European Communities and Certain Member States – Measures Affecting Trade in Large Civil Aircraft: Recourse to Article 22.6 of the DSU by the European Union

(DS316)

METHODOLOGY PAPER OF THE UNITED STATES

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EC – Large Civil Aircraft (Panel)	Panel Report, *European Communities and Certain Member States – Measures Affecting Trade in Large Civil Aircraft*, WT/DS316/R, adopted 1 June 2011, as modified by Appellate Body Report, WT/DS316/AB/R
EC – Large Civil Aircraft (Article 21.5 – US) (AB)	Appellate Body Report, *European Communities and Certain Member States – Measures Affecting Trade in Large Civil Aircraft, Recourse to Article 21.5 of the DSU by the United States*, WT/DS316/AB/RW, adopted 28 May 2018
EC – Large Civil Aircraft (Article 21.5 – US) (Panel)	Panel Report, *European Communities and Certain Member States – Measures Affecting Trade in Large Civil Aircraft, Recourse to Article 21.5 of the DSU by the United States*, WT/DS316/RW, adopted 28 May 2018
US – Upland Cotton (Article 22.6 – US II)	Decision by the Arbitrator, *United States – Subsidies on Upland Cotton – Recourse to Arbitration by the United States under Article 22.6 of the DSU and Article 7.10 of the* SCM Agreement, WT/DS267/ARB/2 and Corr.1, 31 August 2009

INTRODUCTION

1. In this long-running dispute, the Dispute Settlement Body ("DSB") recommended that the European Union and its member States Spain, France, Germany, and the United Kingdom (referred to collectively, for the sake of convenience, as "the EU") bring its subsidized financing and other subsidies to Airbus into conformity with WTO rules. When the EU failed to do so within six months, the United States requested authorization to take countermeasures commensurate with the adverse effects determined to exist. The United States also requested establishment of a compliance panel pursuant to Article 21.5 of the *Understanding on Rules and Procedures Governing the Settlement of Disputes* ("DSU") because the EU asserted that it had achieved full compliance with the DSB's recommendations and rulings.

2. At that point, the United States was free to pursue countermeasures, alongside a separate compliance proceeding. However, the EU and the United States entered into discussions regarding the best way to proceed. The parties agreed to suspend the countermeasures arbitration so that compliance could be assessed first. Then, if the EU were found not to have achieved compliance, the arbitration would resume to resolve whether the proposed countermeasures were commensurate with the adverse effects determined to exist.[1]

3. The compliance Panel and appellate reports found that the alleged compliance steps had failed to bring the EU into compliance, either by withdrawing the subsidies or removing the adverse effects, as recommended by the DSB. In fact, the compliance reports adopted by the DSB found that, as of the end of its compliance period, the EU continued to cause adverse effects through billions of dollars in subsidized Launch Aid/ Member-State Financing (LA/MSF) to Airbus's A380, and billions more in subsidized LA/MSF to the A350 XWB. As the compliance Panel and appellate reports found, those LA/MSF subsidies have caused the U.S. large civil aircraft ("LCA") industry to suffer significant lost sales of twin-aisle aircraft and very large aircraft ("VLA"), as well as impedance of U.S. VLA in the EU, Australia, China, Korea, Singapore, and UAE markets.[2] Accordingly, and consistent with its agreement with the EU, the United States requested the Arbitrator to resume this arbitration so that the Arbitrator can evaluate the EU's objection to the countermeasures proposed by the United States.

4. This paper describes the U.S. methodology for calculating the value of countermeasures that is commensurate with the degree and nature of the adverse effects determined to exist. The methodology has two steps. First, the United States quantifies "the adverse effects determined to exist."[3] Using conservative assumptions, the United States values each of the findings of significant lost sales and impedance found in the compliance Panel and appellate reports.[4]

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[1] *See* Agreement on Certain Procedures under Articles 21 and 22 of the DSU and Article 7 of the SCM Agreement (WT/DS316/21).

[2] *See EC and certain member States – Large Civil Aircraft (21.5) (AB)*, paras. 6.36-6.38 ("Compliance Appellate Report").

[3] *Agreement on Subsidies and Countervailing Measures*, Art. 7.9 ("SCM Agreement").

[4] For the sake of brevity, the United States refers to the appellate report, and the compliance Panel report as amended by the appellate report, in the DSU Article 21.5 proceeding as "the compliance Panel and appellate reports" or "the compliance reports."

Second, the United States takes this quantification of the adverse effects determined to exist and derives a formula for calculating commensurate countermeasures that can be applied prospectively on an annualized basis.

5. Based on this methodology, the United States demonstrates that countermeasures totaling $11.2 billion in 2018 would be commensurate with the adverse effects determined to exist. (Of course, the United States would pro-rate this amount for any portion of 2018 in which countermeasures are actually applied.) This is based on a formula that calculates, for any given year, countermeasures commensurate with adverse effects determined to exist, which total approximately $10.56 billion per year in 2013 dollars. As explained in this paper, the United States requests authorization to apply countermeasures in an amount expressed by the following formula:

$$\text{Countermeasures}_{(\text{year})} = \$10.56 \text{ billion} \times (\text{PPI}_{(\text{year-1})} / 256.3)^{5}$$

This level of countermeasures requested by the United States is commensurate with the degree and nature of the adverse effects determined to exist in the compliance proceeding.

6. Indeed, it is a conservative estimate of what is commensurate. It is no secret that, after nearly 14 years of litigation, and the EU's failure to comply at every step along the way, the United States is anxious to pursue countermeasures in the hope that they motivate a positive solution, and the United States can finally achieve respite from the adverse effects inflicted by EU aircraft subsidies throughout this lengthy period. The DSU envisages a quick arbitration; specifically, DSU Article 22.6 allows only 60 days to complete the arbitration after the expiry of the reasonable period of time to comply. In part to avoid a protracted arbitration and ensure the swift process envisaged by the DSU following the unprecedented delay in this dispute, the United States has at many turns adopted conservative assumptions or methodological choices, even where a colorable alternative would have resulted in a substantially higher level of countermeasures.

7. Section I summarizes the long history of this dispute. Section II addresses the adverse effects determined to exist in the Article 21.5 proceeding. Section III explains and applies the U.S. methodology for quantifying those adverse effects. Section IV explains the formula for calculating on a prospective basis the level of countermeasures commensurate with the adverse effects determined to exist.

I. I. HISTORY AND BACKGROUND OF THIS DISPUTE

8. The original and compliance proceedings in this dispute concerned billions of dollars in LA/MSF, capital contributions, and other subsidies that the EU provided Airbus over decades,

[5] As explained in further detail in this paper, PPI is the U.S. Producer Price Index for Aircraft Manufacturing of Civilian Aircraft prepared by the U.S. Bureau of Labor Statistics, and 256.3 is the Aircraft Manufacturing PPI figure for 2013.

from Airbus's formation in the late 1960s and early 1970s through the present day. Those subsidies enabled Airbus to grow into the world-class producer it is today. They did so by solving the central challenge for an LCA producer: the huge risk of making the necessary up-front investment, which can exceed $10 billion, to develop an LCA program and hopefully bring it to market successfully.

9. Decisions about such investments must confront significant industrial, technological, and commercial risks, and must reckon with the uncertainties inherent in the industry's long time horizons. Producers incur the development costs years before the program generates significant cash inflows, and many more years before it can be known whether the investment will generate a positive return. Billions of dollars in LA/MSF subsidies shifted LCA development costs and risks from Airbus to the governments of France, Germany, Spain, and the United Kingdom and thereby enabled Airbus to launch and bring to market each of its aircraft families.[6] The resulting adverse effects to the U.S. LCA industry have been profound, as recounted further below.

