Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA):

Introduction & Expectations on the Submission of Emissions Monitoring Plan

Presented to: NBAA’S Business Aviation Convention & Exhibition (NBAA-BACE)
By: Donald S. Scata Jr.
FAA Office of Environment & Energy
Date: Oct. 16, 2018
Contents

• Introduction to CORSIA

• Overview of Monitoring Reporting and Verification (MRV)

• Emissions Monitoring Plan (EMP)

• Process for Implementing CORSIA in the United States
CORSIA: What and why

• What:
  • CORSIA is an emissions offsetting market-based measure that applies to operators that fly internationally and produce more than 10,000 tonnes of CO2 emissions. Many operators are below that threshold and are outside the scope of CORSIA entirely. Domestic flights are also outside the scope of CORSIA.
  • Operators that are above the emissions threshold will need to monitor their emissions annually, and buy emissions offsets for any growth beyond 2020 levels by the end of the first compliance cycle (2021-2023).

• Why:
  • The U.S. supports CORSIA as the exclusive market-based measure for international aviation emissions because it will ensure fair playing field for all operators.
  • CORSIA avoids a patchwork of country- or regionally-based regulatory measures that are inconsistently applied, bureaucratically costly, and economically damaging.
  • Currently, 74 countries representing 75.96% of international aviation activity will participate in CORSIA from the outset.
Global CO$_2$ Emissions from International Aviation & Role of CORSIA

- CORSIA complements technology and operational improvements to meet the 2020 carbon neutral goal.

- It will allow airlines and aircraft operators to offset emissions between 2021 and 2035 above a 2019-2020 reference
Introduction to CORSIA
CORSIA Key Elements:
Assembly Resolution A39-3

- Agreement by ICAO Assembly in 2016
- Establishes core rules
- Formed the basis for more detailed standards and recommended practices (SARPs)
CORSIA Key Elements:
Annex to the Chicago Convention - Annex 16 Volume IV on CORSIA

SARPs Annex 16 Volume IV

Part I. DEFINITIONS, ABBREVIATIONS AND UNITS

Part II. CARBON OFFSETTING AND REDUCTION SCHEME FOR INTERNATIONAL AVIATION (CORSIA)

- CHAPTER 1. Administration
- CHAPTER 2. Monitoring, Reporting and Verification
- CHAPTER 3. CO₂ Offsetting Requirements and Emissions Reductions from Sustainable Aviation Fuels
- CHAPTER 4. Emission Units

APPENDICES

- APPENDIX 1. Administrative Processes
- APPENDIX 2. Fuel Use Monitoring Methods
- APPENDIX 3. CO₂ Emissions Estimation and Reporting Methods and Tools
- APPENDIX 4. Emissions Monitoring Plans
- APPENDIX 5. Reporting
- APPENDIX 6. Verification

ATTACHMENTS

- Attachment A. Attribution Processes
- Attachment B. Applicability of MRV Requirements to International Operations
- Attachment C. Processes for Fuel Use Monitoring
CORSIA Key Elements:
Environmental Technical Manuel (ETM) on CORSIA

2 ETM Volume IV

CHAPTER 1. INTRODUCTION

CHAPTER 2. GENERAL GUIDELINES
   2.1 Applicability of MRV of Annual CO₂ Emissions from an Aeroplane Operator
   2.2 Applicability of CO₂ Offsetting Requirements

CHAPTER 3. GUIDELINES ON MONITORING, REPORTING AND VERIFICATION
   3.1 Monitoring
   3.2 Reporting
   3.3 Verification

CHAPTER 4. GUIDELINES ON CALCULATION OF OFFSETTING REQUIREMENTS
   4.1 Calculation of Offsetting Requirements During the 2021-2030 Compliance Period
   4.2 Calculation of Offsetting Requirements During the 2031-2035 Compliance Period
   4.3 Baseline Emissions from 2019-2020 for Calculation of Offsetting Requirement
   4.4 Sector Growth Factor

CHAPTER 5. ADMINISTRATIVE PARTNERSHIPS UNDER CORSIA
   5.1 Example of a Bilateral Agreement

APPENDIX 1.
STANDARDIZED EMISSIONS MONITORING PLAN AND REPORTING TEMPLATES
CORSIA Key Elements: 
** ICOA CORSIA Implementation Elements **

