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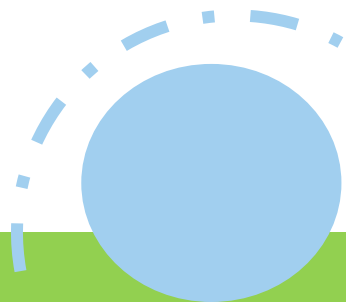


Verification of CO₂ Emission

ICAO-CASSOA-RCAA ENV Workshop

Kigali, Rwanda (23-26 May 2023)

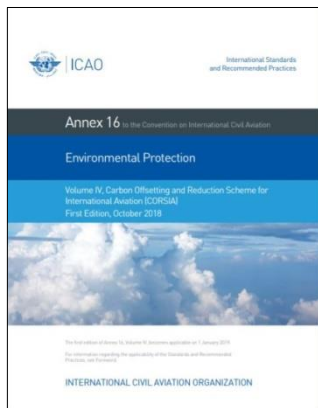
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Regional Officer: Environment/ Meteorology
ICAO ESAF Office, Nairobi





- This presentation will:
 - Provide an overview of the CORSIA verification process for CO₂ emissions
 - Demonstration of the Verification Report template

ICAO Standards and Recommended Practices (SARPs)



Annex 16 - Environmental Protection, Volume IV: CORSIA

- Part II, Chapter 2, 2.4; Chapter 4, 4.4; and Appendix 6

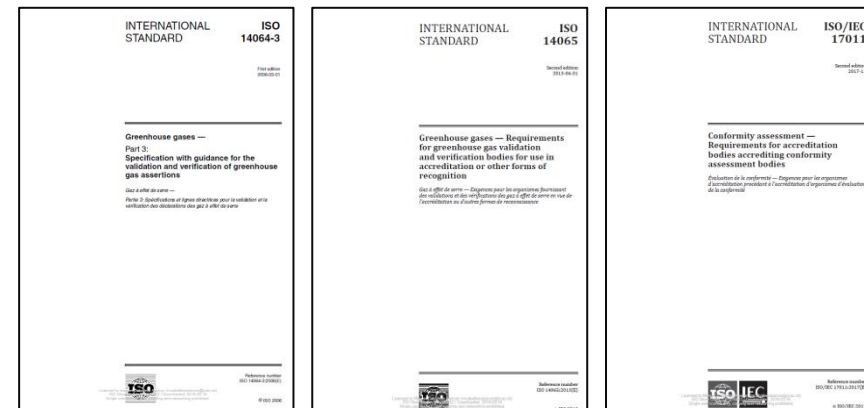
ICAO Guidance



Environmental Technical Manual (ETM), Volume IV (Doc 9501): CORSIA

- Chapter 3, 3.3.

ISO Standards



- **ISO 14064-3:2006**: “Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions.”

- **ISO 14065:2013** “Greenhouse gases – Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition.”

- **ISO/IEC 17011:2004** “Conformity assessment – General requirements for accreditation bodies accrediting conformity assessment bodies”.



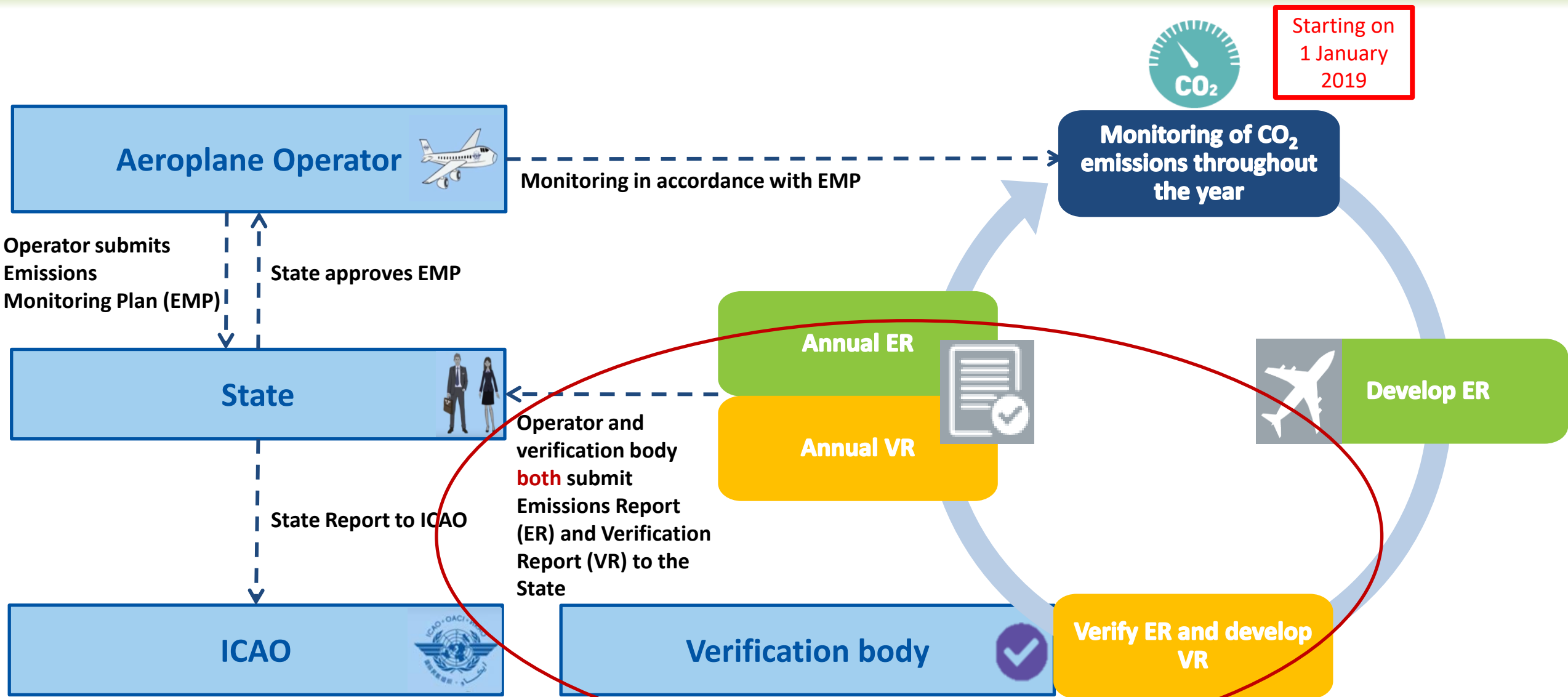
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Verification Process



