Boeing has deliberately prioritized the development of MAX 8 and MAX 9 over the MAX 7.[162] As the Commission noted, because the MAX 7 is derived from the 737-700, with new engines and other enhancements shared with the MAX 8 and MAX 9, Boeing's cost to develop the MAX 7 will be [ ] than the cost to develop a clean sheet design.[163]

In addition to cash flow and profits generated by its other models, funding for development of new aircraft—whether the MAX 7 or other successor models—is further aided by government subsidies to Boeing. Boeing asserts that it must rely on early-stage orders and pre-delivery payments to fund the development phases because it is as an "unsubsidized producer."[164] However, Boeing's own website concedes that the World Trade Organization ruled that Boeing had received over $3 billion in impermissible subsidies.[165] In fact, the figure is higher, as this does not take into account the massive $2.2 billion export tax credit subsidy that the U.S. had eliminated before the WTO ruling.[166] Furthermore, government funding allows

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[161] *See, e.g.,* B. Fehrm, "How Boeing pays back the 787 debts" Leeham (Jul. 27, 2017) (**Exhibit 35**) at 2-3 (taking Boeing's 787 family as an example of how the first aircraft of the family drills the way through the costliest part of production, after which the other 787 program siblings benefit from design problems that have been fixed, operations of well-oiled machinery, and mechanics that have become experts of that line); Prehearing Report at 18-19 (reporting that [ ]); "737 aircraft family enjoys robust financial health" **(Exhibit 28) (**the average profit margin across Boeing Commercial Airplanes for 2013-15 was 9.8%).

[162] Conf. Tr. at 91-92 (Mr. Conner).

[163] *See* Prelim. Det. (APO Version), at 37 (citing Boeing Post-Conference Brief, at A-19) (Boeing reported $[ ] in research and development expenses related to the 737 MAX 7 during the 2011-16 period.).

[164] Boeing Post-Conference Brief, at 19.

[165] *See* Boeing: World Trade Organization, http://www.boeing.com/company/key-orgs/government-operations/wto.page ("The WTO found $3.25 billion in subsidies to Boeing, noting that an additional $2.2 billion subsidy claim in the form of U.S. export tax credits had already been eliminated. Of the remaining subsidies, $2.6 billion were related to NASA R&D programs, $154 million to Defense R&D programs, and $500 million to state and local tax breaks.") (**Exhibit 36**).

[166] *See id.*

Boeing to develop new technologies under its military division and then share those technologies and profits thereof with its commercial operations, an advantage Bombardier simply does not have.[167]

### c) Zero inventory and lumpy long-term orders

Unlike most products, LCA are rarely manufactured in the absence of a firm order for a specific model. Manufacturers want to rely on a sufficient order backlog. If the backlog is insufficient, manufacturers reduce production rates, as the cost of production is far too high to risk holding unsold planes in inventory. As a result, there is no threat of inventory being dumped. Trends in market shares, moreover, are difficult to assess because purchases of single-aisle aircraft are typically "lumpy" and infrequent.[168] For example, an airline will buy a relatively large number of planes to be delivered over a multi-year timeframe, but will not purchase other planes of that size for many years. As a result, market share statistics may swing dramatically depending upon which airlines are buying what planes in a given year.[169] Year-over-year changes that might indicate a threat in other markets are the norm for LCA.

Moreover, the lag between orders and deliveries can be many years, particularly if a manufacturer has a significant backlog. Purchase negotiations consequently take place years before a single plane is produced or delivered, rendering any injury far from imminent. Both

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[167] Arvai, "Making Boeing Great Again" **(Exhibit 24)**.

[168] Boeing Post-Conference Brief, at 16.

[169] Based on current firm orders, Boeing's projected share of the 100- to 150-seat LCA market will be [ ] in 2017 and 2018, [ ] percent in 2019, [ ] percent in 2020, and [ ] percent in 2021; Bombardier's projected share will be [ ] in 2017, [ ] percent in 2018, [ ] percent in 2019, [ ] percent in 2020, and [ ] percent in 2021; and Airbus's projected share will be [ ] in 2017, 2018, and 2019, [ ] percent in 2020, and [ ] percent in 2021. Prelim. Det. (APO Version), at 34.

sides agree that the minimum lag time between order and delivery is 18 to 24 months.[170] Given the long lead times, manufacturers plan future production in their "skyline," which defines the production order and operates as a factory reservation system. The "backlog," by contrast, represents the cumulative total of firm orders outstanding, without regard to production schedules. Options are not included in the backlog, but based on information from customers, manufacturers hold certain production slots in the skyline for options that are likely to be exercised. This is necessary because an option is the right of an airline to purchase an aircraft at a pre-determined price and delivery schedule.

### 3. Other Conditions of Competition

#### a) Marketing and purchase of single-aisle aircraft

Airlines and manufacturers are in constant dialogue regarding their respective needs and offerings, and have ongoing relationships. Delta, for example, meets monthly with all major manufacturers.[171] Similarly, a campaign to buy single-aisle aircraft typically involves extended, informal discussions between prospective buyers and manufacturers.[172] Formal bidding on the basis of a single, predetermined set of specifications is exceedingly rare.[173] The importer/purchaser responses to III-2a confirm that there is no standard bidding process.[174]

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[170] Prelim. Det. (APO Version), at 37 (citing Boeing's Post-Conference Brief at 19; Bombardier's post-conference brief at 42). This is consistent with [ ]'s questionnaire response, at III-2c, that [

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[171] Conf. Tr. at 203 (Mr. May).

[172] Conf. Tr. at 164 (Mr. Mitchell).

[173] *Id.*

[174] [ ] said they generally [ ]. According to [ ] by which it makes it purchases. [ ] stated that it [ ] [ ] reported that it [ ]. [ ] indicated that while sometimes it [

Given the extended lifespan of single-aisle aircraft, the initial purchase price is far less important to airlines than the total lifetime operating costs.[175] Indeed, the purchase price represents only [ ] of the lifetime operating costs, depending on the airline.[176] The Importer/purchaser responses to III-13a confirm the wide range of highly salient non-price considerations.[177] For example, [ ] importers/purchasers responded that [ ] are [ ] in their purchasing decisions, as [ ].[178] As Boeing noted, purchasers generally monetize non-price factors and combine them with an aircraft's purchase price to arrive at a net present value for an aircraft.[179] However, the valuation of various non-cash items are highly deal-specific and vary by purchaser.

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]. *See* Importers/Purchasers Responses to III-2a.

[175] [ ] purchasers reported that lifetime operating costs were very important. According to [ ] Similarly, [ ] *See* Importers/Purchasers Responses at III-13a. Additionally, several purchasers emphasized that price is only one consideration within lifetime operating costs. *See id.* [ ] at III-13a; [ ] at III-15b; and [ ] at III-14.

[176] Prehearing Report II-25; [ ] responses to Importer/Purchase Questionnaire, at III-15b (reporting that [ ]).

[177] Importer/purchaser responses to III-13a. [ ] purchasers reported that availability/backlog/capacity limitations, maintenance costs, performance, reduced fuel requirements, and/or and seat capacity were very important. No fewer than [ ] purchasers emphasized that commonality with existing fleet, delivery terms, and/or entry-into-service support were very important. *See* Importer/purchaser responses to III-13a.

[178] *See* [ ] Importer/purchaser responses to III-13a.

[179] Boeing Post-Conference Brief, at 17.

Initial deposits upon execution of a firm order tend to be between 1% and 5% of the contract value, while overall pre-delivery payments do not exceed 15% to 30% of the contract value.[180] Accordingly, the vast majority of the purchase price is paid only upon delivery.

Given the long lead time between order and delivery, contracts for single-aisle aircraft typically include multiple flexibilities that allow parties to respond to changing conditions. For example, many contracts include conversion rights whereby a purchaser may elect to convert an order for one model to another model, typically within the same family.[181] Relatedly, contracts may include purchase or option rights to increase the order, or deferral rights to delay deliveries. Accordingly, between execution of a contract and delivery, core terms of the deal—including price, quantity, and even product—may change significantly.[182] Boeing's decision to report many of its MAX sales without specifying a model perfectly illustrates this phenomenon.[183]

Boeing claims that airlines have some flexibility as to when they purchase new aircraft to replace older models, or grow their fleets, and can extend the useful life of existing aircraft as needed. In Boeing's view, the willingness of airlines to purchase new aircraft tends to increase when pricing conditions are perceived to be favorable and uncertainty about the in-service performance and viability of new aircraft declines. This implies that the availability of an

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[180] Prehearing Report, at II-4; Conf. Tr. at 166-67 (Mr. Mitchell).

[181] *See* Flight Ascend Expert Report at 14 (**Attachment A**) (noting that 737-700 took 28% of original orders placed but this has fallen to just 18% after swaps to other family members- these typically being the 737-800), 16 (noting that some 250 of the original A319 orders were changed to larger members of the same family), 18 (noting that 199 of the orders for the 737 Max have been swapped between different series), 20 (noting that 18% of the orders originally placed for the A319neo have been swapped to larger A320neo or A321 neo models), and 21 (noting that the first orders of the C Series were placed in 2009 and since then Lufthansa Group has swapped 20 of its CS100 orders to the CS300 and Braathens swapped five CS300s to CS100s).

[182] Prehearing Report, at V-5.

[183] Flight Ascend Expert Report at 22 (**Attachment A**) (observing that Boeing's published order data only identifies orders for the MAX series rather than a specific model).

aircraft within a specific timeframe is not very important to purchasers.[184] Yet [ ] firms responded that availability/backlog/capacity limitations is a [ ] purchasing factor.[185] Indeed, there are times—such as the recent Delta sales campaign—when the term that defeats a proposed purchase is not price, but delivery.[186]

**b) Launch pricing and marquee pricing are standard practice**

Boeing concedes that aircraft manufacturers commonly employ launch pricing "to compensate customers for the risks of purchasing an unproven and uncertified aircraft."[187] The risks presented by a new aircraft based on a clean sheet design are not limited to whether it can achieve its technical specifications, but rather encompass a host of issues that cannot be resolved with confidence until well after launch, such as whether the manufacturer can reliably meet delivery schedules and whether the airplane operates reliably.

On the production side, manufacturers need time to traverse the learning curve and to establish a reliable network of suppliers.[188] Technical problems affect reliability, which can disrupt operations across the network of scheduled flights.[189] Supply chain issues delay aircraft deliveries, which can disrupt airline planning and efficient fleet allocation.[190] In addition, early

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[184] Boeing Post-Conference Brief, at 18.

[185] Prehearing Report, at II-33; Responses to US Importer/Purchaser Questionnaire, at III-13a, III-24. [ ] responded that [ ] [ ] responded that [ ].

[186] Delta Post-Conference Brief, at 34.

[187] Boeing Post-Conference Br. at 41.

[188] Conf. Tr. at 157 (Mr. Mullot); 166 (Mr. Mitchell).

[189] Conf. Tr. at 166-166 (Mr. Mitchell).

[190] *Id.*

adopters risk ending up with orphan aircraft with little service support or residual value.[191] Airlines that are among the first to adopt a new aircraft seek compensation for these risks in the form of reduced prices, known as "launch pricing," notwithstanding a new model's superior technology.[192] In some markets for less complicated products, a new and improved model, other things equal, may command a premium. In the market for single-aisle aircraft, where timely delivery, performance metrics, and operational reliability are prized, even a potentially superior product will carry a discounted price so long as its delivery stream and dependability in service remain in doubt. These were real concerns among purchasers at the time of the Delta deal, informed in part by the troubled launches of the Boeing 787 and Airbus A380.[193] [ ] importers/purchasers responded that they are familiar with launch sales of LCA.[194]

Accordingly, the time period during which launch pricing is demanded in the market is related to risks associated with an unproven aircraft, lasting until the aircraft's dependability bears out in service.[195] Contrary to Boeing's claims,[196] the window for launch pricing does not close just because a certain number of years has passed since the announcement or "launch" of a new model. Aircraft that experience prolonged or troubled launch may still require launch

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[191] *Id.*

[192] *Id.* ("An airline that is among the first to accept delivery of a new model knows that it faces risks of difficulties and delays given the complexity of aircraft production.").

[193] Conf. Tr. at 210 (Mr. Mitchell). *See, e.g.*, Chris Ziegler, *Is the 787 Dreamliner a lemon?* The Verge (Jan. 17, 2013) (noting battery problems with the 787, and engine and wing problems with the A380) (**Exhibit 38**).

[194] Prehearing Report, at V-15; Responses to US Importer/Purchaser Questionnaire, at III-4a.

[195] Flight Ascend Expert Report, at 44-46 (**Attachment A**) (explaining that launch discounts become less necessary as an aircraft begins to be proven through flight test results and operational service, rather than after a certain number of years since launch); Conf. Tr. at 166, 237 (Mr. Mitchell) (describing how there is typically multiple launch customers, who may be across different geographies or business types), at 238 (Mr. May) (acknowledging that airlines understand that the "customer who stepped up, took the risk is going to get a better price").

[196] Boeing brief, at 41 (raising that the CS100 pricing was offered to Delta several years after program launch; however, this was still before entry into service).

pricing to alleviate risk to customers years after a "launch" date. If the Commission were to accept Boeing's claim that launch pricing is based on passage of time, rather than existence of risk, such a decision would introduce substantial uncertainty to the market, where allaying risks through launch pricing has been standard practice for more than 30 years.[197]

"Marquee sales" are sales of LCA to prominent purchasers, such as Delta and [ ].[198] [ ] importers/purchasers responded that they are familiar with marquee customer sales of LCA.[199] Marquee customers can expect discounts for several reasons. According to [ ], [

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[ ] estimates that marquee customers would receive [ ], while [ ] would expect [ ].[200] According to [ ], a marquee customer who is [ ] and [

] should expect to receive [

].[201]

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[197] Conf. Tr. at 177 (Mr. May).

[198] [ ], Response to US Importer/Purchaser Questionnaire at III-4b (indicating that it [ ]).

[199] Prehearing Report, at V-17; Responses to US Importer/Purchaser Questionnaire, at III-4b.

[200] [ ], Response to US Importer/Purchaser Questionnaire at III-4b.

[201] [ ], Response to Importer/Purchaser Questionnaire at III-4b (noting that [ ]. While purchasers variously refer to discounts from [ ], the key takeaway is not that specific percentage discounts are negotiated from known list prices, but that market participants understand that launch sales and marquee sales receive better prices.).

In addition to discounts [ ], a marquee customer can expect the most favorable pricing when it is the launch customer of a new clean sheet model. First, there are only a handful of airlines with the depth of resources to fully evaluate new aircraft.[202] Thus, a particular aircraft can have [

].[203] Second, as discussed above, a clean sheet model carries more risk for the customer than a derivative model. A marquee launch customer for a derivative model can expect [

], while a marquee launch customer for a clean sheet model can expect [ ].[204] In the case of [

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**c) No "lighthouse effect" or price transmission exists**

Boeing argues that prices in the single-aisle market have a "lighthouse effect," creating expectations that future sales will be at comparably low prices.[206] This theory depends on purchasers having reliable information about prior pricing; in the U.S. single-aisle market, however, *no* price information is typically revealed, let alone reliable information.[207] While Boeing claimed that the results of aircraft sales campaigns are well-publicized and customers are

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[202] Delta Post-Conference Brief, at 31.

[203] [ ], Response to US Importer/Purchaser Questionnaire, at III-4a; Delta Post-Conference Brief, at 25 ("While Bombardier had already secured a small " launch customer," it still needed the market validation of a high-profile and well-respected marquee airline making a large purchase. Presumably, with United out of the picture, Delta had the opportunity to secure the customary marquee purchase price where one had not been available before.")

[204] [ ], Response to US Importer/Purchaser Questionnaire, at III-4a.

[205] *Id.* at III-4b.

[206] Prehearing Report, at V-19.

[207] Delta Post-Conference Brief, at 28-29.

able to obtain information on past pricing obtained by their competitors,[208] [ ] responding importers/purchasers (including [ ]) responded that they are *not* aware of prices that other airlines of purchasers have paid for 100- to 150-seat LCA.[209] Industry experts report that actual terms of an aircraft purchase are "guarded like nuclear launch codes".[210] Delta, for example, stated that it does not know what other airlines pay, and that it would never reveal to one of its competitors what it had paid.[211] Thus, while there are any number of outlets that purport to reveal the prices paid by airlines for aircraft purchases, this press speculation is inaccurate and unreliable.[212] [ ] agreed that [ ], but [ ].[213] Given the high degree of price opacity and the fact that each airline has its own valuation methods, it is no surprise that any speculative pricing information would, at most, [ ],[214] rather than lead purchasers to expect the same pricing for future sales.

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[208] Boeing Post-Conference Brief, at 17.

[209] Prehearing Report, at V-20; Responses to US Importer/Purchaser Questionnaire, at III-5 ([ ]).

[210] D. Michaels, "The Secret Price of a Jet Airliner - Discounts of 50% or More off the Sticker Number Are Common as Plane Makers and Buyers Haggle" Wall Street Journal (Jul. 9, 2012) (**Exhibit 39**), at 1 (explaining that a reason for the secrecy is that less experienced plane buyers don't want to be embarrassed if it turns out that they had overpaid, while more seasoned plane buyers know that "bragging about discount specifics would anger Airbus, Boeing or other producers and hurt the chances of striking a sweetheart deal again").

[211] Delta Post-Conference Brief, at 28-29.

[212] *Id*.

[213] Prehearing Report, at V-20; [ ] US Importer/Purchaser Questionnaire, at III-4b, III-5.

[214] Prehearing Report, at V-20; [ ] US Importer/Purchaser Questionnaire, at III-5.

### d) "Commercial momentum" relates to performance, not price

Boeing contends that "commercial momentum" is an important aspect of competition in the market for single-aisle aircraft.[215] Contrary to their consistent views on launch and marquee pricing, airlines are skeptical that "commercial momentum" is a meaningful concept. When asked whether commercial momentum played a role in their purchasing decisions, [ ] importer/purchasers (including [ ]) responded that it did not.[216] Delta does not perceive "commercial momentum" to be a concept recognized by others in the industry.[217]

To the extent commercial momentum has meaning in this industry, it reflects the increased acceptance of a new aircraft, generated when that aircraft meets its metrics for production, certification, and entry into service.[218] As such, [ ] stated that a history of prior sales only matters to the extent it provides [ ].[219] In its Preliminary Opinion, the Commission considered whether a manufacturer gains commercial momentum when it makes a sale to a marquee customer.[220] But manufacturers cannot buy commercial momentum through pricing, only through delivering an aircraft that performs as promised,

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[215] Boeing post-conference report, at 18.

[216] Prehearing Report, at II-22; Response to US Importer/Purchaser Questionnaire, at III-22.

[217] Delta Post-Conference Brief, at 31.

[218] Fred Cormer, president of Bombardier Commercial Airplanes, *Bombardier sees no merit to Boeing complaint, says president,* Leeham Co. (June 5. 2017) (**Exhibit 40**) (explaining that the C Series hitting performance metrics such as certification and entry into service is what builds momentum: "it's not just about sales, it's about how the aircraft is doing and what are we doing to advance the program").

[219] [ ] Response to US Importer/Purchaser Questionnaire, at III-22.

[220] Prelim. Det. (APO Version), at 33-34 ("Five of six responding importers/purchasers reported that "prior domestic market sales" were not important to their purchasing decisions. Nevertheless, Delta claims that LCA producers must secure an initial large order for a new LCA design from a major airline, or "marquee customer," as soon as possible after the launch of the new design in order to validate the design in the eyes of other potential customers and overcome their natural resistance to purchasing an unproven aircraft.")

lowering the risk to future purchasers. Moreover, while a marquee customer's validation of a new design may provide reassurance for smaller customers,[221] it would not lead other airlines to purchase the same model unless those other airlines had the same fleet needs.

### B. Because competition between the C Series and 737s is attenuated, the C Series is not a cause of any threatened injury to Boeing

The C Series is a uniquely modern, high-performance, and efficient option for airline routes with passenger counts in the lower part of the single-aisle size range. Analysts and customers praise its low fuel burn, quiet operation, passenger comfort, and landing and takeoff performance, among other features.[222] There is nothing like the C Series in the lower segment of the size continuum. Boeing once produced aircraft within that segment, including the 717 and the 737-600, but none were as efficient as the C Series, and Boeing abandoned them more than a decade ago. Today, Boeing does not produce any commercial aircraft for the 100- to 120-seat segment, and thus offers no competitor to the CS100, such that any competition with Boeing is attenuated, at best.[223]

Outside of this petition, when discussing its business strategy with investors, Boeing executives have consistently denied interest in competing with the C Series.[224] On a recent earnings call, when asked whether Boeing wants to enter the segment below 150 seats, Boeing's CEO dismissed the idea and reiterated his confidence in the fact that they were oversold on

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[221] *See supra* "—Launch pricing and marquee pricing are standard practice".

[222] AirInsight, "Bombardier C Series at EIS Regaining Momentum" (**Exhibit 31**) at 12; Ernest S. Arvai, "Why are Airbus and Boeing Afraid of Bombardier?" AirInsight (**Exhibit 30**).

[223] Flight Ascend Expert Report, at 7 (**Attachment A**).

[224] *See* Bombardier Post-Conference Brief, at 24 (citing the remarks of Boeing Vice Chairman & President and CEO at Boeing Co.'s Corporate 2016 Investor Conference: "At the lower end the airplanes that have been purchase have been CS100s. We aren't competing with those with the MAX.")

production line capacity with 4,400 aircraft in backlog.[225] Boeing's stance makes sense. The MAX 7 is a "shrink" of the 162-seat MAX 8, using wings and fuselage designed to accommodate the needs of the larger members of the 737 family; its heavy design is not optimized for a 138-seat plane.[226] The clean sheet design of the C Series, by contrast, is optimized around a smaller size and uses the most advanced weight-saving materials on the market.[227] As set out in the expert report submitted in this proceeding by Flight Ascend, a shrink such as the MAX 7, due to its higher operating costs per seat, cannot overcome the inherent cost disadvantage of smaller planes.[228] Thus, even for routes where the MAX 7 and CS300 might both be considered based on seat capacity, there is attenuated competition due to the higher seat-mile costs of the MAX 7.

Indeed, several purchasers of the MAX 8, 9 and 10 have also ordered C Series for various reasons, despite the benefits of commonality that could have been gained by adding a MAX 7 to the fleet.[229] For example, Air Canada—a significant customer of the 737s, having ordered MAX 8 and 9 planes to replace its A320s—ordered the C Series with the objective of replacing its E190s.[230] The airline was looking for aircraft to slot in between the 76-seat regional jets and the 160-seat MAX 8, and calculated that the C Series' projected per-seat fuel burn and maintenance

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[225] Ernest S. Arvai, "Making Boeing Great Again," AirInsight (**Exhibit 24**) (observing that Boeing has two messages; one for those who know the industry (the investors), and another for those who don't (the Commission)).

[226] *Id.* (**Exhibit 24**) (noting that "not surprisingly" with these economics, the 737 MAX 7 has not sold well; yet, Boeing has brought a case solely around "the least efficient and most unpopular model in its 737 fleet, ignoring the other 3,884 aircraft in its backlog").

[227] *Id.* (**Exhibit 24**); Flight Ascend Expert Report, at 10 (**Attachment A**) (for example, the C Series' fuselage is manufactured using third generation aluminum-lithium, one of the most advanced aluminum alloys on the market.)

[228] Flight Ascend Expert Report, at 14, 17 (**Attachment A**).

[229] *Id.* at 28.

[230] *Id*.

cost savings "of greater than 15%" will cut cost per available seat-mile by "approximately 10%."[231] From Air Canada's perspective, the MAX and C Series were two discrete aircraft types with different fleet applications, and the MAX 7 did not suit their ongoing strategy to reduce its cost per available seat mile.[232]

The shrink design of the MAX 7 and 737-700 does seem to beget one unique feature that may offset their unfavorable seat-mile economics when it comes to a certain mission profile. Due to the vestiges of their larger 737 siblings, the MAX 7 and 737-700 have a "relatively high thrust to weight ratio,"[233] making them somewhat overpowered and proportionally heavy for normal routes but allowing them to service the relatively rarer "high/hot" airports having a short runway combined with a high altitude or hot climate, where the larger 737 variants cannot.[234] Delta recognizes these capabilities and keeps ten 737-700s in its fleet for this specific mission profile, despite the fact that it is "not a fuel efficient aircraft"[235] and is "not economical on the vast majority of {Delta's} routes."[236] Boeing estimates that there are [ ] high/hot airports in the United States.[237] In other words, the only time that these suboptimal designs have a competitive advantage is when airlines need to service those select airports, but are otherwise an uneconomical choice. While Boeing's MAX 7 is not competitive in the small single-aisle segment, Bombardier competes regularly in this space with Embraer's larger E-Jets. Analysts

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[231] *Id*.

[232] *Id.*

[233] Delta Post-Conference Brief, at 16.

[234] Boeing Post-Conference Brief, at 11.

[235] Delta Post-Conference Brief, at 25; Prehearing Report, at II-40, II-41.

[236] Conf. Tr. at 183 (Mr. May).

[237] Boeing Post-Conference Brief, at 12.

widely note that Embraer is the primary competition to the C Series, as do questionnaire respondents.[238] Boeing's petition deliberately masks this competition through the artificial 2,900 nautical mile range limitation in the scope of this investigation.[239] The truth is that, absent the C Series, sales in the small single aisle segment would be likely to go to Embraer, not Boeing.

Case in point is the 2015 United sales campaign, where Boeing claims that the 737-700 and the C Series competed "head-to-head" based on price.[240] Yet Boeing had not been in the picture for most of the campaign. In fact, Bombardier's competition from the start of that campaign was Embraer.[241] At the very end of the sales campaign, Boeing intervened and offered United cut-rate pricing on the larger 737-700—whose configured seating capacity of 123 exceeded the seating capacity requested by United and which, in any event, does not compete with the CS100—for the stated purpose of preventing "validation of this C Series in the marketplace."[242] While most conversions occur due to changed market conditions, within less than a year, United converted its order to the MAX 8. This highly suspect timing makes clear that United never wanted the 737-700. Instead, United got a sweetheart deal on larger planes in

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[238] *See, e.g.*, Flight Ascend Expert Report at 10, 13 (**Attachment A**) (noting that the closes seating to the CS100 is the Embraer E195); AirInsight, "Bombardier C Series at EIS Regaining Momentum" (**Exhibit 31**), at 11 ("We believe that Bombardier's competition in this segment is not Airbus or Boeing, but Embraer"), 12 ("Bombardier faces a tough competitor in the forthcoming Embraer E2 family that will be economically competitive with CSeries"), 17 ("Airbus and Boeing offerings in the 100-150 seat category are not competitive with Bombardier and Embraer"); Ernest S. Arvai, "Making Boeing Great Again," AirInsight (**Exhibit 24**) (observing that "{i}f Delta could not buy the C Series, they would almost certainly have chosen Embraer"); [ ] Importer/Purchaser Questionnaire Response, at II-10 (reporting that [
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[239] Prehearing Report, at VII-20 (noting that, "while Embraer's new E-jet offerings are similar in seating capacity to 100- to 150-seat large civil aircraft, their lower nautical mile range classifies them as regional jets").

[240] Boeing Post-Conference Brief, at 20.

[241] Conf. Tr. at 163 (Mr. Mitchell).

