



Session 2: CORSIA MRV System: Monitoring of CO₂ Emissions

ICAO Secretariat



Components of CORSIA MRV System

- A monitoring, reporting and verification (MRV) system is a key component of CORSIA implementation
 - Implementation of the MRV system from 1 January 2019 for all international flights is essential to establish CORSIA's baseline (2019-2020 average)
 - Purpose of MRV is to collect information on international aviation CO₂ emissions on an annual basis and compare emissions from 2021 against the baseline emissions

Monitoring

Monitoring of CO₂ emissions is either based on a Fuel Use Monitoring Method, or the use of the ICAO CORSIA CERT.

Reporting

CO₂ emissions will be reported from aeroplane operators to their State Authority, and from States to ICAO.

Verification

CO₂ emissions information is accurate and free of errors.



MRV of CO₂ Emissions

- Monitoring, reporting and verification of aeroplane operator's annual CO₂ emissions – Annex 16, Volume IV, Chapter 2

- 2.1 Applicability of MRV Requirements
- 2.2 Monitoring of CO₂ Emissions
- 2.3 Reporting of CO₂ Emissions
- 2.4 Verification of CO₂ Emissions
- 2.5 Data Gaps
- 2.6 Error Correction to Emissions Reports

CHAPTER 2. MONITORING, REPORTING AND VERIFICATION (MRV) OF AEROPLANE OPERATOR ANNUAL CO₂ EMISSIONS

2.1 Applicability of MRV requirements

Note.— See also Chapter 1 for administration requirements of the State and aeroplane operator.

2.1.1 The Standards and Recommended Practices of this Chapter shall be applicable to an aeroplane operator that produces annual CO₂ emissions greater than 10 000 tonnes from the use of an aeroplane(s) with a maximum certificated take-off 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.

2.1.2 **Recommendation.**— *When considering whether a flight is international or domestic, an aeroplane operator and a State should use, for the purpose of this Volume, Doc 7910 — Location Indicators, which contains a list of aerodromes and the State they are attributed to. Further guidance material is also provided in the Environmental Technical Manual (Doc 9501), Volume IV — Procedures for demonstrating compliance with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSA).*

2.1.3 The Standards and Recommended Practices of this Chapter shall not be applicable to international flights, as defined in 1.1.2, preceding or following a humanitarian, medical or firefighting flight provided such flights were conducted with the same aeroplane, and were required to accomplish the related humanitarian, medical or firefighting activities or to reposition thereafter the aeroplane for its next activity. The aeroplane operator shall provide supporting evidence of such activities to the verification body or, upon request, to the State.

2.1.4 The Standards and Recommended Practices of this Chapter shall be applicable to a new entrant aeroplane operator from the year after it meets the requirements in 2.1.1 and 2.1.3.

2.1.5 **Recommendation.**— *If the aeroplane operator is close to the threshold of annual CO₂ emissions, as defined in 2.1.1 and 2.1.3, from international flights, as defined in 1.1.2, it should consider engaging with the State to which it is attributed for guidance. Likewise, the State should carry out oversight of the aeroplane operators attributed to it, and engage with any that it considers may be close to or above the threshold. The aeroplane operator with annual CO₂ emissions below the threshold may choose to voluntarily engage with the State to which it is attributed.*

Note.— See Attachment B Figure B-1 for a process flowchart on the determination of the applicability of Chapter 2 to international flights, as defined in 1.1.2.

2.2 Monitoring of CO₂ emissions

2.2.1 Eligibility of monitoring methods

2.2.1.1 The aeroplane operator shall monitor and record its fuel use from international flights, as defined in 1.1.2 and 2.1, in accordance with an eligible monitoring method as defined in 2.2.1.2 and 2.2.1.3, and approved by the State to which it is attributed. Following approval of the Emissions Monitoring Plan, the aeroplane operator shall use the same eligible monitoring method for the entire compliance period.



- Monitoring, reporting and verification of aeroplane operator's annual CO₂ emissions – Annex 16, Volume IV, Chapter 2

2.1 Applicability of MRV Requirements

2.2 Monitoring of CO₂ Emissions

2.3 Reporting of CO₂ Emissions

2.4 Verification of CO₂ Emissions

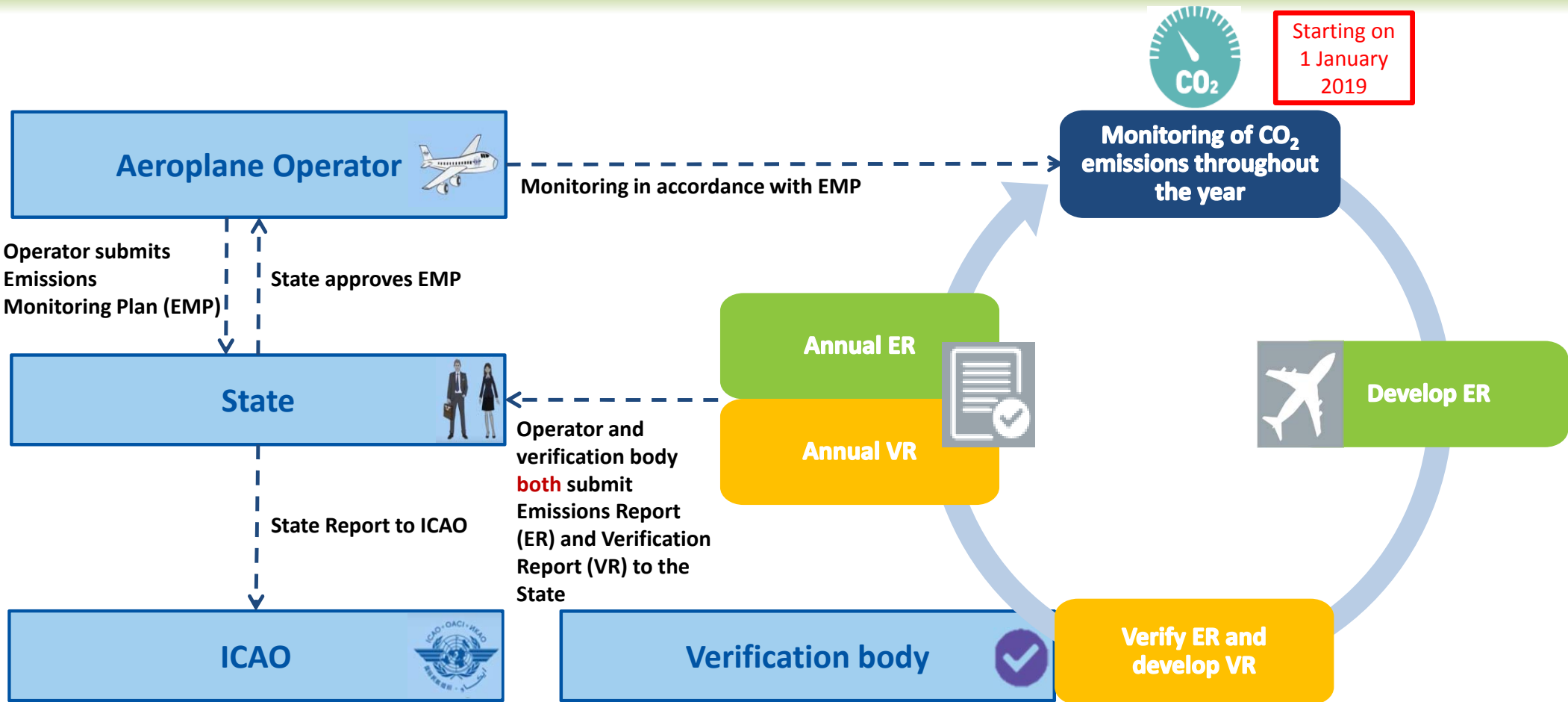
2.5 Data Gaps

2.6 Error Correction to Emissions Reports

Covered in this session

Covered in sessions
#3 and #4

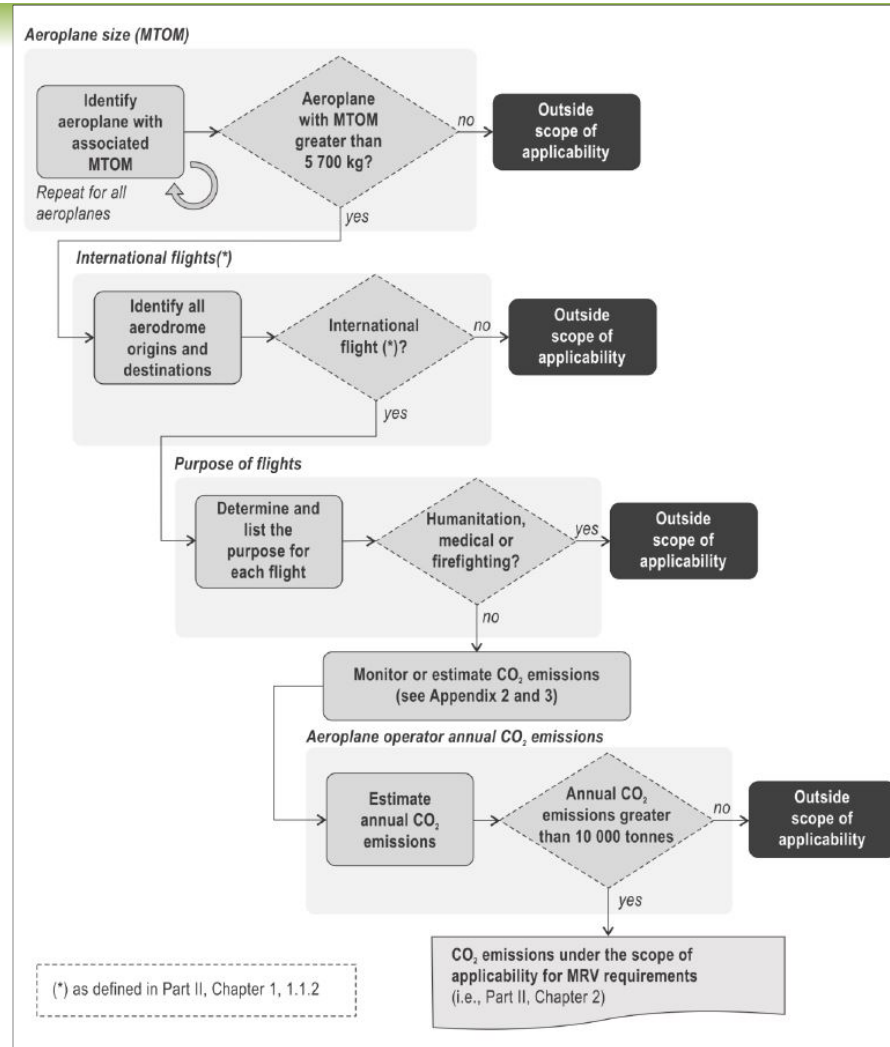
Annual Cycle for MRV Activities



Applicability of Monitoring Requirements

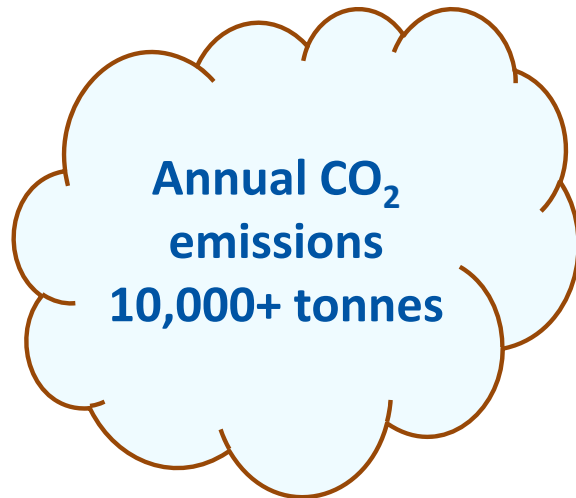
Aviation activity is covered by CORSIA monitoring requirements, if the activity is:

