An Airline Handbook on CORSIA

Third edition

Revised, November 2018

Preface

On 27 June 2018, the ICAO Council adopted the First Edition of Annex 16, Volume IV, which includes the international Standards and Recommended Practices (SARPs) for CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation). CORSIA aims to help address any annual increase in total CO_2 emissions from international civil aviation above 2020 levels.

In accordance with the new standards, all operators with annual emissions greater than 10,000 tonnes of CO_2 will have to report their emissions on an annual basis, with monitoring starting from 1 January 2019 (international flights only). Already in 2018, operators will need to develop an emissions monitoring plan, which details the procedures that will be used to monitor fuel use, calculate emissions and manage data.

The adoption of the CORSIA SARPs as a new Volume IV of Annex 16 to the Chicago Convention will ensure the necessary level of uniformity in regulations which our industry needs and which is recognized by both Article 37 of the Chicago Convention and ICAO Assembly Resolution A39-22. Uniformity is not only key to prevent market distortions, but also to preserve the environmental integrity of CORSIA.

This handbook is intended to provide information to airlines on the main elements of and requirements associated with CORSIA. It is based on the requirements defined in ICAO Assembly Resolution A39-3 and Annex 16, volume IV, to the Chicago Convention. It should be noted, however, that states which find it impracticable to comply with the international standards of Annex 16, volume IV, may adopt requirements which differ from those established by ICAO. IATA would however strongly urge states to bring their own regulations in full accord with Annex 16, volume IV. To the extent any state may seek to apply different requirements from those established by the SARPs, it is our position that this could upset the careful structure of Annex 16, Volume IV, and set a negative precedent against the integrity of the scheme.

What's new in this edition?

The main updates in this revised edition are:

- A new section on the definition of an international flight (3.2);
- Further clarifications on the meaning of humanitarian and medical flights (4.1.2);
- Additional information on the applicability of the 10,000 tCO_2 threshold for small emitters (4.1.3);
- Additional information on simplified monitoring (4.2.3);
- Clarification that no distinction needs to be made between CORSIA eligible fuels used for international flights and for domestic flights (4.3.3).

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1. Introduction

On 6 October 2016, the 39th session of the ICAO Assembly concluded with the adoption of a global market-based measure scheme to address CO_2 emissions from international aviation. This historic decision is the first time that a single industry sector has agreed to a global market-based measure in the climate change field. The industry first proposed this measure in 2009 and has supported the ICAO process ever since.

The agreement at ICAO demonstrates that the aviation industry is determined to live up to its climate change commitments and play its part in meeting international goals for greenhouse gas emission reduction.

In 2009, the aviation industry set three global goals to address its climate impact:

1. An annual average fuel efficiency improvement of 1.5% from 2009 to 2020. The industry is on track to meet this short-term target.
2. Stabilize net CO_2 emissions at 2020 levels with carbon-neutral growth. The global market-based measure is one of the elements that will enable aviation to meet the mid-term goal of carbon-neutral growth 2020, by complementing technology, sustainable aviation fuels, operational and infrastructure measures.
3. Reduce aviation's net CO_2 emissions to half of what they were in 2005, by 2050. Achieving this ambitious goal will only be possible with continued investment in new technologies and strong support mechanisms for the deployment of sustainable aviation fuels.

These CO_2 reduction goals are ambitious, but they are achievable, and the strategy that the industry has implemented is bearing fruit. Our ability to achieve the goal of carbon-neutral growth has been enabled by the agreement of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) at ICAO in October 2016.

The aviation sector is committed to technology, operational and infrastructure advances to continue to reduce the sector's carbon emissions. Offsetting is not intended to replace these efforts. Nor would CORSIA make fuel efficiency any less of a day-to-day priority. Rather, CORSIA can help the sector achieve its climate targets in the short and medium term by complementing emissions reduction initiatives within the sector.

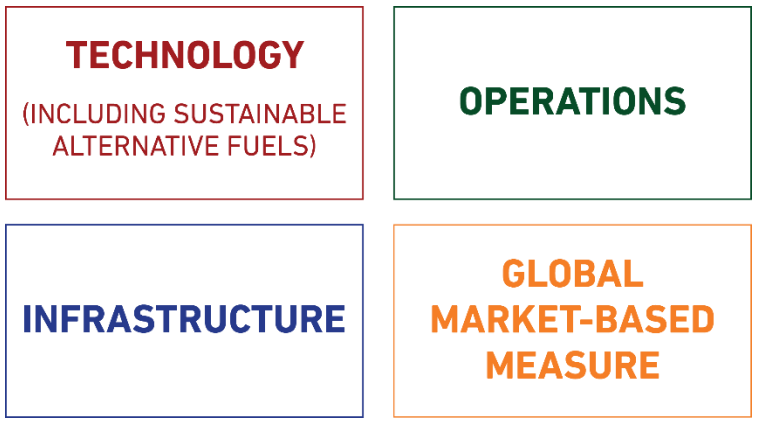
Aviation's third goal is the long-term challenge for the industry. Carbon-neutral growth is a holding measure, rather than a full solution in itself. Reducing overall emissions by half is no easy task, but work is already underway to lay the foundations. This goal can only be achieved through technological development and innovation, areas where the aviation industry has a strong track record, and with appropriate government investment and support.

2. Aviation's climate strategy: three goals, four pillars

Air transport is a vital feature of our modern, globalized world, connecting people and businesses across oceans and continents. The global aviation industry supports over 63 million jobs and accounts for 3.5% of global GDP ($2.7 trillion – based on 2014 data).

The benefits of air travel are clear, but global connectivity creates an environmental challenge. In 2017, civil aviation, as a whole, emitted around 859 million tonnes of CO_2, which is roughly 2% of man-made carbon emissions. Our industry recognizes that our operations contribute to climate change and we are taking the responsibility to lessen this impact extremely seriously.

Aviation is approaching the challenge of achieving its climate goals through a four-pillar strategy: developing new technology (including sustainable aviation fuel), more efficient operations, better use of infrastructure and a global market-based measure for aviation CO_2 emissions.



The development of new, more efficient aircraft and engines can substantially decrease CO_2 emissions. New technology aircraft are, on average, around 15-20% more fuel-efficient than the models that they replace. Sustainable aviation fuels, which are already being used on certain commercial flights, have the potential to cut emissions by up to 80%.

Operational measures include identifying weight savings in the current fleet, allowing the aircraft to burn less fuel. Airlines have been investing in lightweight seats and cabin equipment and even replacing heavy pilot manuals with tablet computers. Other operational measures include single-engine taxiing, idle reverse thrust, and ATC procedures such as continuous descents into airports and traffic flow management that prevent unnecessary airborne holding.

The infrastructure pillar of the strategy relates mainly to navigational improvements, making better use of airspace and streamlining the routes taken by aircraft to cut down on flight time, and optimizing airport layout to improve throughput and prevent unnecessary holding.

The industry remains confident that technology, operational measures and better infrastructure will provide long term solutions to ensure the sustainable growth of the aviation industry through partnership between industry and government. However, we also acknowledge that a global market-based measure is needed to fill any remaining emissions gap until those other measures have taken full effect.

3. CORSIA

3.1 Overview

The scheme established by ICAO Assembly Resolution A39-3 (see Annex 1) is a global offsetting mechanism. Under CORSIA, aeroplane operators will be required to purchase and cancel "emissions units" to offset the increase in CO_2 emissions covered by the scheme.

CORSIA aims to address any increase in total CO_2 emissions from international civil aviation using the average annual emissions between 2019 and 2020 as baseline. With the exceptions of humanitarian, medical and firefighting flights, all international civilian operations of aeroplanes are covered by CORSIA, including for example scheduled and non-scheduled flights, passenger and cargo flights, training and maintenance flights, as well as general aviation and private jets. The term "aeroplane operator" is used by ICAO to exclude helicopter operations from the scope of applicability of CORSIA. For simplicity, "operator" will be used in this handbook. For the purpose of CORSIA, international flights are defined as flights that depart in one ICAO member state and arrive in a different ICAO member state.

The Resolution's Preamble emphasizes that market-based measures (MBMs) should not be duplicative and CO_2 emissions from international aviation should be accounted for only once. Paragraph 19 also stipulates that CORSIA is to be *the* MBM applying to CO_2 emissions from international aviation.

In the context of addressing climate change concerns, offsetting is an action by a company or individual to compensate for their emissions by financing a reduction in emissions elsewhere. While carbon offsetting does not require companies to reduce their emissions "in-house", it provides an environmentally effective option for sectors where the potential for further emissions reductions is limited or the abatement costs are unduly high.

Offsetting and carbon markets have been a fundamental component of global, regional and national emissions reduction policies. They have operated for decades for compliance purposes and voluntary emissions reductions, and continue to be an effective mechanism to underpin action against climate change.

There are many ways to achieve CO_2 reductions that can be used as offsets, many of which bring other social, environmental and/or economic benefits relevant to sustainable development. Such offsets can be sourced from diverse types of project activities (e.g. renewable energy projects) and can be purchased through specialized offset providers or carbon brokers.

3.2 Definition of international flight

3.2.1 International flights

CORSIA only applies to international flights, which are flights that take-off in a state and land in another state. Domestic flights, *i.e.* flights between two aerodromes located in the same state, are not included in the scope of CORSIA.

Under CORSIA, the categorization of a flight as international does not take into account the nationality of the operator or the airspace which may be used to operate the flight. A flight between two aerodromes located in the same state would, therefore, be considered as domestic even if the aircraft flew through foreign airspace or if the operator is administrated by another state.

3.2.2 Overseas territories

For CORSIA, aerodromes located in overseas territories are attributed to their respective ICAO member state. This is also the case for overseas territories which may in some organizations be assimilated to small island developing states. For example, flights to and from French Polynesia will be treated in the same way as flights to and from any other aerodrome in France.

The ICAO Manual on Location Indicators (Doc 7910) contains a list of aerodromes and the attributed state they are attributed to.

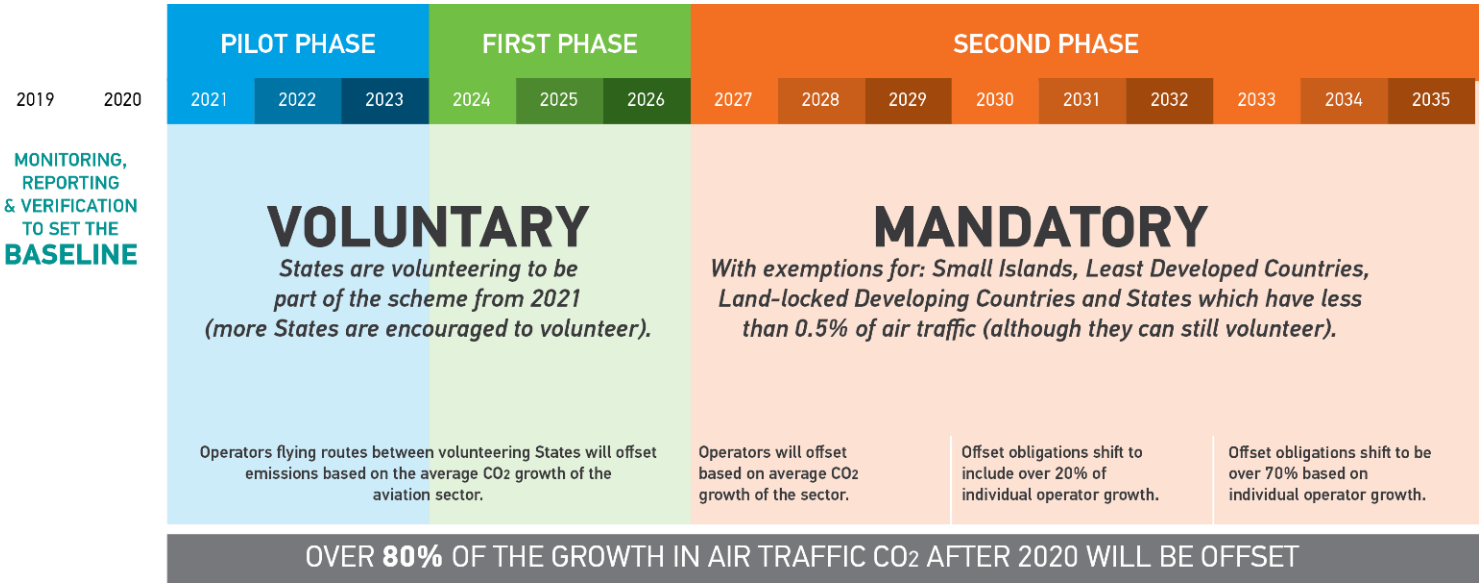
3.2.3 Flight stages and diversions

Under CORSIA, each individual “stage” of a flight with intermediate stops is considered as a separate flight and the applicability of CORSIA will be determined for each flight stage individually. For example, if an operator flies between Los Angeles and London with a stop in New York, the (domestic) flight operation between Los Angeles and New York will be considered independently from the (international) operation between New York and London.