10. The United States requested consultations in 2004 regarding the EU's massive subsidization of its large civil aircraft industry. In 2010, the original panel issued its report finding that the EU breached its obligations under Articles 5 and 6.3 of the SCM Agreement not to use subsidies so as to cause adverse effects to U.S. interests. The Appellate Body in 2011 upheld the original panel's ultimate finding that EU subsidies, including LA/MSF, caused adverse effects to the U.S. LCA industry.[7] On June 1, 2011, the Dispute Settlement Body adopted its recommendations for the EU to bring the WTO-inconsistent launch aid and other subsidies into conformity with WTO rules.[8]

11. The key measures, and the ones most central to the original panel and the Appellate Body findings, consisted of subsidized financing in the form of LA/MSF provided by the French, German, Spanish, and U.K. governments to each and every Airbus LCA development program: the A300/310, A320, A330/340, A340-500/600, and the A380.[9] This subsidized LA/MSF

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[6] *See, e.g., EC – Large Civil Aircraft (Panel)*, para. 7.1934 ("LA/MSF functions as a risk transferring device which significantly alters the economics of a decision to launch any given LCA programme. This we believe is adequately demonstrated by the Dorman Report which, in this respect, is supported by the sensitivity testing included in the A380 business case. According to both pieces of evidence, the provision of LA/MSF improves the predicted results of the aircraft programme in question, indicating that an affirmative launch decision is more likely than it would be in the absence of such financing. As noted above, we do not consider that the Dorman Report proves that any particular Airbus model would not have had a positive NPV in the absence of LA/MSF. It does, however, demonstrate how LA/MSF, by transferring risk to the government lenders, reduces the manufacturer's risk, and improves the potential profitability of any particular aircraft programme, making a decision to go ahead with LCA programme launch more likely.") ("Original Panel Report"); *ibid.*, para. 7.1948.

[7] *EC – Large Civil Aircraft (AB)*, para. 1416 ("Original AB Report").

[8] Minutes of Meeting Held in the Centre William Rappard on June 1, 2011, WT/DSB/M/297, para. 28 (July 11, 2011).

[9] *See, e.g.*, Original Panel Report, para. 7.525 (finding "there is no doubt that all of the challenged LA/MSF contracts may be characterised as unsecured loans granted to Airbus on back-loaded and success-dependent repayment terms, at below-market interest rates, for the purpose of developing various new models of LCA").

financing totaled $15 *billion* in principal alone, without accounting for the impossibility of Airbus funding those aircraft programs absent LA/MSF subsidies or the "massive" debt Airbus would have accumulated had it somehow managed to do so.[10] The adverse effects caused by these and other subsidies were even greater – significant lost sales involving more than 300 aircraft worth tens of billions of dollars and displaced exports to seven major country markets in the 2001-2006 period alone.[11] The subsidies found by the original panel and the Appellate Body were unprecedented, both in terms of their immensity and their harmful market effects.

12. LA/MSF is characterized by four core features:

- ***Unsecured****:* there was no form of security for the repayment of the loan principal and interest; no assets or collateral were nominated against which the lender could make a claim in the event that payment obligations were not met.[12]
- ***Back-loaded****:* the repayment structure puts off a significant proportion of expected payments until later in time.[13]
- ***Success-dependent****:* "{b}ecause loan repayments and, in general, any additional returns (interest payments) were charged via levies, this made the loans essentially *success-dependent* – the obligation to make a levy-based payment was not triggered until a successful delivery was made."[14]
- ***Below-market interest rates***[15]

As the original panel found, "there is no doubt that all of the challenged LA/MSF contracts may be characterized as unsecured loans granted to Airbus on back-loaded and success-dependent repayment terms, at below-market interest rates, for the purpose of developing various new models of LCA."[16]

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[10] *See* Original Panel Report, para. 7.1948.

[11] The original panel found, and the Appellate Body confirmed, that Boeing lost sales involving 342 firm orders. Original Panel Report, paras. 7.1803-7.1832; Original AB Report, para. 1414(p). The total value of these lost orders amounts to many billions of dollars by any reasonable calculation. The Appellate Body found displacement in the following markets: in the single-aisle product market in Australia and in the single-aisle and twin-aisle product markets in the European Communities, China, and Korea. Original AB Report, para. 1414(p).

[12] *See* Original Panel Report, para. 7.375 ("{T}he scheduled repayments are not secured by any lien on Airbus assets.").

[13] *EC – Large Civil Aircraft (21.5) (Panel)*, para. 6.273 ("Compliance Panel Report").

[14] Compliance Panel Report, para. 6.270.

[15] *See* Compliance Panel Report, para. 6.114.

[16] Original Panel Report, para. 7.525. *See also* Compliance Panel Report, para. 6.116 (noting that the EU did not dispute that the repayment terms of the A350XWB LA/MSF measures were overall success-dependent, back-loaded, levy-based and unsecured).

13. Because of its nature, LA/MSF had especially pernicious effects. As the original panel found:

> Given the amount of funding transferred to Airbus under the individual LA/MSF contracts, and in the light of the formidable risks associated with the LCA business and the learning curve effects that are necessary to successfully participate in this sector, we have found that it would not have been possible for Airbus to have launched all of these models, as originally designed and at the times it did, without LA/MSF. Even assuming this were a possibility, and that Airbus had actually been able to launch these aircraft relying on only market financing, the increase in the level of debt Airbus would have accumulated over the years would have been massive.[17]

In confirming the original panel's findings, the Appellate Body concluded that "{w}ithout the subsidies, Airbus would not have existed under these scenarios and there would be no Airbus aircraft on the market. None of the sales that the subsidized Airbus made would have occurred."[18]

14. The original panel recommended, pursuant to Article 7.8 of the SCM Agreement, that "the Member granting each subsidy found to have resulted in such adverse effects 'take appropriate steps to remove the adverse effects or . . . withdraw the subsidy."[19] The Appellate Body found that the original panel's recommendation stands and recommended that "the DSB request the European Union to bring its measures, found in this Report, and in the Panel Report as modified by this Report, to be inconsistent with the *SCM Agreement*, into conformity with its obligations under that Agreement."[20]

15. On June 1, 2011, the DSB adopted the report of the original panel, as modified by the Appellate Body, and the Appellate Body report.[21] Under Article 7.9 of the SCM Agreement, if the EU did not comply with the DSB's recommendations within six months – by December 1, 2011 – the United States could seek DSB authorization to take countermeasures.

16. On December 1, 2011, the EU informed the DSB, through a notification listing 36 supposed compliance "steps," that it had achieved compliance with its WTO obligations and the DSB's recommendations and rulings.[22] On December 9, 2011, the United States requested

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[17] *EC – Large Civil Aircraft (Panel)*, para. 7.1948.

[18] *EC – Large Civil Aircraft (AB)*, para. 1264.

[19] *EC – Large Civil Aircraft (Panel)*, para. 8.7 (ellipsis in original).

[20] *EC – Large Civil Aircraft (AB)*, para. 1418.

[21] Minutes of Meeting Held in the Centre William Rappard on 1 June 2011, WT/DSB/M/297, para. 28 (July 11, 2011).

[22] Communication from the European Union dated 1 December 2011, WT/DS316/17 (Dec. 5, 2011).

consultations with the EU, explaining that "the actions and events listed in the EU Notification do not withdraw the subsidies or remove their adverse effects for purposes of Article 7.8 of the SCM Agreement and the EU has therefore failed to implement the DSB's recommendations and rulings."[23]

17. The same day, the United States requested, under SCM Agreement Article 7.9 and DSU Article 22.2, DSB authorization to take countermeasures with respect to the EU at an annual level commensurate with the degree and nature of the adverse effects caused to the interests of the United States by the failure of the EU to withdraw subsidies or remove their adverse effects in compliance with the recommendations and rulings of the DSB.[24] Upon the EU's objection to the level of the U.S. request, the matter was referred to arbitration under Article 22.6 of the DSU.[25]

18. The United States and the EU (the "Parties") entered into a joint sequencing agreement on January 12, 2012. Pursuant to the sequencing agreement, the Parties agreed to request suspension of the arbitration regarding the level of countermeasures pending completion of a compliance panel proceeding under DSU Article 21.5 and any appeal thereof. Therefore, pursuant to the Parties' joint request, the Arbitrator suspended the Article 22.6 proceedings on January 20, 2012, "until either party requests their resumption."[26] At the request of the United States, the Arbitrator resumed these arbitration proceedings on July 13, 2018.[27]

19. The United States was vindicated in its view that the EU had failed to achieve compliance. In fact, the EU took *no* affirmative steps to withdraw the LA/MSF subsidies. The compliance panel made a factual finding that only two of the 36 "steps" the EU said it took to comply with the DSB recommendations and rulings were related to ongoing subsidization, and that these related exclusively to the relatively minor Bremen airport and Mühlenberger Loch subsidies.[28]

20. With respect to the other subsidies, including *all* of the LA/MSF, "the remaining 34 alleged compliance 'steps' are not 'actions' relating to the ongoing (or even past) subsidization of Airbus LCA . . . ."[29] To make matters even worse, the four Airbus member States actually granted *another* round of LA/MSF to Airbus, this time to launch its latest new model in the twin-

[23] WT/DS316/19, p. 3.