- From the use of an aeroplane with a maximum certificated take-off mass of greater than 5,700 kg
- From international operations on or after 1 January 2019
- With the exception of humanitarian, medical and firefighting operations
- From an operator that produces annual CO₂ emissions greater than 10,000 tonnes



Applicability of Monitoring Requirements: Illustrative Example of the 10,000 tonnes of CO₂ Threshold

- One-way flight of approximately 2 hours
- Round trip operated once every day: 365 days a year, a total of 730 flights
- Using a medium-sized aeroplane (in this example, E190)



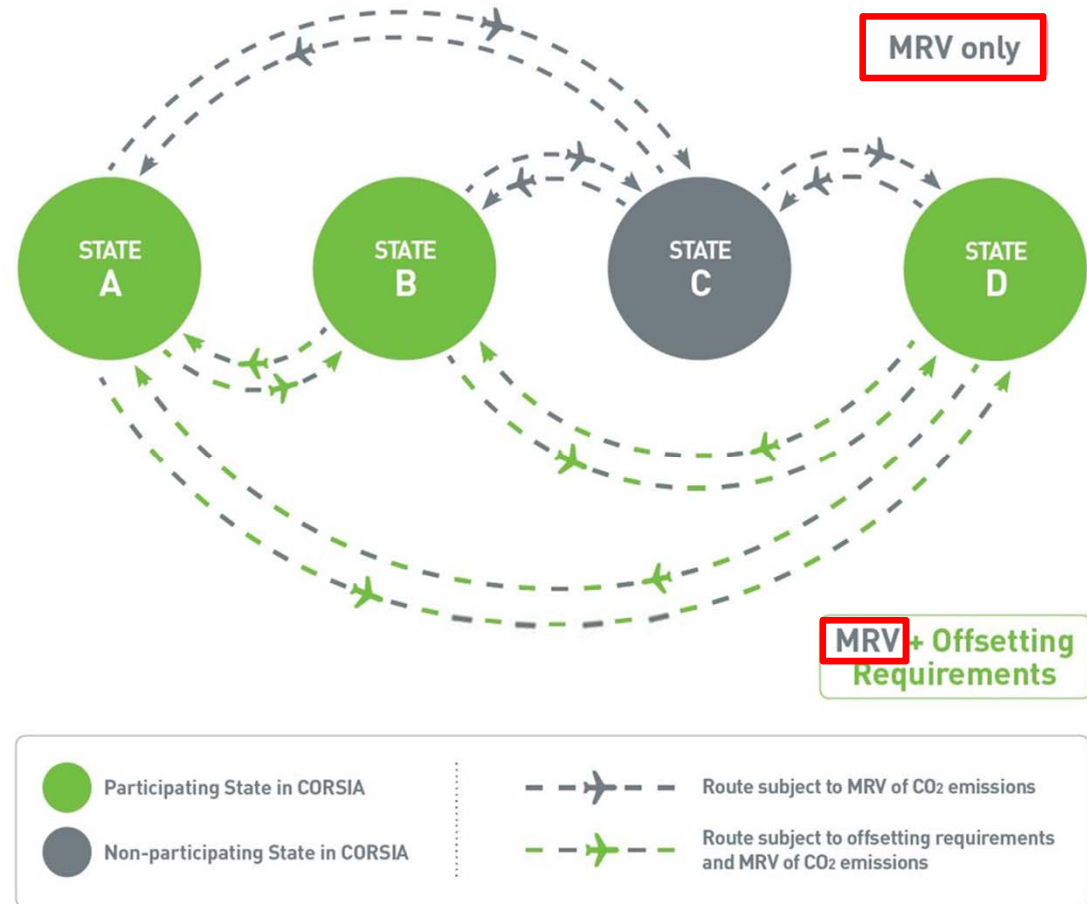
**Annual CO₂ emissions
10,000+ tonnes**

From	To	Annual CO ₂ emissions, tonnes*
Singapore (WSSS)	Bangkok (VTBS)	10,176
Luanda (FNLU)	Windhoek (FYWH)	11,206
Montreal (CYUL)	Atlanta (KATL)	11,383
Rome (LIRF)	London (EGLL)	10,388
Mexico City (MMMX)	Havana (MUHA)	12,561
Buenos Aires (SABE)	Sao Paulo (SBGR)	12,021
Abu Dhabi (OMAA)	Baghdad (ORBI)	10,176

* Estimated with ICAO CORSIA CERT

Applicability of Monitoring Requirements

- All aeroplane operators conducting international flights are required to monitor, report and verify CO₂ emissions from these flights every year starting on 1 January 2019
- Requirement for the MRV of CO₂ emissions is independent from participation in CORSIA offsetting



Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.1



Monitoring of CO₂ Emissions – Emissions Monitoring Plan

Monitoring of CO₂ Emissions – Emissions Monitoring Plan

- An Emissions Monitoring Plan (EMP) is a collaborative tool between the State and the aeroplane operator. The EMP:
 - Identifies the most appropriate means and methods for CO₂ emissions monitoring on an operator-specific basis; and
 - Facilitates the reporting of required information to the State.
- An aeroplane operator shall submit an EMP to the State to which it is attributed for approval
 - Operator to submit an EMP to State by 28 February 2019
 - State to approve the EMP by 30 April 2019
- The State and aeroplane operator should maintain clear and open communication during development and review of an EMP

Development of Emissions Monitoring Plan



1 PREPARATION AND SUBMISSION

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

- **Mandatory timeframe:** submit by 28 February 2019.

2 REVIEW AND APPROVAL

The State reviews and approves the Emissions Monitoring Plan.

- **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.

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.

Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.2.2, and Appendix 1

Contents of Emissions Monitoring Plan

- EMP contents are included in the Annex 16, Volume IV, Appendix 4
- Main components of an EMP are:

1. Aeroplane operator identification
2. Fleet and operations data
3. Methods and means of calculating emissions from international flights
4. Data management, data flow and control

Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.2.2, and Appendix 4

CORSIA EMISSIONS MONITORING PLAN (EMP)

CONTENTS

- 1 [Version control of Emissions Monitoring Plan](#)
- 2 [Aeroplane operator identification and description of activities](#)
- 3 [Fleet and operations data](#)
- 4 [Methods and means for calculating emissions](#)
 - 4.1 [Fuel Use Monitoring Method: Method A](#)
 - 4.2 [Fuel Use Monitoring Method: Method B](#)
 - 4.3 [Fuel Use Monitoring Method: Block-off / Block-on](#)
 - 4.4 [Fuel Use Monitoring Method: Fuel Uplift](#)
 - 4.5 [Fuel Use Monitoring Method: Fuel Allocation with Block Hour](#)
 - 4.6 [ICAO CORSIA CO₂ Estimation and Reporting Tool \(CERT\)](#)
- 5 [Data management, data flow, control system, risk analysis and data gaps](#)

Template Information

Template provided by:	
Version (publication date):	

Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1.

EMP – 1. Aeroplane Operator Identification

EMP Contents

1. Aeroplane operator identification

2. Fleet and operations data

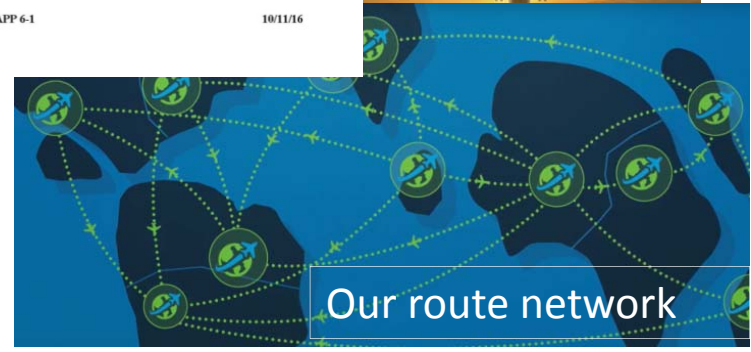
3. Methods and means of calculating emissions from international flights

4. Data management, data flow and control

AIR OPERATOR CERTIFICATE		
1	STATE OF THE OPERATOR ²	1
	ISSUING AUTHORITY ³	
AOC # ⁴ : Expiry date ⁵ :	OPERATOR NAME ⁶ Dba trading name ⁷ : Operator address ⁸ : Telephone ⁹ : Fax: Email:	OPERATIONAL POINTS OF CONTACT ¹⁰ Contact details, at which operational management can be contacted without undue delay, are listed in _____ ¹¹ .
This certificate certifies that _____ ¹² is authorized to perform commercial air operations, as defined in the attached operations specifications, in accordance with the operations manual and the _____ ¹³ .		
Date of issue ¹⁴ :	Name and signature ¹⁵ : Title:	

Notes—
 1. For use of the State of the Operator.
 2. Replace by the name of the State of the Operator.
 3. Replace by the identification of the issuing authority of the State of the Operator.
 4. Unique AOC number, as issued by the State of the Operator.
 5. Date after which the AOC ceases to be valid (dd-mm-yyyy).
 6. Replace by the operator's registered name.
 7. Operator's trading name, if different. Insert "dba" before the trading name (for "doing business as").

