



ICAO

ENVIRONMENT

# Session 4: CORSIA MRV System: Reporting and Verification of CO<sub>2</sub> Emissions

ICAO Secretariat





## A reminder from the previous presentation...

- 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)
- Components of the MRV system:
  - **Monitoring** of fuel use on each international flight and calculation of the related CO<sub>2</sub> emissions
  - **Reporting** of CO<sub>2</sub> emissions information between aeroplane operators, States and ICAO
  - **Verification** of reported emissions data to ensure completeness and to avoid misstatements



- Monitoring, reporting and verification of aeroplane operator's annual CO<sub>2</sub> emissions –Annex 16, Volume IV, Part II, Chapter 2

2.1. Applicability of MRV Requirements

2.2. Monitoring of CO<sub>2</sub> Emissions

2.3. Reporting of CO<sub>2</sub> Emissions

2.4. Verification of CO<sub>2</sub> Emissions

2.5. Data Gaps

2.6. Error Correction to Emissions Reports

Covered in Session 2:  
*CORSIA MRV System:  
Monitoring of CO<sub>2</sub>  
Emissions* 

Covered in this session

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



ICAO

ENVIRONMENT

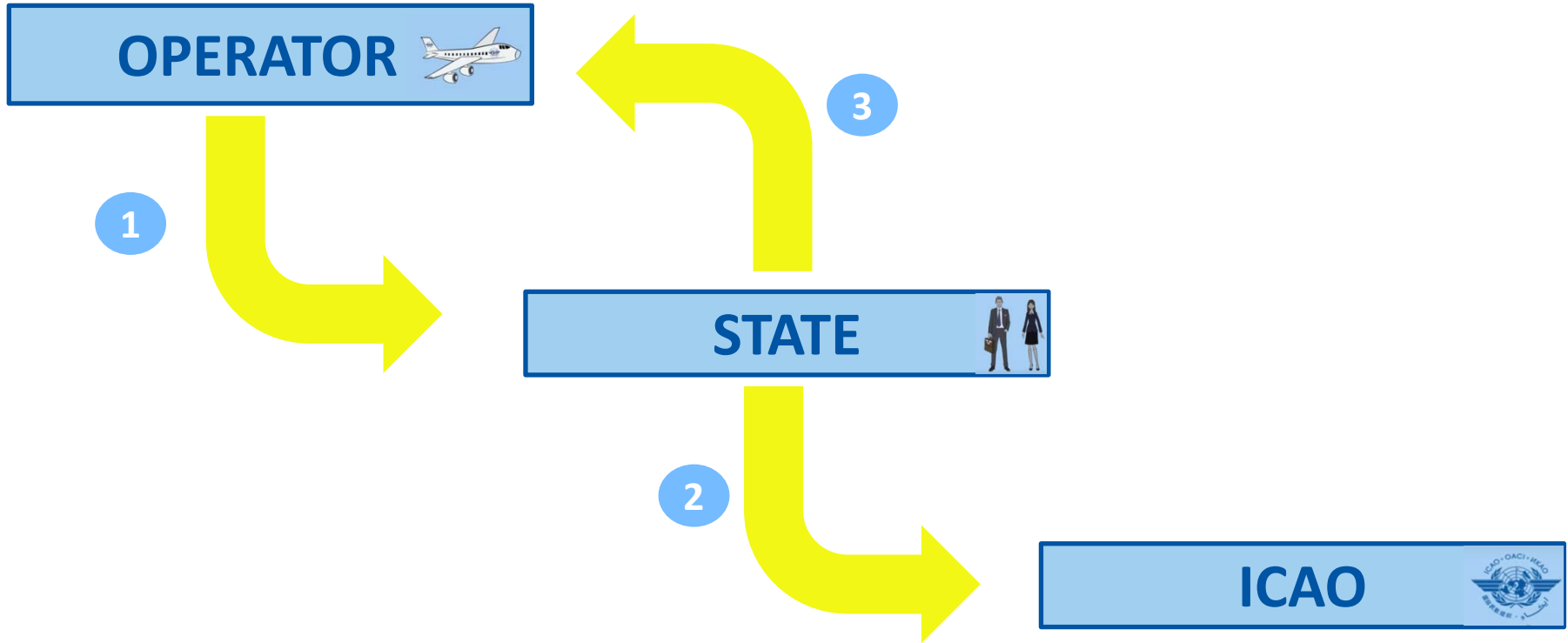


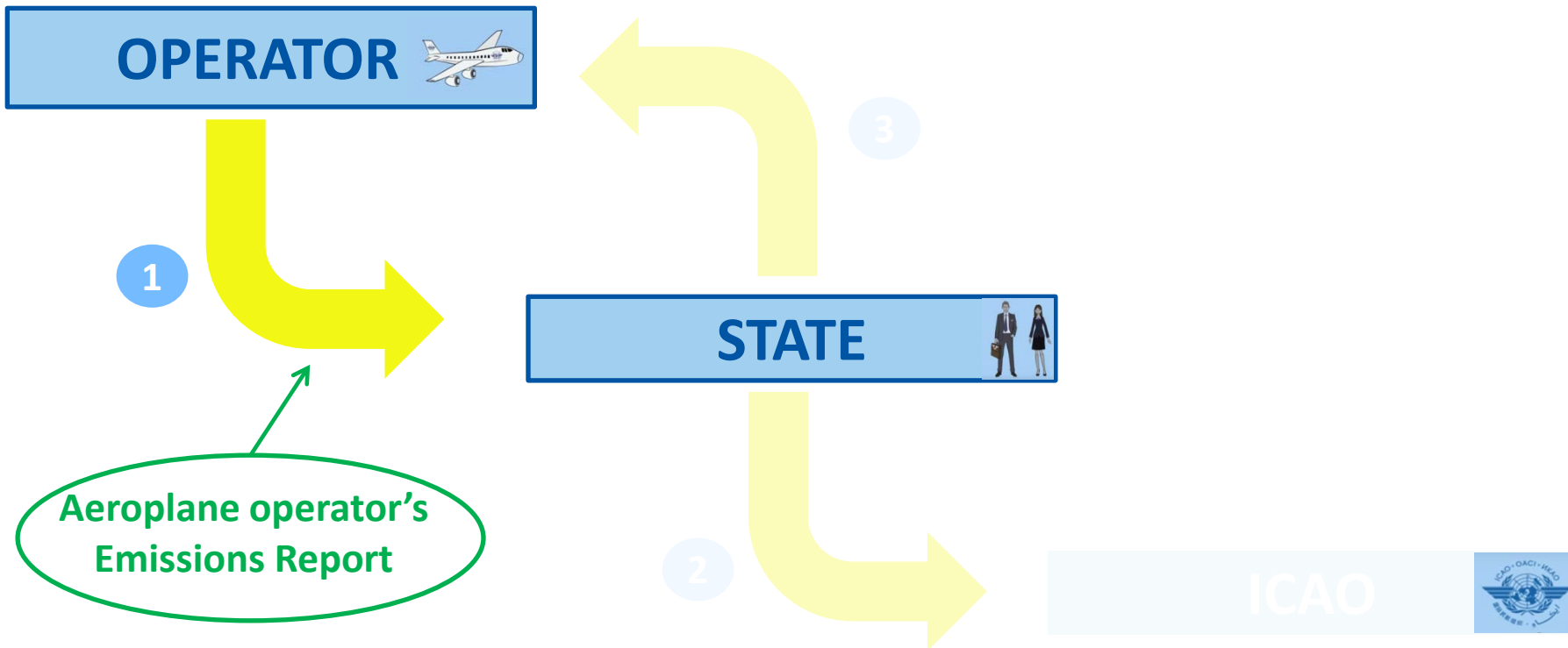
# Session 4, Part 1: Reporting of CO<sub>2</sub> Emissions

---

ICAO Secretariat

**CORSIA**





Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.3.1



- CORSIA requires aeroplane operators conducting international flights<sup>(\*)</sup> to report on related CO<sub>2</sub> emissions information
  - First reporting year: **2020** (for data related to 2019 international flights)
  - Frequency of reporting: on an annual basis
  - Reporting format: **Emissions Report**
  - Reporting recipient: State

(\*) aeroplane operators that produce annual CO<sub>2</sub> emissions greater than 10 000 tonnes from international flights conducted by aeroplanes with a maximum certificated take-off mass greater than 5 700 kg (with the exception of humanitarian, medical and firefighting flights)

Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.3.1



## Aeroplane operator's annual Emissions Report

- The aeroplane operator will draft an annual Emissions Report based on the procedures included in the approved **Emissions Monitoring Plan**



Covered in session #2:  
CORSIA MRV System:  
Monitoring of CO<sub>2</sub> Emissions

- The aeroplane operator's annual Emissions Report is the main document within the CORSIA MRV as it includes all relevant CO<sub>2</sub> emissions related data as described in Annex 16, Volume IV, Appendix 5

Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.3.1





## Contents of an aeroplane operator's Emissions Report (1/4)

- Aeroplane operator information
  - Name, contact information, State of attribution, etc.
- Reporting year (year during which emissions were monitored)
