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BEIJING BRUSSELS LONDON LOS ANGELES  
NEW YORK SAN FRANCISCO SEOUL  
SHANGHAI SILICON VALLEY WASHINGTON

Covington & Burling LLP  
One CityCenter  
850 Tenth Street, NW  
Washington, DC 20001-4956  
T +1 202 662 6000

December 28, 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: 528

## **PUBLIC VERSION**

Business Proprietary Information deleted  
from Brief Pages 2, 4, 7, 9-10, 13, 14;  
Responses to Commission Questions Pages  
2-3, 8-11, 14-15, 18-33; Attachments B, C,  
D, E, F; and Exhibits 5, 9, 17, 31, 42, 43

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

Dear Secretary Barton:

On behalf of Bombardier Inc. and C Series Aircraft Limited Partnership (“CSALP”), we hereby submit the public version of our Post-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).

**COVINGTON**

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

Respectfully submitted,



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

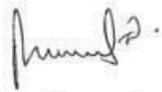
**COMPANY CERTIFICATION**

**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 27, 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 27<sup>th</sup> 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.

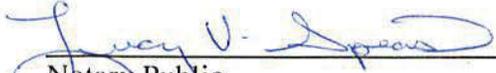


Shara L. Aranoff  
Covington & Burling LLP  
One City Center  
850 Tenth Street, NW  
Washington, DC 20001

District of Columbia: SS

Subscribed and sworn before me this

27<sup>th</sup> day of December, 2017

  
\_\_\_\_\_  
Notary Public

My Commission expires: 03/31/2021

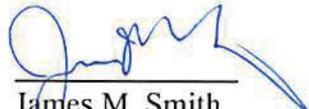


**PUBLIC CERTIFICATE OF SERVICE**  
**100- To 150-Seat Large Civil Aircraft from Canada**  
**Inv. Nos. 701-TA-578 and 731-TA-1368 (Final)**

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I, James M. Smith, hereby certify that on the 28th day of December 2017, copies of the foregoing document were served on the following parties by hand delivery:

Patrick J. McLain, Esq. <b>Wilmer Cutler Pickering Hale and Dorr LLP</b> 1875 Pennsylvania Avenue, NW Washington, D.C. 20006 Phone: 202-663-6000	Daniel L. Porter, Esq. <b>Curtis, Mallet-Prevost, Colt &amp; Mosle LLP</b> 1717 Pennsylvania Avenue, NW Washington, DC 20006 Phone: 202-452-7373	Thomas J. Trendl, Esq. <b>Steptoe &amp; Johnson LLP</b> 1330 Connecticut Avenue, NW Washington, DC 20036-1795 202-429-8055 – voice ttrendl@steptoe.com
Eric C. Emerson, Esq. <b>Steptoe &amp; Johnson LLP</b> 1330 Connecticut Avenue, NW Washington, DC 20036 Phone: 202-429-8076	Matthew J. Clark, Esq. <b>Arent Fox LLP</b> 1717 K Street, NW Washington, DC 20006 Phone: 202-857-6066	H. Deen Kaplan, Esq. <b>Hogan Lovells US LLP</b> 555 Thirteenth Street, NW Washington, DC 20004 Phone: 202-637-5799
Richard L.A. Weiner, Esq. <b>Sidley Austin LLP</b> 1501 K Street, NW Washington, DC 20005 Phone: 202-736-8000	Sibylle Zitko, Esq. <b>European Union</b> 2175 K Street, NW Washington, DC 20037 Phone: 202-862-9500	Yohai Baisburd <b>Dentons US LLP</b> 1900 K Street, NW Washington, DC 20006 Phone: 202-408-3245

  
James M. Smith  
Covington & Burling LLP

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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**

---

**POST-HEARING BRIEF OF  
RESPONDENTS BOMBARDIER INC. AND  
C SERIES AIRCRAFT LIMITED PARTNERSHIP**

Covington & Burling LLP  
One CityCenter  
850 Tenth Street, NW  
Washington, D.C. 20001-4956

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

December 28, 2017

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At the Hearing, Boeing’s witness panel reflected its general approach to the case: long on rhetoric, but short on substance. In the preliminary phase, the Commission specifically noted its interest in further examining the details and effects of the two sales campaigns, by United and Delta, on which Boeing’s claims of injury rest.<sup>1</sup> In response, Boeing might have produced a marketing or sales executive with knowledge of the United and Delta campaigns. Boeing might have brought an executive with direct knowledge of the development or production of the MAX 7, or of what purportedly makes that model distinct from the rest of the 737 family. Boeing might also have encouraged United, a leading customer, to provide perspective on its order for and conversions from the 737-700. Instead, Boeing’s panel included a single fact witness who joined the company well after the relevant campaigns;<sup>2</sup> an academic who has been out of the industry for years and discussed remote historical examples from the 1960s;<sup>3</sup> and an economist who described the industry for large civil aircraft (“LCA”) as new and “fascinating.”<sup>4</sup> This is not a lineup designed to shed light on the critical facts in this case.

The contrast with the panel presented by Respondents is striking. Witnesses included senior Bombardier executives with direct experience in producing and marketing the C Series, and in planning the new production facility in Alabama; senior Delta executives responsible for acquisitions and system planning, and directly involved with the purchase from Bombardier; and an industry consultant on whose data Boeing itself has relied. Given its longstanding interest in encouraging purchasers to provide evidence, the Commission should credit Delta for coming forward even as a Boeing customer to set the record straight. Its unrebutted account reveals

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<sup>1</sup> See Prelim. Det. (Public Version), nn. 226, 231.

<sup>2</sup> Tr. at 38 (Mr. McAllister).

<sup>3</sup> Tr. at 76-78, 134 (Mr. Nickelsburg) (invoking Convair examples).

<sup>4</sup> Tr. at 57 (Mr. Anderson).

there was no lost sale for Boeing to the C Series, as Boeing did not offer any new plane to Delta.

Just as Boeing’s testimony confirmed that there was no “lost sale” at Delta, its witnesses conceded that there was no “lost revenue” or pricing injury in the United campaign. Chairman Schmidlein’s questions eventually prompted two concessions—first, that when United quickly converted to larger 737s, it was to fill a “separate need” and “different network use,” revealing that the 737 was never a substitute for the CS100; and second, by reference to a Petition exhibit, that the prices United paid upon converting to larger 737s were [

] <sup>5</sup>

After previously arguing that there should be “no exception for launch pricing,”<sup>6</sup> Boeing corroborated at the Hearing that launch pricing is “common” to compensate for production, performance, and entry-into-service risks, and also conceded that the timeline from launch to certification is longer for clean sheet models like the C Series.<sup>7</sup> When asked about the deliberate exclusion from scope of Embraer aircraft with more than 100 seats, Boeing’s witnesses invoked a new criterion scarcely mentioned in Boeing’s prior submissions: “transcontinental” range.<sup>8</sup> But the claim that Embraer’s 100-seat-plus single-aisle jets “don’t have transcontinental capability,” as Mr. Novick asserted, is false.<sup>9</sup> Meanwhile, within days of the Hearing, reports revealed that Boeing has been in “takeover talks” with Embraer, its longtime collaborator.<sup>10</sup> It

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<sup>5</sup> Tr. at 95-96 (Mr. McAllister); Tr. at 159 (Mr. Novick); Petition Ex. 101, ¶ 10.

<sup>6</sup> Boeing Prehearing Br. at 104.

<sup>7</sup> Tr. at 132-33 (Mr. Nickelsburg); *id.* at 139 (Mr. Anderson).

<sup>8</sup> Tr. at 73-74, 172 (Mr. McAllister); *id.* at 78 (Mr. Nickelsburg); *id.* at 90 (Mr. Anderson);

<sup>9</sup> Tr. at 75 (Mr. Novick); *see also id.* at 264-65 (Mr. Mitchell) (explaining actual range of Embraers).

<sup>10</sup> *See* Wall St. J., *Boeing Held Takeover Talks With Brazilian Aircraft Maker Embraer* (Dec. 21, 2017) (**Ex. 1**); Forbes, *A Boeing-Embraer Tie-Up is Hardly a Surprise* (Dec. 22, 2017) (noting that Boeing and Embraer “already cooperate extensively” on the KC-130 military cargo jet and have collaborated “on a number of other projects, including the design of a new 150-to 175-seat commercial jet”) (**Ex. 2**).

thus appears that both Embraer *and* Boeing—presumably by design—may benefit from the artificial range requirement, as out-of-scope Embraer E-Jets have much to gain if Boeing prevails. This news also casts doubt on Boeing’s testimony, including when its executive proudly claimed to stand by the enlarged MAX 7 as Boeing’s sole offering to customers seeking a small single-aisle LCA, revealing no intention to supply the segment below 138 seats.<sup>11</sup>

By contrast, Bombardier’s witnesses provided unrebutted testimony regarding plans with Airbus to move forward, as quickly as possible, with establishment of a new U.S. final assembly line (“FAL”) for the C Series in Alabama. These plans mean that U.S. customers will be supplied from the U.S. FAL, not from Québec, which Delta confirmed.<sup>12</sup> Thanks to the Airbus partnership, there can be no threat of imminent injury caused by imports from Canada, as Part II details. All the same, based on the record evidence, Boeing’s case for relief falls far short of what Title VII requires even without regard to the U.S. FAL, as explained in Part I.

### **I. The Record Apart from the U.S. FAL Compels a Negative Determination**

Significant attention at the Hearing focused on the U.S. FAL—which is appropriate, as it is a case-dispositive development. Nonetheless, the Commission should not lose sight of the fact that even independent of the U.S. FAL, Boeing’s claims of imminent injury fail on their face.

#### **A. In the Delta and United Campaigns, Boeing Suffered No Injury**

As the Hearing confirmed, the allegedly injurious Delta and United campaigns involved no lost sale and no pricing harm for Boeing. Boeing did not contradict Delta’s clear and convincing account of its campaign; indeed, Boeing conceded that it offered used aircraft made

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<sup>11</sup> Tr. at 116-17 (Mr. McAllister); *see also id.* at 38-39, 45-46, 73-74 (Mr. McAllister on the MAX 7).

<sup>12</sup> Tr. at 200-01, 251 (Mr. May); *see also id.* at 266 (Mr. Levesque) (stating CSALP’s supply plans).

by Embraer,<sup>13</sup> its potential takeover target. Because no new Boeing aircraft fit Delta’s stated mission, Boeing could not and did not compete with the 737-700 or MAX 7, and thus never lost that sale to the C Series.<sup>14</sup> Meanwhile, Boeing admits that when United quickly converted *all* of the 737-700s it ordered initially to larger models in the 737 family, United [ ]<sup>15</sup>

Moreover, Boeing has not contradicted clear evidence that it gave United a “smoking deal” to deny “a validation of this C Series in the marketplace.”<sup>16</sup> Indeed, Boeing made an offer that displaced the principal competitors, Bombardier and Embraer, in a competition that focused on models with no more than 100 seats.<sup>17</sup> Such reports have been on the record, yet neither Boeing nor United has offered a contrary (or anything close to complete) account of that contractual exchange.<sup>18</sup> At the Hearing, Delta noted that even at a low price, it was puzzled by United’s initial order for plainly uneconomical 737-700s—but not surprised by United’s speedy conversions to larger, more efficient models.<sup>19</sup> Commissioners Schmidlein and Broadbent were puzzled by Boeing’s goal with United, but Bombardier witnesses explained that with no C Series, airlines would have no choice but to move up, to the MAX 7—or over, to Embraer E-

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<sup>13</sup> Tr. at 73 (Mr. McAllister) (conceding that the “solution we were working on involved used aircraft”).

<sup>14</sup> Tr. at 198-99 (Mr. May) (emphasizing that Boeing “simply was not in the mix” at Delta).

<sup>15</sup> Petition Ex. 101, ¶ 10.

<sup>16</sup> See Forbes, *Boeing Gives United a Smoking Deal on 737s to Block Bombardier from Gaining Traction* (Mar. 8, 2016) (Ex. 3); Seattle Times, *Price war, plane transitions put Boeing in financial crunch* (Apr. 1, 2016) (Ex. 4).

<sup>17</sup> A contemporaneous slide presentation shown to United in 2015 confirms Bombardier’s account. See Bombardier, *C Series for United Airlines* (detailing offer for 100-seat CS100 Lite and emphasizing its operating and comfort advantages over Embraer E-190-E2, with no mention of Boeing) (Ex. 5).

<sup>18</sup> [

]. United U.S. Importer/Purchaser Questionnaire at [ ].

<sup>19</sup> Tr. at 239 (Mr. May) (explaining that because ownership cost is just 20 percent of the overall assessment, even a massive 50 percent price difference would make only a 10 percent impact).

Jets.<sup>20</sup> Last week’s revelation that Boeing is in “takeover talks” with Embraer completes the picture.<sup>21</sup> By killing the C Series, Boeing would clear the field for E-Jets to dominate the lower segment in which Boeing’s own 737s do not currently—and will not—compete. Like the United deal, this entire proceeding thus appears to be aimed at denying the C Series validation.

These two campaigns are the exclusive foundation for Boeing’s claims of lost sales and pricing harms. Mr. Novick alleged “demand effects” and “price effects,” both “at that time” and “continuing.”<sup>22</sup> Yet in both instances, as the Hearing revealed, Boeing suffered no injury—and will suffer no related harm, on volume or pricing, in the imminent future. Without those two predicates, Boeing’s speculative theory of the case collapses.

### **B. Boeing Produces No Airplane for Most of Its Own Defined Market**

Witnesses confirmed that there is no widely accepted, distinct market for “100- to 150-seat” LCAs; instead, companies define segments of the single-aisle market in ways that reflect an airline’s mission profile or flatter a manufacturer’s offerings.<sup>23</sup> While Boeing defended its scope definition, the fact remained that Boeing’s *only* offering from 100 to 150 seats—the recently enlarged MAX 7—seats 138 passengers.<sup>24</sup> For any airline seeking a smaller seat capacity and better operating costs, such as Delta, Boeing offers nothing.<sup>25</sup> From 100 to 137 seats—fully 75 percent of the market as Boeing sees it—Boeing is absent. Bombardier, by contrast, offered the

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<sup>20</sup> Tr. at 236-38 (answering Chairman Schmidlein); *id.* at 257-60 (answering Commissioner Broadbent).

<sup>21</sup> Wall St. J., *Boeing Held Takeover Talks With Brazilian Aircraft Maker Embraer* (Dec. 21, 2017) (Ex. 1).

<sup>22</sup> Tr. at 159-60 (Mr. Novick).

<sup>23</sup> Tr. at 261 (Mr. Esposito) (“We use a 100- to 110, 124, and then . . . 130 count.”); *id.* at 185 (Mr. Mitchell) (noting that Bombardier said 100- to 150-seat “for marketing purposes,” and that Embraer dropped “70 to 130-seat” in favor of “70-seat plus”).

<sup>24</sup> Boeing added two rows to the MAX 7, making it a “straight-forward shrink of the MAX 8,” to satisfy the “niche requirements” of Southwest and WestJet, not to drive new demand. Leeham News, *History undermines Boeing claim of C Series impact: analysis* (Dec. 22, 2107) (Ex. 6).

<sup>25</sup> Tr. at 286 (Mr. Baisburd); *id.* at 262-63 (Mr. Esposito) (noting that in the market as defined by Boeing with no C Series, Delta would go from 76-seat regional jets to 138-seat MAX 7, an 80 percent leap).

fuel-efficient CS100 Lite and CS100 to United and/or Delta in 100-, 109-, and 114-seat models.

The C Series thus occupies the segment that Boeing previously abandoned (by dropping the 717 and 737-600) or underserves (with the 737-700 and the derivative and enlarged MAX 7). Boeing's absence reflects a strategic—and successful—decision to focus on larger aircraft. For years, Boeing executives disclaimed interest in the “lower end of the market,” which they derided as “the ‘Bermuda Triangle’ for sales” while predicting that “the bulk of the single-aisle orders will be in the *150 to 160-seat category*.”<sup>26</sup> With regard to Boeing's sales of the MAX 7 and MAX 8, this view has proven accurate. Against that backdrop, for Boeing now to claim that it made a “commitment to this segment” with the enlarged, non-optimized MAX 7 is absurd.<sup>27</sup>

**C. The MAX 7 Is Not Competitive and Is Failing on the Merits, Not on Price**

Record evidence and testimony have confirmed that the Boeing 737-700 and MAX 7 are inefficient, shrunken derivatives of larger, more widely accepted, and more profitable aircraft: the 737-800 and MAX 8.<sup>28</sup> As a result, the 737-700 and MAX 7 are significantly heavier and less efficient than the C Series, with operating costs nearly 20 percent higher than the CS100.<sup>29</sup> Those significant cash operating cost disadvantages explain their lack of success in the market. The MAX 7, for example, has had only a small number of orders—and none since 2013, well before Delta's 2016 C Series purchase.<sup>30</sup> With a design that dates to the 1960s, the 737 is nothing like the C Series, whose clean sheet design incorporates the latest technologies.

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<sup>26</sup> Financial Post, *Bombardier CSeries program 'off to a slow start', says Boeing exec* (Oct. 25, 2012) (emphasis added) (Ex. 7).

<sup>27</sup> Tr. at 114 (Mr. McAllister) (Boeing committed “by deciding to improve the 700 with the MAX 7”).

<sup>28</sup> See Flight Ascend Expert Report at 9-17 (Att. A); Tr. at 209-10 (Mr. Dimitroff).

<sup>29</sup> Dimitroff Hearing Slide 2, “Competitive Aircraft Operating Cost Estimates” (Ex. 8).

<sup>30</sup> Leeham News, *History undermines Boeing claim of C Series impact: analysis* (Dec. 22, 2107) (Ex. 6).

At the Hearing, Boeing contended that its base of 1,200 orders for the 737-700 revealed the opportunity for the MAX 7.<sup>31</sup> But many existing U.S. operators or purchasers—including United, Alaska Airlines, Aviation Capital Group, ILFC/AerCap, and Air Lease Corp.—have replaced or converted 737-700s by choosing larger models, not the MAX 7.<sup>32</sup> Southwest, which alone had more than 500 737-700s in 2011, has ordered 30 MAX 7s; by contrast, it has ordered more than 370 of Boeing’s 737-800s and MAX 8s.<sup>33</sup> The 737-700 may have been “a very big part of Southwest’s history,” as Boeing claimed at the Hearing, but given existing orders to date the MAX 7 will *not* be “an important part of Southwest’s future” in any similar fashion.<sup>34</sup> The record of conversions to models larger and more efficient than the MAX 7 tells a similar story. Boeing reported [ ] conversions of 100- to 150-seat LCA to larger 737s, [ ] conversions [ ].<sup>35</sup> In fact, the reported conversions [ ] of 100- to 150-seat LCA from 2014 through 2022.<sup>36</sup>

The decisions of Southwest and other U.S. purchasers to replace 737-700s with larger models in the Boeing 737 family, or to convert orders from the 737-700 and MAX 7 to larger 737 models, cannot be attributed to the C Series. Even if the C Series did not exist, or were closed out of the U.S. market, the MAX 7 would continue to struggle.<sup>37</sup> In that scenario, as noted at the Hearing, a likely beneficiary would be Embraer, which competed with the C Series in the United and Delta campaigns.<sup>38</sup> While Boeing’s artificial range requirement may have

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<sup>31</sup> Tr. at 113 (Mr. McAllister); *id.* at 116 (Mr. Anderson); *id.* at 144-45 (Mr. Novick).

<sup>32</sup> Leeham News, *History undermines Boeing claim of C Series impact: analysis* (Dec. 22, 2107) (Ex. 6).

<sup>33</sup> *Id.* (noting that “the MAX 7 won’t be replacing the larger MAX 8” at Southwest) (Ex. 6).

<sup>34</sup> Tr. at 148 (Mr. McAllister).

<sup>35</sup> See Prehearing Report at V-18; Boeing U.S. Producers’ Questionnaire at IV-17.

<sup>36</sup> See Boeing U.S. Producers’ Questionnaire at II-3a, II-13, and IV-17.

<sup>37</sup> Flight Ascend Expert Report at 47 (Att. A); Tr. at 235-37 (Mr. Mitchell).

<sup>38</sup> Tr. at 185-86, 188, 222, 237 (Mr. Mitchell); *id.* at 196-98 (Mr. May).

erased Embraer from the record, its ongoing takeover talks with Embraer should be construed as an admission that the inefficient MAX 7 cannot successfully serve the lower end of the single-aisle market. Rather than investing to develop a competitive clean sheet design, as Bombardier did, Boeing is looking to buy its way into that segment via what would be a multi-billion dollar acquisition. That shortcut may work. Either way, the fact of Boeing's takeover talks powerfully validates Bombardier's and Delta's attenuated competition arguments.

**D. Boeing's Speculative Claims about Future Pricing Rest on Flawed Premises**

At the Hearing, for the first time, Boeing's own witnesses corroborated as "common" the industry-wide practice of launch pricing, which compensates purchasers for assuming risks associated with the production, performance, and entry into service of new aircraft, especially those with unproven clean sheet designs.<sup>39</sup> This reversal was perhaps inevitable, given that Boeing could not and did not deny offering launch pricing on its troubled 787 aircraft.<sup>40</sup> At the time of the United campaign in 2015, the CS100 had not been certified. When Delta placed its order for 75 CS100s in 2016, the CS100 still had not been certified in the United States and had not entered into service anywhere.<sup>41</sup> United and Delta thus were offered time-limited launch discounts that other airlines would not "realistically expect to obtain," according to George Dimitroff, an expert appraiser at Flight Ascend.<sup>42</sup>

Boeing nonetheless maintained at the Hearing that it has faced, and will continue to face, pricing pressures as a result of the launch pricing Bombardier offered to United and Delta. Such

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<sup>39</sup> Tr. at 132-33 (Mr. Nickelsburg); *id.* at 139 (Mr. Anderson).