This rule applies irrespective of the nature of the intermediate landing, including in cases of unplanned stops such as technical or medical diversions.

3.3 Design elements

The main design elements of CORSIA are a phased implementation and the rules related to the calculation of offsetting requirements.

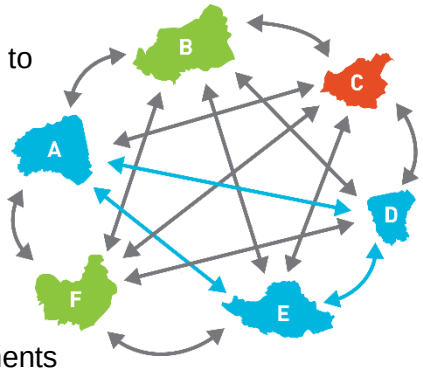


3.3.1 Phased implementation

In order to address the concerns of developing states and to take into account the special circumstances and respective capabilities of states, CORSIA will be implemented in phases.

The phased implementation, however, only relates to offsetting requirements. All operators which emit more than 10,000 tCO_2 per year on international flights will have to report emissions for all international flights from 1 January 2019, including flights to and from exempted states.

3.3.1.1 Pilot phase (2021-2023) and first phase (2024-2026)



From 2021 until 2026, offsetting requirements will only apply to international flights between states that volunteer to participate in the pilot and/or first phase (states **A**, **E** and **D** in this example).

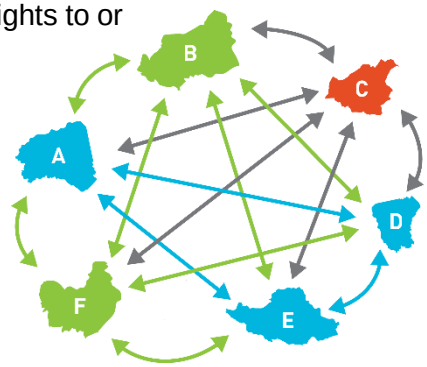
Any operator flying between volunteering states (↔ blue lines) will be subject to offsetting requirements, even if the operator is based in an exempted state.

All other international flights to and from states that have not volunteered (**B**, **F** and **C**) will be exempt from offsetting requirements (↔ grey lines).

However, the CO_2 emissions from all international flights, including flights exempt from offsetting requirements, will have to be monitored, verified and reported on an annual basis.

3.3.1.2 Second phase

From 2027, offsetting requirements will apply to ***all*** international flights (including those that did not volunteer to be part of the first phases: **B** and **F**), ***except*** flights to or from states that meet one of the two following criteria (**C**):



- Least Developed Countries, Small Island Developing States, and Landlocked Developing Countries; ***or***
- States that represent a small share of international aviation activities (in RTKs): these include the States that account for less than 0.5% of total RTKs from international aviation in 2018.[1]

3.3.1.3 Voluntary participation

Exempted states can decide to join the scheme at the beginning of any year. The only requirement is that they communicate their decision to ICAO before 30 June of the preceding year.

States who decide to participate in CORSIA on a voluntary basis may discontinue their voluntary participation from the scheme from 1 January of any given year, provided they inform ICAO no later than 30 June of the preceding year.

As of 15 November 2018, 76 states have volunteered to participate in CORSIA. A list is provided in Annex 2.

[1] Assembly Resolution A39-3 provides that the Second phase applies to all flights between States that have an individual share of international aviation activities in RTKs in 2018 above 0.5 per cent of total RTKs or whose cumulative share in the list of States from the highest to the lowest amount of RTKs reaches 90 per cent of total RTKs, except LDCs, SIDS and LLDCs unless they volunteer to participate in this phase. The RTK taken into account will be the aggregated RTK from international flights by all operators registered in the State in question.

3.3.2 Calculation of offsetting requirements

Paragraph 11 of Resolution A39-3 establishes the rules which determine how offsetting requirements will be calculated for each operators. The calculation of offsetting requirements will evolve over time from a "sectoral" approach to a combination of a "sectoral" component and an "individual" component.

The sectoral component is based on the total CO_2 emissions of each operator. Each operator will have to offset a given percentage of its CO_2 emissions from flights subject to offsetting requirements. This percentage, the sector's "growth factor", will be the same for all operators and refers to the increase in CO_2 emissions divided by the total CO_2 emissions on state-pairs covered by CORSIA in a given year.[2]

The individual component is based solely on the increase in CO_2 emissions of each individual operator.

It is important to note that all CO_2 emissions from flights exempt from CORSIA or not subject to offsetting requirements, as a result of the phased-implementation or technical exemptions, are excluded from the calculation of offsetting requirements.

The weighting between the sectoral and individual components will evolve over time as follows:

	PILOT PHASE 2021-2023	FIRST PHASE 2024-2026	SECOND PHASE 2027-2029	SECOND PHASE 2030-2032	SECOND PHASE 2033-2035
SECTORAL COMPONENT	100%	100%	100%	up to 80%	up to 30%
INDIVIDUAL COMPONENT	0%	0%	0%	at least 20%	at least 70%

Paragraph 11 foresees that the weighting to be applied in Phase 2 may be adjusted by the ICAO Assembly in 2028, but should include an individual component of at least 20% from 2030, and at least 70% from 2033. The weighting will be identical for all operators.

[2] For example, if the industry's emissions in the reference years are 50 and emissions in a given compliance year are 55, the sector's growth factor referred to in Paragraph 11 would be 9%: (55-50) ÷ 55. Please note that it is different from what is generally understood as the growth rate.

3.3.2.1 Calculation of an operator's sectoral component

The sectoral component is obtained by multiplying an operator's total CO_2 emissions covered by CORSIA by the "sector's growth factor".

The sector's growth factor is obtained by dividing the aggregated increase in total CO_2 emissions above the baseline from all operators by the total CO_2 emissions from international civil aviation in a given year. Only the emissions from state-pairs subject to offsetting requirements are taken into account in the determination of the sector's growth factor.

For example, if the total CO_2 emitted (by all operators) on state-pairs subject to offsetting requirements in 2030 is 750 million tonnes of CO_2 and the 2019-2020 baseline emissions for the same state-pairs are 500 million tonnes of CO_2, the sector's growth factor in 2030 would be:

$$(750–500) \div 750 = 33.3\%$$

If an individual operator emits 150,000 tonnes of CO_2 in 2030, its sectoral component would therefore be:

$$150{,}000 \times 33.3\% = 50{,}000 \text{ tonnes of } CO_2$$

While by default, the sectoral component is calculated by applying the sector's growth rate to an operator's total emissions in a given year, during the pilot phase (2021-2023) states may opt to apply the sectoral rate to operators' emissions in 2020 instead.

3.3.2.2 Calculation of an operator's individual component

The individual component simply corresponds to the difference between an operator's CO_2 emissions in a given compliance year and its emissions in the baseline (average of 2019-2020). Only the emissions from state-pairs subject to offsetting requirements are taken into account in the determination of the sector's growth factor.

For example, if the CO_2 emitted by an operator on state-pairs subject to offsetting requirements in 2030 is 1.2 million tonnes of CO_2 and the operator's 2019-2020 baseline emissions for the same state-pairs are 800,000 tonnes of CO_2, the operator's individual component would be 400,000 tonnes of CO_2 for 2030:

$$1{,}200{,}000 – 800{,}000 = 400{,}000 \text{ tonnes of } CO_2$$

3.3.2.3 Calculation of an operator's offsetting requirements

Once an operator's sectoral and individual components are known, they should be multiplied by the applicable weightings.

In compliance years where the approach is 100% sectoral, an operator's offsetting requirement will be its sectoral component. In compliance years where offsetting requirements are a combination of the individual and sectoral components, the components should be multiplied by the respective weightings.

For example, if the weighting in a given year is 20% individual and 80% sectoral, an operator's offsetting requirements will be:

0.2 × individual component + 0.8 × sectoral component = tonnes of CO_2 to offset

The table below provides illustrative values.

Illustration of calculation of offsetting requirements for an operator			**2019/2020 baseline**	**2025**	**2030**	**2035**
Total emissions		*tCO_2, in thousands*	600	650	710	790
Total emissions from state-pairs subject to offsetting requirements in:	2025	*tCO_2, in thousands*	380	400		
	2030	*tCO_2, in thousands*	430		500	
	2035	*tCO_2, in thousands*	430			550
Sector's growth factor			N/A	20%	30%	40%
Sectoral component		*tCO_2, in thousands*	N/A	400 x 20% = 80	500 x 30% = 150	550 x 40% = 220
Individual component		*tCO_2, in thousands*	N/A	Not applicable	500-430 = 70	550-430 = 120
Offsetting requirements		*tCO_2, in thousands*	N/A	100% x 80 = 80	80% x 150 + 20% x 70 = 134	30% x 220 + 70% x 120 = 150

The exact formulas defined in Paragraph 11 of Assembly Resolution A39-3 are as follows:

a) an aircraft operator's offset requirement = [% Sectoral × (an aircraft operator's emissions covered by CORSIA in a given year × the sector's growth factor in the given year)] + [% Individual × (an aircraft operator's emissions covered by CORSIA in a given year × that aircraft operator's growth factor in the given year);

b) where the sector's growth factor = (total emissions covered by CORSIA in the given year – average of total emissions covered by CORSIA between 2019 and 2020) / total emissions covered by CORSIA in the given year;

c) where the aircraft operator's growth factor = (the aircraft operator's total emissions covered by CORSIA in the given year – average of the aircraft operator's emissions covered by CORSIA between 2019 and 2020) / the aircraft operator's total emissions covered by CORSIA in the given year;

d) where the % Sectoral = (100% – % Individual) and;

e) where the % Sectoral and % Individual will be applied as follows:

f) from 2021 through 2023, 100% sectoral and 0% individual, though each participating State may choose during this pilot phase whether to apply this to:

g) an aircraft operator's emissions covered by CORSIA in a given year, as stated above, or an aircraft operator's emissions covered by CORSIA in 2020;

3.4 Review

Paragraph 18 of Assembly Resolution A39-3 provides that the Council will undertake a periodic review of CORSIA, for consideration by the Assembly, every three years from 2022. The review should serve as a basis for the Council to consider whether any adjustments are necessary and should assess the impact of the scheme on the growth of international aviation.

In addition, Paragraph 17 introduces a safeguard clause under which the ICAO Council is asked to decide on criteria for triggering action to ensure the sustainable development of international aviation and protect it against any inappropriate economic burden that may result from the application of CORSIA.

4. Monitoring, reporting and verification (MRV)

The international Standards and Recommended Practices (SARPs) for the monitoring, reporting and verification (MRV) have been adopted by the ICAO Council on 27 June 2018, as the First Edition of Annex 16, Volume IV. The SARPS of Annex 16, Volume IV, will apply in **all ICAO member states** from 1 January 2019.

All operators, including operators registered in states that have not volunteered for CORSIA, will have to report CO_2 emissions on all their international flights to their national authority ("administrating authority") on an annual basis.

As the baseline of CORSIA will be set using the average annual emissions between 2019 and 2020, operators will need to start monitoring their CO_2 emissions from 1 January 2019.

4.1 Exemptions

CORSIA only applies to international *civil* aviation. State flights are, therefore, excluded from the scope of the scheme. State flights include military, customs and police flights.

Furthermore, several exemptions of a technical nature are provided for, namely:

- Operations with aeroplanes with a Maximum Take Off Mass (MTOM) below or equal to 5,700 kg;
- Humanitarian, medical and firefighting operations;
- Operators whose total annual CO_2 emissions from international aviation are below or equal to 10,000 tonnes.

These flight operations are exempt from CORSIA and not subject to any of its MRV or offsetting requirements.

In contrast to EU ETS, the following categories of flights are not exempt from CORSIA:

- training flights;
- flights performed for scientific research or to check, test, or certify aircraft or equipment; and
- flights performed as public service obligations or on routes where capacity offered is below 30,000 seats per year.

4.1.1 State flights

In accordance with Article 3(b) of the Chicago Convention, state flights include aircraft used in military, customs and police services. The status of a flight is determined by the function the aircraft performs at a given time, taking into account all the circumstances surrounding a flight, rather than just the registration or ownership of the aircraft. State flights may, for example, be operated by aircraft which are normally used for civilian purposes.

