



ICAO

**METHODOLOGY FOR  
ICAO-LEVEL DATA GAP FILLING**

**CORSIA**

**November 2021**

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

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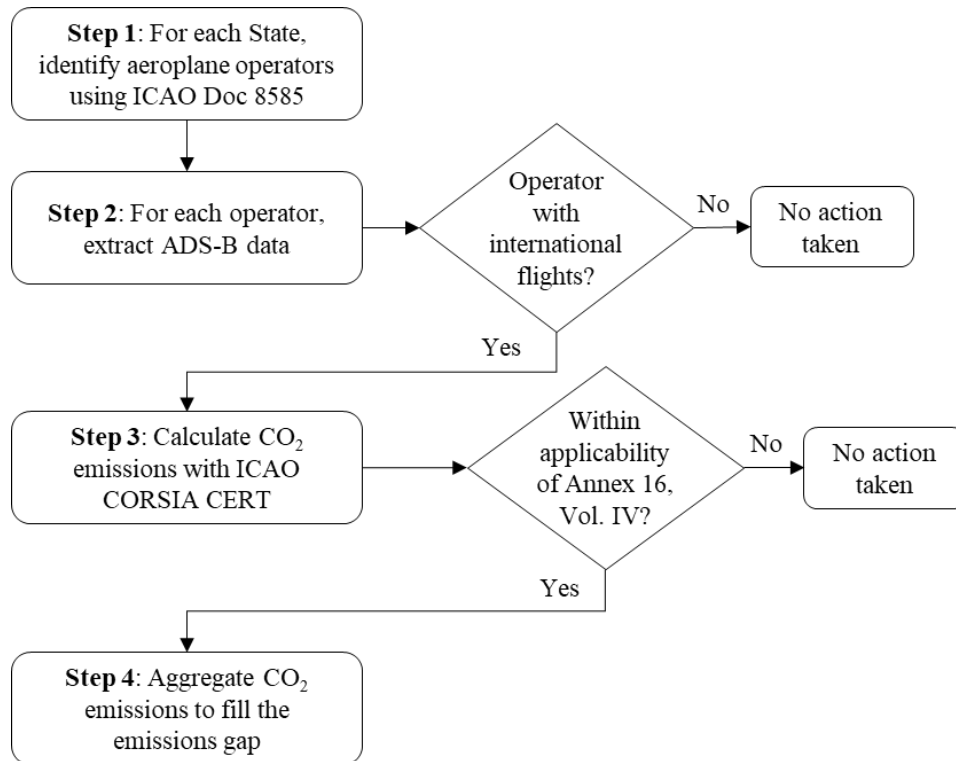
**Introduction**

In accordance with the First Edition of Annex 16 — Environmental Protection, Volume IV — Carbon Offsetting and Reduction Scheme for International Aviation (CORSA), Part II, Chapter 2, 2.5.2.2, “[i]f the State does not provide its annual aggregated Emissions Report to ICAO in accordance with the timeline as defined in Appendix 1, then the data provided by ICAO shall be used to fill these gaps and calculate the total sectoral CO<sub>2</sub> emissions in a given year and the Sectoral Growth Factor, as defined in Chapter 3”.

This document provides a description of the methodology that has been developed by ICAO to fill the emissions gaps, and to calculate the total sectoral CO<sub>2</sub> emissions and the Sectoral Growth Factor in a given year, consistent with Annex 16, Volume IV.

**Methodology for ICAO-level data gap filling in CORSIA**

Figure 1 depicts the steps of the methodology that has been developed by ICAO for data gap filling under CORSIA, should a State not provide its annual aggregated Emissions Report through the CORSIA Central Registry (CCR). The methodology is underpinned by the use of international traffic data based on the Automatic Dependent Surveillance – Broadcast (ADS-B) (see Box 1) and the ICAO CORSIA CO<sub>2</sub> Estimation and Reporting Tool (CERT) (see Box 2). The steps of the methodology are described below.



**Figure 1.** ICAO methodology for data-gap filling under CORSIA

**Box 1: Automatic Dependent Surveillance – Broadcast (ADS-B)**

The ADS-B represents the world’s largest network of air traffic data. It is “a means by which aircraft, aerodrome vehicles and other objects can automatically transmit and/or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link” (Annex 11 – Air Traffic Services refers).

Approximately 600 million rows of data on aircraft positions (departure, en-route and arrival in intervals of one minute) are recorded monthly, covering scheduled passenger and freighter operations, as well as charter, business jets and other commercial operations. The ICAO Secretariat has developed specific algorithms, which complement the collected data with additional information of carrier code, aircraft type, Flight Information Region (FIR) and distance flown.

**Box 2. ICAO CORSIA CO<sub>2</sub> Estimation and Reporting Tool (CERT)**

The ICAO CORSIA CERT is one of the five Implementation Elements of CORSIA and is referenced in Annex 16, Volume IV. The tool can be used to support the monitoring and reporting of CO<sub>2</sub> emissions, in accordance with the requirements of Annex 16, Volume IV.

The ICAO CORSIA CERT is underpinned by the CO<sub>2</sub> Estimation Models (CEMs), which is a set of equations that allow for the estimation of CO<sub>2</sub> emissions as a function of Great Circle Distance or Block Time for a given aircraft type.

For more details, please refer to the ICAO website (<https://www.icao.int/environmental-protection/CORSIA/Pages/CERT.aspx>)

**Description of the methodological steps*****Step 1: Identify aeroplane operators***

Using the edition of ICAO Doc 8585, *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services* for a specific reporting year, the ICAO Secretariat identifies the aeroplane operators for the States that have not submitted CO<sub>2</sub> emissions data through the CCR.

***Step 2: Extract ADS-B data***

The ICAO Secretariat extracts data from the ADS-B for each operator identified during Step 1. Based on the ADS-B data, it is determined which operators have performed international flights. Operators without international flights are not considered further.

***Step 3: Calculate CO<sub>2</sub> Emissions***

For each aeroplane operator with international flights identified during Step 2, the ICAO Secretariat uses the extracted ADS-B traffic data and the version of the ICAO CORSIA CERT that applies to the specific

reporting year to estimate the CO<sub>2</sub> emissions. Operators that do not fulfil the applicability requirements as per Annex 16, Volume IV, Part II, Chapter 2, 2.1.1<sup>1</sup> are not considered further.

***Step 4: Aggregate CO<sub>2</sub> Emissions***

The ICAO Secretariat aggregates the CO<sub>2</sub> emissions data calculated during Step 3 for all aeroplane operators that fulfil the applicability requirements as per Annex 16, Volume IV, Part II, Chapter 2, 2.1.1. This step involves summing up emissions on each State pair for all relevant operators attributed to a State. The aggregated data from this step are used to fill the emissions gap for each State concerned and to prepare ICAO CORSIA documents in accordance with the provisions of Annex 16, Volume IV.

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<sup>1</sup> Annex 16, Volume IV, Part II, Chapter 2, 2.1.1 states “*The Standards and Recommended Practices of this Chapter shall be applicable to an aeroplane operator that produces annual CO<sub>2</sub> emissions greater than 10 000 tonnes from the use of an aeroplane(s) with a maximum certificated takeoff mass greater than 5 700 kg conducting international flights, as defined in 1.1.2, on or after 1 January 2019, with the exception of humanitarian, medical and firefighting flights.*”