  - E.g. 2019 (for the Emissions Report to be prepared in 2020)
- Reference of the aeroplane operator's Emissions Monitoring Plan that is the basis for the emissions monitoring in the reporting year
  - Version number, date of approval, date of validity, date of last update, etc.

Reference: Annex 16, Volume IV, Appendix 5, Table A5-1



## Contents of an aeroplane operator's Emissions Report (2/4)

- List of operator's aeroplane fleet
  - Applicable to all operator's aeroplanes (with MTOM > 5 700 kg) operating international flights during the reporting year
  - Leased aeroplanes have to be included
- Details on use of CERT (if operator is eligible for use of CERT)
- Total fuel mass per type of fuel
  - When using CERT, operators will not report this information

Reference: Annex 16, Volume IV, Appendix 5, Table A5-1



## Contents of an aeroplane operator's Emissions Report (3/4)

- Number of international flights during the reporting period, including:
  - Total number of operator's international flights during the reporting period
  - Breakdown per State pair (minimum information requirement) OR per aerodrome pair
    - a) per State pair (minimum information requirement); or
    - b) per aerodrome pair

*During the preparation of the Emissions Monitoring Plan, the operator will be informed by the State of the level of aggregation to be used when reporting on international flights*

Reference: Annex 16, Volume IV, Appendix 5, Table A5-1



## Contents of an aeroplane operator's Emissions Report (4/4)

- CO<sub>2</sub> emissions:
  - Total CO<sub>2</sub> emissions from reported flights
  - Breakdown per State pair OR per aerodrome pair (same level of aggregation as for the reporting of the number of international flights)
  - From the start of CORSIA's pilot phase (i.e. reporting of CO<sub>2</sub> emissions for 2021 and beyond), reporting will include sub-totals for flights subject to offsetting requirements and flights not subject to offsetting requirements
- Information on verification body that has verified the Emissions Report
  - Name, contact information

(More information on this is provided in the second part of this presentation)

Reference: Annex 16,  
Volume IV, Appendix 5,  
Table A5-1



## Reporting on CORSIA eligible fuels (1/4)

- From the start of CORSIA's pilot phase (i.e. reporting of 2021 CO<sub>2</sub> emissions and beyond), aeroplane operators can claim emissions reductions by reporting on CORSIA eligible fuels
- Aeroplane operators can report on CORSIA eligible fuels in two different ways:
  - a) On an annual basis (recommended)
  - b) One-time reporting within a given compliance period (e.g. 2021 – 2023)
    - Applicable to all CORSIA eligible fuel received by a blender within that compliance period
- When reporting on CORSIA eligible fuels, operators shall subtract the fuel traded or sold to a third party from its total reported quantity