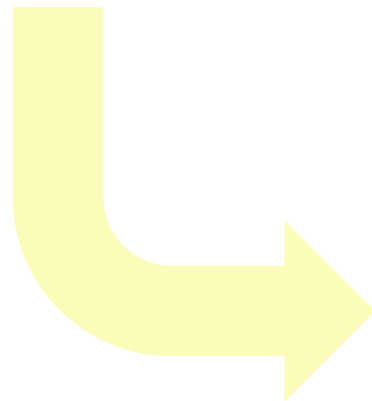
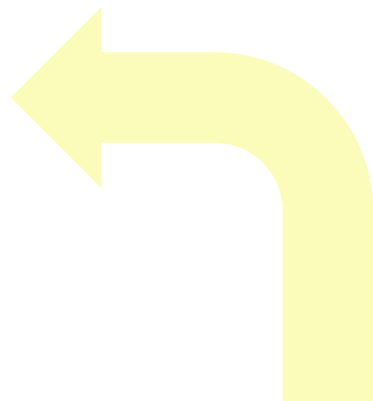
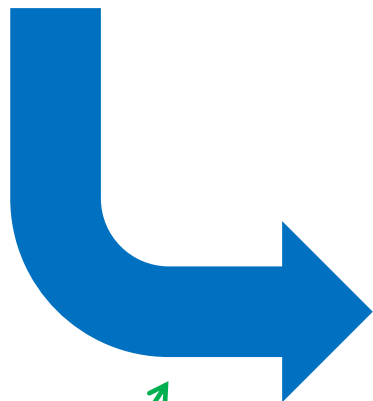
Annual Cycle for MRV Activities



What is Verification?

- A process to ensure that the information is accurate without errors prior to an aeroplane operator's reporting to State
- Requires an independent third-party
- Already in use in various forms (financial auditing, greenhouse gas inventories, emissions reduction projects etc.)

Verification Information Flow

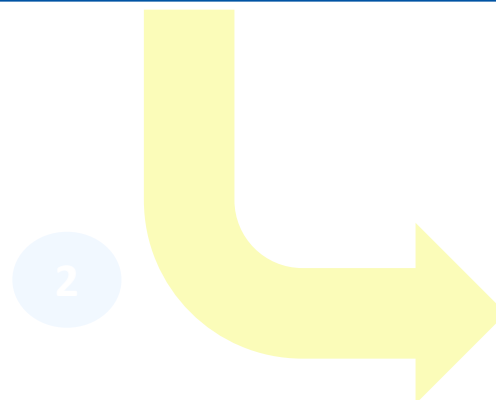
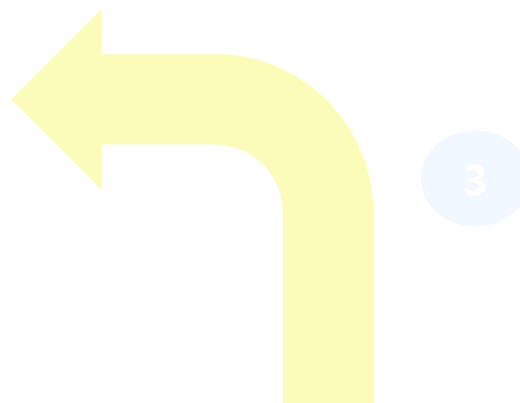


Aeroplane operator reports to State through the annual Emissions Report



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

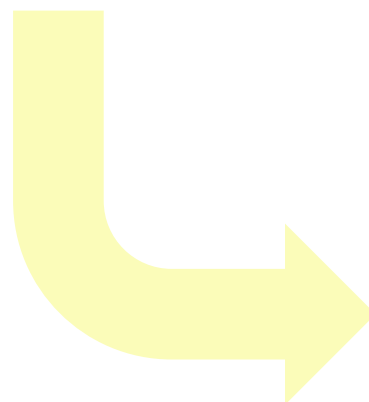
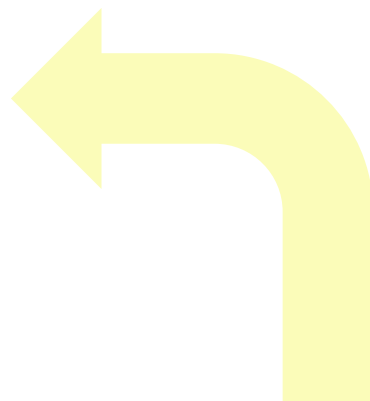
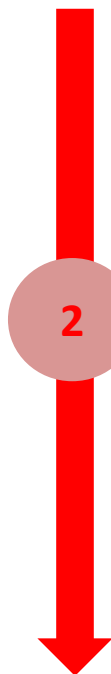