ANNEX 6—PART I APP 6-1 10/11/16



- Name of the operator
- Information for attributing the operator to a State:
 - ICAO Designator;
 - Air operator certificate; or
 - Place of juridical registration
- Operator's ownership structure, including parent-subsidiary relationships
- Contact information, including operator's CORSIA Focal Point
- Description of the operator's activities

EMP – 2. Fleet and Operations Data

EMP Contents

1. Aeroplane operator identification
2. Fleet and operations data
3. Methods and means of calculating emissions from international flights
4. Data management, data flow and control



No.	ICAO type designator	Fuel type	Number of aeroplanes
1	A320	Jet-A	2
2	AT72	Jet-A	2
3	B789	Jet-A	2
4	DH8D	Jet-A	2
5	E190	Jet-A	1
6	MD11	Jet-A	1
7			
8			
9			
10			

- Information on the operator’s aeroplane types and types of fuel
- Flight attribution to the operator
- Procedures to track changes in the fleet
- List of State pairs operated at the time of the EMP submission
- Procedures to identify international flights and exempted flights

ICAO model flight plan form

FLIGHT PLAN
PLAN DE VOL

PRIORITY
Priorité
FF →

ADDRESSEE(S)
Destinataire(s)

FILING TIME
Heure de dépôt

ORIGINATOR
Expéditeur

SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND/OR ORIGINATOR
Identification précise du(des) destinataire(s) et/ou de l'expéditeur

3 MESSAGE TYPE
Type de message
(FPL)

7 AIRCRAFT IDENTIFICATION
Identification de l'aéronef

8 FLIGHT RULES
Règles de vol

9 NUMBER
Numéro

10 EQUIPMENT
Équipement

13 DEPARTURE AERODROME
Aéroport de départ

TIME

14 TURBULENCE CAT.
Cat. de turbulence de sillage

- ICAO Designator
- Registration mark
- Aeroplane owner

Reference: Annex 16, Volume IV, Appendix 4

EMP – 3. Emissions Monitoring Options

EMP Contents

1. Aeroplane operator identification
2. Fleet and operations data
3. Methods and means of calculating emissions from international flights
4. Data management, data flow and control

$CO_2 \text{ Emissions} = \text{Mass of fuel} * \text{Fuel Conversion Factor of given fuel type}$

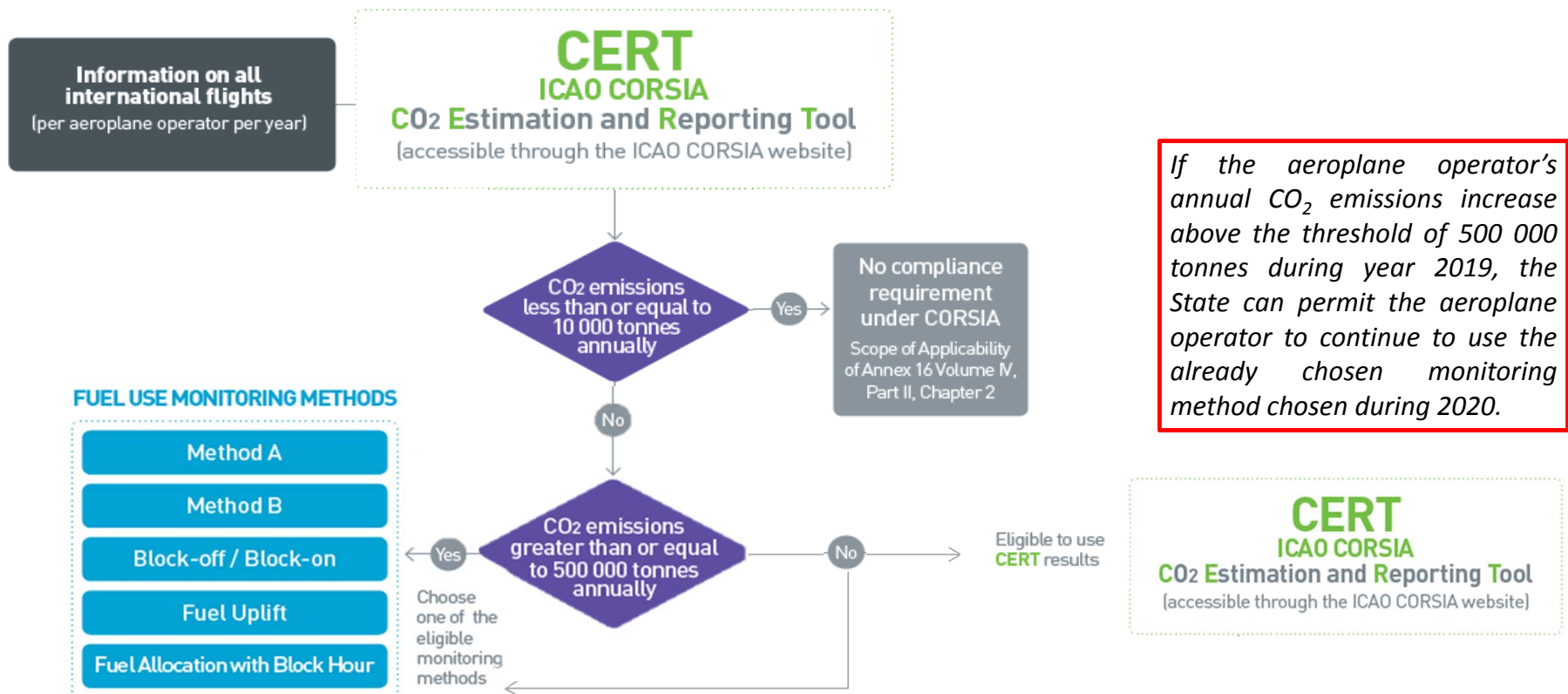


- An aeroplane operator shall monitor and record its fuel use from international flights in accordance with an eligible monitoring method
- Monitoring method shall be approved by the State as a part of aeroplane operator's Emissions Monitoring Plan
- The aeroplane operator shall use the same eligible monitoring method for the entire compliance period

EMP – 3. Emissions Monitoring Options (Decision Tree for 2019 & 2020)



Decision tree for 2019 & 2020

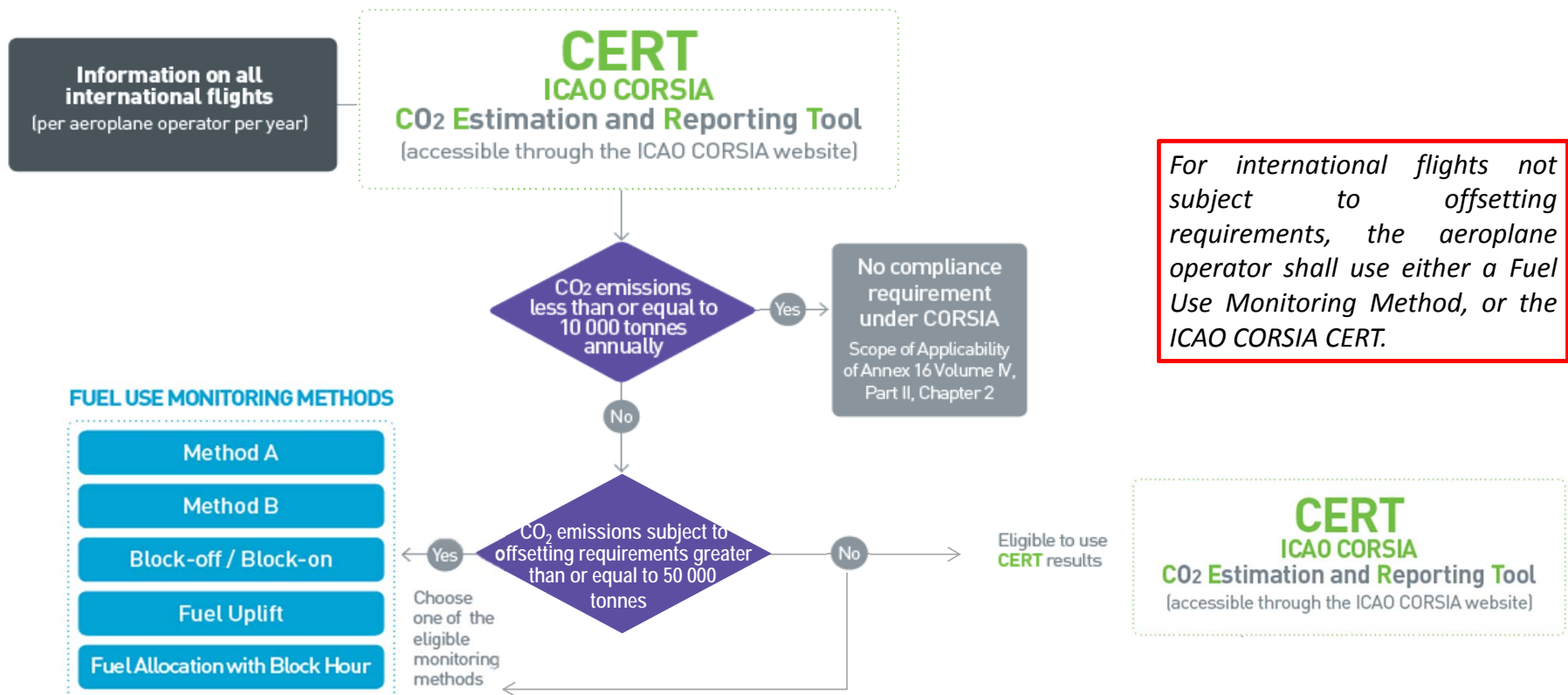


If the aeroplane operator's annual CO₂ emissions increase above the threshold of 500 000 tonnes during year 2019, the State can permit the aeroplane operator to continue to use the already chosen monitoring method chosen during 2020.

Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.2.1

EMP – 3. Emissions Monitoring Options (Decision Tree for 2021 – 2035)

Decision tree from 2021 to 2035



EMP – 3. Emissions Monitoring Options

ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT)

CERT
ICAO CORSIA
CO₂ Estimation and Reporting Tool
(accessible through the ICAO CORSIA website)

- CORSIA CERT is an ICAO tool to help aeroplane operators estimate and report their international aviation emissions (Annex 16, Volume IV, Appendix 3)

- All operators can use the ICAO CORSIA CERT for a preliminary CO₂ assessment, and for filling in possible data gaps
- Eligible operators can use the ICAO CORSIA CERT for:
 - Estimating CO₂ emissions; and
 - Populating the Emissions Monitoring Plan and Emissions Report templates
- ICAO CORSIA CERT is available on the ICAO CORSIA webpage

Practical demonstration of the ICAO CORSIA CERT: later in this session

EMP – 3. Emissions Monitoring Options (5 Monitoring Methods)

FUEL USE MONITORING METHODS

Method A

Method B

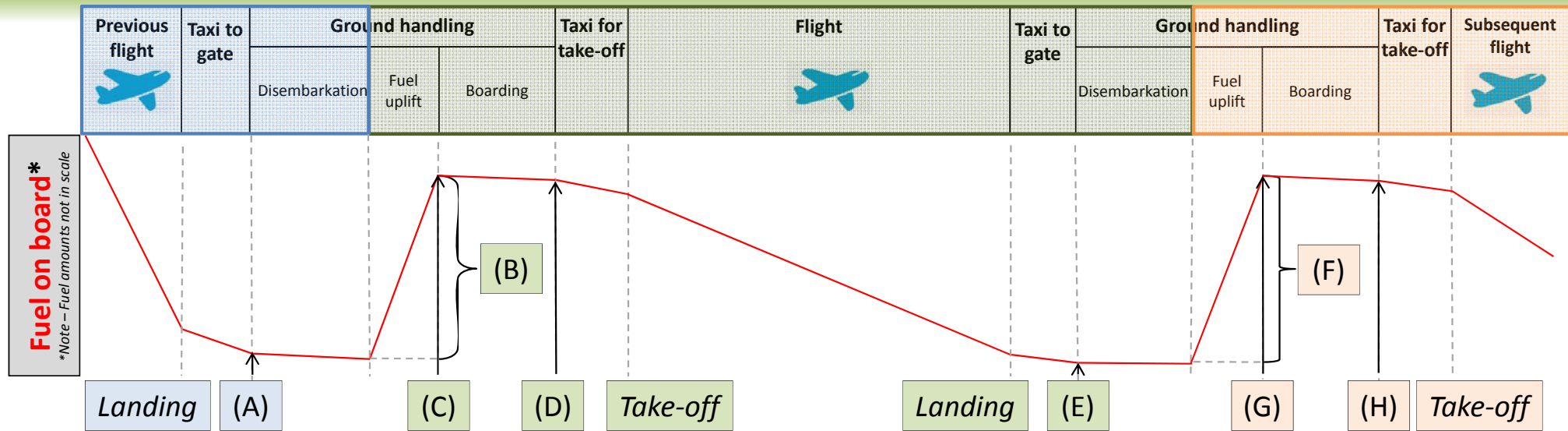
Block-off / Block-on

Fuel Uplift

Fuel Allocation with Block Hour

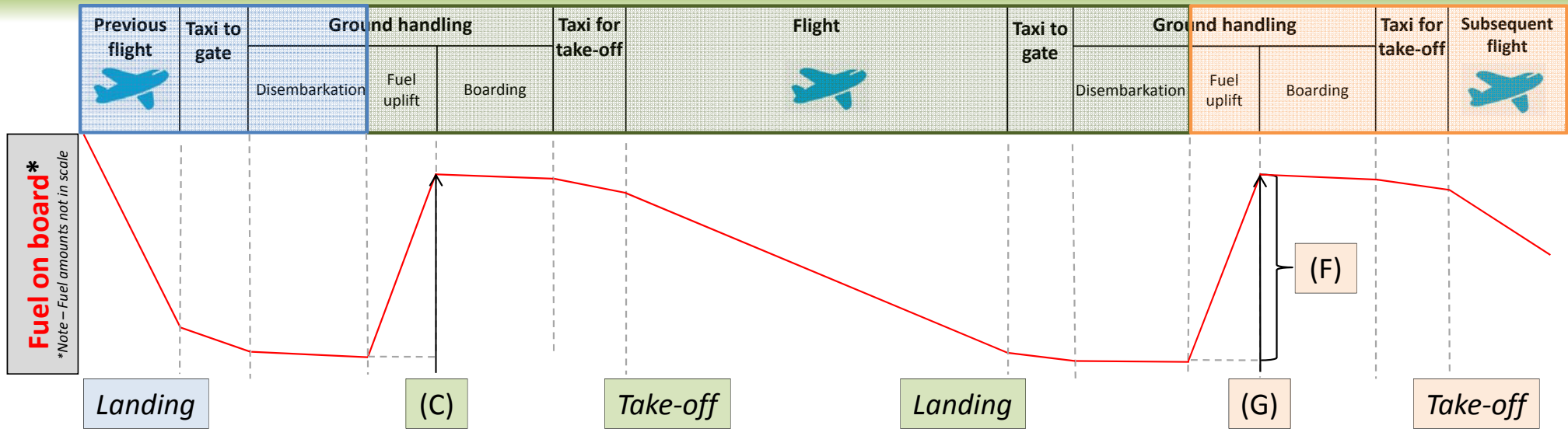
- Those operators that are not eligible to use ICAO CORSIA CERT, have five Fuel Use Monitoring Methods to choose from
- An operator shall choose one of the five methods; Different methods can be selected for different aeroplane types
- Methods represent the most accurate established practices, and are equivalent; there is no hierarchy for selecting a method
- Each method uses different fuel measurement points. Specifications of the methods are included in the Annex 16, Volume IV, Appendix 2.

EMP – 3. Emissions Monitoring Options (Fuel Measurement Points)



Fuel Measurement Points		Definition of the measurement point
Block-on	(A) (E)	Any time between last engine out and first door open
Fuel Uplift	(B) (F)	Measurement of fuel provided by the fuel supplier, as documented in the fuel delivery notes or invoices for each flight (in litre)
Fuel in tanks after fuel uplift	(C) (G)	Amount of fuel contained in aeroplane tanks once fuel uplifts for the flight under consideration (in tonnes)
Block-off	(D) (H)	Any time between last door closed and first engine on

EMP – 3. Emissions Monitoring Options (5 Monitoring Methods – Method A)



Illustrative calculation example

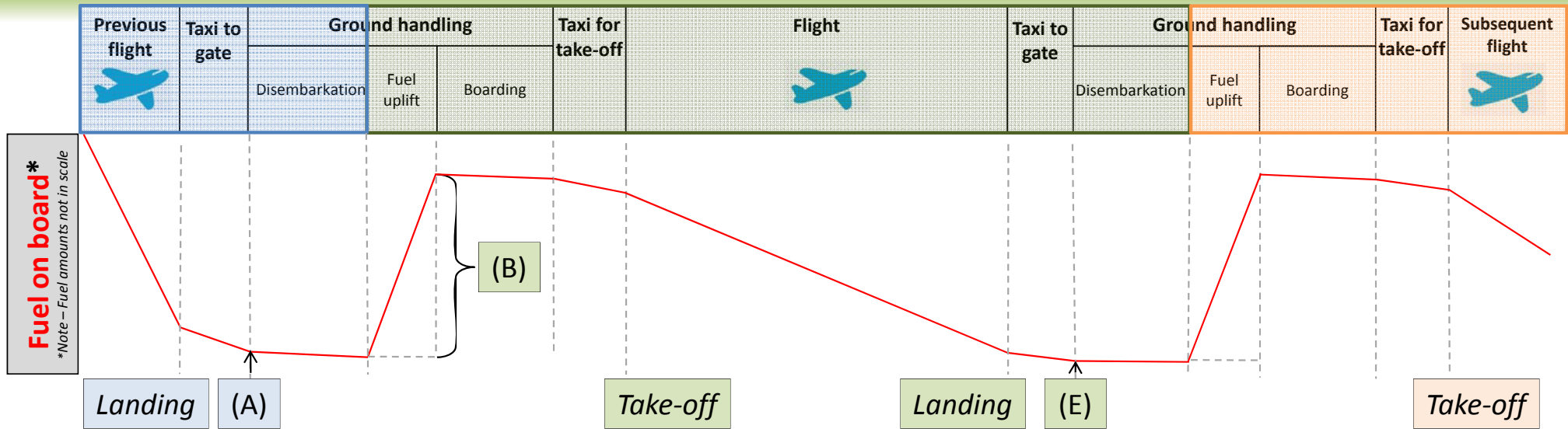
Fuel Measurement Points	
Block-on	(A) (E)
Fuel Uplift	(B) (F)
Fuel in tanks after fuel uplift	(C) (G)
Block-off	(D) (H)

Method A
Fuel used = (C) - (G) + (F)
Note: Where no fuel uplift for the flight takes place, the amount of fuel contained in aeroplane tanks shall be determined at block-off for the flight

Flight	Uplift	Fuel after uplift	Block-off	Block-on	Block hour
1	25.8	33.1	33.1	4.1	2.5
2	44.5	48.5	48.5	19.3	2.6
3	17.6	36.8	36.7	2.8	3.1

$$48.5 - 36.8 + 17.6 = 29.3$$

EMP – 3. Emissions Monitoring Options (5 Monitoring Methods – Method B)



Illustrative calculation example

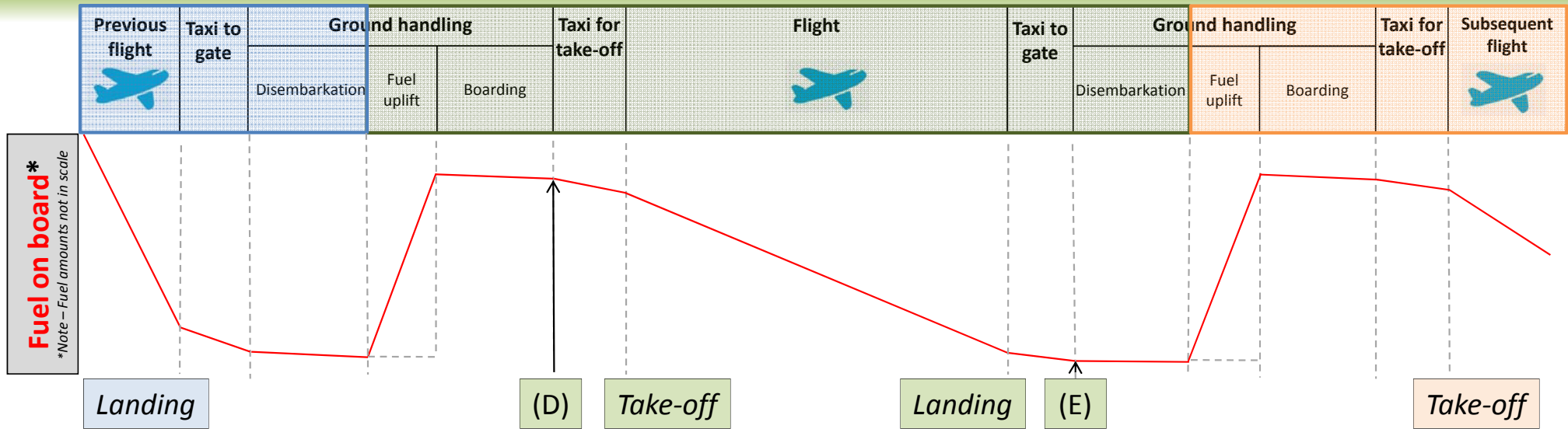
Fuel Measurement Points	
Block-on	(A) (E)
Fuel Uplift	(B) (F)
Fuel in tanks after fuel uplift	(C) (G)
Block-off	(D) (H)