Reference: Annex 16, Volume IV, Appendix 5, Table A5-1



## Reporting on CORSIA eligible fuels (2/4)

- Information to be included in the operator's annual Emissions Report when claiming emissions reductions from CORSIA eligible fuels (reporting of 2021 CO<sub>2</sub> emissions and beyond):
  - For each CORSIA eligible fuel type:
    - a) Total mass
    - b) Approved Life Cycle Emissions values
    - c) Emissions reductions claimed
  - Total emissions reductions claimed from the use of all CORSIA eligible fuel types

Reference: Annex 16, Volume IV, Appendix 5, Table A5-1



## Reporting on CORSIA eligible fuels (3/4)

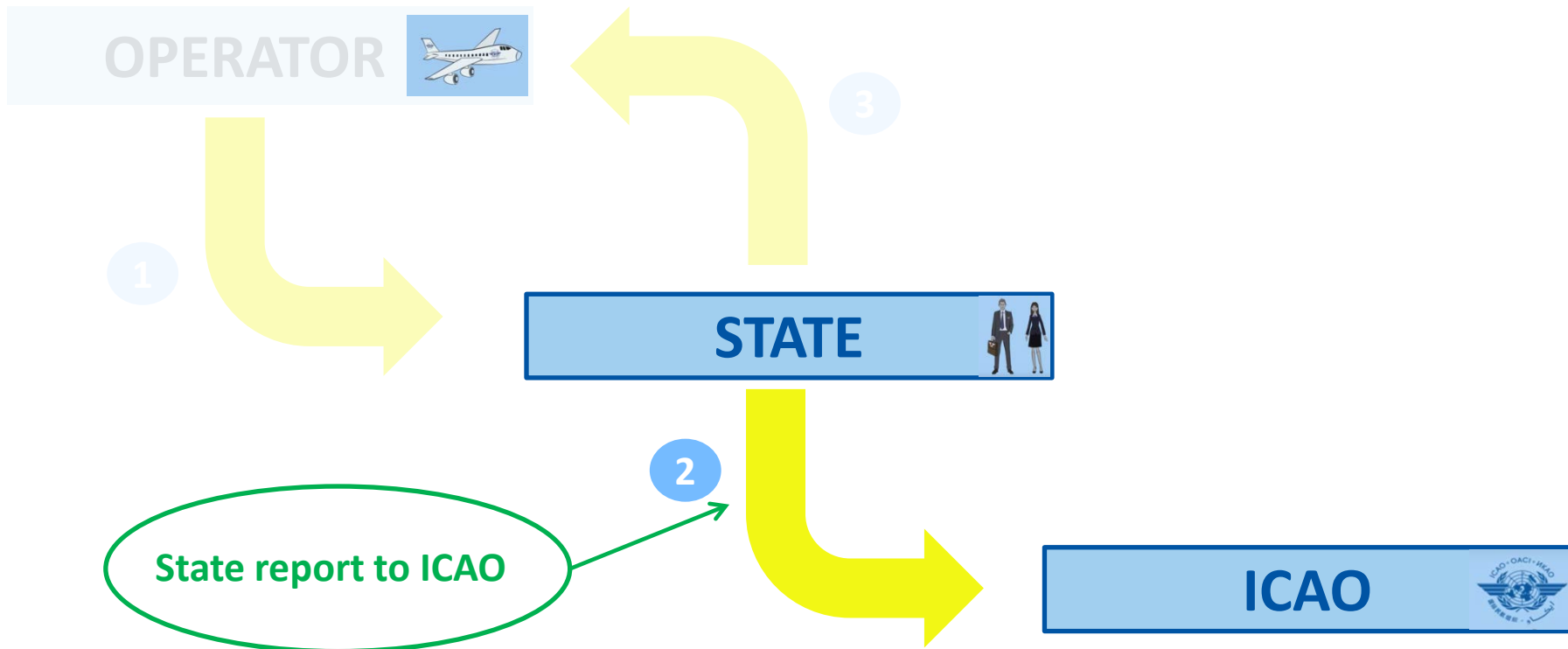
- If an operator claims emissions reductions from CORSIA eligible fuels, additional information needs to be provided as a separate supplementary report to the Emissions Report:
  - Additional information includes data received from the producer of the neat (unblended) fuel, and from the fuel blender
  - If the operator purchases fuel from a supplier downstream from the fuel blender, this supplier shall provide all of the documentation required to claim emissions reductions from CORSIA eligible fuels
  - The operator shall also provide:
    - a) Declaration of all other GHG schemes it participates in where the emissions reductions from the use of CORSIA eligible fuels may be claimed
    - b) Declaration that it has not made claims for the same batches of CORSIA eligible fuels under these other schemes



## Reporting on CORSIA eligible fuels (4/4)

- Standardized reporting templates will be made available to facilitate uniform reporting from aeroplane operators to States
  - Template of Emissions Report
  - Template of CORSIA eligible fuels supplementary information to the Emissions Report





Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.3.2



- CORSIA requires States with aeroplane operators conducting international flights<sup>(\*)</sup> to report on related CO<sub>2</sub> emissions information
  - First reporting year: **2020** (for data related to 2019 international flights)
  - Frequency of reporting: on an annual basis
  - Reporting recipient: ICAO

(\*) aeroplane operators that produce annual CO<sub>2</sub> emissions greater than 10 000 tonnes from international flights conducted by aeroplanes with a maximum certificated take-off mass greater than 5 700 kg (with the exception of humanitarian, medical and firefighting flights)

Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.3.2



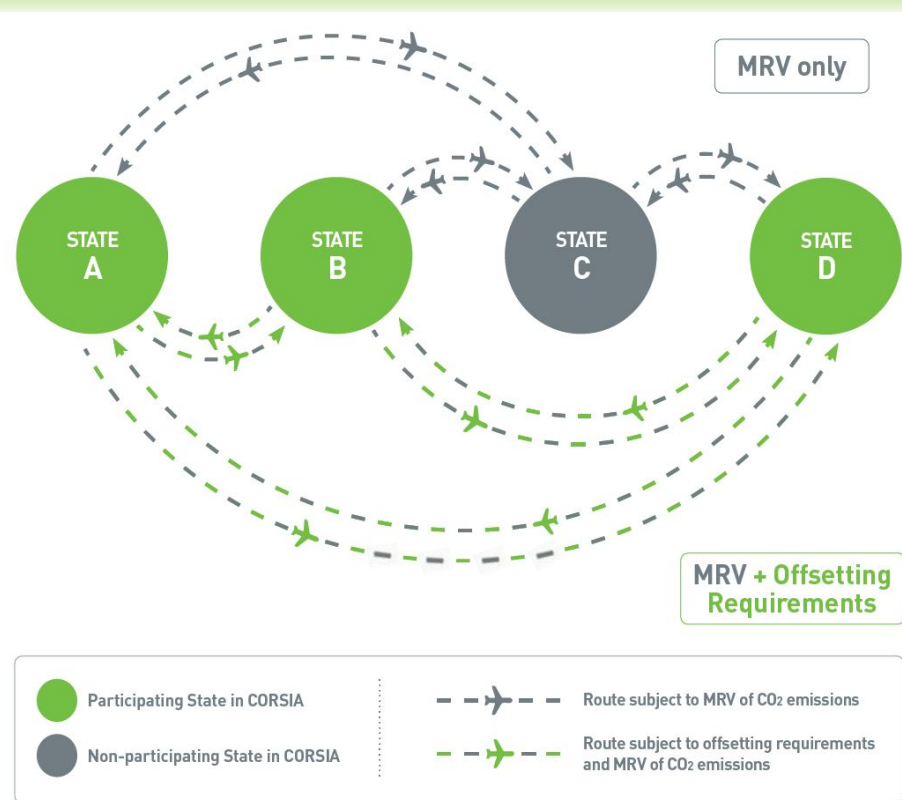
## State reporting of CO<sub>2</sub> emissions to ICAO (2019 and 2020)

- Total annual CO<sub>2</sub> emissions (in tonnes):
  - Per State pair
  - For each State pair, data aggregated for all aeroplane operators attributed to the State that conduct operations in that State pair
    - a) For a given State pair, no operator-specific data
    - b) For a given State pair, emissions from operators not attributed to the State are not taken into consideration

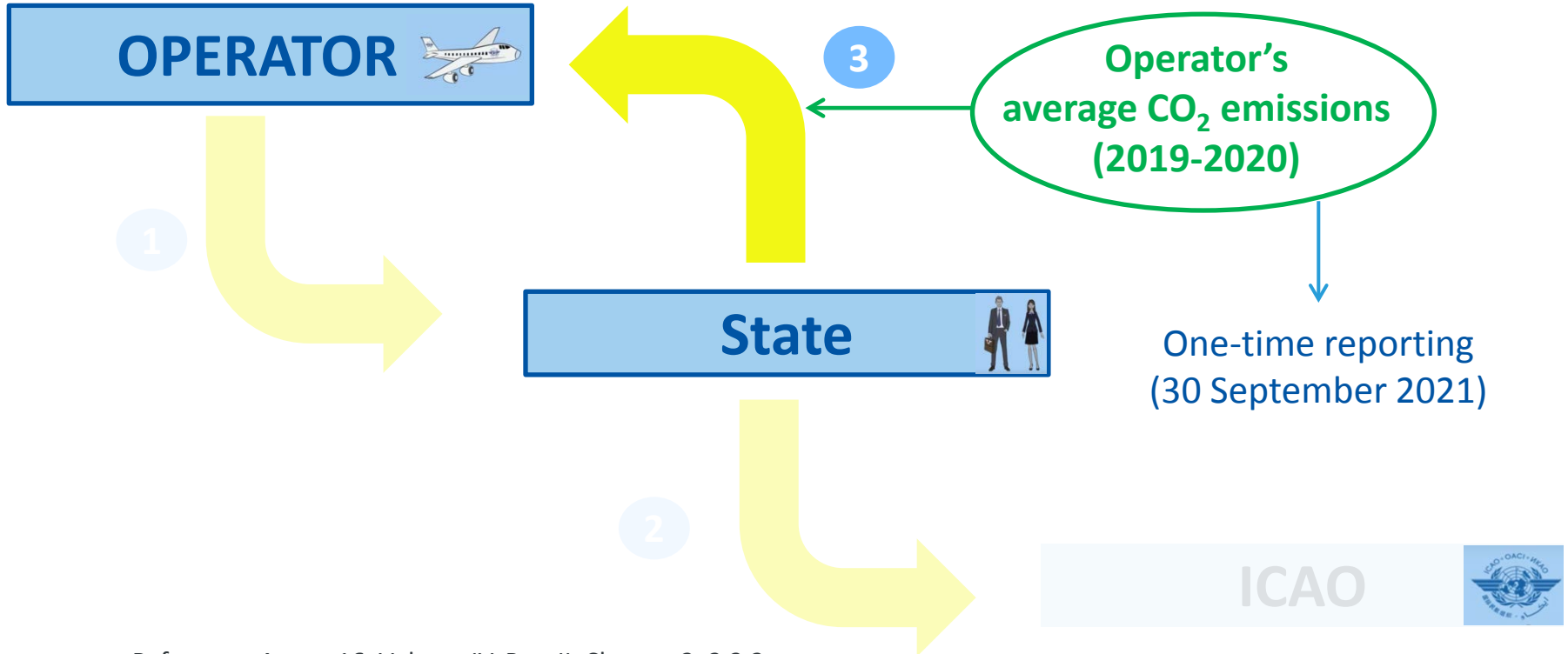


## State reporting of CO<sub>2</sub> emissions to ICAO (from the start of the pilot phase)

- Total annual CO<sub>2</sub> emissions per State pair, aggregated for all aeroplane operators attributed to the State, with sub-totals for:
  - State pairs subject to offsetting requirements
  - State pairs not subject to offsetting requirements
- Total annual CO<sub>2</sub> emissions for each operator attributed to the State
  - One value per operator
  - When CERT is used by the operator (subject to eligibility), this will be specified