State flights can, for example, be identified through the information in the flight plan. If Item 18 of the flight plan is marked "HEAD", then the flight is considered to be a flight with Head of State status. Other state flights, such as customs and police services, will use the indicator "STATE" in Item 18. Military flights are usually recognizable if item 8 of the flight plan (flight rules and type of flight) is marked with an "M".

Subject to the approval of their administrating authority, operators may use other means to demonstrate that a flight was operated as a state flight.

4.1.2 Exemptions

4.1.2.1 Exemption based on the maximum take-off mass

Emissions from operations with aeroplanes with a MTOM below or equal to 5,700 kg are exempt from CORSIA.

4.1.2.2 Humanitarian, medical and firefighting flights

Humanitarian, medical and firefighting operations are also exempt from the scope of CORSIA. This exemption extends to flights preceding or following a humanitarian, medical or firefighting flights if they were required to accomplish the humanitarian, medical or firefighting activities or to reposition the aeroplane thereafter.

Humanitarian flights are typically flights operated for humanitarian purposes which carry relief personnel and relief supplies during or after an emergency and/or disaster and/or are used to evacuate persons from a place where their life or health is threatened by such emergency and/or disaster.

Medical flights include flights carrying any sick or seriously injured person requiring urgent medical attention and life critical medical emergency evacuation, as well as flights transporting medical personnel, equipment, organ donors, organs or other lifesaving medical material urgently required.

Operators will need to provide evidence that specific flights were operated for humanitarian, medical or firefighting reasons. Such evidence may, for example, include the information contained in item 18 (other information) of the flight plan,[3] which can contain a specific indicator:

- “HUM” for humanitarian flights;
- “HOSP” and “MEDEVAC” for medical flights;
- “FFR” for fire-fighting flights.

Subject to the approval of their administrating authority, operators may use other means to demonstrate that a flight was operated for humanitarian, medical or firefighting reasons.

[3] The ICAO model flight plan form is provided in Annex 3.

4.1.3 Small emitters

Operators whose total CO_2 emissions from international flights are below or equal to 10,000 tonnes are exempt from CORSIA. Only flights which are within the scope of applicability of CORSIA must be included in an operator's total emissions to determine if it emits more or less than 10,000 tonnes of CO_2. Emissions from exempt flight operations (see 4.1.1 to 4.1.3) must be excluded.

If an operator's CO_2 emissions increase above the 10,000 tonnes threshold, which may be as a result of an increase in international operations or the start of international operations ("new entrant"),[4] it will have to start monitoring its emissions from the start of the year after which its CO_2 emissions pass the 10,000 tonnes threshold. For example, if an operator's CO_2 emissions increase above 10,000 tonnes in 2023, it will have to start complying with the MRV requirements of CORSIA from 1 January 2024.

However, with the approval of its administrating authority, an operator may already start monitoring its emissions in the year during which it passes or expects to pass the 10,000 tonnes threshold.

If an operator's emissions decrease below 10,000 tonnes, the operator will fall outside of the scope of applicability of CORSIA and will no longer have to report its emissions. However, it is advised that operators engage with their authority if they are in this situation.

[4] A "new entrant" is an operator that commences operating international flights falling within the scope of CORSIA on or after 2019 and whose operations are not in whole or in part a continuation of operations previously performed by another operator. To be considered a "new entrant", the operations must not be, even partially, a continuation of the operations of another operator. For example, if an airline creates a new AOC for its regional flights and splits its network between the parent company and the new AOC, the new AOC would not be considered as a new entrant. Similarly, if an airline operating domestic flights only takes over the international flights of another airline it has merged with, this would likely not be a situation of a "new entrant".

4.2 Monitoring of emissions

4.2.1 Emissions Monitoring Plan

All operators with annual emissions greater than 10,000 tonnes of CO_2 will be required to report CO_2 emissions on an annual basis, with monitoring starting from 1st January 2019.

In order to prepare for the monitoring, reporting and verification (MRV) of CO_2 emissions, each operator will need to develop an emissions monitoring plan. The emissions monitoring plan shall include information on the operator, its fleet and operations. The emissions monitoring plan will also detail the methods that will be used by the operator to monitor fuel use and calculate emissions, and all associated data management.

The emissions monitoring plan is important for the verification process. It helps the verifier to understand the procedures chosen and approved by the authority and check if they have been applied properly.

Annex 16, Volume IV, to the Chicago Convention requires that operators submit their emissions monitoring plan before 28 February 2019 to their national authority for approval, but it is recommended that states require operators to submit emissions monitoring plans by 30 September 2018.

IATA encourages all operators to develop their emissions monitoring plan as early as possible, and preferably by 1 January 2019, even if the deadline imposed by their state is later.

The emissions monitoring plan will have to be approved by the administrating authority, who should be satisfied that the processes described by the operator are appropriate and sufficient to comply with the prescribed MRV requirements. There is no need for the emissions monitoring plan to be reviewed or approved by a verification body before or after the approval by the administrating authority.

Before approving it, the administrating authority will review the emissions monitoring plan to ensure it is complete and consistent with the requirements of Annex 16 vol. IV. It will notably assess if the procedures in place are sufficient and if the operator has a suitable data management plan in place.

The approval by the administrating authority will give the operator the assurance that the processes detailed in its emissions monitoring plan are satisfactory.

The key MRV requirements and information to be included in the emissions monitoring plan are explained in the following sections.

4.2.2 Administration

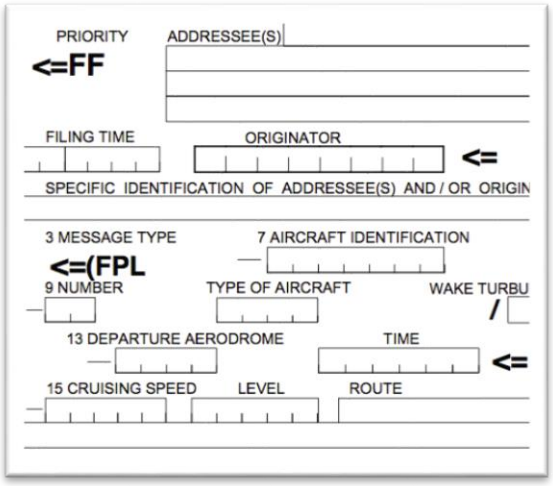
Operators are liable for compliance with the MRV and offsetting requirements under CORSIA, with each operator reporting to a single national authority.

For most commercial operators, the identification of the accountable entity and the attribution to a state will be based on the ICAO designator. The ICAO designator is a three letter code which is used to identify aircraft operating agencies in aeronautical telecommunications services. A list of ICAO designators is published as ICAO Document 8585, *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*.

For operators with an ICAO designator, the operator that has been assigned the ICAO designator will be the accountable entity and it will be administrated by the state which has notified ICAO of the designator.

Operators without an ICAO designator will be administered by the state that issued their air operator certificate (AOC). In the absence of AOC, they will administered by the state where they are incorporated.

Two operators may request to be treated as a single entity if one is a wholly owned subsidiary of the other and both are administrated by the same state. The possibility to treat several operators as a single entity does not apply when they are wholly owned by a holding group which is not an operator itself. If two operators decide to be treated as a single entity, their emissions will be aggregated in order to calculate the pooled entity's offsetting requirements.



In order to associate individual flights with operators, the aircraft identification information in item 7 of the flight plan will be used.

If an ICAO designator is used to identify the aircraft in item 7, the operator holding the ICAO designator will be responsible for the flight.

The same applies in cases of wet-leases; if a flight is operated under the ICAO designator of the lessee, the obligations related to the emissions from the flight are attributed to the lessee and not to the lessor. Similarly, emissions from a code-share flight marketed by different airlines will only be allocated to the operator whose ICAO designator is used in the flight plan.

If a registration mark is used in item 7 to identify an aircraft, the operator in whose AOC, or equivalent document, the aircraft registration mark is listed will be responsible for the flight. In addition to registration marks listed in the AOC (or equivalent), and subject to the approval of the administrating authority, registration marks listed in the emissions monitoring plan may be used to attribute flights to an operator.

If a flight cannot be attributed to an operator on the basis of an ICAO designator or registration mark listed in the AOC or equivalent, the owner of the aeroplane will be responsible for a flight.

4.2.3 Monitoring of fuel use and calculation of CO_2 emissions

CO_2 emissions are, as a general rule, calculated on the basis of the **actual** fuel use on each individual international flight. However, in certain circumstances, operators will be eligible to use simplified monitoring.

4.2.3.1 Simplified monitoring

Operators eligible for simplified monitoring are not required to monitor actual fuel use but have the possibility to calculate their emissions using the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT), an **estimation** tool developed in ICAO. The CERT applies CO_2 Estimation Models (CEMs) to estimate the emissions of a flight on the basis of great circle distance or block time for a given aircraft type.

Operators may implement the CERT's CO_2 Estimation Models (CEMs) in their IT systems to facilitate compliance with CORSIA. They will however need to ensure the latest version of the CEMs is implemented and that the results of implementing the CEMs in IT systems are identical to those obtained with the same input from the downloadable CERT version. Annex 16, volume IV, does not provide for the use of any other estimation method for simplified monitoring.

During the **baseline period (2019-2020)**, operators with annual CO_2 emissions (from all international flights) below **500,000 tonnes** are eligible for simplified monitoring.

If the emissions of an operator using simplified monitoring increase above 500,000 tonnes during 2019 or 2020, its administrating authority may authorize it to continue using the CERT for the baseline period.

Operators should make sure they have data available to forecast their 2019 and 2020 emissions. Fuel and emissions data collected in 2017 and/or 2018 may be used as a proxy, taking into account any potential significant changes in operations that may take place in 2019. Operators may also use the CERT to determine eligibility for simplified procedures.

Even if it is eligible to use the CERT, an operator can choose to monitor actual fuel use for all its operations or for a particular sub-fleet.

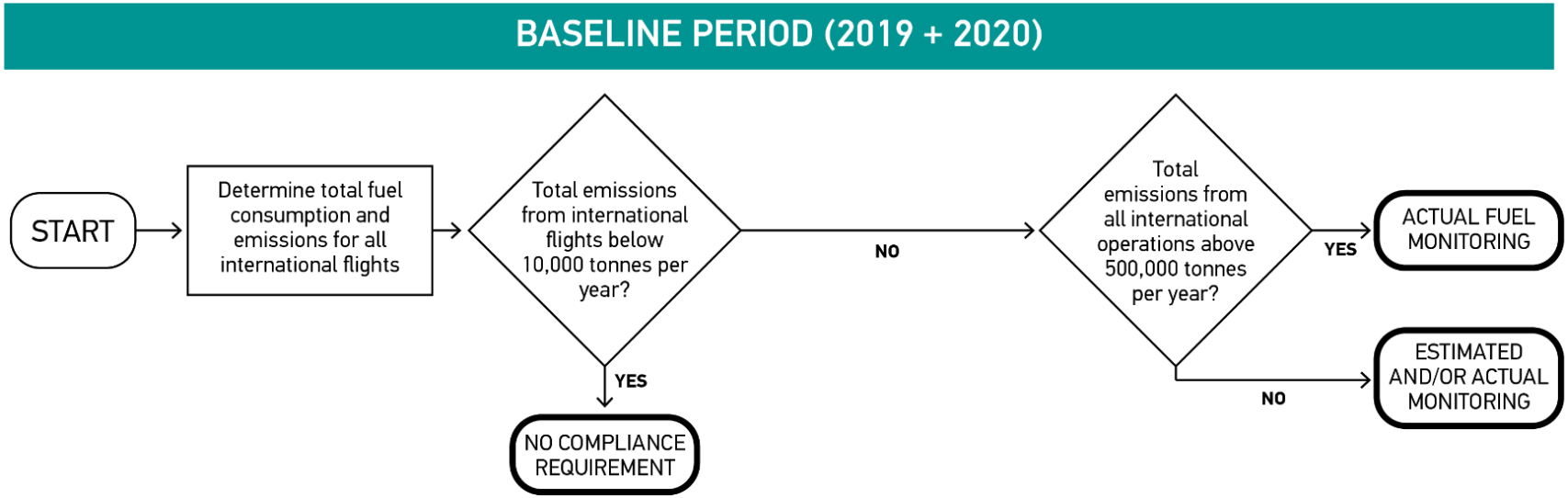
If two operators have decided to be treated as a single entity, the eligibility for simplified monitoring is determined on the basis of their aggregated CO_2 emissions.