<sup>40</sup> Tr. at 132 (Mr. McAllister); *id.* at 136 (Mr. Anderson); *see also id.* at 212-14 (Mr. Dimitroff).

<sup>41</sup> Tr. at 188 (Mr. Mitchell).

<sup>42</sup> Tr. at 213-14 (Mr. Dimitroff).

claims find scarce support in the record. For one thing, Boeing does not and cannot claim that other airlines in fact know the prices Delta received from Bombardier,<sup>43</sup> or United received from Boeing.<sup>44</sup> If not known, such prices cannot meaningfully constrain bargaining. Even if prices were known, airlines could not credibly insist on a right to match a recognized launch order, and Boeing would not sensibly agree to provide such an offer. For Boeing to claim otherwise, or to disregard sworn questionnaires,<sup>45</sup> is self-serving, speculative, and deserving of little weight.

Even if the Delta and United histories play no role in future negotiations, Boeing speculates that Bombardier will price the C Series aggressively in the U.S. market.<sup>46</sup> This conjecture is belied by recent events that place the C Series on a very different footing from 2015 and 2016. First, the entry into service at SWISS and Air Baltic has exceeded expectations in terms of operational performance, and passengers have praised the comfort, legroom, luggage space, and large windows.<sup>47</sup> Second, the C Series has been further validated through recent deals

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<sup>43</sup> A Boeing affidavit claims that [ ] Boeing Prehearing Brief, Ex. 1, but [ ] U.S. Importer/Purchaser Questionnaire at III-5a. Similarly, an affidavit from [ ] which are known to be unreliable, Tr. at 286-87 (Mr. Dimitroff). See Boeing Prehearing Brief, Ex. 2. [ ] *Id.* Finally, [ ] *Id.* But [ ] See [ ] U.S. Importer/Purchaser Questionnaire at III-5a, III-2d.

<sup>44</sup> According to Boeing, [ ] Pet. Ex. 101, ¶ 10 (emphasis added). Yet Boeing has not [ ] See Business Insider, *Boeing Just Gave United a Massive Discount* (Mar. 9, 2016) (rumored price) (Ex. 38); [ ] U.S. Importer/Purchaser Questionnaire at [ ].

<sup>45</sup> Tr. at 126-29 (Mr. Anderson) (suggesting that 10 purchasers incorrectly reported that they do not know prices).

<sup>46</sup> Tr. at 44 (Mr. McAllister); *id.* at 67-68 (Mr. McClain).

<sup>47</sup> Tr. at 181 (Mr. Dewar); Statement of [ ] (Att. F); [ ] (Ex. 9); Apex, *Bombardier Intros Atmosphere Cabin* (Sept. 12, 2017) (Ex. 10).

with non-U.S. customers.<sup>48</sup> Finally, the announced partnership with Airbus has reassured prospective customers about the long-term prospects of the C Series, providing the most valuable validation of all: praise from a well-respected airframer. Thanks to this development and the C Series’s proven performance, validation is complete and the risk for future purchasers is substantially reduced. The program’s launch pricing phase lies in the past, not the future.

**E. Bombardier Has No Ability to Increase Imports from Canada Imminently**

At the Hearing, Boeing trumpeted Bombardier’s uncontroversial plan to continue ramping up production at Mirabel, as if this gradual long-term process somehow threatens Boeing.<sup>49</sup> It does not. Boeing rings the alarm because Bombardier hopes one day to produce 120 C Series per year. Boeing *currently* produces more than 500 737s per year, and by 2020 will increase capacity to 684 per year—more than 5 times Bombardier’s long-term objective at Mirabel, and more than [ ] the projected production for 2018 and 2019 *combined*.<sup>50</sup> The head of C Series production, Rob Dewar, explained that the Mirabel FAL is “still operating well below our projected capacity levels,” primarily due to “the reliability and timeliness of our supply chain.”<sup>51</sup> The resulting shortfall in deliveries has been significant in both 2016 and 2017. Accordingly, Mr. Dewar emphasized, “due to capacity constraints at Mirabel, we would not be able to produce *any* additional aircraft for the United States in the imminent future.”<sup>52</sup> In this respect as in others, Boeing’s alarmist allegations of imminent threat are contradicted by reality.

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<sup>48</sup> Bombardier Prehearing Br. at 13 & n.32 (detailing “two important deals” in November 2017).

<sup>49</sup> Tr. at 22 (Mr. Novick); *id.* at 55 (Mr. Nickelsburg); *id.* at 64 (Mr. Anderson); *id.* at 67 (Mr. McClain).

<sup>50</sup> Flight Ascend Report at 41 & Tab. 14 (**Att. A**); Bombardier Foreign Producer Questionnaire at II-11a.

<sup>51</sup> Tr. at 182-83 (Mr. Dewar).

<sup>52</sup> Tr. at 183 (Mr. Dewar) (emphasis added).

**F. Boeing Has Not Claimed Any Threat of Injury to the 737 Family, a Product Continuum Boeing Itself Calls “One Airplane, Four Sizes”**

In the Preliminary Determination, the Commission made clear its plan “to investigate further the appropriate definition of the like product.”<sup>53</sup> The staff, in questionnaires, collected complete information about the larger domestic industry manufacturing single-aisle LCAs with more than 100 seats. At the Hearing, Commissioners expressed skepticism about whether 150 seats is in fact a clear dividing line.<sup>54</sup> Boeing has thus been on notice that the like product may be expanded, but not once has Boeing argued that there is an imminent threat of injury with respect to the broader domestic industry encompassing the 737 family, which it calls the world’s “most successful commercial jet.”<sup>55</sup> This amounts to a concession that if the Commission expands the domestic like product, as the record makes clear that it should, a negative determination is the only appropriate result.

Boeing’s own documents, which tout the 737 as “ONE Airplane, FOUR Sizes,” support defining the domestic like product as a continuum that covers the 737 family.<sup>56</sup> Boeing’s witnesses conceded that conversions across the 737 family, as occurred with United, are common.<sup>57</sup> Indeed, flexibility with respect to MAX orders is so well established that Boeing no longer publishes 737 orders by model, as it did for the NG program. For the MAX, Boeing merely reports the cumulative total across *all* models. Notably, Boeing’s “rationale for this is that each Max customer may have the ability to select or change the series until they make a final

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<sup>53</sup> See Prelim. Det. (Public Version), at 13.

<sup>54</sup> Tr. at 79-80, 148-52 (Commissioner Broadbent); *id.* at 88-89 (Commissioner Schmidlein).

<sup>55</sup> Mitchell Hearing Slide 3, “Boeing 737 family: ‘One airplane, four sizes’” (Ex. 11).

<sup>56</sup> *Id.* (Ex. 11).

<sup>57</sup> Tr. at 60, 91-92 (Mr. Anderson); *id.* at 92-94, 96 (Mr. McAllister).

selection.”<sup>58</sup> Boeing’s own policy reinforces that the MAX 7 is by no means distinct.

At the Hearing, Boeing was asked about its purported line of demarcation at 150 seats. For example, the difference in seat counts between the MAX 7 and 737-800 resembles the difference between the MAX 7 and CS100, and the span from 100 to 150 seats is twice as large as the 24 seats separating the MAX 7 and MAX 8.<sup>59</sup> Moreover, Boeing markets the enlarged MAX 7 as seating 138-153 in two classes, and 172 maximum.<sup>60</sup> Finally, when asked, Boeing’s witnesses declined to address reports that Southwest will seat 155 passengers on the MAX 7.<sup>61</sup>

The 737 MAX family is a classic product continuum. In multiple cases, the Commission has included in the domestic like product goods that fall beyond the described scope.<sup>62</sup> It should reach the same result here, and find no threat of injury to the broader domestic industry.

## **II. The U.S. FAL Removes Any Threat of Imminent Injury by Imports from Canada**

As Part I details and the Hearing confirmed, Boeing is not deserving of relief under Title VII even under its artificially restrictive like product and without regard to the U.S. FAL. That said, the Bombardier-Airbus partnership extinguishes any flicker of concern about the already remote prospect of threatened injury by reason of C Series imports from Canada.

The Delta deal for 75 CS100s is the only purchase order of C Series by a U.S. customer with deliveries scheduled in the imminent future. In sworn statements at the Hearing, witnesses confirmed that Bombardier will supply U.S. customers from the U.S. FAL, and that Delta does

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<sup>58</sup> Flight Ascend Report at 21 (**Att. A**).

<sup>59</sup> Tr. at 79-80 (Commissioner Broadbent). Notwithstanding its proposed scope, which relies heavily on seating, Boeing’s only response was that “it’s really not just about seat count.” *Id.* at 80 (Mr. Anderson).

<sup>60</sup> See Boeing, 737 MAX Technical Specs (**Ex. 12**).

<sup>61</sup> Tr. at 148-49 (Mr. McAllister and Mr. Novick).

<sup>62</sup> See Bombardier Response to Commission Questions at No. 4.

not intend to import into the United States from Mirabel the C Series ordered in 2016.<sup>63</sup> Delta has made clear that it intends to take deliveries from the U.S. FAL.<sup>64</sup> With respect to aircraft already in production at Mirabel, Bombardier is in “advanced negotiation {s}” to place those with non-U.S. customers.<sup>65</sup> Given these commitments, imports into the United States are no longer planned under the only U.S. order for C Series with imminent scheduled deliveries.

In the face of this testimony, Boeing retreated to argue that even if no C Series *aircraft* are imported, C Series *parts and subassemblies* would be imported to the U.S. FAL, threatening injury.<sup>66</sup> This fallback argument also fails. First, in its final determinations, the Commerce Department expressly declined to address whether subassemblies or parts qualify as “partially assembled” aircraft within scope.<sup>67</sup> Bombardier believes they do not. Second, as explained at the Hearing, even if subassemblies were in scope, “the content of Canada for the fuselage is really just a cockpit and a small section of the aft fusel {sic}, very minor components comparted {sic} to the scope of the whole.”<sup>68</sup> Specifically, [

] <sup>69</sup> Any claim by Boeing that imports of parts threaten imminent injury is thus absurdly speculative, and likely irrelevant.

As a result of the U.S. FAL and Delta’s plans, subject imports from Canada will be

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<sup>63</sup> Tr. at 189-90 (Mr. Mitchell); *id.* at 194-95, 266 (Mr. Levesque); *id.* at 200-01, 251 (Mr. May).

<sup>64</sup> Tr. at 246 (Mr. May).

<sup>65</sup> Tr. at 252 (Mr. Dewar); Statement of Fred Cromer (noting that [ ] (Att. C).

<sup>66</sup> Tr. at 142-43, 156-58 (Mr. Novick).

<sup>67</sup> See Commerce Department, Antidumping Issues and Decision Memo, at 43 (Dec. 18, 2017).

<sup>68</sup> Tr. at 272 (Mr. Dewar).

<sup>69</sup> Statement of Sylvain Levesque, ¶ 2 (Att. D).

negligible, and there can be no threat of material injury under the statute absent imminent imports. These new facts, by their terms, necessarily put Boeing’s case to rest. Recognizing that peril, Boeing responded at the Hearing by alleging that the U.S. FAL is a mere “ruse” and asserting, without foundation, that “{i}t will be undone just as fast as it was concocted.”<sup>70</sup> This is false. As the Commission heard, compelling business reasons support the investment in a U.S. FAL, which will replicate the Mirabel production process. The commercial advantages for both partners, and for the C Series program as a whole, are substantial.<sup>71</sup> Given the risk that Boeing will file a new petition even after a negative determination in this case, the U.S. FAL is also necessary to reassure Delta and prospective U.S. customers that they face no risk of duties.<sup>72</sup> Boeing has argued that it is speculative for Bombardier to claim that U.S. airlines will wait for the Mobile facility to come on line, but the record is replete with evidence that U.S. airlines are accustomed to extended lead times, including on orders from Boeing.<sup>73</sup> In the face of public announcements by three blue-chip companies and formal approval from the Government of Québec, Boeing’s professed skepticism about the Alabama facility strains credibility.

Given the opportunities presented, the partners are moving ahead posthaste. Regulatory approvals have been obtained in [

] <sup>74</sup> Site visits

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<sup>70</sup> Tr. at 25 (Mr. Novick).

<sup>71</sup> Tr. at 191-92, 194-95 (Mr. Levesque).

<sup>72</sup> Tr. at 189-90 (Mr. Mitchell); *id.* at 275 (Mr. May).

<sup>73</sup> Tr. at 107 (Mr. Novick); *id.* at 101-02 (Mr. McAllister).

<sup>74</sup> Statement of James J. O’Connell, ¶¶ 3-7 (**Att. B**). Bombardier’s statement to Commerce raised at the Hearing, Tr. at 293-95, was solely regarding regulatory approvals, on which substantial progress has since been made. *See* Bombardier, Brief on Proposed Transaction, Dep’t of Commerce Inv. Nos. A-122-859 & 860 (Nov. 13, 2017), at 1 (“{T}he proposed transaction has not, due to regulatory requirements, been finalized and it would therefore be premature for the Department to base any decision on it.”).

have commenced, and the partners are planning, consistent with antitrust law, for the volume and timing of deliveries, the required production equipment, the organizational structure, the tasks to be executed, and local permitting and budgeting.<sup>75</sup> With events unfolding rapidly, Bombardier and CSALP hope to be able to provide the Commission an update in mid-January. They also reiterate their invitation to visit the Mirabel production line that will be replicated in Mobile.

The partnership's substantial new investment in the domestic industry is a development to be celebrated, not condemned as circumvention or dismissed as a ruse. Under the statute, the Commission has an obligation in a threat case to assess what is likely to happen with regard to imports, and what that portends for the domestic industry. All signs in this case are positive, both for the domestic industry and workers and for the broader U.S. economy.

\* \* \*

Accordingly, for all the reasons stated above, Bombardier and CSALP respectfully urge the Commission to issue a negative threat determination and bring this case to a close.

Dated: December 27, 2017

Respectfully submitted,

/s/ Shara L. Aranoff

Shara L. Aranoff

Peter Lichtenbaum

Maureen F. Browne

James M. Smith

Isaac Belfer

Sooan (Vivian) Choi\*

COVINGTON & BURLING LLP

*Counsel for Bombardier Inc. and CSALP*

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<sup>75</sup> Tr. at 195 (Mr. Levesque).

\* Member of New York Bar. District of Columbia bar application pending; supervised by principals of the firm.

# Bombardier's Responses to Commission Questions

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## Bombardier's Responses to Commission Questions

### I. Questions Relating to Scope and Domestic Like Product

1. **Transcontinental Range: Commissioner Williamson (p. 76):** Okay, yeah, there are plenty of examples of people switching, moving up and all, but--and maybe this is post-hearing--I'm still trying to figure out why somebody wants a 100- 110-seat plane to fly transcontinental. I mean it seems like, you know, I'm so used to hearing about the hub-and-spoke system, but what's the evidence or examples of why that is an important consideration?

**Answer:** From the outset of this investigation, Respondents have observed that Boeing's scope limitation based on a range of 2,900 nautical miles makes no commercial sense and serves only one purpose: to erase Embraer from this investigation, despite its status as a supplier of non-subject imports that compete with the C Series.<sup>1</sup> At best, this was a ploy to make the 737 seem more competitive with the C Series than it actually is. But now we know Boeing had an additional motive. Boeing is pursuing an acquisition of Embraer, a longstanding partner of Boeing in the development of military cargo and other aircraft.<sup>2</sup> If Boeing could convince the Commission that Embraer's largest E-jets don't serve the same market segment as the C Series, despite their capacity to seat more than 100 passengers, E-jets would have free and clear access to potential U.S. purchasers of 100- to 150-seat LCA, while C Series imports from Canada would be subject to AD/CVD duties.

Boeing's Hearing presentation gave the impression that one of the requirements for aircraft serving the small end of the market for single-aisle LCA is transcontinental range. But it is not. Although Boeing has defined the scope to require a range of 2,900 nautical miles, this range far exceeds any route across the continental United States.<sup>3</sup> As Mr. Mitchell explained, "New York to Los Angeles is roughly about 2,200 nautical miles. And if you look at Washington, D.C., you can see there 2,550 nautical miles gets you anywhere you want in North America and beyond."<sup>4</sup> Embraer's E190 E2 and E195 E2 models have a maximum range of 2,850 and 2,600 nautical miles, respectively, which is more than adequate to fly so-called transcontinental routes.<sup>5</sup> Thus, even if the Commission were to accept Boeing's assertion that transcontinental range is important to this market segment, it would not support Boeing's proposed 2,900 nautical mile requirement.

Transcontinental range, though, is not relevant to this market segment. Mr. Mitchell explained that airlines interested in purchasing C Series aircraft "{v}ery rarely" ask for transcontinental

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<sup>1</sup> Conf. Tr. at 185 (Ms. Aranoff).

<sup>2</sup> Wall Street Journal, *Boeing Held Takeover Talks With Brazilian Aircraft Maker Embraer* (Dec. 21, 2017) (Ex. 1); Forbes, *A Boeing-Embraer Tie-Up is Hardly a Surprise, but it Sure Would Make Things Interesting* (Dec. 22, 2017) (noting that Boeing and Embraer "already cooperate extensively" on the KC-130 and "on a number of other projects, including the design of a new 150-to 175-seat commercial jet") (Ex. 2).

<sup>3</sup> Bombardier Hearing Slide, *CS100 Range Out of Washington DC and Atlanta* (Ex. 13).

<sup>4</sup> Tr. at 264 (Mr. Mitchell).

<sup>5</sup> "E190-E2 in detail" (Ex. 14); "E195-E2 in detail" (Ex. 15); Tr. at 265 (Mr. Mitchell).

range, and “the majority of the flights that they will fly with the C Series, and aircraft of its size, will be around 500 to 1,000 nautical miles, significantly below transcontinental.”<sup>6</sup>

Similarly, [ ] explained that [

[ ].<sup>7</sup> Indeed, even if the Commission credits Boeing’s assertion that certain routes are “right-sized” for 100- to 150-seat LCA (which it should not, as discussed below), it is notable that [

[ ].<sup>8</sup> Thus, transcontinental range, as well as the significantly greater range of 2,900 nmi, is simply not relevant to how airlines use C Series and similarly sized aircraft. Boeing’s proposed 2,900 nmi range is “completely artificial.”<sup>9</sup>

Why, then, did Boeing propose a range of 2,900 nmi? Because it gives Boeing a tactical advantage in this litigation. As explained at the Hearing and in Bombardier’s prehearing brief, Embraer E-Jets compete regularly with the C Series and were “the primary competition for the C Series in the sales campaigns at United and Delta.”<sup>10</sup> Embraer E-Jets, however, have a maximum range of 2,850 nmi.<sup>11</sup> Thus, defining the scope to require a range of 2,900 nmi “conveniently takes Embraer out of the picture”<sup>12</sup>—a tactic consistent with Boeing’s failure to even mention Embraer in its prehearing brief, despite the prominent role Embraer E-Jets played in both of the transactions at the center of this case. By strategically excluding non-subject Embraer E-Jets from the Commission’s import data, Boeing hopes to distort the conditions of competition in this market and convince the Commission that the C Series’ primary competitors are the 737-700 and MAX 7. The record unambiguously shows otherwise.

**2. Right-Sized Routes: Commissioner Broadbent (p. 221): Page 31 to 32 of its brief, Boeing provides a list of examples of routes that are rightsized in their paper “for 100 to 150-seat large civil aircraft.” Do you have any examples of airlines serving those routes with out of scope single aisle large aircraft?**

**Answer:** Because Boeing treated as proprietary the handful of routes it describes as “right-sized” for aircraft fitting the described scope, we could not provide the list to Bombardier for an

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<sup>6</sup> Tr. at 265 (Mr. Mitchell). Indeed, Boeing’s expert Professor Nickelsburg conceded that “the overwhelming number of the flights that one takes with the {MAX} 7 is going to be shorter than 2900 {nmi}.” Tr. at 146 (Commissioner Williamson, agreed to by Professor Nickelsburg). Although Professor Nickelsburg attempted to downplay his concession with a hypothetical example in which a MAX 7 would fly a transcontinental route followed by two shorter routes, he presented no evidence indicating that this example is typical of how airlines use the MAX 7, let alone C Series aircraft.

<sup>7</sup> [ ] U.S. Importer/Purchaser Questionnaire at II-9.

<sup>8</sup> Boeing Prehearing Brief at 32. Even [ ]—far shorter than the 2,900 nmi requirement proposed by Boeing.

<sup>9</sup> Tr. at 186 (Mr. Mitchell).

<sup>10</sup> *Id.*; see also [ ] U.S. Importer/Purchaser Questionnaire at II-10 (reporting that [ ]); Flight Ascend Expert Report at 37 (Att. A) (“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.”); AirInsight, “*Making Boeing Great Again*” (Nov. 30, 2017) (Ex. 16) (observing that “if Delta could not buy the C Series, they would almost certainly have chosen Embraer”).