1 Internal pre-verification

Internal pre-verification is a recommendation and not a requirement

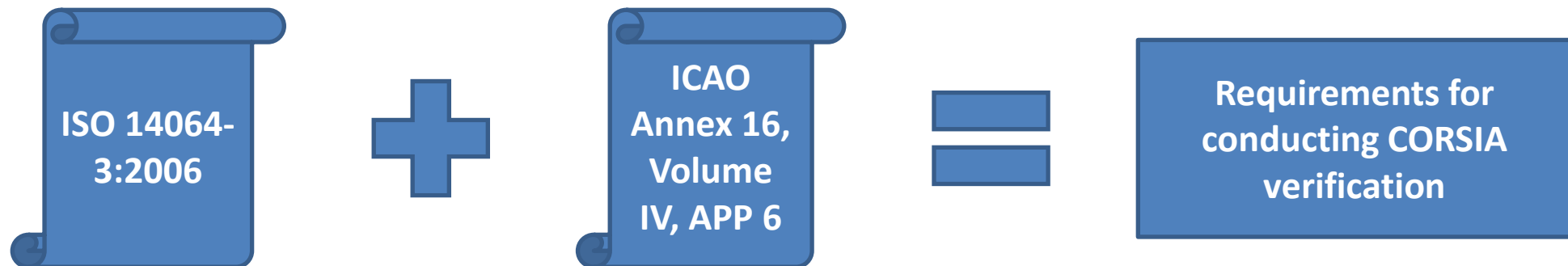
Verification Information Flow



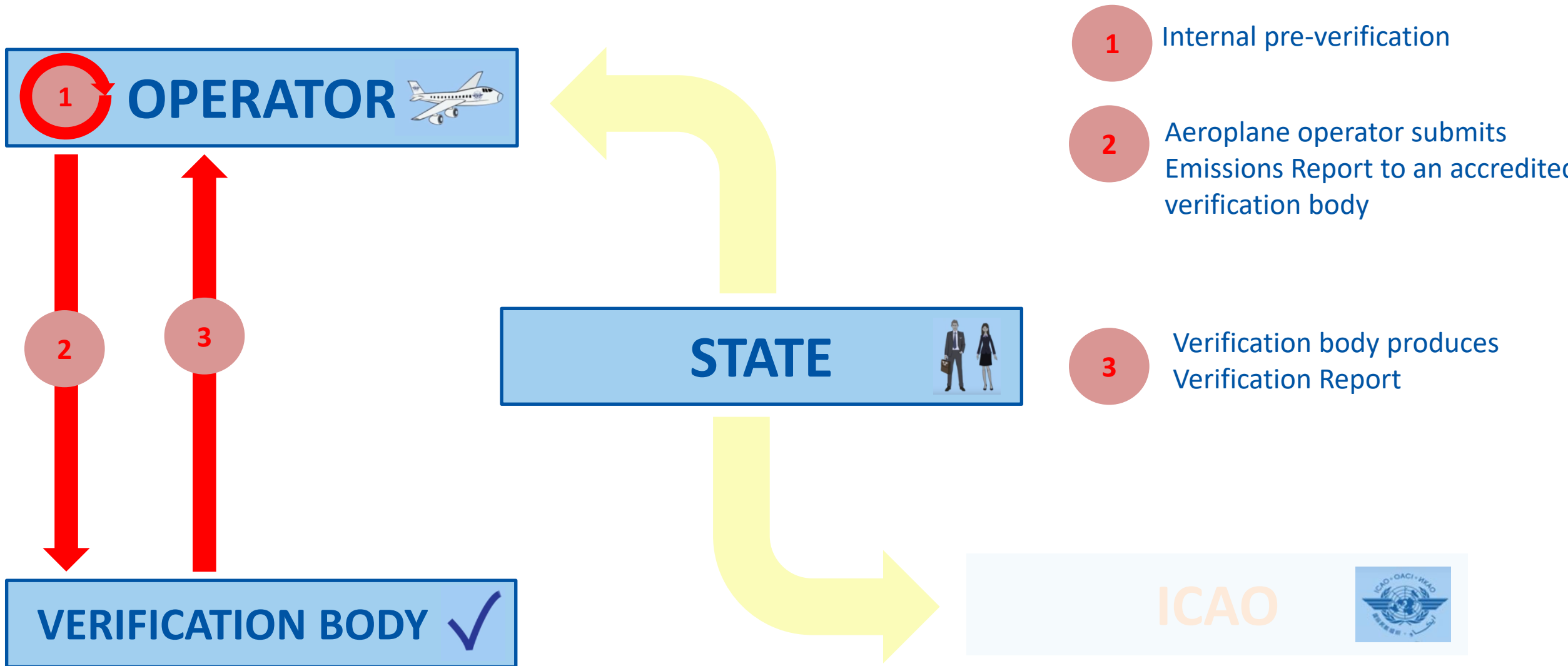
- 1** Internal pre-verification
- 2** Aeroplane operator submits Emissions Report to an accredited verification body