[24] WT/DS316/18 (Dec. 12, 2011).

[25] WT/DS316/20 (Jan. 13, 2012), para. 2.

[26] Communication from the Arbitrator, WT/DS316/22 (February 2, 2012).

[27] *See* Communication from the Arbitrator, WT/DS316/38 (July 19, 2018).

[28] Compliance Panel Report, para. 6.42.

[29] Compliance Panel Report, para. 6.42. The EU did not appeal the compliance panel's finding that only two of the 36 alleged steps – and none of the LA/MSF-related steps – were affirmative compliance actions.

aisle market, the A350 XWB, amounting to an additional $4.8 billion,[30] for a total of approximately $20 billion in subsidized LA/MSF.

21. The appellate report subsequently found that the EU had no remaining compliance obligations with respect to LA/MSF subsidies provided to Airbus LCA models launched prior to the A380 – *i.e.*, LA/MSF to the A300/310, A320, A330/340, and A340-500/600. The appellate report reached this conclusion not because the EU had taken affirmative compliance action, but because the Appellate Body considered that, because those earlier LA/MSF subsidies had "expired" with the passage of time, they had been "withdrawn" for purposes of Article 7.8 of the SCM Agreement.[31] While the United States may strenuously disagree with that conclusion for products that continue to be marketed and obtain sales in the marketplace, for purposes of this proceeding, we proceed taking as a given the compliance report findings.

22. As to LA/MSF to the A380 and A350 XWB, the appellate report confirmed that these measures constitute unwithdrawn subsidies that cause adverse effects in the post-implementation period.[32] In the next section, the United States reviews the adverse effects determined to exist.

II. II. THE ADVERSE EFFECTS DETERMINED TO EXIST

23. Article 7.9 of the SCM Agreement provides:

> In the event the Member has not taken appropriate steps to remove the adverse effects of the subsidy or withdraw the subsidy within six months from the date when the DSB adopts the panel report or the Appellate Body report, and in the absence of agreement on compensation, the DSB shall grant authorization to the complaining Member to take countermeasures, *commensurate with the degree and nature of the adverse effects determined to exist*, unless the DSB decides by consensus to reject the request.[33]

24. On December 9, 2011, the United States requested authorization to take countermeasures with respect to the EU at an annual level "commensurate with the degree and nature of the adverse effects caused to the interests of the United States by the failure of the EU and certain member States to withdraw subsidies or remove their adverse effects in compliance with the

[30] *Airbus set to gain aid for A350*, Kevin Done and Peggy Hollinger, Financial Times (June 15, 2009) (Exhibit USA-1).

[31] Compliance Appellate Report, paras. 5.383, 5.402, 5.410-5.411, 6.11-6.12, 6.19.

[32] Compliance Appellate Report, paras. 6.10, 6.20-6.23, 6.30-6.31, 6.36-6.37, 6.41, 6.44. The United States uses the phrase "post-implementation period" to refer to the period after the end of the reasonable period of time to comply with the DSB's recommendations and rulings.

[33] SCM Agreement, Art. 7.9 (emphasis added).

recommendations and rulings of the DSB."[34] The EU objected to the proposed U.S. countermeasures, and the matter was referred to arbitration pursuant to Article 22.6 of the DSU.

25. Article 7.10 of the SCM Agreement provides that, if a Member seeks arbitration under DSU Article 22.6 regarding countermeasures proposed under Article 7.9 of the SCM Agreement, "the arbitrator shall determine whether the countermeasures are commensurate with the degree and nature of the adverse effects determined to exist."[35] A previous arbitrator found that "the precise findings on adverse effects made by the panels and the Appellate Body…constitute the 'adverse effects determined to exist'" referred to in SCM Articles 7.9 and 7.10.[36]

26. As noted, the Parties agreed to suspend this arbitration proceeding to permit the consistency of the EU's alleged compliance steps to be evaluated through a proceeding under DSU Article 21.5. To assess the U.S. complaint that the EU had failed to bring its WTO-inconsistent subsidies into compliance with WTO rules by the end of the implementation period, the compliance panel and appellate reports evaluated alleged adverse effects during the period from December 1, 2011 (the end of the implementation period) through 2013.[37] The appellate report found that "the orders identified in Table 19 of the Panel Report in the twin-aisle LCA market represent 'significant lost sales' to the US LCA industry and, therefore, that the LA/MSF subsidies existing in the post-implementation period are a genuine and substantial cause of serious prejudice to the United States within the meaning of Article 6.3(c) of the SCM Agreement."[38] The appellate report further found that "the orders identified in Table 19 of the Panel Report in the VLA market represent 'significant lost sales' to the US LCA industry and, therefore, that the LA/MSF subsidies existing in the post-implementation period are a genuine and substantial cause of serious prejudice to the United States within the meaning of Article 6.3(c) of the SCM Agreement."[39]

27. Table 19 of the Compliance Panel Report provides, in relevant part:[40]

Table 19: United States' "Lost Sales" Claims in the Post-Implementation Period

Product Market / Customer	LCA model	No. of Orders	No. of Orders

[34] WT/DS316/18 (Dec. 12, 2011).

[35] SCM Agreement, Art. 7.10.

[36] *US – Upland Cotton (22.6) (SCM Art. 7.10) (Arbitrator)*, para. 4.49.

[37] *See* Compliance Panel Report, paras. 6.1805, 6.1817.

[38] Compliance Appellate Report, para. 6.31(a).

[39] Compliance Appellate Report, para. 6.37(a).

[40] Compliance Panel Report, para. 6.1781, Table 19. *See also* Compliance Appellate Report, para. 5.705, Table 10 and para. 5.723, Table 12.

		2012	2013
Twin-Aisle			
Cathay Pacific Airways	A350XWB-1000	10	
Singapore Airways	A350XWB-900		30
United Airlines	A350XWB-1000		10
Very Large Aircraft			
Emirates	A380		50
Transaero Airlines	A380	4	

28. The compliance appellate report also found that Boeing's VLA imports into the subsidizing Member market and exports to third country markets – *i.e.*, 747-8I deliveries – were impeded by deliveries of the A380 that would have been unavailable without LA/MSF.[41] The specific country markets, deliveries, and market shares are reproduced below from the compliance appellate report:[42]

[41] Compliance Appellate Report, paras. 5.740-5.742.

[42] Compliance Appellate Report, paras. 5.732, 5.742.

Table 13: Market for very large LCA

	European Union			Australia			China		
Delivery Data	Dec. 2011	2012	2013	Dec. 2011	2012	2013	Dec. 2011	2012	2013
Boeing Volume (Units)	0	5	5	0	0	0	0	0	0
Boeing Market Share	-	55.6%	55.6%	0.0%	-	-	0.0%	0.0%	0.0%
Airbus Volume (Units)	0	4	4	1	0	0	1	2	1
Airbus Market Share	-	44.4%	44.4%	100%	-	-	100%	100%	100%

	Korea			Singapore			United Arab Emirates		
Delivery Data	Dec. 2011	2012	2013	Dec. 2011	2012	2013	Dec. 2011	2012	2013
Boeing Volume (Units)	0	0	0	0	0	0	0	0	0
Boeing Market Share	-	0.0%	0.0%	-	0.0%	-	0.0%	0.0%	0.0%
Airbus Volume (Units)	0	1	2	0	5	0	2	11	13
Airbus Market Share	-	100%	100%	-	100%	-	100%	100%	100%

29. Thus, the "adverse effects determined to exist" consist of these significant lost sales in the twin-aisle and VLA markets, and impedance in the EU, Australia, China, Korea, Singapore, and UAE VLA markets, during the December 1, 2011 – 2013 period.