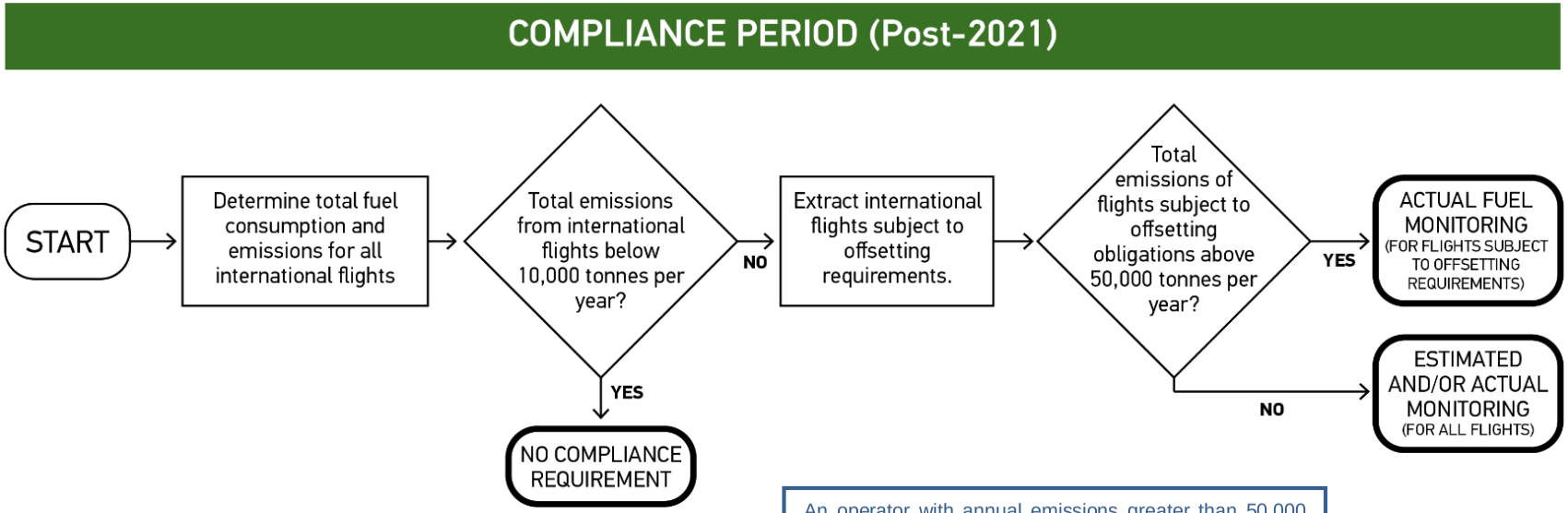
From **2021**, an operator may use the CERT:

- for flights *not* subject to offsetting requirements; and
- for flights subject to offsetting requirements, if the total annual CO_2 emissions from these flights is below **50,000 tonnes**.

If an operator's CO_2 emissions increase above the 50,000 tonnes threshold for two consecutive years, it will no longer be eligible to use the CERT. The operator will have to submit a revised emissions monitoring plan by 30 September of the following year and then start monitoring its actual fuel use from the following 1 January. For example, if an operator's CO_2 emissions from flights subject to offsetting requirements are greater than 50,000 tonnes in 2024 and 2025, a new emissions monitoring plan will need to be submitted by 30 September 2026 and actual fuel use will have to be monitored from 1 January 2027.

Similar to the baseline period, an operator may decide to monitor actual fuel use instead of using the CERT to estimate its emissions.





An operator with annual emissions greater than 50,000 tonnes per year can use the CERT to estimate its emissions from flights which are not subject to offsetting requirements. The obligation to monitor actual fuel use only applies to flights subject to offsetting requirements.

4.2.3.2 Overview of fuel use monitoring methods

Where operators monitor actual fuel use, they may select one of five fuel monitoring methods.

Different methods may be used for different aeroplane types, but the same method must be used for all aeroplanes of the same type.

> The standard units of measurement used are in accordance with the International System of Units (SI).

Two variants of an aeroplane which share the same ICAO aircraft type designators cannot be considered as different aeroplane types. For example, an Airbus A320 is assigned “A320” as ICAO aircraft type designator irrespective of whether it is an Airbus A320-100 or -200 variant, or retrofitted with sharklets. In contrast, an Airbus A320 and an Airbus A320neo will constitute different types as the A320neo is identified by the “A20N” ICAO aircraft type designator. A non-exhaustive list of ICAO aircraft type designators is provided in Annex 4.

Operators should use the same fuel use monitoring method in the baseline period as the one they will use from 2021. With the approval of its administrating authority, an operator may change the fuel monitoring method it uses for its fleet or for a sub-fleet, but the change must not occur in the middle of a 3-year compliance cycle. The change can only become effective from the start of the next compliance cycle.

It is also important to note that while the different fuel use monitoring methods require the collection of specific data points, the specific means through which the data is collected by the operator are not prescribed. In its emissions monitoring plan, the operator will need to describe how it plans to collect the data for the application of a specific fuel monitoring method, including the equipment, procedures and documentation which will be used.

The operator shall in particular identify primary data sources, but also secondary data sources which will be available if the primary source cannot be used. The operator will also need to detail the exact points in time when the measurements will be made.

Naturally, like the other elements of the emissions monitoring plan, the processes described in the emissions monitoring plan will need to be considered as satisfactory and be approved by the administrating authority.

The five monitoring methods are:

Method A, which is based on measurements after the completion of fuel uplifts (for the flight under consideration and for the subsequent flight) and the fuel uplift for the subsequent flight;

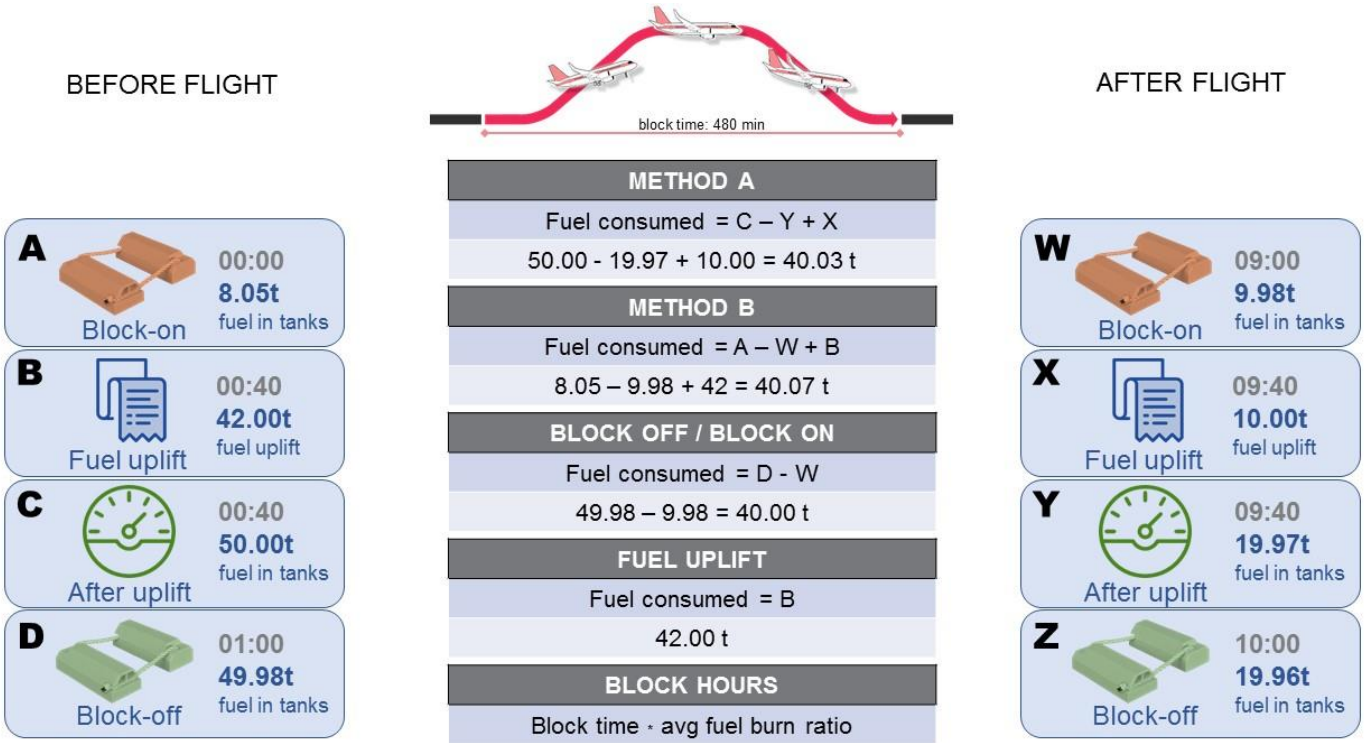
Method B, which is based on measurements at block-on times (preceding flight and flight under consideration) and the fuel uplift for the flight considered;

Block-off / block-on, which is based on the fuel consumed between block-off and block-on;

Fuel uplift, which is based on the fuel uplift before each flight; and

Block-hours, which applies the average fuel burn ratio by aeroplane type and during the reporting year in question to the block hours of each flight.

The chart below provides an overview of the data points and formulas for each method. The figures indicated in the chart are illustrative and are not indicative of any quantitative differences which would be observed using real-life measurements.



4.2.3.3 Method A

Method A is based on the following measurements:

1. the fuel quantity in tanks after the completion of the fuel uplift for the flight under consideration;
2. the fuel quantity in tanks after the completion of the fuel uplift for the subsequent flight; and
3. the fuel uplift for the subsequent flight.

It is important to note that method A relies on data from the subsequent flight, which may be a domestic flight. Therefore, to prevent data gaps it is recommended that operators using method A systematically collect all fuel measurements used in method A for all flights (domestic and international) operated by aircraft which are used in international operations.

In cases where no uplift takes place for a flight, the amount of fuel contained in the tanks at block-off should be used as an alternative to the fuel contained in the tanks after the uplift is complete.

In cases where a flight is followed by an activity other than a flight, such as maintenance, the operator may substitute the measurement of fuel in tanks after the uplift for the subsequence flight with the amount of fuel remaining in tanks at the start of the subsequent activity or fuel in tanks at block-on.

Finally, if an operator performs one or more flights for another operator on an ad hoc basis, such as a short term wet-lease, the monitoring of fuel consumption shall be done in accordance with the block-off / block-on method.

4.2.3.4 Method B

Method B is based on the following measurements:

1. the fuel quantity in tanks at block-on at the end of the preceding flight;
2. the fuel quantity in tanks at block-on at the end of the flight under consideration; and
3. the fuel uplift for the flight under consideration.

Similarly to method A, the application of method B relies on data from another flight, which may be a domestic flight. Therefore, to prevent data gaps it is recommended that operators using method B systematically collect fuel quantity at block-on for all flights (domestic and international) operated by aircraft which are used in international operations.

In cases where a flight is preceded by an activity other than a flight, such as maintenance, the operator may substitute the quantity of fuel at block-on at the end of the preceding flight with the amount of fuel remaining in aeroplane tanks at the end of the previous activity.

Finally, if an operator performs one or more flights for another operator on an ad hoc basis, such as a short term wet-lease, the monitoring of fuel consumption shall be done in accordance with the block-off / block-on method described below.

4.2.3.5 Block-off / block-on

Block-off / block-on is based on the following measurements:

- the fuel quantity in tanks at block-off at the start of the flight under consideration; and
- the fuel quantity in tanks at block-on at the end of the flight under consideration.

Commonly, block-off is understood as a point in time between the last door closed and first engine on, and block-on as a point in time between the last engine off and first door open.

In its emissions monitoring plan, the operator will need to define the precise point of time at which the measurements will be made. If an operator uses a definition of block-off or block-on which is not within the common time windows defined above, such deviation may be approved by the administrating authority if it is in accordance with the operator's existing practices.

4.2.3.6 Fuel uplift

Fuel uplift is based on the fuel uplift before each flight.

Adjustments will be required to allocate fuel consumption between different flights when one or more flights is not preceded by a fuel uplift, for example in the case of fuel tankering. In such cases, the allocation must be done in proportion to the block hours of the different flights covered by the same uplift.

4.2.3.7 Block hours

Block-hours applies the average fuel burn ratio by aeroplane type to the block hours of each flight. It requires the collection of total fuel uplifts and total block hours for each aeroplane type used by the operator for international flights.

The average fuel burn ratio is calculated by dividing the sum of fuel uplifts by the total block hours. The operator will need to calculate the average fuel burn ratio for each aeroplane type at the end of each reporting year. The average fuel burn ratios will not be calculated using historic data and will only be valid for the reporting year in question. For example, to determine the average fuel burn ratios for 2022, an operator will use the fuel uplift and block hours data collected in 2022.

If the operator can clearly distinguish between fuel uplifts for international flights and fuel uplifts for domestic flights, the average fuel burn ratio shall be calculated on the basis of fuel uplifts and block hours for international flights only.