Verification by the Verification Body

- The aeroplane operator shall engage an accredited verification body for the verification of its annual Emissions Report
- A verification body shall conduct the verification according to ISO 14064-3:2006, and the CORSIA-specific requirements described in Annex 16, Volume IV, Appendix 6



Verification Information Flow

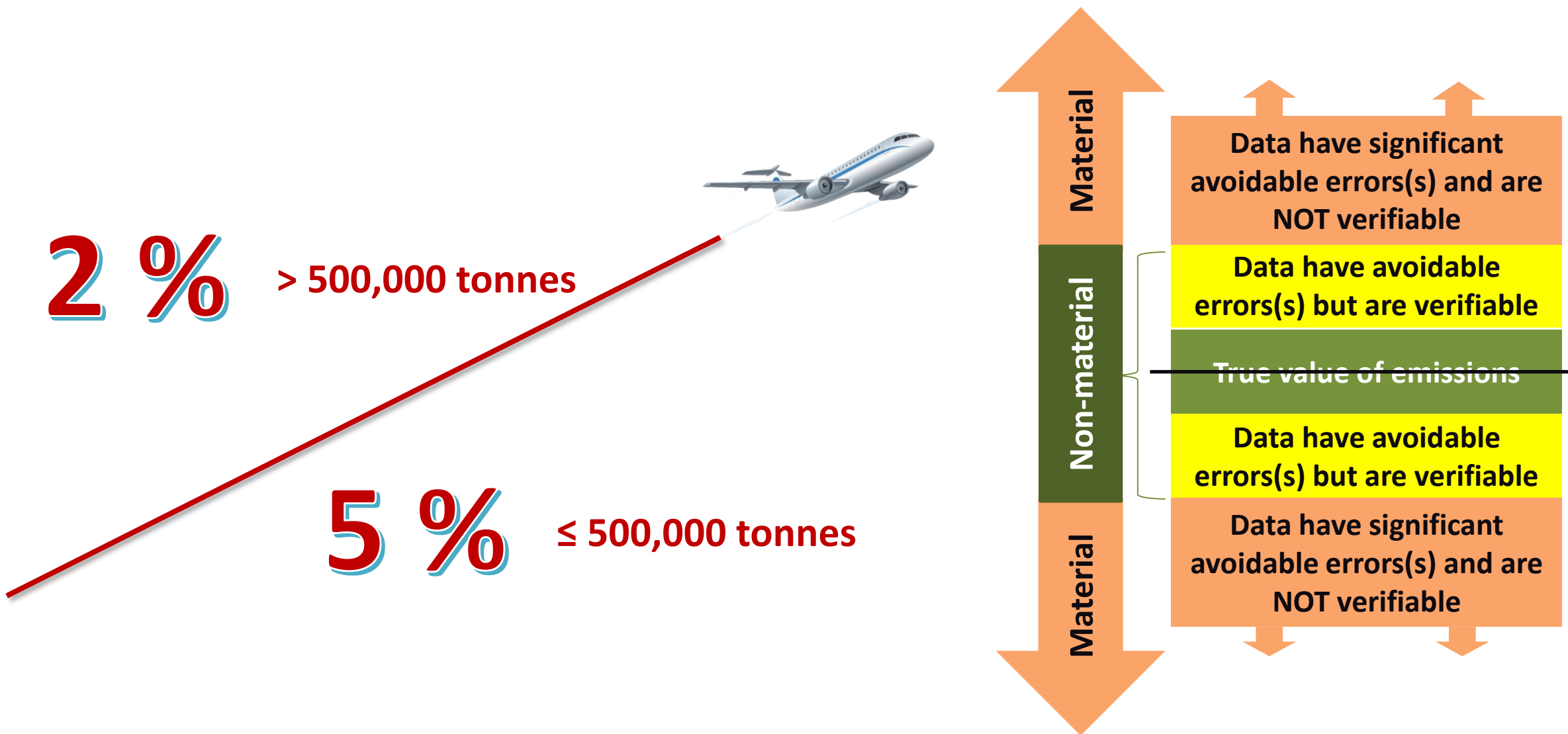


- Contents of the VR is provided in the Annex 16, Volume IV, Appendix 6, 3.10.1
 - Includes all verification-related information
- CORSIA specific content:
 - Determination of compliance of the Emissions Report with the Emissions Monitoring Plan
 - Determination of any non-compliances of the Emissions Monitoring Plan with SARPs