III. III. QUANTIFYING THE "ADVERSE EFFECTS DETERMINED TO EXIST"

30. As described above, the adverse effects determined to exist consist of serious prejudice to the interests of the United States in the form of significant lost sales in the twin-aisle and VLA markets and impedance in six VLA country markets. The compliance Panel and appellate reports identified the following as significant lost sales: the Cathay Pacific twin-aisle order in 2012, the Transaero VLA order in 2012, the Singapore Airlines twin-aisle order in 2013, the United twin-aisle order in 2013, and the Emirates VLA order in 2013. These transactions varied in terms of the Airbus model and number of aircraft ordered, as indicated above. The compliance appellate report's impedance findings reflect four (4) A380 deliveries in December 2011, 23 A380 deliveries in 2012, and 20 A380 deliveries in 2013, which in the absence of A380 LA/MSF, would have been U.S. deliveries.

31. The degree of these adverse effects is measured by the value of the aircraft the U.S. LCA industry would have sold in the case of lost sales, or delivered in the case of impedance. The United States explains its approach to valuing lost sales and then applies that approach in Section A below, before turning to its approach to valuing impedance and the application of that approach in Section B.

A. Valuation of Lost Sales

1. U.S. Approach to Valuing Lost Sales

32. As discussed above, the compliance appellate report confirmed significant lost sales findings in the post-implementation period with respect to five sales campaigns. For purposes of its request for authorization to take countermeasures, and consistent with the compliance appellate report's findings, the United States has assumed that, absent the subsidies that enabled Airbus to make those sales, Boeing would have sold an equal number of the closest competing Boeing model. The lost sales findings from the compliance proceeding involve three Airbus LCA models within the A350 XWB and A380 model "families": the A350 XWB-900 (Singapore Airways), the A350 XWB-1000 (Cathay Pacific and United), and the A380 (Emirates and Transaero).[43]

33. The respective closest Boeing models are as follows:

Airbus Model	Closest Boeing Model
A350XWB-900	787-10[44]
A350XWB-1000	777-300ER[45]
A380	747-8I[46]

34. To determine the value of each lost sale, the United States started with the value of the closest Boeing model in the projected years of delivery. To be conservative, and in recognition of the general principle that economic activity tomorrow is not as valuable as economic activity

[43] An LCA producer often develops two or more variants (sometimes referred to as "minor models") within the same LCA model "family," such as the A350 XWB-900 and A350 XWB-1000 variants developed as part of the A350 XWB program. In contrast, Airbus currently offers only one variant of the A380, the A380-800, which the United States refers to herein simply as the "A380."

[44] *See* Compliance Panel Report, para. 6.1792; Airbus presentation by John Leahy, COO Customers, Commercial update – Global Investor Forum, slides 43-44 (Dec. 12, 2013) (entitled, "A350-900 capability versus 787-10") (Exhibit USA-2); *Emirates to choose between A350-900 and 787-10 next year*, Murdo Morrison, FlightGlobal (Oct. 1, 2015) (Exhibit USA-3); *Wide Body Battle: Boeing 787-10 Or Airbus A350-900?*, Dhierin Bechai, Seeking Alpha (Dec. 19, 2014) (Exhibit USA-4).

[45] *See* Compliance Panel Report, para. 6.1308 (quoting Airbus COO-Customers John Leahy as stating, "{t}he day we deliver the first A350-1000, the 777-300ER will become obsolete"); *ibid*., paras. 6.1359-6.1360 (rejecting the EU's argument that the A350 XWB-1000 did not compete with the 777-300ER in a sales campaign conducted by Cathay Pacific Airways); *ibid.*, para. 6.1370 (finding that the A350 XWB-1000 and 777-300ER compete along with other twin-aisle LCA in the same product market); Airbus presentation by John Leahy, COO Customers, Commercial update – Global Investor Forum, slide 45 (Dec. 12, 2013) (comparing efficiency of A350 XWB-1000 to 777-300ER) (Exhibit USA-2).

[46] *See* Compliance Panel Report, para. 6.1410 (finding that the A380 and 747-8I compete in the same product market).

today, the United States discounted the value of future scheduled deliveries to calculate the value of a lost sale at the time it was lost.

35. For example, suppose Boeing lost a sale in 2012 to Airbus in which the customer ordered 10 A350 XWB-1000s. Suppose further that three aircraft were to be delivered in 2018, three in 2019, and the remaining four in 2020. The U.S. methodology would:

(1) Identify the closest Boeing model. (In this example, it would be the 777-300ER.)
(2) Multiply 3 x the 2018 777-300ER price to determine the total 2018 value.
(3) Discount that total 2018 value to order year (2012) dollars.
(4) Multiply 3 x the 2019 777-300ER price to determine the total 2019 value.
(5) Discount that total 2019 value to order year (2012) dollars.
(6) Multiply 4 x the 2020 777-300ER price to determine the total 2020 value.
(7) Discount that total 2020 value to order year (2012) dollars.
(8) Sum the values of the three sets of deliveries, as stated in 2012 dollars, to determine the value of the 2012 lost sale in the year it was lost.

36. Thus, the data required to implement this methodology include an expected delivery schedule for each lost sale, an aircraft price for each year of expected delivery, and a discount rate. The United States explains its conceptual approach to each in greater detail in the ensuing subsections. The United States addresses the application of that approach to each of the five lost sales in Section III.A.2.

a. Delivery schedule

37. The exact delivery schedule agreed upon between Airbus and each of the five relevant customers at the time of order was not available to the United States. Instead, the United States relies on Boeing estimates of a delivery schedule for each order. Boeing based its estimates on its understanding of each "customer's fleet activity and planning (including past and anticipated future aircraft disposals and additions), Airbus's past deliveries and known scheduled deliveries to that customer (including deliveries of Airbus aircraft ordered in the lost sales at issue), and airline and LCA industry practices in general."[47]

38. For example, Boeing's industry knowledge and experience has led it to estimate that, when Cathay Pacific ordered ten A350XWB-1000 aircraft in 2012, three would have been scheduled for delivery in 2018, another three would have been scheduled for delivery in 2019, and the remaining four would have been scheduled for delivery in 2020.

39. As indicated above, the United States applies this approach to each of the five lost sales in Section III.A.2 below. That discussion identifies, for each lost sale, the estimated delivery schedule.

[47] *See* Boeing Declaration, para. 5 (Exhibit USA-5(BCI)).

b. Delivery prices

40. The value of a lost sale is the value of the airplanes the U.S. LCA industry would have sold. For each of the orders of Airbus aircraft found to be significant lost sales, the United States assumes that the customer would have ordered the closest Boeing model, as identified above, in the same unit volume as the number of aircraft that the customer actually ordered from Airbus.

41. In economic terms, the value of an LCA is the contractual price paid by the customer to the producer. Accordingly, the United States based the value of each lost sale on contractual prices for the relevant Boeing LCA. The price that customers pay for a Boeing aircraft is determined through negotiations between Boeing and the customer and has several components. Each aircraft has a "gross price" expressed in base-year dollars, where the "base year" is agreed upon between Boeing and the customer.[48] Of note, the base year is not necessarily the order year. Sometimes, existing customers will place a firm order that references the base year already in place from a previous order in an earlier year. It is also possible that a base year will be set as the year in which a sales campaign begins, even if the firm order is not placed until a subsequent year.[49]

42. Boeing typically receives **[BCI]** payment upon order. As delivery nears, the customer typically must begin making **[BCI]** payments, referred to as pre-delivery payments, or "PDPs."[50] At delivery, the customer must then pay whatever balance remains from the delivery price.[51] Because Boeing receives much of the payment for aircraft orders several years after the orders are contracted, each contract contains an escalation formula, which determines the escalation factors for transforming base-year prices into delivery-year prices. These escalation formulas are an industry-accepted practice to offset the increase in labor and material costs over time resulting from inflation and other economic changes.[52]

43. Each customer contract has a specific escalation formula based on **[BCI]**.[53] The formula determines an escalation factor for each month of each year between the base year and the delivery year.

44. For example, for an order received in a given month in 2012, the contract may specify that the base-year purchase price is $100 million per aircraft in that month, but that this price will

[48] *See* Boeing Declaration, para. 4 (Exhibit USA-5(BCI)).