[242] Id.

exchange for keeping out the C Series. Boeing achieved its goal of denying Bombardier a foothold at United and fabricated a "lost sale" narrative for its AD/CVD petition.[243]

In a market with so few choices, it should not be surprising if airlines "cross shop" among the C Series, Embraer models, the A319, and Boeing's 737-700 or MAX 7, in the sense that they may look at all or a few of these planes as an initial step in the path to purchase. However, the fact that the C Series and 737s may both be considered by an airline does not mean that they compete or are interchangeable in the small single aisle market segment. Ultimately, the airline's mission profile defines the aircraft it seeks to acquire.[244] If an airline needs a small single aisle LCA, they will focus on the C Series.

### C. Any "launch" or "marquee" pricing by Bombardier to Delta will not have enduring price effects in the marketplace and does not threaten injury to Boeing

While Boeing challenges the price in the Delta sale, it fails to establish (1) that launch pricing was unwarranted; (2) that Boeing "lost" this sale at all, let alone due to price; or (3) that the Delta price will injure Boeing in the future through a "lighthouse effect".

First, [ ].[245] As discussed above, it is common practice for "launch customers" to obtain favorable pricing in compensation for the risks presented by being among the first to adopt an unproven aircraft, which encompass a host of issues that cannot be resolved with confidence until well after launch,.[246] A clean sheet model

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[243] Ernest S. Arvai, "Why are Airbus and Boeing Afraid of Bombardier?" AirInsight (Feb. 23, 2017) (**Exhibit 30**) (noting that other airlines, such as Easyjet and Vueling, also received pricing from Boeing undercutting Bombardier that was too good to refuse).

[244] Delta Post-Conference Brief, at 17.

[245] [ ], Response to US Importer/Purchaser Questionnaire, at III-4b.

[246] *See supra* Part IV.A.3.b.

such as the C Series carries even more risk for customers compared to derivative models, as there is a steep learning curve for the manufacturer in teaching itself and its supply chain how to efficiently and effectively manufacture the aircraft and make timely delivery.[247] The fact that the CS100 "had been certified by Transport Canada"[248] prior to the Delta sale does not alleviate these risks.[249] Nor is it significant that Bombardier's 2016 price offer was reportedly "25% lower than Bombardier's initial CS100 offer to Delta in 2011."[250] If anything, the pricing to Delta reinforces the importance to Bombardier of securing a marquee U.S. launch customer as the C Series launch approached, the need for steep discounting to convince a customer to try the untested, clean-sheet-design C Series, and the irrelevance of the price offered to Delta to the prices other customers will expect from Bombardier in the future.

Moreover, Boeing is no exception to the rule of launch pricing. Boeing's launch of the 787 is a perfect example of launch pricing practice continuing so long as risks remain high for the customers. The first several hundred 787s sold by Boeing were reportedly sold below the cost to make them, to the extent where industry experts are still wondering whether Boeing will ever break even on the program.[251]

Second, Bombardier's 2016 sale of 75 CS 100 aircraft to Delta was not a "lost sale" to Boeing, nor does the pricing in that purchase agreement signal any threat of future injury to the

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[247] Delta Post-Conference Brief, at 30-31; [ ] US Importer/Purchaser Questionnaire, at [ ].

[248] Boeing Post-Conference Br. at 41.

[249] Notably, the CCS100 was not approved by the FAA until June 2016, after the Delta sale. *See* "Bombardier CS100 gets EASA, FAA certification," https://www.wingsmagazine.com/news/bombardier-cs100-gets-easa-faa-certification-13697 (June 17, 2016).

[250] *Id*.

[251] Arvai, "Making Boeing Great Again" AirInsight (**Exhibit 24**); Fehrm, "How Boeing pays back the 787 debts" (**Exhibit 35**).

domestic industry. Based on its mission plan for replacement aircraft, Delta sought to up-gauge from 50-seat regional jets to a single-aisle aircraft with 100 to 110 seats.[252] At first, it considered used and new aircraft from Embraer and the new C Series.[253] Because Boeing does not offer any new aircraft in that size, Boeing's only offer to Delta was for used Embraer E190s; it never asked Delta to consider a 737.[254] Moreover, Boeing told Delta that the 737 family was effectively "sold out" until 2020, which conflicted with Delta's desire for deliveries of 100-110 seat LCA starting in 2018.[255] Thus, the CS100 was Delta's choice, based on its evaluation of lifetime costs and the availability of aircraft during the desired timeframe.

Third, the "lighthouse effect" theory is completely contrary to the widely accepted phenomenon of launch pricing. Even if contract prices were accurately publicized, purchasers are well aware that aircraft prices will increase post-launch. As aircraft proceed up the learning curve and perform well in service, the ownership risks to airlines decrease and airlines no longer need to be compensated for that risk in purchase prices.[256] In Delta's purchase of the CS100, the airline obtained particularly favorable pricing as a marquee launch customer of a new clean sheet model.[257] After a marquee launch sale has been made, manufacturers are disciplined about not providing similar pricing down the road.[258] No other U.S. airline would reasonably expect to receive the same deal as Delta. Furthermore, as a general matter, numerous ancillary terms of

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[252] Delta Post-Conference Brief, at 2.

[253] *Id*.

[254] *Id.* at 24.

[255] Prelim. Det. (APO Version), at 35; Delta Post-Conference Brief, at 34.

[256] *See supra* Part IV.A.3.b.

[257] *Id*.

[258] Conf. Tr. at 238 (Mr. May).

the contract, options, and performance guarantees would make it impossible to compare simple price data across contracts on a consistent, apples-to-apples basis.[259]

The United campaign is yet another case in which Boeing's price transmission theory fails to reflect reality. As discussed above, Boeing had not been part of the competition in the United campaign until the very end, when it suddenly came in and offered price and other terms on the much larger 737-700 that were too favorable for United to refuse.[260] In publicly reported remarks, Boeing's vice chair, Mr. Conner, revealed that Boeing lowered its price dramatically specifically to block Bombardier, because if the C Series prevailed at United, "that would've been a validation of the C Series in the marketplace, . . . {s}o very important for us to win that."[261] This was no "forced price concession," as Boeing claims.[262] By Boeing's own account, the unusually favorable deal it offered United—on planes United had not even been considering—was motivated not by a need to match any prior price set by Bombardier, but rather by a need to keep Bombardier out of the U.S. market at all costs.[263]

Boeing complains about the alleged effects of launch or marquee pricing by Bombardier, when it very well knows from industry practice that the extent of such pricing practices will

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[259] While the Commission cited Boeing's ability to [ ] estimate Bombardier's sales price to Delta as evidence of price transmission in the market for LCA, it is clear that this is not always the case. [

] Petition Exhibit 101 ([ ] affidavit; Prehearing Report at V-26.

[260] *See supra* Part IV.B.

[261] *See* Dominic Gates, "Price war, plane transitions put Boeing in financial crunch," *Seattle Times* (Apr. 1, 2016) (**Exhibit 42**).

[262] *Petition* at 14.

[263] Delta's experience corroborates Boeing's desperation strategy. When it became clear that Boeing had no viable competitive alternative to the CS100 and no ability to timely deliver any suitable aircraft to Delta, Boeing "instead attempted solely to block Bombardier, offering [

]. *See* Delta Post-Conference Brief, at 26.

diminish as the C Series proves its dependability in service and is accepted by the market. With this petition, Boeing is not attempting to counter any imminent threat of injury, but is rather trying to block imports from getting any toehold in the U.S. market at all.

## V. Even with Boeing's Like Product Definition and No U.S. FAL, There is Still No Imminent Threat of Material Injury to Boeing

As demonstrated above, there is no threat of imminent material injury in light of Bombardier's and Airbus's plan for a U.S. FAL and because, even without a U.S. FAL, the properly defined domestic industry—all single-aisle LCA with at least 100 seats—is plainly not threatened with material injury by reason of subject imports. But even if the Commission disagrees with both of these points, it should still find that the domestic industry is not threatened with imminent material injury. As a matter of law, for threat to be imminent, injury must materialize within 1-2 years. Furthermore, the factual record in this case shows that an imminence horizon of 1-2 years makes sense in this industry. Because Boeing's 737 skyline is already overbooked until 2023, and for the many additional reasons discussed below, Boeing has failed to show that it is threatened with imminent material injury.

### A. It would be unprecedented for the Commission to find an imminent threat where the alleged injury could not possibly manifest until many years later.

#### 1. For Threat to be Imminent, Injury Must Materialize Within 1-2 Years.

The statute requires the Commission to "consider {the factors} … as a whole in making a determination of whether further dumped or subsidized imports are imminent and whether material injury by reason of imports would occur unless an order is issued…. Such a determination may not be made on the basis of mere conjecture or supposition."[264] For the

[264] 19 U.S.C. § 1677(7)(F)(ii).

reasons discussed below, the Commission would be hard pressed to find a threat of imminent material injury in this investigation, without running afoul of the statutory admonition against reliance on conjecture or supposition.[265] This is true even if the Commission discounts Delta's intent to take delivery of C Series aircraft produced in Alabama and disregards the strong disincentive for any U.S. airline to import from Canada while there is a credible threat of future trade litigation.

To reach an affirmative threat determination, the Commission must conclude that material injury to the domestic industry is imminent. "No bright-line test exists to determine when injury is imminent. Congress, however, is presumed to have used words in their ordinary meaning, absent a contrary expressed intent."[266] Thus, "{b}oth the dictionary definition and case law from the CIT demonstrate that the statutory term 'imminent' means impending."[267]

The Commission, while not applying a bright-line test, has traditionally understood an imminent threat to be one that will result in material injury within approximately a year and a half. For that reason, Commission questionnaires normally collect projection data covering the current year and one additional year. Even in cases involving large capital goods with long lead times, the Commission has followed its traditional practice of looking out through the end of the current year and one projected year.[268] In the appeal of *Large Newspaper Printing Presses,* the

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[265] Present material injury is not at issue in this investigation: Boeing has conceded that it is not presently suffering material injury, *Petition*, at 52, and its Post-Conference Brief did not claim present material injury.

[266] *Asociacion De Productores De Salmon Y Trucha De Chile AG v. U.S. Int'l Trade Comm'n.*, 180 F. Supp. 2d 1360, 1371 (Ct. Int'l Trade 2002).

[267] *Id*.

[268] *See Vector Supercomputers from Japan*, Inv. No. 731-TA-750 (Final), USITC Pub. 3062 (Oct. 1997), at 16 (considering projections through 1998); *Elec. Conductor Aluminum Redraw Rod from Venezuela*, Inv. Nos. 701-TA-287 and 731-TA-378 (Final), USITC Pub. 2103 (Aug. 1988), at 11 ("a year to a year and half" would be imminent).

CIT found that the Commission reasonably found imminent harm to the domestic industry when financial effects of subject imports would manifest in about two years.[269] Boeing has not cited, nor has Bombardier found, any decision in which the Commission has looked out considerably further into the future. Yet that is what the Commission would have to do to find imminent material injury in this case, and such an approach would be completely unprecedented. Indeed, the Commission would be relying for its threat determination on an injury that would not fully materialize until the Commission had completed its first sunset review of the relevant order.

To deflect from this reality, Boeing quotes from legislative history to argue that Congress empowered the Commission to make an affirmative threat finding when there are no imports during the POI but there is a sale for importation.[270] But this argument misses the point. Even if the Commission could make an affirmative threat finding based on a sale for importation rather than actual imports,[271] the petitioner still must satisfy the separate statutory requirement that it will suffer *imminent* material injury, and that this injury not be speculative.[272] Indeed, this is

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[269] *Large Newspaper Printing Presses and Components Thereof, Whether Assembled or Unassembled, from Germany and Japan*, Inv. Nos. 731-TA-736-737 (Final), USITC Pub. 2988 (Aug. 1996), at 8.

[270] Boeing Post-Conference Br. at 24-26.

[271] A sale for importation is not sufficient for a threat finding because the statute requires that the basis for the Commission's determination be actual or imminent imports in addition to imminent threat of injury. *See* 19 U.S.C. § 1677(7)(F)(ii) (the "basis for determination" states that "{t}he Commission shall consider the factors set forth in clause (i) {i.e., the statutory threat factors} as a whole in making a determination of whether further dumped or subsidized *imports are* imminent and whether *material injury by reason of imports* would occur unless an order is issued or a suspension agreement is accepted under this subtitle" (emphases added)). Imminent injury *and* imports are needed for an affirmative determination on the basis of threat.

[272] In this context, the Commission has made clear that although the statutory language refers to imminent imports, the Commission interprets the statute to require that actual injury also be imminent. Consistent with its prior practice, the Commission does not make an affirmative injury determination without actual or imminent imports *and* injury. *See Vector Supercomputers from Japan*, at 21 n.121 ("While the language referring to imports being imminent (instead of 'actual injury' being imminent and the threat being 'real') is a change from the prior provision, the SAA indicates the 'new language is fully consistent with the Commission's practice, the existing statutory language, and judicial precedent interpreting the statute.' SAA at 184."). In *Vector Supercomputers*, the Commission found actual and imminent imports: there were imports over the POI, and an "imminent likelihood of

clear from the very legislative history that Boeing cites: "Relief should not be delayed if sufficient evidence exists for concluding that the threat of injury is real and *injury is imminent*."[273] In short, even if an affirmative threat determination can be made without prior imports, the petitioner still must show that it will suffer material injury in the imminent future, which the Commission has consistently interpreted to mean the current year and one additional year.

**2. An Imminence Horizon of 1-2 Years Makes Sense in this Industry.**

An "imminence period" extending no further than 2019 would also be consistent with "the facts and circumstances of the industry, product, and marketplace."[274] Because of the long lead times required by suppliers, LCA orders generally must be placed a minimum of 18-24 months before delivery.[275] For orders placed further in advance, there is a "cut off" about 18-24 months before the scheduled delivery date, at which point any flexibility to convert the order to a different aircraft terminates. For instance, Boeing's expert Mr. Anderson testified that aircraft orders are "lock{ed} down" about "24 months before scheduled delivery," at which point "you cannot switch out because {of} the lead time required for all the specific parts and components."[276] Similarly, Bombardier reported that the [

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substantially increased imports" due to "large increases in subject import volume and market share during the latter part of the period of investigation." The Commission also found imminent injury: poor industry conditions included a "current weakened financial condition," "declining profitability," and an inability to fund research and development. *Id.* at 21-25.

[273] Boeing Post-Conference Brief at 25 (quoting Trade Agreements Act of 1979, S. Rep. 96-249, at 89 (1979) (emphasis added)) (**Exhibit 43**).

[274] *Asociacion De Productores De Salmon Y Trucha De Chile AG*, 180 F. Supp. 2d at 1372.

[275] Conf. Tr. at 65 (Mr. Conner), 265 (Ms. Aranoff); Boeing Post-Conference Brief at 19; Bombardier Post-Conference Brief at 42.

[276] Conf. Tr. at 148 (Mr. Anderson).

].[277] As a result of this required lead time, and assuming no unusual supplier delays, aircraft manufacturers can predict their production and delivery schedules about 18-24 months in advance with a high degree of confidence. Thus, "the facts and circumstances of the {LCA} industry, product, and marketplace" are consistent with the Commission's standard practice of examining the current and following year, or a maximum of two years, in determining whether there is a threat of imminent material injury.

By contrast, it would be speculative to attempt to predict LCA production more than two years out. Beyond the two-year lead time period, firm orders are not a reliable predictor of the exact nature of future production or deliveries. As Mr. Mitchell testified, "there are often significant changes between when a contract for a firm order is executed and when deliveries are made," including with respect to quantity, price, and delivery date.[278]

At least two sources of flexibility contribute to this unpredictability. First, aircraft orders frequently contain options that permit the purchaser to order additional aircraft or different aircraft.[279] For instance, [

].[280] Similarly, [ ] production estimates reveal options to purchase [

].[281] It is also common in the LCA industry to include deferral rights in a contract, which

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[277] Bombardier Foreign Producer/Exporter Questionnaire at [ ].

[278] Conf. Tr. at 167 (Mr. Mitchell).

[279] [ ] Questionnaires at [ ]; [ ] Questionnaire at [ ].

[280] *See* Prehearing Report at V-18-19 ([

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[281] [ ] Questionnaire at [ ].

allow purchasers or manufacturers to adjust their delivery schedules.[282] Indeed, [

].[283] For instance, [

][284] Although [

[285]] Deferments can also be initiated by the producer. For instance, [ ] explained that, [

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Another example of the exercise of options and deferral rights is [

]. The order was initially for [ ].[287] United and Boeing later agreed to convert four 737-700s to 737-800s, to be delivered during the second half of 2017, and to defer the remaining 61 737-700s, which would be converted to 737-MAX aircraft and delivered at an indefinite date in the future.[288] The order was later changed to four

[282] [ ] questionnaires [ ]; Conf. Tr. at 167 (Mr. Mitchell).

[283] Prehearing Report, at Table V-1.

[284] [ ] Importer/Purchaser Questionnaire at [ ].

[285]

[286] [ ] Questionnaire at [ ]; [ ] Supplemental Response, Response to Question [ ].

[287] *Petition* at 14.

[288] *See* Boeing, Boeing Commercial Airplanes Jet Prices (**Exhibit 44**); United Investor Day Conference Presentation, Nov. 15, 2016 (**Exhibit 45**).

737-800s and 104 737 MAX 8 and 9s, and yet again to 100 Boeing 737 MAX 10s, with delivery to begin in late 2020.[289]

As the above examples illustrate, the common use of options and deferral rights in LCA contracts entails that firm orders cannot reliably predict LCA production several years out. Until the cut-off about 18-24 months before delivery, it would be speculative to attempt to predict how many or what kind of aircraft will be produced pursuant to a given contract.

Another source of flexibility, and uncertainty, is the potential for manufacturers and purchasers to enter into new agreements to modify the terms of their original contracts. Until the 18-24 month cutoff, manufacturers and purchasers are free to alter any term of their agreement, including which aircraft will be purchased. Indeed, [

]. For instance, [

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].[291] In the case of [

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].[293] In short, the use of

[289] See Edward Russell, "United targets rapid completion for fleet review" Flight Global (Jan. 18, 2017) (summarizing United's "4Q/FY 2016 Earnings Call.") (**Exhibit 46**); Press Release, Boeing,"Boeing, United Airlines Announce Order for 100 737 MAX 10s" (June 20, 2017) (**Exhibit 47**).

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[291] [

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[293] [

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change orders, which can be executed at unpredictable times and can change an order in unpredictable ways, creates additional uncertainty regarding production beyond the "cutoff" period. Combining the uncertainty from options and deferral rights with the uncertainty from potential change orders, it would be wholly speculative to attempt to predict LCA production levels more than 18-24 months out.[294]

In its preliminary determination, the Commission discussed the prospect of new orders Bombardier might receive in the future. Basing a threat determination on orders that have yet to be placed is problematic. Such an inquiry would pile speculation upon speculation: the Commission would be required to speculate about when an order would be placed, what the order's terms would be, whether the purchaser would exercise any options, and whether the parties would alter their contract through a change order. Such a speculative inquiry is plainly barred by the statute, which requires that future injury be "based upon evidence showing that the likelihood is real and imminent and not on mere supposition, speculation, or conjecture."[295] A showing of a "mere *possibility* of injury … occur{ring} at some remote future time is not substantial evidence . . . of a 'likelihood' of injury."[296]

In short, "the facts and circumstances of the industry, product, and marketplace" indicate that the proper period during which to examine threat of imminent material injury is 18-24 months in the future. This is consistent with the Commission's well-established practice of investigating the current calendar year and the following year. In this case, the Commission's

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[294] Notably, Boeing's own final projections of deliveries and revenue extend only one financial year. *See* Press Release, "Boeing Reports Fourth-Quarter Results and Provides 2017 Guidance," (Jan. 25, 2017) (Table 7) **(Exhibit 27)**.

[295] *See Alberta Gas Chemicals, Inc. v. United States*, 515 F. Supp. 780, 790 (Ct. Int'l Trade 1981); *see also* 19 U.S.C. § 1677(7)(F)(ii).

[296] *Suramerica de Aleaciones Laminadas, C.A. v. United States*, 818 F. Supp. 348, 373 (Ct. Int'l Trade 1993).

imminence analysis should look no farther than deliveries called for under existing contracts through 2019.

### 3. Boeing Will Not Be Materially Injured by Reason of Subject Imports Within an Imminent Period Because Its Skyline Is Already Overbooked.

The evidence shows that Boeing has essentially no capacity to accept new MAX 7 orders until 2023, and the pricing for all of its existing orders were determined at the time of order.[297] Thus, the soonest material injury Boeing could potentially suffer from lost deliveries or adverse price effects would be five years in the future. Under the statute and this Commission's past practice, such injury is not imminent.

Notably, Boeing's production constraint has nothing to do with Bombardier, but rather is its own overbooked skyline. Boeing's 737 backlog exceeds 4,400 planes[298] and stretches until at least 2023.[299] While Boeing's backlog for 100- to 150-seat LCA is [ ] is the relevant figure for the Commission to consider, because all 737s are produced on the same machinery using the same employees. Moreover, the 737 skyline is not just booked, but overbooked: as Boeing's CEO recently announced, the 737 skyline is "oversold through the end of the decade."[300] Thus, even if a 737 production slot opens up due to a cancellation or deferral, the slot will likely be filled with another order on the

[297] Flight Ascend Expert Report, at 44-45 (**Attachment A**); Petition at 47.

[298] Prehearing Report, at II-10.

[299] Flight Ascend Expert Report at 44-45 (**Attachment A**); "[ ] Backlog of [ ] Family Aircraft vs. Projected Production Q4 2017-2022" **(Attachment C, Chart 7)**; *see also* [ ].

[300] "The Boeing (BA) Q12017 Results - Earnings Call Transcript" (Apr. 26, 2017) **(Exhibit 56)**.

overbooked skyline.[301] Boeing has, at most, minimal capacity to accept new orders for delivery before the end of its current skyline in 2023. The Prehearing Report thus found that the domestic industry's "high level of capacity utilization indicates that U.S. producers do not have the ability to increase production of 100- to 150-seat LCAs in the short term in response to an increase in prices."[302] Furthermore, even to the extent Boeing has some flexibility to fit new orders into its overbooked 737 skyline, "it is unlikely Boeing could accommodate any additional major orders for 737 MAX 7 aircraft" before 2023.[303] Indeed, in 2016, [

]304

On top of all this, even if Boeing were able to fit a new MAX 7 order into its skyline and prioritized completion of the order (which, as discussed below, it has no economic reason to do), there would be a lag time of at least 18-24 months before delivery.[305] In other words, even if the MAX 7 were ordered immediately, it would not be available for delivery until the end of the "imminence period" at the earliest, and likely far later.[306]

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[301][
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[ ] questionnaire at [ ]. [
] *Id.* At this point, it is speculative how [ ] would alter Boeing's available production capacity, if at all. Moreover, even if delivery of [
], the open production slots would likely not go to new MAX 7 orders because Boeing's skyline is already overbooked and, as discussed below, it would not make economic sense for Boeing to devote open production slots to orders for MAX 7s rather than orders for larger, more profitable MAX family LCAs.

[302] Prehearing Report, at II-9.

[303] Flight Ascend Expert Report at 45 (**Attachment A**).

[304] [ ] Importer/Purchaser Questionnaire at [ ].

[305] Conf. Tr. at 65 (Mr. Conner), 265 (Ms. Aranoff); Boeing Post-Conference Brief at 19; Bombardier Post-Conference Brief at 42.

[306] The average lag time between order and delivery for [ ] Qquestionnaire at [ ].

Boeing argues that it is not capacity-constrained and can increase its MAX 7 production rate to match an increase in orders.[307] However, "given their decision to raise 787 rates in 2019, and the introduction of the 777-8 / 9 in 2020," it is unlikely that Boeing could raise MAX 7 production rates above currently projected levels.[308] But even if Boeing had the capability to raise its MAX 7 production rates, its suppliers would need [ ] to increase their production rates.[309] Moreover, industry experts have opined that "the potential for suppliers to increase further beyond these rates is extremely low" in light of rate increases by both Boeing and Airbus, and the fact that "in many cases these OEMs have common first and second-tier suppliers within their supply chain."[310] In any event, Boeing would still be facing a skyline extending several years out, with limited capacity to add new MAX 7 orders before then.

It would make no economic sense for Boeing to shift orders in its skyline or increase its MAX 7 production capacity. The larger members of the 737 MAX family, particularly the MAX 10, "command{} a significantly higher price and profit margin than the MAX 7."[311] Indeed, the MAX 7 accounts for only 1% of MAX family orders.[312] Even industrywide, aircraft manufacturers have shifted production toward larger LCAs, since "{t}he incremental cost to manufacture a larger variant within the same family is far outweighed by the incremental

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[307] Conf. Tr. at 118 (Mr. Anderson), 119-20 (Mr. Conner); App. to Boeing's Post-Conference Brief at A-18.

[308] Flight Ascend Expert Report at 38 (**Attachment A**).

[309] [

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Questionnaire at [ ].

[310] Flight Ascend Expert Report at 42 (**Attachment A**).

[311] *Id.* at 38.

[312] *Id.* at 14.

revenue potential the airframer can achieve."[313] Given that Boeing is relying on "cash flow from the 737 programme during the production transition phase from the current 777 to the new 777-8 / 9," and in light of Boeing's incentive to prioritize production of the MAX 10 in order "to defend {its} position at key Boeing customer airlines against the A321neo, it would be economically irrational for Boeing to change course."[314] Indeed, the [

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Finally, although Boeing argues that "the domestic industry is susceptible to rapid declines in its revenues and profitability" given "the tendency of sales to occur mainly through large but infrequent orders by a handful of major customers,"[316] this cannot demonstrate vulnerability to imminent material injury because even if true, it describes conditions of competition rather than the condition of the domestic industry. If Boeing's argument was sufficient to show vulnerability, then every OEM in this industry would always be inherently vulnerable no matter how successful, which would be an absurdity. In any event, Boeing's market success shows that it has overcome any handicap imposed by these conditions of competition. In fact, what Boeing is trying to do is prevent progress and convince the Commission to rejig the competitive landscape so that it can go back to having a marketplace where airlines are forced to operate unsuitably big aircraft for their purposes, as in the past.

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[313] Steve Mason, Avolon, The 737 MAX – Taking Flight: A Product Assessment 15 (Aug. 2017) **(Exhibit 57)**.

[314] *Id*.

[315] [ ] Questionnaire [ ].

[316] Boeing Post-Conference Brief at 45.

### A. The statutory factors do not support a threat finding regardless of how the domestic industry is defined

Even if the Commission accepts Boeing's proposed Domestic Like Product, under the relevant statutory factors, it is clear that the domestic industry is not threatened with imminent material injury by the small number of C Series to be imported in the near future.[317]

#### 1. The alleged subsidies are not export subsidies

The Department of Commerce investigated the nature of the subsidies, if any, that exist in this case, and did not find that there were export subsidies.[318] The Commission should accept the Department's finding and conclude that there are no export subsidies in this case.

#### 2. Bombardier has minimal existing unused production capacity and has no ability to achieve an imminent, substantial increase in capacity in Canada

In considering whether subject imports threaten a domestic industry with material injury, the Commission must determine whether there is "any existing unused production capacity or imminent, substantial increase in production capacity in the exporting country indicating the likelihood of substantially increased imports of the subject merchandise into the United States, taking into account the availability of other export markets to absorb any additional exports."[319]

With regard to C Series aircraft, there is at most minimal existing unused production capacity, and there is no indication of an imminent, substantial increase in production capacity that would presage the likelihood of increased imports. As discussed above in Part II,

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[317] If the Commission agrees with Bombardier's proposed domestic like product, it is even clearer that there is no threat of imminent material injury.