Reference: Annex 16, Volume IV, Appendix 5, Table A5-5



Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.3.2



ICAO

ENVIRONMENT



# Session 4, Part 2: Verification of CO<sub>2</sub> Emissions Data Gaps and Error Corrections

**C** **RSIA**

The logo for CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation), featuring a stylized globe with a blue arrow pointing upwards and to the right, symbolizing growth and sustainability.



- A process to ensure that the information is accurate without errors prior to final reporting
- Requires an independent third-party
- Already in use in various forms (financial auditing, greenhouse gas inventories, etc.)



- Verification is an essential part of the CORSIA, as it ensures the accuracy of the information related to:

- The amount of CO<sub>2</sub> emissions from international flights

Covered in this session

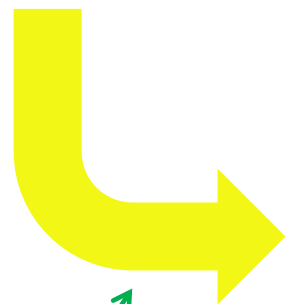
- The purchase of emissions units from eligible programmes to address offsetting requirements
- The cancellation of eligible emissions units
- The confirmation of the single use of eligible emissions units

Covered in Session #5:  
CORSIA Calculation of  
CO<sub>2</sub> Offsetting  
Requirements





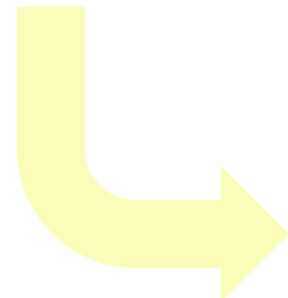
1



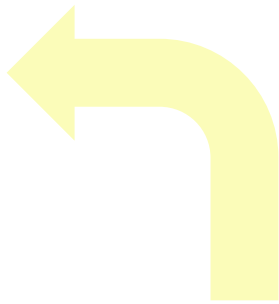
Aeroplane operator's Emissions Report



2



3



Aeroplane operator reports to State through the annual Emissions Report



The annual Emissions Report is a document subject to a verification procedure



- Verification of an aeroplane operator's annual Emissions Report
  - **Step 1:** an aeroplane operator should perform a voluntary internal **pre-verification** of its Emissions Report prior to the verification by a verification body



**1** Internal pre-verification



3

2





## Aeroplane operator's internal pre-verification of its annual Emissions Report (1/2)

- In order to prepare for third-party external verification, an aeroplane operator should consider conducting a voluntary internal pre-verification in order to ensure there will be no large data issues during the verification
- Each operator decides how to conduct the internal pre-verification of its annual Emissions Report
  - Guidance will be made available to support operators in this task



## Aeroplane operator's internal pre-verification of its annual Emissions Report (2/2)

### *Example of guidance for operators' internal pre-verification*

Completed by	Topic	Task	MRV	Simplified MRV
Internal Auditor	Emission Calculation & Fuel Data used	Consult Emissions Monitoring Plan to determine how emissions are calculated and perform some cross checks to see if the applied calculation works by adding logics to the report	x	x
		If based on real fuel figures, cross check how those are recorded and if this has been done correctly or if there are any reoccurring error sources e.g. below	x	
		Calculate if the arrival fuel of the previous flight + the recorded fuel uplift are roughly the same figure as the departure fuel	x	
		Cross check if 2 equal fuel uplifts have been recorded for 2 or more consecutive flights and if those are genuine or typing errors	x	x
		Check report for very low/high fuel uplifts/figures to see if those are genuine or typos	x	x



- Verification of an aeroplane operator's annual Emissions Report
  - **Step 1:** an aeroplane operator should perform a voluntary internal **pre-verification** of its Emissions Report prior to the verification by a verification body
  - **Step 2:** an aeroplane operator shall **engage an accredited verification body** for the verification of its annual Emissions Report



**2**

VERIFICATION BODY ✓



**3**

**2**

ICAO



- 1** Internal pre-verification
- 2** Aeroplane operator submits Emissions Report to an accredited verification body
- 3**



## Accreditation of verification bodies (1/2)

- A **verification body** shall be accredited by a national accreditation body in order to be eligible to verify Emissions Reports in CORSIA:
  - ISO 14065:2013 “Greenhouse gases - Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition” (published on: 2013-04)
  - CORSIA-specific requirements as described in Annex 16, Volume IV, Appendix 6
- A **national accreditation body** shall be working in accordance with ISO/IEC 17011 “Conformity assessment - General requirements for accreditation bodies accrediting conformity assessment bodies”

Reference: Annex 16, Volume IV, Part II, (Chapter 2, 2.4.2) and Appendix 6



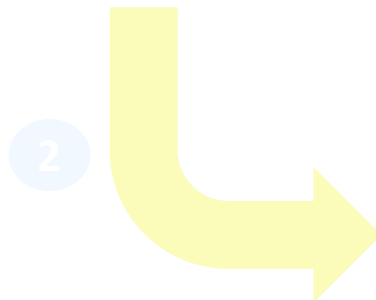
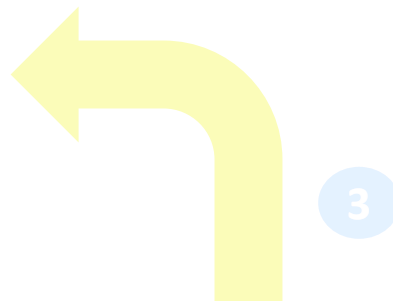
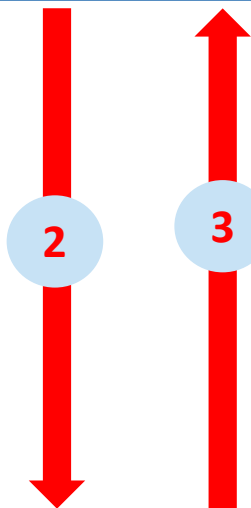