[49] *See* Boeing Declaration, para. 4, footnote 1 (Exhibit USA-5(BCI)).

[50] Boeing Declaration, para. 4, footnote 3 (Exhibit USA-5(BCI)).

[51] Boeing Declaration, para. 4, footnote 3 (Exhibit USA-5(BCI)).

[52] *See* Boeing Declaration, para. 4 (Exhibit USA-5(BCI)). *See also* Original Panel Report, para. 7.1719 ("most sales contracts include provisions for price escalation in line with inflation").

[53] *See* Boeing Declaration, para. 4 (Exhibit USA-5(BCI)).

be multiplied by an escalation factor as specified for the relevant month in the expected delivery years.

45. Each contract also includes "price concessions," which are discounts to the gross price. Generally, these are expressed as a discount from the base-year gross price.[54] A "net price" is calculated by subtracting the price concessions from the gross price. This net price is then escalated using the escalation formula to arrive at a delivery-year price for each aircraft.[55] This net price, denominated in delivery year dollars, is what the United States used to calculate the value of lost sales.

46. For four of the five lost sales, the same customer placed firm orders for the closest Boeing model within one or two years of the Airbus order. These include all three twin-aisle customers (Cathay Pacific (2012), Singapore Airways (2013), and United (2013)), and Transaero (2012) in the VLA market.[56] The pricing terms actually observed for those contemporaneous Boeing orders are the best available indication of the prices these same customers would have paid for the closest Boeing model in the counterfactual situation absent LA/MSF. Indeed, these prices may be conservative because they reflect competition with the subsidy-enabled Airbus model with which competition is the closest.

47. Boeing's internal records, including in particular its electronic revenue management system, contain detailed data on the aircraft gross price, price concessions, net price, price escalation terms, and the base year.[57] Boeing relied on these records to provide the United States with the requested data.[58] The data provided to the United States by Boeing for these transactions is contained in Exhibits USA-12(HSBI) through USA-15(HSBI). In Section III.A.2, the United States applies its approach to each of the five lost sales. That discussion includes the delivery-year price for each ordered aircraft.

48. With respect to the Emirates (2013) VLA lost sale, there was no contemporaneous 747-8I sale to Emirates upon which to rely. **[BCI]**.[59] Boeing consulted this **[BCI]** and reported the necessary information that it used to calculate the delivery-year prices with respect to the

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[54] *See* Boeing Declaration, para. 4 (Exhibit USA-5(BCI)). **[BCI]**. Of the five sets of customer terms relied on in the U.S. methodology, this is only the case **[[HSBI]]**. *See* **[[HSBI]]**. Therefore, **[BCI]**.

[55] *See* Boeing Declaration, para. 4 (Exhibit USA-5(BCI)).

[56] *See Cathay Pacific Announces Additional Aircraft Order*, Cathay Pacific Press Release (Dec. 27, 2013) (Exhibit USA-6); *Boeing Launches 787-10 Dreamliner*, Boeing Press Release (June 18, 2013) (Exhibit USA-7); *United Converts 10 787 Orders to 777-300ER*, Edward Russell, FlightGlobal (Apr. 23, 2015) (Exhibit USA-8); Airbus and Boeing Orders 2013, Aviation Strategy (Feb. 2014), p. 17 (Exhibit USA-9).

[57] *See* Boeing Declaration, para. 4 (Exhibit USA-5(BCI)).

[58] *See* Boeing Declaration, para. 4 (Exhibit USA-5(BCI)).

[59] *See* Boeing Declaration, para. 4 (Exhibit USA-5(BCI)).

Emirates lost sale.[60] Exhibit USA-16(HSBI) provides the information reported to the United States by Boeing that is relevant to its calculation of the delivery-year price.

c. Discount Rate

49. The values derived by the U.S. approach to this point are in delivery-year dollars. While they reflect the expected value of the aircraft the U.S. industry would have sold, they arguably do not reflect the value at the time of sale, *i.e.*, the time the sale was lost. In economics, there is a general principle that economic activity tomorrow is not as valuable as economic activity today. A "discount rate" is used to determine the present value of that future economic activity.

50. A discount rate in this context is the rate that the United States is willing to pay to transfer the relevant economic activity, reflected in trade, from the future to the present. This rate corresponds straightforwardly to the interest rate on U.S. sovereign debt. Borrowing enables the United States to spend money today – generating economic activity today – but at the cost of having to forego spending (and thus the economic activity that would be fueled by that spending) at the date when it repays the loan. Thus, the interest rate of U.S. sovereign debt reveals the "price" the United States has had to pay to transfer economic activity from the future to the present.

51. The United States used a discount rate equal to the interest rate on U.S. 10-year Treasury Bonds. These U.S. Treasury bonds of intermediate duration provide a robust measure of the interest rate on U.S. sovereign debt. Indeed, this approach is conservative because 10 years is longer than the time between the orders and nearly all of the estimated deliveries at issue here, and the interest rate on shorter bonds would be lower. Therefore, for 2012 sales, the United States used the 2012 interest rate on U.S. 10-year Treasury Bonds, which was 1.80 percent.[61] And for 2013 sales, the United States used the 2013 interest rate on U.S. 10-year Treasury Bonds, which was 2.35 percent.[62]

52. The mathematics of calculating the discounted present value are well-known. The present value in the order year of a delivery made in a future year is obtained by dividing the value upon delivery by (1 + discount rate) raised to the power of (delivery year – order year). This is expressed by the following formula:

$$Discounted\ Present\ Value = \frac{Value\ upon\ Delivery}{(1 + \text{Discount Rate})^{Delivery\ Year - Order\ Year}}$$

53. For example, suppose that an order received in 2012 will generate an export of an LCA worth $100 million in 2015. The present value in 2012 of that order is $100 million divided by

[60] *See* Boeing Declaration, para. 4 (Exhibit USA-5(BCI)).

[61] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

[62] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

(1 + 0.018) ^ (2015 – 2012) = $100 million / 1.018 ^ 3 = $94.8 million. Thus, using the conservative methodology adopted by the United States, this hypothetical sale lost in 2012 would be valued at $94.8 million even though its value in 2015 would have been $100 million.

2. Application of U.S. Approach to Valuing Lost Sales

54. Below is an explanation of the valuation of the lost sales determined to exist in 2012 and 2013, through application of the approach described above.[63]

2012 Lost Sales

55. The compliance appellate report determined that the U.S. LCA industry lost two orders in 2012 because of the EU's provision of WTO inconsistent subsidies to Airbus: Cathay Pacific's order of ten (10) A350 XWB-1000s, and Transero's order of four (4) A380s.

a. Cathay Pacific (2012)

56. Cathay Pacific ordered 10 A350 XWB-1000s in 2012.[64] Boeing estimated that deliveries of these orders would have occurred as follows: three (3) in 2018, three (3) in 2019, and four (4) in 2020.[65] The closest Boeing model was the 777-300ER.

57. To determine pricing information, Boeing relied on a contract between Boeing and Cathay Pacific signed in 2013 for 777-300ERs. The contract set the base year as **[BCI]**.[66] Using the base year gross price, pricing concessions, and the escalation formula contained in the contract, Boeing determined the 2018, 2019, and 2020 aircraft prices.[67]

58. As explained previously, the discount factor is equal to the U.S. 10-year Treasury bond rate in the order year, which for 2012 was 1.8 percent,[68] to the power of the number of years to be discounted. Thus, the discount factor for six years of discounting (*e.g.*, 2018 to 2012) would be equal to 1.018 to the sixth power, or 1.1130. Dividing a future value by this discount factor provides the discounted value (sometimes referred to as the "present value").

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[63] There were no December 2011 lost sales determined to exist.

[64] Compliance Panel Report, para. 6.1781, Table 19. *See also* Compliance Appellate Report, para. 5.705, Table 10.

[65] Estimated Delivery Schedules (Exhibit USA-11).

[66] Cathay Pacific 777-300ER Order Information (Exhibit USA-12(HSBI)).

[67] *See* Cathay Pacific 777-300ER Order Information (Exhibit USA-12(HSBI)).

