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WORKING PAPER

ELEVENTH SESSION OF THE STATISTICS DIVISION

Virtual, 4 to 8 April 2022

Agenda Item 4: Aviation Satellite Account (ASA) Methodological Framework

AVIATION SATELLITE ACCOUNT

(Presented by the Secretariat)

EXECUTIVE SUMMARY

This paper presents the development of the methodological framework of the Aviation Satellite Account (ASA) for measuring the economic contribution of aviation to national economy. A summary of the draft ASA methodological framework document along with the recommendations of the 40th Session of the ICAO Assembly is included. The paper also presents the validation of the methodology using available data on aviation's economic impact and national accounts of States, with special focus on the assessment of the inclusion of aircraft manufacturing in the scope of civil aviation measurement. Reconciliation and analysis results are presented in Appendix B.

Action by the Division is indicated in paragraph 5.

Strategic Objectives:	This working paper relates to Strategic Objective — *Economic Development of Air Transport*.
References:	Doc 10140, *Assembly Resolutions in Force (as of 4 October 2019)* Doc 10075, *Assembly Resolutions in Force (as of 6 October 2016)* Doc 10139, *Assembly 40th Session - Report of the Economic Commission* A40-WP/21 AT-WP/2177, AT-SD 218/1 AT-WP/2195, AT-SD 224/1 *A preliminary version of the ASA Methodological Framework Document* https://www.icao.int/Meetings/a40/Documents/Aviation_Satellite_Account_en.pdf *Report of the Third Meeting of the Aviation Data and Analysis Panel* (ADAP/3, Yellow Cover)

1. INTRODUCTION

1.1 Pursuant to the recommendation of the 39th Session of the ICAO Assembly, an expert advisory group (EAG) was established under the Aviation Data Analysis Panel (ADAP) to work on the development of Aviation Satellite Account (ASA) methodological framework for measuring the direct impact of aviation on national economy. The EAG was comprised of nominated experts from ten Member

States, three international organizations and national account experts of the United Nations Statistical Division (UNSD). Membership of the EAG-ASA is included in Appendix A.

1.2 Since its establishment, the EAG has been working through correspondence and held in-person meetings and conference calls to work on the task assigned. The work of the EAG along with the preliminary version of the ASA methodological framework document was presented to the 40th Session of the Assembly (A40-WP/21 refers).

1.3 During the A40, the Economic Commission endorsed the proposed future work of ICAO in this area and requested the validation of the draft methodology framework and refinement to the methodology if deemed necessary. Subsequently, further activities were carried out by the EAG to address these aspects.

2. DRAFT AVIATION SATELLITE ACCOUNT METHODOLOGICAL FRAMEWORK

2.1 The preliminary version of the draft ASA methodological framework document presented to the A40 (https://www.icao.int/Meetings/a40/Documents/Aviation_Satellite_Account_en.pdf) provides guidance on how a satellite account can be compiled for the measurement of civil aviation activities in a State according to the principles of the *System of National Accounts, 2008* (2008 SNA). It adopts the basic system of concepts, classifications, definitions, tables and aggregates of the 2008 SNA, and includes classification of civil aviation activities, concepts and definitions of the supply and demand perspective, supply-use framework, etc.

2.2 The document comprises seven chapters describing steps involved in setting up an ASA and five appendices including classifications and tables of the framework. It introduces the concept of ASA, and defines the scope of ASA measurement and the production boundary, i.e. the activities of aviation industry and the products that are supplied by the aviation activities, as well as the products that are used by the aviation activities to produce their output. In order to identify these aviation activities and products and allow for international comparability in the national accounts, they are mapped respectively with the International Standard Industrial Classification of All Economic Activities (ISIC) and the Central Product Classification (CPC). The detailed classifications are presented in Appendices 1 and 2 of the document.

2.3 The ASA methodological framework also consists of a set of tables, including the Supply and Use Tables (SUTs), which are an integral part of the 2008 SNA. The SUTs are prepared to estimate aviation's direct gross value added (GVA) and gross domestic product (GDP), etc.; describing: a) how products (goods and services) are brought into the national economy (either as a result of domestic production or imports from other countries); and b) how those same products are used (as intermediate consumption, household final consumption, non-profit institutions serving households, general government final consumption, gross capital formation and exports). Other tables in the ASA are prepared to cover the generation of additional elements, both monetary and non-monetary, such as data on employment and indicators of output.