<sup>11</sup> “E190-E2 in detail” (Ex. 14); “E195-E2 in detail” (Ex. 15); Tr. at 265 (Mr. Mitchell).

<sup>12</sup> Tr. at 186 (Mr. Mitchell).

assessment. Nonetheless, even a brief internet search of selected routes on Boeing's list immediately revealed that the use of out-of-scope aircraft is common. For example, [

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In any event, Boeing's suggestion that certain routes are "right-sized" for 100- to 150-seat LCA is disproven by its own brief, which concedes that "airlines constantly adjust the aircraft they use to fly particular routes (depending on the season, day of week, and time of day) in order to capture as much passenger demand as possible while maximizing revenue and minimizing operating costs."<sup>14</sup> Similarly, Mr. Esposito testified at the Hearing that Delta "almost always offer{s} service with a variety of aircraft types on the same route."<sup>15</sup>

Delta's slide presentation at the Hearing confirmed that almost all of Delta's routes served by aircraft meeting Boeing's domestic like product definition are also served by aircraft that do not meet that definition. In particular, of the 426 Delta routes on which Delta operated 100- to 150-seat LCA with a range of 2,900 nmi during 2016, 90% were also served by larger aircraft, and 66% were also served by smaller aircraft. Moreover, on 68.5% of those routes, Delta also operated 100- to 150-seat LCA that do not have a range of 2,900 nmi. Finally, only 6 of the 426 routes (i.e., 1%) were served exclusively by 100- to 150-seat LCA with a range of 2,900 nmi.<sup>16</sup> And of these 6 routes, "only three involve year-round service and one of those was recently cancelled."<sup>17</sup> Similarly, [ ] reported in its questionnaire response that, in 2016, it substituted 100- to 150-seat LCA with larger aircraft on [ ]% of routes and smaller aircraft on [ ]% of routes.<sup>18</sup> In sum, of the routes served by aircraft meeting Boeing's artificial like product definition, the overwhelming majority were also served by aircraft that do not meet that definition.

- 3. Partially Assembled Aircraft: Commissioner Williamson (pp. 167-68): In regard to the thing you raised earlier and Chairman Schmidlein raised about the scope and what it is, I was wondering if post-hearing you could take a look at footnote -- I'm sorry 37 on page 17 of Bombardier's brief and if maybe they've got it wrong or something, or just -- so if there's any clarification you think needs to be.***

**Answer:** We appreciate the opportunity to clear up any confusion regarding footnote 37 to the Bombardier prehearing brief. The scope in this investigation includes aircraft and "partially assembled" aircraft. As we advised the Department of Commerce ("Commerce"), LCA that are

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<sup>13</sup> See Out-of-Scope Aircraft on "Right-Sized" Routes (Ex. 17).

<sup>14</sup> Boeing Prehearing Brief at 31.

<sup>15</sup> Tr. at 205 (Mr. Esposito).

<sup>16</sup> Delta Hearing Presentation (Ex. 18); see also Delta U.S. Importer/Purchaser Questionnaire at III-16.

<sup>17</sup> Tr. at 206 (Mr. Esposito).

<sup>18</sup> [ ] U.S. Importer/Purchaser Questionnaire at III-16.

“partially assembled” reasonably refers to aircraft that, although operational, are not yet certified for flight and lack certain finishes (e.g., seating, steering, trimmings, etc.).<sup>19</sup>

Boeing’s petition is focused on imports of aircraft from Canada. Boeing cited to the HTSUS codes that cover aircraft in its Petition, as opposed to the separate HTSUS code that captures LCA parts.<sup>20</sup> 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 from Canada for U.S. assembly as within-scope “partially assembled” products, arguing that establishing a final assembly line in the United States constitutes a form of circumvention.<sup>21</sup> In response to this new stance by Boeing, Bombardier requested in its November 17, 2017, submission to Commerce that the Department reject the belated attempt of Boeing to expand the scope. In its final determination, Commerce declined to perform any analysis of scope or circumvention thereof with respect to aircraft subassemblies or parts.<sup>22</sup>

Simply put, “parts” are not “aircraft.” For the Commission at this stage to interpret the scope to include parts (after Commerce declined to do so) would cause any injury determination to be invalid, as it would not be based on the correct domestic industry (*i.e.*, domestic aircraft producers as well as domestic producers of sections, components, and parts). Here, where there has been no record developed pertaining to parts, the Commission should not accept Boeing’s suggestion that it can base a finding of imminent threat on imports of parts for U.S. assembly.

4. ***Expanded Like Product and Attenuated Competition with Subject Imports: Chairman Schmidlein*** (p. 230): **Well, no, but you’re making the argument that not only is that the like product, but that we should expand the product beyond the scope, which I have a question about that. How many cases do we actually take a like product and sweep in more products than what is in the scope? I’m trying to think of some and it’s unusual.**

**Answer:** The Commission has a long history of expanding like product beyond the scope, both in cases involving a “continuum” of products and in cases involving a few discrete products. A

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<sup>19</sup> See, e.g., *Improved Flammability Standards for Thermal/Acoustic Insulation Materials Used in Transport Category Airplanes*, 68 Fed. Reg. 45,046, 45,055 (July 31, 2003) (Final Rule) (explaining that although an aircraft may be capable of safe flight, that is “not necessarily the date on which the airplane is in conformity with the approved type design, or the date on which a certificate of airworthiness is issued, since some items not relevant to safe flight, such as passenger seats, may not be installed at that time”).

<sup>20</sup> HTSUS subheading 8802.40.00.40 covers “Airplanes and other aircraft, of an unladen weight exceeding 15,000 kg; New; Other; Passenger transports” and subheading 8802.40.00.90 covers “Airplanes and other aircraft, of an unladen weight exceeding 15,000 kg; Used or Rebuilt; Other aircraft.”

<sup>21</sup> See Boeing, Brief on the Announced Airbus-Bombardier C-Series Partnership (Nov. 13, 2017), at 9-12 (Ex. 19); Bombardier, Rebuttal Brief on the Proposed Transaction (Nov. 17, 2017) (Ex. 20).

<sup>22</sup> See Antidumping Issues and Decision Memo at 43 (Dec. 18, 2017) (Ex. 36) (“{T}he Department does not find it appropriate to make a scope or circumvention determination about whether activity conducted pursuant to the planned partnership, which has yet to be finalized, may render merchandise outside the scope of an order, should this investigation result in an order.”); Countervailing Duty Issues and Decision Memorandum at 87 (Dec. 18, 2017) (Ex. 37) (same).

decision to define a single domestic like product including similar articles that span a range of sizes, qualities, or other features does not preclude the Commission from finding attenuated competition between the domestic like product and subject imports. The like product factors—several of which are unrelated to competition—define the domestic industry as to which injury or threat must be considered. Attenuated competition, by contrast, addresses causation, and specifically whether reduced sales of the domestic product are attributable to imports.

In the like product analysis, step one is to identify the subject imports, then find the domestic product that is either “like” or “most similar in characteristics and uses.”<sup>23</sup> In this case, the subject imports are the CS100 and CS300, but no domestic product qualifies as “like” the C Series. Boeing’s offerings in the 100- to 150-seat segment are all larger, derivative designs with worse operating costs than the smaller, more efficient, clean sheet C Series design. The domestic products “most similar” to the C Series are the 737-700 and MAX 7, even though competition between them and the C Series is attenuated.

Step two is to determine if there is any clear dividing line between the domestic LCA described by the scope and larger single-aisle LCA outside the scope. The Commission may expand the like product beyond the scope when there is no clear dividing line between within-scope and out-of-scope domestic products.<sup>24</sup> As Commissioner Schmidlein noted at the Hearing, Tr. at 88-89, a series of recent ITC determinations involving washing machines is instructive. In two early cases, the Commission expanded the domestic like product to include (i) smaller top-load agitator washers<sup>25</sup> and (ii) front-load washers with a dated belt drive mechanism,<sup>26</sup> both of which fell outside the described scope. Then, in a recent safeguard determination, the Commission declined to define as a distinct like product high-end, dual-chamber models capable of washing two loads independently at once.<sup>27</sup> The products deemed like thus covered a wide range of washer designs and types, varying dramatically in technology and price, with at best attenuated competition between low-end agitator models and high-efficiency dual-chamber washers.

Many such cases involve a continuum of products that vary incrementally in size, quality, or grade, but others involve small numbers of discrete products within and beyond the scope. *See, e.g., Certain Iron Mech. Transfer Drive Components from Canada & China*, Inv. No. 701-TA-550 (Final), USITC Pub. 4652 at 48 (Dec. 2016) (“the record does not support TBW’s assertion that a clear line divides small-diameter IMTDCs from the large-diameter IMTDCs that correspond to the scope of these investigations” where “producers and customers do not differentiate among IMTDCs based on a four-inch diameter dividing line”); *Certain Lined Paper Sch. Supplies from China, India, & Indonesia*, Inv. Nos. 701-TA-442-43 and 731-TA-1095-97

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<sup>23</sup> 19 U.S.C. § 1677(10).

<sup>24</sup> *See Hosiden Corp. v. Advanced Display Mfrs. of Am.*, 85 F.3d 1561, 1564 (Fed. Cir. 1996) (“The Commission may find a domestic like product to be broader than the class or kind of imported merchandise described by Commerce . . .”).

<sup>25</sup> *See Certain Large Residential Washers from Korea and Mexico*, Inv. Nos. 701-TA-488 and 731-TA-1199-1200 (Final), USITC Pub. 4378 at 8-11 (Feb. 2013).

<sup>26</sup> *See Large Residential Washers from China*, Inv. No. 731-TA-1306 (Preliminary), USITC Pub. 4591 at 9 (Feb. 2016) (including in the like product “low tech front load washers that are specifically excluded from the scope”); *Large Residential Washers from China*, Inv. No. 731-TA-1306 (Final), USITC Pub. 4666 at 7 (Jan. 2017).

<sup>27</sup> *See Large Residential Washers*, Inv. No. TA-201-076, USITC Pub. 4745 at 13-15 (Dec. 2017).

(Final), USITC Pub. 3884 at 11 (Sept. 2006) (finding a continuum of sizes and shapes of lined paper products where “the differences between LPP and outsized lined paper products (such as price and practical interchangeability) also exist among the products within LPP and outsized lined paper products, respectively”); *Refined Brown Aluminum Oxide from China*, Inv. No. 731-TA-1022 (Final), USITC Pub. 3643 at 5 (Nov. 2003) (finding no clear dividing line between screened and sorted product on either side of the 3/8 inch size parameter in the scope); *Certain Wax & Wax/Resin Thermal Transfer Ribbons from France, Japan, & Korea*, Inv. No. 731-TA-1039 (Preliminary, Revised Issue), USITC Pub. 3613 at 8 (July 2003) (expanding like product beyond scope to include finished fax TTR, a discrete product, where “many of the differences between finished fax TTR and certain TTR (such as customer perceptions and practical interchangeability) also exist between types of certain TTR”); *Pure Magnesium from China & Israel*, Inv. No. 701-TA-403 (Final), USITC Pub. 3467 at 8 (Nov. 2001) (expanding like product to include magnesium ingot as well as granular magnesium where both were produced in a continuum of forms and sizes); *PET Film, Sheet & Strip from Japan & Korea*, Inv. No. 731-TA-458 & 459 (Final), USITC Pub. 2383 at 5 (May 1991) (expanding like product to include certain coated PET film products because “all customers perceive a myriad of PET film like products while the majority of U.S. producers view all PET film . . . as a *continuous* product”).

The hallmark of a like product continuum is that it includes products—particularly at the high and low ends of the product spectrum—that do not compete or serve precisely the same end uses. For example, in *Iron Mechanical Transfer Drive Components*, the Commission found that “it is not unexpected that prices differ for small- and large-diameter IMTDCs or that small- and large-diameter IMTDCs are not interchangeable.”<sup>28</sup> Similarly, in *Refined Brown Aluminum Oxide*, the Commission observed that “a lack of direct interchangeability does not distinguish crushed, screened, and sorted BAO particles with a diameter in excess of 3/8 inch from smaller particles along the *continuum* of refined BAO.”<sup>29</sup> Such products will frequently sell at meaningfully different prices, due to differences in size, weight, quality, or other features.<sup>30</sup>

These same product differences that characterize a continuum of domestic products can point to attenuated competition between subject imports and the domestic like product. In the case of single-aisle LCA, the members of the 737 MAX family are “one airplane in four sizes,” but all four of those models are not competitive alternatives to each other from the perspective of a customer with a specific fleet need. Given the differences in seat costs, a customer that wants a 138-seat aircraft will not view a 180-seat aircraft as competitive for that mission. This distinction is even more clear when comparing the CS100s sold to Delta and offered to United with any of Boeing’s 737 offerings. The single-aisle LCA market offers a relatively small number of choices. For that reason, a customer looking to purchase a single-aisle aircraft may start out looking at a range of choices, possibly including products from all four OEMs. Tr. at 236 (Mr. Mitchell). Once the customer defines the mission and starts evaluating aircraft economics to narrow down the options, however, the less competitive models will be dropped

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<sup>28</sup> *Certain Iron Mech. Transfer Drive Components from Canada and China*, Inv. No. 701-TA-550 (Preliminary), USITC Pub. 4857 at 11 (Dec. 2015).

<sup>29</sup> *Refined Brown Aluminum Oxide*, USITC Pub. 3643 at 5.

<sup>30</sup> *Iron Mech. Transfer Drive Components*, USITC Pub. 4857 at 11 (“It is not unexpected that prices differ for small- and large-diameter IMTDCs or that small- and large-diameter IMTDCs are not interchangeable.”).

from the running.<sup>31</sup> Customers seeking aircraft in the lower end of the single-aisle aircraft market, such as Delta in its recent sales campaign, will at this point be comparing Bombardier C Series, Embraer E-Jets, and perhaps older out-of-production aircraft in this size range like the 737-717.<sup>32</sup>

For these reasons, it would be fully consistent for the Commission to find that the 737 family of products is a single domestic like product, but that there is attenuated competition between the C Series (particularly the CS100 and CS100 Lite offered to Delta and United) and the domestic like product.

**5. Design of the MAX Family: Supplemental Question from Commission for Boeing (No. 3): Why did Boeing increase the seating capacity from the 126 seats in the 737-700 to 138 seats in the MAX 7?**

In its original iteration, as revealed in August 2011, the MAX 7 was to have 126 seats, the same as the 737-700. But in July 2016, Boeing announced that it was redesigning the MAX 7 to have 138 seats, adding two rows of passengers to the design. To accomplish this increase in seating capacity, which raised the maximum takeoff weight by 10 tons, Boeing also had to incorporate into the revamped MAX 7 the “thicker gauge” wing and “stronger landing gear” of the MAX 8, reducing the already minor differences between the two models.<sup>33</sup>

This redesign of the MAX 7, which brought it closer in design and structure to the MAX 8, was reportedly undertaken in response to customer interest in “a bigger airplane.”<sup>34</sup> In reality, the changes to the MAX 7 reflected the poor operating economics of the original MAX 7 design, as the MAX 7 is a derivative, shrunken design of a larger, more efficient aircraft.<sup>35</sup> By enlarging the MAX 7 to make it somewhat closer to the optimized MAX 8, Boeing sought to diminish (though it could not eliminate) the intrinsic disadvantages of the inefficient MAX 7 design.

As explained at the Hearing, Boeing’s Vice President of Marketing also stated publicly that the seat counts of the MAX 7 and MAX 8 helped “bracket” the Airbus A320, Boeing’s principal competition in the single-aisle market.<sup>36</sup> This move had the corollary effect of further attenuating any competition between the C Series and the enlarged MAX 7.

## **II. Questions Relating to Conditions of Competition**

**6. Price Transmission: Vice Chairman Johanson (p. 130): And continuing with the issue of price transmission, could you all please comment on the Government of Canada’s confidential discussion of price transmission at pages 44 to 45 of its brief? It may be interesting to join this discussion with a comparison of the material at page 101 of your own brief, which is also**

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<sup>31</sup> Tr. at 236 (Mr. Mitchell).

<sup>32</sup> Tr. at 196 (Mr. May).

<sup>33</sup> See Flight Ascend Expert Report at 10-11 (Att. A).

<sup>34</sup> *Id.* (Att. A).

<sup>35</sup> Tr. at 209-10 (Mr. Dimitroff).

<sup>36</sup> Tr. at 186 (Mr. Mitchell).

**confidential. I assume that you will want to address this in your post-hearing brief, as opposed to in this public hearing, of course.**

- 7. Price Transmission: Chairman Schmidlein (p. 162): Okay. If you could put on the record, and maybe you already have and I just haven't, I'm not recalling it, evidence of where other airlines are using that {Delta} sale. I know I recall in your brief there's some. But if you have it already, if you could put that on the record.**

**Answer:** Aircraft manufacturers and their customers bargain over prices, and it is routine for airlines to ask for lower prices in any purchasing negotiation.<sup>37</sup> At best, word-of-mouth information on prior sales pricing would [

] for purchasing aircraft,<sup>38</sup> rather than leading purchasers to expect the same pricing for future sales.<sup>39</sup> At the Hearing, Respondents' panel dismissed Boeing's claims regarding price transmission, stating that they may hear rumors about prices paid for various aircraft, but that such rumors are not a basis for realistic demands from other airlines that such prices be met.<sup>40</sup>

Boeing presents [ ] and [ ] as evidence that airlines know the price Delta agreed to pay Bombardier for CS100s ("the Delta price") and are able to use that knowledge to obtain price concessions from Boeing.<sup>41</sup> However, neither of the conclusions Boeing draws from these statements is consistent with the purchasers' respective questionnaire responses. Interestingly, these airlines are [ ].<sup>42</sup>

Boeing claims that [ ]<sup>43</sup> In its questionnaire response, however, [ ].<sup>44</sup> Boeing also claims that [ ] without offering any explanation to link the two events.<sup>45</sup> Meanwhile, when asked about [ ] in its questionnaire response, [ ]

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<sup>37</sup> Tr. at 284 (Mr. Mitchell).

<sup>38</sup> [ ] U.S. Importer/Purchaser Questionnaire at III-5.

<sup>39</sup> Tr. at 284 (Mr. Mitchell).

<sup>40</sup> See, e.g., Tr. at 239-240 (Mr. May).

<sup>41</sup> Boeing Prehearing Brief at 101-102, Exhibits 2-3.

<sup>42</sup> [ ] U.S. Importer/Purchaser Questionnaire at III-2a, III-4b, III-6, III-13a (stating that [ ]); [ ]

<sup>43</sup> Boeing Prehearing Brief at 101.

<sup>44</sup> [ ] U.S. Importer/Purchaser Questionnaire at III-5a.

<sup>45</sup> Boeing Prehearing Brief at 101.

].<sup>46</sup>

Boeing also claims that [

].<sup>47</sup> Yet, in one of its few responses to the

questionnaire, [

].<sup>48</sup> The affidavit further

stated that [

],<sup>49</sup> but its

questionnaire response said that [

].<sup>50</sup> While these contradictory statements

fail to advance Boeing's argument that meaningful price transmission occurs, it is worth noting

that [

].<sup>51</sup>

8. **Conversion and Deferral: Commissioner Williamson (p. 110):** Okay. I was gonna say, post hearing, if you have any data readily available or something that you can substantiate -- 95%, 80% of the orders are {executed as} originally ordered, but it'd be helpful. I'm not asking you to create anything special, but if there's something that's ... available, that might be -- ... that would go to this point.

**Answer:** As noted in the Flight Ascend report, as of 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. The data regarding which MAX variant has been selected is more difficult to determine from official Boeing data than on the previous 737NG program because Boeing no longer publishes official order data broken down by variant.<sup>52</sup> 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 convert the order to a different MAX variant up until they make a final selection 18- to 24 months before scheduled delivery. However, the net effect is to make it nearly impossible to precisely determine conversion rates for the MAX series.

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<sup>46</sup> [ ] U.S. Importer/Purchaser Questionnaire at III-9a, III-9c ([

]. *Id.* at III-12).

<sup>47</sup> Boeing Prehearing Brief at 102.

<sup>48</sup> [ ] U.S. Importer/Purchaser Questionnaire at III-5a.

<sup>49</sup> Boeing Prehearing Brief at Exhibit 3.

<sup>50</sup> [ ] U.S. Importer/Purchaser Questionnaire at III-2d.

<sup>51</sup> Government of Canada Prehearing Brief at 45.