[318] *See* Memorandum To Ms. Carole Showers, Executive Director, Office of Policy, From Mr. James P. Maeder, Senior Director, Decision Memorandum for the Affirmative Preliminary Determination in the Countervailing Duty Investigation of 100- to 150-Seat Large Civil Aircraft from Canada (Sept. 25, 2017) (not finding any subsidies contingent on exportation) **(Exhibit 58)**.

[319] 19 U.S.C. § 1677(7)(F)(i)(II).

Bombardier intends to supply the U.S. market from the planned facility in Alabama. But even if the Commission does not credit either Bombardier's representation that it will supply U.S. customers from its Alabama facility or Delta's representation that it will not import C Series aircraft from Canada, there would still be at most minimal existing unused production capacity and no indication of an imminent, substantial increase in production capacity.

At most, only minimal further imports are possible within the imminent future, as the Commission has generally defined that period. [

].[320] However, even if [

]. Aside from the minimum 18- to 24-month lag time between any new order and delivery discussed above,[321] the C Series lag time would likely be even longer; in [

].[322] There are two principal reasons for this long delay. First, [

].[323] Second, [

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[320] [320] [ ] Questionnaire at [ ]. In addition to the orders reflected in [ ] questionnaire responses, Bombardier received firm orders from EgyptAir for 12 C Series aircraft and from an undisclosed European buyer for 31 C Series aircraft in November 2017. Alexander Cornwell & Allison Lampert, Reuters, "EgyptAir signs $1.1 billion deal for 12 Bombardier C Series jets" (Nov. 14, 2017) **(Exhibit 59)**.

[321] Conf. Tr. at 119, 148 (Mr. Conner).

[322] [ ] Questionnaire at [ ].

[323][ ] Questionnaire at [

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].[324] As a result, [

] as well as [

].[325] These [

].[326] For all practical purposes, then, Bombardier has essentially no unused capacity.

There also will not be an imminent substantial increase in Bombardier's production capacity. Bombardier currently projects an average production capacity of [ ] C Series aircraft this year, [ ] in 2018, and [ ] in 2019, eventually leading up to a capacity of [ ] in 2022.[327] Yet even these production capacity estimates are [

][328] And [

][329]

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[324] *Id.*

[325] [ ] Questionnaire at [ ]; [ ] Supplement Response, [ ].

[326] [ ] Questionnaire [ ].

[327] [ ] Questionnaire [ ]. Although [

] *Id.* [ ]. *Id.*

[328] [ ] Questionnaire [ ].

[329] [ ] Questionnaire [ ]; *see also* Conf. Tr. at 157 (Mr. Mullot) (explaining that Bombardier is "still on (a) learning curve, working to optimize the supply chain and the final assembly operation so it can meet the delivery dates for existing U.S. and International customers").

As discussed above, [

].[330] Finally, there is no plan to [

].[331] Thus, there is no realistic possibility that Bombardier exceeds its production estimates.

Further, as discussed above, any imminent U.S. sales are unlikely because of the threat of a trade enforcement action by Boeing. Regardless of the outcome of this investigation, its very pendency might "discourage{} near-term customers to buy the C Series because of its future uncertainty."[332] In fact, since this investigation was commenced, and indeed since the Delta order in April 2016, Bombardier has received no new U.S. orders for C Series aircraft, despite receiving several new orders from non-U.S. customers in 2017.[333]

### 3. The record fails to establish a significant rate of increase in the volume or market penetration of imports indicating the likelihood of substantially increased imports

The statute requires the Commission to evaluate whether there has been "a significant rate of increase of the volume or market penetration of imports of the subject merchandise indicating the likelihood of substantially increased imports." 19 U.S.C. § 1677(7)(F)(i)(III). The statutory focus is plainly on extrapolating from recent trends to predict the future volume and market share of subject imports.

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[330] Id.

[331] [ ] Questionnaire [ ]; Conf. Tr. at 196-97 (Mr. Mullot).

[332] Ernest S. Arvai, AirInsight, Premium #253 – Making Boeing Great Again (Nov. 30, 2017) **(Exhbit 24)**.

[333] *See* Alexander Cornwell & Allison Lampert, Reuters, EgyptAir signs $1.1 billion deal for 12 Bombardier C Series jets (Nov. 14, 2017) **(Exhibit 59)**.

Here, there were no subject imports, and thus no "significant rate of increase of the volume or market penetration of imports," during the POI. The market share of subject imports is zero and will remain zero until at least April 2018—and indefinitely if Delta's planes are produced at the U.S. FAL. Assuming for the sake of argument that deliveries to Delta from Mirabel proceed as originally planned—with no new supplier delays—Bombardier would deliver [ ].[334] Bombardier's ability to increase its exports to the United States beyond its current orders is sharply constrained because, as explained with respect to the previous factor, it has minimal existing unused production capacity and no ability to achieve an imminent, substantial increase in capacity in Canada. Finally, Bombardier has been unable to secure any U.S. orders for C Series aircraft since the Delta deal in April 2016, in contrast to the multiple C Series orders it has secured from foreign customers.[335]

Although the Commission noted that Bombardier has a [ ] of open production slots through 2021 and a strong incentive to fill these slots in order to progress down the learning curve,[336] the proper inquiry for determining the likelihood of imminent imports is not Bombardier's production capacity through 2021, but instead its capacity through 2019. As

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[334] [

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[335] For instance, in Q3 2017, a European customer signed a Letter of Intent to order 31 CS300s, and in November 2017, EgyptAir signed a Letter of Intent to order 12 CS300s. Flight Ascend Expert Report § 3.6.5 (**Attachment A**). Furthermore, [ ] of Bombardier's projected exports through 2019 are to markets other than the United States. [ ] Questionnaire [ ].

[336] Prelim. Det. (Public Version) at 29.

discussed above, Bombardier has [ ] open production slots in 2018 and [ ] open slots in 2019, though it is [ ] in light of multi-year lead times and Bombardier's [ ] supplier and ramp-up delays.

The Commission also found that Bombardier is likely to target the U.S. market for additional imminent sales in light of the importance of the U.S. LCA market, [ ], and the "momentum" gained from the Delta deal. However, whether Bombardier will succeed in obtaining new U.S. orders is pure speculation. Over a year has passed since the Delta deal in July 2016, and [ ] additional U.S. firm orders have been secured.[337] Moreover, as discussed above, Bombardier intends to supply the U.S. market from its U.S. FAL, not from its Canadian facility, and in any event U.S. airlines have a strong disincentive to import LCAs from Canada to the United States in light of the risk that Boeing will bring another trade action. Furthermore, the sale to Delta has not resulted in "commercial momentum": not only does [ ],[338] but Boeing's suggestion that the mere fact of prior LCA sales increases the likelihood of future sales is false.[339] Instead, to the extent commercial momentum has meaning in this industry, it reflects the increased acceptance of a new aircraft, generated when that aircraft meets its metrics for

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[337] Conf. Tr. at 189 (Ms. Aranoff); [ ] Questionnaire at [ ] (submitted by [ ] as a separate excel file attachment).

[338] [ ] Importer/Purchaser Questionnaire at [ ].

[339] *See* Prehearing Report, at V-12 ("Among importer/purchasers, several responding firms indicated that past sales performance does not play a large role in their purchases of 100- to 150-seat LCA. Three [ ], along with [ ], stated that past sales performance of a particular model plays little or no role in their likelihood to order that model."). Similarly, [ ] reported that "commercial momentum" [ ] "play{} a role in their decisions to purchase 100- to 150-seat LCA from specific producers." Prehearing Report, at II-22. Although [ ], *id.*, this is insignificant in the context of the C Series because [ ]. [ ] Questionnaire at [ ].

production, certification, and entry into service. Yet Bombardier has not yet delivered any C Series aircraft to Delta and will not do so until April 2018 at the earliest. Thus, the evidence does not indicate that the small number of open production slots through 2019 will be filled, if at all, with U.S. orders.[340] But even if Bombardier were able to secure additional U.S. C Series orders soon, the multi-year lag time dictates that [

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#### 4. The C Series is not entering at prices likely to have a significant depressing or suppressing effect on domestic prices

Under the statute, the Commission must evaluate "whether imports of the subject merchandise are entering at prices that are likely to have a significant depressing or suppressing effect on domestic prices, and are likely to increase demand for further imports."[341] The evidence shows that this question must be answered in the negative.

To start, there is no evidence that pricing offered by Bombardier has depressed the price of any existing sales by Boeing of 100- to 150 seat LCA. In its questionnaire response, [

]342 [

]343 Boeing has not claimed that [

] The [

---

340 Although Boeing suggests that [ ] will likely be replaced by U.S. sales, Boeing Post-Conference Br. at 33–35, this argument rests on speculation, in contravention of the statute. Furthermore, Bombardier has reported that [ ], Bombardier questionnaire at [ ], and Boeing has provided no reason to believe that [ ].

341 19 U.S.C. § 1677(7)(F)(i)(IV).

342 [ ] Questionnaire at [ ].

343 *Id*.

]344 Furthermore, although Boeing reports that [

],345 there is no evidence that [ ] had anything to do with C Series prices offered by Bombardier. Indeed, [

]346

There is also no evidence that Bombardier's pricing will depress the price of any future Boeing sales of 100- to 150 seat LCA. In its Preliminary Opinion, the Commission found that "the low prices offered by Bombardier for the CS100 in both the United and Delta sales campaigns are likely to have a significant depressing or suppressing effect on domestic prices and are likely to increase demand for further imports."347 As demonstrated below, however, the prices offered by Bombardier in these sales campaigns were reasonable under those circumstances and are not likely to depress or suppress domestic prices or increase demand for further imports, particularly since the specific circumstances justifying launch pricing will not likely recur in the future.

With respect to the United campaign, although Boeing has disputed Bombardier's account of events, numerous contemporary publications corroborate Bombardier's account. As confirmed by sworn conference testimony and these contemporary publications, United told Bombardier it was looking for LCA configured with *fewer than 114 seats*, for which Boeing

344 *See* [ ] Average Sales Prices for 100- to 150-Seat LCA and Other Single Aisle LCA **(Attachment C, Chart 5**).

345 [ ] U.S. Producer Questionnaire at [ ].

346 [ ] Importer/Purchaser Questionnaire at [ ]

347 Prelim. Det. (Public Version) at 33.

could not compete, and Boeing entered the picture only at the last minute to offer 737-700s—larger than what United was looking for—at prices so low that United could not turn down the offer, for the admitted purpose of blocking the C Series from gaining validation in the market.[348] In other words, the 737-700 did not compete with the C Series to meet United's expressed needs, but rather was offered at a bargain-basement price to induce United to purchase it anyway, in order to prevent the C Series from getting off the ground.

United confirms that [ ].[349] Similarly, United [ ].[350] Furthermore, Boeing ultimately did not supply a single 737-700 to United, because United converted its order to the even larger 737-800 and MAX 8 within less than a year.[351] United's rapid decision to convert its order to larger LCAs indicates that it knew from the beginning that the 737-700s would not satisfy its needs and that the only economically sensible thing to do would be to convert to larger LCAs. Although airlines and other aircraft purchasers generally choose whether to convert LCA orders based on

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[348] *See, e.g.*, Scott Hamilton, Boeing Gives United a Smoking Deal on 737s to Block Bombardier from Gaining Traction, Forbes (Mar. 8, 2016) **(Exhibit 62)**; Aircraft Value News, United Airlines Buys B737700s for "$20-25 million": "Strategic Pricing" Still Evident Despite Record Backlog, (May 2, 2016) **(Exhibit 32)**; Ernes S. Avai, AirInsight, Why are Airbus and Boeing Afraid of Bombardier? (Feb. 23, 2017) **(Exhibit 30)**; AirInsight, Bombardier's C Series at EIS: Regaining Momentum at 20 (July 2016) **(Exhibit 31)**.

[349] *See* United U.S. Importer/Purchaser Questionnaire at [ ]

[350] *See* United U.S. Importer/Purchaser Questionnaire at [ ].

[351] Conf. Tr. at 163 (Mr. Mitchell). Boeing testified that United requested to convert its order for the 737-700 to other, larger 737s, even though it had no conversion rights. Conf. Tr. at 127 (Mr. Conner). However, [ ] This indicates that [ ].

[ ],[352] there is no indication that there were any such [ ] in the short time between United's order and its decision to convert to larger LCAs, suggesting that the question of whether prices for the 737-700 were suppressed is entirely moot, even if the original sales terms reflected competition between the CS100 and the 737-700 (which they did not).

In its Preliminary Opinion, the Commission cited Boeing's representation that [ ] and [ ].[353] But even if it is true that *Boeing's* offer to United influenced pricing on future sales, this does not mean that *Bombardier's* offer to United influenced such sales. As discussed above, Bombardier did not craft its offer to United in order to compete with Boeing, as the 737-700 was not even a candidate for the United order at the time of Bombardier's offer. Boeing entered a bid only at the last minute, and offered a pricing so low that United could not refuse, even given that the 737-700 was larger than what United wanted, for the express purpose of obstructing the C Series' validation in the market. Thus, even if Boeing's offer to United influenced later sales, this offer was not the result of competition with Bombardier.

With respect to the Delta sale, [ ] questionnaire responses and sworn conference testimony corroborate Bombardier's account of the sale and confirm that Boeing's version of events does not square with reality. The Commission should therefore credit the account reported by Bombardier and Delta, in accordance with its past practice of crediting the purchaser's

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[352] *See, e.g.*, [ ] US Importer/Purchaser Questionnaire [ ]; *see also* [ ] US Importer/Purchaser Questionnaire [ ]; [ ] US Importer/Purchaser Questionnaire [ ].

[353] Prelim. Det. (APO Version) at 50–51 (citing Petition at Exhibit 101 ([ ]).

description of the history of a transaction where competing sellers have offered varying accounts.[354] The bottom line is that Boeing effectively was not in competition for the Delta sale because it could not offer a new aircraft that met Delta's requirements.[355] Not only did Boeing not lose any sales to the Delta deal, but the pricing offered by Bombardier had nothing whatsoever to do with any competition with Boeing's 737s. Although the Prehearing Report reproduces verbatim three pages of argument from [

], the Prehearing Report neither incorporates nor even references the extensive discussion in [

].[356]

The Delta sale did not and will not have a price depressing effect on domestic industry sales because the price was not public and will have no "lighthouse effect." As confirmed by the importer/purchaser questionnaire responses, bids in the LCA industry are private, and customers do not disclose bid details, including price, to other bidders.[357] The importer/purchaser respondents also uniformly reported that [

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[354] *See, e.g.*, *Bottom Mount Combination Refrigerator-Freezers from Korea and Mexico*, Inv. Nos. 701-TA-477 and 731-TA-1180-1181 (Final), USITC Pub. 4318 (May 2012), at 37-38; *Ni-Resist Piston Inserts from Argentina*, Inv. No. 701-TA-460 (Final), USITC Pub. 4104 (Oct. 2009), at 18-20.

[355] *See* FlightAscend Expert Report, at 43 ("In the case of Delta, their order for the CSeries was competed against by used E190s. In the absence of the CSeries, it appears highly unlikely that Delta would have ordered Boeing aircraft instead, with used or new Embraer E-Jets being the most likely decision."); Ernes S. Avai, Premium #327 – Boeing's Trade Complaint Against Bombardier – Does It Hold Water? (May 2, 2017) **(Exhibit 29)** ("Delta wanted a 100 seat aircraft, a size range Boeing no longer makes.").

[356] Prehearing Report at [ ]; [ ] Questionnaire at [ ].

[357] Importer/purchaser Questionnaires, at [ ]. [

]. *Id.*

].[358] The absence of price transmission in the LCA market was confirmed by the importer/purchasers' questionnaire responses and sworn testimony at the staff conference.[359]

In its Preliminary Opinion, the Commission noted that Boeing had been able to [ ] estimate the price Bombardier offered Delta using public information.[360] However, the fact that Boeing's after-the fact estimates turned out to be [ ] the actual price says nothing about the degree of confidence Boeing could reasonably have had in its estimates, let alone whether airlines and other purchasers can accurately estimate prices with a high degree of confidence. Nevertheless, even if the market knows anything about the Delta sale, the price offered by Bombardier would not depress prices in domestic industry sales. First, Bombardier was competing against used aircraft [ ], which all things being equal tends to exert downward pressure on prices.[361] Second, Bombardier's offered price was an example of launch pricing, which as discussed above, is a standard practice in the industry in order to compensate customers for the risks of taking on a new and untested aircraft. Moreover,

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[358] Prehearing Report, at V-20 ("[ ]) stated that in general, they were not aware of prices that other purchasers have paid for 100- to 150-seat LCA. [ ] stated that it was broadly aware, and both it and [ ] stated that sometimes they received word-of-mouth information at conferences or industry events, but that such information was relatively vague. [ ] stated that it [ ] in combination with many other factors it uses in purchase negotiations."). [ ] clarified:
[

] questionnaire at [ ].

[359] *See* Importer/Purchaser Questionnaires [ ]; Conf. Tr. at 166 (Mr. Mitchell) (noting that "specific purchase prices are not known to others in the industry so there is no lighthouse (e)ffect in the U.S. market."); *id.* at 178 (Mr. May) ("there … is no pricing transparency here"; "the price information is not something that we would ever share with our competitors. It is not in our best interest.").

[360] Prelim. Det. (APO Version) at 41.

[361] Tr. at 162 (Mr. Mitchell).

the significant risk Delta assumed in its April 2016 order is confirmed by the fact that no C Series aircraft had yet been delivered: the first C Series delivery was made to Swiss International Air Lines in June 2016, and the C Series first entered service in July 2016.[362] Nor had the CS100 or CS300 been certified by the FAA, which did not occur until June and December 2016, respectively.[363] The market would not expect any launch pricing offered to Delta to become a new price ceiling; to the contrary, it is generally understood that post-launch pricing goes up.[364] Finally, Delta received a [ ] as a marquee customer that could help validate the C Series—another standard industry practice that would not create an expectation that Bombardier would offer similarly [ ] pricing to non-marquee customers or once the C Series had become established.

### 5. There is no "inventory" of Bombardier C Series aircraft by which the domestic market could be threatened

The statute requires the Commission to consider the "inventories of the subject merchandise" in evaluating whether the domestic industry is threatened with material injury. *See* 19 U.S.C. § 1677(7)(F)(i)(V).

This is a straightforward factor, as aircraft are not produced for inventory. Bombardier has [ ],[365] and Boeing has conceded that no aircraft manufacturer produces a "white tail"; all production is to order.[366]

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[362] *See* "Bombardier Delivers First C Series Aircraft to Launch Operator SWISS" (June 29, 2016) **(Exhibit 64)**; "Bombardier C Series enters commercial service with Swiss" (July 18, 2016) **(Exhibit 65)**.

[363] *See* "Bombardier CS100 gets EASA, FAA certification" (June 17, 2016) **(Exhibit 41)**; "Bombardier CS300 awarded FAA type validation" (Dec. 20, 2016) **(Exhibit 66)**.

[364] Conf. Tr. at 177 (Mr. May).

[365] [ ] Foreign Producer Questionnaire at [ ].

[366] Conf. Tr. at 21, 86-87 (Mr. Novick).

### 6. There is no potential for product-shifting

The Commission must evaluate "the potential for product-shifting if production facilities in the foreign country, which can be used to produce the subject merchandise, are currently being used to produce other products." 19 U.S.C. § 1677(7)(F)(i)(VI).

Here, there is no potential for product-shifting. Bombardier has reported that [

].[367] Specifically, the manufacturing processes for Bombardier's regional jets "is fundamentally different" from the C Series manufacturing process, and "they are not using the same tooling at all."[368] The overlap between these manufacturing processes is [

].[369]

### 7. The C Series will cause no actual or potential negative effects on existing development and production efforts of the domestic industry

The Commission must consider "the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the domestic like product." 19 U.S.C. § 1677(7)(F)(i)(VIII).

There is no merit to Boeing's claim that current or potential C Series sales jeopardize any research and development ("R&D") efforts for the 737 MAX 7. The MAX 7 development phase

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[367] [ ] Foreign Producer Questionnaire at [ ].

[368] Conf. Tr. at 198 (Mr. Mullot).

[369] [ ] Foreign Producer Questionnaire at [ ].

is now complete, as the MAX 7 entered production on October 4, 2017,[370] and thus the principal R&D costs for the MAX 7 program have likely already been incurred.[371] Boeing has accordingly projected MAX 7 R&D costs of [ ] in 2018.[372] Moreover, even to the extent that unexpected R&D issues arise in 2018 or 2019, these are unlikely to be significant. MAX 7 R&D is limited because the MAX 7 is simply a re-engined version of the 737-700, which dates to the 1990s; development costs are therefore far less than would be required for an aircraft based on a clean sheet design.[373] Furthermore, re-engining is often partly underwritten by the engine manufacturer, and the engine used for the MAX 7 was already integrated into the MAX 8, so most of the R&D expenses associated with the new engines and other enhancements were already incurred in development of the MAX 8.[374] Because Boeing has already begun delivering the MAX 8, which shares great commonality with the MAX 7, even those R&D issues that may arise during production have likely already been addressed.[375] Notably, Boeing reported that, [

[370] Stephen Trimble, "Boeing starts building first 737 Max 7," (Oct. 4, 2017) **(Exhibit 67)**.

[371] Although Boeing defines the [ ] Boeing does not dispute the fact that the vast majority of R&D costs will have been incurred by the time an aircraft enters production. Indeed, this is borne out by [ ]. [ ] questionnaire [ ]

[372] [ ] U.S. Producer Questionnaire at [ ].

[373] *See* Tr. 59:9–20, 149:6–15 (Conner); *see also* [ ] **(Exhibit 70)**.

[374] Conf. Tr. at 285 (Mr. Lichtenbaum).

[375] See CAPA Centre for Aviation, Lion Group's Malindo Air opts for single class configuration on 737-8 as MAX deliveries begin (May 16, 2017) **(Exhibit 68)**.

].”[376]

Even to the extent Boeing loses any revenue as a result of C Series imports, this would have no impact on its ability to finance the remaining development of the MAX 7. Given that pre-delivery payments “top out at 15 to 30 percent of contract value,” aircraft manufacturers cannot plan “to finance development costs using pre-delivery payments.”[377] Furthermore, Boeing’s 737 backlog is valued at roughly $190 billion, and its total commercial aircraft backlog is valued at $424 billion.[378] The enormous revenues from this backlog could easily finance further research and development of the MAX 7 or another aircraft. Of course, as discussed above, the evidence indicates Boeing has decided to prioritize larger, more profitable LCAs over the MAX 7, and thus would not divert funds from development of larger LCAs to the MAX 7 even if it had the option.

As industry experts have recognized:

> The Boeing 737 Max 7 is the least efficient variant of the Boeing 737 Max family and its current poor market performance is driven by the aircraft design and relatively uncompetitive performance in the market generally. This repeats the experience of the smallest members of multi-gauge single-aisle families historically and is expected to continue by virtue of the design, rather than as a result of any direct competitor actions.[379]

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[376] [ ] questionnaire at [ ].

[377] Conf. Tr. at 167 (Mr. Mitchell); *see also* [ ] questionnaire at [ ]. Indeed, pre-delivery expenses quickly exceed advance payments once production starts.

[378] *See* “737 aircraft family enjoys robust financial health” **(Exhibit 28)**; *see also* [ ] questionnaire response at [ ].

[379] Flight Ascend Expert Report at 50 (**Attachment A**).

The MAX 7's failure to achieve commercial success[380] is thus not attributable to the C Series, but rather to the MAX 7's own deficiencies, as well as Boeing's decision to prioritize sales of larger, more profitable 737 family members.[381]

### 8. There are no other demonstrable adverse trends that indicate a likelihood of material injury

Lastly, the Commission considers "any other demonstrable adverse trends that indicate the probability that there is likely to be material injury by reason of imports (or sale for importation) of the subject merchandise (whether or not it is actually being imported at the time)." 19 U.S.C. § 1677(7)(F)(i)(IX). No such adverse trends are referenced in either Boeing's petition or its post-conference brief. Indeed, as discussed above, the Commission should consider Boeing's strong current performance for the 737 program as evidence that this factor is not satisfied. The increase in Boeing's share price over the past year[382] shows the markets believe that Boeing`s market presence is not decreasing, but rather increasing in light of Boeing's substantial order backlog. It would be hard to imagine how Boeing could be any less vulnerable under the circumstances, and concluding that it is vulnerable would be counter to the facts and the perceptions of a highly informed group of investors and industry specialists.

For all these reasons, it is clear that the domestic industry is not threatened with imminent material injury by the small number of C Series aircraft to be imported in the next two years.

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[380] Since [ ]. *See* [ ] Questionnaire at [ ].

[381] Flight Ascend Expert Report at 45-46, 50 (**Attachment A**).

[382] *See* Boeing Share Prices **(Exhibit 69)**.

*  *  *

For the reasons stated above, on behalf of Respondent Bombardier Inc. and C Series Aircraft Limited Partnership, we urge the Commission to conclude that there is no imminent threat of material injury to the domestic industry and issue a negative determination.