## Accreditation of verification bodies (2/2)

- How to ensure sufficient availability of accredited verification bodies to aeroplane operators, in support of verification activities under CORSIA?
  - a) National accreditation bodies and verification bodies need to have the required knowledge
    - ICAO is exploring means to provide training on CORSIA verification requirements to both national accreditation bodies and verification bodies
  - b) Operators need to have access to verification bodies accredited for CORSIA
    - Annex 16, Volume IV allows an operator to work with a verification body accredited by the national accreditation body of another State
    - ICAO will compile and publish, on an annual basis, a list of verification bodies accredited for CORSIA to facilitate operators' access to accredited verification bodies



- Verification of an aeroplane operator's annual Emissions Report
  - **Step 1:** an aeroplane operator should perform a voluntary internal **pre-verification** of its Emissions Report prior to the verification by a verification body
  - **Step 2:** an aeroplane operator shall **engage an accredited verification body** for the verification of its annual Emissions Report
  - **Step 3:** following the verification of the Emissions Report by the verification body, the verification body **produces a Verification Report**



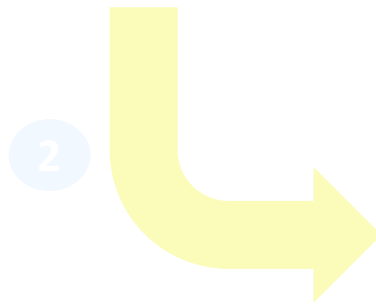
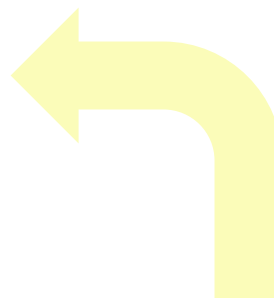
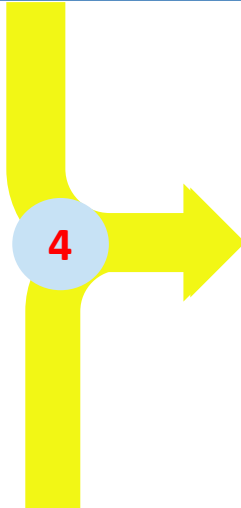
- 1** Internal pre-verification
- 2** Aeroplane operator submits Emissions Report to an accredited verification body
- 3** Verification body produces Verification Report





- Verification of an aeroplane operator's annual Emissions Report
  - **Step 1:** an aeroplane operator should perform a voluntary internal **pre-verification** of its Emissions Report prior to the verification by a verification body
  - **Step 2:** an aeroplane operator shall **engage an accredited verification body** for the verification of its annual Emissions Report
  - **Step 3:** following the verification of the Emissions Report by the verification body, the verification body **produces a Verification Report**
  - **Step 4:** aeroplane operator and verification body shall **both submit a copy of the Emissions Report and associated Verification Report to the State**

Reference: Annex 16, Volume IV, Part II, (Chapter 2, 2.4.2) and Appendix 6



- 1** Internal pre-verification
- 2** Aeroplane operator submits Emissions Report to an accredited verification body
- 3** Verification body produces Verification Report
- 4** Aeroplane operator and verification body submit Emissions Report and Verification Report to State