Method B
Fuel used = (A) - (E) + (B)

Flight	Uplift	Fuel after uplift	Block-off	Block-on	Block hour
1	25.8	33.1	33.1	4.1	2.5
2	44.5	48.5	48.5	19.3	2.6
3	17.6	36.8	36.7	2.8	3.1

4.1 - 19.3 + 44.5 = 29.3

EMP – 3. Emissions Monitoring Options (5 Monitoring Methods – Block-off/Block-on)



Illustrative calculation example

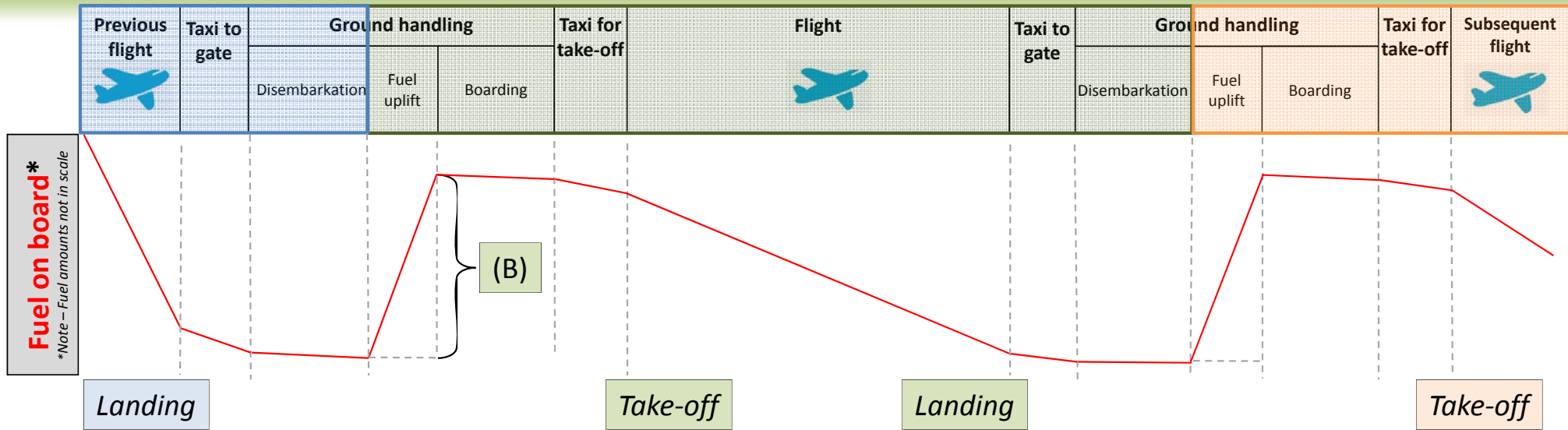
Fuel Measurement Points	
Block-on	(A) (E)
Fuel Uplift	(B) (F)
Fuel in tanks after fuel uplift	(C) (G)
Block-off	(D) (H)

Block-off /Block-on
Fuel used = (D) - (E)

Flight	Uplift	Fuel after uplift	Block-off	Block-on	Block hour
1	25.8	33.1	33.1	4.1	2.5
2	44.5	48.5	48.5	19.3	2.6
3	17.6	36.8	36.7	2.8	3.1

48.5 – 19.3 = 29.2

EMP – 3. Emissions Monitoring Options (5 Monitoring Methods – Fuel Uplift)



Illustrative calculation example

Fuel Measurement Points	
Block-on	(A) (E)
Fuel Uplift	(B) (F)
Fuel in tanks after fuel uplift	(C) (G)
Block-off	(D) (H)

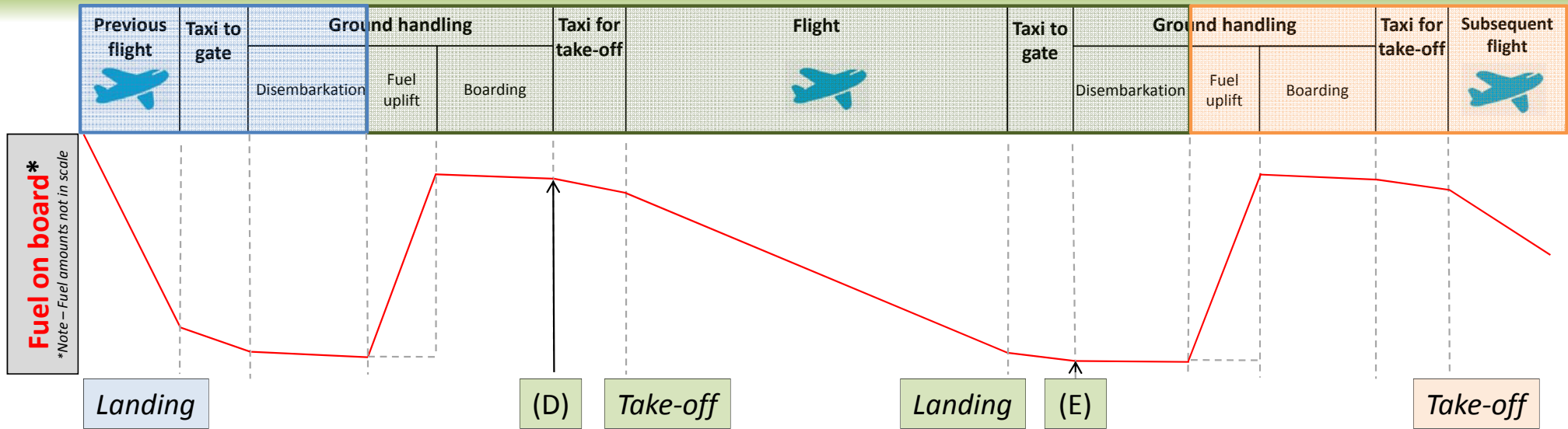
Fuel Uplift	
Fuel used	= (B)

Note: For flights without a fuel uplift, an aeroplane operator shall allocate fuel use proportionally to block hours between different flights covered by the same uplift

Flight	Uplift	Fuel after uplift	Block-off	Block-on	Block hour
1	25.8	33.1	33.1	4.1	2.5
2	44.5	48.5	48.5	19.3	2.6
3	17.6	36.8	36.7	2.8	3.1

44.5

EMP – 3. Emissions Monitoring Options (5 Monitoring Methods – Block Hour)



Illustrative calculation example

Fuel Measurement Points	
Block-on	(A) (E)
Fuel Uplift	(B) (F)
Fuel in tanks after fuel uplift	(C) (G)
Block-off	(D) (H)

Fuel Allocation with Block Hour
Fuel used = Block hour * Average fuel burn ratio ("AFBR"; represented in tonnes of fuel per hour)
<i>Note: For an operator which cannot distinguish between international and domestic fuel uplifts, the AFBR shall be based on both international and domestic fuel uplifts and block hours for a given year</i>

Flight	Uplift	Fuel after uplift	Block-off	Block-on	Block hour
1	25.8	33.1	33.1	4.1	2.5
2	44.5	48.5	48.5	19.3	2.6
3	17.6	36.8	36.7	2.8	3.1

$$(25.8+44.5+17.6) / (2.5+2.6+3.1) = 10.7 \text{ (AFBR)} * 2.6 = 27.8$$

EMP – 3. Emissions Monitoring Options (Fuel Density)

- If the amount of fuel is determined in units of volume, an aeroplane operator shall apply a fuel density value to calculate fuel mass
 - This is the case in, e.g., when fuel uplift is measured in volume
- The operator shall record the fuel density that is used for operational and safety reasons
 - Density is usually recorded e.g., in an operational, flight or technical log
 - Fuel density value may be:
 - An actual fuel density value; or
 - A standard value of 0.8 kg per litre
- The operator shall detail the procedure for informing the use of fuel density in the EMP, along with a reference to the relevant documentation

EMP – 4. Data Management, Data Flow and Control

EMP Contents

1. Aeroplane operator identification
2. Fleet and operations data
3. Methods and means of calculating emissions from international flights
4. Data management, data flow and control



- Aeroplane operator’s internal roles, responsibilities and procedures on data management, and related risks
- Procedures to handle possible data gaps and errors
- Documentation and record keeping plan
- Procedures for communicating the changes in the EMP to the State

Reference: Annex 16, Volume IV, Appendix 4



Monitoring of CO₂ Emissions – Review and Approval of the Emissions Monitoring Plan

- The State and aeroplane operator should maintain clear and open communication during the development and review of an EMP
 - The State shall engage with the aeroplane operator to resolve any outstanding issues in the EMP
- The State shall review and approve aeroplane operator's Emissions Monitoring Plan
 - Operator to submit an EMP to State by 28 February 2019
 - State to approve the EMP by 30 April 2019
- Guidance material on Emissions Monitoring Plans is included in the Environmental Technical Manual (ETM), Volume IV

State's Review of the Emissions Monitoring Plan – Some Specific Cases

What happens if an aeroplane operator does not have an approved Emissions Monitoring Plan on 1 January 2019?

- Operator should prepare and submit EMP as soon as possible
- If operator does not have an approved EMP by 1 Jan 2019, it shall monitor and record its emissions in accordance with the eligible monitoring method outlined in the EMP that it will submit, or has submitted

What if an aeroplane operator does not have sufficient information to use a Fuel Use Monitoring Method?

- The State can approve the use of the ICAO CORSIA CERT for a period lasting no later than 30 June 2019

What if an aeroplane operator's Emissions Monitoring Plan is inconsistent with an eligible Fuel Use Monitoring Method?

- The State can approve a different eligible Fuel Use Monitoring Method within the EMP for a period lasting no later than 30 June 2019

State's Review of the Emissions Monitoring Plan – Level of Data Aggregation

- The State shall decide on the level of aggregation (i.e., State pair or aerodrome pair) for which an aeroplane operator shall report the number of international flights and CO₂ emissions
- The State shall inform an aeroplane operator whether the operator shall report at the level of State pair or aerodrome pair during the approval process for the Emissions Monitoring Plan.