[68] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

59. The following table reflects the valuation of the Cathay Pacific 2012 lost sale:

Cathay Pacific (2012)						
Delivery Year	Deliveries (A)[69]	Closest Boeing Model	Delivery Year Price (B)[70]	Total Delivery Year Value (C) = A*B	Discount Factor (D)[71]	Discounted Order Year (2012) Value (E) = C/D
2018	3	777-300ER	$[[HSBI]]	$[[HSBI]]	1.1130	$[[HSBI]]
2019	3	777-300ER	$[[HSBI]]	$[[HSBI]]	1.1330	$[[HSBI]]
2020	4	777-300ER	$[[HSBI]]	$[[HSBI]]	1.1534	$[[HSBI]]
Total 2012 lost sale value						$[[HSBI]]

60. As reflected in the table, the value (in 2012 dollars) of the Cathay Pacific (2012) lost sale was approximately $**[[HSBI]]** billion.

b. Transaero (2012)

61. Transaero ordered 4 A380s in 2012.[72] Boeing estimated that deliveries of these orders would have occurred as follows: two (2) in 2016 and two (2) in 2017.[73] The closest Boeing model was the 747-8I.

62. To determine pricing information, Boeing relied on a contract between Boeing and Transaero signed in 2013 for 747-8Is. The contract set the base year as **[BCI]**.[74] Using the base year gross price, pricing concessions, and the escalation formula contained in the contract, Boeing determined the 2016 and 2017 aircraft prices.[75]

63. As explained previously, the discount factor is equal to the U.S. 10-year Treasury bond rate in the order year, which for 2012 was 1.8 percent,[76] to the power of the number of years to be discounted. Thus, the discount factor for six years of discounting (*e.g.*, 2018 to 2012) would be equal to 1.018 to the sixth power, or 1.1130. Dividing a future value by this discount factor provides the discounted value (sometimes referred to as the "present value").

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[69] Estimated Delivery Schedules (Exhibit USA-11).

[70] Cathay Pacific 777-300ER Order Information (Exhibit USA-12(HSBI)).

[71] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

[72] Compliance Panel Report, para. 6.1781, Table 19. *See also* Compliance Appellate Report, para. 5.723, Table 12.

[73] Estimated Delivery Schedules (Exhibit USA-11).

[74] Transaero 747-8I Order Information (Exhibit USA-13(HSBI)).

[75] *See* Transaero 747-8I Order Information (Exhibit USA-13(HSBI)).

[76] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

64. The following table reflects the valuation of the Transaero 2012 lost sale:

Transaero (2012)						
Delivery Year	Deliveries (A)[77]	Closest Boeing Model	Delivery Year Price (B)[78]	Total Delivery Year Value (C) = A*B	Discount Factor (D)[79]	Discounted Order Year (2012) Value (E) = C/D
2016	2	747-8I	$[[HSBI]]	$[[HSBI]]	1.0740	$[[HSBI]]
2017	2	747-8I	$[[HSBI]]	$[[HSBI]]	1.0933	$[[HSBI]]
Total 2012 lost sale value						$[[HSBI]]

65. As reflected in the table, the value (in 2012 dollars) of the Transaero 2012 lost sale was approximately $**[[HSBI]]** billion.

2013 Lost Sales

66. The compliance Panel and appellate reports determined that the U.S. LCA industry lost three sales in 2013 because of the EU's provision of WTO inconsistent subsidies to Airbus: Singapore Airline's order of thirty (30) A350 XWB-900s, United Airlines' order of ten (10) A350 XWB-1000s, and Emirates' order of fifty (50) A380s.

c. Singapore Airlines (2013)

67. Singapore Airlines ordered 30 A350 XWB-900s in 2013.[80] Boeing estimated that deliveries of these orders would have occurred as follows: ten (10) in 2019, ten (10) in 2020, and ten (10) in 2021.[81] The closest Boeing model was the 787-10.

68. To determine pricing information, Boeing relied on a contract between Boeing and Singapore Airlines signed in 2013 for 787-10s. The contract set the base year as **[BCI]**.[82] Using the base year gross price, pricing concessions, and the escalation formula contained in the contract, Boeing determined the 2019, 2020, and 2021 aircraft prices.[83]

69. As explained previously, the discount factor is equal to the U.S. 10-year Treasury bond

[77] Estimated Delivery Schedules (Exhibit USA-11).

[78] Transaero 747-8I Order Information (Exhibit USA-13(HSBI)).

[79] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

[80] Compliance Panel Report, para. 6.1781, Table 19. *See also ibid*., para. 5.705, Table 10.

[81] Estimated Delivery Schedules (Exhibit USA-11).

[82] Singapore Airlines 787-10 Order Information (Exhibit USA-14(HSBI)).

[83] *See* Singapore Airlines 787-10 Order Information (Exhibit USA-14(HSBI)).

rate in the order year, which for 2013 was 2.35 percent,[84] to the power of the number of years to be discounted. Thus, the discount factor for six years of discounting (*e.g.*, 2019 to 2013) would be equal to 1.0235 to the sixth power, or 1.1495. Dividing a future value by this discount factor provides the discounted value (sometimes referred to as the "present value").

70. The following table reflects the valuation of the Singapore Airlines 2013 lost sale:

Singapore Airlines (2013)						
Delivery Year	Deliveries (A)[85]	Closest Boeing Model	Delivery Year Price (B)[86]	Total Delivery Year Value (C) = A*B	Discount Factor (D)[87]	Discounted Order Year (2013) Value (E) = C/D
2019	10	787-10	$[[HSBI]]	$[[HSBI]]	1.1495	$[[HSBI]]
2020	10	787-10	$[[HSBI]]	$[[HSBI]]	1.1766	$[[HSBI]]
2021	10	787-10	$[[HSBI]]	$[[HSBI]]	1.2042	$[[HSBI]]
Total 2013 lost sale value						$[[HSBI]]

71. As reflected in the table, the value (in 2013 dollars) of the Singapore Airlines 2013 lost sale was approximately $**[[HSBI]]** billion.

d. United Airlines (2013)

72. United Airlines ordered 10 A350 XWB-1000s in 2013.[88] Boeing estimated that deliveries of these orders would have occurred as follows: two (2) in 2018, four (4) in 2019, and four (4) in 2020.[89] The closest Boeing model was the 777-300ER.

73. To determine pricing information, Boeing relied on a contract between Boeing and United signed in 2015 for 777-300ERs. The contract set the base year as **[BCI]**.[90] Using the base year gross price, pricing concessions, and the escalation formula contained in the contract, Boeing determined the 2018, 2019, and 2020 aircraft prices.[91]

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[84] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

[85] Estimated Delivery Schedules (Exhibit USA-11).

[86] Singapore Airlines 787-10 Order Information (Exhibit USA-14(HSBI)).

[87] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

[88] Compliance Panel Report, para. 6.1781, Table 19. *See also* Compliance Appellate Report, para. 5.705, Table 10.

[89] Estimated Delivery Schedules (Exhibit USA-11).

[90] United 777-300ER Order Information (Exhibit USA-15(HSBI)).

[91] *See* United 777-300ER Order Information (Exhibit USA-15(HSBI)).

74. As explained previously, the discount factor is equal to the U.S. 10-year Treasury bond rate in the order year, which for 2013 was 2.35 percent,[92] to the power of the number of years to be discounted. Thus, the discount factor for five years of discounting (*e.g.*, 2018 to 2013) would be equal to 1.0235 to the fifth power, or 1.1232. Dividing a future value by this discount factor provides the discounted value (sometimes referred to as the "present value").

75. The following table reflects the valuation of the United 2013 lost sale:

United (2013)						
Delivery Year	Deliveries (A)[93]	Closest Boeing Model	Delivery Year Price (B)[94]	Total Delivery Year Value (C) = A*B	Discount Factor (D)[95]	Discounted Order Year (2013) Value (E) = C/D
2018	2	777-300ER	$[[HSBI]]	$[[HSBI]]	1.1232	$[[HSBI]]
2019	4	777-300ER	$[[HSBI]]	$[[HSBI]]	1.1495	$[[HSBI]]
2020	4	777-300ER	$[[HSBI]]	$[[HSBI]]	1.1766	$[[HSBI]]
Total 2013 lost sale value						$[[HSBI]]

76. As reflected in the table, the value (in 2013 dollars) of the United 2013 lost sale was approximately $**[[HSBI]]** billion.

e. Emirates (2013)

77. Emirates ordered 50 A380s in 2013.[96] Boeing estimated that deliveries of these orders would have occurred as follows: three (3) in 2016, nine (9) in 2017, six (6) in each year from 2018 through 2023, and two (2) in 2024.[97] The closest Boeing model was the 747-8I.