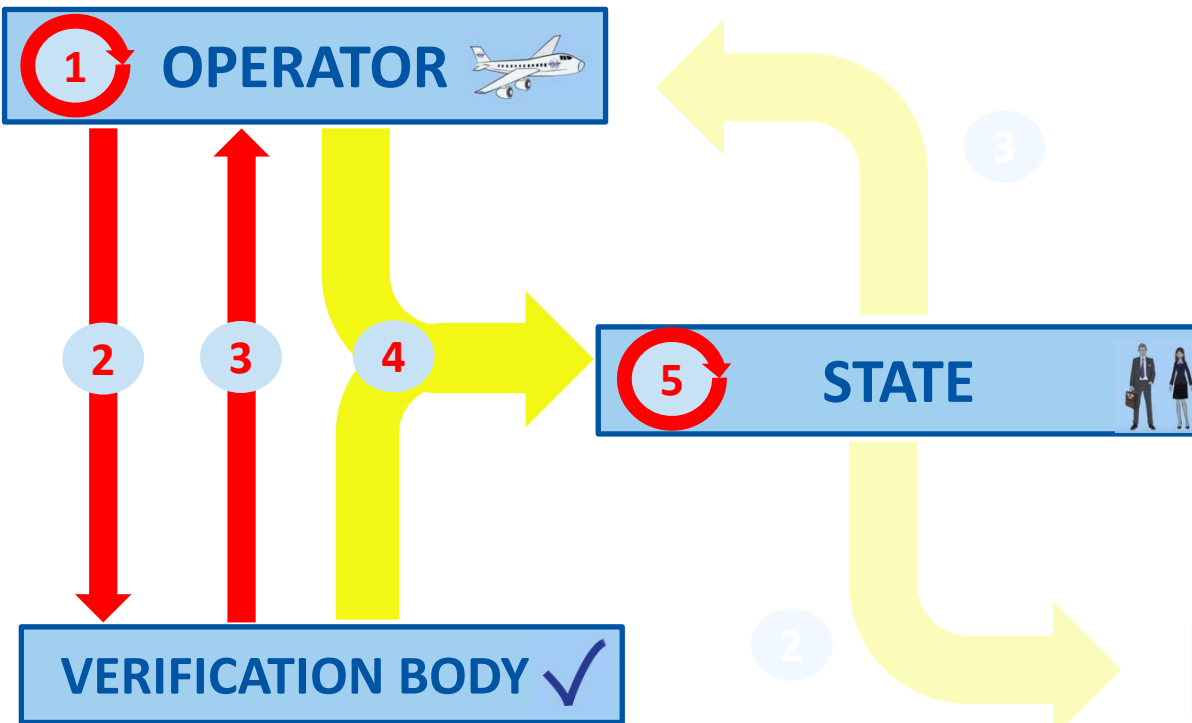


- Verification of an aeroplane operator's annual Emissions Report
  - **Step 1:** an aeroplane operator should perform a voluntary internal **pre-verification** of its Emissions Report prior to the verification by a verification body
  - **Step 2:** an aeroplane operator shall **engage an accredited verification body** for the verification of its annual Emissions Report
  - **Step 3:** following the verification of the Emissions Report by the verification body, the verification body **produces a Verification Report**
  - **Step 4:** aeroplane operator and verification body shall **both submit a copy of the Emissions Report and associated Verification Report to the State**
  - **Step 5:** The State shall perform an **order of magnitude check** of the Emissions Report

Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.4.1



- 1 Internal pre-verification
- 2 Aeroplane operator submits Emissions Report to an accredited verification body
- 3 Verification body produces Verification Report
- 4 Aeroplane operator and verification body submit Emissions Report and Verification Report to State
- 5 State's order of magnitude check of Emissions Report





## State's order of magnitude check of Emissions Report (1/2)

- The objective of the State's order of magnitude check of an aeroplane operator's Emissions Reports is to assess the completeness of data reported by the operator
- For an operator with an Emissions Report verified as “satisfactory”, the order of magnitude check will take approximately 3 hours





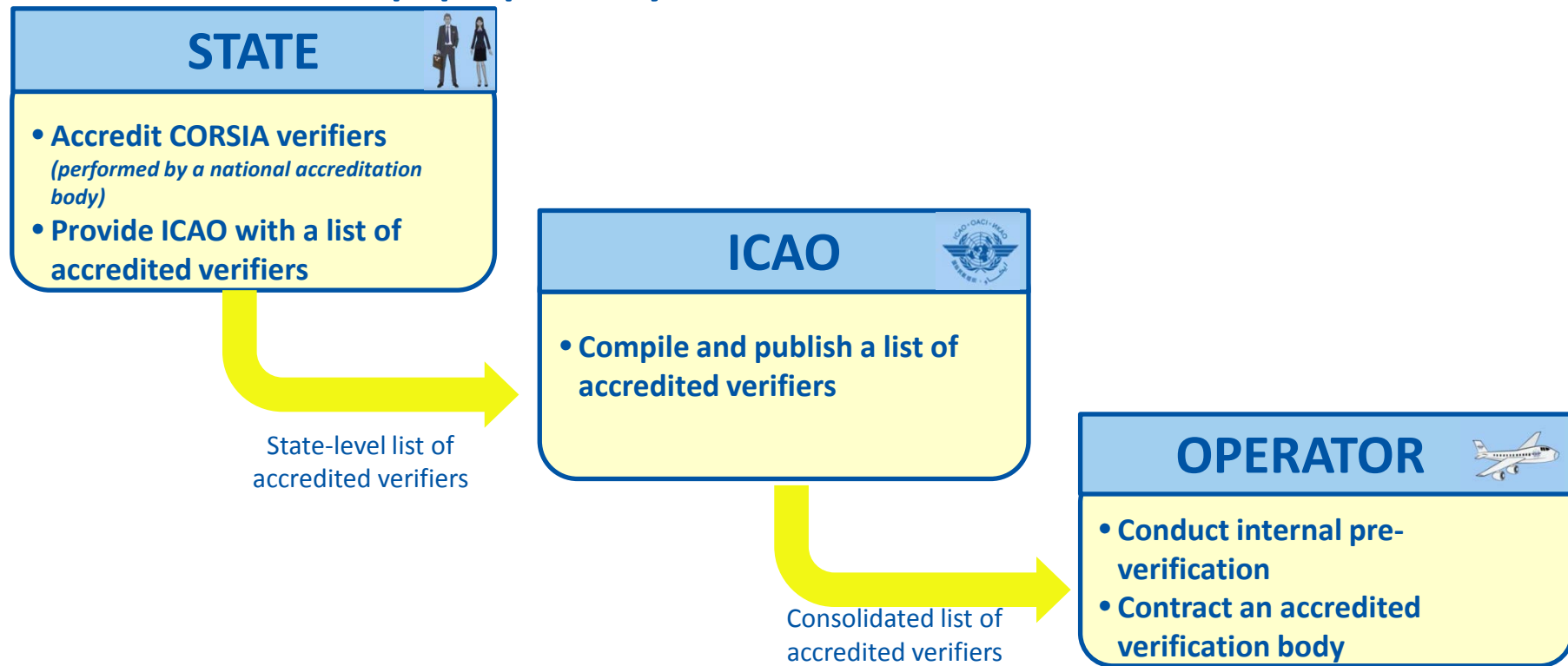
## State's order of magnitude check of Emissions Report (2/2)

*Example of a section of the checklist for States' order of magnitude check of Emissions Reports*

No.	Question / Issue	Additional Information	Status: OK/Yes/No /Not Applicable	Notes and Results of Checks
	<b><u>Aeroplane Operator</u></b>			
1	<u>Aeroplane Operator</u> /Verification Body both separately submit Emissions Report and Verification Report. Is the content of both submissions identical?	Minimum check: reported fuel consumption and number of flights. Get back to <u>Aeroplane Operator</u> in case of deviations.		
2	Is the name of the <u>Aeroplane Operator</u> given and unambiguous?	Ensure unambiguous identification of <u>Aeroplane Operator</u> . Get back to <u>Aeroplane Operator</u> in case of uncertainties.		
3	Is there a valid ICAO designator for <u>Aeroplane Operating Agencies</u> ? Does it have the correct character length?	Ensure unambiguous identification of <u>Aeroplane Operator</u> . Get back to <u>Aeroplane Operator</u> in case of uncertainties.		
4	Basic information (address, AOC etc.) plausible?	Ensure unambiguous identification of <u>Aeroplane Operator</u> . Get back to <u>Aeroplane Operator</u> in case of uncertainties.		