4.2.3.8 Fuel density

In instances where fuel measurements are in volume, the operator shall use actual and/or standard density in accordance with the procedures it already has in place for operational and safety purposes. This may include a combination of standard and actual density, for example where the operator's procedures require actual density for weight critical flights, and standard density for other flights. Nevertheless, in all cases where standard density is applied, the value used must be 0.8 kilogram per liter.

Operators are required to detail the procedures used to determine fuel density in the emissions monitoring plan. They should provide references to the relevant documentation, such as operational manuals.

4.2.3.9 Emission factor

Once the quantity of fuel used has been identified, the CO_2 emissions are calculated using an emission factor of 3.16 kilogram CO_2 per kilogram of Jet-A/A1. The same emission factor should be applied to fuels equivalent to Jet-A and Jet-A1 (e.g. TS-1 and China No 3 fuels).

The emission factor for Jet-B and AvGas is 3.10 kilogram CO_2 per kilogram of fuel.

4.2.4 Data management

4.2.4.1 Data management and record keeping plan

As the monitoring and reporting of emissions will rely on the collection and handling of large sets of data, a key aspect of MRV is the procedures an operator has in place to manage data.

In their emissions monitoring plans, operators will need to provide information on the roles, responsibilities and procedures for data management. They will need to describe each step in the management of data, including sources of data, systems used to store and process data, as well as the controls in place to ensure the quality of data processing and integrity of the data itself.

Operators also need to assess the risks associated with the management of data and the measures they will implement to mitigate those risks. The risks may be associated with potential deficiencies in the systems used to collect data, but may also be related to the storage of records.

Operators shall put in place a plan for record keeping. The SARPs require that operator keep records relevant to demonstrating compliance with the requirements of CORSIA for a period of 10 years.

4.2.4.2 Data gaps

Data gaps occur when an operator is missing data relevant for the determination of the fuel use of a flight in accordance with the approved fuel monitoring method. Gaps in emissions-related data can occur due to various reasons, including irregular operations, data feed issues or critical system failures.

In cases where the operator can use a secondary data source to determine fuel use in accordance with the approved fuel monitoring method, this would not constitute a data gap. For example, if an operator normally uses ACARS data and, due to a problem, is missing data for a flight, it may be able to source actual fuel data from fuel invoices or technical logs (the secondary sources).

If there is no primary or secondary data available and the approved fuel monitoring methodology cannot be applied, then a data gaps occurs and the operator will have to use the CERT to fill the data gap.

It should be noted that data gaps may not affect more than 5% of international flights in the 2019-2020 period and more than 5% of international flights subject to offsetting requirements in 2021-2035. The 5% thresholds are assessed on the basis of the number of flights, not in relation to fuel use or CO_2 emissions. If these thresholds are exceeded, the operator will be required to take remedial action in consultation with its administrating authority.

4.2.5 Material changes

An operator will be required to resubmit its emissions monitoring plan if there are any significant changes to the information it contains (“material changes”).

Material changes include changes that would affect the status or eligibility of the aeroplane operator for an option under the emissions monitoring requirements, or that would otherwise affect the decision by the state to which the aeroplane operator is attributed with regard to whether the aeroplane operator’s approach to monitoring conforms with the requirements of Annex 16, vol. IV.

Changes to the information that affects the administration or identification of an operator (for example the ICAO Designator), changes that affect the eligibility to use simplified monitoring, changes to methodologies to monitor fuel use or determine fuel density, and changes to data management processes are examples of material changes.

In contrast, for example, changes in ownership structure that do not affect the accountable entity or changes to the contact information, list of aeroplanes or state-pairs provided in the emissions monitoring plan are not material and do not require the submission and approval of an amended emissions monitoring plan. Such changes should however be notified to the administrating authority in the annual Emissions Report.

4.3 Reporting and verification of emissions

After the end of each reporting year, operators will have to compile the fuel data collected in an annual emissions report. The emissions reports will need to be verified by a verification body prior to their submission to the administrating authority. The deadline for the submission of the verified 2019 and 2020 emissions reports will be 31 May 2020 and 2021 respectively. For the following emissions reports, the deadline will be 30 April (for example, 30 April 2022 for the 2021 emissions report).

4.3.1 Reporting of CO_2 emissions

Information which has to be included in the emissions report includes operator identification, information on the reporting cycle, reference to the most recently approved emissions monitoring plan, fleet and fuel information, and data gaps.

In cases where several operators report jointly, the emissions data relating to each subsidiary will have to be provided as appendices to the main emissions report.

By default, emissions data will need to be reported by state-pair, but an administrating authority can request that the data be reported to them by aerodrome-pair. Inbound and outbound flights must be treated as distinct state-pairs (for example, flights that depart from A and land in B are to be reported separately from flights that depart in B and land in A).

4.3.2 Public disclosure of CO_2 data

4.3.2.1 Public disclosure requirements

Some of the data reported to states will be disclosed to the public, after aggregation. The information which will be published, by ICAO, includes:

(1) the annual CO_2 emissions on each state-pair, aggregated for all operators.

It will also include, for each operator:

(2) the total annual CO_2 emissions;

(3) the total annual CO_2 emissions for state-pairs subject to offsetting requirements; and

(4) the total annual CO_2 emissions for state-pairs not subject to offsetting requirements.

Where an operator is concerned that the publication of its data, including after aggregation, could result in the disclosure of commercially sensitive information, it can submit a written and justified request to its national authority that the related data be treated as confidential and not be disclosed to the public.

4.3.2.2 Commercially sensitive information

Fuel is the most important cost item for commercial operators. In 2015, fuel represented on average 28.7% of airlines' costs globally, with some regional averages as high as 33%. Therefore, CO_2 emissions data, which is derived directly from fuel use, provides a very good indication of an operator's main cost item, even if the price paid for its fuel remains undisclosed.

Airline competition on some routes is fierce with operators competing to keep and gain market share. In such an environment, having the lowest fuel consumption – or even a relatively low level – is a key advantage to sustain the competition. As a corollary, intelligence on a competitor's fuel use on a specific route can be used to inform pricing and other commercial strategies, with the aim to reduce the market shares of a competitor.

Therefore, annual CO_2 emissions of an operator on a state-pair are considered as commercially sensitive if they are determined on the basis of actual fuel use.

This is why Annex 16, Volume IV only foresees the disclosure of aggregated data. However, it also identifies a number of situations where aggregated data may enable the determination of commercially sensitive state-pair information.

- An operator operates very few international state-pairs (for example Operator A in table below)
- An operator operates very few state-pairs subject to offsetting requirements or very few state-pairs not subject to offsetting requirements (for example Operator B in the table below)
- An operator operates a state-pair that no or very few other operators fly (for example Operator C in the table below)

Operator	State-pairs operated	Data published		
		Total CO2	CO2 for all flights subject to offsetting requirements	CO2 for all flights not subject to offsetting requirements
A	A <-> B	A <-> B	A <-> B	n/a
B	A <-> B A <-> C A <-> D A <-> E	A <-> B A <-> C A <-> D A <-> E	A <-> B A <-> C A <-> D	A <->E
C	A <-> B A <-> C A <-> D A <-> E A <-> F	A <-> B A <-> C A <-> D A <-> E A <-> F	A <-> B A <-> C A <-> D	A <-> E A <-> F
All 3 operators are administered by State A. There are no other operators administered by State A. All state-pairs are subject to offsetting requirements, except A< - >E and A <-> F. Operator C is the only operator flying between State A and State F.				

It is important to note that such data will not automatically be treated as confidential. The operators concerned will need to submit a written and justified request to their national authority that the related data be treated as confidential and not be disclosed to the public. If the national authority approves the operator's request, it should ensure that the data is identified as confidential when it reports the data to ICAO to prevent its publication by ICAO. When evaluating whether the level of aggregation would be sufficient to prevent the disclosure of commercially sensitive data, potential corporate relationships between operators should be taken into account.

4.3.2 CORSIA eligible fuels

Operators will be entitled to claim emissions reductions from fuels which meet defined sustainability criteria and are certified by an approved certification scheme. These "CORSIA eligible fuels" include "sustainable aviation fuels", which are renewable or waste-derived fuels, as well "lower carbon aviation fuels", which are fossil-based fuels.

To meet CORSIA's sustainability criteria, a specific CORSIA eligible fuel needs to achieve net greenhouse gas emission reductions of at least 10% compared to conventional jet fuel on a life cycle basis. Furthermore, a CORSIA eligible fuel must not be made from biomass obtained from land with high carbon stock. Additional sustainability criteria are being developed in ICAO's Committee on Aviation Environmental Protection for future consideration by the ICAO Council.

The accounting of CORSIA eligible fuels will be based on purchasing and blending records, excluding fuels sold to a third party or claimed under other greenhouse gas emissions schemes. CORSIA eligible fuels used on domestic flights may be claimed under CORSIA, provided they are not claimed under any other greenhouse gas emissions schemes.

CORSIA eligible fuels should be reported during the same compliance period as when the blending occurs. It is recommended that operators make CORSIA eligible fuel claims on an annual basis, but operators may decide when to make a claim within a given compliance period. For example, if a batch of CORSIA eligible fuel is blended in 2021, it is recommended that the batch be included in the 2021 emissions report. Nevertheless, the operator may instead decide to report it with its 2022 or 2023 emissions. However, in all cases, the associated emissions reductions can only be claimed in relation to offsetting requirements for the 2021-2023 compliance cycle.

In addition to detailed information on the CORSIA eligible fuels claimed, operators will need to provide a list of all other greenhouse gas schemes that they participate in. Only schemes where emission reductions from CORSIA eligible fuels may be claimed need to be included in that list. They will also need to include a declaration that they have not made claims for the same batches of CORSIA eligible fuel under any other schemes.

The emissions reductions that an operator can claim from CORSIA eligible fuels will be proportional to the life cycle emissions benefits of the fuels used, compared to a baseline life cycle emissions value of 89 gCO2e/MJ for jet fuel. Life cycle emissions include emissions from the full supply chain of production and use ("core LCA") and emissions from induced land-use change ("ILUC"). The emissions reductions will be deducted from the operator's total offsetting requirements at the end of each 3-year compliance period (see chapter 5.1).

4.3.3 Verification

Annual emissions reports will have to be verified by an external and independent body before being submitted to the national authority. This also applies to emissions reports of operators which are eligible to use the CERT for simplified monitoring.

While it is not a requirement, operators should prepare for the third-party verification process by selecting an internal auditor to review the draft emissions report in order to check the data, processes and resulting output. This will give the opportunity to the operator to identify potential irregularities and take corrective actions prior to third-party involvement. The internal auditor will, for example, check if the responsibilities assigned to various staff have been completed, how data compares to previous years, whether it is complete and if measurements have been taken in accordance with the agreed procedures.

4.3.3.1 Objective of verification

One of the main tasks of the verification body will be to ensure that the monitoring of CO_2 emissions has been undertaken in accordance with the emissions monitoring plan. The verification body will, for example, check if fuel use was calculated in line with the selected methodology, if fuel density was determined in accordance with the procedures detailed in the emissions monitoring plan, etc.

> In order to perform verification activities, the operator will need to provide access to all relevant documents and sources of data to the verification body. The operator and the verification body should identify the data sources and access needs prior to the verification exercise.

The verification body will check if the CO_2 emissions reported are accurate and supported by sufficient evidence. A certain margin of uncertainty is tolerated ("materiality threshold"), but it should not exceed 2% of total emissions for operators with annual CO_2 emissions from international flights greater than 500,000 tonnes. The materiality threshold for operators with annual CO_2 emissions from international flights equal to or less than 500,000 tonnes is 5%.

The verification body will also check that the stated amount of CORSIA eligible fuels is accurate and that the claimed batches have not been claimed under any other voluntary or mandatory schemes that the operator has participated in during the current or preceding compliance cycle.

> Given the confidential nature of the information the verification body will have access to, the operator and the verification body should make sure to include appropriate confidentiality clauses in their contract. As the verifier is required to submit a copy of the verification report to the State, it is however also important that the contract properly authorizes the verifier to do so.

As described in the next chapter, verification requirements also apply to the reports operators will need to submit on the emissions units cancelled to meet offsetting requirements.

If the accuracy of the report is satisfactory, the verification body will issue a written declaration that confirms that the CO_2 emissions assertion is stated within the defined level of assurance and materiality. In cases where the verification body may find misstatements and other irregularities in the emissions report, the operator will need to take corrective actions prior to the submission of the report.

4.3.3.2 Verification bodies

Operators can only engage verification bodies which will be accredited by a National Accreditation Body (NAB) to ISO 14065:2013 and to additional CORSIA-specific requirements. An operator may engage a verification body accredited by a national accreditation body from another state.