**Demonstration of the Verification
Report template after this presentation**



Materiality Threshold



2 %

> 500,000 tonnes

5 %

≤ 500,000 tonnes

Material

Non-material

Material

Data have significant avoidable errors(s) and are NOT verifiable

Data have avoidable errors(s) but are verifiable

True value of emissions

Data have avoidable errors(s) but are verifiable

Data have significant avoidable errors(s) and are NOT verifiable

Materiality Example

Item	Verification	Reported value	Verification body's value	Difference	Materiality
Flight 1	Incorrect fuel uplift	50	42	8	3.48%
Flight 2	Correct	12	12	0	
Flight 3	Incorrect block-on fuel	15	25	-10	-4.35%
Flight 4	Incorrect fuel uplift	52	42	10	4.35%
...
Total		230	222	8	3.48%

$$\frac{\text{Difference}}{\text{Total Reported value}} = \text{Materiality}$$

MISSTATEMENT:

Error, omission, misrepresentation

Examples

- ✈ Missing flights in the sequence of flights
- ✈ Non addressed data gaps as missing fuel uplift
- ✈ Implausible data, such as:
 - Fuel uplifts larger than tank capacity
 - Block-on fuel higher than Block-off fuel
 - Wrong unit, etc.

may cause



NON-CONFORMITIES:

Act or omission or an act that is not in accordance with EMP

Examples

- ✈ Incorrect application of the fuel use monitoring methods
- ✈ Incorrect application of the CERT
- ✈ Incorrect version of the EMP used
- ✈ Required quality procedures not followed, etc.

AO will correct all misstatements and non-conformities discovered during verification



- ✗ Includes material misstatements and/or non-conformities;
- ✗ The scope of verification too limited;
- ✗ No sufficient confidence in data.

→ Advise the AO to contact the State



- ✓ NO misstatements and/or non-conformities

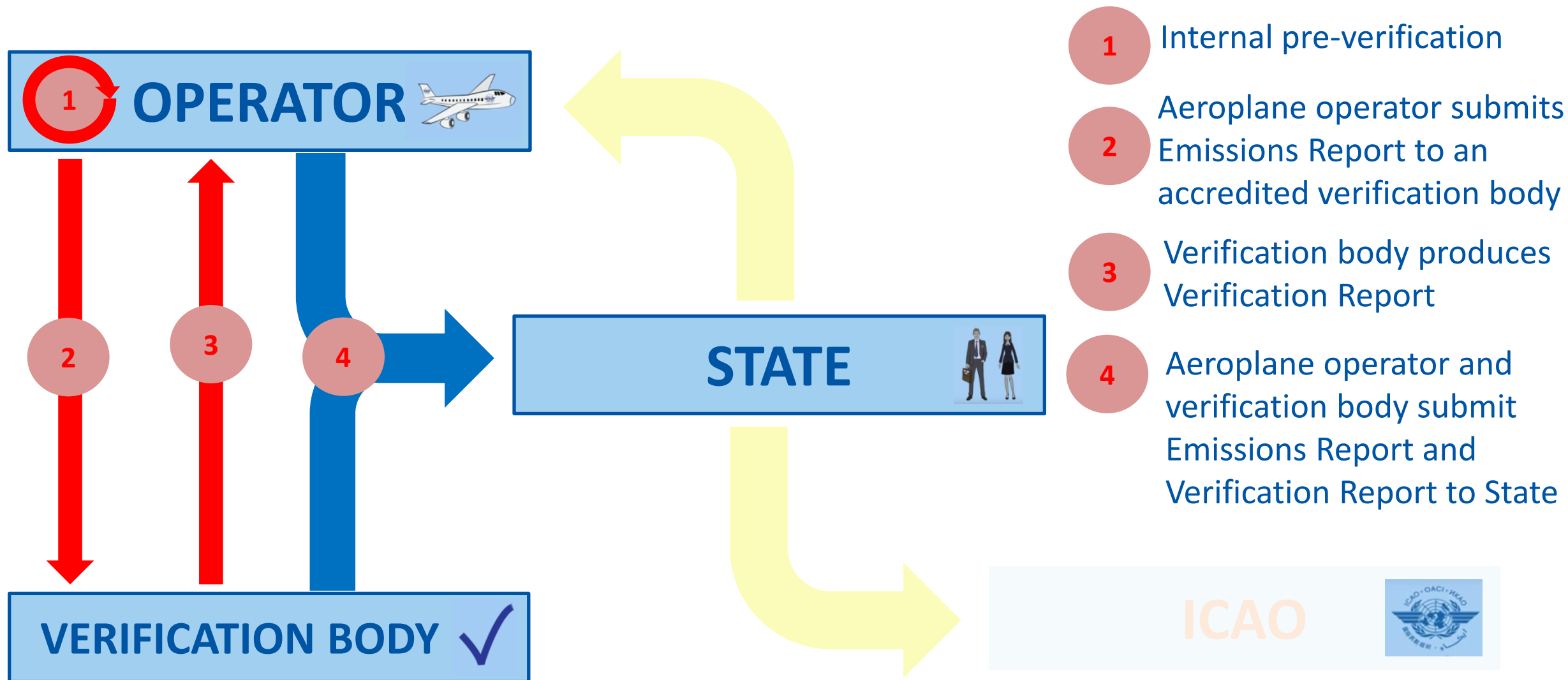
OR



- ✓ Includes non-material misstatements and/or non-conformities;
- ✓ Specify the misstatements and non-conformities.