[92] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

[93] Estimated Delivery Schedules (Exhibit USA-11).

[94] United 777-300ER Order Information (Exhibit USA-15(HSBI)).

[95] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

[96] Compliance Panel Report, para. 6.1781, Table 19. *See also* Compliance Appellate Report, para. 5.723, Table 12.

[97] Estimated Delivery Schedules (Exhibit USA-11).

78. To determine pricing information, Boeing relied on **[BCI]**. This **[BCI]** set the base year as **[BCI]**.[98] Using those data on base year gross price, pricing concessions, and the escalation formula, Boeing determined the aircraft prices for 2016-2024.[99]

79. As explained previously, the discount factor is equal to the U.S. 10-year Treasury bond rate in the order year, which for 2013 was 2.35 percent,[100] to the power of the number of years to be discounted. Thus, the discount factor for three years of discounting (e.g., 2016 to 2013) would be equal to 1.0235 to the third power, or 1.0722. Dividing a future value by this discount factor provides the discounted value (sometimes referred to as the "present value").

80. The following table reflects the valuation of the Emirates 2013 lost sale:

Emirates (2013)						
Delivery Year	Deliveries (A)[101]	Closest Boeing Model	Delivery Year Price (B)[102]	Total Delivery Year Value (C) = A*B	Discount Factor (D)[103]	Discounted Order Year (2013) Value (E) = C/D
2016	3	747-8I	$[[HSBI]]	$[[HSBI]]	1.0722	$[[HSBI]]
2017	9	747-8I	$[[HSBI]]	$[[HSBI]]	1.0974	$[[HSBI]]
2018	6	747-8I	$[[HSBI]]	$[[HSBI]]	1.1232	$[[HSBI]]
2019	6	747-8I	$[[HSBI]]	$[[HSBI]]	1.1495	$[[HSBI]]
2020	6	747-8I	$[[HSBI]]	$[[HSBI]]	1.1766	$[[HSBI]]
2021	6	747-8I	$[[HSBI]]	$[[HSBI]]	1.2042	$[[HSBI]]
2022	6	747-8I	$[[HSBI]]	$[[HSBI]]	1.2325	$[[HSBI]]
2023	6	747-8I	$[[HSBI]]	$[[HSBI]]	1.2615	$[[HSBI]]
2024	2	747-8I	$[[HSBI]]	$[[HSBI]]	1.2911	$[[HSBI]]
Total 2013 lost sale value						$[[HSBI]]

81. As reflected in the table, the value (in 2013 dollars) of the Emirates 2013 lost sale was approximately $**[[HSBI]]** billion.

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[98] Emirates **[BCI]** Information (Exhibit USA-16(HSBI)).

[99] *See* Emirates **[BCI]** Information (Exhibit USA-16(HSBI)).

[100] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

[101] Estimated Delivery Schedules (Exhibit USA-11).

[102] Emirates **[BCI]** Information (Exhibit USA-16(HSBI)).

[103] *See* U.S. 10-Year Treasury Bond Interest Rates (Exhibit USA-10).

B. Valuation of Impedance

1. U.S. Approach to Valuing Impedance

82. In the six country VLA markets where the compliance Panel and appellate reports found impedance of U.S. VLA, Airbus delivered a total of four (4) A380s in December 2011, 23 A380s in 2012, and 20 A380s in 2013.[104] Consistent with the compliance appellate report's findings, the United States considers that those A380 aircraft deliveries would have been deliveries of the Boeing 747-8I in the counterfactual absent the inconsistent LA/MSF subsidies. To calculate the value of impedance associated with those Airbus deliveries, the United States multiplied the global average price of 747-8I deliveries for the relevant year by the number of deliveries in the corresponding year.

83. Boeing used proprietary data on all 747-8I deliveries in 2012 and 2013 to calculate the global average per-aircraft prices of 747-8I deliveries for each of those years.[105] Boeing maintains 747-8I price data information on the gross price, price concessions, and resulting net price of each aircraft, escalated to the delivery month and year.[106] Boeing calculated the global average per-aircraft delivery price for a given year by dividing the sum of all net prices for aircraft delivered in that year by the number of aircraft delivered in that year.[107] Boeing provided the United States with the delivery price for each 747-8I delivery in 2012 and 2013, and the resulting average prices for those years. This information is contained in Exhibit USA-17(HSBI).

84. Similarly, Boeing used proprietary data on all 747-8I orders in 2011 to calculate the global average per-aircraft 747-8I order price for 2011, which was used to derive a December 2011 delivery price, as discussed below.[108]

85. As with the price data used in the lost sales calculations discussed above, using 747-8I delivery prices (and order prices to derive delivery prices in the case of 2011) is likely

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[104] The United States notes that the compliance Panel found that EU subsidies caused displacement and/or impedance of twin-aisle aircraft in various geographic markets. The compliance appellate report reversed this finding because it included subsidies to the A330, for which the compliance appellate report found the EU had no remaining obligations under SCM Article 7.8 because the subsidies had "expired." The compliance appellate report indicated that it could not complete the analysis in the twin-aisle market because the compliance Panel had not disentangled the A330 from the A350 XWB. While the United States strenuously maintains that A350 XWB LA/MSF continues to cause displacement and/or impedance, we ignore this for present purposes and follow the adopted compliance reports for the purposes of calculating commensurate countermeasures.

[105] *See* Boeing Declaration, para. 6 (Exhibit USA-5(BCI)); 747-8I Global Delivery Prices for 2012 and 2013(Exhibit USA-17(HSBI)).

[106] *See* Boeing Declaration, para. 6 (Exhibit USA-5(BCI)).

[107] *See* 747-8I Global Delivery Prices for 2012 and 2013(Exhibit USA-17(HSBI)).

[108] *See* Boeing Declaration, para. 6 (Exhibit USA-5(BCI)).

conservative because those prices reflect competition against subsidized Airbus A380 aircraft that would have been absent from the market in the counterfactual situation without subsidies.

2. Application of U.S. Approach to Valuing Impedance

86. In 2012, Boeing delivered 10 747-8Is worldwide, and the net prices of those aircraft totaled $**[[HSBI]]**.[109] This resulted in an average per-aircraft price of $**[[HSBI]]** for 2012. Thus, to calculate the value of impedance for 2012, the United States multiplied the global average 747-8I per-aircraft delivery price in 2012 ($**[[HSBI]])** by 23, corresponding to the number of VLA delivered by Airbus in 2012 in the six country markets where the Appellate Body found impedance of U.S. VLA. This results in a value of impedance in 2012 of $**[[HSBI]]**.[110]

87. Boeing delivered five (5) 747-8Is in 2013, and the net prices of those aircraft totaled $**[[HSBI]]**.[111] This resulted in an average per-aircraft price of $**[[HSBI]]** for 2013. Similarly, to calculate the value of impedance in 2013, the United States multiplied the global average per-aircraft price of 747-8I deliveries in 2013 ($**[[HSBI]])** by 20, the number of A380 deliveries in those same six country markets in 2013. This results in a value of impedance in 2013 of $**[[HSBI]]**.[112]

88. There were no deliveries of 747-8Is in 2011. However, two (2) 747-8Is were ordered in 2011.[113] The average price of 747-8Is ordered in 2011 was $**[[HSBI]]**.[114] Therefore, to derive a delivery price for 2011, the United States compared the 2012 and 2013 747-8I delivery prices to the 2012 and 2013 order prices to derive a ratio of **[BCI]**.[115] The United States then applied this ratio to the 2011 global average 747-8I per-aircraft order price ($**[[HSBI]])** to derive a 2011 delivery price of $**[[HSBI]]**.[116] This 2011 delivery price was then multiplied by four (4), the number of A380 deliveries in December 2011. This results in a value of impedance in December 2011 of $**[[HSBI]]**.