In addition to the ISO standards, the verification body will have to satisfy a number of personnel and team competency requirements. The verification team will, for example, need to demonstrate knowledge in general technical processes in the field of civil aviation, in aviation fuels and related processes, in fuel use monitoring and measurement devices and procedures, data management systems and controls, etc.

To minimize the potential for a conflict of interest, if the leader of the verification team undertakes six annual verifications for CORSIA or any other greenhouse gas verification for one operator, then the leader of the verification team shall take a break of three consecutive years from providing verification services to that same operator.

4.3.4 State review of emissions reports

The administrating authority will perform an order of magnitude check of the emissions reports submitted by operators. The administrating authority will not need to review the emissions reports in detail but should perform a number of checks to ensure that the information in the report is plausible and complete.

The administrating authority should, for example, check if the information on the operator and its fleet is accurate. It should make sure that the proper template has been used for the emissions report, that the emissions report was verified and by a verification body accredited for CORSIA, that the approved fuel monitoring method was used and that the reported CO_2 emissions and number of flights are roughly plausible. The administrating authority may for example estimate the typical fuel consumption for a flight by using the CERT and compare it with the data reported by the operator. The order of magnitude review will also ensure that the data has been aggregated at the right level and that state-pairs have properly been classified as subject or not subject to offsetting requirements. The administrating authority will also consider whether any data gaps existed during the reporting year and whether potential comments from the verification body have been taken into consideration.

5. Offsetting and emissions units

While the reporting of emissions will take place on an annual basis, offsetting requirements will be aggregated by 3-year compliance cycles. For every compliance cycle, operators will need to offset and cancel a quantity of eligible emissions units corresponding to their offsetting requirements, as determined by the rules in Paragraph 11 of Assembly Resolution A39-3 (see chapter 3.2.2).

Administrating authorities will notify operators of their final offsetting requirements for each 3-year period by 30 November of the following year. Operators will, however, also be informed on an annual basis (also by 30 November) of the provisional offsetting requirements associated with each individual compliance year.

When an emissions unit is cancelled, it is taken out of circulation and becomes unavailable for any other uses. It is only if an emissions unit is cancelled for the purpose of compliance with CORSIA that it can be used to comply with offsetting requirements.

The deadline to complete the cancellation of the required number of units will be 31 January following the notification of the final offsetting requirements by the administrating authority. However, if the administrating authority were to notify the final offsetting requirements later than 30 November, the operator will have 60 days to complete the cancellation. Naturally, operators do not have to wait until they are notified of their final offsetting requirements to purchase and cancel emissions units and may do so before.

Information on the emissions units cancelled will need to be compiled in an “emissions unit cancellation report” and submitted to the administrating authority, after verification.

Compliance cycle	Notification of final offsetting requirements	Cancellation of emissions units	Submission of verified emissions unit cancellation report
2021-2023	By 30 November 2024	By 31 January 2025*	By 30 April 2025
2024-2026	By 30 November 2027	By 31 January 2028*	By 30 April 2028
2027-2029	By 30 November 2030	By 31 January 2031*	By 30 April 2031
2030-2032	By 30 November 2033	By 31 January 2034*	By 30 April 2034
2033-2035	By 30 November 2036	By 31 January 2037*	By 30 April 2037

** or, if the notification of final offsetting requirements occurs after 30 November, 60 days after the notification of the final offsetting requirements.*

5.1 Calculation of offsetting requirements

5.1.1. Determination of offsetting requirements

The offsetting requirements of an operator will be determined by its administrating authority in accordance with the formulas explained in chapter 3.2.2. The final offsetting requirements will however benefit from a reduction if an operator has used CORSIA eligible fuels that meet the applicable sustainability criteria (see 4.3.2).

5.1.2. Exemption for new entrants

Operators that commence operating international flights after 2019 ("new entrants") are exempt from offsetting requirements for 3 years. The 3-year "grace" period includes the year during which they started their operations. For example, if an operator starts operating international flights in 2024, it will be exempt from offsetting requirements in 2024, 2025 and 2026. It will be subject to offsetting requirements for its 2027 emissions onwards.

To be considered a "new entrant", the operations must not be, even partially, a continuation of the operations of another operator. For example, if an airline creates a new AOC for its regional flights and splits its network between the parent company and the new AOC, the new AOC would not be considered as a new entrant. Similarly, if an airline operating domestic flights only takes over the international flights of another airline it has merged with, this would likely not be a situation of a "new entrant".

5.1.3. CORSIA eligible fuels

The emissions reductions that an operator can claim from CORSIA eligible fuels will be proportional to the life cycle emissions benefits of the fuels used, compared to a reference value for jet fuel of 89 gCO2e/MJ.

For example, if an operator used 1,000 tonnes of sustainable aviation fuels with a life cycle emissions value of 20 gCO_2e/MJ, the corresponding emissions reduction would be:

$$\text{Emissions reduction} = 3.16 * 1000 * \left(1 - \frac{20}{89}\right)$$

where 3.16 (kg CO2/kg fuel) is the emissions factor for jet fuel and 89 (gCO2e/MJ), the default life cycle emissions value for conventional aviation fuel.

Default life cycle values for some CORSIA eligible fuels will be published by ICAO. An operator may however decide to use the actual life cycle emissions if a fuel producer can demonstrate lower lifecycle emissions than the default value, or if a fuel producer is using a pathway that does not have a default value. In order to do so, the operator will select an approved Sustainability Certification Scheme (SCS) from a list that will be included in an ICAO document entitled, "CORSIA Approved Sustainability Certification Schemes". The SCS will ensure that the methodology applied is approved for CORSIA. While ICAO will approve SCS, ICAO will not certify the CORSIA eligible fuels.

The emissions reductions will be deducted from the operator's total offsetting requirements at the end of each 3-year compliance period. The deduction can however only be claimed for the compliance period during which the CORSIA eligible fuel was blended.

5.2 CORSIA eligible emissions units

To meet their offsetting requirements, operators will have to purchase and cancel a quantity of "CORSIA eligible emissions units" corresponding to their final offsetting requirements. The ICAO Council will determine which emissions units are eligible for use under CORSIA.

The Council's decision will be informed by a recommendation from a Technical Advisory Body, to be set up, and by eligibility criteria approved by the Council. The list of eligible emissions units will be made public, on the ICAO website, through an ICAO Document entitled "CORSIA Eligible Emissions Units".

Assembly Resolution A39-3 stipulates that emissions units generated from mechanisms established under the UNFCCC and the Paris Agreement shall be eligible for use in CORSIA, provided that they align with decisions by the ICAO Council.

In addition to UNFCCC and Paris Agreement units, there are several offset standards which could offer high-quality offsets for international aviation and could be considered for CORSIA, including voluntary offset standards and REDD+.

Several standards were developed to provide companies and individuals wishing to offset their emissions on a voluntary basis the certainty that the offsets that they purchase are environmentally effective. Provided these standards meet ICAO's criteria, they could make high quality offsets available to aviation, often with co-benefits for biodiversity, employment, health and more.

Examples of offset certified under voluntary standards include those from wind energy, landfill methane, and smaller community-focused energy efficiency and clean cook stove projects.

To date, the ICAO Council has not adopted any decision on which emissions units are eligible for use under CORSIA. Operators can therefore not have any guarantee that an emission unit they may purchase now would be eligible for CORSIA. Caution should therefore be exercised by operators who may consider procuring emissions units prior to any decision of the ICAO Council.

Operators can purchase any eligible emissions unit and can therefore choose to privilege emissions units from projects hosted in their home state, in states they operate to or in developing countries.

5.2.1 Purchasing emissions units

Operators can purchase emissions units through different ways, including from:

- *Project developers*: an operator could purchase emissions units directly from the person or organization coordinating a carbon offset project;
- *Brokers*: as emissions units are intangible commodities traded in a market exchange, one common way to purchase emissions units is through a market trader or broker. Brokers will locate emissions units that respond to the operators' quantitative and qualitative requirements and introduce the buyer to the seller(s).
- *Aggregators*: aggregators will develop a carbon offset portfolio for their clients from a variety of projects.
- *Retailer/wholesale*: some organizations sell carbon offsets to the public in small or large quantities.

Offsets sold by project developers are often referred to as *primary* carbon credits, while *secondary* credits are traded by brokers and retailers on the carbon market. In principle, primary credits entail a higher risk as the contract is signed before the issuance of the credits. Secondary credits are traded after issuance.

As tradeable commodities, the price of emissions units can vary significantly depending on the characteristics of the emissions units, notably the type of project, the standard under which it is certified, and on market dynamics.

Operators will not need to apply the criteria to determine if emissions units are eligible. They will only need to ensure that the units they acquire are on the list of units determined as eligible by the ICAO Council.

5.2.2 Emissions Units Eligibility Criteria

The Emissions Units Eligibility Criteria guarantee that eligible emissions units deliver the desired CO_2 reductions. The criteria are based on principles commonly applied under existing trading mechanisms and certification schemes.

5.2.2.1 Additionality, permanence and leakage

A key requirement is that the CO_2 reduction or removal used as an offset be 'additional' to business-as-usual activity. Additionality addresses the question: "would the activity have occurred, holding all else constant, were the activity not be implemented as an offset project?" Or, in simpler terms "would the project have happened anyway?"

Offsets must also represent a permanent reduction of emissions that cannot be reversed. Similarly, an activity that generates offsets should not result in unintended increases in emissions elsewhere.

5.2.2.2 Baseline and quantification

To quantify the greenhouse gas reduction benefits from an offsetting project, a baseline must be determined. The baseline corresponds to what would have happened if the project had not been implemented. The baseline being a hypothetical scenario, it is important that it be realistic and credible. The emissions reductions calculated against the baseline be quantified using accurate measurements, valid protocols, and be externally audited.

5.2.2.3 No double-counting and traceability

Generally speaking, double counting occurs when an emissions reduction is counted more than once towards attaining climate change mitigation.

One type of double counting is double use. **Double use** occurs if the same emissions unit is used twice by the same operator to attain different mitigation requirements or pledges.

In contrast to double use, **double selling** (same emissions unit is used by two entities) and **double issuance** (more than one unit is issued for the same emission reduction) are within the control of emissions unit programs. **Double claiming** would occur if a country which hosts emissions unit programs were to count the reductions associated with units used for CORSIA towards its own mitigation pledges.

Emissions Units Programs will need to have procedures in place to ensure identification and tracking of units. They will also need to provide information on how they address risks of double-counting and demonstrate that host countries of emissions reduction activities do not include the respective reductions in their national greenhouse gas accounting. The Verification Body will need to make sure that the operator hasn't used the units cancelled for CORSIA to offset any other emissions.

5.2.2.4 Environmental and social risks

Emissions units programs will also need to have in place safeguards to address environmental and social risks and disclose how the sustainability criteria are satisfied.

5.3 Emissions units cancellation

5.3.1 Cancelling emissions units

In order to meet their offsetting requirements, it is important that operators "cancel" the required quantity of emissions units. When an emissions unit is cancelled, it is taken out of circulation and becomes unavailable for any other uses. It is only if an emissions unit is cancelled for the purpose of compliance with CORSIA that it can be used to comply with offsetting requirements.

The cancellation of an emissions unit will be reflected in a registry. Registries are databases which allow to keep track of emissions units and related transactions. Registries are notably important to minimize the risk of double-counting.

Operators will have to request that the registry in which its emissions units are cancelled publishes detailed information on the units cancelled. The information should include the quantity, serial numbers, the date of cancellation, the program, the unit type, the host country, the methodology, the demonstration of unit date eligibility, and the name of the operator in whose name the units were cancelled.

If an operator contracts a third party, such as a broker, to purchase its emissions units, it should ensure that there is clarity on whether the third party will also cancel the emissions units on its behalf. If the third party is responsible for cancelling the units, the operator should make sure that the third party is mandated to request the publication, by the registry, of the information related to the cancellation. It is important that the third party explicitly cancels the units on behalf of the operator.

5.3.2 Emissions unit cancellation report

The information on the emissions units cancelled by an operator will need to be compiled in an emissions unit cancellation report, for submission to the administrating authority after verification. Operators will have until 30 April following the notification of its final offsetting requirements to submit the verified report.

The emissions unit cancellation report will need to include information on the operator, the compliance period years reported, the total final offsetting requirements and the total quantity of emissions units cancelled. Detailed information for each batch of emissions units cancelled will also have to be provided: serial numbers; date of cancellation; eligible emissions unit program; unit type, host country, methodology, demonstration of unit date eligibility; registry name; identifier for the registry account to which the batch was cancelled; the name of the operator in whose name the units were cancelled; identifier for the registry account from which the cancellation was initiated.