Dated: December 12, 2017

Respectfully submitted,

*/s/ Shara L. Aranoff*

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## List of Attachments and Exhibits

| Number | Description | Status |
|---|---|---|
| A | Flight Ascend Expert Report | Public |
| B | Avitas Report on Demise of McDonnell Douglas and Importance of U.S. Market | Public |
| C | Charts Based on Questionnaire Responses | APO |
| D | Declaration of Attorney at Covington & Burling LLP | APO |
| E | Affidavit of [ ] | APO |
| 1 | Bombardier Press Release, "Airbus and Bombardier Announce C Series Partnership" (Oct. 16, 2017) | Public |
| 2 | Aviation Week, "Enough With the Hypocrisy, Boeing" (Dec. 8, 2017) | Public |
| 3 | [ ] (German Original and English Translation) | APO |
| 4 | [ ] | APO |
| 5 | Wikipedia, "Boeing 737 Next Generation" | Public |
| 6 | Boeing Brief on the Announced Airbus-Bombardier C Series Partnership (Nov. 13, 2017) | Public |
| 7 | Zacks Equity Research, "20-Year Market Outlook for Jetliners: Airbus vs. Boeing" (June 12, 2017) | Public |
| 8 | The Canadian Press, "Delta CEO says 'We will not pay those tariffs' on Bombardier C Series order" (Oct. 11, 2017) | Public |
| 9 | Leeham News, "Egyptaire Signs For Up to 24 CS300s at Dubai Air Show" (Nov. 14, 2017) | Public |
| 10 | Bombardier Rebuttal Brief on the Proposed Transaction (Nov. 17, 2017) | Public |
| 11 | Boeing Press Release, "Production on 737 MAX 7, the Newest MAX Airplane, Gets Underway" (Oct. 5, 2017) | Public |
| 12 | Boeing's 737NG and MAX Series: Comparison of Physical Characteristics | Public |
| 13 | Boeing Press Release, "A Family First: 737 MAX 8 Awarded FAA Certification" (Mar. 10, 2017) | Public |
| 14 | Bombardier, "The 737 Family Represents a Continuum of Seat Counts" | Public |
| 15 | Bombardier, "Examples of Seating Configuration" | Public |
| 16 | AirInsight, "Boeing Finalizes a Larger 737 Max 7 Design" | Public |
| 17 | Diio, U.S. Routes Analysis | Public |
| 18 | FAA Type Certificate for 737 | Public |
| 19 | The Boeing Company 2016 Annual Report | Public |
| 20 | Boeing Current Market Outlook 2016-2035 | Public |
| 21 | Boeing Markets 737s as a Family: Next Generation 737 Design Highlights | Public |
| 22 | Boeing Website: 737 MAX | Public |
| 23 | Boeing Support and Services Overview | Public |
| 24 | AirInsight, "Making Boeing Great Again" (Nov. 30, 2017) | Public |
| 25 | Wall Street Journal, "Budget Carriers Gird for Growth" (Nov. 16, 2017) | Public |
| 26 | Boeing Website: Orders and Deliveries | Public |

**List of Attachments and Exhibits**

| Number | Description | Status |
|---|---|---|
| 27 | Boeing Reports Fourth Quarter Results and Provides 2017 Guidance (Jan. 25, 2017) | Public |
| 28 | 737 Aircraft Family Enjoys Robust Financial Health | Public |
| 29 | AirInsight, "Boeing's Trade Complaint Against Bombardier -- Does it Hold Water?" (May 2, 2017) | Public |
| 30 | AirInsight, "Why are Airbus and Boeing Afraid of Bombardier?" (Feb. 23, 2017) | Public |
| 31 | AirInsight, "Bombardier's C Series at EIS: Regaining Momentum" (Jul. 2016) | Public |
| 32 | Aircraft Value News, "United Airlines Buys B737-700s for '$20-25 million'" (May 2, 2016) | Public |
| 33 | Average Age for In-Service Boeing 737s and Airbus A320s | Public |
| 34 | Business Insider, "How the Boeing Jet No One Wanted Became the Plane Airlines Scour the Planet For" (Dec. 3, 2017) | |
| 35 | Leeham News, "How Boeing pays back the 787 debts" (Jul. 27, 2017) | Public |
| 36 | Boeing Website: World Trade Organization | Public |
| 38 | The Verge, "Is the 787 Dreamliner a Lemon?" (Jan. 17, 2013) | Public |
| 39 | Wall Street Journal, "The Secret Price of a Jet Airliner - Discounts of 50% or More off the Sticker Number Are Common as Plane Makers and Buyers Haggle" (Jul. 9, 2012) | Public |
| 40 | Leeham News, "Bombardier sees no merit to Boeing complaint, says president" (Jun. 5, 2017) | Public |
| 41 | Wings Magazine, "Bombardier CS100 gets EASA, FAA Certification" (Jun. 17, 2016) | Public |
| 42 | Seattle Times, "Price War, Plane Transitions Put Boeing in Financial Crunch" (Apr. 1, 2016) | Public |
| 43 | Trade Agreements Act of 1979, S. Rep. 96-39, at 88-89 (1979) | Public |
| 44 | Boeing Website: About Boeing Commercial Airplanes, Jet Prices | Public |
| 45 | United Investor Day Conference Presentation, November 15, 2016 | Public |
| 46 | Edward Russell, "United Targets Rapid Completion for Fleet Review" (Jan. 18, 2017) | Public |
| 47 | Boeing Press Release, "Boeing, United Airlines Announce Order for 100 737 MAX 10s" (Jun. 20, 2017) | Public |
| 48 | [ ] | APO |
| 49 | [ ] | APO |
| 50 | [ ] | APO |
| 51 | [ ] | APO |
| 52 | [ ] | APO |
| 53 | [ ] | APO |
| 54 | [ ] | APO |
| 56 | Boeing Q12017 Results Earnings Call Transcript (Apr. 26, 2017) | Public |
| 57 | Avolon, "The 737 MAX – Taking Flight: A Product Assessment" (Aug. 2017) | Public |

**List of Attachments and Exhibits**

| Number | Description | Status |
|---|---|---|
| **58** | Decision Memorandum for the Affirmative Preliminary Determination in the Countervailing Duty Investigation of 100- to 150-Seat Large Civil Aircraft from Canada | Public |
| **59** | Reuters, "EgyptAir signs $1.1 billion deal for 12 Bombardier C Series Jets" (Nov. 14, 2017) | Public |
| **62** | Aircraft Value News, "Boeing Gives United a Smoking Deal on 737s to Block Bombardier from Gaining Traction" (Mar. 8, 2016) | Public |
| **64** | Bombardier Press Release, "Bombardier Delivers First C Series Aircraft to Launch Operator SWISS" (Jun. 29, 2016) | Public |
| **65** | Australian Aviation, "Bombardier CSeries enters commercial service with Swiss" (Jul. 18, 2016) | Public |
| **66** | Aviation Brief, "FAA Validates Bombardier CS300" | Public |
| **67** | Flight Global, “Boeing Starts Building First 737 MAX 7” (Oct. 4, 2017) | Public |
| **68** | CAPA, "Lion Group's Malindo Air opts for single class configuration on 737-8" (May 16, 2017) | Public |
| **69** | Yahoo Finance, Boeing Share Prices | Public |
| **70** | Bombardier Responses to Staff Questions | APO |

# ATTACHMENT A

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# EXPERT REPORT
# FOR US ITC INVESTIGATION
# (100 to 150 seat large civil aircraft from Canada)
# (Inv. Nos. 701-Ta-578 and 731-TA-1368 (Final))

**Prepared by Flight Ascend Consultancy**
**for**
**Covington & Burling LLP**

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12th December 2017



Attention: Shara Aranoff

Dear Shara,

**Expert Report for US ITC Aircraft Investigation**
**(*100- to 150-Seat Large Civil Aircraft from Canada*,**
(Inv. Nos. 701-Ta-578 and 731-TA-1368 (Final))

According to the instructions received from yourselves, Flight Ascend Consultancy is pleased to provide the following report, as expert witness analysis in support of testimony in support of the final injury investigation of 100- to 150-Seat Large Civilian Aircraft from Canada before the U.S. International Trade Commission (ITC).

This Phase 1 report is in advance of the oral testimony before the ITC in its public hearing on 18 December 2017.

Please note that opinions provided by Flight Ascend Consultancy are valid only as at the date of issue. Subsequent to that date, there may be alterations in the world aviation market, global economy, or other general factors that may impact Flight Ascend Consultancy's opinions.

Yours sincerely,

**Rob Morris**
*Head of Consultancy*

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## 1. Introduction and Key Conclusions

This report includes analysis on the following issues involving the lower end of the commercial aircraft single-aisle market.

1. The lack of economic viability and marketability of the Boeing 737 Max 7, including a discussion of its limited market niche, and uneconomic comparison with other offerings in the market, i.e. other Boeing models, BBD, Embraer, Airbus. This is addressed is section 3 of the report.
2. Projected demand for 100- to 150-seat civilian aircraft in the United States, and globally, over the next 4-5 year period, based on FlightGlobal database. This is addressed in section 4 of the report.
3. An examination of the real elasticity of Boeing's production capacity for the 737 Max 7, and of Boeing's commercial interest in substituting sales of 737 Max 7 aircraft with other 737 models. This is addressed in section 5 of the report.
4. An examination of the phenomena of "launch pricing" and "commercial momentum", two factors discussed in the ITC's preliminary determination. This is addressed in section 6 of the report.

The key conclusions are set out in section 8 of the report, but are also summarised below in response to each of the issues above.

1. **The Boeing 737 Max 7 is the least efficient variant of the Boeing 737 Max family and its current poor market performance is driven by the aircraft design and relatively uncompetitive performance in the market generally. This repeats the experience of the smallest members of multi-gauge single-aisle families historically and is expected to continue by virtue of the design, rather than as a result of any direct competitor actions.**

2. **Demand for new single-aisle aircraft over the next five years, both in the United States and globally, is expected to be focussed on larger members of the new-generation programmes. This is driven in the US by the Major airlines' plans to continue to seek the most efficient seat-mile costs possible - which are typically rendered by the largest aircraft family members. The smallest family members will thus likely remain niche players in this time period.**

3. **Boeing is highly incentivised by market pricing to deliver the largest members of its 737 Max family. Analysis of the Max backlog suggests that production is fully committed over the next five years. If Boeing were to defer these slots in favour of 75 Max 7 aircraft, the cost in deferred sales revenue is estimated to be as much as $1.25 billion.**

4. **"Launch" pricing is typically offered at the outset of a commercial aircraft programme for a finite period, as compensation for risk undertaken by customers who commit to an aircraft before it meets development and performance milestones. It is distinct from "strategic" campaigns in which a manufacturer may offer reduced pricing for other reasons**.

## 2. Expert qualifications

Flight Ascend Consultancy ("Ascend") has a history in the industry that can be traced back over 50 years. Ascend specialises in aviation asset valuations covering commercial aircraft and aero-engines, business jets and turboprops and commercial helicopters. The Ascend team delivers more than 200,000 unit valuations annually, either through desktop reports or via an online valuation portfolio. Ascend has been named appraiser of the year for six of the last seven years in the Aviation 100 Awards public poll.

Ascend was acquired in 2011 by Reed Business Information and now trades as part of the FlightGlobal brand. Reed Business Information is itself owned by RELX Group, a leading data solutions company listed on the London, Amsterdam and New York stock exchanges. RELX Group has around 28,500 employees and market capitalisation of around $40 billion.

Ascend remain fully objective in the commercial aviation market. Neither Ascend, nor any of its employees, invest in aircraft or broker sales of aircraft. Consequently, there is no conflict of interest when it comes to assessing asset values.

Ascend's team of 26 consultants are based in three office locations – London, New York and Hong Kong. Comprising some of the industry's leading experts, the Flight Ascend Consultancy team includes seven ISTAT and one ASA certified appraisers, experts in commercial aircraft, operating leasing, forecasting and economics.

Ascend's unique, sophisticated modelling underpins our views on the market which support opinion on aircraft valuations, aircraft forecasts and asset ratings. Ascend's opinion is benchmarked on a continuous basis, providing the industry's most reliable data. Our unique data, expert team and robust methodology provide a fully independent and objective view.

Flight Ascend Consultancy has clients across the aerospace and air finance spectrum, including aircraft manufacturers, major supply-chain companies, aircraft financiers, aircraft leasing companies, airlines and airports.

The Flight Ascend team that has compiled this expert witness report has over 100 years' experience in the commercial aerospace industry. The primary contributors are detailed below:

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George is a certified ISTAT appraiser, and joined Flight Ascend Consultancy in 2005, having previously worked at Airbus and United Airlines. He has ultimate responsibility for all Value and Lease Rate opinions produced by the Consultancy team. He also leads the annual Future Value and Lease Rate forecasting process. George has worked with the majority of lessors, banks, manufacturers and a number of airlines to support their decision making processes. He is based in the New York office and has worked extensively with global clients in the past out of London and Hong Kong. George has a BEng (Hons) in Air Transport Engineering from City University in London.

**Rob Morris, Global Head of Consultancy**

Rob leads the Ascend Consultancy team and has more than twenty five years industry experience as a commercial aviation analyst. Prior to joining Flight Ascend Consultancy in January 2012, Rob was Vice President, Marketing & Analysis at BAE Systems Asset Management in Hatfield where he was responsible for market and strategy analysis in support of the regional aircraft lessor's business winning process. Rob has also worked in the Aerospace team at the UK Government's Department of Trade and Industry where he managed all aspects of market analysis and forecasting in support of the UK's investment in a wide range of commercial aircraft and aero-engine programmes. He began his Aviation career in 1990 as a Marketing Executive at British Aerospace (Regional Aircraft).

**Richard Evans, Senior Analyst**

Richard Evans is a Senior Consultant with Flight Ascend Consultancy, where he applies his expertise working on advisory and valuations projects across the whole commercial aviation sector. Richard joined the consultancy team in 2014 after 27 years with Rolls-Royce. Most recently Head of Market Analysis in their Civil Aerospace division, Richard is well known and widely respected for his informed industry views and experience. At Rolls-Royce he was responsible for published industry forecasts and provided analysis of major airline and aerospace industry trends for both internal and external customers, as well as acting as a consultant for business improvement activities. Richard frequently presents at international conferences. He is currently chair of the European aerospace analysts group, FEAMA, and is a Fellow of the Royal Aeronautical Society. He has a BSc (Hons) in Mechanical Engineering from the University of Nottingham.

**Chris Seymour, Head of Market Analysis**

Chris joined Flight Ascend Consultancy in 1985 after taking a Business Studies degree at City University, London. In the early 1990s he joined the expanding consultancy arm of the business, undertaking aircraft valuations and market studies. He was instrumental in developing the helicopter valuation side of the business. As Head of Market Analysis Chris now specialises in the growing advisory and market analysis. He is responsible for the annual Flight Fleet Forecast and has developed the new Global Helicopter Forecast. He is editor of our Market Commentaries, which cover all major commercial aircraft types, business jets and helicopters, and is also a speaker and moderator at aviation conferences.

## 3. Boeing 737 Max 7 and CSeries comparison

This section will consider how the Boeing 737 Max 7 compares with the CSeries (in particular the CS100 ordered by Delta) and other aircraft in the small single-aisle sector.

### 3.1 Aircraft size classification

FlightAscend Consultancy divides the single-aisle (narrowbody) airliner fleet into four size categories: 110 seats, 125 seats, 150 seats and 180 seats. These single-aisle (SA) sizes are based on typical dual-class seating, although within each size, the various aircraft types can have higher seating densities in a single class. For example, whilst the 737-700s flown by Delta have 124 seats, and those flown by United hold 118, those flown by Southwest have a total of 143 seats, actually closer to 150 than to 125.

The Airbus, Boeing and Bombardier types within each size are broadly these –

- 110-seats - Airbus A318, Boeing 737-600, Bombardier CS100
- 125-seats - Airbus A319 and A319neo, Boeing 737-700 and Max 7, Bombardier CS300
- 150-seats - Airbus A320 and A320neo, Boeing 737-800 and Max 8
- 180-seats - Airbus A321 and A321neo, Boeing 737-900/900ER and Max 9/10

New programmes from China (C919) and Russia (Irkut MS-21) will fall into the 150 & 180 and 125 & 150 seat categories respectively.

In addition, the 110-seat SA aircraft can be considered competing with the large 100-seat regional jets, of which the largest is the Embraer 195, with a nominal 108 seats (dual-class) in the current E1 version and 118 seats in the stretched E2 version due in 2019. The current spread of seating layouts in the E195 E1 varies from 104 to 122 seats, with an average of 118 seats. The smaller E190 seating between 93 and 114, with an average of 97 seats.

Other analysts and forecasters may use slightly different categories – for example Boeing in their forecast just split by regional jet and single-aisle (including the E195 large regional jet) while Airbus has 100, 125, 150, 180 and 210 seat sizes.

Bombardier in their forecast categorise Small single-aisles (100 to 150 seats) including the A319neo, CSeries and 737-700, with the Max 7 being in the Large single-aisle (150 to 210 seat) segment.

Embraer categorise 90-130 seaters (inc CS100 and E195) and 130-210 seaters (inc A319neo and 737 Max).

### 3.2 Redesign of the Max 7

On August 30th 2011, a new 737 family was revealed as the 737 Max, to be available in three versions, called the -7, -8 and -9, based on the same sizes as the 737-700 / 800 / 900ER members of the 737NG. In November 2011, Boeing announced the selection of a 68-inch fan version of the LEAP-1B, and also defined the configuration further. Southwest Airlines became launch customer on December 13th 2011 with 150 orders.

The original Max 7 design was therefore sized identically to the 737-700, with a Maximum Take-off Weight (MTOW) up to 72.35 tonnes, seating for 126 in 2 classes (149 maximum) and a range of up to 3,350nm.

Industry rumours about a redesign of the Max 7 with more seats and range surfaced in the Spring of 2016. Boeing confirmed the design of the smallest version of the 737 Max was being reviewed with customers in April. Southwest Airlines and WestJet, which were the two largest customers for the Max 7 variant, were reported to have asked Boeing to increase the size of the aircraft.

"When we take a look at the 737 Max 7 that is an area where we're having active discussions with our customers," says Boeing chairman, president and chief executive Dennis Muilenburg, speaking to analysts on a first quarter earnings call. Muilenburg noted that the baseline design still offered a "clear value proposition" to customers. But, he added, "we (Boeing) also have the flexibility to design it to meet their needs". "We like bigger rather than smaller units, and that's the reason we like the 7X better than the 7," WestJet CEO Gregg Saretsky says during the carrier's first quarter earnings call.

Delta also reported positively, "Yes, we do have interest," said Greg May, senior vice-president of supply chain management and fleet strategy at the Atlanta-based carrier, during a media event at its headquarters on 29 April. Delta was especially interested in more range from a redesigned Max 7, said May. The airline was looking at replacing its MD-88 fleet with A321s and possibly a smaller aircraft.

Part of the rationale for a redesign was also coming from a need to offer a longer range Corporate / VIP BBJ version. Boeing had launched the BBJ Max as a derivative of the 737 Max 8 with a 6,000nm range. However, the business aviation market had started developing aircraft with greater than 7,000nm range, such as the Gulfstream G650. So Boeing discussed the option of redesigning the 737 Max 7 with the wing of the 737 Max 8, allowing the re-engined BBJ to achieve the same range as the G650 and the developmental Bombardier Global 7000.

Boeing confirmed in July 2016 that the 737 Max 7 had indeed been redesigned with a stretch to accommodate two more seat rows, with up to 12 more seats than available on the 737-700. Boeing is scheduled to deliver the Max 7 in the second quarter of 2019. The BBJ Max 7 version was also launched for delivery from 2022.

"It's not so much about responding competitors out there. It's much more about responding to our customer needs," says John Wojick, Boeing's chief salesman. "I don't know that it dramatically changes the sales" outlook for the Max 7 variant.

"We have now assessed the market. The customers have said that a bigger airplane is something we would like with that range," said Keith Leverkuhn, vice-president and general manager for the 737.

Boeing vice-president of marketing Randy Tinseth noted the stretch of the Max 7 follows the example of the larger 737-800, which entered service in the late-1990s. The 737-800 represented a stretch of two seat rows over the 737-400. Referring to the Airbus A320, he said that the new pairing of the 138-seat 737-7 and the 160-seat 737-8 now "brackets our competition quite well and I like that part".

The main design changes were –

- Adding a 1.17m fuselage plug forward of the wing and a 0.76m aft – effectively adding 2 seat rows
- Using the thicker gauge Max 8 wing
- Adding a second overwing exit to allow the increase in seating
- Using the stronger Max 8 landing gear to cope with a 10 tonne increase in MTOW

The results are an aircraft which can carry 12 more passengers (to 138 seats dual-class) and has 500nm more range (to 3,825nm). Maximum seating increases by 15% from 149 to 172. The Max 7 therefore becomes the longest range member of the Max family.

### 3.3 Capacity and weight comparison between Max 7 and CSeries

The redesigned Max 7 is compared with other aircraft between 100 and 150 seats below. Operating Empty Weight (OEW) can be a good reflection of the efficiency of a design, especially when expressed in terms of weight per seat. Heavier airframe structures and larger engines are required to meet longer range requirements, but will result in higher costs of operation on shorter range missions in comparison with lighter weight designs.

**Table 1: Key figures for main small single-aisle/large regional jet types**

| Type | Dual-class seats | Range (nm) | OEW (lb) | MTOW (lb) | OEW (lb)/seat |
|---|---|---|---|---|---|
| **737-700** | 128 | 3,250 | 83,000 | 154,500 | 648 |
| **737 Max 7** | 138 | 3,825 | 93,000* | 177,000 | 674 |
| **CS100** | 108 | 3,100 | 77,650 | 134,000 | 718 |
| **CS300** | 130 | 3,300 | 81,750 | 149,000 | 629 |
| **A319ceo** | 124 | 3,250 | 89,950 | 168,650 | 725 |
| **A319neo** | 124 | 3,750 | 95,000* | 166,450 | 766 |
| **E195 E1** | 112 | 2,450 | 63,200 | 115,300 | 564 |
| **E195 E2** | 120 | 2,850 | 75,000* | 133,800 | 625 |

*Source: Flight Ascend Consultancy, Manufacturers. * Estimated*

**Seating capacity**

In dual class the Max 7 has considerably higher capacity (28%) than the CS100. The Max 7 has 138 seats (eight business-class at four-abreast plus 130 economy-class at 6-abreast) versus 108 in the CS100 (eight business-class at four-abreast plus 100 economy-class at 5-abreast). These are in a like-for-like seating configuration with the business seats at a 36-inch pitch (i.e. the spacing between seat rows) and the economy (coach) seats at a 32-inch pitch.

The 172-seats maximum density layout of the Max 7 is 38% higher when compared with the 125 seats of the CS100.

The Max 7 is closer in size to the CS300, with eight more seats compared to the CS300's 130 (12 business-class plus 118 economy. At maximum seats the Max 7 has 22 more, with 172 versus a standard high density 150-seats available on the CS300 at 30 in pitch. There is now a 160 seat extra capacity layout on the CS300 at 28in pitch. The extra capacity seating option requires the addition of a second pair of overwing exit doors.

Compared to the A319neo, the Max 7 has 10% more seats at maximum (172 versus 156).

The closest in seating to the CS100 is the Embraer E195, with 4 more seats at dual class on the E1 and 12 more seats on the E2, with a maximum of 144 (versus 125).

**Weights**

Generally, larger single-aisles have a lower OEW per seat, reflecting efficiency of stretched fuselage designs. For example, the 737-900ER has an OEW per seat of just 553lb. The 737 Max 7 is heavier than the CS300, even after allowing for its extra eight seats. Based on this parameter, it would appear the E195 E2 is the closest competitor to the CSeries family, with a highly competitive empty weight, a new wing design, and the same Pratt & Whitney GTF engines.

The Max 7 is a heavier aircraft with an MTOW of 172,000lb (80 tonnes) compared to 134,000lb (61 tonnes) on the CS100 and 149,000lb (67 tonnes) on the CS300. Being a shrink of the baseline 737 Max 8, this is not surprising, when compared to a clean-sheet CSeries design. The A319neo by comparison has an MTOW of up to 166,000lb (75.5 tonnes).

The CSeries is a newer generation design than the Max, allowing use of more weight-saving materials. The fuselage is manufactured using third generation aluminium-lithium, one of the most advanced aluminium alloys on the market. It is lighter, about 40% more fatigue resistant and 250% more resistant to corrosion than traditional aluminium.

The wing, centre wingbox, wing-to-body fairing, empennage, aft fuselage, and nacelles are all made of composite materials allowing for over 2,000lb of weight savings. Composites not only make the aircraft lighter, they also reduce the number of components in the assembly and allow for greater simplicity and lower costs.

737 Max 7 payload is likely to be around 43,000lb, compared to 38,700lb on the 737-700. The CS100 payload is 33,000lb, with the CS300 being 41,250lb. The CS100 is therefore clearly in a different payload-range segment to the 737 Max 7. The CS300 has a similar payload, but is optimised for shorter-range flights, and has a lower cost per seat.

### 3.4 Performance comparison between Max 7 and CSeries

Engines on the CSeries and Max 7 are similar levels of technology, but the Max 7 has 26,000lb Leap engines as standard, whilst the CS100 has options on its PW1000G between 18,900lb and 23,300lb. This will drive lower engine maintenance costs and lower fuel burn.

The larger CS300 has the same 23,300lb thrust engines, again lower and more economical than the Max 7 engines.

Noise and emissions will be similar, with comparable performance margins relative to international rules.

The wing area on 737 Max 7 is 11% larger (1340 vs 1209 sq ft) but the CS100 has an all-new wing, compared to the 737 wing originally designed in mid-90s.

**Field performance and speed**

Field performance on the 737-700 is considerably worse than on the CS100. The CS100 powered by the higher thrust 23,000lb engine has a Take-Off Field Length (TOFL) of just 4,000ft and a Landing Field Length (LFL) of 4,450ft. The 737-700 has 5,300ft and 4,900ft respectively.

Boeing has not yet published figures for the 737 Max 7, but it is considerably heavier than the 737-700, so is assumed to have performance closer to the 737-800, which has figures of 7,500ft and 5,700ft respectively and hence worse than the CS100's TOFL of just 4,000ft and LFL of 4,450ft.

Boeing is promoting the Max 7 as an aircraft with good performance for hot-and-high operations. These relate to take-off performance in high temperature conditions, especially at high-altitude airports. This is less of a factor in the United States, where most airports have sufficiently long runways to allow all commonly-used types to operate without restrictions. Southwest Airlines does need the ability to take-off with the maximum payload possible from Chicago Midway, Burbank and Orange County. Indeed, Delta maintains a small fleet of 737-700s specifically for operations from Orange County. The Max 7 will have an advantage relative to the larger A320neo and Max 8, but this aspect of performance is a niche requirement for many major airlines, and comes at the penalty of higher overall operating cost.

Cruise speeds are similar (M0.78 CS100 versus M0.79 Max 7).

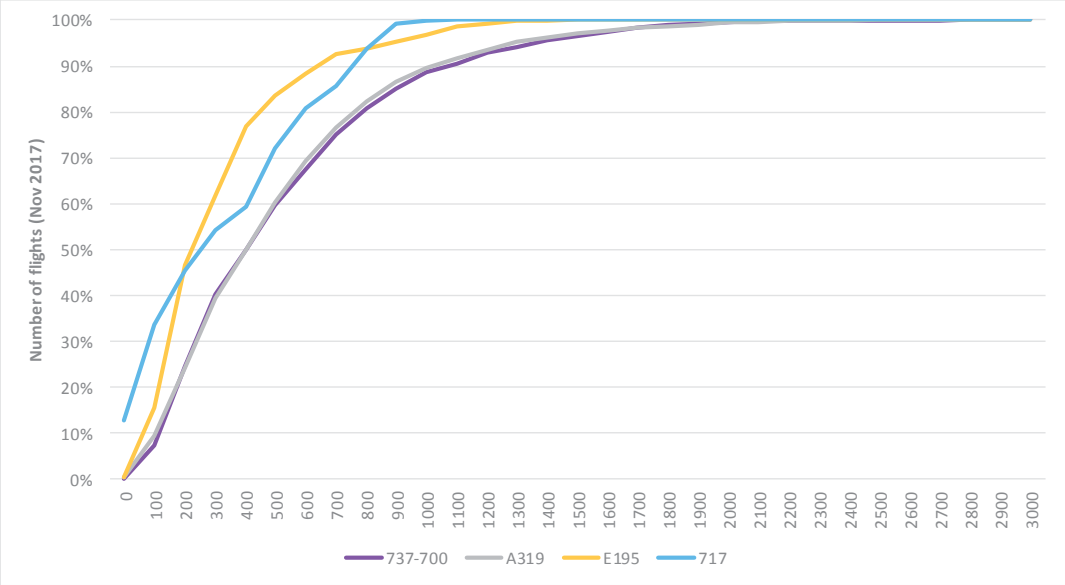
## Range

In terms of range, the Max 7 has an advantage of some 725nm over the CS100 and 525nm over the CS300. Boeing's redesign of the Max 7 was in part to give it the longest range member of the family and a 575nm advantage when compared to the previous -700 model.

The Max 7 has a small advantage over the A319neo by about 75nm.

The chart below shows the cumulative global range profile, in terms of number of flights, for key 100-150 seater types. Both the A319 & 737-700 have 90% of flights under 1,100nm, and 99% of flights under 2,000nm. The 50% point (effectively the average sector length) is around 450nm. This highlights how all aircraft types in this size bracket are most often used on stage lengths well below their maximum capabilities.