<table>
<thead>
<tr>
<th>CORSIA Key Elements</th>
<th>Implementation elements and supporting documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORSIA STATES FOR CHAPTER 3 STATE PAIRS</td>
<td>Implementation elements and supporting documents</td>
</tr>
<tr>
<td>CORSIA SUSTAINABLE AVIATION FUELS</td>
<td>Essential for the implementation of CORSIA</td>
</tr>
<tr>
<td>CORSIA ELIGIBLE EMISSIONS UNITS</td>
<td>Contains the CORSIA CO$_2$ Estimation and Reporting Tool (CERT).</td>
</tr>
<tr>
<td>CORSIA CENTRAL REGISTRY (CCR)</td>
<td></td>
</tr>
</tbody>
</table>

**ICAO CORSIA Implementation Elements**

(Directly referenced in the SARPs)

Five ICAO CORSIA Implementation Elements will be reflected in fourteen ICAO documents directly referenced in the upcoming Volumes I-VII of Annex 16 and will contain material to be approved by the ICAO Council for publication by ICAO to support such Annex. These publications will be made available on the ICAO CORSIA website when they are completed and may only be amended by the ICAO Council.

1. **CORSIA STATES FOR CHAPTER 3 STATE PAIRS**
   - **Description:** States' participation in CORSIA, to define route-based emissions coverage every year from 2021.
   - **Expected availability:** 30 July 2020.
   - **Periodicity of updates:** Updated annually.

2. **ICAO CORSIA CO$_2$ ESTIMATION AND REPORTING TOOL (CERT)**
   - **Description:** ICAO tool for simplified monitoring, reporting and verification (MRV) procedures.
   - **Expected availability:** 2018 (estimation functionality only).
   - **Periodicity of updates:**
     - 2019 version (report function to be added).
     - 2021 version (report by route-coverage).

3. **CORSIA SUSTAINABLE AVIATION FUELS**
   - **Description:** Information related to CO$_2$ emissions reduction from sustainable aviation fuels.
   - **Expected availability:** No later than 2021.
   - **Periodicity of updates:** as needed (e.g., updates of default life-cycle methodologies / values for new fuels and eligible certification schemes).

4. **CORSIA ELIGIBLE EMISSIONS UNITS**
   - **Description:** Emissions units criteria and eligible emissions units programmes.
   - **Expected availability:** No later than 2021.
   - **Periodicity of updates:** Periodic updates of the list of eligible programmes.

5. **CORSIA CENTRAL REGISTRY (CCR)**
   - **Description:** Information to be made available from the CORSIA central registry, to allow implementation of CORSIA.
   - **Expected availability:** 2021.
   - **Periodicity of updates:**
     - From 2021, annual update of total CO$_2$ emissions data.
     - From 2025, triennial update of information on emissions units and compliance.
Contents

• Introduction to CORSIA

• Overview of Monitoring Reporting and Verification (MRV)

• Emissions Monitoring Plan (EMP)

• Process for Implementing CORSIA in the United States
CORSIA’s Scope: Which activities are covered by CORSIA?

✅ Included:

- International flights only
- Civil flights including...
  - Scheduled flights
  - Non-scheduled flights
  - Cargo
  - Business aviation
  - General aviation
- Aeroplanes with MTOM > 5700 kg
- Operators with annual CO$_2$ > 10,000 tonnes

❌ Excluded:

- Domestic flights
- Flights for...
  - Heads of State flights
  - Military
  - Customs and police
  - Humanitarian, firefighting and medical purposes
- Helicopters (aeroplanes = fixed wings)
- Aeroplanes with MTOM ≤ 5,700 kg
- Operators with annual CO$_2$ ≤ 10,000 tonnes
Monitoring, Reporting and Verification Requirements

SARPs Annex 16 Volume IV

Part I. DEFINITIONS, ABBREVIATIONS AND UNITS

Part II. CARBON OFFSETTING AND REDUCTION SCHEME FOR INTERNATIONAL AVIATION (CORSIA)
   
   CHAPTER 1. Administration
   
   **CHAPTER 2. Monitoring, Reporting and Verification**
   
   CHAPTER 3. CO2 Offsetting Requirements and Emissions Reductions from Sustainable Aviation Fuels
   
   CHAPTER 4. Emission Units

APPENDICES

APPENDIX 1. Administrative Processes
APPENDIX 2. Fuel Use Monitoring Methods
APPENDIX 3. CO2 Emissions Estimation and Reporting Methods and Tools
APPENDIX 4. Emissions Monitoring Plans
APPENDIX 5. Reporting
APPENDIX 6. Verification

ATTACHMENTS

Attachment A. Attribution Processes
Attachment B. Applicability of MRV Requirements to International Operations
Attachment C. Processes for Fuel Use Monitoring
Objective of Monitoring, Reporting and Verification (MRV)

The MRV requirements will enable operators to report:

- their annual fuel use (per type),
- their annual CO$_2$ emissions per State pair (or aerodrome pair), and
- if applicable, CORSIA eligible fuels claimed (2021-2035).