Operators must not forget to request from the registry or third party cancelling the units on their behalf all the information which needs to be included in the emissions unit cancellation report.

Similar to the annual emissions reports, the emissions unit cancellation report will have to be verified by an independent verification body, which may be the same one as for the emissions report. The objective of the verification will be to ensure that the operator has accurately reported cancellations of eligible emissions units and that the number of emissions units cancelled is sufficient to meet the operator's final offsetting requirements. The verification will also aim to ensure that the emissions units have not been used to offset any other emissions.

6. Supporting information and documents to be published by ICAO

In order to facilitate and harmonize the implementation of CORSIA, supporting information and documents will be made available by ICAO on its website and will include reference materials such as:

- the list of state-pairs subject to offsetting requirements;
- sustainability criteria and sustainability certification schemes for CORSIA eligible fuels; and
- CORSIA eligible emissions units and eligibility criteria.

A CORSIA Central Registry will be established. The CORSIA Central Registry will serve as a database for the management and publication of information related to CORSIA, including the following:

- For each operator:
  - Total annual CO_2 emissions;
  - Total annual CO_2 emissions for state pairs subject to offsetting requirements;
  - Total annual CO_2 emissions for state-pairs not subject to offsetting requirements.
- Information aggregated at state level:
  - Total final offsetting requirements over each compliance period;
  - Total quantity of emissions units cancelled over the compliance period;
  - Consolidated information on the cancelled emissions units (eligible emissions unit program, unit type, host country, methodology and program-designated registry name).

Information on sustainable aviation fuels claimed under CORSIA will also be included in the CORSIA Central Registry.

Annex 1: ICAO Assembly Resolution A39-3

Consolidated statement of continuing ICAO policies and practices related to environmental protection – Global Market-based Measure (MBM) scheme

Whereas Assembly Resolution A38-18 decided to develop a global market-based measure (GMBM) scheme for international aviation, for decision by the 39th Session of the Assembly;

Recalling that Assembly Resolution A38-18 requested the Council, with the support of Member States, to finalize the work on the technical aspects, environmental and economic impacts and modalities of the possible options for a GMBM scheme, including on its feasibility and practicability, taking into account the need for development of international aviation, the proposal of the aviation industry and other international developments, as appropriate, and without prejudice to the negotiations under the UNFCCC;

Also recalling that Assembly Resolution A38-18 requested the Council, with the support of Member States, to identify the major issues and problems, including for Member States, and make a recommendation on a GMBM scheme that appropriately addresses them and key design elements, including a means to take into account special circumstances and respective capabilities, and the mechanisms for the implementation of the scheme from 2020 as part of a basket of measures which also include technologies, operational improvements and sustainable alternative fuels to achieve ICAO's global aspirational goals;

Recognizing that ICAO is the appropriate forum to address emissions from international aviation, and the significant amount of work undertaken by the Council, its Environment Advisory Group (EAG) and its Committee on Aviation Environmental Protection (CAEP) to develop a recommendation for a GMBM scheme and its design elements and implementation mechanisms, including the analyses of various approaches for distribution of obligations;

Further recalling that Assembly Resolution A38-18 requested the Council, with the support of Member States, to organize seminars, workshops on a GMBM scheme for international aviation participated by officials and experts of Member States as well as relevant organizations;

Recognizing the convening of two rounds of Global Aviation Dialogues (GLADs) seminars held in 2015 and 2016 for all regions;

Noting the support of the aviation industry for a single global carbon offsetting scheme, as opposed to a patchwork of State and regional MBMs, as a cost effective measure to complement a broader package of measures including technology, operations and infrastructure measures;

Recognizing that MBMs should not be duplicative and international aviation CO_2 emissions should be accounted for only once;

Emphasizing that the decision by the 38th Session of the Assembly to develop a global MBM scheme for international aviation reflects the strong support of Member States for a global solution for the international aviation industry, as opposed to a possible patchwork of State and regional MBMs;

Reaffirming the concern with the use of international civil aviation as a potential source for the mobilization of revenue for climate finance to the other sectors, and that MBMs should ensure the fair treatment of the international aviation sector in relation to other sectors;

Recalling the UNFCCC and the Paris Agreement and *acknowledging* its principle of common but differentiated responsibilities and respective capabilities, in light of different national circumstances;

Also acknowledging the principles of non-discrimination and equal and fair opportunities to develop international aviation set forth in the Chicago Convention;

Welcoming the adoption of the Paris Agreement under the UNFCCC and *recognizing* that the work related to a global MBM scheme for international aviation and its implementation will contribute to the achievement of the goals set out in the Paris Agreement;

Whereas the UNFCCC and the Paris Agreement provide for mechanisms, such as the Clean Development Mechanism (CDM) and a new market mechanism under the Paris Agreement, to contribute to the mitigation of GHG emissions to support sustainable development, which benefit developing States in particular;

Welcoming the cooperation between the United Nations Framework Convention on Climate Change (UNFCCC) and ICAO on the development of CDM methodologies for aviation;

Recognizing that this Resolution does not set a precedent for or prejudge the outcome of negotiations under the UNFCCC, the Paris Agreement, or other international agreements, nor represent the position of the Parties to the UNFCCC, the Paris Agreement, or other international agreements;

The Assembly:

1. Resolves that this Resolution, together with Resolution A39-1: Consolidated statement of continuing ICAO policies and practices related to environmental protection - General provisions, noise and local air quality and Resolution A39-2: Consolidated statement of continuing ICAO policies and practices related to environmental protection – Climate change, supersede Resolutions A38-17 and A38-18 and constitute the consolidated statement of continuing ICAO policies and practices related to environmental protection;

2. *Acknowledges* the progress achieved on all elements of the basket of measures available to address CO_2 emissions from international aviation, including aircraft technologies, operational improvements, sustainable alternative fuels and a GMBM scheme and any other measures, and *affirms* the preference for the use of aircraft technologies, operational improvements and sustainable alternative fuels that provide the environmental benefits within the aviation sector;

3. *Also acknowledges* that, despite this progress, the environmental benefits from aircraft technologies, operational improvements and sustainable alternative fuels may not deliver sufficient CO_2 emissions reductions to address the growth of international air traffic, in time to achieve the global aspirational goal of keeping the global net CO_2 emissions from international aviation from 2020 at the same level;

4. *Emphasizes* the role of a GMBM scheme to complement a broader package of measures to achieve the global aspirational goal, without imposing inappropriate economic burden on international aviation;

5. *Decides* to implement a GMBM scheme in the form of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) to address any annual increase in total CO_2 emissions from international civil aviation (i.e. civil aviation flights that depart in one country and arrive in a different country) above the 2020 levels, taking into account special circumstances and respective capabilities;

6. *Requests* the Council to continue to ensure all efforts to make further progress on aircraft technologies, operational improvements and sustainable alternative fuels be taken by Member States and reflected in their action plans to address CO_2 emissions from international aviation, and to monitor and report the progress on implementation of action plans, and that a methodology should be developed to ensure that an aircraft operator's offsetting requirements under the scheme in a given year can be reduced through the use of sustainable alternative fuels, so that all elements of the basket of measures are reflected;

7. *Request* the Council to continuously monitor the implementation of all elements of the basket of measures, and consider the necessary policies and actions to ensure that progress is achieved in all of the elements in a balanced way with an increasing percentage of emissions reductions accruing from non-MBM measures over time;

8. *Acknowledges* special circumstances and respective capabilities of States, in particular developing States, in terms of vulnerability to the impacts of climate change, economic development levels, and contributions to international aviation emissions, among other things, while minimizing market distortion;

9. *Decides* the use of a phased implementation for the CORSIA to accommodate the special circumstances and respective capabilities of States, in particular developing States, while minimizing market distortion, as follows:

a) Pilot phase applies from 2021 through 2023 to States that have volunteered to participate in the scheme. States participating in this phase may determine the basis of their aircraft operator's offsetting requirements from paragraph 11 e) i) below;

b) First phase applies from 2024 through 2026 to States that voluntarily participate in the pilot phase, as well as any other States that volunteer to participate in this phase, with the calculation of offsetting requirements in paragraph 11 a) below;

c) All States are strongly encouraged to voluntarily participate in the pilot phase and the first phase, noting that developed States, which have already volunteered, are taking the lead, and that several other States have also volunteered;

d) The Secretariat will make public on the ICAO website updated information on the States that volunteered to participate in the pilot phase and first phase;

e) Second phase applies from 2027 through 2035 to all States that have an individual share of international aviation activities in RTKs in year 2018 above 0.5 per cent of total RTKs or whose cumulative share in the list of States from the highest to the lowest amount of RTKs reaches 90 per cent of total RTKs, except Least Developed Countries (LDCs), Small Island Developing States (SIDS) and Landlocked Developing Countries (LLDCs) unless they volunteer to participate in this phase;

f) States that are exempted or have not yet participated are strongly encouraged to voluntarily participate in the scheme as early as possible, in particular those States that are members of a regional economic integration organization. States who decide to voluntarily participate in the scheme, or decide to discontinue the voluntary participation from the scheme, may only do so from 1 January in any given year and they shall notify ICAO of their decision by no later than 30 June of the preceding year;

g) Starting in 2022, the Council will conduct a review of the implementation of the CORSIA every three years, including its impact on the growth of international aviation, which serves as an important basis for the Council to consider whether it is necessary to make adjustments to the next phase or compliance cycle and, as appropriate, to recommend such adjustments to the Assembly for its decision;

10. *Decides* that the CORSIA shall apply to all aircraft operators on the same routes between States with a view to minimizing market distortion, as follows:

a) all international flights on the routes between States, both of which are included in the CORSIA by paragraph 9 above, are covered by the offsetting requirements of the CORSIA;

b) all international flights on the routes between a State that is included in the CORSIA and another State that is not included in the CORSIA by paragraph 9 above are exempted from the offsetting requirements of the CORSIA, while retaining simplified reporting requirements; and

c) all international flights on the routes between States, both of which are not included in the CORSIA by paragraph 9 above, are exempted from the offsetting requirements of the CORSIA, while retaining simplified reporting requirements;

11. *Decides* that the amount of CO_2 emissions required to be offset by an aircraft operator in a given year from 2021 is calculated every year as follows:

a) an aircraft operator's offset requirement = [% Sectoral × (an aircraft operator's emissions covered by CORSIA in a given year × the sector's growth factor in the given year)] + [% Individual × (an aircraft operator's emissions covered by CORSIA in a given year × that aircraft operator's growth factor in the given year);

b) where the sector's growth factor = (total emissions covered by CORSIA in the given year – average of total emissions covered by CORSIA between 2019 and 2020) / total emissions covered by CORSIA in the given year;

c) where the aircraft operator's growth factor = (the aircraft operator's total emissions covered by CORSIA in the given year – average of the aircraft operator's emissions covered by CORSIA between 2019 and 2020) / the aircraft operator's total emissions covered by CORSIA in the given year;

d) where the % Sectoral = (100% – % Individual) and;

e) where the % Sectoral and % Individual will be applied as follows:

i) from 2021 through 2023, 100% sectoral and 0% individual, though each participating State may choose during this pilot phase whether to apply this to:

a) an aircraft operator's emissions covered by CORSIA in a given year, as stated above, or
b) an aircraft operator's emissions covered by CORSIA in 2020;

ii) from 2024 through 2026, 100 % sectoral and 0% individual;

iii) from 2027 through 2029, 100 % sectoral and 0% individual;

iv) from 2030 through 2032, at least 20% individual, with the Council recommending to the Assembly in 2028 whether and to what extent to adjust the individual percentage;

v) from 2033 through 2035, at least 70% individual, with the Council recommending to the Assembly in 2028 whether and to what extent to adjust the individual percentage;

f) the aircraft operator's emissions and the total emissions covered by CORSIA in the given year do not include emissions exempted from the scheme in that year;

g) the scope of emissions in paragraphs 11 b) and 11 c) above will be recalculated at the start of each year to take into account routes to and from all States that will be added due to their voluntary participation or the start of a new phase or compliance cycle;

12. *Decides* that a new entrant[5] is exempted from the application of the CORSIA for three years or until the year in which its annual emissions exceed 0.1 per cent of total emissions in 2020, whichever occurs earlier. From the subsequent year, the new entrant is included in the scheme and treated in the same way as the other aircraft operators.