**Chart 1: Global range profile (nm) of 100-150 seaters, November 2017**

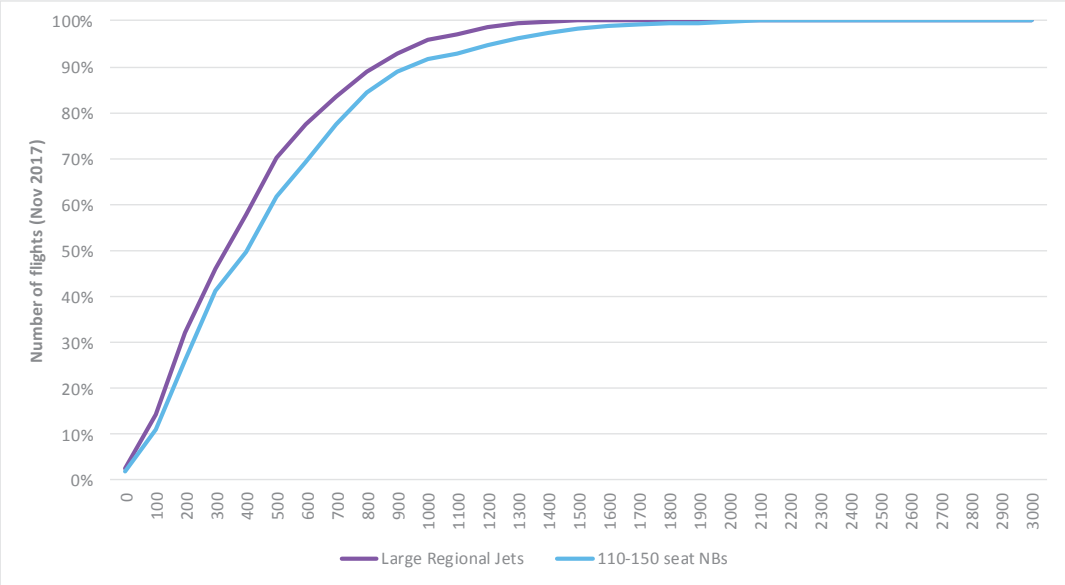



*Source: Flight Schedules data, November 2017*

The second chart shows the data for the US Domestic market specifically. Here, the aggregate data for all small single-aisles is shown, plus the total of all large regional jets. The latter comprises the CRJ 900, and the Embraer E175 and E190.

The average is again around 450nm, with 90% of US Domestic flights in this size category being under 1,000nm, and 99% of flights under 1,700nm. This shows how the US airlines use their 76-seat RJs in a very similar manner to their 130-seater single-aisles.

**Chart 2: US domestic range profile, November 2017**




*Source: Flight Schedules data, November 2017*

In summary, the competitive position between the CSeries and the 737 Max 7 depends on a number of factors, including the economic comparison, not simply on comparing seat counts.

### 3.5 Economic comparison

Aircraft operating economics, most specifically the cost to operate the aircraft both on a per trip (or per block hour) basis and also on a cost per seat-mile flown, are one of the key decision factors in airline fleet selections. There are many variables which impact the cost of operation of an aircraft, but these can typically be categorised in five groups, which are;

- Fuel burn – directly calculated from the aircraft's fuel burn per trip and cost of fuel;
- Maintenance costs – typically calculated on an hourly basis but related to the maintenance of the engine, airframe, landing gear and aircraft systems;
- Crew costs – related to the cost of flight and cabin crew wages. These will vary on an airline and specific aircraft basis but for comparison purposes standard assumptions are made;

- Landing and Navigation costs – typically a function of the Maximum Take-Off Weight (MTOW) of the aircraft but calculated using different formulae in different regions and airports of the world;
- Ownership costs – a function of the cost to lease or finance the aircraft, but also typically incorporating insurance costs.

Operating costs are typically expressed as either Cash Operating Costs (COC) or Direct Operating Costs (DOC). The former is a summation of the first four costs which are typically hourly based. The latter includes the ownership cost, either for lease or finance. This is a fixed cost on an annual basis.

Since many of these parameters will vary based upon the specific airline's use of the aircraft – for example aircraft flown on longer routes can see better hourly fuel burn since aircraft burn less fuel in the cruise portion of the flight than in climb or descent – for comparison it is necessary to select fixed parameters which include fuel price, hourly utilisation, pay rates and maintenance rates. When marketing their aircraft, manufacturers will often select the optimum parameters to make their aircraft appear most efficient compared to the competition.

Ascend has its own simple models which estimate competitive operating costs. Fuel burns are estimated using public source data which includes US DoT Form 41 and other publications. Manufacturers also provide some data to Ascend as part of annual appraiser briefings. Maintenance costs are similarly estimated. Crew Costs are estimated from similar public source data. Landing and Navigation costs are calculated using a standard formula with MTOWs as set out in Table 1 of this report. Ownership costs are based upon our own Current Market Lease Rates for 2017 build aircraft, with interpolated estimates for aircraft where we do not have a Current Market Lease Rate opinion.

Our resulting estimates of comparative operating costs are illustrated in Table 2 below.

**Table 2: Competitive aircraft operating cost estimates**

| | Block Hour COC | Block Hour DOC | Seat Mile COC | Seat Mile DOC |
|---|---|---|---|---|
| **CS100** | Datum | Datum | Datum | Datum |
| **CS300** | 7.1% | 7.2% | -11.0% | -10.9% |
| **737-700** | 18.6% | 14.2% | 0.1% | -3.6% |
| **737 Max 7** | 19.6% | 18.2% | -6.4% | -7.5% |

These show that the CS100 is estimated to have the most efficient operating economics on a block hour basis of any of the aircraft types considered. Looking at 737-700 and Max 7 specifically, both of these aircraft show much higher block hour costs and in the case of the former, also higher seat-mile costs despite having 18% more seats installed in this analysis. The Max 7 does show slightly lower seat-mile costs but to achieve this is has 28% more seats installed.

Note also that the CS300 shows better block hour and seat-mile costs than Max 7. In reality an airline requiring around 130-seats would likely compete the CS300, Max 7, A319neo and E195 E2. There will be other selection criteria in addition to the economics, but in economics alone CSeries is estimated to be the most efficient aircraft.

### 3.6 Orders comparison

#### 3.6.1 Boeing 737NG orders

When reviewing market demand for the different size categories, it is helpful to look at the programme performance of the Boeing 737 NG, their single-aisle programme which is now being superseded by the 737 Max. Consisting of the four different models as shown above, deliveries began in 1997 and will continue for several more years until the Max completely replaces it on the production line.

**Table 3: 737 NG cumulative firm orderbook 1993-2017**

| Series | Original Orders | Cancelled | Net Swaps | Net Orders |
|---|---|---|---|---|
| **737-600** | 194 | 0 | -125 | 69 |
| **737-700** | 2,195 | 308 | -605 | 1,282 |
| **737-800** | 4,925 | 442 | 721 | 5,204 |
| **737-900** | 628 | 68 | 9 | 569 |
| **Grand Total** | **7,942** | **818** | **0** | **7,124** |

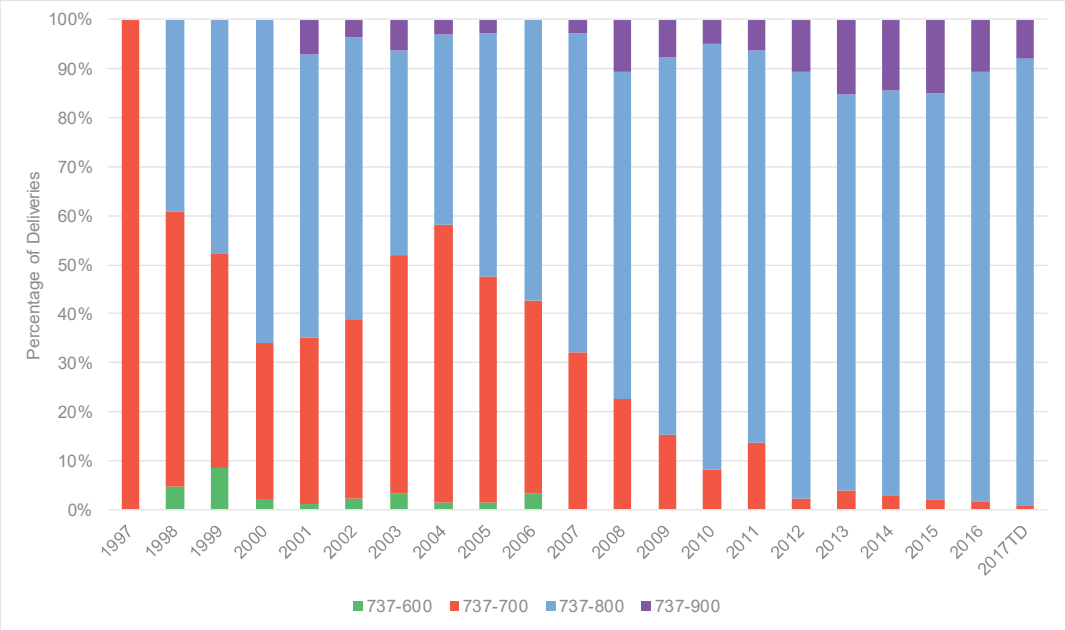
*Source: Flight Fleets Analyzer @ 28 November 2017*

As can be seen, the smallest 110-seater 737-600 achieved just a 1% share of the orderbook and two thirds of its original orders were later changed to larger family members. Like its rival the A318, the 'shrink-of-a-shrink' 737-600 (the baseline size is the 737-800) is a heavyweight 100-seater and although offering long range capability, it failed to generate significant sales. Its final deliveries were in 2006. The primary reason was the much higher fuel burn per seat, and higher weight-related costs per seat (i.e. landing fees and air navigation charges) compared to the latest large regional jet aircraft such as the Embraer E190.

When it launched the 737 Max, Boeing decided not to offer an equivalent sized 110-seat member of the Max family.

The 737-700 took 28% of original orders placed but this has fallen to just 18% after swaps to other family members - these typically being the 737-800. Examples of airlines that swapped their firm orders for the 737-700 to larger 737 variants include Southwest, United, Westjet, Aeromexico, China Southern, and Garuda. It is clear that the 150-seat 737-800 has been the aircraft of choice in the NG family, with a 73% share of net orders.

**Chart 3: 737NG annual deliveries**




*Source: Flight Fleets Analyzer @ 28 November 2017*

The delivery pattern of the 737NG programme to date clearly shows that the focus has been on the larger sized aircraft over the past ten years. In the early years of the programme, the -700 was averaging around 50% of deliveries, but in the past decade this has fallen to 7% and just 2% in 2016, the most recent full-year. Just one 737-700 remains on firm order for an airline customer, for Kunming Airlines, an airline based in Kunming, Yunnan, China with a current fleet size of 21 aircraft.

### 3.6.2 Airbus A320 orders

To answer whether the 737-600/700 experience was any different from the rest of the market, it can be viewed against its main in-production rival, the Airbus A320 family. Airbus introduced the A320 in 1988 and built up a family of four different sizes in direct competition with the 737.

In a replication of the 737-600 experience in the market, the smallest A318 also failed to achieve any market penetration, with just 1% of orders, and many of those for the corporate variant. Similar to Boeing, Airbus decided not to offer an A318neo version when it developed its re-engined A320neo family. The A318 suffered from an uncompetitive cost per seat compared to both larger types, as well as newer 100-seater types such as the E190 and CRJ1000, primarily due to its heavier weight and higher thrust engines.

The original A320 family is now known as the A320ceo (current engine option), with the re-engined version termed the A320neo (new engine option).

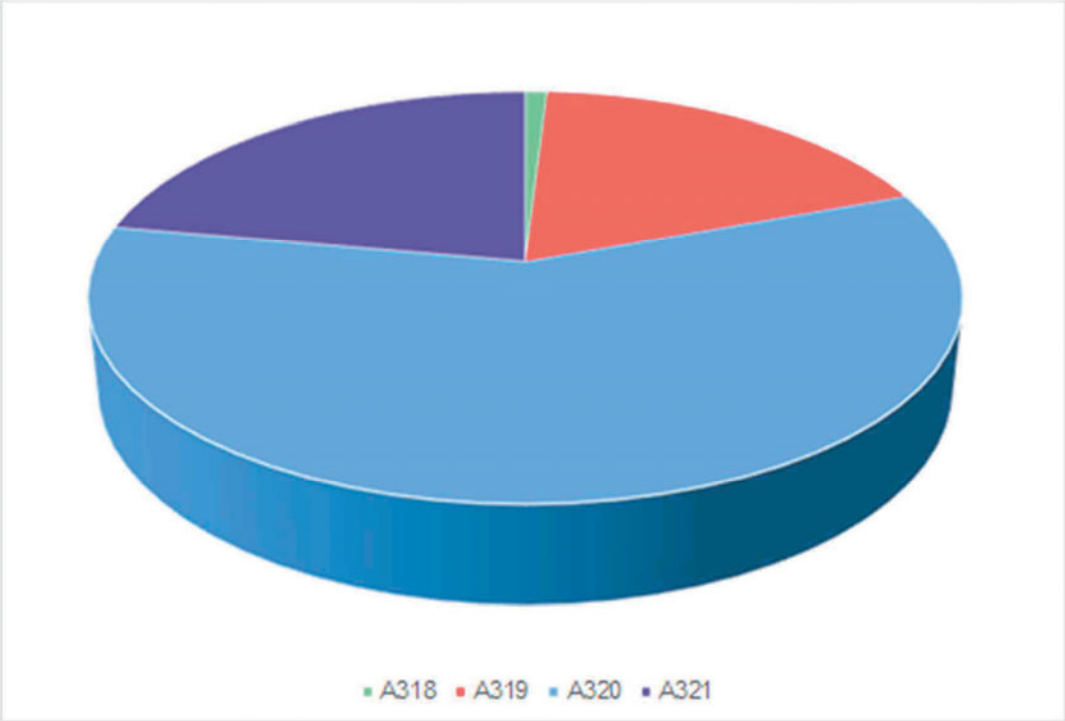
**Table 4: Airbus A320ceo cumulative firm orderbook 1983-2017**

| Series | Original Orders | Cancelled | Net Swaps | Net Orders |
|---|---|---|---|---|
| **A318** | 227 | 81 | -68 | 78 |
| **A319** | 1,929 | 199 | -246 | 1,484 |
| **A320** | 5,645 | 851 | -59 | 4,735 |
| **A321** | 1,539 | 121 | 374 | 1,792 |
| **Grand Total** | **9,340** | **1,252** | **1** | **8,089** |

*Source: Flight Fleets Analyzer @ 28 November 2017*

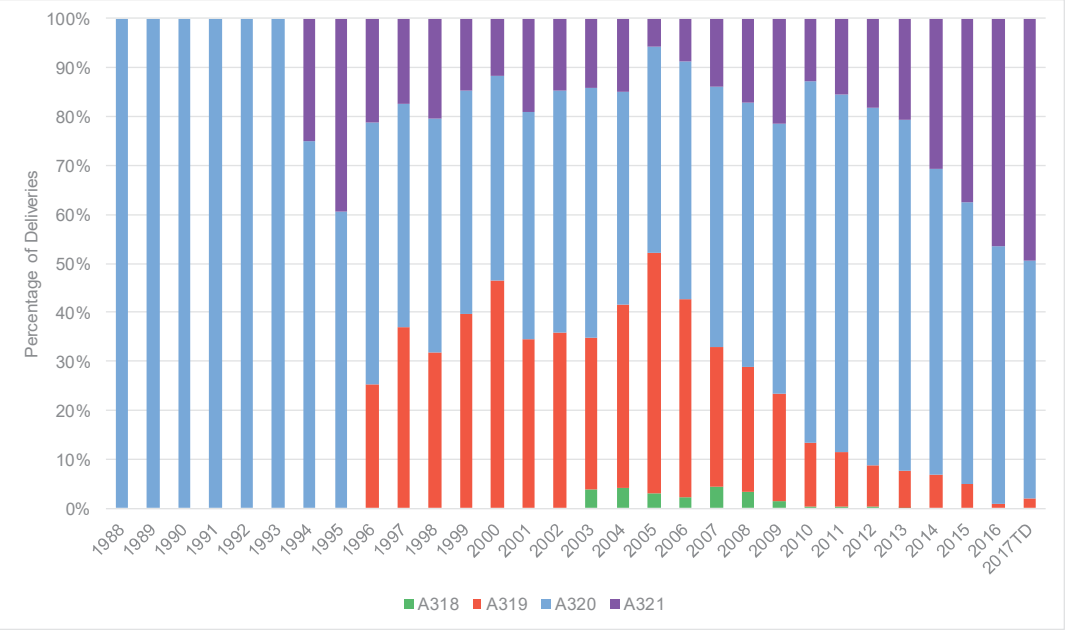
The A319 competes with the 737-700 and has taken an 18% share of the net orderbook – exactly the same as its Boeing rival. Some 250 of its original orders were changed to larger members of the family. So the A320 programme has also demonstrated that the larger family members – the A320 (59%) and A321 (22%) have been the most favoured for new orders. Airbus has continued to take new orders for the A320ceo family, and extended the date for the final delivery, although the A320neo versions have made up the vast majority of recent orders.

## Chart 4: A320ceo orderbook




*Source: Flight Fleets Analyzer @ 28 November 2017*

## Chart 5: A320ceo family deliveries




*Source: Flight Fleets Analyzer @ 28 November 2017*

The delivery pattern of the A320ceo programme to date, as with the 737NG, clearly shows that the focus has been on the larger sized aircraft over the past ten years. The A318 made very little impact and the A319, introduced in 1996, averaged 37% in its first decade, but this has fallen to 10% in the most recent 10 years and just 1% in 2016. 22 A319ceos remain on backlog.

### 3.6.3 Boeing 737 Max orders

The CFM Leap re-engined 737 Max now has five different series offered to the market. The Max 8 (and higher capacity 8-200 version) and Max 9 are sized the same as the previous generation -800 and -900. The smallest series, the Max 7 has now been increased in size so it is larger than the -700, while the new Max 10 is a further stretch beyond the Max 9.

**Table 5: 737 Max cumulative firm orderbook to November 2017**

| Series | Original Orders | Cancelled | Net Swaps/Choice | Net Orders |
|---|---|---|---|---|
| **Max 7** | 66 | 0 | -2 | 64 |
| **Max 8** | 2,313 | 56 | -64 | 2,193 |
| **Max 8-200** | 210 | 0 | 0 | 210 |
| **Max 9** | 250 | 1 | -133 | 116 |
| **Max 10** | 132 | 0 | 221 | 353 |
| **Max TBD** | 1,168 | 11 | -22 | 1,135 |
| **Grand Total** | **4,139** | **68** | **0** | **4,071** |

*Source: Flight Fleets Analyzer @ 28 November 2017*

As at 28 November 2017, firm orders recorded for the 737 Max stood at 4,071 aircraft. There have been 4,139 original gross orders, of which 68 have subsequently been cancelled. 199 of the orders have been swapped between different series, while 22 ordered as Max To Be Decided have been chosen as the new Max 10 series since that was launched in 2017.

The data regarding which Max series has been selected is more difficult to determine from official Boeing data than on the previous 737NG programme. Boeing's published order data (on their website) only identifies 737 Max against each order. Their rationale for this is that each Max customer may have the ability to select or change the series until they make a final selection.

However, when orders are announced by Boeing, some of these do give details which series have been selected – for example during the launch of the new Max 10 series in June 2017. Sometimes airlines also detail which series they have on order. The Flight Fleets Analyzer (FFA) database therefore records this data.

The Flight Fleets Analyzer database currently records just 64 Max 7 series on order, although the actual total may be higher if some of the 737 Max TBD (To Be Decided) have or will be chosen as Max 7s. Given the competitive position, it is likely that only a small proportion of these 'undecided' Max orders will be delivered as Max 7s.

Of the 2,936 orders with a series currently shown on the FFA (72% of the total), the Max 7 has a 2% share with the Max 8 having a 75% share, with higher capacity series (Max 8-200, 9 and 10) having 23%.

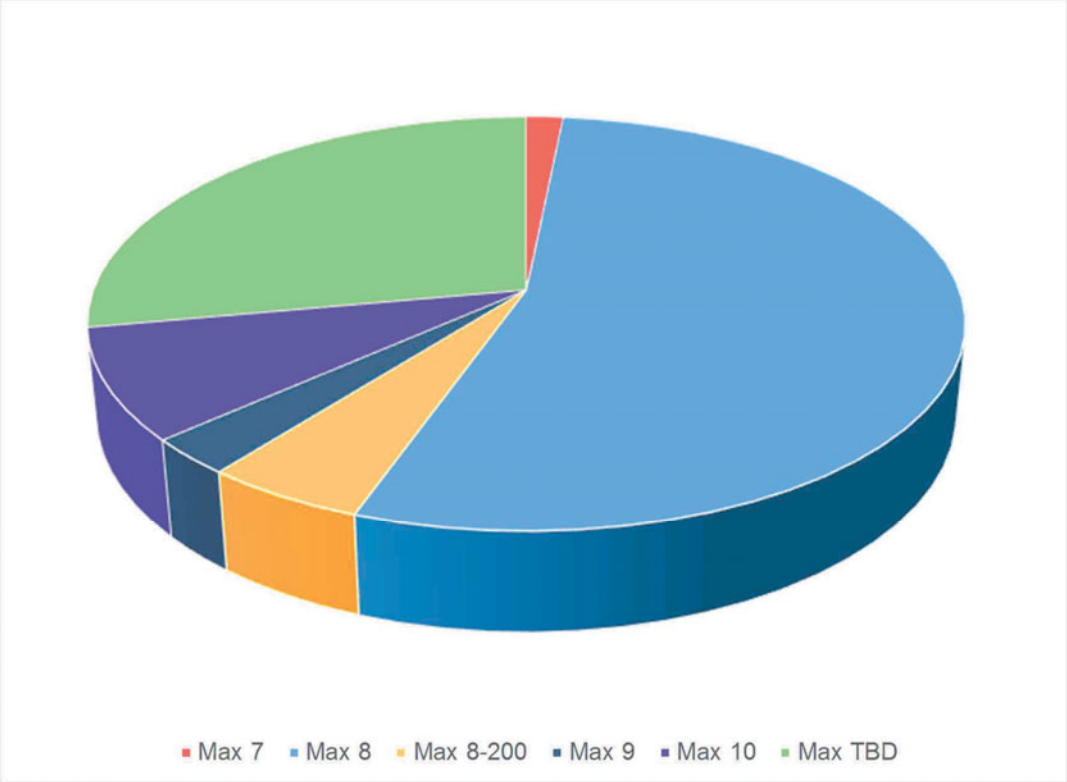
These percentages are not very different from the current 737 NG orderbook – the most popular series is the baseline one (737-800 and now Max 8). The smallest series has the smallest orderbook.

Customers recorded for the Max 7 series are –

- Southwest Airlines – 30
- WestJet – 25
- Air Lease Corporation – 5
- Jetlines – 5
- Orient Global – 1 (a BBJ corporate version)

The announced commercial orderbook is therefore currently limited to the US and Canadian low cost carriers who also have other Max variants on order; lessor Air Lease and a Canadian startup Jetlines.

**Chart 6: 737 Max net orders**




*Source: Flight Fleets Analyzer @ 28 November 2017*

### 3.6.4 Airbus A320neo orders

The main rival to the Boeing 737 Max is the Airbus A320neo programme, a similar re-engining of the previous A320, in this case with CFM Leap or Pratt & Whiney PW1100G—JM engines.

The three neo models are the same size as the previous A320ceo models. The closest in size to the 737 Max 7 is the A319neo.

**Table 6: Airbus A320neo cumulative firm orderbook to November 2017**

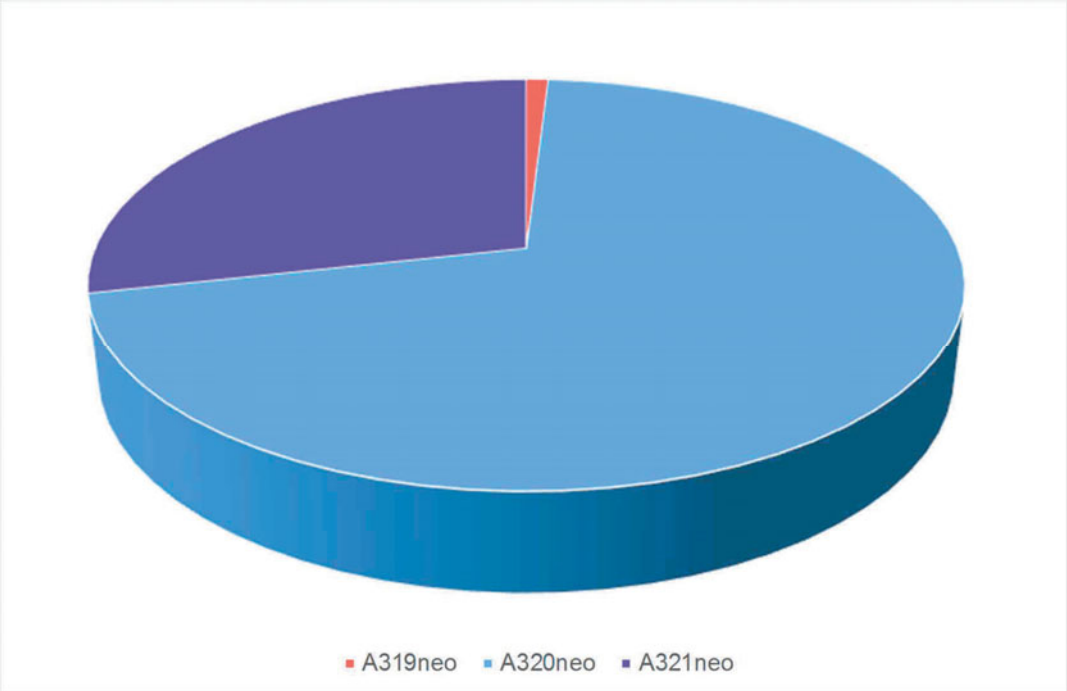
| Series | Original Orders | Cancelled | Net Swaps | Net Orders |
|---|---|---|---|---|
| **A319neo** | 61 | 0 | -11 | 50 |
| **A320neo** | 4,022 | -55 | -262 | 3,705 |
| **A321neo** | 1,275 | -53 | 274 | 1,496 |
| **Grand Total** | **5,358** | **-108** | **1** | **5,251** |

*Source: Flight Fleets Analyzer @ 28 November 2017*

To date, the A319neo has therefore taken just 1% of the orders placed for neos, with 11 orders (18%) of those originally placed having been swapped to the larger A320neo or A321neo models. As with the previous A320ceo, the major market for the family is in the larger aircraft sizes.

The A319neo does compete with the slightly larger 737 Max 7, and has a firm order from Frontier Airlines in the United States, for delivery commencing in 2024. It is expected that Airbus will compete with Boeing across the whole A320neo family product range for future US airline orders, including with the 737 Max 7.

**Chart 7: A320neo family net orders**




*Source: Flight Fleets Analyzer @ 28 November 2017*

### 3.6.5 Bombardier CSeries orders

The CSeries programme has to date gained 360 firm orders, of which around one third are currently for the smaller CS100 and two thirds for the larger CS300.

In addition, in November 2017 Egyptair signed a Letter of Intent to order 12 firm CS300s and Bombardier also revealed that an unannounced European customer signed a Letter of Intent in Q3 2017 to order 31 firm CSeries aircraft.

**Table 7: Bombardier CSeries orderbook**

| Series | Original Orders | Cancelled | Net Swaps | Net Orders |
|---|---|---|---|---|
| **CS100** | 141 | -3 | -15 | 123 |
| **CS300** | 234 | -12 | 15 | 237 |
| **Grand Total** | **375** | **-15** | **0** | **360** |

*Source: Flight Fleets Analyzer @ 28 November 2017*

The first orders were placed in 2009 and since then Lufthansa Group has swapped 20 of its CS100 orders to the CS300 and Braathens swapped five CS300s to CS100s.