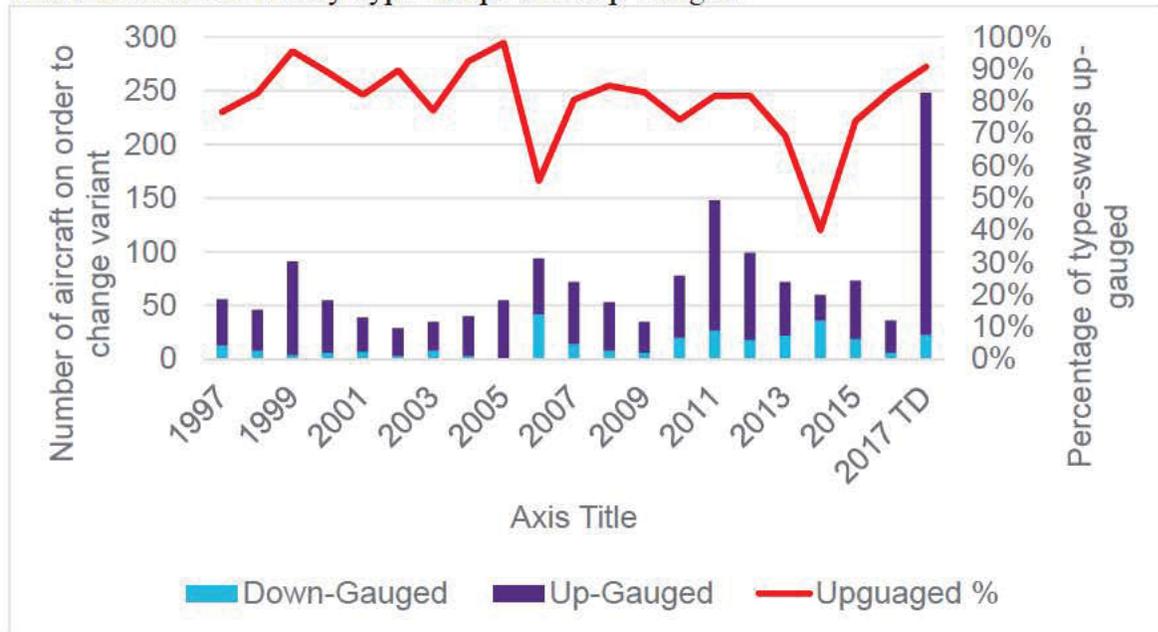
<sup>52</sup> Flight Ascend Expert Report at 21 (Att. A).

Nonetheless, the record is notable with respect to Boeing’s experience with conversion from 100- to 150-seat LCA to other planes. Boeing’s U.S. Producer questionnaire cites [ ] conversions of 100- to 150-seat LCA to [ ] and [ ] conversions from [ ] to 100- to 150-seat LCA.<sup>53</sup> Those total reported conversions in fact [ ] of 100- to 150-seat LCA from 2014 through 2022.<sup>54</sup>

9. ***Conversion and Deferral: Commissioner Williamson*** (p. 254): I asked this from Boeing this morning about how often do airlines really change the original order. I mean it happens frequently, but I’m not sure what percentage of {...}; (p. 255) is there sort of some cutoff period when you don’t do this, or are you -- it’s more difficult to do that?

**Answer:** Please see below a chart of Boeing 737 order up-gauging and down-gauging. The 737-700 entered service in 1997. The chart includes changes from NG to MAX and indicates that 81% of 737 Family type<sup>55</sup> swaps were up-gauged.

Chart: 81% of 737 Family Type-Swaps were Up-Gauged



Source: *Flight Fleets Analyzer* as at 21<sup>st</sup> December 2017. 737 Family includes Classics, NG and MAX

The bars show the total number of aircraft on order that were up-gauged (purple) and down-gauged (blue)—the count is on the left-hand axis. The red line shows the percentage of aircraft that were up-gauged, on the right-hand axis. The data demonstrate that, over time, 80% of orders to Boeing that were changed were up-gauged.

<sup>53</sup> See Boeing U.S. Producer Questionnaire at IV-11b.

<sup>54</sup> Boeing U.S. Producer Questionnaire at II-3a and II-13.

<sup>55</sup> “Family type swap” refers to swaps within and among any of the 737 Classic, NG and/or MAX variants.

In contrast, Bombardier is in discussions with [ ] regarding the [ ]<sup>56</sup> In 2010, [ ] aircraft. These aircraft were originally intended for delivery [ ]<sup>57</sup> Due to [ ]

].<sup>58</sup>

Because of the long lead times required by suppliers, LCA orders generally must be placed a minimum of 18-24 months before delivery.<sup>59</sup> For orders placed further in advance, there is a “cut off” about 18-24 months before the scheduled delivery date. Until the 18-24 month cutoff, manufacturers and purchasers are free to alter terms of their agreement, including which aircraft will be purchased.

**10. Launch Pricing: Vice Chairman Johanson (p. 138): I wanted to remind you to look at page 63 of their brief. And Bombardier does contend that the 787 was sold below cost of production, at least in some instances. And I don't mean to denigrate the 787. I've never even been on one. But this is just something that they raised.**

**Answer:** Bombardier referred to 787 prices as evidence that Boeing has offered launch prices in the past, particularly with its most recent clean sheet design. As illustrated in the chart below, prices for the 787 demonstrate that, contrary to Boeing's “price transmission” theory, launch prices do not permanently establish market prices at lower levels. Airlines understand that launch customers obtain more favorable pricing because they share into the risk of the program with the manufacturer. Thus, after a new aircraft establishes itself in the market and enters into service, the manufacturer is able to increase prices. In the chart below, Flight Ascend estimated the prices that Boeing obtained for its 787-8 model since its entry into service in 2011. The upward trend since the aircraft entered into service—and more reliable data on its performance became available—is clear.

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<sup>56</sup> See Statement of Ross Mitchell (Att. E).

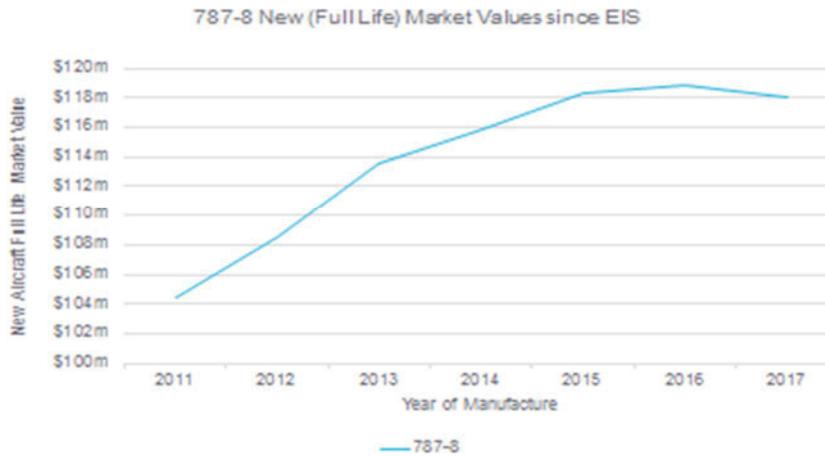
<sup>57</sup> *Id.*

<sup>58</sup> *Id.*

<sup>59</sup> Prelim. Det. (APO Version) at 37 (citing Boeing Post-Conference Brief at 19; Bombardier Post-Conference brief at 42). This is consistent with [ ] U.S. Importer/Purchaser Questionnaire at III-2c, that [ ]

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## 787-8 new price increased steadily after EIS



FlightAscend  
Consultancy

flightglobal.com/consultancy 7

Contrary to what Boeing's price transmission theory would suggest, therefore, initial launch prices for the 787 did not undermine Boeing's ability to obtain higher prices for the aircraft once it entered into service and performance data became available.<sup>60</sup> Boeing is simply incorrect that other customers would expect launch prices to continue even after an aircraft had entered into routine service and its reliability was established.

11. **Launch Pricing: Commissioner Williamson** (pp. 138-39): Continuing along that line, I guess they said they were going to announce the C Series in 2008, and didn't get certified until 2015. Was that an unusually long period of time? Or is that kind of normal? And the reason I'm asking that is, did that have any effect on what one might call the marquee pricing, the fact that it took that length of time it took before it got certified {and there was greater uncertainty}? / {agreeing with statement by Mr. Novick that "Let us provide you information on the time between launch and first delivery or certification in the post-hearing brief."}

**Answer:** Bombardier began to explore entering the market around 2004; completed its first C Series design in 2006; substantially revised the design in 2008; and secured its first C Series order (which was from a non-U.S. customer) in 2009.<sup>61</sup> Contrary to what Boeing suggested at

<sup>60</sup> See also Mitchell Hearing Slide 9, *Boeing 787 Family Prices Rose As Risks Decreased* (Ex. 21) (depicting the same phenomenon in a different chart, reproduced from Leeham News, *How Boeing Pays Back the 787 Debts*, attached as Exhibit 35 to Bombardier's Prehearing Brief).

<sup>61</sup> Bombardier Prehearing Brief at 45.

the Hearing, the C Series had not been FAA-certified prior to the Delta sale. The timeline below clarifies when certification occurred relative to the Delta sale.<sup>62</sup>

Dec 2015: CS100 receives certification from Transport Canada  
Apr 2016: Delta agrees to purchase CS100s  
June 2016: CS100 receives certification from the European Aviation Safety Agency  
June 2016: CS100 receives certification from the Federal Aviation Administration (FAA)  
July 2016: C Series first enters into service at SWISS

Thus, when Delta agreed to buy the CS100, the aircraft had not been certified by the FAA and had not entered into service anywhere.<sup>63</sup> FAA certification is, of course, a required precursor to operation of the aircraft in the United States.<sup>64</sup> Thus, even if the Commission accepts Boeing's claim that the program risk is gone once an aircraft is certified,<sup>65</sup> that risk was still present at the time of the Delta sale.

However, industry experts do not agree with Boeing that launch risk disappears at the time of certification or even at the time an aircraft first enters into service. Boeing itself continued to offer launch pricing on the 787 even after entry into service, in order to counteract customer risk resulting from poor initial reliability and performance data,<sup>66</sup> as many early 787s were grounded for three months while Boeing resolved the lithium ion battery fires that disrupted one flight and left one aircraft smoking at the gate.<sup>67</sup>

At the staff conference, Boeing suggested that the time period between the announced launch of the C Series in 2004 and the Delta sale in 2016 was too long to qualify the Delta sale as "launch pricing."<sup>68</sup> At the Hearing, however, Boeing's economist confirmed that "launch... can be eight years before the plane is actually delivered"<sup>69</sup> and that "{i}t does take a number of years to go from launch to certification" for a clean-sheet airplane.<sup>70</sup> Boeing's counsel also tried to argue that launch pricing should not have been necessary for the Delta sale because Bombardier had already made a launch sale to Lufthansa (for SWISS) and the Delta sale was close in time to (albeit before) the first delivery to SWISS.<sup>71</sup> However, as Boeing's expert witness made clear, launch pricing is expected in the market for new large civil aircraft when a customer is taking considerable program risk, and he admitted that such risk persists at least until an aircraft is

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<sup>62</sup> See Bombardier Prehearing Brief at 90; Bombardier CS100 Gets EASA, FAA Certification (Jun. 17, 2016) (**Ex. 22**); FAA Validates Bombardier CS300 (Dec. 20, 2016) (**Ex. 23**).

<sup>63</sup> Tr. at 188 (Mr. Mitchell).

<sup>64</sup> Bombardier CS100 Gets EASA, FAA Certification (**Ex. 22**).

<sup>65</sup> Tr. at 134 (Mr. Nickelsburg).

<sup>66</sup> Tr. at 214 (Mr. Dimitroff).

<sup>67</sup> The Verge, *Is the Dreamliner a Lemon?* (Jan. 17, 2013) (**Ex. 24**); Federal Aviation Administration, Press Release - FAA Approves Boeing 787 Battery System Design Changes (Apr. 19, 2013) (**Ex. 25**).

<sup>68</sup> Conf. Tr. at 19 (Mr. Novick).

<sup>69</sup> Tr. at 136 (Mr. Anderson).

<sup>70</sup> Tr. at 139-140 (Mr. Anderson).

<sup>71</sup> Tr. at 135-136 (Mr. McLain).

certified and enters into service.<sup>72</sup> In fact, the risk that warrants launch pricing does not disappear until the aircraft has sufficient experience in service to demonstrate its performance and reliability, as exemplified by the early performance problems of Boeing's 787.<sup>73</sup> In any case, it should be undisputable that the Delta sale, which occurred prior to FAA certification or entry into service of the CS100, warranted launch pricing based on industry practice.

**12. Attenuated Competition: Commissioner Broadbent (p. 226): I think I heard in the opening presentation that the customer experience in the C-100 is 20 percent better. How do you measure that?**

**13. Attenuated Competition: Vice Chairman Johanson (pp. 279-80): (agreeing with statement by Mr. Mitchell that “certainly I think we can demonstrate to the views of our customers in the postconference brief and what they think, and how the airplane is performing in service, and you will see this for yourself”)**

**Answer:** The first C Series aircraft that entered into service were sold to Lufthansa Group for use by its subsidiary SWISS. The SWISS order included 10 CS100 and 20 CS300, and SWISS began operating the C Series aircraft in 2016.<sup>74</sup> SWISS reported that the entry into service was “‘perfect,’ with the CS100 becoming an instant hit with passengers, mainly due to its spacious cabin.”<sup>75</sup> According to *Business Traveller*, SWISS said the new aircraft was more comfortable for passengers with a roomier cabin than the Avro RJ100 it was replacing. “The aircraft has 25 percent more hand baggage storage, with upward closing bins for greater space, larger windows positioned more closely together, lower noise levels and consequently better cabin ambience and thinner seats which the airline says are more comfortable.”<sup>76</sup>

A customer survey conducted among [

] <sup>77</sup>

AirBaltic of Latvia, the first airline to operate the CS300, similarly reported that the aircraft has “performed beyond the company’s expectations, delivering better overall performance, fuel efficiency and convenience for both staff and the passengers.”<sup>78</sup> Commenting on the CS300, airBaltic CEO Martin Gauss said, “The smooth operational performance is complimented {sic} by a lot of positive feedback that we receive from our customers about the improved flying

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<sup>72</sup> Tr. at 133 (Mr. Nickelsburg).

<sup>73</sup> *Is the Dreamliner a Lemon?* (Ex. 24).

<sup>74</sup> SWISS, *C Series: European flights redefined*, <https://www.swiss.com/us/EN/various/cseries>, last visited December 23, 2017 (Ex. 26).

<sup>75</sup> The Points Guy, *A Look Inside the Swiss Bombardier CS100, the Newest Jetliner* (Oct. 5, 2017) (Ex. 27).

<sup>76</sup> *Business Traveller*, *Swiss debuts Bombardier CS100 into London City Airport* (Aug. 8, 2017) (Ex. 28).

<sup>77</sup> The survey results were provided to Bombardier by [

]. See (Ex. 9).

<sup>78</sup> *Traveller*, *Bombardier C Series: The ultra-comfortable plane that airlines don’t think you want* (Oct. 5, 2017) (Ex. 29).

experience with the new Bombardier CS300 aircraft.”<sup>79</sup> [

]

[ ] further stated that [

] <sup>80</sup>

**14. Attenuated Competition: Commissioner Williamson (p. 288): I was interested in that chart that Delta had, showing the, I guess it was the cost of the CS100 compared to the other airline. And I noticed there has been very little talk about the weight of the different planes. And I guess, which translate also into fuel efficiency, but I know engines are a factor. So the question I’m asking is, is it possible, and I guess petitioners to comment on this, to get an impression of where the CS100 and 300 fit with basis to 737-700? In terms of relative cost -- the things that are important to the airline when they decide to {purchase an aircraft}.**

**Answer:** Data provided by Flight Ascend show that aircraft weight is one of the key factors that make the C Series aircraft more economically efficient, and therefore attractive, than Boeing’s 737-700 and MAX 7.

As described in the Flight Ascend Report and provided in the chart below, the MAX 7 is a much heavier aircraft with a maximum takeoff weight (MTOW) of 172,000 lb compared to CS100’s 134,000 lb and CS300’s 149,000 lb.<sup>81</sup> Operating empty weight (OEW) usually expresses the efficiency of a design, especially when expressed in terms of OEW per seat. Generally, larger aircraft have more seats and therefore better OEW per seat economics. However, the fact that the MAX 7 has more seats than the C Series does not make it a more efficient aircraft. Although the MAX 7’s OEW/seat of 674 is slightly lower than the far smaller CS100’s score of 718, the MAX 7’s OEW/seat is *higher* than the smaller CS300’s score of 629. Moreover, the MAX 7’s cash operating costs (or trip costs) are 19.6% higher than the CS100, and 11.7% higher than the CS300. The MAX 8’s MTOW of 181,200 is only 2.3% greater than the MAX 7’s MTOW of 177,000, while the MAX 7’s MTOW is 18.8% greater than the CS300’s and 32% greater than the CS100’s.

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<sup>79</sup> Air Baltic Press Release, *airBaltic CS300 operation performance exceeding expectations* (Jan. 1, 2017) (Ex. 30).

<sup>80</sup> Statement of [ ] (Att. F).

<sup>81</sup> For this response, we are using information provided by Flight Ascend, which is more recent than the weight data Mr. Mitchell referred to in response to Commissioner Williamson’s question. Flight Ascend receives its data from manufacturers as part of annual appraisal briefings and uses its own models to estimate competitive operating costs, as described more fully in Flight Ascend Expert Report at 7, 16 (Att. A).

<b>Weight Comparison of the C Series and 737-700/MAX 7</b>					
<b>Aircraft</b>	<b>Seats (2 class, standard)</b>	<b>MTOW (lb)</b>	<b>OEW (lb)</b>	<b>OEW/Seat</b>	<b>Block Hour COC (Trip Cost)</b>
<b>Bombardier CS100</b>	108	134,000	77,650	718	Benchmark
<b>Bombardier CS300</b>	130	149,000	81,750	629	+7.1%
<b>Boeing 737-700</b>	128	154,500	83,000	648	+18.6%
<b>Boeing 737 MAX 7</b>	138	177,000	93,000*	674	+19.6%

*Note: MTOW:* maximum takeoff weight;  
*OEM:* Operating Empty Weight;  
 \* Estimated  
*Source:* Flight Ascend Report, at 11, 16

High operating costs on a per seat basis are a key reason the 737 MAX 7 (and its predecessor, the 737-700) is not a good solution for operators seeking a small single-aisle LCA. Expert and customer testimony demonstrate that the lack of sales Boeing has experienced for the MAX 7 predates the advent of the C Series and is directly related to the inherent limitations in its 50-year-old design that make it unappealing to customers except in very limited circumstances.<sup>82</sup>

**15. Ability to Increase Domestic Supply: Supplemental Question from Commission for Boeing (No. 4): Regarding the skyline data that Boeing provided in spreadsheet form as a supplement to its producer questionnaire response, please explain why the production projections vary by month, as well as how those variations relate to your firm’s total production capacity for both 100- to 150-seat LCA and other single aisle LCA. Please also provide a detailed explanation of how Boeing would increase its capacity should more orders for 100- to 150-seat LCA be added to this skyline.**

<sup>82</sup> Flight Ascend Expert Report at 13 (Att. A); Tr. at 217 (Mr. Dimitroff), 290 (Mr. Esposito) (referring to the 737 MAX 7: “we bought them for very specific mission reasons, for hot and high type airports. And that’s why we would never purchase any {}more than what we have today, because of the cost profile of that airplane.”).

Boeing's huge backlog of orders for single-aisle LCA in the 737 family means that their skyline at Renton is full for the next several years, as Boeing executives have publicly acknowledged.<sup>83</sup> At the Hearing, Boeing nonetheless insisted that by modifying the production rate of its existing lines, it can effectively increase its production capacity to allow for new MAX 7 orders, if such demand were suddenly to materialize for the first time since 2013.<sup>84</sup>

Indeed, Boeing does plan increases in its monthly production rate over the next few years, from 47 currently to "52 in 2018 and 57 in 2019."<sup>85</sup> These changes, however, are *already* planned, precisely because Boeing at present has such a sizable backlog for single-aisle LCA. The changes, moreover, are modest in magnitude when compared to the aggregate existing backlog—not to mention the prospect of any significant future orders.

Boeing has not indicated that it would expand its physical production capacity. The changes being considered relate to increasing the rate of production on existing lines. Mr. McAllister indicated that these are modest, incremental changes pursued daily.<sup>86</sup> Moreover, at the Hearing, Mr. McAllister indicated only that if new orders were placed, it would be "within the capability of Boeing, and specifically our Renton facility, *to go look at further increases in rate* should the demand materialize."<sup>87</sup> Along the same lines, Mr. McAllister added that if "Max 7 competitions emerge, we will of course *look at opportunities* to grow rate beyond where we are today."<sup>88</sup> These hedged statements regarding future assessments fall well short of a clear statement of ability to increase capacity. And if further increases in work rate beyond those already planned are *not* feasible during the imminent future, the only way Boeing could possibly accommodate new orders for the MAX 7 would be to renegotiate delivery dates with existing purchasers in an attempt to open space in the skyline. Such changes, of course, could draw sharp objections from customers, requiring Boeing to pay compensation for deferrals, and may also be against Boeing's financial interest in producing larger, more expensive aircraft. Significant questions thus remain about Boeing's ability and incentives to meet any future orders for 100- to 150-seat LCA.

### III. Questions Regarding Conditions of Competition and Threat of Injury for An Expanded Domestic Industry

**16. Threat Analysis for Expanded Domestic Industry: Commissioner Broadbent (p. 175): Please respond to Bombardier's arguments on page 37 to 40 within your post-hearing brief. These arguments concern whether the domestic industry producing all single aisle large civil aircraft are threatened with material injury.**

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<sup>83</sup> Tr. at 167 (Vice Chairman Johanson) (noting "oversold" remark by Boeing CEO on earnings call).

<sup>84</sup> Tr. at 173 (Mr. McAllister) (noting "change{s} to increase our rate" at Renton in 2017, 2018, and 2019).

<sup>85</sup> Tr. at 174 (Mr. Anderson).