## Recap: preparatory actions for verification in CORSIA





- Gaps in emissions-related data can occur due to various reasons (e.g. irregular operations, data feed issues or critical system failures)
- Data gaps can be identified at various stages:
  - By the aeroplane operator when preparing the Emissions Report
  - By the verification body when receiving the Emissions Report submitted by the aeroplane operator  
*It can lead to an Emissions Report being assessed as “non-satisfactory”*
  - By the State in its review of the verified Emissions Report submitted by the aeroplane operator and the verification body



- Actions to address data gaps - aeroplane operator
  - The aeroplane operator shall fill identified data gaps and correct systematic errors and misstatements prior to the submission of the Emissions Report
  - The aeroplane operator using a Fuel Use Monitoring Method (covered in session #2), shall fill data gaps using the ICAO CERT, provided that the data gaps during a compliance period do not exceed the following thresholds:
    - a) 2019-2020 period: 5 per cent of international flights*
    - b) 2021-2035 period: 5 per cent of international flights subject to offsetting requirements*
  - If the extent of the data gaps is beyond these thresholds, the aeroplane operator will inform of the percentage of international flights affected and provide an explanation in its Emissions Report

Reference: Annex 16, Volume IV, Part II, Chapter 2, 2.5



- Actions to address data gaps – State / ICAO
  - If the aeroplane operator does not provide its annual Emissions Report in accordance with the timeline as defined in Appendix 1, then the State to which it is attributed shall engage with the operator to obtain the necessary information
  - If this proves unsuccessful, then the State shall estimate the operator's annual emissions using the best available information and tools (i.e. CERT)
  - If the State does not report to ICAO in due time, ICAO will fill the data gaps to calculate the total sectoral CO<sub>2</sub> emissions in that year and related calculations
- Error correction to Emissions Report
  - The State shall report an error in aeroplane operator's CO<sub>2</sub> emissions data submitted to ICAO and update the reported CO<sub>2</sub> emissions to address the error



ICAO

ENVIRONMENT



# Session 4, Part 3: Timeline for actions on Reporting and Verification of CO<sub>2</sub> Emissions

**CORSIA**



Timeline	Responsibility	Action
30 September 2018	Operator	Submit <b>Emissions Monitoring Plan</b> to State of attribution <i>(recommended)</i>
30 November 2018	State	Approve <b>Emissions Monitoring Plans</b> of operators attributed to the State <i>(recommended)</i>
30 November 2018	State	Submit to ICAO a list of <b>operators attributed to the State</b>
31 December 2018	ICAO	Make available the <b>ICAO document entitled "CORSA Aeroplane Operator to State Attributions"</b>
<b>2019</b>		
1 January to 31 December 2019	Operator	Monitor <b>2019 CO<sub>2</sub> emissions</b> from international flights
28 February 2019	Operator	Submit <b>Emissions Monitoring Plan</b> to State of attribution
30 April 2019	State	Approve <b>Emissions Monitoring Plans</b> of operators attributed to the State
30 April 2019	State	Submit to ICAO: <ul style="list-style-type: none"><li>- List of <b>operators attributed to the State</b></li><li>- List of <b>verification bodies accredited in the State</b></li></ul>
31 May 2019	ICAO	Make available the <b>ICAO document entitled "CORSA Aeroplane Operator to State Attributions"</b>



# Timeline and Actions (2020)



Timeline	Responsibility	Action
1 January to 31 December 2020	Operator	Monitor <b>2020 CO<sub>2</sub> emissions</b> from international flights
1 January to 31 May 2020	Operator	<ul style="list-style-type: none"> <li>- Compile <b>2019 CO<sub>2</sub> emissions data</b> to be verified by a verification body</li> <li>- Submit <b>Emissions Report</b> (coverage: 2019 CO<sub>2</sub> emissions) to selected verification body for verification</li> </ul>
31 May 2020	Operator and verification body	Submit <b>Emissions Report</b> and associated <b>Verification Report</b> to the State of attribution
1 June 2020 to 31 August 2020	State	Conduct an <b>order of magnitude check</b> of verified Emissions Report from operators attributed to the State
31 August 2020	State	Submit <b>2019 CO<sub>2</sub> emissions data</b> to ICAO
30 November 2020	State	Submit to ICAO: <ul style="list-style-type: none"> <li>- List of <b>operators attributed to the State</b></li> <li>- List of <b>verification bodies accredited in the State</b></li> </ul>
31 December 2020	ICAO	Make available the <b>ICAO document entitled "CORSIA Aeroplane Operator to State Attributions"</b>





# Questions?



ICAO

ENVIRONMENT



ICAO

North American  
Central American  
and Caribbean  
(NACC) Office  
Mexico City

South American  
(SAM) Office  
Lima

ICAO  
Headquarters  
Montréal

Western and  
Central African  
(WACAF) Office  
Dakar

European and  
North Atlantic  
(EUR/NAT) Office  
Paris

Middle East  
(MID) Office  
Cairo

Eastern and  
Southern African  
(ESAF) Office  
Nairobi

Asia and Pacific  
(APAC) Sub-office  
Beijing

Asia and Pacific  
(APAC) Office  
Bangkok



[www.icao.int/corsia](http://www.icao.int/corsia)

THANK YOU

CORSIA