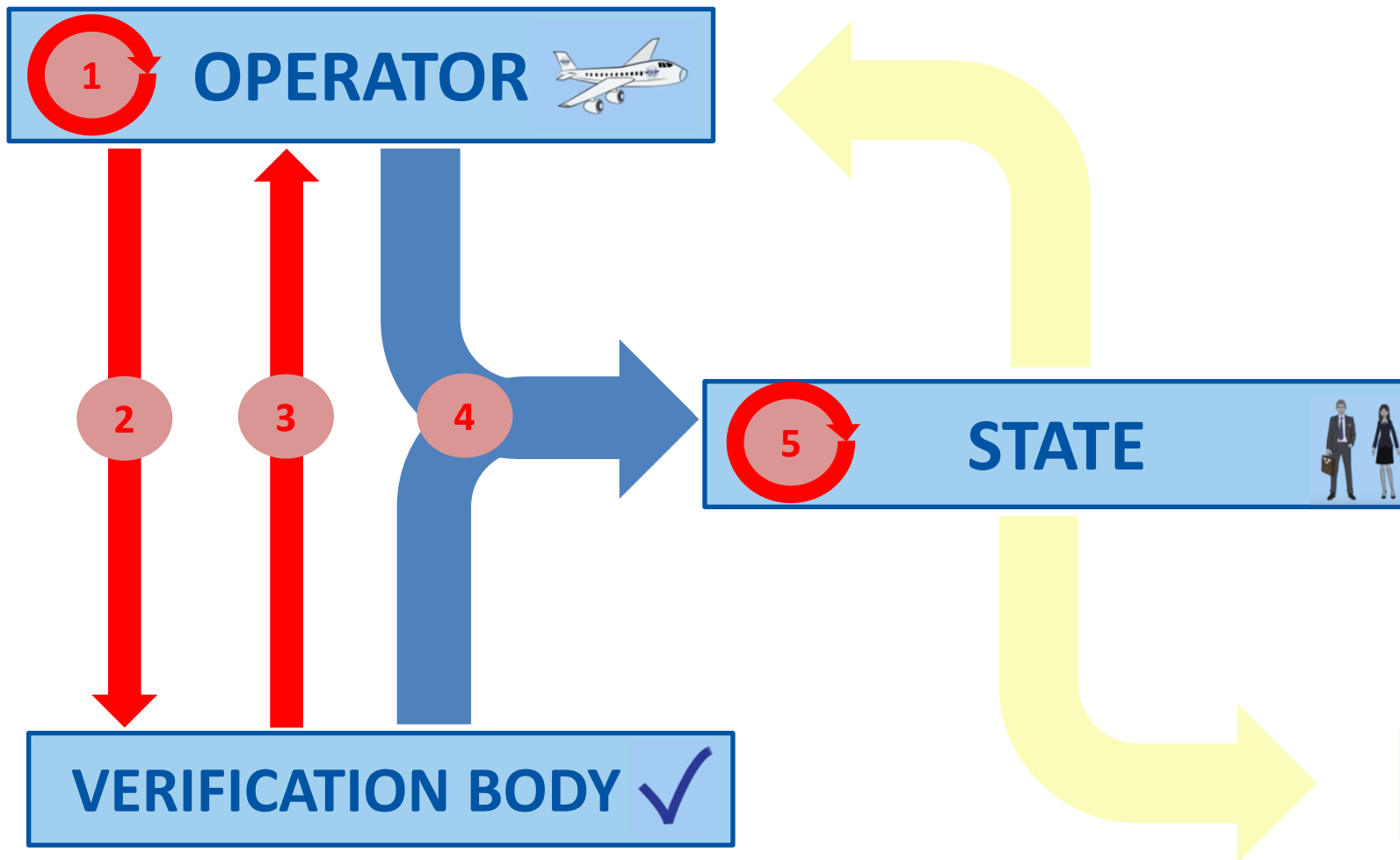
Verification Information Flow



- 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

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- 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



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State's Order of Magnitude Check



- 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

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

Table 3-9 of the ETM provides checklist for States' order of magnitude check of Emissions Reports

Main sections:

- Aeroplane Operator
- Emissions Report information
- Aeroplane fleet
- OPTION 1: State pairs
- OPTION 2: Aerodrome pairs
- Data gaps
- Verification body
- Change of data by State
- Communication with aeroplane operator
- Communication with verification body

No.	Question / Issue	Additional Information	Status: OK/Yes/No /Not Applicable	Notes and Results of Checks
	<u>Aeroplane Operator</u>			
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.		

Example – Fuel Reported Check

- Are the types of fuel reported plausible and contained in the EMP? (*ETM (Doc 9501), Volume IV, Table 3-9, #31*)
 - Since emissions factors are fuel type-specific, deviation might lead to implausible amount of calculated emissions.

Example:

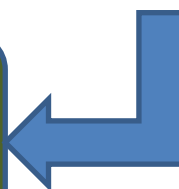
An aeroplane operator has reported the following information in its ER:

- Total amount of Jet A1 Fuel = 250,000 tonnes (FCF = 3.16 tonnes of CO₂/tonne of fuel)
- Total amount of AvGas = 50,000 tonnes (FCF = 3.10 tonnes of CO₂/tonne of fuel)

You can use this information to calculate the total CO₂ emissions:

CO₂ emissions = (250,000 x 3.16) + (50,000 x 3.10) = 790,000 + 155,000 = 945,000 tonnes

Compare the result with total reported CO₂ emissions



- Is the given information regarding number of flights plausible?
(*ETM (Doc 9501), Volume IV, Table 3-9, #30*)
 - Does aeroplane operator report a noticeable small number of flights on typical destinations of the airline?