<sup>86</sup> Tr. at 173-74 (Mr. McAllister) (emphasizing that "we wake up every day in that factory thinking about what we can do to take a few hours out to get more -- to get less flow days for an airplane, to be more efficient, so that we can increase the capacity in the Renton facility").

<sup>87</sup> Tr. at 167 (Mr. McAllister).

<sup>88</sup> *Id.*

**17. Conditions of Competition in Expanded Domestic Industry: Supplemental Question from Commission for Bombardier (No. 7): If the Commission decides to define the domestic like product as all single aisle large civil aircraft, it will need to assess conditions of competition in that market as opposed to the narrower 100-to 150-seat market.**

- a. What key distinctions, if any, would you draw between the demand conditions in the market for in-scope 100- to 150-seat LCA and the market for all single aisle LCA?
- b. What key distinctions, if any, would you draw between the supply conditions in the market for in-scope 100- to 150-seat LCA and the market for all single aisle LCA?
- c. What conclusions should the Commission draw with respect to substitutability and the importance of price when looking at the market for all single aisle LCA?

**Answer:** In both the preliminary and final phases, Bombardier has argued that the domestic like product should include all single-aisle LCA with capacity for at least 100 seats. Although the Commission adopted Boeing's narrower domestic like product definition for purposes of its Preliminary Determination, it indicated that it would reconsider this issue in the final phase of the investigation.<sup>89</sup> Accordingly, the Commission staff collected data not just on 100- to 150-seat single-aisle LCA, but also on all other single-aisle LCA.<sup>90</sup>

If the Commission appropriately finds the domestic like product to be all single-aisle LCA, it should note the following key conditions of competition in that market, which will help inform the Commission as to why there can be no threat of material injury to the domestic industry producing all single-aisle LCA:

- On the demand side, there is significantly higher demand for mid- to large-sized single-aisle aircraft, such as the 162-seat MAX 8 and the 185-seat A321neo, than there is demand for small-sized single-aisle aircraft, such as Bombardier's C Series. Tr. at 263-264 (Mr. Mitchell). Not only is there significantly more demand at the mid- to large-size end of the market for single-aisle LCA than at the low end, but demand continues to shift in that direction. Specifically, airlines choose increasingly to upgauge to the 737-800 from the 700, and to the MAX 8 instead of the MAX 7.<sup>91</sup> Indeed, Boeing's [ ].<sup>92</sup>
- On the supply side, the popular mid- to large-size portion of the market is supplied exclusively by Boeing and Airbus, while new aircraft serving the lower end of the market are produced by Bombardier and Embraer. Tr. at 263-264 (Mr. Mitchell). Because

<sup>89</sup> Prelim. Det. (APO Version) at 13.

<sup>90</sup> See, e.g., Prehearing Report at Table C-3.

<sup>91</sup> Leecham News, *History Undermines Boeing Claim of C Series Impact: Analysis* (Dec. 22, 2017) (Ex. 6).

<sup>92</sup> Boeing U.S. Producer Questionnaire at [ ].

Boeing’s principal competitor in the broader market for single-aisle LCA is Airbus, the need to offer aircraft that are competitive with Airbus is what drives Boeing’s design and marketing decisions. When Airbus announced the 165-seat A320neo, Boeing rushed to market with a re-engined MAX 7, then upsized the MAX 7 by adding 12 more seats,<sup>93</sup> a move that placed it further away from competing with Bombardier.

- With respect to substitutability, competition between the C Series and the 737 is even more attenuated when viewed across Boeing’s entire 737 product range. Even if the Commission were to conclude (erroneously, as explained at the Hearing and in Bombardier’s prehearing brief<sup>94</sup>) 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.

Boeing has been aware since the preliminary phase of Bombardier’s proposed like product definition and the Commission’s intent to evaluate that definition in the final phase. Because there have been no C Series imports, subject imports are negligible and Boeing cannot claim its broader domestic industry has suffered present material injury. Yet Boeing has not even tried to claim that the domestic industry—still made up mostly of Boeing—is threatened with imminent material injury when the industry is defined in accordance with Bombardier’s proposed domestic like product. As Boeing apparently recognizes, any such threat argument would be futile. If the Commission finds the domestic industry comprises production of all single-aisle LCA seating at least 100 passengers—including all Boeing 737 production and Airbus America’s domestic production of the A320 and A321—this industry is plainly not vulnerable to imminent material injury,<sup>95</sup> and to the contrary is performing [ ].

The industry’s operating margins were [ ] in 2014, 2015, and 2016, respectively<sup>96</sup>— results [ ]

[ ].<sup>97</sup> 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 orders for 737 MAX 8, MAX 9, and MAX 10 aircraft.<sup>98</sup> 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 large number of units, the ability to offset the low profitability of one product line with revenues from a more profitable line, and airlines’

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<sup>93</sup> Bombardier Prehearing Brief at 47; History Undermines Boeing Claim of C Series Impact: Analysis (Ex. 6).

<sup>94</sup> See Tr. at 214 (Mr. Dimitroff); Bombardier Prehearing Brief at 58-62.

<sup>95</sup> 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 (Jan. 25, 2017) (Ex. 46).

<sup>96</sup> Prehearing Report at Table C-3.

<sup>97</sup> Charts Based on Questionnaire Responses, “Boeing P&L Data for 100- to 150-Seat LCA and Other Single Aisle LCA” (Ex. 31).

<sup>98</sup> See Flight Ascend Expert Report at 41 (“{T}he current 737 Max firm order backlog stands at 4,071 aircraft, of which just 64 are identified as the Max 7 variant.”) (Att. A).

desire for commonality in their fleets, which incentivizes them to replace and expand their fleets through existing suppliers.<sup>99</sup>

Other economic indicators confirm the healthy state of the domestic industry. During the POI, the domestic industry's U.S. market share [ ] from [ ] percent in 2014 to [ ] percent in 2016, and was [ ] in interim 2017 at [ ] percent.<sup>100</sup> Consistent with Boeing's enormous backlog and stated intention to increase production, the industry's production/capacity [ ] from [ ] aircraft in 2014 to [ ] in 2016.<sup>101</sup> U.S. shipments [ ] by almost [ ] percent in the same period.<sup>102</sup> The future looks bright: at the Dubai Air Show in November 2017, Boeing received \$27 billion in new 737 orders.<sup>103</sup>

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.<sup>104</sup> These problems have 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.<sup>105</sup> Given that competition is even more attenuated when comparing the C Series against all of the 737 family, the domestic industry producing all single-aisle large civil aircraft could not be threatened with material injury by reason of subject imports.

#### IV. Questions About Delta and United

**18. Status of Delta's CS100 Order: Commissioner Williamson (p. 252):{. . .}I guess there's been talk that I guess the first orders of the Bombardier planes will be going to Aero Mexico. I don't know what you can say here or post-hearing on that. { . . . } Anything you can put on the record post-hearing I guess.**

**19. Status of Delta's CS100 Order: Commissioner Broadbent (p. 293): If there's potential that Bombardier's Canadian exports to Delta will occur within the next several years as planned, then subject imports are not negligible for purposes of threat. Given that Bombardier's brief has argued that these deliveries will not occur, can you provide stronger evidence to this effect in**

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<sup>99</sup> See, e.g., AirInsight, *Boeing's Trade Complaint Against Bombardier – Does It Hold Water?* (May 2, 2017) (Ex. 32); AirInsight, *Why are Airbus and Boeing Afraid of Bombardier?* (Feb. 23, 2017) (Ex. 33); AirInsight, *Bombardier's C Series at EIS: Regaining Momentum* at 20, 44-46 (July 2016) (Ex. 34); Aircraft Value News, *United Airlines Buys B737-700s for "\$20-25 million": "Strategic Pricing" Still Evident Despite Record Backlog* (May 2, 2016) (Ex. 35).

<sup>100</sup> Prehearing Report at Table C-3.

<sup>101</sup> *Id.*

<sup>102</sup> *Id.*

<sup>103</sup> *Boeing, flydubai Sign Historic Deal for 225 737 MAX Airplanes* (Nov. 15, 2017) (Ex. 41).

<sup>104</sup> See Bombardier Prehearing Brief at 58-62; Leeham News, *History Undermines Boeing Claim of C Series Impact: Analysis* (Dec. 22, 2017) (Ex. 6).

<sup>105</sup> See Flight Ascend Expert Report at 15-17, 47 (Att. A).

**your post-hearing brief? Could we get sworn statements from Bombardier? That would be helpful.**

- 20. Status of Delta's CS100 Order: Vice Chairman Johanson (p. 100): For your post-hearing brief, could you please comment on the confidential statement at the bottom of page 12 of Canada's brief? Specifically, I am referring to the last three lines of page 12, which are in brackets.**
- 21. Status of Delta's CS100 Order: Supplemental Question from Commission for Bombardier (No. 4). Please explain what Bombardier's intentions are for Delta's original order of CS100s from Canada. In light of the CSALP news, has Bombardier secured a non-U.S. customer to fill Delta's original production volume at Mirabel? Has production related to the original Delta order already begun in Mirabel?**

**Answer:** At the Hearing, Delta's and Bombardier's employees testified under oath that the companies intend for Delta's planes to be produced at the U.S. FAL, not in Mirabel. Mr. May from Delta testified that "Delta now does not intend to take delivery of any Canadian-manufactured CS100 but will instead be taking delivery of CS100s manufactured in Mobile, Alabama."<sup>106</sup> He later confirmed that Delta has "made clear our intentions to only take deliveries out of the U.S."<sup>107</sup> From Bombardier, Mr. Levesque testified that "our plan is to supply our U.S. customers from the new U.S. FAL,"<sup>108</sup> and Mr. Dewar testified that the planes ordered by Delta "will be delivered now to non-U.S. customers"<sup>109</sup> and are "not going to go to U.S. customers {,} that's clear."<sup>110</sup>

Delta and Bombardier made [ ] representations to the Commission in their certified questionnaire responses. In particular, Delta's questionnaire response stated that [

] <sup>111</sup> Likewise, Bombardier's questionnaire response stated that "[

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<sup>106</sup> Tr. at 201 (Mr. May).

<sup>107</sup> Tr. at 275 (Mr. May).

<sup>108</sup> Tr. at 194 (Mr. Levesque).

<sup>109</sup> Tr. at 298 (Mr. Dewar).

<sup>110</sup> *Id.* at 252. Witnesses from both Bombardier and Delta also explained why a negative determination in this case would not change Delta's plans or persuade other U.S. airlines to risk a new Boeing petition. Tr. at 189-90 (Mr. Mitchell) ("With long lead times between order and delivery, Boeing could file a new petition as soon as there is a new U.S. order. No airline wants to take the risk of a future case either. That means the only way for us to reassure potential U.S. customers is to make these C Series in the United States."); Tr. at 246 (Mr. May) (in light of the "future risk of trade case{s}," the U.S. FAL "makes us feel more secure"); *id.* at 275 ("It's a different world {after Boeing brought the present Petition} and it's not a risk that we want to take. We've made clear our intentions to only take deliveries out of the U.S.").

<sup>111</sup> Delta U.S. Importer/Purchaser Questionnaire at II-8; *see also* Delta Prehearing Brief at 39, 51.

] <sup>112</sup>

Delta’s and Bombardier’s certified statements in their prehearing briefs are to the same effect. Delta stated: “It is now clear that even as to fill {Delta’s} order, no Canadian-manufactured LCA will be imported.<sup>113</sup> Likewise, Bombardier stated, “In light of the Airbus deal, Bombardier is no longer planning to make future deliveries from Québec to the United States.”<sup>114</sup>

Finally, the above testimony, certified questionnaire responses, and certified prehearing briefs are consistent with the attached Statement of Fred Cromer, President of Commercial Aircraft at Bombardier and President of the C Series Aircraft Limited Partnership (“CSALP”).<sup>115</sup> Mr.

Cromer states that [

] <sup>116</sup> He further states that

[

] <sup>117</sup>

Bombardier would be pleased to provide an update on these issues prior to the closing of the record in this proceeding, if requested to do so by the Commission.

**22. Pricing for United: Chairman Schmidlein (p. 92): Well, my question really is now about when United converted to those larger aircraft did the fact that you -- you know you allege that there was loss revenue from the downward pricing pressure from the Delta sale on this United campaign. Did that flow through to what United had to pay in terms of -- you know they paid more for the bigger plane? Did that have an affect on what United paid for those larger planes?**

**Answer:** Boeing has conceded that the price United agreed to pay for 737-700s [

]

Specifically, the [ ] Affidavit attached as Exhibit 101 to Boeing’s Petition states:

“United later exercised its rights to convert its 737-700 orders to orders for other Boeing aircraft, [ ]”<sup>118</sup> Thus,

even if the Commission accepts Boeing’s argument that it offered United a depressed price for 737-700s due to competition with the C Series—which it should not<sup>119</sup>—this issue was rendered moot when United converted to 737-800s and MAX 8s at prices [

]. Boeing could not have suffered any lost revenues from the United order.

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<sup>112</sup> Bombardier Foreign Producer Questionnaire at 1-3a; *see also* CSALP U.S. Producer Questionnaire at II-16; Bombardier Posthearing Brief at 12-16.

<sup>113</sup> Delta Prehearing Brief at 51.

<sup>114</sup> Bombardier Prehearing Brief at 15.

<sup>115</sup> Statement of Fred Cromer ¶ 1 (Att. C).

<sup>116</sup> *Id.* ¶ 2.

<sup>117</sup> *Id.* ¶ 3.

<sup>118</sup> Pet. at Ex. 101 [ ] Aff. ¶ 10.

<sup>119</sup> *See* Bombardier Prehearing Brief at 85-87.

To the contrary, since larger 737s are more profitable than 737-700s,<sup>120</sup> Boeing likely made a greater profit than it would have from selling the 700s at a “normal” price.

One might wonder why Boeing and United entered into an agreement for purchase of the 737-700s in the first place, given that (1) throughout the 2015 campaign, United had been looking for LCA with substantially fewer seats<sup>121</sup>; and (2) United converted to larger aircraft very soon after placing its 737-700 order, and did so at prices [ ].<sup>122</sup>

For an answer, one need look no further than the public statement of Boeing’s vice chair, Mr. Conner, conceding that it was “very important for {Boeing} to win” the United deal in order to avoid “a validation of the C Series in the marketplace.”<sup>123</sup> Boeing has not disputed this fact in this investigation, and numerous contemporaneous reports confirm that Boeing’s goal in the 2015 United transaction was to block the C Series from gaining a foothold in the U.S. market.<sup>124</sup> A sales presentation shown to United in 2015 confirms that Bombardier offered a 100-seat CS100 Lite in response to United’s feedback on its needs, and that Bombardier’s competition was Embraer, not Boeing.<sup>125</sup> As Mr. Conner essentially admits, Boeing was not forced to lower its price in a head-to-head competition with Bombardier for a 100-seat aircraft. It strategically and purposely chose to offer United a deal that was too good to refuse. In so doing, not only did Boeing keep the C Series from gaining its first major U.S. customer and end up making a profitable sale of larger 737s, but it also manufactured a lost revenue narrative it could use in the present investigation.

Why did United go along with this deal to buy aircraft it did not want and then ultimately [ ] by converting to larger aircraft? It is hard to know for certain,<sup>126</sup> since United’s questionnaire responses [ ] despite the Commission’s explicit statement that it “intend{ed} to further investigate details of the United sales campaign, including the factors driving its decision to purchase 737-700s as opposed to other aircraft as well as United’s subsequent decision to convert and defer its

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<sup>120</sup> See Flight Ascend Expert Report at 44 (Att. A).

<sup>121</sup> Bombardier Prehearing Brief at 85-86.

<sup>122</sup> Pet. at Ex. 101 [ ] Aff. ¶ 10.

<sup>123</sup> See Seattle Times, *Price war, plane transitions put Boeing in financial crunch* (Apr. 1, 2016) (Ex. 4).

<sup>124</sup> See, e.g., Forbes, *Boeing Gives United a Smoking Deal on 737s to Block Bombardier from Gaining Traction* (Mar. 8, 2016) (Ex. 3); Aircraft Value News, *United Airlines Buys B737-700s for “\$20-25 million”: “Strategic Pricing” Still Evident Despite Record Backlog*, (May 2, 2016) (Ex. 32); AirInsight, *Bombardier’s C Series at EIS: Regaining Momentum* at 20 (July 2016) (Ex. 34); see also Bombardier Prehearing Brief at 85-87.

<sup>125</sup> Statement of Ross Mitchell (Att. E); Bombardier Presentation, *C Series for United Airlines* (Ex. 5).

<sup>126</sup> Boeing has offered no evidence in support of Mr. Novick’s assertion that United’s decision to convert to larger 737s was due to a change in management. Tr. at 308 (Mr. Novick). Nor has [ ]

[ ] To the contrary, contemporaneous press reports indicate that United accepted Boeing’s 737-700 offer because of the bargain-basement price and Boeing’s other concessions, despite the fact that the 700s did not meet United’s needs. See, e.g., Forbes, *Boeing Gives United a Smoking Deal on 737s to Block Bombardier from Gaining Traction* (Mar. 8, 2016) (Ex. 3).

order with Boeing.”<sup>127</sup> Nonetheless, a contemporaneous press report noted that Boeing sweetened the deal for United by offering “*additional concessions on previous transactions.*”<sup>128</sup> United was also able to “swap {} some 787-8 orders for the 777-300ER and the 787-9.”<sup>129</sup> In this investigation, Boeing has not disputed or explained the concessions offered to United, despite the fact that the article describing those concessions was cited in Bombardier’s post-conference brief.<sup>130</sup>

In short, the record shows that Boeing used concessions to United involving sales terms for other aircraft to secure United’s cooperation in arranging a sale of 737-700s at artificially low prices that would support Boeing’s commercial and litigation strategy.

## V. Questions Concerning Current Bombardier Orders and Production

**23. Viability of the C Series: Commissioner Williamson (p. 283): What number of orders do you need to make the C-100, C-300 viable? On ongoing production models? And I guess I would like, when you answer that question, if it’s just Mirabel and Mobile, and does that make a difference in what your answer is?**

**Answer:** The CS100 and CS300 are both commercially viable. The C Series has received 360 net orders: 123 for the CS100 and 237 for the CS300.<sup>131</sup> Furthermore, as described in its questionnaire response, Bombardier has [

] <sup>132</sup> As of September 30, 2017, the total C Series backlog was [ ] aircraft.<sup>133</sup> Moreover, for the next two years, Bombardier’s production in Mirabel is effectively at full capacity serving non-U.S. customers.<sup>134</sup> Thus, Bombardier’s existing order volume is sufficient for the Mirabel FAL to progress down the learning curve, thereby increasing production efficiency and reducing costs.

The C Series has also been validated in the market by sales to several large customers—Lufthansa, Air Canada, and Delta—and by the successful entry into service of the CS100 and CS300 at SWISS and airBaltic in 2016. The first C Series aircraft for Korean Airlines was delivered in December 2017.

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<sup>127</sup> Prelim. Det. (Public Version) at 32 n.226. [

] contrasts sharply with Delta’s detailed description of its transaction with Bombardier in its questionnaire responses.

<sup>128</sup> Forbes, *Boeing Gives United a Smoking Deal on 737s to Block Bombardier from Gaining Traction* (Mar. 8, 2016) (emphasis added) (**Ex. 3**).

<sup>129</sup> *Id.*

<sup>130</sup> See Bombardier Post-Conference Brief at 31 n.94.

<sup>131</sup> Flight Ascend Expert Report at 24 (**Att. A**).

<sup>132</sup> Bombardier Foreign Producer Questionnaire Supplemental Response at II-11a.

<sup>133</sup> Bombardier Foreign Producer Questionnaire at II-12b.

<sup>134</sup> Tr. at 183 (Mr. Dewar) (“So due to capacity constraints at {Mirabel}, we would not be able to produce any additional aircraft for the United States in the imminent future.”); Bombardier Foreign Producer Questionnaire at II-14.

Finally, the partnership with Airbus removes any doubt regarding the C Series' viability. As Mr. Levesque testified at the Hearing, the Airbus partnership will provide "additional manufacturing resources and supply chain synergies," generating "significant production cost savings for the C Series."<sup>135</sup> In particular, Mr. Levesque explained that "co-location of the Airbus and C Series production line also creates synergies and opportunities for learning while adding a second production location reduces risk," and "the fact that many C Series suppliers are U.S. based is also an advantage."<sup>136</sup> Airbus will also contribute "additional marketing expertise, a global network of potential customers, and extensive experience with ongoing product support."<sup>137</sup> Bombardier has stated that "access to such resources would help instill confidence in the C Series program among potential purchasers."<sup>138</sup> The validation of the C Series attributable to the Airbus partnership has been immediately apparent. Industry experts have uniformly extolled the partnership as setting the final seal of approval on the C Series.<sup>139</sup> Moreover, after a period of slow sales activity as the market observed the C Series' entry into service, two new major deals for the C Series have been announced since the announcement of the Airbus partnership: in Q3 2017, an undisclosed 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.<sup>140</sup>

**24. CS300 Orders: Supplemental Question from Commission to Bombardier (No. 3): Please explain if Bombardier has received any U.S. orders specifically for the CS300 or had U.S. customers convert prior orders into CS300s. If yes, please specify when, for which customer, and the net price paid for the CS300.**

**Answer:** In 2010, Bombardier received an order from Republic Airways for 40 CS300s, with 40 options for additional aircraft.<sup>141</sup> These aircraft were originally intended for delivery [ ]<sup>142</sup> As reported in Bombardier's foreign producer questionnaire, [

]<sup>143</sup> At the preliminary conference, Boeing's counsel Mr. Novick indicated that Boeing does not regard Bombardier's sale to Republic as injurious. Conf. Tr. at 130 (Mr. Novick).