89. These totals of $**[[HSBI]]** in December 2011, $**[[HSBI]]** in 2012, and $**[[HSBI]]** in 2013 represent the value (at the time of impedance) of the adverse effects in the form of impedance determined to exist.

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[109] 747-8I Global Delivery Prices for 2012 and 2013(Exhibit USA-17(HSBI)).

[110] *See* 747-8I Global Delivery Prices for 2012 and 2013(Exhibit USA-17(HSBI)).

[111] 747-8I Global Delivery Prices for 2012 and 2013(Exhibit USA-17(HSBI)).

[112] *See* 747-8I Global Delivery Prices for 2012 and 2013(Exhibit USA-17(HSBI)).

[113] *See* 747-8I Global Order Prices, p. 1 (Exhibit USA-18(HSBI)).

[114] 747-8I Global Order Prices, p. 1 (Exhibit USA-18(HSBI)).

[115] *See* Calculation of 2011 747-8I Delivery Prices (Exhibit USA-19(HSBI)); 747-8I Global Order Prices, pp. 2-3 (Exhibit USA-18(HSBI)).

[116] *See* Calculation of 2011 747-8I Delivery Prices (Exhibit USA-19(HSBI)).

IV. IV. DERIVING A FORMULA FOR COUNTERMEASURES COMMENSURATE WITH THE ADVERSE EFFECTS DETERMINED TO EXIST

90. As is common, and for the sake of administrability, the United States intends to apply countermeasures on an annualized basis. To calculate a value of countermeasures for a given year, the United States must account for the increases over time of costs and prices and annualize the value of adverse effects determined to exist so as not to overstate adverse effects that were found over a 25-month, rather than a 12-month, period.

91. The adverse effects determined to exist were valued as of the time they arose during the December 2011 – 2013 post-implementation period evaluated in the compliance Panel and appellate reports. The proposed countermeasures will be applied prospectively, several years after that period. To ensure that the level of such prospective countermeasures is "commensurate" with the nature and degree of the adverse effects determined to exist in the December 2011 – 2013 period, and to prevent inflation from diminishing the real value of the prospective countermeasures, it is necessary to account for changes in price levels.

92. In the real world, the prices of aircraft change over time, for example, because of changes in the costs of manufacturing aircraft. Therefore, to project into another year adverse effects valued as of the evaluated time period, one must adjust the value of adverse effects to reflect changes in the pricing of aircraft in the subject year relative to December 2011, 2012, and 2013.

93. Because adverse effects arose in December 2011, 2012, and 2013, the time consistency adjustment would have to be performed separately for December 2011, 2012, and 2013. However, to simplify the formula, as a first step, the United States adjusted the December 2011 and 2012 adverse effects to re-state them in 2013 dollars so as to place all adverse effects on a common basis.[117] Also, by placing these figures on a common basis, the United States is able to aggregate them and then present a total adverse effects figure in 2013 dollars that does not require HSBI protection.

94. To make the necessary time adjustments, the United States used the U.S. Producer Price Index (PPI) for Aircraft Manufacturing of Civilian Aircraft.[118] The Bureau of Labor Statistics (BLS), which prepares this index, describes the PPI for an industry as "measure{ing} price

[117] The more complicated formula that utilizes the adverse effects as valued in the year in which they were determined to exist (and also annualizes the figure by dividing by 25/12) would be stated as follows:

$$Adjusted\ Total\ Value\ of\ Adverse\ Effects\ in\ Year\ Y\ Dollars =$$

$$\frac{Total\ Adverse\ Effects_{Dec\,2011} * \frac{PPI_Y}{PPI_{Dec-2011}} + Total\ Adverse\ Effects_{2012} * \frac{PPI_Y}{PPI_{2012}} + Total\ Adverse\ Effects_{2013} * \frac{PPI_Y}{PPI_{2013}}}{2 + \frac{1}{12}}$$

[118] It is worth noting that there is no publicly available price index for the aircraft models involved in this calculation. Moreover, even if such an index were available, it would not necessarily be reliable for these purposes because it would likely be distorted by the presence of subsidy-enabled A380 and A350 XWB aircraft.

change from the perspective of the seller" and as "a measure of changes in prices received for the industry's output sold outside the industry (that is, its net output)."[119] BLS lists "indicator of overall price movement at the producer level" and "measure of price movement for particular industries and products" among the uses of the PPI.[120] In the U.S. calculations, the PPI for each year is an annual average of the monthly PPI values for each month and is not seasonally adjusted.

95. To obtain the 2013 adjusted value of the impeded deliveries found in December 2011, the United States divided the PPI in 2013 (256.3) by the PPI in December 2011 (248.7) to arrive at an adjustment factor of 1.03. The United States then multiplied the value of adverse effects determined to exist in December 2011 ($**[[HSBI]]** billion[121]) by 1.03, which equals $**[[HSBI]]** billion. This is the value, stated in 2013 dollars, of the adverse effects determined to exist in 2011.

96. Similarly, to obtain the 2013 adjusted value of the adverse effects determined to exist in 2012, the United States divided the PPI in 2013 (256.3) by the PPI in 2012 (251.8) to arrive at an adjustment factor of 1.018. The United States then multiplied the value of adverse effects determined to exist in 2012 ($**[[HSBI]]** billion[122]) by 1.018, which equals $**[[HSBI]]** billion. This is the value, in 2013 dollars, of the adverse effects determined to exist in 2012.

97. The United States then added $**[[HSBI]]** and $**[[HSBI]]** to $**[[HSBI]]** (the 2013 adverse effects[123]) and divided that sum by 2 +1/12 (or 25/12) to derive the total annualized value of the adverse effects determined to exist, which, stated in 2013 dollars, is approximately $10.56 billion.

98. The same PPI for Aircraft Manufacturing of Civilian Aircraft can then allow the calculation of commensurate countermeasures for any year in which countermeasures are applied. Because the United States would suspend concessions with respect to trade as measured in the preceding year, and to again be conservative, for any year in which the United States will apply countermeasures, the United States proposes to use the PPI figure for the preceding year.

99. Therefore, the formula, for which the United States seeks authorization, can be expressed as follows:

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[119] Producer Price Indexes – Program Overview, U.S. Department of Labor, Bureau of Labor Statistics (Exhibit USA-20).

[120] Producer Price Indexes – Program Overview, U.S. Department of Labor, Bureau of Labor Statistics (Exhibit USA-20). *See also* PPI Industry Data File for Aircraft Manufacturing – Civilian Aircraft, Not Seasonally Adjusted (Jan. 1986 - July 2018), U.S. Department of Labor, Bureau of Labor Statistics (Exhibit USA-21).

[121] *See* Aggregation of Adverse Effects Determined to Exist (Exhibit USA- 22(HSBI)).

[122] *See* Aggregation of Adverse Effects Determined to Exist by Year (Exhibit USA-22(HSBI)).

[123] *See* Aggregation of Adverse Effects Determined to Exist by Year (Exhibit USA-22(HSBI)).

$$\text{Countermeasures}_{(\text{year})} = \$10.56 \text{ billion} \times (\text{PPI}_{(\text{year-1})} / 256.3)$$[124]

100. Thus, for 2018, the formula would use the 2017 PPI figure of 271.7.[125] The authorized countermeasures for 2018 would then be $10.556 billion x (271.7 / 256.3), or approximately $11.2 billion. (Of course, the United States would pro-rate this for any portion of 2018 in which countermeasures were actually applied.)

CONCLUSION

101. Based on the foregoing, the United States respectfully requests authorization to apply countermeasures in an amount expressed, for a given year, by the following formula:

$$\text{Countermeasures}_{(\text{year})} = \$10.56 \text{ billion} \times (\text{PPI}_{(\text{year-1})} / 256.3)$$

102. For the current year (2018), this would equal $11.2 billion.

[124] $10.56 billion is the value, in 2013 dollars, of the adverse effects determined to exist. 256.3 is the Aircraft Manufacturing PPI figure for 2013.

[125] *See* PPI Industry Data File for Aircraft Manufacturing – Civilian Aircraft, Not Seasonally Adjusted (Jan. 1986 - July 2018), U.S. Department of Labor, Bureau of Labor Statistics (Exhibit USA-21).