Example based on reporting State pairs:

An aeroplane operator has reported the following information in its ER:

- Total no of flights per year = 7,500
- Total number of aeroplanes = 5

You can use this information to calculate an average number of flights per aeroplane:

Average = $7,500 \text{ flights} / (365 \text{ days} \times 5 \text{ aeroplanes}) = \text{about } 4 \text{ flights/aeroplane/day}$

Could be considered as plausible for an operator on short- and medium-haul flights



Example – Two Specific Fuel Consumption Checks

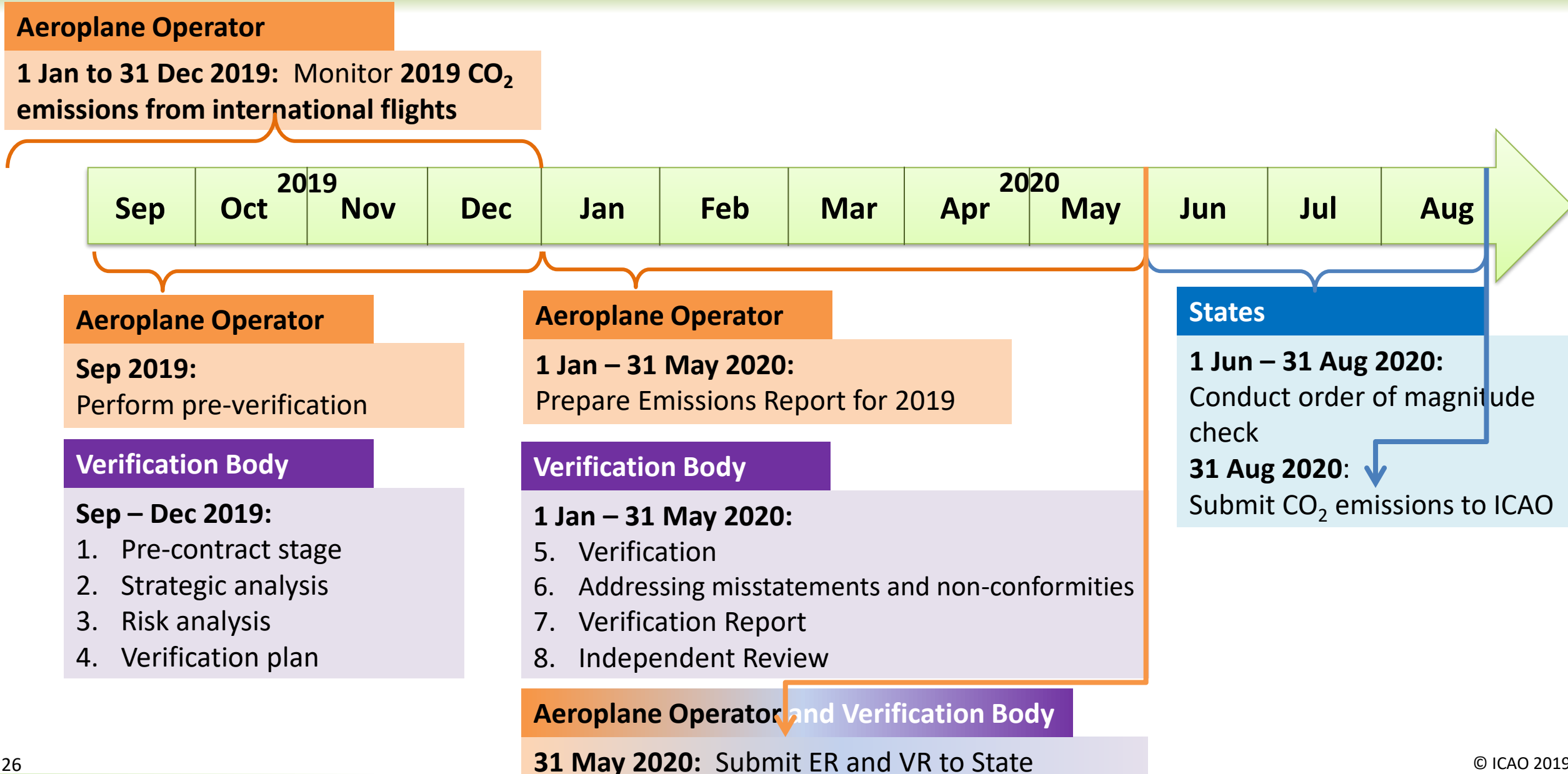
- Are there State pairs with more than 250 tonnes average fuel consumption per flight? (*ETM (Doc 9501), Volume IV, Table 3-9, #38*)
- Are there State pairs with less than 2.5 tonnes average fuel consumption per flight? (*ETM (Doc 9501), Volume IV, Table 3-9, #39*)

Example:

State of Departure	State of Arrival	Total No of Flights	Total Amount of Fuel (tonnes)	Average Fuel Consumption
State A	State B	150	250	1.7
State A	State E	150	2,000	13.3
State C	State D	40	15,000	375.0

$250/150 = 1.7$

Timeline for Verification of 2019 Data





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Accreditation Process for Verification Bodies