State's Review and Approval of the Emissions Monitoring Plan

- Guidance material on submission, amendments and approval of Emissions Monitoring Plans is included in the Environmental Technical Manual (ETM), Volume IV



Table 3-2. Emissions Monitoring Plan checklist

<i>Emissions Monitoring Plan provision</i>	<i>Checklist for State review</i>	<i>Material change or notice of change</i>
I. Aeroplane operator identification		
Identification of aeroplane operator with legal responsibility.	Subject to review and approval by the State; reviewer to review and confirm document(s).	Can be material – If legal entity or means to identify legal entity changes; resubmit and subject to re-approval.
Name and address.	Subject to review and approval by the State; reviewer to review and confirm document(s).	Can be material – If changes to name and/or address are due to a change in the legal entity or means for the State to identify legal entity changes; resubmit and subject to re-approval.
Identifying information for attributing the aeroplane operator to a State: either unique ICAO Designator (or Designators) used in the call sign for air traffic control	Subject to review and approval by the State; reviewer to review and confirm document(s)	A change in the identifying information would be material; resubmit and subject to re-approval.

Revisions to the Emissions Monitoring Plan

- The aeroplane operator shall resubmit the Emissions Monitoring Plan to the State for approval if “a material change” is made to the Plan
- A material change would affect e.g.:
 - The status or eligibility for an option under the emissions monitoring requirements; or
 - Operator’s approach to monitoring.
- The aeroplane operator shall also inform the State of changes that would affect the State’s oversight, even if the changes do not fall within the definition of a material change, e.g.:
 - Change in corporate name / address.

Revisions to the Emissions Monitoring Plan

- Selected examples of material and non-material changes to an EMP

Type of change to an EMP	Material change?	Follow-up actions for an operator and State
Means of attributing international flights to the operator	Yes	Operator: Resubmit the EMP to State State: Review and re-approve the EMP
List of the aeroplane types used by the operator	No	Operator: Notify the change of aeroplane types to the State as a part of the annual Emissions Report State: Receive and take note of the changes
Fuel Use Monitoring Method	Yes	Operator: Resubmit the EMP to State State: Review and re-approve the EMP
List of all State pairs operated by the operator	No	Operator: Notify the change of State pairs to the State as a part of the annual Emissions Report State: Receive and take note of the changes
Eligibility to use ICAO CORSIA CERT	Yes	Operator: Resubmit the EMP to State State: Review and re-approve the EMP



Calculation of CO₂ Emissions and Monitoring of CORSIA Eligible Fuels

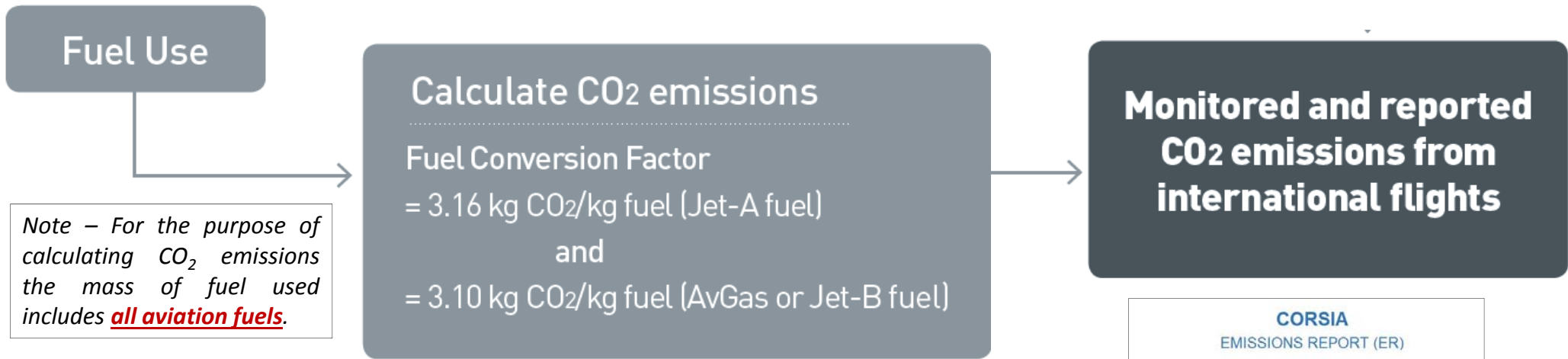
Calculation of CO₂ Emissions from Fuel Use

- After an aeroplane operator monitors its fuel use in accordance with an approved EMP, it shall calculate CO₂ emissions from the fuel burn
- ICAO CORSIA CERT automatically estimates the CO₂ emissions for aeroplane operators who have been approved to use the CERT
- An operator using a Fuel Use Monitoring Method shall determine the CO₂ emissions by using the following equation:

$$CO_2 \text{ Emissions} = \text{Mass of fuel} * \text{Fuel Conversion Factor of given fuel type}$$

Calculation of CO₂ Emissions from Fuel Use

$$CO_2 \text{ Emissions} = \text{Mass of fuel} \times \text{Fuel Conversion Factor of given fuel type}$$



Note – For the purpose of calculating CO₂ emissions the mass of fuel used includes **all aviation fuels**.

- Information on CO₂ emissions will be reported as a part of an aeroplane operator’s Emissions Report

CORSIA
EMISSIONS REPORT (ER)

CONTENTS

- [1 Aeroplane operator identification and description of activities](#)
- [2 Underlying basic information of the Emissions Report](#)
- [3 Aeroplane fleet and fuel types](#)
- [4 Fuel density](#)
- [5. Reporting](#)
 - [5.1 Reporting - State pairs](#)
 - [5.2 Reporting - Aerodrome pairs](#)
- [6 Data gaps](#)

Template Information

Template provided by:	
Version (publication date):	

Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1.

Monitoring of CORSIA Eligible Fuel Claims

- Purchasing and blending records will form the basis for monitoring of the use of CORSIA eligible fuels
- For the purpose of calculating the CO₂ emissions, the mass of fuel used includes all aviation fuel
- The emissions reductions from the use of CORSIA eligible fuels are calculated as part of the CO₂ offsetting requirements



Covered in:

Session 3: CORSIA MRV System: Reporting of CO₂ emissions; and Session 6: CORSIA offsetting requirements

FAQs regarding the EMP and Monitoring of CO₂ Emissions

A selection of Frequently Asked Questions (FAQs) on CORSIA and related responses are available for download via the CORSIA webpage: www.icao.int/corsia

What are the contents of an Emissions Monitoring Plan?

Does the Emissions Monitoring Plan have to be submitted annually?

Can an aeroplane operator change its Fuel Use Monitoring Method?

What is an Emissions Monitoring Plan and why is it needed?

What will happen if an aeroplane operator exceeds the eligibility threshold to use ICAO CORSIA CERT during a given year?

ICAO - OACI - ИКАО
Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)
— Frequently Asked Questions (FAQs) —
(updated as of 8 February 2019)
CORSIA



Questions?

Demonstration of the Emissions Monitoring Plan Template

About ICAO	Global Priorities	Meetings and Events	Information Resources	Careers	Subscribe
------------	-------------------	---------------------	-----------------------	---------	-----------

ICAO / Environmental Protection / CORSIA / Standardized templates

- ENV Homepage
- CORSIA Homepage
- CORSIA IMPLEMENTATION**
- A39-3
- Annex 16 Volume IV
- ETM - Volume IV
- CORSIA Implementation Elements
- Additional Material for CORSIA Implementation
- ACT CORSIA**
- Buddy Partnerships
- Example Regulatory Framework

Standardized templates

Template of Emissions Monitoring Plan (from aeroplane operator to State)

An aeroplane operator shall submit an Emissions Monitoring Plan to the State to which it is attributed for approval by the State in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.2.

It is recommended that an aeroplane operator uses the standardised Emissions Monitoring Plan template to develop the Emissions Monitoring Plan for submission to its State.

A standardized Emissions Monitoring Plan template in the format of a spreadsheet is available to aeroplane operators for download below (Note: Russian template will be available shortly).

- EN
- FR
- SP
- RU
- AR
- ZH

<http://www.icao.int/corsia>



ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT)



Background on the ICAO CORSIA CERT

**SARPs
Annex 16 Volume IV**

Part I

- Definitions, etc.

Part II

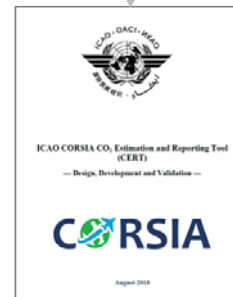
- **MRV**
- CO₂ offsetting requirements and emissions reductions
- Emissions Units

ETM Volume IV

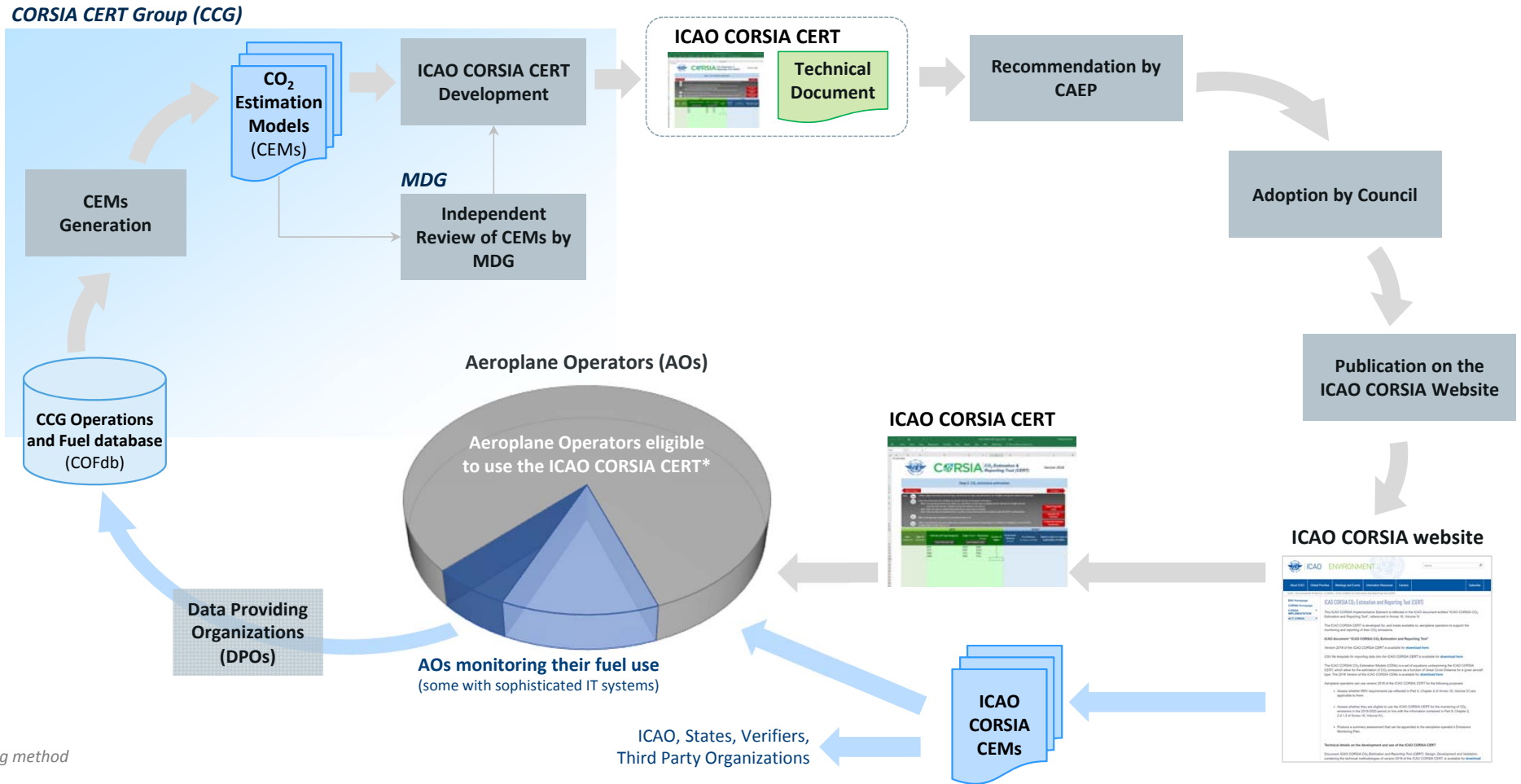
- General guideline
- **Guidelines on MRV**
- Guidelines on calculation of offsetting requirements