Two customers (one unannounced and Ilyushin Finance) have cancelled three CS100s and twelve CS300s respectively.

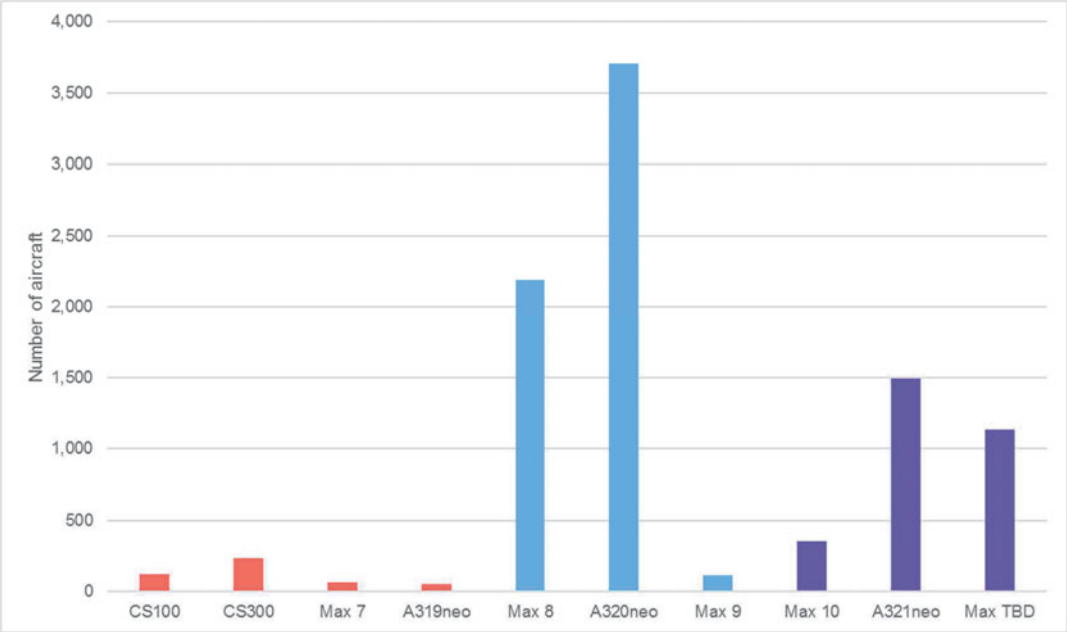
**Chart 8: CSeries net orders by year**


*Source: Flight Fleets Analyzer @ 28 November 2017*

### 3.6.6 Comparison of CSeries, Max and A320neo families orders

The three families have a current firm orderbook total of 9,682 aircraft, of which the smallest versions (CSeries, Max 7 and A319neo) have a combined total of just 5% of recorded orders.

**Chart 9: CSeries, 737 Max and A320neo family current global orderbook**




*Source: Flight Fleets Analyzer @ 28 November 2017*

It can clearly be seen that the heart of the market is in the mid-size single-aisle types, where the A320neo and 737 Max 8 compete.

## 3.7 The competitive dynamic

### 3.7.1 CSeries airline customers

When considering which other aircraft types compete with the CSeries, in particular whether that includes the Max 7, an overview of CSeries customers (outside of Delta) and their reasons for choosing the CSeries can provide some insight. The following looks at the key airlines which have chosen the type (lessors will select types which are marketable and liquid and may have multiple types of the same size in their portfolios). Note that this analysis has been completed using public source information and includes opinion and comment from sources additional to Bombardier's own published comment on each campaign.

**Air Canada**

Air Canada is a significant customer for the Boeing 737 Max, having ordered 61 Max 8s and Max 9s in March 2014, to replace its existing Airbus A320 family aircraft. Air Canada was also the first large North American carrier to commit to the CSeries, with a February 2016 letter of intent for 45 CS300 orders and 30 options, which also allowed Air Canada to convert some orders to the smaller CS100. An order for 45 CS300s was confirmed in June 2016. The objective was to replace the fleet of Embraer 190s.

"The entry of the CSeries into our fleet is expected to yield significant cost savings," said the carrier. It foresaw that projected per-seat fuel burn and maintenance cost savings of "greater than 15%" will cut cost per available seat-mile by "approximately 10%".

During Air Canada's May 2016 earnings call, it described CSeries as critical component of Air Canada's ongoing plan to further reduce its cost per available seat mile (CASM). "These aircraft are very well suited to our future network strategy and will result in further CASM reductions given the compelling economics of these aircraft." The CS300's range and capacity were described as an ideal fit in the carrier's internal and trans-border route networks.

In June 2016 the company's president of passenger airlines Benjamin Smith said he agreed with statements by Bombardier Commercial Aircraft president Fred Cromer that there is no direct competitor to the CSeries. "Boeing and Airbus do not make an airplane that's economical in that size," he said. The roughly 130-seat CS300 will slot in what would otherwise be a "large gap" between the 76-seat regional jets in its feeder fleet and the roughly 160-seat Boeing 737 Max 8, he said.

The conclusion is that Air Canada seems to have considered the 737 Max and CSeries as two discrete aircraft types with different fleet applications.

**Air Tanzania**

Two CS300s were ordered in December 2016 through the Tanzanian Government Flight Agency (along with a Q400 turboprop) for delivery in 2018. The airline is expanding (also ordering a 787) as it only currently operates Q300/Q400 turboprops.

**airBaltic**

Latvian national carrier airBaltic ordered ten CS300s in December 2012 and has since doubled its orderbook. It followed Swiss and became the second airline to put the CSeries into service in 2016.

"We reviewed the narrowbody platforms from the major airframers and determined that the all-new CS300 aircraft was the best fit," said Martin Gauss, chief executive of airBaltic. "The superb economics of the aircraft and the delivery timeframe that is available to us are also key factors in our decision." The aircraft were ordered to replace 737-300s and -500s. The airline was already operating Q400s so had an existing relationship with Bombardier.

**Braathens Regional Airlines**

The former Malmo Aviation ordered the CSeries through Group member Braathens Leasing in June 2011 in order to replace its Avro RJ fleet operating Swedish domestic and regional flights. **The short runway length at Stockholm Bromma restricts landing lengths, meaning the 737-700 and 737 Max 7 would not have been considered for the competition.**

“Bromma, being a city airport, has very strict noise regulations, as well as a short runway," noted Braathens Aviation CEO Knut Solberg. "We have been very focused on noise, emissions, fuel consumption and runway performance in our decision for a new aircraft type. With the CSeries aircraft, we found exactly what we were looking for.”

In July 2017 it deferred deliveries from 2018 until 2020 and also converted five CS300 orders to the smaller CS100. The Swedish government's proposed introduction of an aviation tax from April 2018 reportedly prompted BRA to put the CSeries on hold and it wants to see how Sweden's aviation market develops. BRA insists, however, that it still plans to introduce the CSeries to its fleet, although timing is now less certain.

**Egyptair**

Signing a Letter of Intent to order 12 in November 2017, Egyptair reportedly plans to replace its twelve 70-seater Embraer 170s with the larger CS300. The airline plans to deploy the CSeries aircraft on domestic and regional routes. It says it spoke to Star Alliance partner Swiss – launch customer for the type – as part of its fleet evaluations**. The Russian Superjet 92-seat regional jet was also considered. It is not thought that the 737 Max 7 was considered, due to its larger size.**

**Gulf Air**

Ten CS100s were ordered in June 2011 by Bahrain based Gulf Air, at a time when it was leasing some Embraer 190s to add to its Airbus-focussed fleet of A320s and A330s. At that time Gulf Air foresaw a fleet requirement of 35-40 aircraft of which at least half would be Airbus A320-family narrowbodies, and another 10 or so would be smaller jets. **The 737 Max 7 was not considered, as it had not been launched at the time.**

However it went through restructuring in 2012-13 and sought to simplify its fleet, ordering A320neos in place of more A330s and ending the Embraer leases.

The status of the CS100 order is little mentioned in more recent public articles about Gulf Air fleet plans, with most focus on adding A320/A321neos in 2018-20 and introducing 787-9s to replace A330s.

**Iraqi Airways**

A December 2013 order for five CS300s by the Government for Iraqi Airways is part of the rebuilding of the carrier. Its fleet includes six CRJ900s and 14 Boeing 737-800s, some A320s plus a mix of other Airbus and Boeing widebodies. An order for 16 more 737-800s was cancelled in October 2017 and an order for 16 Max in the same month is believed to be for Iraqi as part of a swap to the newer type.

**Korean Air**

Ten CS300s were ordered in June 2011 and deliveries are expected to start shortly. The airline said in 2012 that the order planned as an expansion its fleet with smaller aircraft. **Although the 737 Max 7 was not considered since it had not been launched at the time, given the desire for smaller aircraft it is likely it would not have been considered even if available.**

Korean's main single-aisle type is the 737 with 36 of the 800/900ERs in service and it has gone on to order 30 Max 8s, plus 30 A321neos, which will mark the introduction of the Airbus A320 family.

**Lufthansa Group (Swiss)**

The CSeries launch customer in March 2009 was Lufthansa Group, with an order for 30 for its Swiss subsidiary. Although all 30 were originally ordered as 125-seat CS100s, twenty have since been upsized to the CS300 in 145-seat layout.

The type was ordered to replace the smaller four-engined Avro RJ fleet. The operations include operating at runway restricted London City airport and the CSeries has been certificated to allow Swiss to operate there from August 2017.

Being launch operator too, the airline says the CSeries delivers 25% cost savings, on a per-seat-basis, compared with the Avro RJ100, which was phased out in October 2017. All the 30 ordered will be delivered by the end of 2018. **Lufthansa ordered the Cseries before the 737 Max programme was launched, but would have been very unlikely to consider it in any case, as it cannot serve London City Airport's short runway.**

**Odyssey Airlines**

Ten CS100s were ordered in June 2011 by Odyssey, a UK start-up planning to operate from London City to North America. However the start date slipped from 2016 to 2017 as a result of delays in obtaining a UK air operator's certificate and the permits required for operations to the USA. There has been no further news in 2017. **Odyssey requires London City operation, so would not have considered the 737-700 or indeed the 737 Max 7 had it been launched at the time.**

**Republic Airways Holdings**

Republic ordered 40 CS300s in February 2010 with the intention of placing the aircraft into the fleet of then-subsidiary Frontier and replacing Airbuses. The deal also included options for 40 CS300s.

However, Republic later sold Frontier in 2013 and its main business was then operating 50 to 76 regional jets for the US Majors. With pilot scope clause agreements, there is an upper limit of 76 seats for aircraft contracted out.

The status of Republic's CSeries order has been in question for several years, and the original timeline for initial deliveries has long since passed. Republic reorganized under Chapter 11 during 2016, reducing its fleet and Republic Airways Holdings and Bombardier reached an agreement to delay delivery of CSeries aircraft and defer Republic's scheduled aircraft payments, according to securities filings in Q4 2016.

**SaudiGulf**

A new Saudi start-up formed by local Al-Qahtani Group, sixteen CS300s were ordered in January 2014 for 2015/16 delivery, followed by four A320s ordered in March 2014. The airline's chief had been at Gulf Air when they ordered CSeries.

The carrier did not eventually gain its AOC until 2016 and began service in October with the four A320s, operating domestically, with its first international route to **Dubai** service to start soon. The airline noted recently that delays in receiving the CSeries have "really put a crimp" on SaudiGulf's plans. "We started the operation last year with four A320s, and we should have the Bombardiers in that year. So we are in discussions with them about the whole thing.

"We don't have aeroplanes to grow, and we have quite a sizeable overhead – built for an operation five times the size – so this is the main issue with Bombardier. We are forced to consider some wet-leased aeroplanes during 2018 in order to get us to whatever happens next."

### 3.7.2 CSeries Airline Customers Summary

The above analysis shows that the majority of CSeries customers have not being existing Boeing operators or customers and their reasons for ordering CSeries have been varied. Looking at some of these and existing OEM relationships:

- Complementing Max 8 orders (Air Canada, Korean, Iraqi)
- 737NG customers (Iraqi)
- 737 CFM operator (airBaltic, Egyptair)
- Short field operation (Swiss, Braathens, Odyssey)
- Replacement of Regional Jets (Air Canada, airBaltic, Swiss, Egyptair)
- Bombardier relationship (Air Tanzania, airBaltic, Iraqi)
- Airbus SA customer (Gulf Air, Swiss, Republic/Frontier, SaudiGulf)
- Corporate/VIP (Falcon, PrivatAir)
- Startups (SaudiGulf)

Six of the 14 customers ordered CSeries before Max was launched and three CSeries customers have also ordered the Max – so the fact they have also ordered CSeries shows that the benefits of commonality were not enough to add the Max 7 as well. Other customers have had existing relationships with Bombardier or needed the CSeries qualities (e.g. shorter field length) so a Max 7 selection was much less likely.

# 4. Projected demand for 100 to 150 seat aircraft

## 4.1 Flight Fleet Forecast to 2022

### 4.1.1 Forecast logic

The Flight Fleet Forecast (FFF) is a demand-based model which estimates the future fleet, retirements and deliveries of commercial jet and turboprop aircraft over the next 20 years, based on detailed analysis of historical trends and developments in the commercial aviation sector. Drawing upon FlightGlobal and Flight Ascend Consultancy's extensive data and knowledge resources, the annual forecast projects the evolution of the global commercial airline fleet and consequent demand for new aircraft through modelling of traffic, retirements, fleet development and future aircraft manufacturers plans.

Capacity forecasts, measured in available seat kilometres (ASKs), are derived from analysis of historical passenger capacity in each of eight forecast regions. The relationship between capacity and historical GDP and yield trends is used to derive a projection of future growth.

The regional passenger capacity forecasts are converted into a fleet requirement in each region. The historical fleet evolution of turboprops, regional jets, single-aisle and twin-aisle types is analysed in terms of actual aircraft numbers and total capacity in a series of aircraft size categories.

Retirement forecasts are made, based on an extensive analysis of historical removals from service over the past 20 years. This forms the basis of a survivor curve methodology that is used to model the future retirements from commercial airline service.

Delivery forecasts are a product of the projected fleet and retirement forecasts. Analysis of the existing and future competitive scenario, together with a view on which aircraft types and variants are expected to be in production and which will be most popular, provide the outlook for new aircraft deliveries by programme for the duration of the forecast. In the early years of the forecast, the firm order backlog is considered to calibrate the expected market shares by type and also inform the split of deliveries in each region by aircraft type and variant. Manufacturers' production rates are also taken into account and can further help to calibrate market shares in the early years. Flight Ascend Consultancy also considers potential programme performance, both in schedule and payload-range/economic terms, to estimate market share splits.

### 4.1.2 Forecast segmentation

Within the single-aisle sector, Flight Ascend segments the aircraft into four size categories: 110-seat aircraft, 125-seat aircraft, 150-seat aircraft and 180-seat aircraft. These categories do not necessarily represent the exact number of installed seats, but reflect manufacturers' nominal seat counts, product ranges, and historical market segmentation.

Large regional aircraft are categorised as 100-seaters, although some types seat more than this. The Embraer E195 is categorised as a regional aircraft, since it is part of the family of 70-110+ seater regional jets with four abreast cabins.

There is no universally recognised definition of the boundary between regional jets and single-aisle aircraft. Historically, regional jets tended to be those with fewer than 100 seats and/or a shorter range than single-aisle aircraft. They were also typically flown by regional airlines using lower-paid pilots than the mainline carriers. The modern 'regional jets' from Embraer, Bombardier and Sukhoi have ranges greater than older single-aisle types such as the DC-9 or 737-200.

The 110-seat and 125-seat categories have evolved into significantly different market segments in several ways. Firstly, Boeing's product range has moved upwards in size to more closely match the current Airbus product range. Each manufacturer now has a 3-member family, covering the 125, 150, and 180-seat segments.

Boeing originally used two/three aircraft types to cover the overall market, with the 110-seat Boeing 717 (which was previously the McDonnell Douglas MD-95 until MDC was acquired by Boeing) competing with older 100-110 seaters such as the Fokker 100 and Avro RJ in the medium-range market, and the Boeing 757 at the top end of the single-aisle market, covering 180-270 seats.

The 737NG included a 110-seat family member, the 737-600, but this proved uneconomic in airline operation compared to other types. Therefore, with the Max family, Boeing has dropped the 110-seat version, and it has also moved the Max 7 upwards in size compared to the 737-700, and introduced the larger Max 10 to better compete with the A321neo.

A summary of current forecast segmentation is shown below. In-production/development types are shown in bold. This segmentation is solely based on generic seating capacity, whereas many other attributes contribute to an airline's competitive assessment. In reality, most airlines will not see the CS300 and 737 Max 7 as directly competing.

**Table 8: Flight Fleet Forecast segmentation**

| Size Category | Boeing types | Airbus types | Bombardier types | Other types |
|---|---|---|---|---|
| **100-seat regional jets** | | | **CRJ1000** | Avro RJ100, Fokker 100, **E190, E195, Superjet** |
| **110-seat single-aisle** | 717, 737-200, 737-500, 737-600 | A318 | **CS100** | |
| **125-seat single-aisle** | **737-700, 737 Max 7** 737-300 | **A319, A319neo** | **CS300** | |
| **150-seat single-aisle** | **737-800, 737 Max 8** 737-400, MD-80, MD-90 | **A320, A320neo** | | **MC21-300, C919** |

*Source: Flight Fleet Forecast 2017*

### 4.1.3 Forecast trends

Over the long-term, there has been a trend within the regional and single-aisle markets to move towards larger aircraft.

This trend has been evident in the US Domestic market, where airline consolidation and scope clauses are allowing some airlines to replace regional jets with larger aircraft. In other words, they are using mainline pilots and single-aisle aircraft to replace 50-76 seat regional jets flown by regional partner airlines with lower paid pilots. American, Delta and United have all increased fleet focus on larger single-aisles, and Delta has acquired a fleet of used Boeing 717s and ordered the CS100. Fleet plans for these airlines are discussed below.

The 125-seater market is still seen primarily as a core mainline carrier market, but is being largely abandoned by Low Cost Carriers in the search for lower unit costs. Legacy airlines have reacted to the LCCs by increasing seat densities and moving upwards to larger single-aisle types. The 737 Max 7 is not optimised to replace older aircraft in this size bracket (i.e. A319s and 737-700s), being larger and heavier. Most airlines are replacing older A319s with larger A320s (e.g. Easyjet), and 737-700s with 737-800s or Max 8s (e.g. Aeromexico, Aerolineas Argentinas, Alaska, Gol).

Many airlines are now concentrating on the 150-seat and 180-seat market, with the firm order backlog for the 737 Max and A320neo family now reflecting this. Many North American and European carriers still operate 737-700s or A319s, but are steadily shrinking this size category as a proportion of their fleets.

The Flight Fleet Forecast therefore reflects the market trends and manufacturer order backlogs in its delivery forecast over the 2018-2022 period. At a global level the number of 150-seat deliveries is seven times larger than the smaller single-aisle categories.

The 2017 Flight Fleet Forecast continues the assumptions and outcome of earlier years. For example, the 2013 Flight Fleet Forecast predicted 600 deliveries in the 110- and 125-seat classes from 2018-2022, a figure very consistent with the 2017 forecast of 650.

In North America specifically, there is no demand seen for 100-seat RJs, due to Scope Clauses (which limit seating to 76), and the 110-seat category reflects the Delta CSeries order alone. North America makes up over 50% of the 125-seat deliveries, which includes the Max 7 and CS300. There are relatively few 150-seat deliveries compared to the current fleet, as the major North American carriers have placed major orders for the larger 180-seat jets; the 737 Max 9, Max 10, and A321neo. Again, this reflects the trend to upsizing within the fleet.

The delivery forecast for the next five years is summarised below. Note that this includes deliveries of aircraft that are already on order.

**Table 9: Forecast 100-150 seat aircraft deliveries 2018-2022 by size**

| Size Category | North America | World total |
|---|---|---|
| **100-seat regional jets** | 0 | 444 |
| **110-seat single-aisle** | 75 | 136 |
| **125-seat single-aisle** | 272 | 514 |
| **150-seat single-aisle** | 503 | 4,693 |
| | **850** | **5,787** |

*Source: Flight Fleet Forecast 2017*

The delivery forecast for key types in the 100-150 seat market is shown below. The 737 Max 7 is only forecast to deliver 24 units outside of North America in this timeframe, reflecting a perceived uncompetitive assessment of the type by global airlines.

**Table 10: Forecast 100-150 seater deliveries 2018-2022 by type**

| Size Category | North America | World total |
|---|---|---|
| **CS100** | 75 | 136 |
| **CS300** | 144 | 292 |
| **737 Max 7** | 119 | 143 |
| **737-700** | | 2 |
| **A319** | | 11 |
| **A319neo** | 9 | 50 |
| **E195** | | 33 |
| **E195 E2** | | 84 |
| **Total** | **347** | **751** |

*Source: Flight Fleet Forecast 2017*

## 4.2 Fleet plans of US Major airlines to 2022

The US market has seen major restructuring since 2007, with all three of today's largest carriers having been through bankruptcy and mergers. Consolidation has helped the industry to record significant levels of profitability. This sound financial position has lessened management's ability to gain concessions from pilots to allow more (or larger) regional jets to be flown under Scope Clause. In fact, all three have signed deals to raise pilot and other staff pay significantly.

Other airlines such as Southwest and Alaska, both major operators of the 737-700, are upsizing, with most of their recent deliveries being 737-800s (Southwest), or 737-900ERs (Alaska). Southwest is the major customer for the Max 7 (30 aircraft), but has placed orders for a total of 170 Max 8s. LCCs such as Spirit, Allegiant and Frontier, all of which operate A319s, also have fleet plans that reflect increasing aircraft size.

Cost pressures, and consolidation itself, are thus leading to major upsizing within the domestic fleets. 125-seat category types such as the Max 7 and A319neo do not appear to fit the new plans, and instead the carriers have ordered large numbers of 180-seat 737 Max 9/10 and A321neo aircraft, which have the lowest operating cost per seat. There may well still be a requirement for aircraft in the 125-seat category, but aircraft with better economics than the 737 Max 7 and A319neo appear to be needed.

### 4.2.1 Delta Air Lines

Delta has not published a detailed fleet plan via its Investor Relations website. It is known to favour a policy of 'upgauging' aircraft size within its regional jet and single-aisle domestic fleet. It stated in 2016 that the CSeries order was not directly aimed at replacing the MD-88 fleet (149 seats), but that new A321ceos and 737-900ERs, and possibly used A320s and 737-800s, would be the primary replacements for the remaining MD-80s.

The A321 is a key part of Delta's shift to larger-gauge domestic aircraft. Its CEO Ed Bastian again re-iterated these plans in May 2017, noting how the Airbus narrowbody was replacing Boeing MD-88s in its fleet. Delta plans to retire its 112 MD-88s by 2020, replacing them with the 192-seat A321 and 180-seat Boeing 737-900ERs.

Delta also has a fleet of older A320s, which it inherited in the Northwest merger, delivered in 1990 onwards. Some of these are likely to be retired in the next five years. Delta is currently evaluating the A320neo and the 737 Max as part of an RFP process to look at additional [narrowbody] aircraft. Delta will use the aircraft from the order to replace older narrowbodies as they retire from its mainline fleet, it stated in October 2017, but did not comment on which types it plans to replace.

The CS100 is therefore part of these upgauging plans. Smaller, 50-seat, regional jets (CRJ200 and ERJ-145) are being gradually retired and replaced by 76-seat CRJ900s and E175s, plus the 70-seat E175SC variant. However, the number of these 76-seat types in the fleet is limited by pilot scope clause agreements. Delta can fly a maximum of 325 large regional jets (70-76 seats), and will have reached that limit by the end of 2017. It therefore would like to upgauge some current 76-seat flights to small single-aisles. Thus the CS100 is part of this overall plan, and will effectively replace 76-seat Bombardier and Embraer aircraft.

It is not clear what the long-term plans are for the Boeing 717 fleet (110 seats), which it leased used from Boeing Capital. The CSeries may eventually replace some of these aircraft in the fleet, but leases are expected to run to 2022 and beyond.

Delta's current fleet is summarised below. This includes regional jets flown on its behalf by other operators such as SkyWest, ExpressJet, Endeavor Air and GoJet.

**Table 11: Delta Air Lines current fleet**

| Type | Number of seats | In-service | Stored | On order |
|---|---|---|---|---|
| **CRJ 100/200** | 50 | 142 | 20 | |
| **CRJ700** | 65-70 | 82 | | |
| **CRJ900** | 76 | 149 | 1 | |
| **E170** | 70 | 7 | | |
| **E175** | 69/70/76 | 70 | | 30 |
| **717** | 110 | 91 | | |
| **CS100** | 110 | | | 75 |
| **737-700** | 124 | 10 | | |
| **A319** | 132 | 57 | | |
| **MD-88** | 149 | 110 | 2 | |
| **A320** | 150[1] | 64 | 1 | |
| **MD-90** | 158 | 62 | 1 | |
| **737-800** | 160[2] | 77 | | |
| **737-900ER** | 180 | 87 | | 33 |
| **A321** | 192 | 28 | | 94 |
| **757-200** | 168-199[3] | 112 | 16 | |
| **757-300** | 234 | 16 | | |
| **Grand Total** | | **1,164** | **41** | **232** |

*Source: Flight Fleets Analyzer, Flight Ascend Consultancy. [1] Four A320s have 164 seats. [2] Four 737-800s have 154 seats. [3] 11 757s have an all-premium 72 seat layout.*

Delta has repeatedly insisted that the 737 was never an option in its campaign for a new 100-seat aircraft, noting in past statements that Boeing had pitched used Embraer 190s and not the 737 Max when it selected the CS100.

### 4.2.2 United Airlines

United has not published a detailed fleet plan via its Investor Relations website. It is aiming to maximise fleet utilisation and increase the proportion of flying by large regional jets at the expense of 50-seaters.

United will also continue to acquire used single-aisle aircraft, both purchased and leased. This follows its recent acquisition of used A319s and 737-700s to fulfil 130-seater needs. These second-hand aircraft deals would appear to indicate a focus on 150-seater and larger aircraft for its new-build fleet, and are consistent with the upgauging of its order for 737-700s.

Interestingly, United ordered 40 737-700s in January 2016 and is understood to be the unidentified customer in March 2016 for 25 more (it reported ordering 65 aircraft in its US SEC filings). Four of these orders were then changed to -800s and then in December 2016, the remainder were cancelled in favour of orders for 61 Max aircraft. 25 of these remain as undecided variants, with the remainder being shown as Max 9s and Max 10s.

United's current focus is on taking deliveries of new 737 Max 8s and Max 9s from April 2018. United has converted 100 of its 135 strong 737 Max order backlog to the larger Max 10 in 2017. There has been no mention of the Max 7 being amongst its orderbook.

Like Delta, United would like to maximise the use of large regional jets, but has reached the limit on how many 70-76 seat jets it can fly under its current pilot Scope Clause agreement.

In the most recent round of pilot pay negotiations, United continues to show a pay rate for the Embraer 190 and 195. This is considerably lower than pay rates for 737s and A320 family aircraft, but the airline appears to have cooled to the idea of adding a new 100-130 seater type. It said in August that it continued to evaluate adding a 100-seat aircraft to its mainline fleet, even though it had cited the aircraft category's poor economics for the conversion of its 737-700 order to larger variants in 2016.

United has a clause in its pilots agreement that, if it adds a new small mainline narrowbody, including either the CS100 or E190-E2, it can add up to 70 more 76-seat regional jets to its feeder fleet.