**Monitoring:** Operator monitors CO$_2$ emissions from all international flights

**Reporting:** Operator reports CO$_2$ emissions to its administrating authority

**Verification:** Operator engages verification body to ensure that its emissions report is accurate and data collected in accordance with applicable requirements
**MRV: Key Documents**

- **Emissions monitoring plan**
  Details methods and procedures to monitor fuel use and calculate emissions

- **Emissions report**
  Compiled emissions data and information

- **Verification report and verification statement**
  Conclusions from the verification process
MRV: Roles & Responsibilities

Emissions monitoring plan
- Prepared by the operator
- Approved by the authority

Emissions report
- Compiled by the operator
- Verified by an independent verification body
- Authority conducts an order of magnitude check

Verification report and verification statement
- Prepared by the verification body
- Submitted to authority with emissions report
Overview of CORSIA Implementation and Timeline

YEAR 1
- CO₂ emissions data

YEAR 2
- Compile year 1 CO₂ emissions data
- Verification
- Check year 1 Emissions Report
- Compile year 1 CO₂ emissions data and calculate the sectoral growth factor for year 1

CORSIA Central Registry System

* ICAO, 2018
Contents

• Introduction to CORSIA

• Overview of Monitoring Reporting and Verification (MRV)

• Emissions Monitoring Plan (EMP)

• Process for Implementing CORSIA in the United States
Emissions Monitoring Plan (EMP)

- Collaborative tool between the State and the aeroplane operator that identifies the most appropriate means and methods for CO$_2$ emissions monitoring on an operator-specific basis.

- Facilitates the reporting of required information to the State.

- State and aeroplane operator should maintain clear and open communication during the development of the plan.

- Working collaboratively during CORSIA preparation and implementation reduces potential errors and increases efficiency.
Contents of the Emissions Monitoring Plan (EMP)

- Aeroplane operator identification
- Fleet and operations data
- Methods used for fuel monitoring
- Methods and means of calculating emissions from international flights
- Data management, data flow and control
Timeline for the Emissions Monitoring Plan (EMP)

<table>
<thead>
<tr>
<th>PREPARATORY ACTIONS</th>
<th>BASELINE PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2018</strong></td>
<td><strong>2019</strong></td>
</tr>
</tbody>
</table>
| Emissions Monitoring Plan | Monitor CO₂ emissions:  
- Fuel use monitoring method  
- ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT)  
  Compile 2019 CO₂ emissions data  
  Verification  
| 2019 Emissions & Verification Reports |
| AEROPLANE OPERATOR | **2019** | **2019** | **2020** |
| Recommend (Submit by 30 Sept 2018) | Submit by 28 Feb 2019 | Approve by 30 April 2019 |
| STATE | **2018** | **2019** | **2020** |
| Emissions Monitoring Plan | Conduct order of magnitude check of 2019 Emissions Report |

Starting 01 January 2019, all aeroplane operators will be required to monitor CO₂ emissions from international flights.

* Adapted from ICAO CORSIA capacity building material, ICAO, 2018
Developing an Emissions Monitoring Plan (EMP)

PREPARATION AND SUBMISSION

An aeroplane operator submits an Emissions Monitoring Plan for consultation and review by the State to which it is attributed.

- **Recommended timeframe:** submit by 30 September 2018.
- **Mandatory timeframe:** submit by 28 February 2019.

*Adapted from ICAO CORSIA capacity building material, ICAO, 2018*
Developing an Emissions Monitoring Plan (EMP) (cont.)

1. PREPARATION AND SUBMISSION

2. REVIEW AND APPROVAL

   The State reviews and approves the Emissions Monitoring Plan.
   
   - **Recommended timeframe:** approve by 30 November 2018.
   - **Mandatory timeframe:** approve by 30 April 2019.