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<sup>135</sup> Tr. at 191 (Mr. Levesque).

<sup>136</sup> *Id.* at 194.

<sup>137</sup> *Id.* at 192.

<sup>138</sup> *Id.*

<sup>139</sup> Leeham News, *Egyptair signs for up to 24 CS300s at Dubai Air Show* (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) (Ex. 39).

<sup>140</sup> Flight Ascend Expert Report § 3.6.5 (Att. A); Reuters, *EgyptAir signs \$1.1 billion deal for 12 Bombardier C Series jets* (Nov. 14, 2017) (Ex. 40).

<sup>141</sup> See Statement of Ross Mitchell (Att. E).

<sup>142</sup> *Id.*

<sup>143</sup> Bombardier Foreign Producer Questionnaire at II-12a.

However, delivery under that order [ ], due to [ ],<sup>144</sup> Republic has gone through a bankruptcy proceeding since placing its order. Tr. at 282 (Mr. Mitchell). Bombardier is continuing to have discussions with Republic, but the timing and form of delivery have not yet been finalized. *Id.* For now, Bombardier has [ ],<sup>145</sup> such that [ ],<sup>146</sup>

Bombardier is [ ].<sup>147</sup> Due to [ ],<sup>148</sup>

Bombardier has received no other orders for the CS300 from U.S. customers, nor has any U.S. customer converted a prior order into an order for CS300s. The only other order Bombardier has received from a U.S. airline is Delta's order for CS100s. Tr. at 300 (Mr. Mitchell) (confirming that Bombardier has not made any U.S. sales of the C Series since the Delta sale). Delta has not converted any part of its order into CS300s and has no plans to do so. Tr. at 253 (Mr. May).

**25. U.S. Customers: Supplemental Question from Commission to Bombardier (No. 5): Please confirm that Bombardier has not secured any additional orders from U.S. customers for C Series aircraft between the sale to Delta in early 2016 and the filing of the petition in early 2017. Has Bombardier secured any C Series orders from U.S. customers since the filing of the petition?**

**Answer:** Mr. Mitchell testified at the Hearing that “after our sale to Delta, we have not had any more {C Series} orders from U.S. customers.”<sup>149</sup>

**VI. Questions About the U.S. FAL**

**26. Regulatory Approvals Needed: Commissioner Williamson (p. 249): I'm not quite sure where to begin, but on this last subject of how are we -- what do we make of the decision to start the production in Mobile, and I had based a question this morning about the conjectures and speculative, whether or not this was conjecture or speculation and I said I ought to ask you all this afternoon. So I guess there are a number of questions to ask about this. How many regulatory steps have to be taken? If you want to do that post-hearing, you can. When actually is production, you know, when is the first**

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<sup>144</sup> Bombardier Foreign Producer Questionnaire at II-12g, III-11a.

<sup>145</sup> Bombardier Foreign Producer Questionnaire at II-12g.

<sup>146</sup> Bombardier Foreign Producer Questionnaire at II-11a, II-12a.

<sup>147</sup> See Statement of Ross Mitchell (**Att. E**).

<sup>148</sup> *Id.*

<sup>149</sup> Tr. at 189 (Mr. Mitchell).

**aircraft expected to be delivered from Mobile? How many regulatory steps need to be taken to build the Alabama FAL?**

**Answer:** There is nothing speculative about the progress that has been made on regulatory approvals since November, and there was never anything speculative about the commercial logic of the Airbus deal.<sup>150</sup> In order for the parties to begin construction of the U.S. FAL, they must first secure antitrust clearance in a small number of jurisdictions.<sup>151</sup> As Mr. Lichtenbaum explained at the Hearing, Bombardier “has engaged in detailed fashion with the relevant antitrust authorities” and is “making good progress on that.”<sup>152</sup> This is confirmed by the attached affidavit of James J. O’Connell, antitrust counsel for Bombardier with regard to the proposed investment by Airbus in C Series Aircraft Limited Partnership (“CSALP”) (the “Transaction”).<sup>153</sup> Mr. O’Connell explains that the Transaction has already obtained antitrust approvals from four jurisdictions: [ ], Germany, Austria, and [ ]. With respect to [

] <sup>154</sup> With regard to Germany, “{t}he German Federal Cartel Office issued a public statement on Wednesday, December 6, 2017 clearing the Transaction.”<sup>155</sup> With regard to Austria, “{t}he Austrian Federal Competition Authority (the ‘FCA’) cleared the transaction on December 19, 2017.”<sup>156</sup> Finally, with respect to [ ]<sup>157</sup>

Bombardier and Airbus “[

] <sup>158</sup> In short, the antitrust approvals necessary to begin construction of the U.S. FAL are far along and are [ ]. As Commissioner Williamson indicated would happen,<sup>159</sup> Bombardier encourages the Commission to request additional information regarding the status of antitrust approvals prior to the record closing date in January so that the Commission can make its determination using the most recent information.

**27. Regulatory Approvals Needed: Commissioner Broadbent (pp. 297-98): I was just trying to get to Mr. Lichtenbaum’s use of the word speculative**

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<sup>150</sup> Bombardier’s statement to Commerce raised at the Hearing, Tr. at 293-95, was solely regarding regulatory approvals. See Bombardier, Brief on Proposed Transaction, Dep’t of Commerce Inv. Nos. A-122-859 & 860 (Nov. 13, 2017), at 1 (“{T}he proposed transaction has not, due to regulatory requirements, been finalized and it would therefore be premature for the Department to base any decision on it.”)

<sup>151</sup> Tr. at 250 (Mr. Lichtenbaum).

<sup>152</sup> *Id.*

<sup>153</sup> O’Connell Aff. ¶ 1 (Att. B).

<sup>154</sup> *Id.* ¶ 3.

<sup>155</sup> *Id.* ¶ 4.

<sup>156</sup> *Id.* ¶ 5.

<sup>157</sup> *Id.* ¶ 6.

<sup>158</sup> *Id.* ¶ 7.

<sup>159</sup> Tr. at 251 (Commissioner Williamson) (responding “Good, okay. We will.” to Ms. Aranoff’s suggestion that the Commission ask for more information before the record closes).

**{regarding the transaction between Bombardier and Airbus}, and you can just clarify that for the record, that would be helpful.**

**Answer:** As Mr. Lichtenbaum stated at the Hearing, when he used the word “speculative” in the heading of a section of a brief submitted to the Commerce Department one month ago, he was speaking about the uncertainty of the regulatory (i.e., antitrust review) process at that point in time. Specifically, Mr. Lichtenbaum was borrowing the language from the determination of the Department in a prior investigation to make the point that in making CVD determinations, the Department has refused to consider future events that have yet to materialize.<sup>160</sup>

The Commerce Department’s task is very different than the Commission’s. The Commerce Department is charged with reviewing a particular POI for the purpose of determining whether the alleged dumping or subsidization occurred during the designated period in the past and it must disregard events that happen beyond the POI. The Commission’s role in a threat of injury determination, on the other hand, is to look prospectively at the imminent future. The imminent establishment of CSALP’s U.S. FAL in Alabama is directly relevant to the Commission’s threat analysis. The uncertainty referenced by Mr. Lichtenbaum when he used the word “speculative” was regarding the regulatory approval process and not the commercial relationship between Bombardier and Airbus. Additional information about the status of that regulatory process is included in the Statement of James J. O’Connell, Att. B.

**28. Bombardier/Airbus Agreement: Chairman Schmidtlein (p. 302): {C}an you put on the record the agreement between Bombardier and Airbus? I presume there is a written agreement between you being that you’re seeking regulatory approvals and you’ve asserted here that this is definitely going to happen? I believe that is already on the record, okay --including all Addendums, Appendix, side letters, anything.**

The [ ] was submitted to the Commission in confidential Exhibit 2 to CSALP’s U.S. Producer Questionnaire response (Nov. 17, 2017). The exhibits to CSALP’s questionnaire response include several other documents detailing the terms of the Bombardier/Airbus agreement, including the parties’ commitment to build the U.S. FAL at the Airbus Americas site in Mobile, Alabama. **Exhibit 43** to this brief contains [

]. Specifically, [

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<sup>160</sup> *Wooden Bedroom Furniture From the People’s Republic of China: Final Results of Antidumping Duty Changed Circumstances Review*, 72 Fed. Reg. 60,812, 60,813-14 (Oct. 26, 2007); *Wooden Bedroom Furniture from the People’s Republic of China: Preliminary Results of Antidumping Duty Changed Circumstances Review*, 72 Fed. Reg. 41,492, 41,495 (July 30, 2007).

**29. Most Current Information: Commissioner Williamson (p. 251): {agreeing with statement by Ms. Aranoff that “You know, there are ongoing conversations {regarding the U.S. FAL}, and to the extent that there are developments before we file our post-hearing brief we will include those. But we do encourage you if you want the latest information on which to base your determination that this is changing by the day, ask us before the recorded closes in January and we’ll give you everything that’s gone on since.”}}**

**Answer:** The reviewing courts have required the Commission to make its determination based on current information regarding the state of the domestic industry and conditions of competition as of vote day.<sup>161</sup> The timing of the vote in this investigation presents a challenge to the Commission because the facts on the ground are changing rapidly. Bombardier’s agreement with Airbus to build the U.S. FAL was announced in October, which allowed the Commission to request information about the U.S. FAL in its questionnaires. Those plans continue to progress, however, and are [

] In this post-hearing brief, Bombardier has presented the most current available information about the state of planning for the U.S. FAL. The Commission’s factual record does not close until January 19, 2018. Absent permission from the Commission, however, Bombardier is not able to provide updated information before the record closes. Because the Commission is making a threat determination which is very much dependent on events that will unfold in the imminent future, Bombardier respectfully urges the Commission to request updated information about the U.S. FAL, the status of regulatory approvals, and [

] prior to the record closing date. Upon the Commission’s request, Bombardier would be pleased to provide this updated information for inclusion in the record.

**30. Production Operations at U.S. FAL: Vice Chairman Johanson (p. 275): Do you have any idea what the value added to a finished C Series aircraft through the final assembly alone in Alabama, do you know what the value added to that would be?**

**31. Production Operations at U.S. FAL: Supplemental Question from Commission to Bombardier (No. 1): At page 223 of the hearing transcript, Mr. Dewar of Bombardier states that “{The primary manufacturing center in Mirabel} actually have {sic} two production lines in parallel. And our plans are to take a replica, exact replica and have one of those lines in the U.S. for U.S. customers.” Please describe in detail the manufacturing/assembly functions that are performed on each production line in Mirabel, as well as which of these lines will be the one replicated in Mobile.**

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<sup>161</sup> *Suramerica de Aleaciones Laminadas, C.A. v. U.S.*, 44 F.3d 978 (Dec. 30. 1994), 984 (finding that the Commission must not disregard any relevant economic factor that might help in making the difficult assessment of a threat determination); *see also, e.g., Manganese Sulfate from the People’s Republic of China*, USITC Inv. No. 731-TA-725, USITC Pub. No. 2932 (Nov. 1, 1995), at n.122 (citing the *Suramerica* decision and finding no current demonstrable adverse trends indicating the probability that subject imports will be the cause of material injury).

**a. Please also describe any additional production of subassemblies in Mirabel or elsewhere in Canada for use in Bombardier’s C Series aircraft.**

**Answer:** As reiterated at the Hearing, Tr. at 184 (Mr. Dewar), Bombardier invites the Commission to visit its facility in Mirabel, Québec to see the production process that will be replicated in Alabama. Bombardier’s assembly facility for C Series aircraft in Mirabel consists of two parallel and identical assembly lines. Each line consists of [

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The U.S. FAL in Mobile will consist of [ ] that replicates the production process used in Mirabel, and will have a capacity to produce approximately [ ] aircraft per year.<sup>162</sup>

For current production at Mirabel, more than 50% of the spend on the C Series supply chain already goes to U.S. suppliers.<sup>163</sup> With the establishment of the U.S. FAL, [

].<sup>164</sup> Bombardier and CSALP currently estimate that [

].<sup>165</sup>

With respect to inputs sourced in Canada, as Mr. Dewar explained at the Commission’s Hearing, “{i}n fact, the content of Canada for the fuselage is really just a cockpit and a small section of the aft fuse, very minor components compared to the scope of the whole.”<sup>166</sup> Mr. Dewar further indicated that none of the aircraft finally assembled in Mobile will first undergo any assembly operations in Mirabel. *Id.* Specifically, [

] <sup>167</sup>

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<sup>162</sup> Tr. at 272 (Mr. Dewar); [

[ ] (Ex. 43).

] (Ex. 42); Excerpt from

<sup>163</sup> Tr. at 182 (Mr. Dewar).

<sup>164</sup> CSALP U.S. Producer Questionnaire at II-16.

<sup>165</sup> Statement of Sylvain Levesque (Att. D).

<sup>166</sup> Tr. at 272 (Mr. Dewar).

<sup>167</sup> Statement of Sylvain Levesque (Att. D).

In its prehearing brief and at the Hearing, Boeing attempted to discredit the C Series U.S. FAL, arguing that U.S. production operations would likely be minimal and limited to joining together substantially complete aircraft subassemblies produced in Mirabel.<sup>168</sup> Since the U.S. FAL will replicate the FAL in Mirabel [ ], the record clearly belies these claims.<sup>169</sup> Indeed, if the production activities planned for the U.S. FAL are too insubstantial to make aircraft “American,” C Series produced in Mirabel aren’t Canadian, either.

Once operational, the U.S. FAL will be a full-fledged member of the domestic industry and C Series aircraft produced in Mobile will be domestic merchandise. As demonstrated in Bombardier’s Prehearing Brief at 9-10, the sophisticated process for assembling high-technology large civil aircraft, significant employment, and share of U.S. content planned for the new U.S. FAL more than meet the Commission’s test of “sufficient production-related activity.”<sup>170</sup> This would be true even if the U.S.-origin content were significantly less than what Bombardier is reporting here.<sup>171</sup> Once it is established that the U.S. FAL will be part of the domestic industry,

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<sup>168</sup> Tr. at 122, 143 (Mr. Novick); Boeing Prehearing Brief at 57-58.

<sup>169</sup> At certain points, Boeing suggests that in order to engage in meaningful domestic production, fuselage sections must be “stuffed” (i.e. wiring installed) on the final assembly line. Tr. at 122, 143 (Mr. Novick). In the case of aircraft designed many years ago such as Boeing’s 737 family—which are based on a 1960s design—or some of Bombardier’s older CRJ and Q400 series, it was typical for manufacturers to employ a high degree of vertical integration producing parts and subassemblies internally for use in final assembly. By contrast, newly designed aircraft, such as Bombardier’s C Series or Boeing’s 787, typically employ a global supply chain with parts delivered to the final assembly line from many countries. See Tr. at 224 (Mr. Dewar) (noting that the 787 and C Series both use “a modern way to assemble aircraft”); Bombardier Hearing Slide, *The Global Origins of the Boeing Dreamliner* (Ex. 44). If Boeing believes that a high percentage of domestically produced parts is necessary for an aircraft to be a domestic product, it must not consider the 787 to be an American aircraft. In any event, Boeing’s argument is belied by the fact that the C Series production line at the U.S. FAL will be an “exact replica” of the C Series production line at Mirabel. Tr. at 223 (Mr. Dewar).

<sup>170</sup> The Commission considers six 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.

<sup>171</sup> See, e.g., *Certain Iron Mechanical Transfer Drive Components From Canada & China*, USITC Inv. Nos. 701-TA-550 and 731-TA-1304-1305 (Final), USITC Pub. 4652 at 12 (Dec. 2016) machining grooves or teeth and applying surface treatments qualify as domestic production, as finishing operations rely primarily on unfinished components that are manufactured in the United States); *Drill Pipe And Drill Collars From China*, Inv. Nos. 701-TA-474 and 731-TA-1176 (Preliminary), USITC Pub. 4127 at 11 (Mar. 2010) (U.S. operations turning green tubes into finished drill pipe constitute sufficient production-related activities, as “drill pipe finishers have substantial capital investments and use significant technical expertise and a large number of employees in the production of drill pipe” from unfinished pipe sourced domestically, from non-subject imports or China); *Certain Coated Paper Suitable for High-Quality Print Graphics Using Sheet-Fed Presses from China & Indonesia*, Inv. Nos. 701-TA-470-471 and 731-TA-1169-1170 (Preliminary), USITC Pub. 4108 at 10 (Nov. 2009) (converters that cut/sheet sheeter rolls into the finished sheet product are part of domestic industry, even though “their capital investment and technical expertise cannot rival that of integrated producers” and “the value added by conversion is modest”); *Diamond Sawblades & Parts Thereof from China & Korea*, Inv. Nos. 731-TA-1092-1093 (Final), USITC Pub. 3862 at 9 (Jul. 2006) (assembly operations constitute sufficient production-related activities even when an assembler “does not manufacture cores or segments, but assembles them . . . into finished sawblades”; has “some capital investment”; and “the value added by its activities is not insubstantial”); *Certain Frozen or Canned Warmwater Shrimp & Prawns from Brazil, China, Ecuador, India, Thailand, & Vietnam*, Inv. Nos. 731-TA-1063-1068 (Final), USITC Pub. 3748 at 11-12 (Jan. 2005) (processing and cooking shrimp qualify as domestic production); *Drams &*

the relative amounts of U.S., Canadian, and third country content in U.S.-produced C Series aircraft have no further legal relevance to the Commission’s threat of injury determination in this investigation. Boeing’s suggestion that some domestic producers are more equal than others has no basis in the injury provisions of Title VII. The Commission should reject Boeing’s invitation to turn a threat determination into an anticircumvention ruling.

**32. Production Operations at U.S. FAL: Supplemental Question from Commission to Bombardier (No. 2): Please describe where the engines for Bombardier’s C Series aircraft are assembled.**

**Answer:** Each of Bombardier’s C Series aircraft utilizes two geared turbofan engines supplied by United Technologies Corporation (a Delaware Corporation), through its Pratt & Whitney Division, Commercial Engines (Hartford, CT). Pratt & Whitney produces various types of geared turbofan engines for multiple customers from its primary manufacturing location in the United States. The engines supplied by Pratt & Whitney for C Series aircraft that Bombardier produces at Bombardier’s FAL in Mirabel, Québec are [

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[

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**33. Production Operations at U.S. FAL: Supplemental Question from Commission to Bombardier (No. 6): Please provide the annual value (in USD) of aircraft parts for 100- to 150-seat LCA projected to be imported into the United States by the CSALP through 2022. Please separate into imports from Canada and imports from all other countries and provide a list of the type of parts contained therein. If exact projections are unavailable, please provide estimates based on Bombardier’s experience at its Mirabel facility.**

**Answer:** The U.S. FAL in Mobile will consist of [ ] that replicates the production process used in Mirabel, with a capacity to produce approximately [ ] aircraft per year.<sup>173</sup> Bombardier expects that once the U.S. FAL is operational, the facility will begin

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*Dram Modules from Korea*, Inv. No. 701-TA-431 (Final), USITC Pub. 3616 at 7 (Aug. 2003) (DRAM assembly operations are sufficient production-related activities even though they involve “a moderate degree of technological sophistication” and “more than minimal value added,” but “employ a significant number of domestic PRWs,” and “source domestically the \*\*\* of uncased DRAMs used. . . .”); *Certain Color Television Receivers from China & Malaysia*, USITC Inv. No. 731-TA-1034 (Preliminary), USITC Pub. 3607 at 5 (Jun. 2003) (assembly of color television receivers is sufficient production-related activity as “the color picture tubes. . . , the primary and most expensive component of a CTV, were purchased from U.S. producers).

<sup>172</sup> See Statement of Sylvain Levesque (Att. D).

<sup>173</sup> Tr. at 272 (Mr. Dewar); [

] (Ex. 42).

producing the 75 CS100 aircraft ordered by Delta, which will occupy the effective capacity of the FAL for approximately [ ].

For current production at Mirabel, more than 50% of the spend on the C Series supply chain already goes to U.S. suppliers.<sup>174</sup> With the establishment of the U.S. FAL, [

] <sup>175</sup> Bombardier and CSALP currently estimate that [

] <sup>176</sup>

With respect to inputs sourced in Canada, as Mr. Dewar explained at the Commission’s Hearing, “{i}n fact, the content of Canada for the fuselage is really just a cockpit and a small section of the aft fuse, very minor components compared to the scope of the whole.”<sup>177</sup> Mr. Dewar further indicated that none of the aircraft finally assembled in Mobile will first undergo any assembly operations in Mirabel.<sup>178</sup> Specifically, [

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Parts to be used in U.S. assembly operations have not yet been ordered and cannot be ordered until antitrust approvals are complete, the transaction between Bombardier and Airbus is closed, and a definitive skyline for the U.S. FAL is developed. Accordingly, Bombardier and CSALP are not able to provide any additional cost estimates for either domestic or imported parts at this time.

If requested to do so by the Commission, Bombardier would be pleased to provide an update on plans for the U.S. FAL prior to the January 19, 2018 deadline for closing of the record in this proceeding.