Therefore the Boeing 737 Max 7 would not be likely to compete for that order, as the benefit of adding more 76-seat jets would not accrue.

United has engaged in a similar fleet upgauge cascade as Delta. It has shifting 50-seat regional jet flying to 76-seat aircraft, large regional jet routes to Airbus A319s and 737s and on upwards to its small fleet of domestic Boeing 777-200s.

United will continue this upgauge strategy when it begins taking 737 Max 10s in 2020. Its SVP of Flight Operations said that the majority of these aircraft will replace 737-800s and -900ERs in domestic markets.

United's current fleet is summarised below. This includes regional jets flown on its behalf by other operators such as SkyWest, ExpressJet, Air Wisconsin and GoJet.

**Table 12: United Airlines current fleet**

| Type | Number of seats | In-service | Stored | On order |
|---|---|---|---|---|
| **CRJ200** | 50 | 85 | | |
| **ERJ-145** | 50 | 172 | 4 | |
| **CRJ700** | 70 | 65 | | |
| **E170** | 70 | 38 | | |
| **E175** | 76 | 151 | | 2 |
| **737-700** | 118 | 40 | | |
| **A319** | 128 | 63 | 3 | 20[1] |
| **A320** | 150 | 97 | 1 | |
| **737-800** | 154/166 | 141 | | |
| **737-900/ER** | 167/179 | 148 | | |
| **737 Max 9** | 180 | | | 10 |
| **737 Max 10** | 188 | | | 100 |
| **737 Max TBD** | - | | | 25 |
| **757-200** | 169[2] | 56 | | |
| **757-300** | 213 | 21 | | |
| **Grand Total** | | **1,077** | **8** | 157 |

*Source: Flight Fleets Analyzer, Flight Ascend Consultancy. [1] Used aircraft to be leased. [2] 15 757s have a 142 seat layout.*

### 4.2.3 American Airlines

American has not published a detailed fleet plan via its Investor Relations website.

It has some headroom under its pilot Scope Clauses to add more 76-80 seat RJs, and will do so with further E175s. Like Delta and United it is reducing the number of 50 seat jets, and also removing remaining turboprops. American has a small fleet of E190s (inherited from US Airways), seating 99, but is removing these from the fleet by the end of 2019.

It commented in June 2016 that it had no plans to replace the E190s with a new fleet of 100 seaters. The withdrawal of the type from American's fleet will leave a gap between its Embraer 175s and Airbus A319s. But its CEO said: "We have enough airplane orders right now, we are not looking to add any more."

Over the past several years American's major fleet activity has been the replacement of aging MD-80s (138 seats) with new 737-800s, and of 757-200s with the similar sized A321.

It has nearly 200 737 Max 8s and A321neos on order. Some will be used for growth, as well as replacing the last MD-80s and 757s. American is also rationalising its fleet by retiring the 48 A320s and replacing them with Max 8s.

American said in August 2017 that its long-term mainline fleet plan includes the A319, A321 and Boeing 737-800, as well as both the A320neo family and 737 Max family. It therefore appears that the 737 Max 7 is not under consideration, nor is an order for smaller CS100s on the horizon.

American's current fleet is summarised below. This includes regional jets flown on its behalf by other operators such as Envoy, SkyWest, Piedmont, Republic etc.

**Table 13: American Airlines current fleet**

| Type | Number of seats | In-service | Stored | On order |
|---|---|---|---|---|
| **ERJ-140/145** | 44/50 | 8/119 | 52 | |
| **CRJ100/200** | 50 | 100 | | |
| **CRJ700** | 63-70 | 110 | | |
| **CRJ900** | 76/79 | 118 | | |
| **E175** | 76/80 | 145 | | 13 |
| **E190** | 99 | 20 | | |
| **A319** | 128 | 125 | | |
| **MD-80** | 138 | 46 | 23 | |
| **A320** | 150 | 48 | | |
| **737-800** | 160[1] | 301 | | 3 |
| **737 Max 8** | 172 | 2 | | 98 |
| **A321** | 181/187[2] | 219 | | |
| **A321neo** | - | | | 100 |
| **757-200** | 176-188 | 37 | 23 | |
| **Grand Total** | | | | |

*Source: Flight Fleets Analyzer, Flight Ascend Consultancy. [1] to have seating increased to 172. [2] 17 A321s are in all-premium 102 seat layout.*

An examination of the fleet plans of the three largest US airlines appears to show that none have any plans to evaluate or acquire new 737 Max 7s or A319neos.

## 5. Elasticity of Boeing production capacity

### 5.1 Current backlog

As was discussed in section 3.6 above, the current 737 Max firm order backlog stands at 4,071 aircraft, of which just 64 are identified as the Max 7 variant.

This is a record total at this stage of a programme for any Boeing airliner, and means that Boeing is effectively 'sold out' at currently announced production rates until 2022.

Boeing has announced a series of 737 production rate increases from 42 per month in 2016 to 47 per month currently, then to 52 per month in 2018, and 57 per month in 2019. Flight Ascend Consultancy estimates that these future rates will be reached, in terms of a delivery rate to customers, in September 2018 and November 2019 respectively.

In total, therefore, we estimate total 737NG/737 Max deliveries of 530 in 2017, rising to 684 in 2020.

For the first 11 months of 2017, Boeing has delivered 462 Boeing 737s of all variants, including the first 49 Max aircraft. This compares to 450 737NGs in 2016. Last year, Boeing delivered 40 737s during December. 2017 will see a slightly higher figure, but it appears our estimate of 530 deliveries in 2017 is slightly optimistic, with the final 2017 delivery number likely to be around 510-520.

The table below summarises forecast deliveries to commercial customers, given current production rate plans. The firm order backlog is taken from Flight Fleets Analyzer, so reflects our data analysts' current assessment of known and estimated delivery dates.

**Table 14: Boeing 737 forecast production and open slots**

| Type | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| **Production rate per month** | 42 – 47 | 47 – 52 | 52 – 57 | 57 | 57 | 57 |
| **Annual deliveries** | 530 | 604 | 644 | 684 | 684 | 684 |
| **Commercial deliveries[1]** | 513 | 590 | 627 | 669 | 669 | 669 |
| **737 NG** | 453 | 332 | 78 | - | - | - |
| **737 Max** | 60 | 268 | 549 | 669 | 669 | 669 |
| **737 Max firm order backlog** | 60 | 268 | 549 | 674 | 675 | 682 |
| **Open slots** | 0 | 0 | 0 | -5 | -6 | -13 |

*Source: Flight Fleets Analyzer, Flight Ascend Consultancy. [1] Excluding military and BBJ versions*

The data shows that Boeing has no open slots for 737 Max delivery until at least 2023. In fact, the data implies a level of 'overbooking 'of slots, even after taking account of Boeing's increased production rate.

This is standard practice by Boeing on the 737 line, and does allow them some flexibility to swap slots around if a customer wishes to defer a delivery position. However, it is unlikely Boeing could accommodate any additional major orders for 737 Max 7 aircraft in this timeframe.

Boeing is able to swap production slots between variants at a lead time of around 18 months, and major customers are likely to have this flexibility in their contracts with Boeing. However, swaps from larger variants to the Max 7 appear unlikely, for reasons discussed in section 7.

### 5.2 737 Max production rate increase rationale

Boeing has been under pressure from Airbus, especially at the top end of the 737 Max family. It has been forced to launch the stretched 737 Max 10 this year to counter the success of the A321neo, which can carry up to 20 more passengers than the Max 9 (and still 10 more than the -10). Even so, at the end of November 2017, the A321neo had a total of 1,496 firm orders compared to 469 for the Max 9 and Max 10 combined. This gives Airbus a market share of 76% in the 180-200 seat single-aisle market.

Boeing may have additional orders for the Max 10, or indeed the Max 7, as there are over 1,000 firm orders where it will not disclose the variant. It is our view that the vast majority of these orders will eventually be delivered as Max 8s, with a substantial portion of Max 10s. Very few are assumed to be Max 7s in our analysis.

If Boeing is able to raise production rates above 57 per month, which is a challenging assumption given their decision to raise 787 rates in 2019, and the introduction of the 777-8/9 in 2020, then priority would likely be given to sales of additional Max 10s, in order to defend Boeing's position at key Boeing customer airlines against the A321neo.

The Max 10 also commands a significantly higher price and profit margin than the Max 7, so it would make little sense for Boeing to increase production in order to satisfy demand for the smallest version. It therefore also follows that it would make little sense to defer deliveries of larger variants in order to build 737 Max 7s for any prospective US customer. This is examined in more detail in section 7.2.

Boeing's production rate increase on the 737 was made in direct response to the decision of Airbus to also raise production. Airbus announced an increase to 60 aircraft per month in October 2015, to take effect in mid-2019. Boeing reacted with its rate increase in January 2016. At a yearly build rate of 60 per month at Airbus and 57 per month at Boeing, they are actually producing a very similar number of 680-690 per year. This is a consequence of Airbus quoting their production rate over 11.5 months a year (with a factory shutdown in August) and Boeing quoting a rate over all 12 months. Note that in many cases these OEMs have common first and second-tier suppliers within their supply chain (for example, CFM provide the LEAP engine to both Boeing – where it is the exclusive offering – and Airbus – where the share is presently in excess of 50%). Thus, these increases provide pressure on the supply chain to deliver their own rates above those of Airbus and Boeing. Consequently, the potential for suppliers to increase further beyond these rates is extremely low.

Boeing's decision is likely to have been influenced by two key factors; the first was to have some slots available in competitive timeframes with Airbus, in order to be able to compete in key campaigns. The second is to obtain cash flow from the 737 programme during the production transition phase from the current 777 to the new 777-8/9. Boeing announced the initial cut in 777 rate to seven per month at the same time as the 737 rate increase was announced, and has since cut the rate further to 3.5 deliveries per month.

The need for cash flow and profits from the 737 line again points clearly to a priority to deliver the larger variants of the 737 Max family at the highest rate possible, rather than the smallest and least profitable member, the Max 7. In conclusion, the overall success of the 737 Max family does not appear to need a successful Max 7, but instead relies on the ability of the Max 8 and Max 10 to compete with the A320neo and A321neo.

## 6. Pricing analysis

### 6.1 List pricing discussion

Current 2017 list prices for the CSeries and 737 Max 7 and Max 8, as published on the aircraft manufacturers' websites are shown below:

- CS100 = $79.5m
- CS300 = $89.5m
- Max 7 = $92.2m
- Max 8 = $112.2m

Aircraft manufacturers' list prices are often referred to as being meaningless, given that all customers receive a discount, and discounts of more than 50% are commonplace. The only practical application of list prices is their use as the basis for calculating customer deposit placements, known as pre-delivery payments (PDPs). The OEM order values when published are also based on these list prices, although it is understood in the industry that this is a poor measure of actual sales values.

As PDPs are based on list prices, and list prices are higher on the larger variants within an aircraft family, some airlines and lessors will seek to place orders for the smaller version of an aircraft, with the flexibility to switch their order at a later date to the larger version. This saves them money in advance of taking delivery. This strategy is the main reason behind the swapping of orders from the 737-600 and 737-700 shown in section 3.6.

Given the incentive that customers would therefore have to place orders for the smaller 737 Max 7 in order to cut their PDP payments, , and the frequency with which they upgauge their orders after capturing that benefit, it is clear that customers view the Max 7 as unattractive.

## 6.2 Value delta between 737 Max 7 and larger variants

As has been discussed above, Boeing will likely be highly incentivised to deliver larger variants of the 737 Max family, rather than seek additional sales of the smallest verison, the 737 Max.

Flight Ascend Consultancy constantly discusses real Market Values with industry participants, and publishes a range of values covering all variants of commercial aircraft, taking account of build year and options such as engine thrust and maximum take-off weights.

Our Full Life Base Values (FLBV) are representative of typical delivery price for new aircraft. The table below shows the current FLBVs for 2017-build aircraft, both for the 737NG family and the new 737 Max. Note that the 737 Max 10 does not have 2017 values, with the first production aircraft being 2020-vintage. Nevertheless, we currently apply a premium for the Max 10 over the Max 9 of around $2.7 million, indicating a like-for-like FLBV of $54.1 million.

**Table 15: 737NG and 737 Max Full Life Base Values**

| | 737 NG variant | Value ($m) | 737 Max variant | Value ($m) |
|---|---|---|---|---|
| **125-seat category** | 737-700 | 33.2 | 737 Max 7 | 37.5 |
| **150-seat category** | 737-800 | 44.1 | 737 Max 8 | 50.6 |
| **180-seat category** | 737-900ER | 47.6 | 737 Max 9 | 51.4 |

*Source: Flight Values Analyzer. 737NG values include Scimitar Winglets.*

Boeing therefore will realise additional revenue of approximately $13.1 million for each 737 Max 8 delivered compared to a Max 7. Assuming Boeing was to substitute a 2020 or 2021 Max 10 delivery slot with a Max 7, it would see a revenue decline of around $16.5 million in today's terms. For an order of 75 aircraft, given current production slots are effectively full over the next five years, the implication would be a revenue deferral of up to $1.25 billion.

Boeing's recurring production costs for the 737 Max will have a much smaller delta between the smallest and largest versions. Engines and systems are common, although the higher thrust of the Max 10's CFM LEAP-1B engines will result in a higher price paid to the engine manufacturer. Our current FLBV for the 28,000lb variant is $2.3 million more than the 23,000lb version for the Max 7. Boeing also has a slightly higher material cost for the stretched fuselage, and possibly some extra transportation costs or overheads associated with its larger size.

Overall, we would estimate that the delta between the production cost of the Max 7 and the Max 10 will be around $5-6 million, with a smaller delta between the Max 7 and Max 8.

This highlights the fact that Boeing is highly incentivised to sell the larger variants of the 737 Max.

### 6.3 Launch pricing

Commercial aircraft pricing is typically opaque. Purchase orders made between manufacturers and their customers are commercially confidential and contracts are rarely, if ever, published openly. Pricing can often be implied by analysis of company accounts or financial filings, but the implied prices may not take into account a number of undisclosed factors and cannot typically be proven as fact. As noted in section 7.1, large discounts from list price are routine in commercial aircraft markets and appraised values reflect this. The typical discount is as much as 50%

Aside from these routine discounts, manufacturers launching a new aircraft may need to grant further discounts to early customers – typically deemed to be launch customers – as an additional incentive. This is necessary because the new aircraft programme has not yet had the opportunity to prove its performance and economic proposition in regular airline service. Thus, discounts are offered as risk mitigation to this uncertainty. Risk also exists that the early production examples of a new type may suffer from weight or performance penalties compared to later deliveries that benefit from any subsequent improvements.

There will also be a cost to a customer to convert from its existing aircraft type to the new type, since it will need to undertake significant training to enable cockpit and cabin crew to operate the aircraft, to enable ground staff to manage the aircraft handling and also to enable maintenance staff to maintain the aircraft. The customer will also need to provision for spare parts to operate and maintain the aircraft and may even require new ground handling equipment, etc. So again further discounts may well be offered to cover disruption costs to the new customer.

As the aircraft moves through its development phase, the performance and economic proposition begins to be proven through flight test results and then operational service. Launch discounts then become less necessary. However, discounts or credits to cover disruption costs associated with the induction of a new aircraft type may still need to be offered.

In the context of CS100 and Delta, the purchase order was announced in April 2016. At that date CSeries was still to achieve its first commercial delivery and the programme lacked commercial momentum that results from proven performance in service. Although orders were recorded for 243 firm aircraft at that time, there were only a handful of large airline customers and the market view of CSeries was of a programme struggling to gain orders and market traction. Bombardier needed one or two marquee airline customers to add credibility to a programme which may otherwise have failed. The Delta campaign was thus likely to have been viewed as strategic by Bombardier.

Bombardier are not alone in extending highly competitive pricing to such strategic customers. Historically, Boeing have (anecdotally) offered such competitive pricing to US airlines in exchange for agreements that those airlines will order only Boeing products. These were termed 'most favored nation' deals at the time. Delta Air Lines was a beneficiary of such an agreement in 1997, along with Continental. It is understood that the airlines were given some form of guarantee that Boeing would not offer a lower price to any other customers. Boeing also offered very low pricing to United Airlines – reportedly as low as $20 million – to purchase Boeing 737-700s in March 2016[1].

In summary, there are two categories of campaigns which justify discounting below that typically seen. "Launch" pricing is offered as compensation to the customer for the risk associated with early adoption of unproven new aircraft programmes. "Strategic" pricing refers to OEMs' broader strategic objectives and can be offered at any time in an aircraft programme. In the example cited above Boeing's decision to offer "strategic" pricing to United Airlines was intended to block other OEMs' from offering aircraft in that campaign.

## 7. Airbus acquisition of CSeries programme

On 16th October 2017 Bombardier announced an agreement with Airbus for the latter to acquire a majority stake in the CSeries Aircraft Limited Partnership, a joint venture formed between Bombardier and province-owned Investissement Québec. The agreement remains subject to regulatory approvals and is not expected to close before July 2018 at the earliest. Although the partnership was not expected, there are sound commercial and industrial logics behind the agreement.

From the Bombardier perspective, despite the orders placed by Delta Air Lines and Air Canada in April and June 2016 respectively, commercial momentum to the CSeries programme was stalled. The only new customer order placed since those orders was for two aircraft from Air Tanzania in December 2016. Through 1st October 2017 only 19 aircraft deliveries in total had been achieved to two customers – Swiss and airBaltic. Against this backdrop the market continued to question the relative strength of the CSeries programme and indeed the ability of Bombardier to achieve commercial success with the aircraft. The agreement with Airbus changes that market perception. Airbus is a hugely successful commercial organisation, with more than 17,400 commercial jet orders and almost 11,000 commercial jet deliveries across its aircraft families. Adding Airbus's global commercial power to the CSeries performance and economics is expected to result in sales additionality above a scenario where Bombardier retained the programme as a standalone company. Further, Airbus has a global product support network that ensures reliable and safe operation of its customers' fleets on a daily 24/7 basis. Adding this support network to CSeries further enhances its market potential.

[1] http://www.businessinsider.com/boeing-took-some-extraordinary-measures-to-crush-its-canadian-opposition-2016-3?international=true&r=US&IR=T

From an Airbus perspective, adding CSeries to its product portfolio enables Airbus to offer an efficient next generation small two-variant single-aisle family. Airbus also gains some industrial benefits. CSeries is the only single-aisle aircraft manufactured today with a fully composite structure. Access to some elements of the manufacturing technology, particularly composite wings, potentially accelerate Airbus's own research and development initiatives in this regard which could enable A320 family developments in the medium term.

## 8. Summary

The Boeing 737 Max 7 is the least efficient variant of the Boeing 737 Max family and its current poor market performance is driven by the aircraft design and relatively uncompetitive performance in the market generally. This repeats the experience of the smallest members of multi-gauge single-aisle families historically and is expected to continue by virtue of the design, rather than as a result of any direct competitor actions.

Demand for new single-aisle aircraft over the next five years, both in the United States and globally, is expected to be focussed on larger members of the new-generation programmes. This is driven in the US by the Major airlines' plans to continue to seek the most efficient seat-mile costs possible - which are typically rendered by the largest aircraft family members. The smallest family members will thus likely remain niche players in this time period.

Boeing is highly incentivised by market pricing to deliver the largest members of its 737 Max family. Analysis of the Max backlog suggests that production is fully committed over the next five years. If Boeing were to defer these slots in favour of 75 Max 7 aircraft, the cost in deferred sales revenue is estimated to be as much as $1.25 billion.

"Launch" pricing is typically offered at the outset of a commercial aircraft programme for a finite period, as compensation for risk undertaken by customers who commit to an aircraft before it meets development and performance milestones. It is distinct from "strategic" campaigns in which a manufacturer may offer reduced pricing for other reasons.

# ATTACHMENT B

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Dear Mr. Mitchell:

AVITAS, Inc. has been retained by Bombardier (the "Client") to give an independent opinion regarding the reasons for the demise of McDonnell Douglas and also the importance of the U.S. market for narrowbody aircraft.

AVITAS is an accepted and highly regarded independent authority on commercial aircraft values and market issues. We have been retained to advise in numerous new and used aircraft transactions and financings. Through this activity, we are privy to some confidential information on aircraft pricing. Though we cannot reveal specific transaction terms and pricing, this information informs our opinions on aircraft values. AVITAS has been in business since 1985 and employs aviation professionals with experience from various aspects of the aircraft market, including airlines, manufacturers, financial institutions and other constituent industry segments. AVITAS adheres to the appraisal standards and ethics of the International Society of Transport Aircraft Trading (ISTAT). Five employees are ISTAT Certified Appraisers, including two Senior Appraisers. AVITAS appraises over 6,000 aircraft and engines per year and publishes the *BlueBook of Jet Aircraft Values*, the definitive desk reference for aircraft values since 1989.

Three of the contributors of this letter have significant experience working at McDonnell Douglas Corporation ("MDC") during the period 1980 to 1997. The bio for each contributor is attached.

***Reasons for the Demise of McDonnell Douglas***

AVITAS has been asked by Bombardier to address the reasons for the demise of MDC. Boeing claims that the primary reason for MDC's demise in the commercial aircraft business was due to unfair subsidies by the European governments, which enabled Airbus to engage in cut-rate pricing. AVITAS disagrees with this argument. The beginning of the decline in MDC's commercial aircraft business began even before delivery of Airbus's first aircraft, the A300B2, which entered service in 1974. In fact, the troubles for MDC can be traced back to the 1960s when the company was known as the Douglas Aircraft Company before the merger with McDonnell Aircraft in 1967. The difficulties continued after the merger until MDC was eventually acquired by Boeing in 1997. Poor management and controls combined with a lack of investment in new technology and tools all contributed to the demise of MDC.

*Douglas Aircraft Company pre-1967 Merger with McDonnell Aircraft*

With the introduction of the DC-3 in 1934 through the end of production of the DC-7 in 1958, Douglas Aircraft Company ("DAC") dominated the commercial aircraft business with over 50% market share. DAC did not surrender their leadership position in aircraft manufacturing until Boeing introduced the four-engine 707 in 1958. While the 707 was not the first jet aircraft built for airlines (the British deHavilland Comet was the first in 1949), it was the first commercially successful jetliner. Boeing's ability to fund the 707 project benefitted from winning the Air Force's contract for the KC-135 tanker, which paid approximately $100 million in development costs.

DAC responded to Boeing's 707 with the DC-8, a similar six-abreast four-engine narrowbody aircraft. While both were popular with airlines, Boeing took the sales lead by the end of the 1950s and never relinquished it. Boeing would later develop the 727, 737, and 757 based on the same fuselage diameter of the 707. DAC responded to Boeing's short-range 737 with its DC-9 model.

Developing this new aircraft significantly increased Douglas' development and tooling costs. During the same time that development costs were increasing, sales were also increasing. Consequently, DAC's inventory carrying costs increased dramatically and the company began to run out of cash. While sales of the DC-9 were strong, the airplane was priced low and airlines were promised early deliveries, which DAC could not meet. The delays in deliveries resulted in litigation from DAC's largest customers. By the end of 1966, DAC reported significant losses along with an increasing debt burden. Facing bankruptcy, DAC was forced to accept a bid to be acquired by a much smaller McDonnell Aircraft Corporation ("MAC") in 1967.

*Post-1967 Merger*

MAC only built military aircraft. It was known for its fighter aircraft, missles, and spacecraft for the Mercury and Gemini projects. MAC did not have any experience in the commercial aircraft business. Because MAC management did not understand the commercial market, they were unwilling to invest serious resources into that part of the business. This was even when customers specifically asked for new products. As one example, Air New Zealand liked the DC-10 but wanted it to be re-engineered with two engines to fit its network. There were other customers who pushed for such new products but MAC management was unwilling to commit resources to develop them. This neglected segment of the market became Airbus' first successfully launched product, the A300.

DAC was not profitable and was not properly funded. Products were derivatives of existing products. The DC-9 became the MD-80 which then became the MD-90 and then the MD-95 with no real significant improvements. The same is true for the DC-10 which became the MD-11. Resources were put into the military segments, not just at MC in St. Louis but also at DAC in Long Beach with the T-45 and the C-17 aircraft.

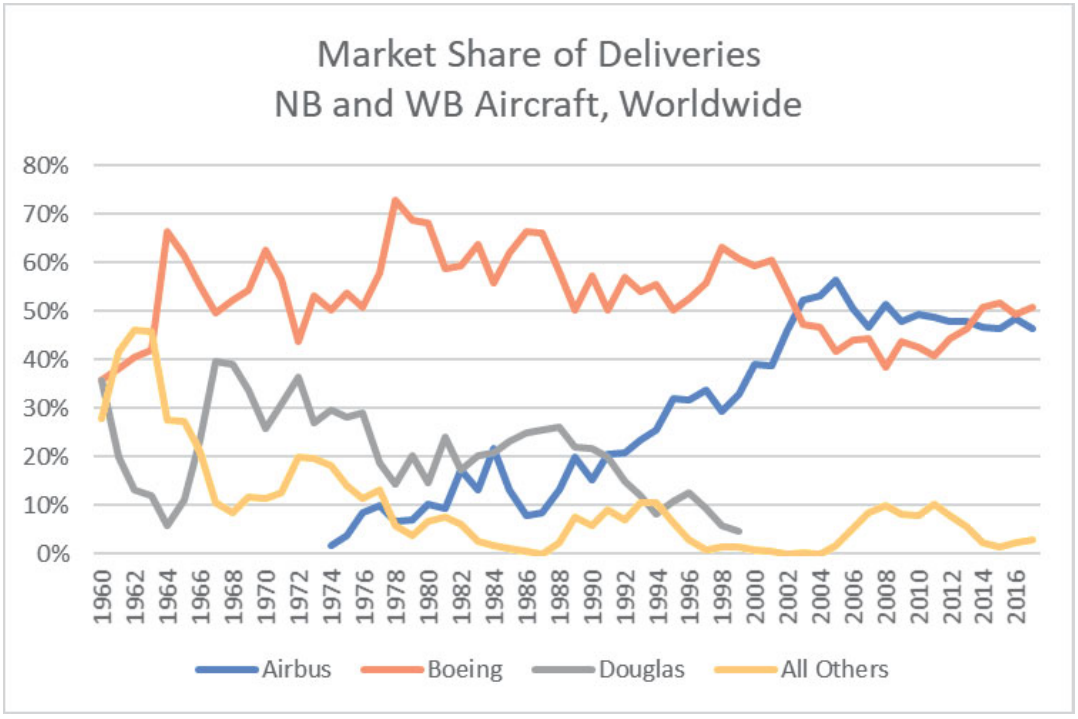
*Introduction of the A320 in 1988*

During the 1970's, the United States, Europe and Asia faced substantial oil shortages which resulted in volatile and high fuel prices. At the same time, there was increasing attention to the noise problem of aircraft. Looking to provide a more fuel-efficient aircraft with less noise, MDC launched the MD-80, a stretched derivative of the DC-9, with Pratt & Whitney JT8D-200 engines. Boeing responded by launching the 737-300/-400/-500 aircraft with CFM56-3 engines.

Airbus entered the narrowbody aircraft market with the A320-200 aircraft in 1988, a 150-seat single-aisle airplane which was a newly developed and highly fuel-efficient aircraft with low noise and emissions. The aircraft was powered by CFM and IAE engines which were subsequently improved with even better fuel efficiency and reliability beginning in 1993. These improved engines had 20% better fuel burn efficiency than similar sized MD-80 aircraft. In an uncertain fuel price environment, the aircraft became popular with operators in Europe and the U.S.