   **Note:** If the aeroplane operator’s Emissions Monitoring Plan is not fully aligned with the Emissions Monitoring Plan requirements in the CORSIA SARPs, the State shall collaborate with the aeroplane operator to resolve the outstanding issues.

* Adapted from ICAO CORSIA capacity building material, ICAO, 2018
Developing an Emissions Monitoring Plan (EMP) (cont.)

1. Preparation and Submission

2. Review and Approval

3. Revisions and Updates

An aeroplane operator resubmits the Emissions Monitoring Plan for review and approval by the State if a material change is made to the information contained within the Emissions Monitoring Plan.

For example, a change to the information that would affect:
- The status or eligibility for an option under the emissions monitoring requirements;
- The approach to monitoring; or
- The State’s oversight (e.g., change in corporate name/address).

* Adapted from ICAO CORSIA capacity building material, ICAO, 2018
Emissions Monitoring Options

- Aeroplane operator will have to monitor and record its fuel use from international flights to determine its annual CO$_2$ emissions.

- Monitoring is conducted in accordance with an eligible monitoring method approved by the State to which it is attributed.

- Simplify the estimation and reporting of CO$_2$ emissions from international flights for operators with low level of activity.

- ICAO has developed the CORSIA CO$_2$ Estimation and Reporting Tool (CERT).
Emissions Monitoring Options:
Fuel Use Monitoring Methods

• Operators can use one (or more) from five fuel use monitoring methods

BEFORE FLIGHT

A
Block-on
00:00
8.05t fuel in tanks

B
Before uplift
00:30
8.00t fuel in tanks

C
Fuel uplift
00:40
42.00t fuel uplift

D
After uplift
00:40
50.00t fuel in tanks

E
Block-off
01:00
49.98t fuel in tanks

AFTER FLIGHT

V
Block-on
09:00
9.98t fuel in tanks

W
Before uplift
09:30
9.97t fuel in tanks

X
Fuel uplift
09:40
10.00t fuel uplift

Y
After uplift
09:40
19.97t fuel in tanks

Z
Block-off
10:00
19.96t fuel in tanks

METHOD A
Fuel consumed = D - Y + X
50.00 - 19.97 + 10.00 = 40.03 t

METHOD B
Fuel consumed = A - V + C
8.05 - 9.98 + 42 = 40.07 t

BLOCK OFF / BLOCK ON
Fuel consumed = E - V
49.98 - 9.98 = 40.00 t

FUEL UPLIFT
Fuel consumed = C
42.00 t

BLOCK HOURS
Block time \cdot \text{avg fuel burn ratio}
480 \text{ min} \cdot 0.083 \text{ t per min} = 39.84 \text{ t}
Emissions Monitoring Options: ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT)*

• **CERT** supports aeroplane operators in:
  - Estimating CO₂ emissions.
  - Populating the Emissions Monitoring Plan and Emissions Report templates.

• **CERT** also supports all aeroplane operators in determining if their CO₂ emissions are under the threshold to be exempt from the CORSIA reporting requirements (≤ 10 000 tonnes of CO₂ annually).

*Available at: [https://www.icao.int/environmental-protection/CORSIA/Pages/CERT.aspx](https://www.icao.int/environmental-protection/CORSIA/Pages/CERT.aspx)
Demo of the CORSIA CO$_2$ Estimation and Reporting Tool (CERT)
The ICAO CORSIA CERT is available for download at: https://www.icao.int/environmental-protection/CORSIA/Pages/CERT.aspx

It opens as a Microsoft Excel spreadsheet.

An end user license agreement governs the expected use of the CERT.
A version of the CERT is valid for a given year e.g., 2018.

The 2018 version is meant to support the estimation of CO₂ emissions and the generation of a summary assessment that can be attached to the EMP.

The CERT follows a simple three step process:
- (1) Aeroplane operator identification,
- (2) CO₂ Estimation, and
- (3) Summary Assessment.
• Simple information about the aeroplane operator can be entered as input.

• This is only meant to tag a summary assessment of emissions to an aeroplane operator (used as supporting evidence and for record keeping).
The CO₂ estimation requires aircraft type by ICAO Designator, aerodrome of departure and arrival.

Individual flights can be entered in the CERT.

Alternatively all flights conducted with the same aircraft type and between the same aerodrome pairs can be aggregated.

Note: For the 2018 version of the CERT, the user should only enter either individual flight records or fully aggregated unique flight records.
The CERT computes great circle distance and CO₂ emissions.