In its brief and at the Hearing, Boeing attempted to discredit the C Series U.S. FAL, arguing that U.S. production operations would likely be minimal and limited to joining together substantially complete aircraft subassemblies produced in Mirabel. Tr. at 122, 143 (Mr. Novick). The record

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<sup>174</sup> Tr. at 182 (Mr. Dewar); Staff Conference Tr. at 243-244 (Mr. Mullot). See also Reuters, *Bombardier spends \$2.4 billion a year on aerospace in U.S.: document* (Oct. 5, 2017), at <https://www.reuters.com/article/us-boeing-bombardier-us-impact/bombardier-spends-2-4-billion-a-year-on-aerospace-in-u-s-document-idUSKBN1CA2N6> (Ex. 45) (reporting on the 10 largest C Series suppliers, including French interiors supplier Zodiac Aerospace SA, through its operations in California; Honeywell International Inc, which makes auxiliary power units in Arizona; Spirit AeroSystems Holdings Inc in Kansas; and Parker Aerospace, a unit of Parker-Hannifin Corp which has operations in Utah, California and Michigan).

<sup>175</sup> CSALP U.S. Producer Questionnaire at II-16.

<sup>176</sup> Statement of Sylvain Levesque (Att. D).

<sup>177</sup> Tr. at 272.

<sup>178</sup> *Id.*

<sup>179</sup> Statement of Sylvain Levesque (Att. D).

belies this claim.<sup>180</sup> Rather than a “shadow of home-market facilities,” as Boeing claims,<sup>181</sup> the U.S. FAL will be an “exact replica” of Bombardier’s manufacturing facilities in Mirabel.<sup>182</sup> Aircraft parts for assembly will not be pre-assembled in Canada.<sup>183</sup>

Once operational, the U.S. FAL will be a full-fledged member of the domestic industry and C Series aircraft produced in Mobile will be domestic merchandise. As demonstrated in Bombardier’s Prehearing Brief at 9-10, the sophisticated process for assembling high-technology large civil aircraft, significant employment, and share of U.S. content planned for the new U.S. FAL more than meet the Commission’s test of “sufficient production-related activity.”<sup>184</sup> In multiple cases where the Commission found that converters, finishers, or assemblers are part of the domestic industry, their production-related activities were far less than those CSALP will undertake at the U.S. FAL.<sup>185</sup>

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<sup>180</sup> At certain points, Boeing suggests that in order to engage in meaningful domestic production, fuselage sections must be “stuffed” (i.e. wiring installed) on the final assembly line. Tr. at 122, 143 (Mr. Novick). In the case of aircraft designed many years ago such as Boeing’s 737 family—which are based on a 1960s design—or some of Bombardier’s older CRJ and Q400 series, it was typical for manufacturers to employ a high degree of vertical integration producing parts and subassemblies internally for use in final assembly. By contrast, newly designed aircraft, such as Bombardier’s C Series or Boeing’s 787, typically employ a global supply chain with parts delivered to the final assembly line from many countries. See *The Global Origins of the Boeing Dreamliner (Ex. 44)*. If Boeing believes that a high percentage of domestically produced parts is necessary for an aircraft to be a domestic product, it must not consider the 787 to be an American aircraft.

<sup>181</sup> Boeing Prehearing Brief at 57-58.

<sup>182</sup> Tr. at 223 (Mr. Dewar).

<sup>183</sup> *Id.* at 272 (Mr. Dewar).

<sup>184</sup> The Commission considers six 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.

<sup>185</sup> See, e.g., *Certain Iron Mechanical Transfer Drive Components From Canada & China*, USITC Inv. Nos. 701-TA-550 and 731-TA-1304-1305 (Final), USITC Pub. 4652 at 12 (Dec. 2016) machining grooves or teeth and applying surface treatments qualify as domestic production, as finishing operations rely primarily on unfinished components that are manufactured in the United States); *Drill Pipe And Drill Collars From China*, Inv. Nos. 701-TA-474 and 731-TA-1176 (Preliminary), USITC Pub. 4127 at 11 (Mar. 2010) (U.S. operations turning green tubes into finished drill pipe constitute sufficient production-related activities, as “drill pipe finishers have substantial capital investments and use significant technical expertise and a large number of employees in the production of drill pipe” from unfinished pipe sourced domestically, from non-subject imports or China); *Certain Coated Paper Suitable for High-Quality Print Graphics Using Sheet-Fed Presses from China & Indonesia*, Inv. Nos. 701-TA-470-471 and 731-TA-1169-1170 (Preliminary), USITC Pub. 4108 at 10 (Nov. 2009) (converters that cut/sheet sheeter rolls into the finished sheet product are part of domestic industry, even though “their capital investment and technical expertise cannot rival that of integrated producers” and “the value added by conversion is modest”); *Diamond Sawblades & Parts Thereof from China & Korea*, Inv. Nos. 731-TA-1092-1093 (Final), USITC Pub. 3862 at 9 (Jul. 2006) (assembly operations constitute sufficient production-related activities even when an assembler “does not manufacture cores or segments, but assembles them . . . into finished sawblades”; has “some capital investment”; and “the value added by its activities is not insubstantial”); *Certain Frozen or Canned Warmwater Shrimp & Prawns from Brazil, China, Ecuador, India, Thailand, & Vietnam*, Inv. Nos. 731-TA-1063-1068 (Final), USITC Pub. 3748 at 11-12 (Jan. 2005) (processing and cooking shrimp qualify as domestic production); *Drams & Dram Modules from Korea*, Inv. No. 701-TA-431 (Final), USITC Pub. 3616 at 7 (Aug. 2003) (DRAM assembly operations are sufficient production-related activities even though they involve “a moderate degree of technological sophistication” and “more than minimal value added,” but “employ a significant number of domestic PRWs,” and “source domestically the \*\*\* of uncased DRAMs used. . . .”); *Certain Color Television Receivers from China &*

Once it is established that the U.S. FAL will be part of the domestic industry, the relative amounts of U.S., Canadian, and third country content in U.S.-produced C Series aircraft have no further legal relevance to the Commission's threat of injury determination in this investigation. Boeing's suggestion that some domestic producers are more equal than others has no basis in the injury provisions of Title VII. The Commission should reject Boeing's invitation to turn a threat determination into an anticircumvention ruling.

## VII. Legal Questions About Negligibility and Threat

**34. Vice Chairman Johanson (p. 100): “could you please comment on the Government of Canada's legal interpretation of our statutory guidance on imminence, especially, the passage on page 12 of its brief.”**

**Answer:** We concur with the Government of Canada and specifically incorporate by reference pp. 3-9 of the Government of Canada's Post-hearing Brief.

**35. Commissioner Williamson (p. 106): I guess the question I'm raising is, this goes to the interpretation {that looking out more than two years is} speculative and conjecture, say, what's the standard there? And is that relevant here?**

**Answer:** We concur with the Government of Canada and specifically incorporate by reference pp. 9-10 of the Government of Canada's Post-hearing Brief.

**36. Commissioner Williamson (pp. 302-303): Boeing cites the I guess 1984 Act about purchasing for importation and you know, this definitely implied here no matter when the plane was imported -- I was wondering if you might want to comment on that post-hearing and your views of that -- what we should make of that provision? {. . .} (p. 304-305) So anything that can be added post-hearing on this {issue of whether imports are imminent} from both sides I would appreciate, thank you.**

**Answer:** We concur with the Government of Canada and specifically incorporate by reference pp. 3-9 of the Government of Canada's Post-hearing Brief.

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*Malaysia*, USITC Inv. No. 731-TA-1034 (Preliminary), USITC Pub. 3607 at 5 (Jun. 2003) (assembly of color television receivers is sufficient production-related activity as “the color picture tubes. . . , the primary and most expensive component of a CTV, were purchased from U.S. producers).

### List of Attachments and Exhibits

Number	Description	Status
A	Flight Ascend Expert Report	Public
B	Statement of James O'Connell	APO
C	Statement of Fred Cromer	APO
D	Statement of Sylvain Levesque	APO
E	Statement of Ross Mitchell	APO
F	Statement of [ ]	APO
1	Wall St. J., <i>Boeing Held Takeover Talks With Brazilian Aircraft Maker Embraer</i> (Dec. 21, 2017)	Public
2	Forbes, <i>A Boeing-Embraer Tie-Up is Hardly a Surprise</i> (Dec. 22, 2017)	Public
3	Forbes, <i>Boeing Gives United a Smoking Deal on 737s to Block Bombardier from Gaining Traction</i> (Mar. 8, 2016)	
4	Seattle Times, <i>Price war, plane transitions put Boeing in financial crunch</i> (Apr. 1, 2016)	Public
5	Bombardier Presentation, <i>C Series for United Airlines</i>	APO
6	Leeham News, <i>History undermines Boeing claim of C Series impact: analysis</i> (Dec. 22, 2107)	Public
7	Financial Post, <i>Bombardier C Series program 'off to a slow start', says Boeing exec</i> (Oct. 25, 2012)	Public
8	Dimitroff Hearing Slide 2, "Competitive Aircraft Operating Cost Estimates"	Public
9	[ ], <i>Customer C Series satisfaction</i> [ ]	APO
10	Apex, <i>Bombardier Intros Atmosphere Cabin</i> (Sept. 12, 2017)	Public
11	Mitchell Hearing Slide 3, "Boeing 737 family: 'One airplane, four sizes'"	Public
12	Boeing Website, 737 Max Technical Specs	Public
13	Bombardier Hearing Slide, <i>CS100 Range Out of Washington DC and Atlanta</i>	Public
14	Embraer Website, E190-E2 in detail	Public
15	Embraer Website, E195-E2 in detail	Public
16	AirInsight, <i>Making Boeing Great Again</i> (Nov. 30, 2017)	Public
17	Out-of-Scope Aircraft on "Right-Sized" Routes	APO
18	Delta Hearing Presentation	Public
19	Boeing, Brief on the Announced Airbus-Bombardier C-Series Partnership (Nov. 13, 2017)	Public
20	Bombardier, Rebuttal Brief on the Proposed Transaction (Nov. 17, 2017)	Public
21	Mitchell Hearing Slide 9, <i>Boeing 787 Family Prices Rose As Risks Decreased</i>	Public
22	Bombardier CS100 Gets EASA, FAA Certification (Jun. 17, 2016)	Public
23	FAA Validates Bombardier CS300 (Dec. 20, 2016)	Public
24	The Verge, <i>Is the Dreamliner a Lemon?</i> (Jan. 17, 2013)	Public
25	Federal Aviation Administration, Press Release - <i>FAA Approves Boeing 787 Battery System Design Changes</i> (Apr. 19, 2013)	Public

Number	Description	Status
26	SWISS Website, <i>C Series: European flights redefined</i>	Public
27	The Points Guy, <i>A Look Inside the Swiss Bombardier CS100, the Newest Jetliner</i> (Oct. 5, 2017)	Public
28	Business Traveller, <i>Swiss debuts Bombardier CS100 into London City Airport</i> (Aug. 8, 2017)	Public
29	Traveller, <i>Bombardier C Series: The ultra-comfortable plane that airlines don't think you want</i> (Oct. 5, 2017)	Public
30	Air Baltic Press Release, <i>airBaltic CS300 operation performance exceeding expectations</i> (Jan. 1, 2017)	Public
31	Charts Based on Questionnaire Responses, "Boeing P&L Data for 100- to 150-Seat LCA and Other Single Aisle LCA"	APO
32	AirInsight, <i>Boeing's Trade Complaint Against Bombardier – Does It Hold Water?</i> (May 2, 2017)	Public
33	AirInsight, <i>Why are Airbus and Boeing Afraid of Bombardier?</i> (Feb. 23, 2017)	Public
34	AirInsight, <i>Bombardier's C Series at EIS: Regaining Momentum</i> , 44-46 (July 2016)	Public
35	Aircraft Value News, <i>United Airlines Buys B737-700s for "\$20-25 million": "Strategic Pricing" Still Evident Despite Record Backlog</i> (May 2, 2016)	Public
36	Antidumping Issues and Decision Memo (Dec. 18, 2017)	Public
37	Countervailing Duty Issues and Decision Memorandum (Dec. 18, 2017)	Public
38	Business Insider, <i>Boeing Just Gave United a Massive Discount</i> (Mar. 9, 2016)	Public
39	Leeham News, <i>Egyptair signs for up to 24 CS300s at Dubai Air Show</i> (Nov. 14, 2017)	Public
40	Reuters, <i>EgyptAir signs \$1.1 billion deal for 12 Bombardier C Series jets</i> (Nov. 14, 2017)	Public
41	Boeing Press Release, <i>Boeing, flydubai Sign Historic Deal for 225 737 MAX Airplanes</i> (Nov. 15, 2017)	Public
42	[ ]	APO
43	Excerpt from [ ]	APO
44	Bombardier Hearing Slide, <i>The Global Origins of the Boeing Dreamliner</i>	Public
45	Reuters, <i>Bombardier spends \$2.4 billion a year on aerospace in U.S.: document</i> (Oct. 5, 2017)	Public
46	Press Release, <i>Boeing Reports Fourth-Quarter Results and Provides 2017 Guidance</i> (Jan. 25, 2017)	Public

# ATTACHMENT A

**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**

Our Ref: 217A135/GD/RGM/RE/CPS/kw

Covington & Burling LLP  
One City Center  
850 Tenth Street NW  
Washington  
DC 20001-4956  
USA

12<sup>th</sup> December 2017

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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



**Chris Seymour**  
Head of Market Analysis



**George Dimitroff**  
Head of Valuations



**Richard Evans**  
Senior Consultant

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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 in 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:

### **George Dimitroff, Head of Valuations**

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 30<sup>th</sup> 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 13<sup>th</sup> 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 Leverkus, 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
<b>737-700</b>	128	3,250	83,000	154,500	648
<b>737 Max 7</b>	138	3,825	93,000*	177,000	674
<b>CS100</b>	108	3,100	77,650	134,000	718
<b>CS300</b>	130	3,300	81,750	149,000	629
<b>A319ceo</b>	124	3,250	89,950	168,650	725
<b>A319neo</b>	124	3,750	95,000*	166,450	766
<b>E195 E1</b>	112	2,450	63,200	115,300	564
<b>E195 E2</b>	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).

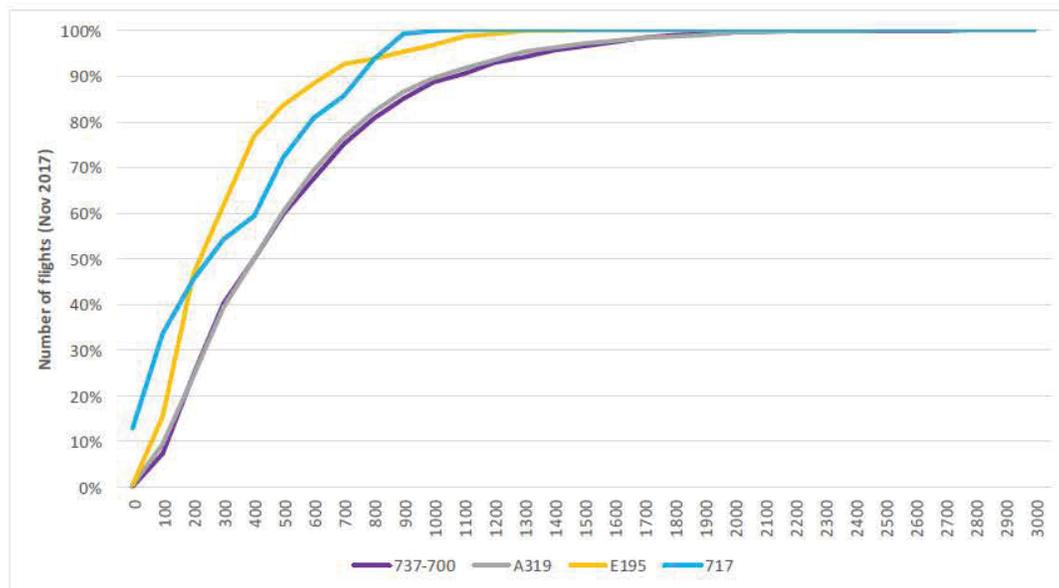
## Range

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**

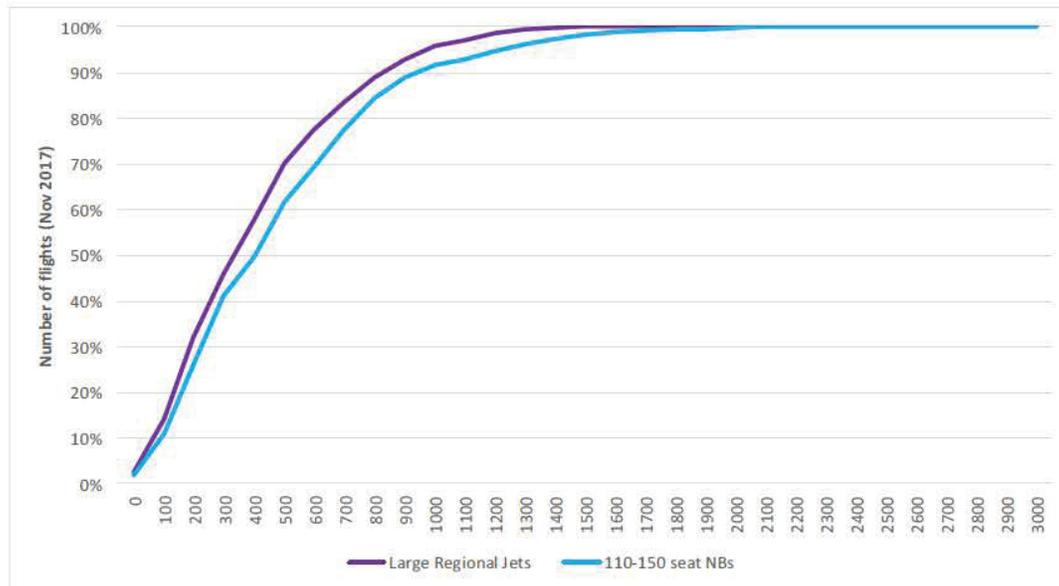


Source: Flight Schedules data, November 2017

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 C Series 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
<b>CS100</b>	Datum	Datum	Datum	Datum
<b>CS300</b>	7.1%	7.2%	-11.0%	-10.9%
<b>737-700</b>	18.6%	14.2%	0.1%	-3.6%
<b>737 Max 7</b>	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 it 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
<b>737-600</b>	194	0	-125	69
<b>737-700</b>	2,195	308	-605	1,282
<b>737-800</b>	4,925	442	721	5,204
<b>737-900</b>	628	68	9	569
<b>Grand Total</b>	<b>7,942</b>	<b>818</b>	<b>0</b>	<b>7,124</b>

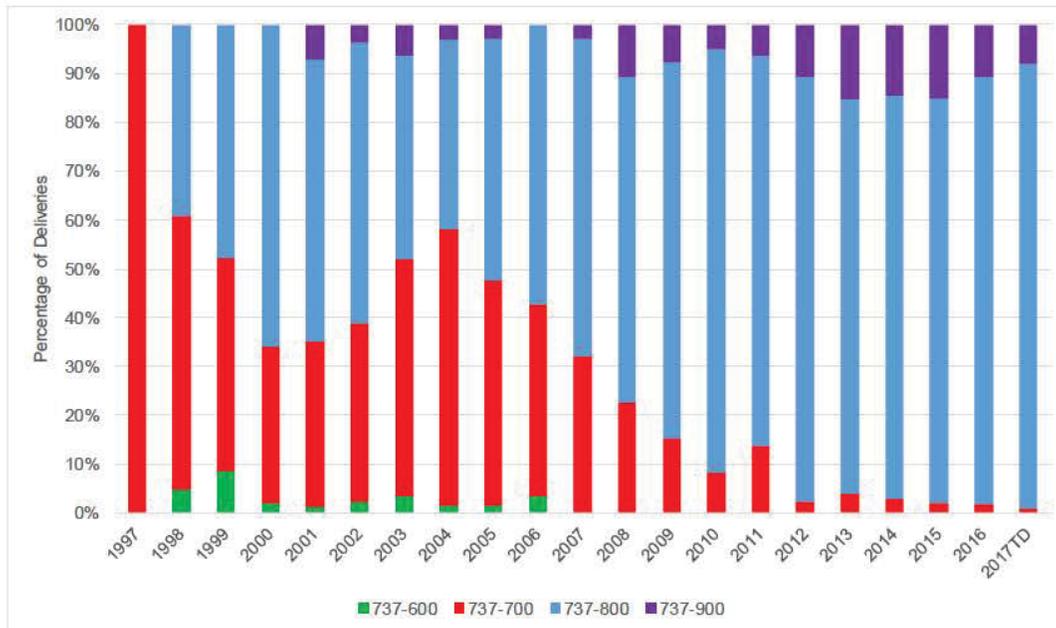
Source: Flight Fleets Analyzer @ 28 November 2017

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).