ICAO CORSIA Implementation Elements	ICAO documents
CORSIA States for Chapter 3 State Pairs	1. CORSIA States for Chapter 3 State Pairs
ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT)	2. ICAO CORSIA CO ₂ Estimation and Reporting Tool
CORSIA Eligible Fuels	3. CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes 4. CORSIA Approved Sustainability Certification Schemes 5. CORSIA Sustainability Criteria for CORSIA Eligible Fuels 6. CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels 7. CORSIA Methodology for Calculating Actual Life Cycle Emissions Values
CORSIA Eligible Emissions Units	8. CORSIA Eligible Emissions Units 9. CORSIA Emissions Unit Eligibility Criteria
CORSIA Central Registry (CCR)	10. CORSIA Central Registry: Information and Data for the Implementation of CORSIA 11. CORSIA Aeroplane Operator to State Attributions 12. CORSIA 2020 Emissions 13. CORSIA Annual Sector's Growth Factor (SGF) 14. CORSIA Central Registry (CCR): Information and Data for Transparency

Direct reference in SARPs



Development of the ICAO CORSIA CERT



* as monitoring method



Operators Eligible to Use the ICAO CORSIA CERT



CERT	Aeroplane Operators International CO ₂ Emissions (tonnes) 2019 – 2020*			
	Function / Use	≤ 10K CO ₂	< 500K CO ₂	≥ 500K CO ₂
Preliminary CO ₂ Assessment		✓	✓	✓
CO ₂ Estimation & Reporting		No CORSIA requirement	✓	Not Eligible to use CERT **
Filling Data Gaps		No CORSIA requirement	✓	✓

* Note: from 2021-2035 operators can use ICAO CORSIA CERT to estimate and report emissions if their annual emissions from international flights subject to offsetting requirement are < 50 000 tonnes of CO₂ annually.

** Note: If an Aeroplane Operator uses ICAO CORSIA CERT for 2019 CO₂ estimation and reporting (based on their preliminary CO₂ assessment) but exceeds the threshold of 500 000 tonnes in 2019, the State could permit the operator to continue to use ICAO CORSIA CERT during 2020.



Functionalities of the ICAO CORSIA CERT

The ICAO CORSIA CERT will have up to 4 functionalities:

ICAO CORSIA CERT CO ₂ Estimation & Reporting Tool			
Year of validity	2018 (Version 2018)	2019-2020 (Version 2019-2020)	2021-2035 (Version 2021-2035)
Estimation of CO ₂ for determination of simplified compliance procedures eligibility	Yes	Yes	Yes
Report generation functionality	Partial*	Yes	Yes
Monitoring (estimating CO ₂)	No	Yes	Yes
List of States pairs subject to offsetting requirement	No	No	Yes

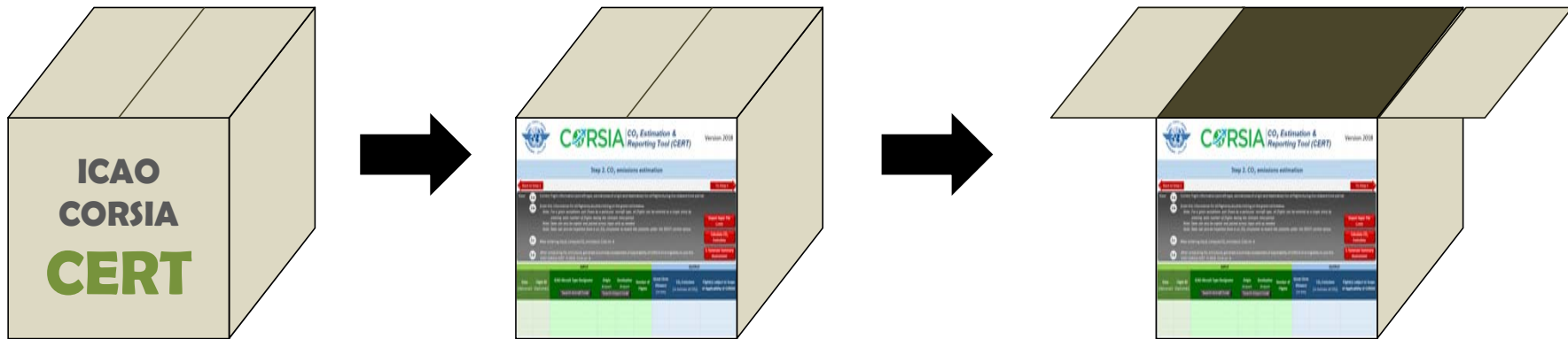
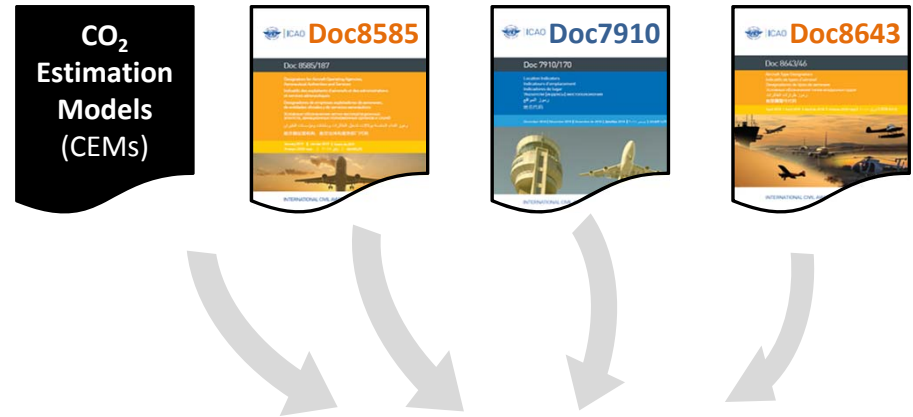
* The 2018 version of the ICAO CORSIA CERT includes the functionality to generate a summary report of the assessment of the estimation of the Aeroplane Operators CO₂ emissions. The report can be used as supporting evidence for the operator’s Emissions Monitoring Plan.

Presentation of the ICAO CORSIA CERT as a tool

Doc 8585 – Manual on Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services

Doc 7910 – Manual on Location Indicators

Doc 8643 – Aircraft Type Designators





ICAO CORSIA CERT – Tool Interface



How does the ICAO CORSIA CERT work?

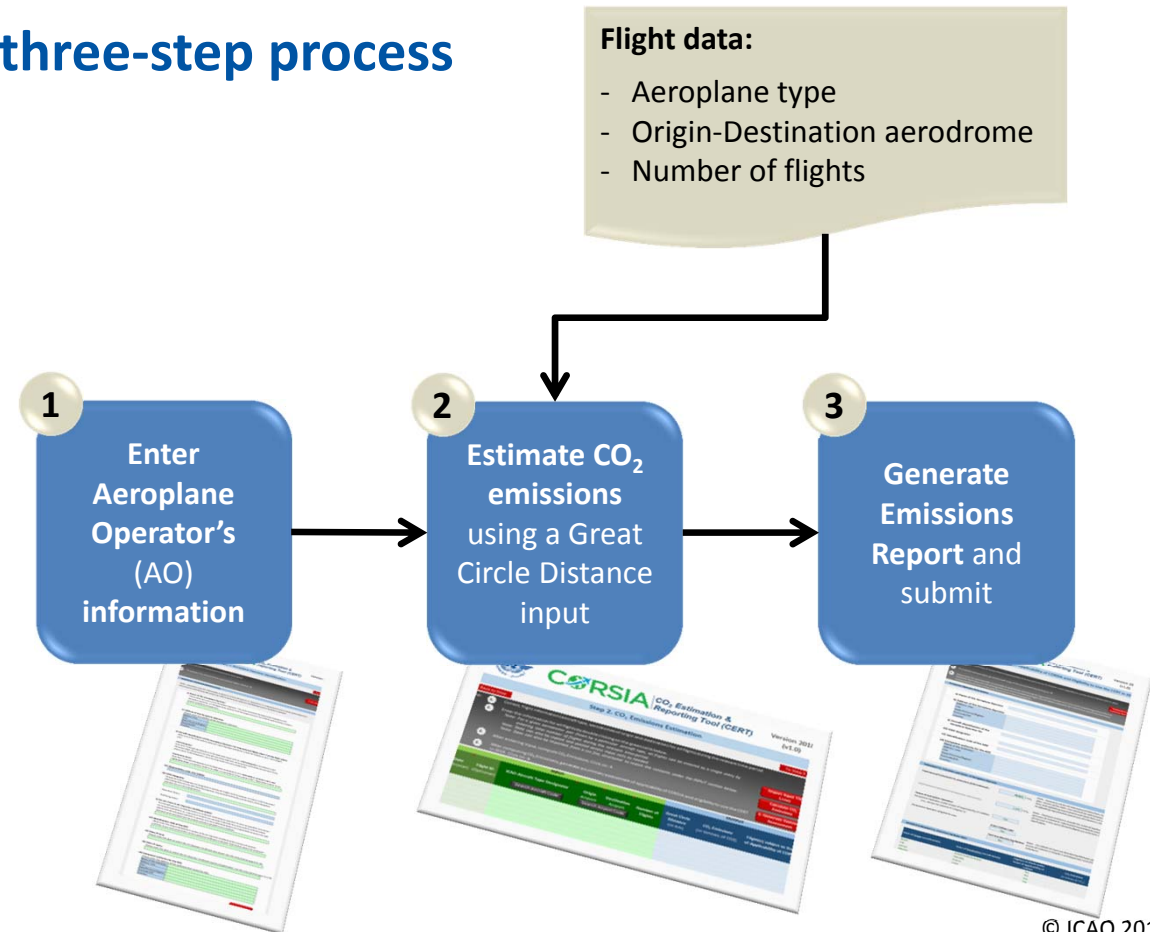
The ICAO CORSIA CERT comprises a three-step process