- 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”
 - 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

- How to ensure sufficient availability of accredited verification bodies to aeroplane operators, in support of verification activities under CORSIA?
 - National accreditation bodies and verification bodies need to have the required knowledge
 - ICAO has developed a training course on CORSIA verification for both national accreditation bodies and verification bodies
 - 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



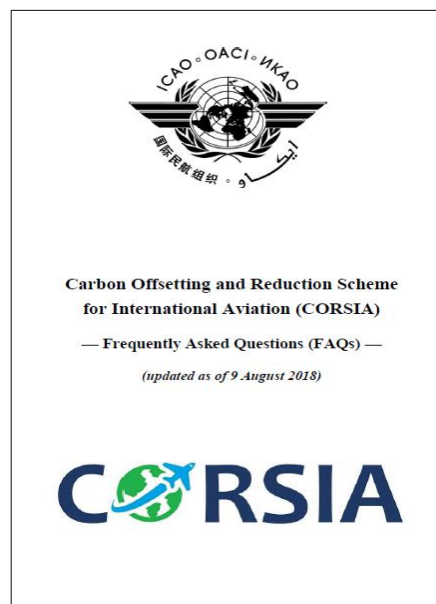
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Frequently Asked Questions



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



- Is a third-party verification needed when using the ICAO CORSIA CERT?
 - *Yes, an aeroplane operator shall engage a third-party verification body for the verification of its annual Emissions Report also when the ICAO CORSIA CERT has been used for generating an Emissions Report.*
 - Reference in Annex 16, Volume IV: Part II, Chapter 4, 2.4.1.
- Does the verification body have to be from the administrating State?
 - *An aeroplane operator may engage a verification body accredited in another State, as long as the State in which the aeroplane operator has been attributed to recognises this accreditation.*
 - Reference in Annex 16, Volume IV: Part II, Chapter 2, 2.4.2.

- How can an aeroplane operator identify an accredited verification body?
 - *States are required to submit to ICAO a list of nationally-accredited verification bodies. ICAO will compile this information, and make available a list of verification bodies accredited in each State as a part of the ICAO document entitled "CORSA Central Registry (CCR): Information and Data for Transparency" that will be available on the ICAO CORSA website.*
 - *An aeroplane operator may consult this list in order to identify and contract a verification body for the verification of the Emissions Report.*

- Who pays for the third-party verification and what will be the price? Is a price list included in the list of verification bodies to be compiled by ICAO?
 - *An aeroplane operator will be responsible for covering the cost of the third-party verification of its Emissions Reports and Emissions Unit Cancellation Reports.*
 - *Details of the verification (including the price of the verification service) will be agreed and included in the contract between an aeroplane operator and a verification body.*

- What if there is no national accreditation body in a State?
 - *An aeroplane operator may engage a verification body accredited in another State, subject to rules and regulations affecting the provision of verification services in the State to which the aeroplane operator is attributed.*
 - *Reference in Annex 16, Volume IV: Part II, Chapter 2, 2.4.*

- Must a State ensure to have accredited verification bodies through its National Accreditation Body by 30 April 2019?
 - *No. According to Annex 16, Volume IV, Part II, Chapter 1, 1.3.7, and Appendix 1, at least once a year States are asked to submit a list of verification bodies accredited in the State. The first time this is requested is by 30 April 2019. In addition, a State may submit updates to this list on a more frequent basis.*
 - *As the accreditation process takes time to be accomplished, it might not be the case that all States will submit extensive lists of accredited verification bodies before 30 April 2019.*
 - *As the number of verification bodies is expected to increase over time and will not be tied to the annual 30 April deadline, States may submit updates to the list on a more frequent basis as needed.*

- How does a verification team meet the technical expertise requirements?
 - *During the accreditation, the verification body must demonstrate that it has processes in place to ensure the appointment of technically competent verification teams.*
 - *One example of such a process involves conducting a detailed comparison of the requirements outlined in Annex 16, Volume IV, Appendix 6, 2.6.1 and 2.6.2 in the form of a matrix, specifying for each verification team member to what extent each of the requirements listed are being met (gap analysis) and which documents were used to prove a specific expertise.*
 - *It is the task of the verification body to analyse whether the identified distribution of competencies throughout the potential verifiers could be combined into a team that meets all the requirements in Annex 16, Volume IV, Appendix 6, 2.6.*
 - *If there is a gap in technical competency, the verification body needs to develop and document a training approach to resolve the deficits in accordance with its established internal processes.*



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QUESTIONS?



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Demonstration of the Verification Report Template



Exercise 2: State's Order of Magnitude Check

- Three documents are provided for this exercise:
 - A1 Airways' 2019 Emissions Report (*document 3_2_Emissions Report Demonstration.xlsx*)
 - Corresponding Verification Report (*document 4_2 Verification Report Template Demonstration.xlsx*)
 - State's Order of Magnitude Check Checklist (*document 4_3_ETM Order of Magnitude Checklist.docx*)
- By using the Order of Magnitude Check Checklist, your task is to conduct an order of magnitude check to A1 Airways' 2019 Emissions Report.
 - Please use the blank columns of the Checklist to include your notes
- 75 minutes to complete the exercise, followed by 30 minutes feedback discussion



Thank You