The following Figure depicts the delivery market share by manufacturer for narrowbody and widebody aircraft for the period between 1960 and 2016.

**Figure 1**



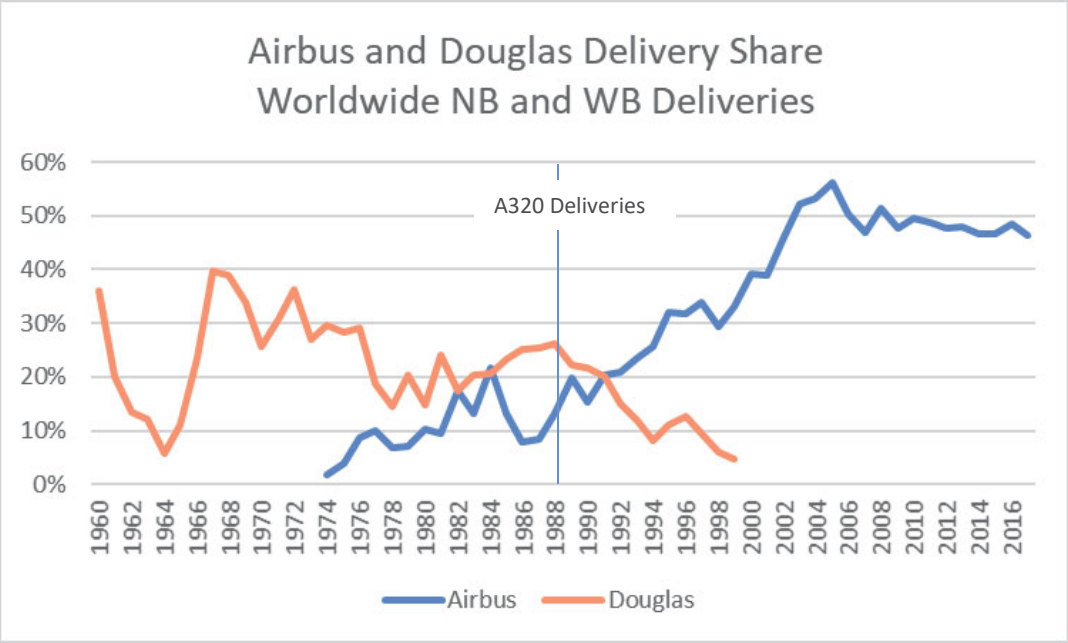

Source: Aviation Week Fleet Discovery; Western built aircraft

Early in this period, Boeing and MDC had the market share lead with Boeing having a superior position against all others. Airbus began taking share in 1974 with the widebody A300 aircraft which had minor success with some airlines. MDC was able to maintain share against Airbus through 1992 before

declining as Airbus's share expanded. Boeing was able to maintain its share against all competitors until Airbus surpassed them in 2002.

The following Figure illustrates market share of delivieries and is isolated between MDC and Airbus.

**Figure 2**




MDC was largely able to maintain a market share advantage over Airbus between 1974 and 1992. Only after Airbus delivered a better narrowbody aircraft—newly developed, better fuel efficiency, lower noise and emissions as compared to MDC's decades old dervivative aircraft—did MDC's share of deliveries decline.

This market share dynamic was particularily evident in Europe. Prior to the arrival of the A320-200, share was largely divided between MDC and Boeing for narrowbody deliveries in Europe. In 1988, Airbus immediately captured market share with A320 deliveries and by 1995, the market was spilt three ways as European operators, sensitive to noise, emmisions, and fuel efficiency, opted for the newer A320 aircraft over the older MD-80 technology. Boeing was able to sustain its share by having a number of different 737 size aircraft while MDC's share of MD-80s consistently declined.

A similar share story occurred in the U.S. as Northwest and United decided to order the newer technology A320 aircraft over the older MD-80 models while Boeing was able to maintain share through different size aircraft variants which had competitive fuel efficiencies with the A320s.

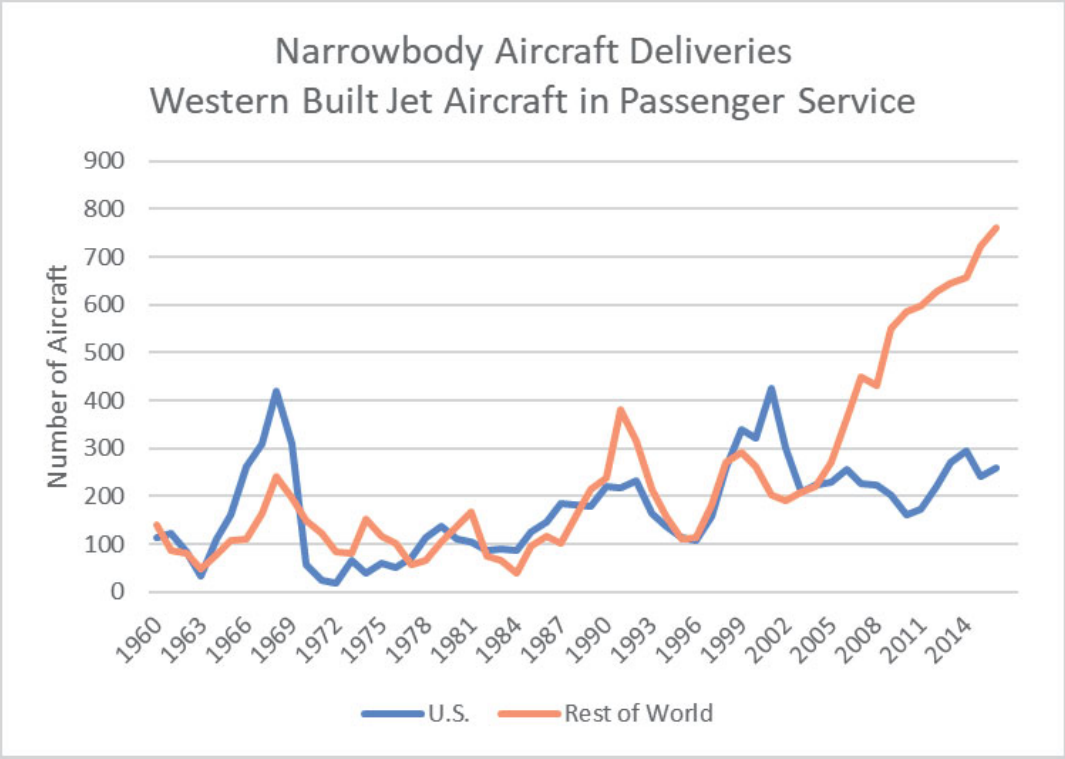
Without investments in its commercial division, MDC had no chance of staying competitive in the market and faced the inevitable decline in market share.

***Importance of the U.S. Market for Narrowbody Aircraft***

The U.S. market for commercial passenger jet aircraft is significant. As of October, 2017 there were almost 7,000 jet aircraft in active service with more than half of those narrowbody airplanes. All major airlines in the U.S. have a diverse fleet with a strong composition of narrowbody aircraft. Narrowbody aircraft work well within the U.S. for both low cost airlines as well as for major airline network carriers who deploy narrowbodies in hub and spoke patterns across the country.

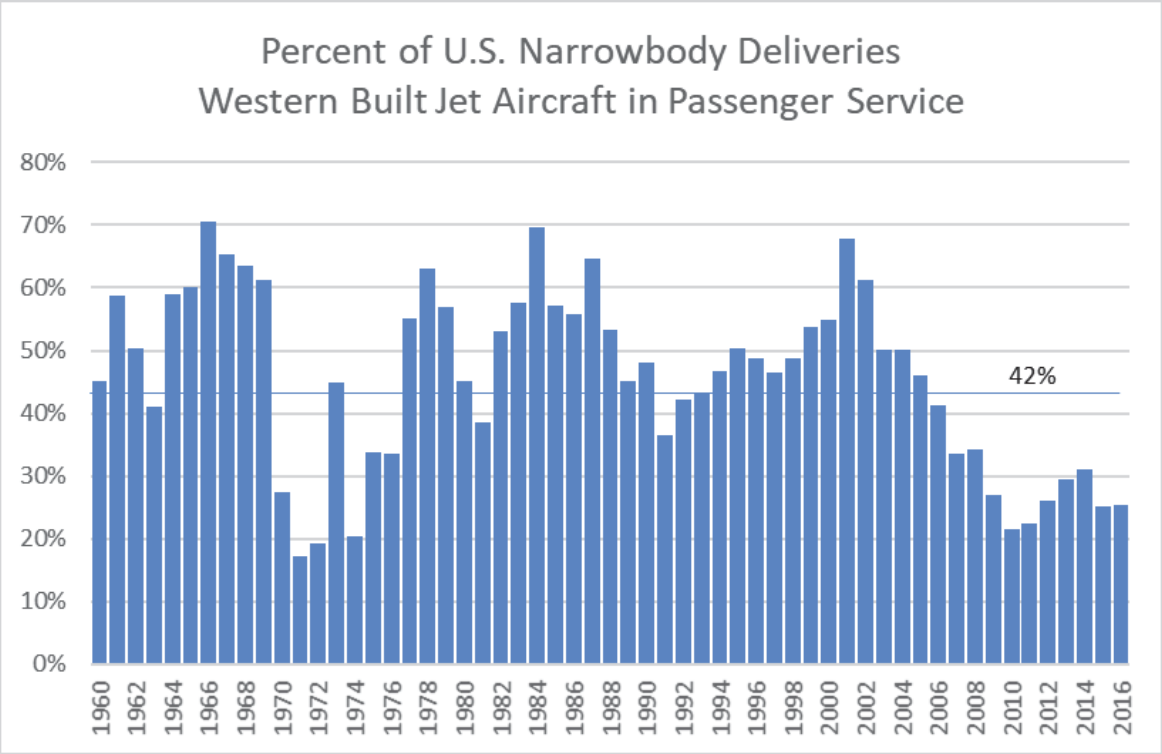
The importance of the U.S. for narrowbody aircraft deployment has always been strong. From the beginnings of the jet age in the U.S., narrowbody deliveries represented half or more of all worldwide narrowbody aircraft new deliveries. The following Figures indicate the absolute number of narrowbody aircraft deliveries in the U.S. and the percent those aircraft represent of total worldwide narrowbody aircraft deliveries for the period from 1960 and 2016.

**Figure 3**




Source: Aviation Week Fleet Discovery; narrowbody aircraft are comprised of aircraft generally between 100 and 185 seats.

**Figure 4**




Source: Aviation Week Fleet Discovery; narrowbody aircraft are comprised of aircraft generally between 100 and 185 seats.

In total, there have been 10,000 new narrowbody aircraft deliveries in the U.S. from 1960 to 2016, an average of almost 180 aircraft per year and 227 per year over the last decade. These airplane deliveries to the U.S. are for both aircraft replacement, i.e., retirements and for market growth. The U.S. narrowbody airplane market has grown from just a few hundred units in 1960 to 3,500 units in-service today. More than 3,000 narrowbody aircraft are in active service today with the largest U.S. airlines: American, Delta, United, Southwest, JetBlue, and Alaska.

As shown in Figure 4, over the period from 1960 to 2016, the U.S. has taken delivery of about 42% of all new narrowbody aircraft delivered in the world. Deliveries occur on an ebb and flow basis as a result of economic conditions, airline orders, manufacturer production plans, etc. which accounts for the varying percentage of U.S. deliveries year by year. While on a proportionate basis, the percent of U.S. deliveries has fallen from the average over the last decade as Asia and other regions have shown stronger growth, the U.S. still represents 20-30% of all new narrowbody aircraft deliveries worldwide.

These proportions are not likely to change over the long term as the U.S. is in the midst of a large fleet renewal process affecting narrowbody aircraft. Almost 1,600 narrowbody aircraft dominciled in the U.S. are greater than 15-years of age. AVITAS forecast that North America (Canada and the U.S.) will need approximately 5,000 new narrowbodies over the next 20 years with most of those coming to U.S. airline operators.

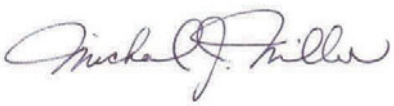
## Covenants

AVITAS does not have, and does not intend to have, any financial or other interest in the Client or any of the subject assets. Further, this report is prepared for the exclusive use of the Client and shall not be provided to other parties without the express consent of the Client.

This letter represents the opinion of AVITAS and is intended to be advisory only in nature. Therefore, AVITAS assumes no responsibility or legal liability for any action taken, or not taken, by the Client or any other party, with regard to this equipment. By accepting this letter, all parties agree that AVITAS shall bear no such responsibility or legal liability including liability for special or consequential damage.

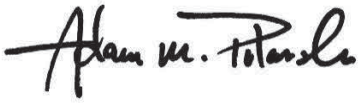
## Statement of Independence

AVITAS hereby states that this Opinion Letter has been independently prepared and fairly represents AVITAS's opinion.



Michael J. Miller
Vice President – Consulting

Douglas B. Kelly
Senior Vice President – Asset Valuation
ISTAT Certified Senior Appraiser



Adam M. Pilarski, Ph.D.
Senior Vice President – Consulting

John W. Vitale
President & CEO
ISTAT Certified Appraiser

# ATTACHMENT C

## Importer/Purchaser Ratings of Comparability Between Boeing Single-Aisle LCA, 100- to 150-seat LCA and Other Single Aisle LCA

**737-700 / Max 7 vs. 737-800 / Max 8.--**

| | Physical characteristics / uses | Interchange-ability | Mfg. facilities, processes, employees | Channels of distribution | Customer / producer perceptions | Price |
|---|---|---|---|---|---|---|
| Fully | *** | | | | | |
| Mostly | | | | | | |
| Somewhat | | | | | | |
| Not at all | | | | | | |

**737-800 / Max 8 vs. 737-900 / Max 9.--**

| | Physical characteristics / uses | Interchange-ability | Mfg. facilities, processes, employees | Channels of distribution | Customer / producer perceptions | Price |
|---|---|---|---|---|---|---|
| Fully | | | | | | |
| Mostly | | | | | | |
| Somewhat | | | | | | |
| Not at all | | | | | | |

**737-700 / Max 7 vs. 737-900 / Max 9.--**

| | Physical characteristics / uses | Interchange-ability | Mfg. facilities, processes, employees | Channels of distribution | Customer / producer perceptions | Price |
|---|---|---|---|---|---|---|
| Fully | | | | | | |
| Mostly | | | | | | |
| Somewhat | | | | | | |
| Not at all | | | | | | |

**737-800 / Max 8 vs. Max 10.--**

| | Physical characteristics / uses | Interchange-ability | Mfg. facilities, processes, employees | Channels of distribution | Customer / producer perceptions | Price |
|---|---|---|---|---|---|---|
| Fully | | | | | | |
| Mostly | | | | | | |
| Somewhat | | | | | | |
| Not at all | | | | | | |

**737-700 / Max 7 vs. Max 10.--**

| | Physical characteristics / uses | Interchange-ability | Mfg. facilities, processes, employees | Channels of distribution | Customer / producer perceptions | Price |
|---|---|---|---|---|---|---|
| Fully | | | | | | |
| Mostly | | | | | | |
| Somewhat | | | | | | |
| Not at all | | | | | | |

**737-900 / Max 9 vs. Max 10.--**

| | Physical characteristics / uses | Interchange-ability | Mfg. facilities, processes, employees | Channels of distribution | Customer / producer perceptions | Price |
|---|---|---|---|---|---|---|
| Fully | *** | | | | | |
| Mostly | | | | | | |
| Somewhat | | | | | | |
| Not at all | | | | | | |

Source: Prehearing Report at I-22 and I-24, Tables I-2 and I-3.

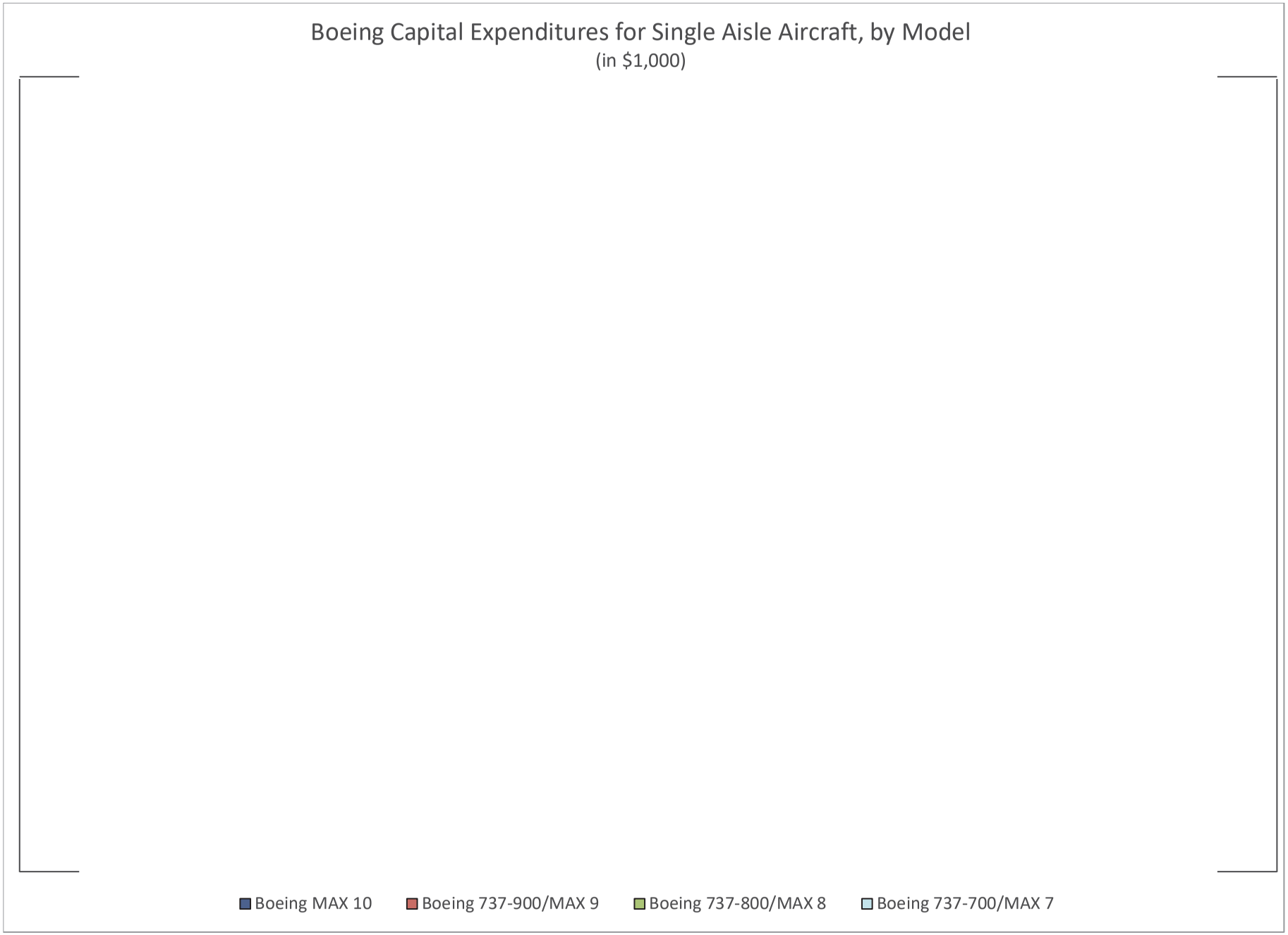
NOTE: The analysis presented in the Staff Report does not appear to reflect purchaser [ ] response that physical characteristics and uses are **fully** comparable between the 737-700 / Max 7 and the 737 / Max 8 and between the 737-900 / Max 9 and the Max 10. See cells containing (***).

Value of Boeing's Dedicated and Other Fixed Assets Used to Produce 100- to 150-Seat LCA

(Values in $1,000)

Source: U.S. Producers' Questionnaire, Table II-3b


Source: Boeing U.S. Producers' Questionnaire at III-13a, III-13e, and V-7




Source: Boeing U.S. Producers' Questionnaire at III-13a and V-7

Boeing P&L Data for 100- to 150-Seat LCA and Other Single Aisle LCA

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | January- September 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Net Sales Quantities** | | | | | | | | | | | | |
| Boeing 737-700/MAX 7 | [ | | | | | | | | | | | ] |
| Boeing 737-800/MAX 8 | [ | | | | | | | | | | | ] |
| Boeing 737-900/MAX 9 | [ | | | | | | | | | | | ] |
| Boeing MAX 10 | [ | | | | | | | | | | | ] |
| Total | [ | | | | | | | | | | | ] |
| **Net Sales Values** | | | | | | | | | | | | |
| Boeing 737-700/MAX 7 | [ | | | | | | | | | | | ] |
| Boeing 737-800/MAX 8 | [ | | | | | | | | | | | ] |
| Boeing 737-900/MAX 9 | [ | | | | | | | | | | | ] |
| Boeing MAX 10 | [ | | | | | | | | | | | ] |
| Total | [ | | | | | | | | | | | ] |
| **Net Sales AUV** | | | | | | | | | | | | |
| Boeing 737-700/MAX 7 | [ | | | | | | | | | | | ] |
| Boeing 737-800/MAX 8 | [ | | | | | | | | | | | ] |
| Boeing 737-900/MAX 9 | [ | | | | | | | | | | | ] |
| Boeing MAX 10 | [ | | | | | | | | | | | ] |
| Total | [ | | | | | | | | | | | ] |
| **Operating Income** | | | | | | | | | | | | |
| Boeing 737-700/MAX 7 | [ | | | | | | | | | | | ] |
| Boeing 737-800/MAX 8 | [ | | | | | | | | | | | ] |
| Boeing 737-900/MAX 9 | [ | | | | | | | | | | | ] |
| Boeing MAX 10 | [ | | | | | | | | | | | ] |
| Total | [ | | | | | | | | | | | ] |
| **Operating Margin** | | | | | | | | | | | | |
| Boeing 737-700/MAX 7 | [ | | | | | | | | | | | ] |
| Boeing 737-800/MAX 8 | [ | | | | | | | | | | | ] |
| Boeing 737-900/MAX 9 | [ | | | | | | | | | | | ] |
| Boeing MAX 10 | [ | | | | | | | | | | | ] |
| Total | [ | | | | | | | | | | | ] |

Source: Boeing U.S. Producers' Questionnaire at III-9a, III-9c, V-5a, V-5b, V-5c, V-5d, V-5e, and V-5f.

PUBLIC VERSION

Boeing Average Sales Prices for 100- to 150-Seat LCA and Other Single Aisle LCA

| | | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | January- September 2016 | 2017 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Net Sales AUV** | | | | | | | | | | | | | | |
| Boeing 737-700/MAX 7 | [ | | | | | | | | | | | | | ] |
| Boeing 737-800/MAX 8 | [ | | | | | | | | | | | | | ] |
| Boeing 737-900/MAX 9 | [ | | | | | | | | | | | | | ] |
| Boeing MAX 10 | [ | | | | | | | | | | | | | ] |
| Total | [ | | | | | | | | | | | | | ] |

Source: Boeing U.S. Producers' Questionnaire at III-9a, III-9c, V-5a, V-5b, V-5c, V-5d, V-5e, and V-5f.

**Boeing Backlog of 737 Family Aircraft vs. Projected Production**
**[ ]: Q4 2017 - 2022**

Sources: PHR at II-10 and Boeing U.S. Producers' Questionnaire at II-3a and II-13.

Boeing 737 Delivery Skyline Compared to Bombardier C Series Delivery Skyline

Sources: /1/ Boeing 737 Delivery Skyline, as provided in Boeing U.S. Producer QR at II-18. /2/ Bombardier Skyline, as provided in Bombardier's Foreign Producer QR at II-14. [ ]

# ATTACHMENT D

**AFFIDAVIT OF [ ]**

The undersigned,[ ], being duly sworn, states of his own knowledge that:

1. I am currently [ ] Bombardier Inc. ("Bombardier").

2. I was part of the corporate team that developed the strategy for approaching Airbus SE ("Airbus") and that analyzed the effect the U.S. Final Assembly Line would have on the U.S. economy.

3. As a result of the foregoing activities, I have knowledge of the definitive investment agreement entered into between Bombardier and Airbus on October 16, 2017.

4. The partnership with Airbus, if consummated, would support current C Series operations and would also increase the C Series global footprint, including through new job creation and direct investment in the United States.

5. Prior to the partnership with Airbus, Bombardier estimated that at full capacity over 22,700 jobs in the United States would be supported by the C Series program, which was projected to drive more than $30 billion in business with U.S. suppliers.

Components from these U.S. suppliers comprise more than 50 percent of C Series content.

6. Bombardier's aforementioned role in supporting the U.S. economy would be further enhanced as a result of the partnership with Airbus, if approved, and the implementation of a U.S. Final Assembly Line.

7. For example, Bombardier estimates that the partnership with Airbus, if approved, would create over 8,000 additional direct, indirect, and induced jobs in the United States, of which over 2,000 are expected to be permanent jobs and over 6,000 person year jobs are expected to be created as a result of the establishment of the necessary U.S. C Series facilities.

8. The breakdown of 1,950 to 2,450 permanent jobs is as follows: 400 to 500 direct jobs, 550 to 700 indirect jobs, and 1,000 to 1,250 induced jobs. The estimates of direct jobs are based on Bombardier estimates assuming current understanding of final assembly line scope. The estimates of indirect jobs are based on an indirect to direct employment ratio for aerospace of 1.4. (Source: AIA, Aerospace & Defense Economic Impact Analysis 2016 provided by HIS Economics). The estimates of induced jobs are based on an induced to direct and indirect jobs ratio of 1.06. (Source: Economic Policy Institute). Figures have been rounded.

9. The breakdown of approximately 6,000 person year jobs related to establishing the C Series facilities in the United States is 1,900 direct jobs, 1,000 indirect jobs, and 3,000 induced jobs. These estimates are based on a construction cost of $300 million using Bombardier experience of similar executed and planned construction projects. The direct job impact is based on ratio of 6.29 jobs per $1 million of construction spent. (Source: Employment requirement tables for 2016 (REAL EMPREQ) published by the US Bureau of Labor). The indirect job impact is based on ratio of 3.25 jobs for $1 million of construction spent. (Employment requirement tables for 2016 (REAL EMPREQ) published by the US Bureau of Labor; difference between total direct and indirect employment and direct employment). Induced jobs are based on an induced to direct and indirect jobs ratio of 1.06. (Source: Economic Policy Institute). These jobs are in person years and are expected to be spread over approximately two years. Figures have been rounded.

10. According to estimates by Bombardier, the creation of these facilities would contribute over $300 million of new foreign direct investment into the United States.

11. As a result of the investment agreement with Airbus, [

]

I,[ ], declare under penalty of perjury that the foregoing is true and accurate to the best of my knowledge.

[ ]

[ ]

[ ]

Signature

Dated: Nov. 6, 2017

Subscribed and Sworn to me this 6th day of November, 2017.

Commissioner of Oaths
#173084

# ATTACHMENT E

**U.S. INTERNATIONAL TRADE COMMISSION**

| In The Matter Of: | Investigation Nos. 701-TA-578 & 731-TA-1368 (Final Investigation) |
|---|---|
| 100- to 150-Seat Large Civil Aircraft from Canada | |

**STATEMENT OF [ ]**
**UNDER 28 U.S.C. § 1746**

I, [ ] state the following:

1. I am an attorney at Covington & Burling LLP, [

]

2. [

]

3. [

]

I declare under penalty of perjury that the foregoing is true and correct.

[ ]
Covington & Burling LLP
One City Center
850 Tenth Street, NW
Washington, DC 20001-4956

Executed on this 11 day of December, 2017