(1) Entering Aeroplane Operator’s basic information

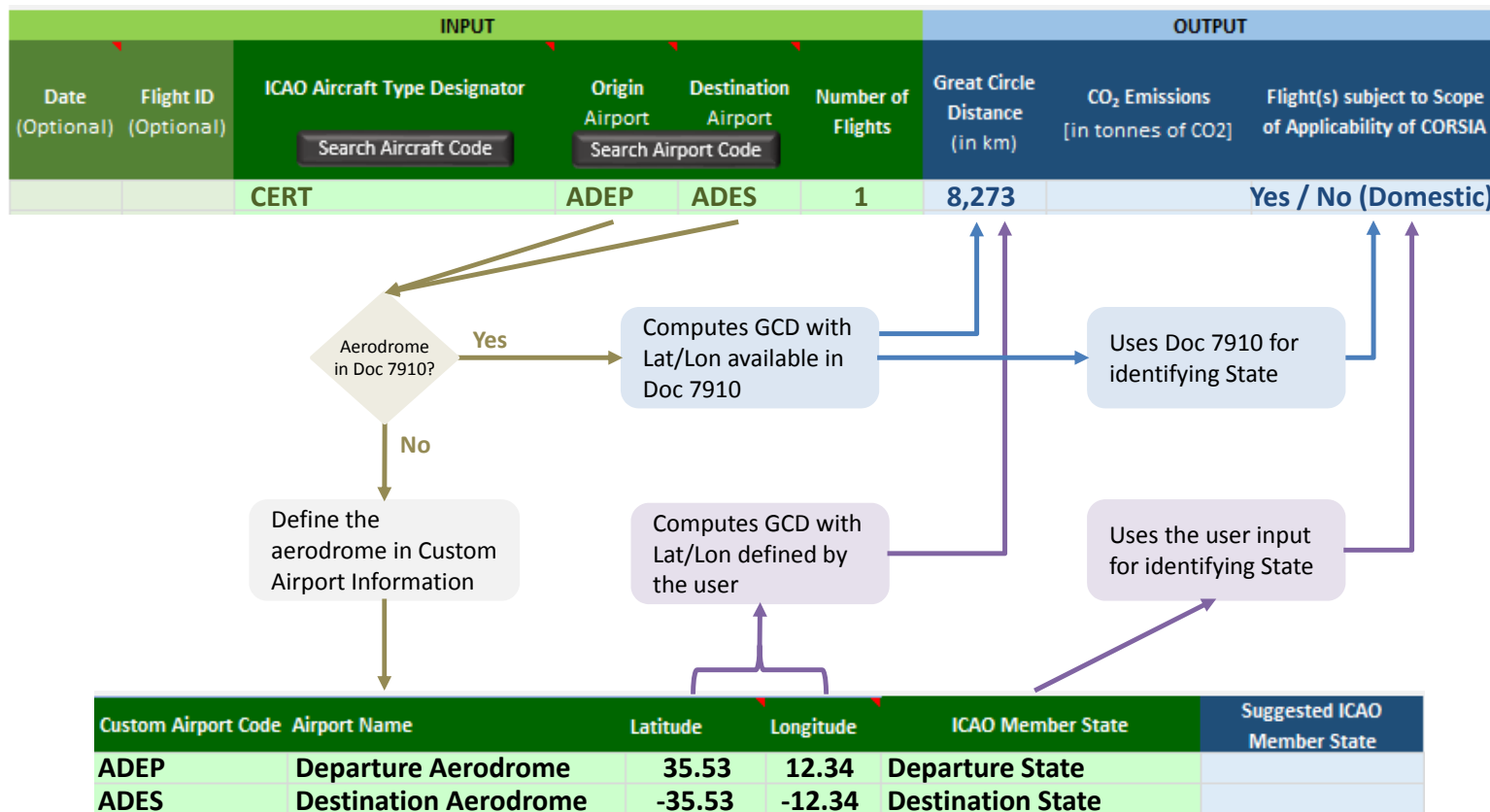
(2) Entering flight data to estimate CO₂ emissions by entering:

- a) Aeroplane type by ICAO type designator
- b) Origin-Destination aerodrome
- c) Number of flights (if batches of flights are entered)

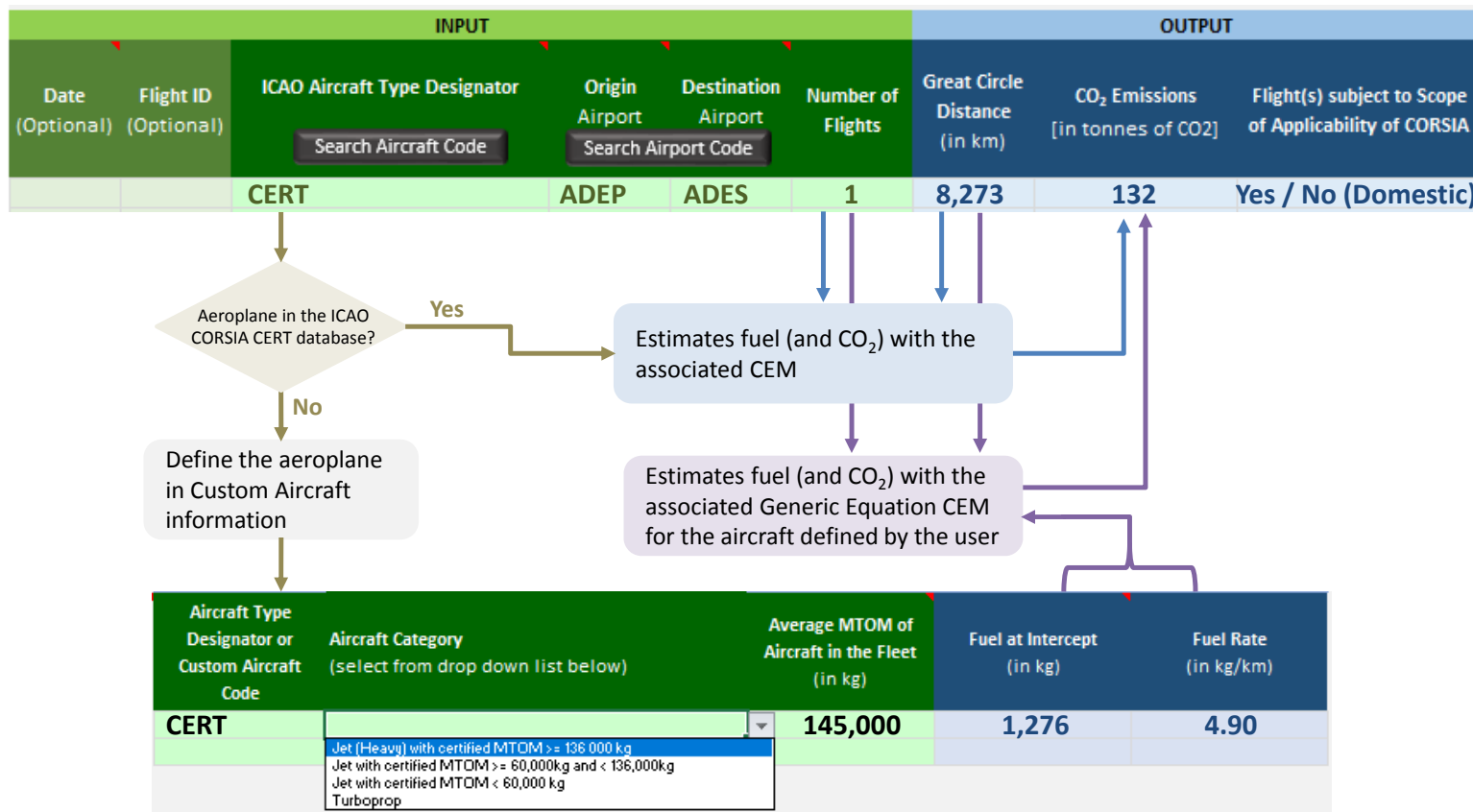
(3) Generating the summary assessment report in support for EMP submission



Step 1: Calculate GCD and identify Scope of Applicability



Step 2: Calculate CO₂ Emissions



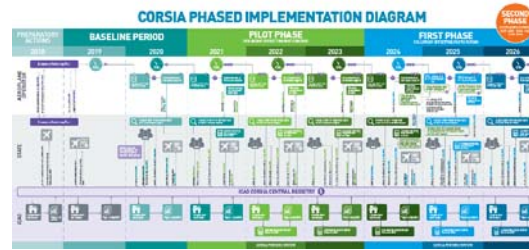


And now a live demonstration of the ICAO CORSA CERT



ICAO

CORSIA - CERT



Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

CORSIA News (click here to consult the complete list)

19-25 Jan 2019

Trinidad & Tobago and Jamaica received training under the ACT-CORSIA Buddy Partnership with Germany

CORSIA IMPLEMENTATION

- Assembly Resolution A39-3
- SARPs - Annex 16 Volume IV
- Environmental Technical Manual - Volume IV (New)
 - Templates (New)
- ICAO CORSIA Implementation Elements
 - ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT)
 - CORSIA Eligible Fuels
 - CORSIA Eligible Emissions Units
 - CORSIA Central Registry (CCR)

Additional Material for CORSIA Implementation



ACT CORSIA

- CORSIA Buddy Partnerships
- Model Regulations
- Frequently Asked Questions
- Brochure and Leaflets
- Videos
- Seminars
- Online Tutorials
- Background Information



For more information, please visit our website: <http://www.icao.int/corsia>