3. RECOMMENDATIONS OF THE ASSEMBLY

3.1 At the 40th Session of the Assembly, a view was expressed at the Economic Commission that the accuracy of the estimated result of direct economic impacts should be validated by vetting the framework with stakeholder experts using aviation specific data to measure the economic impact of aviation in States where such data is available. An additional comment was also made on the consideration of the inclusion of aircraft manufacturing in the scope of measurement of civil aviation industry.

3.2 Subsequently, at the Third Meeting of the Aviation Data and Analysis Panel (ADAP/3) in June 2021, the progress on the development of the ASA methodological framework was discussed. Divergent views were expressed on the inclusion of aircraft manufacturing as civil aviation industry. While some members supported the inclusion considering that the value added and jobs generated by aircraft manufacturing are critical component of aviation's contribution to national economy, some others raised concerns on the imbalanced comparison of contribution of aviation to national economy as limited number of States have such activities.

3.3 Another comment was raised on the need for consistency between ASA measurement with the definition of ICAO civil aviation activities for statistical purposes in which aircraft manufacturing is classified as part of the civil aviation industry. Considering the different views, the Panel recommended that the STA/11 be presented with EAG's reconciliation of the results and further analysis of the impact on the inclusion of aircraft manufacturing.

4. RECONCILIATION AND ANALYSIS

4.1 The ASA draft methodological framework was validated with the frameworks presented in States' national accounts such as the one produced by the United States (U.S.) Bureau of Economic Analysis (BEA), which shows that the direct economic impacts attributable to Air Transport Industry are compatible. This compatibility is owing to the application of the 2008 SNA in both frameworks, which is the international standard adopted by States worldwide for the compilation of national accounts statistics and macroeconomic accounting.

4.2 Nevertheless, when setting up the satellite account for civil aviation industry, the value of the direct economic contribution of the industry for the State will vary according to the different scopes of measurement, primarily due to the inclusion versus non-inclusion of aircraft manufacturing. To understand this difference, the following reconciliation and analysis was conducted:

a) gauge the value added of aircraft manufacturing to a State's economy; and

b) assess the impact of the inclusion of aircraft manufacturing in civil aviation industry's contribution to the national economy.

4.3 In order to assure the creditability of the analysis, data was sourced only from States where both officially published studies on the economic contribution of aviation and national economic accounts are available. In this regard, data from the United States and Eurostat were explored. For the former, two sources of data were used, i.e. The Economic Impact of Civil Aviation on the U.S. Economy published by the Federal Aviation Administration (FAA)[1], and the Make-Use data in national accounts of the U.S. BEA[2]. In the 2016 edition of the FAA study, the total economic impacts of civil aviation are a summation of primary and secondary impacts, estimated by using data from government and private sources. The primary impacts include both direct and indirect impacts generated from three categories: air transportation and supporting services; aircraft, aircraft engines and parts manufacturing; and travel and other trip-related expenditures by travellers using air transportation. The value added of civil aviation in the FAA study is presented in Figure 1 of Appendix B.

4.4 With regard to aviation manufacturing, estimates were broken down by four activities including civilian aircraft manufacturing, civilian aircraft engine and engine parts manufacturing, civilian other aircraft parts and equipment manufacturing, and civilian avionics manufacturing. To compare the

[1] https://www.faa.gov/air_traffic/publications/media/2016-economic-impact-report_FINAL.pdf
[2] https://apps.bea.gov/iTable/iTable.cfm?isuri=1&reqid=151&step=1

value added of the aviation manufacturing in the FAA study with the data produced by BEA, the corresponding North American Industry Classification System (NAICS) codes to the aviation manufacturing activities were identified in the BEA Make-Use table. Comparison of the value added in the two sources is presented in Figure 2 of Appendix B.

4.5 As shown in the comparison, figures in both sources are similar but not the same. According to the FAA study, aviation manufacturing contributed USD 115.8 billion to the GDP of U.S. in 2012, and accounted for around 14 per cent of the total value added of civil aviation (primary and secondary). While the corresponding NAICS codes in the BEA Make-Use table shows USD 119.4 billion of value added by aviation manufacturing for the same year. Through analysis and verification with the experts in FAA and BEA, it was understood that a few reasons may have caused the discrepancy, for instance:

a) there are differences in the data source and methodology used by the two entities;

b) inclusion of indirect and induced value added in the FAA study versus the direct value added in the BEA data;

c) adjustments applied in FAA's estimates to avoid potential double counting; and

d) the underlining codes in the BEA data do not distinguish the production activities for civil and non-civilian products, while the FAA study does not include defence.