The tool also identifies Domestic vs. International flight in accordance with Annex 16 Volume IV definition of International Flights.
• To avoid entering manually flight information, an “Import Input File” in .csv format is available.

• It allows the user to enter all flights conducted in a given year in just a few clicks.
- CO₂ emissions are estimated for each flight records.

- This information is used as input to a summary report.
The CERT generates a summary report with:

- total annual emissions from international flights (used to determine if the operator is subject to CORSIA),
- Total annual emissions from domestic flights (for information only),
- Expected status of the aeroplane operator with regard to CORSIA and its eligibility to use the CERT as a monitoring method, and
- Emissions by State Pairs.
Emissions Monitoring Options:
Eligibility to use the ICAO CORSIA CERT

- All aeroplane operators with emissions between 10,000 and 500,000 tonnes from international flights are eligible to use CERT to monitor and report emissions.

- Other aeroplane operators are able to use CERT to fill in any CO₂ emissions data gaps, regardless of their emissions levels.

<table>
<thead>
<tr>
<th>CERT</th>
<th>Aeroplane Operators International CO₂ Emissions (tonnes) 2019 – 2020*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function / Use</td>
<td>≤ 10K CO₂</td>
</tr>
<tr>
<td></td>
<td>&lt; 500K CO₂</td>
</tr>
<tr>
<td></td>
<td>≥ 500K CO₂</td>
</tr>
<tr>
<td>Preliminary CO₂ Assessment</td>
<td>✓</td>
</tr>
<tr>
<td>CO₂ Estimation &amp; Reporting</td>
<td>No CORSIA requirement</td>
</tr>
<tr>
<td>Filling Data Gaps</td>
<td>No CORSIA requirement</td>
</tr>
</tbody>
</table>

* Adapted from ICAO CORSIA capacity building material, ICAO, 2018
Decision Tree for Emissions Monitoring Options (2019 & 2020)

Decision tree to help aeroplane operator to determine whether they are eligible to use;
(1) the ICAO CORSIA CO2 Estimation and Reporting Tool (CERT), or
(2) eligible fuel use monitoring methods,
to monitor and report their CO2 emissions for international flights in 2019 and 2020.

* Adapted from ICAO CORSIA capacity building material, ICAO, 2018
Contents

• Introduction to CORSIA

• Overview of Monitoring Reporting and Verification (MRV)

• Emissions Monitoring Plan (EMP)

• Process for Implementing CORSIA in the United States
Expected Information Flows Required for CORSIA to Function *(according to Annex 16 Volume IV)*

**ICAO**

- List of Aeroplane Operators
- Emissions Monitoring Plans Approval
- Emissions Report *(State to ICAO)*
- EEU CR Recording
- Fuel Data
- Calculation of Offsetting Requirements
- Emissions Units Cancellation Report *(State to ICAO)*
- Emissions Unit Cancellation Report *(AO to State)*
- Registry

**State (FAA)**

- Operators Information
- Emissions Monitoring Plans
- Emissions Monitoring Plans Approval
- Emissions Report *(AO to State)*
- Emissions Report Review
- Emissions Units Cancellation Process

**Aeroplane Operator(s) (AOs)**

- CO₂ Estimation and Reporting Tool (CERT)
- Needed in 2018-2019
- Needed in 2020+
- Needed in 2025+

**Focus in 2018-2019**
Domestic Implementation

• Implementing the CORSIA via regulation is not possible according to the timeline prescribed in the SARPs

• FAA is exploring voluntary compliance options to allow operators to file EMPs by February 28, 2019

• If you are an operator that thinks it may be at or near the 10,000 tonne CO₂ emissions threshold, please consider using the CERT to check and contact FAA to discuss EMP filing options
Additional Information and Resources

• International Civil Aviation Organization (ICAO)
  CORSIA resources
  • CORSIA Standards and Recommended Practices (SARPS)
  • CORSIA Environmental Technical Manual (ETM)

  available at: https://www.icao.int/corsia

• International Air Transport Association (IATA)
  CORSIA resources

  available at: https://www.iata.org/policy/environment/Pages/corsia.aspx
Questions?

Contact Information:

Donald S. Scata Jr.
Senior International Advisor
Office of Environment & Energy
Federal Aviation Administration
202.267.3281
Donald.Scata@faa.gov

Kevin Partowazam
Environmental Protection Specialist
Office of Environment & Energy
Federal Aviation Administration
202.267-3563
Kevin.Partowazam@faa.gov