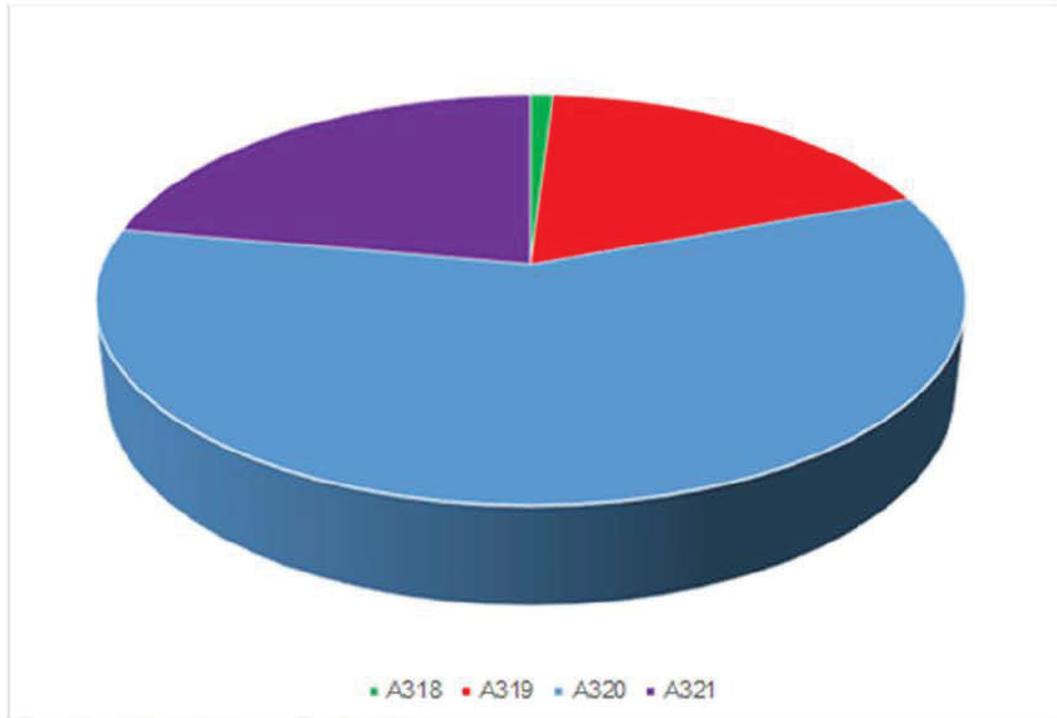
**Table 4: Airbus A320ceo cumulative firm orderbook 1983-2017**

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
<b>Grand Total</b>	<b>9,340</b>	<b>1,252</b>	<b>1</b>	<b>8,089</b>

Source: Flight Fleets Analyzer @ 28 November 2017

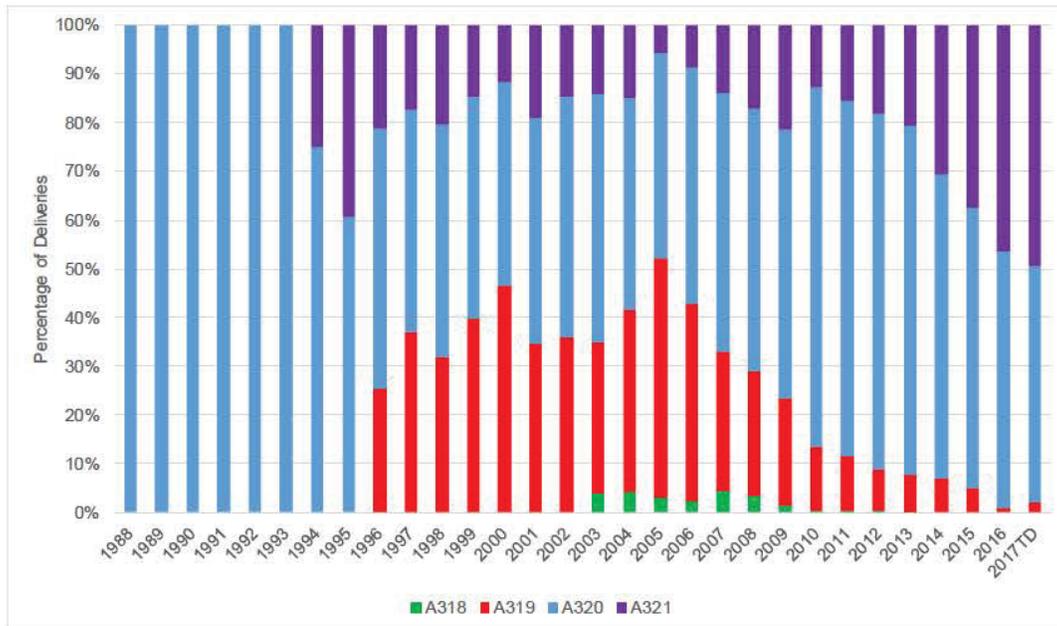
The A319 competes with the 737-700 and has taken an 18% share of the net orderbook – exactly the same as its Boeing rival. Some 250 of its original orders were changed to larger members of the family. So the A320 programme has also demonstrated that the larger family members – the A320 (59%) and A321 (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
<b>Grand Total</b>	<b>4,139</b>	<b>68</b>	<b>0</b>	<b>4,071</b>

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%.

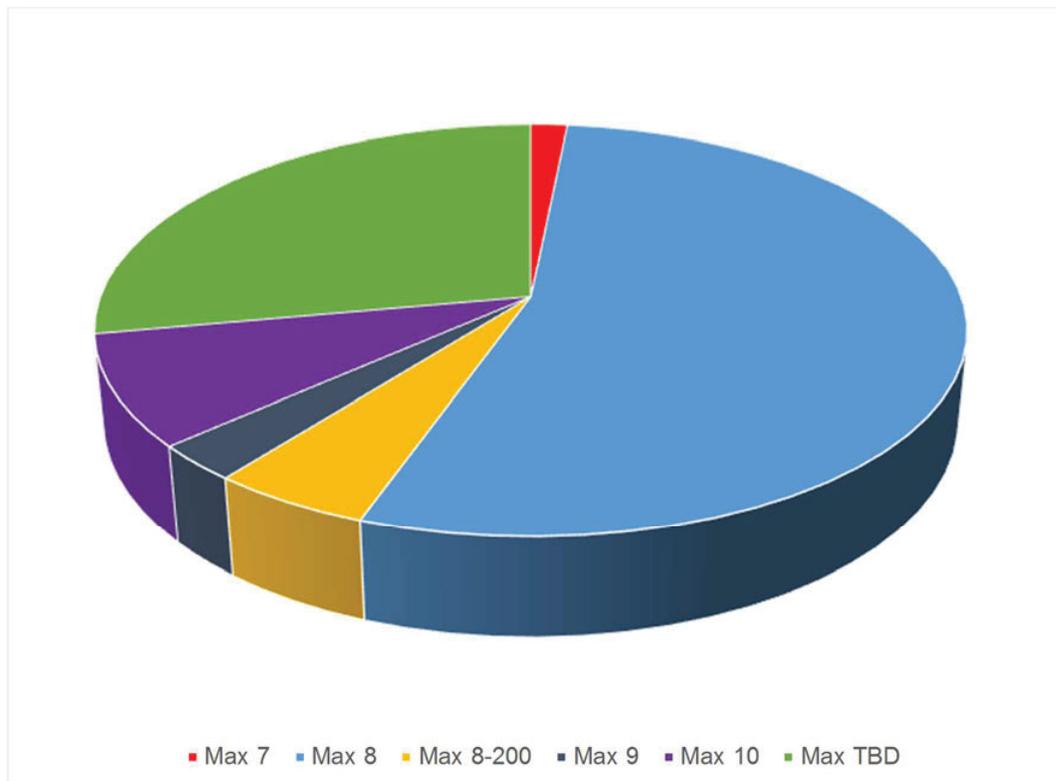
These percentages are not very different from the current 737 NG orderbook – the most popular series is the baseline one (737-800 and now Max 8). The smallest series has the smallest orderbook.

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-engineing 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**

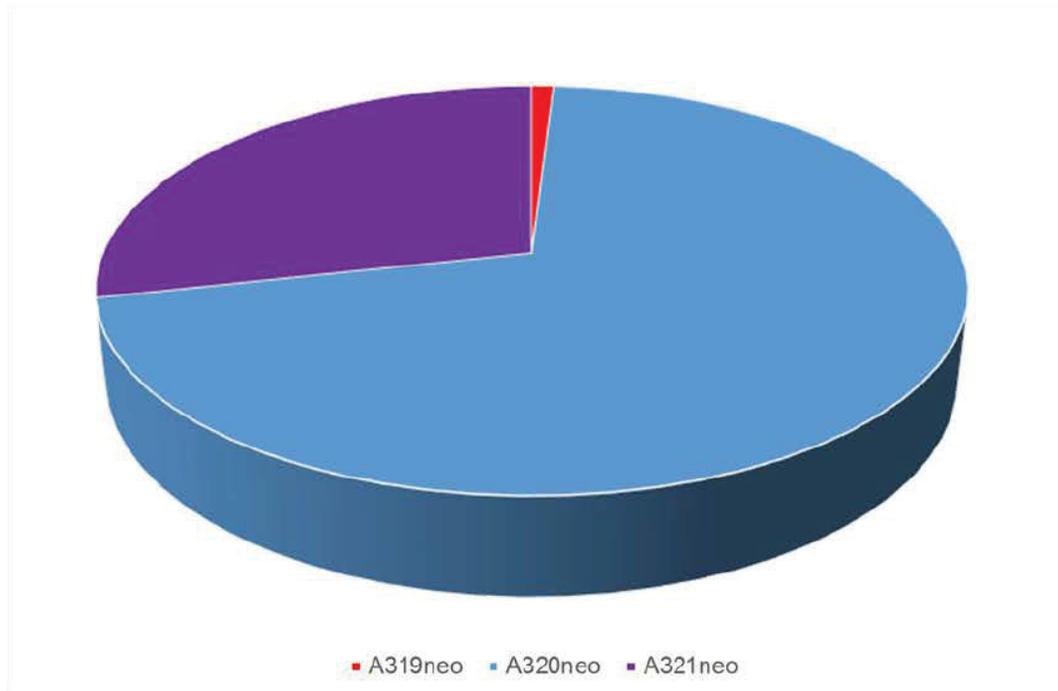
Series	Original Orders	Cancelled	Net Swaps	Net Orders
A319neo	61	0	-11	50
A320neo	4,022	-55	-262	3,705
A321neo	1,275	-53	274	1,496
<b>Grand Total</b>	<b>5,358</b>	<b>-108</b>	<b>1</b>	<b>5,251</b>

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**

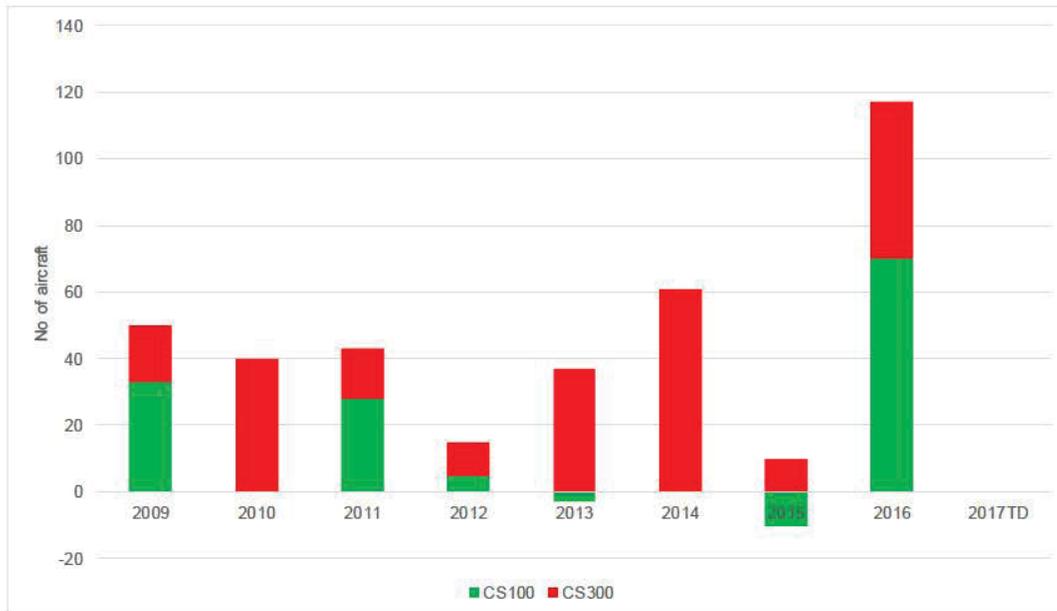
Series	Original Orders	Cancelled	Net Swaps	Net Orders
<b>CS100</b>	141	-3	-15	123
<b>CS300</b>	234	-12	15	237
<b>Grand Total</b>	<b>375</b>	<b>-15</b>	<b>0</b>	<b>360</b>

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**

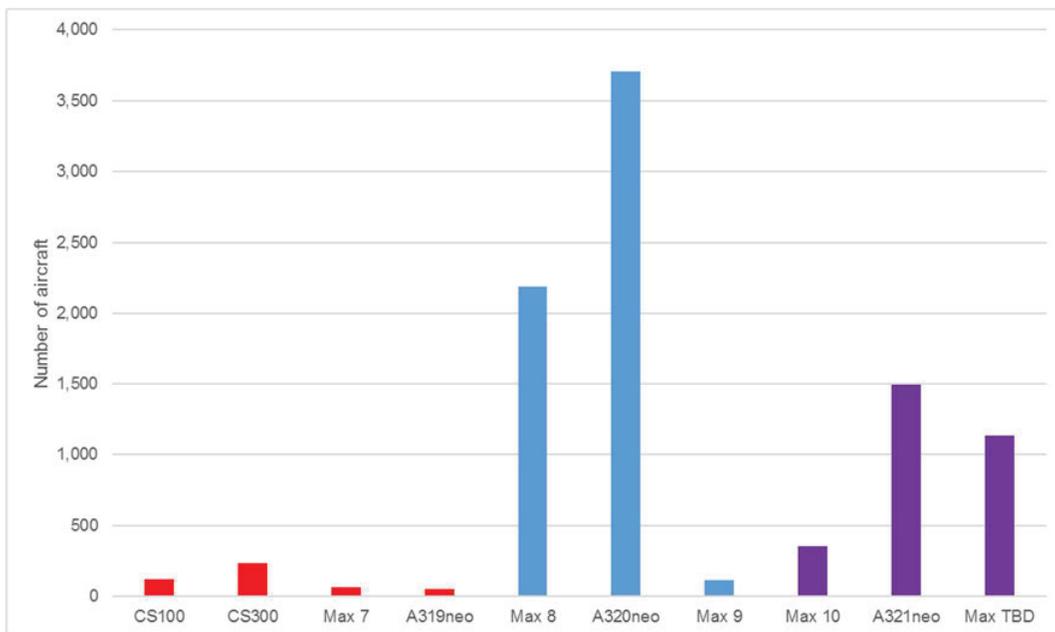


Source: Flight Fleets Analyzer @ 28 November 2017

### 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-subsiary 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
<b>100-seat regional jets</b>			<b>CRJ1000</b>	Avro RJ100, Fokker 100, <b>E190, E195, Superjet</b>
<b>110-seat single-aisle</b>	717, 737-200, 737-500, 737-600	A318	<b>CS100</b>	
<b>125-seat single-aisle</b>	<b>737-700, 737 Max 7</b> 737-300	<b>A319, A319neo</b>	<b>CS300</b>	
<b>150-seat single-aisle</b>	<b>737-800, 737 Max 8</b> 737-400, MD-80, MD-90	<b>A320, A320neo</b>		<b>MC21-300, C919</b>

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 C Series 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
	<b>850</b>	<b>5,787</b>

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
<b>Total</b>	<b>347</b>	<b>751</b>

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 <sup>1</sup>	64	1	
MD-90	158	62	1	
737-800	160 <sup>2</sup>	77		
737-900ER	180	87		33
A321	192	28		94
757-200	168-199 <sup>3</sup>	112	16	
757-300	234	16		
<b>Grand Total</b>		<b>1,164</b>	<b>41</b>	<b>232</b>

Source: Flight Fleets Analyzer, Flight Ascend Consultancy. <sup>1</sup> Four A320s have 164 seats. <sup>2</sup> Four 737-800s have 154 seats. <sup>3</sup> 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 <sup>1</sup>
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 <sup>2</sup>	56		
757-300	213	21		
<b>Grand Total</b>		<b>1,077</b>	<b>8</b>	<b>157</b>

Source: Flight Fleets Analyzer, Flight Ascend Consultancy. <sup>1</sup> Used aircraft to be leased. <sup>2</sup> 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 <sup>1</sup>	301		3
737 Max 8	172	2		98
A321	181/187 <sup>2</sup>	219		
A321neo	-			100
757-200	176-188	37	23	
<b>Grand Total</b>				

Source: Flight Fleets Analyzer, Flight Ascend Consultancy. <sup>1</sup> to have seating increased to 172. <sup>2</sup> 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
<b>Production rate per month</b>	42 – 47	47 – 52	52 – 57	57	57	57
<b>Annual deliveries</b>	530	604	644	684	684	684
<b>Commercial deliveries<sup>1</sup></b>	513	590	627	669	669	669
<b>737 NG</b>	453	332	78	-	-	-
<b>737 Max</b>	60	268	549	669	669	669
<b>737 Max firm order backlog</b>	60	268	549	674	675	682
<b>Open slots</b>	0	0	0	-5	-6	-13

Source: Flight Fleets Analyzer, Flight Ascend Consultancy. <sup>1</sup> 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 version, 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)
<b>125-seat category</b>	737-700	33.2	737 Max 7	37.5
<b>150-seat category</b>	737-800	44.1	737 Max 8	50.6
<b>180-seat category</b>	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<sup>1</sup>.

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 16<sup>th</sup> 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 1<sup>st</sup> 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.

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<sup>1</sup> <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 C Series to its product portfolio enables Airbus to offer an efficient next generation small two-variant single-aisle family. Airbus also gains some industrial benefits. C Series 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.

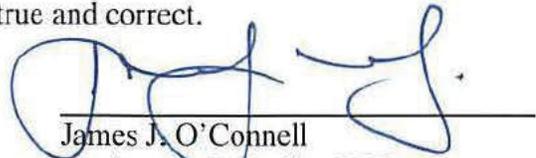
# ATTACHMENT B



7. [

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I declare under penalty of perjury that the foregoing is true and correct.



James J. O'Connell  
Covington & Burling LLP  
One City Center  
850 Tenth Street, NW  
Washington, DC 20001-4956

Executed on this 27 day of December, 2017

# ATTACHMENT C

**U.S. INTERNATIONAL TRADE COMMISSION**

In The Matter Of:  100- to 150-Seat Large Civil Aircraft from Canada	Investigation Nos. 701-TA-578 & 731-TA-1368 (Final Investigation)
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**STATEMENT OF FRED CROMER  
UNDER 28 U.S.C. § 1746**

I, Fred Cromer, state the following:

1. I am President, Commercial Aircraft at Bombardier, Inc. and President of the C Series Aircraft Limited Partnership ("CSALP").

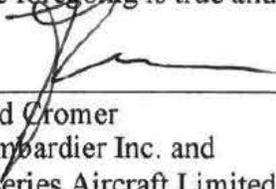
2. [

]

3. [

]

I declare under penalty of perjury that the foregoing is true and correct.

  
\_\_\_\_\_  
Fred Cromer  
Bombardier Inc. and  
C Series Aircraft Limited Partnership  
13100 Boulevard Henri-Fabre  
Mirabel, Québec, Canada  
J7N 3C6

Executed on this 26 day of December, 2017

# ATTACHMENT D

U.S. INTERNATIONAL TRADE COMMISSION

In The Matter Of:

100- to 150-Seat Large Civil  
Aircraft from Canada

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

STATEMENT OF SYLVAIN LEVESQUE  
UNDER 28 U.S.C. § 1746

I, Sylvain Levesque, state the following:

1. I am Vice President of Corporate Strategy at Bombardier Inc. I was on the corporate team at Bombardier that developed the strategy for approaching Airbus and [ ]

2. [ ]

] ]

3. [ ]

] ]

I declare under penalty of perjury that the foregoing is true and correct.

  
Sylvain Levesque  
Vice President, Corporate Strategy  
Bombardier Inc.

Executed on this 26 day of December, 2017

# ATTACHMENT E

**U.S. INTERNATIONAL TRADE COMMISSION**

In The Matter Of:

100- to 150-Seat Large Civil  
Aircraft from Canada

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

**STATEMENT OF ROSS MITCHELL  
UNDER 28 U.S.C. § 1746**

I, Ross Mitchell, state the following:

1. I am Vice President, Commercial Operations for Bombardier Commercial Aircraft.

2. In 2010, [

].<sup>1</sup>

3. [

].

4. In December 2015, [ ] of  
Bombardier made a presentation to United. As reflected in the document, the bid was for  
100- or 114-seat CS100 or CS100Lite aircraft, per United's parameters.<sup>2</sup>

5. [ ] to which I referred at the December 18 Hearing

[

].

---

<sup>1</sup> Bombardier [

].

<sup>2</sup> See Exhibit 5, [ ] 2015 Presentation.

Declaration of Ross Mitchell  
Page 2 of 2

I declare under penalty of perjury that the foregoing is true and correct.



---

Ross Mitchell  
Vice President, Commercial Operations  
Bombardier Commercial Aircraft

Executed on this 27th day of December, 2017

# ATTACHMENT F

EXHIBIT HAS BEEN REDACTED  
IN ITS ENTIRETY