4.6 Similar analysis was intended to be carried out using the Eurostat data, however, as the current economic accounting data does not contain the same granularity with data by detailed industry/activity codes corresponding to aircraft manufacturing, the analysis was not pursued further.

4.7 The reconciliation and analysis process and results reveal that obtaining detailed data on aircraft manufacturing for civil aviation presents difficulties due to the constraint of data availability, and the assessment of its value added can be complicated and will entail estimation using data from various government and private sources. The impact of the inclusion of the value added of aircraft manufacturing in civil aviation industry's contribution to national GDP will vary by States depending on the weight of such production in the State.

5. ACTION BY THE DIVISION

5.1 The Division is invited to:

a) make a decision on whether aircraft manufacturing should be included in the scope of measurement of civil aviation industry; and

b) provide additional comments for the finalization of the ASA methodological framework document to be presented to the 41st Session of the Assembly.

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APPENDIX A

MEMBERSHIP OF THE EXPERT ADVISORY GROUP ON AVIATION SATELLITE ACCOUNT (EAG-ASA)

State/Organization	Name
Brazil	Luiz Andre de Abreu Cruvinel Gordo
Brazil	Flávia Macedo Rocha de Godoi
Brazil	Felemon Boaventura
Canada	Sylvie Mallet
Canada	Michael Scrim
Canada	Issam Alsammak
Canada	Kevin Roberts
China	Jinmei GE
India	Dr. P. K. Srivastava
Kenya	Francis Kungú Mwangi
Mali	Fâtimata FOFANA
Turkey	Esra DİLMEN
Turkey	Cansel BICEN
Turkey	Batın SİMSEK
Turkey	Süleyman ÇALDAĞ
United Republic of Tanzania	Rodney Chubwa
United Republic of Tanzania	Tamika Mwakabumbila
United Republic of Tanzania	Daniel Masolwa
United Republic of Tanzania	Rustis Bernard
United States	Jiemin Guo
ACI	Patrick Lucas
IATA	James Wiltshire
IATA	Jesper Venema
ITF-OECD	Mario Barreto
United Nations Statistical Division	Herman Smith

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APPENDIX B

RECONCILIATION AND ANALYSIS RESULTS

Figure 1 – U.S. Civil Aviation Economic Impact, Value Added

Value Added ($Billions)			
Description	2012	2013	2014
Airline Operations	148.7	153.3	160.9
Airport Operations	38.0	39.7	40.8
Civilian Aircraft Manufacturing	62.0	66.8	72.6
Civilian Aircraft Engine and Engine Parts Manufacturing	7.8	8.0	8.6
Civilian Other Aircraft Parts and Equipment Manufacturing	33.8	36.2	39.3
Civilian Avionics Manufacturing	12.2	12.1	12.1
Civilian Research and Development	12.0	17.0	17.2
Air Couriers	31.1	32.1	33.6
Visitor Expenditures	417.1	435.5	451.5
Travel Arrangements	8.8	9.2	9.9
Subtotal - Commercial	771.5	809.9	846.3
General Aviation Operations	17.1	17.0	19.2
GA Aircraft Manufacturing	10.1	14.0	15.0
GA Visitor Expenditures	6.9	6.8	6.8
Subtotal - General Aviation	34.1	37.8	41.1
Total Impact	805.6	847.7	887.3

Figure 2 – Comparison between the value added of aviation manufacturing in FAA study and the Make-Use table of the BEA

	FAA			**BEA**
Industry	2012 Value added (USD, Billion)	NAICS	Industry	2012 Value added (USD Billion)
Civilian Aircraft Manufacturing	62.0	336411	Aircraft Manufacturing	49.1
Civilian Aircraft Engine and Engine Parts manufacturing	7.8	336412	Aircraft Engine and Engine Parts Manufacturing	18.8
Civilian Other Aircraft Parts and Equipment manufacturing	33.8	336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	15.6
Civilian Avionics Manufacturing	12.2	334511	Search, Detection, Navigation, Guidance, Aeronautical, and	35.9
Total	**115.8**		Total	**119.4**

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