13. *Decides* that, notwithstanding with the provisions above, the CORSIA does not apply to low levels of international aviation activity with a view to avoiding administrative burden: aircraft operators emitting less than 10,000 metric tonnes of CO_2 emissions from international aviation per year; aircraft with less than 5,700 kg of Maximum Take Off Mass (MTOM); or humanitarian, medical and firefighting operations;

14. *Decides* that the emissions that are not covered by the scheme, as the results of phased implementation and exemptions, are not assigned as offsetting requirements of any aircraft operators included in the scheme;

15. *Notes* the work of the Council, with the technical contribution of CAEP, on: a) the monitoring, reporting and verification (MRV) system; b) recommended criteria for emissions units to be purchased by aircraft operators that take into account developments in the UNFCCC process; c) and registries under the CORSIA, and *requests* the Council, with the technical contribution of CAEP, to complete its work as soon as possible

[5] A new entrant is defined as any aircraft operator that commences an aviation activity falling within the scope of the scheme on or after its entry into force and whose activity is not in whole or in part a continuation of an aviation activity previously performed by another aircraft operator.

including the provision of capacity building and assistance, so as to enable the full implementation of the CORSIA from 2020;

16. *Decides* a three year compliance cycle, starting with the first cycle from 2021 to 2023, for aircraft operators to reconcile their offsetting requirements under the scheme, while they report the required data to the authority designated by the aircraft operator's State of registry every year;

17. *Decides* on the need to provide for safeguards in the CORSIA to ensure the sustainable development of the international aviation sector and against inappropriate economic burden on international aviation, and *requests* the Council to decide the basis and criteria for triggering such action and identify possible means to address these issues*;*

18. *Decides* that a periodic review of the CORSIA is undertaken by the Council, for consideration by the Assembly, every three years from 2022 for the purpose referred to in paragraph 9 g) above and to contribute to the sustainable development of the international aviation sector and the effectiveness of the scheme. This will involve, inter alia:

a) assessment of: progress towards achieving the ICAO's global aspirational goal; the scheme's market and cost impact on States and aircraft operators and on international aviation; and the functioning of the scheme's design elements;

b) consideration of the scheme's improvements that would support the purpose of the Paris Agreement, in particular its long-term temperature goals; and update the scheme's design elements to improve implementation, increase effectiveness, and minimize market distortion, taking into account the consequential impact of changing the scheme's design elements, e.g., to MRV requirements; and

c) a special review by the end of 2032 on termination of the scheme, its extension or any other improvements of the scheme beyond 2035, including consideration of the contribution made by aircraft technologies, operational improvements and sustainable alternative fuels towards achieving the ICAO's environmental objectives;

19. *Determines* that the CORSIA or any other scheme decided by the Assembly is to be the market- based measure applying to CO_2 emissions from international aviation;

20. *Requests* the following actions be taken, with a view to establishing necessary mechanisms for implementation of the CORSIA from 2020:

Regarding the implementation of the MRV system,

a) the Council to develop, with the technical contribution of CAEP, the SARPs and related guidance material for the implementation of the MRV system under the CORSIA, including simplified MRV procedures, for adoption by the Council by 2018;

b) all Member States whose aircraft operator undertakes international flights to develop the necessary arrangements, in accordance with the MRV SARPs, for implementation from 1 January 2019;

Regarding the Emissions Unit Criteria (EUC),

c) the Council to develop, with the technical contribution of CAEP, the SARPs and related guidance material for Emissions Unit Criteria (EUC) to support the purchase of appropriate emissions units by aircraft operators under the scheme, taking into account relevant developments in the UNFCCC and Article 6 of the Paris Agreement, for adoption by the Council as soon as possible but not later than 2018;

d) the Council to establish, with the technical contribution of CAEP, a standing technical advisory body on the Emissions Unit Criteria (EUC) to make recommendations to the Council on the eligible emissions units for use by the CORSIA;

e) the Council, with the technical contribution of CAEP, to periodically review the EUC SARPs and related guidance material, as appropriate, to promote compatibility with future relevant decisions under the Paris Agreement;

Regarding the establishment of Registries,

f) the Council to develop, with the technical contribution of CAEP, policies and related guidance material to support the establishment of registries under the scheme, for adoption by the Council by 2018;

g) the Council to establish a consolidated central registry under the auspices of ICAO, for operationalization no later than 1 January 2021;

h) Member States to develop necessary arrangements for the establishment of their own registries or group registries established by groups of States, or to arrange for participation in other registries, in accordance with the ICAO guidance;

Regarding the governance of the CORSIA,

i) the Council to oversee the functioning of the CORSIA, with support provided by the standing technical advisory body and CAEP as needed;

Regarding the regulatory framework,

j) Member States to take necessary action to ensure that the necessary national policies and regulatory framework be established for the compliance and enforcement of the scheme by 2020.

21. *Decides* that emissions units generated from mechanisms established under the UNFCCC and the Paris Agreement are eligible for use in CORSIA, provided that they align with decisions by the Council, with the technical contribution of CAEP, including on avoiding double counting and on eligible vintage and timeframe;

22. *Decides* that ICAO and Member States take all necessary actions in providing the capacity building and assistance and building partnerships for implementation of the CORSIA from 2020, including:

Regarding the implementation of the MRV system,

a) the Council to take necessary action to expand the provision of capacity building and assistance for the preparation and implementation on Member States' action plans, in order to accommodate capacity building and assistance for implementation of the MRV system by Member States from 1 January 2019, including organization of seminars and training in all regions from 2017, and facilitation of financial support where needed, in particular for those States that volunteer to participate in the pilot phase and require support to do so;

b) Member States to build partnerships among themselves to cooperate on the implementation of the MRV system;

Regarding the establishment of Registries,

c) the Council to take necessary action to expand the provision of capacity building and assistance for the preparation and implementation on Member States' action plans, in order to accommodate capacity building and assistance for establishment of registries by States, including organization of seminars and training in all regions from 2017, and facilitation of financial support where needed, in particular for those States that volunteer to participate in the pilot phase and require support to do so;

d) Member States to build partnerships among themselves to cooperate on the establishment of their own registries or group registries established by groups of States, and possible pilot implementation;

23. *Decides* that the CORSIA will use emissions units that meet the Emissions Unit Criteria (EUC) in paragraph 20 above;

24. *Requests* the Council to promote the use of emissions units generated that benefit developing States, and *encourages* States to develop domestic aviation-related projects;

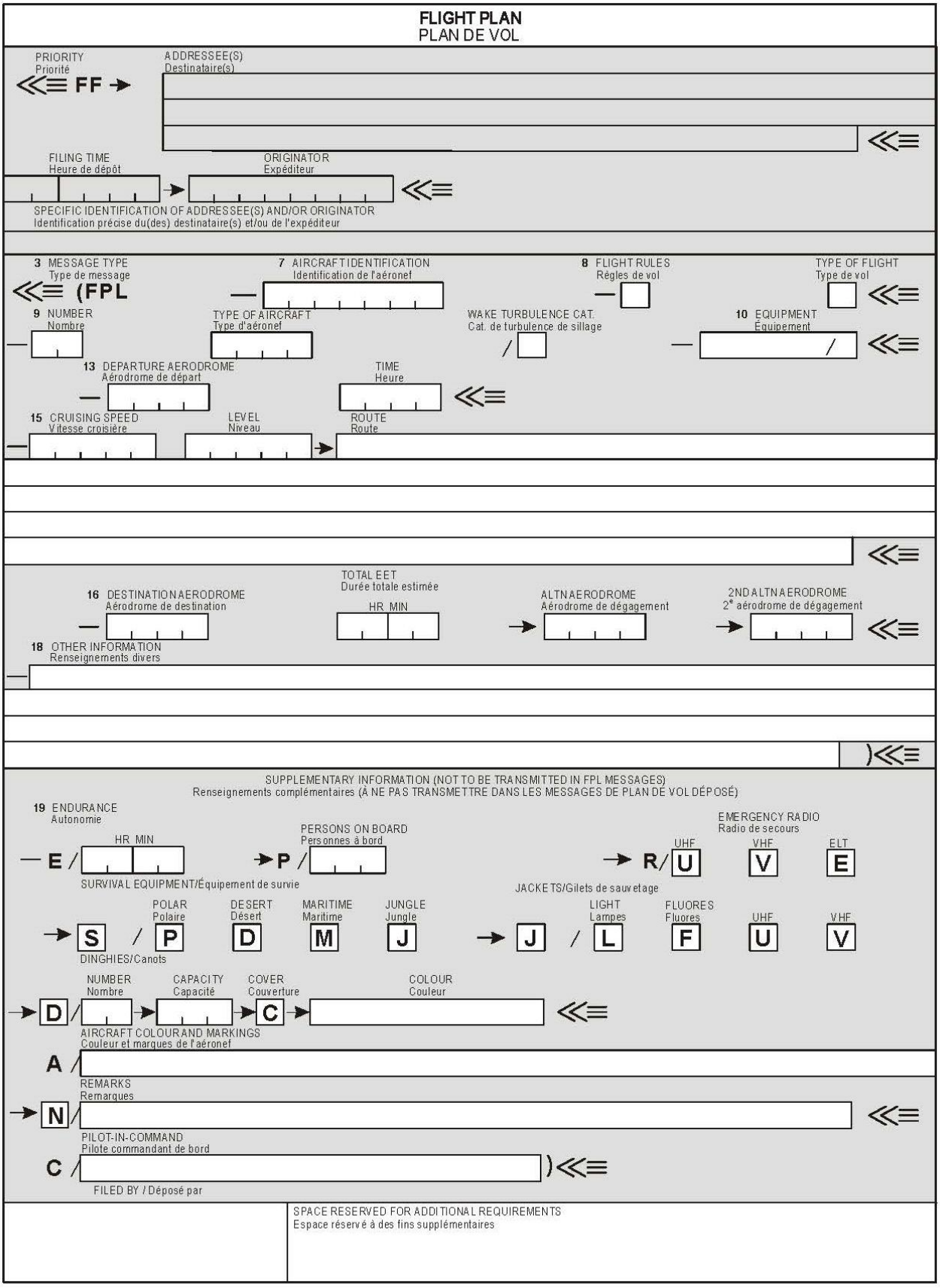
25. *Requests* the Council to explore further development of aviation-related methodologies for use in offsetting programmes, including mechanisms or other programmes under the UNFCCC, and *encourages* States to use such methodologies in taking actions to reduce aviation CO_2 emissions, which could further enable the use of credits generated from the implementation of such programmes by the CORSIA, without double-counting of emissions reduction;

Annex 2: List of volunteering states, as of 15 November 2018

The most up-to-date version of this list is available on the ICAO website.

1. Albania
2. Armenia
3. Australia
4. Austria
5. Azerbaijan
6. Belgium
7. Bosnia and Herzegovina
8. Botswana
9. Bulgaria
10. Burkina Faso
11. Cameroon
12. Canada
13. Costa Rica
14. Croatia
15. Cyprus
16. Czech Republic
17. Denmark
18. Dominican Republic
19. El Salvador
20. Equatorial Guinea
21. Estonia
22. Finland
23. France
24. Gabon
25. Georgia
26. Germany
27. Greece
28. Guatemala
29. Guyana
30. Hungary
31. Iceland
32. Indonesia
33. Ireland
34. Israel
35. Italy
36. Jamaica
37. Japan
38. Kenya
39. Latvia
40. Lithuania
41. Luxembourg
42. Macedonia (The Former Yugoslav Republic of)
43. Malaysia
44. Malta
45. Marshall Islands
46. Mexico
47. Monaco
48. Montenegro
49. Namibia
50. Netherlands
51. New Zealand
52. Nigeria
53. Norway
54. Papua New Guinea
55. Poland
56. Portugal
57. Qatar
58. Republic of Korea
59. Republic of Moldova
60. Romania
61. San Marino
62. Saudi Arabia
63. Serbia
64. Singapore
65. Slovakia
66. Slovenia
67. Spain
68. Sweden
69. Switzerland
70. Thailand
71. Turkey
72. Ukraine
73. United Arab Emirates
74. United Kingdom
75. United States
76. Zambia

Annex 3: ICAO Model Flight Plan Form (from ICAO Doc 4444)



Annex 4: Examples of ICAO aircraft type designators[6]

Manufacturer	Model	ICAO designator
Airbus	A300-B2/B4-200/C4-200/F4-200	A30B
Airbus	A300-600	A306
Airbus	A310-200/-300	A310
Airbus	A318	A318
Airbus	A319	A319
Airbus	A320	A320
Airbus	A320 Neo	A20N
Airbus	A321	A321
Airbus	A321 Neo	A21N
Airbus	A330-200	A332
Airbus	A330-300	A333
Airbus	A340-200	A342
Airbus	A340-300	A343
Airbus	A340-500	A345
Airbus	A340-600	A346
Airbus	A350-1000	A35K
Airbus	A350-900	A359
Airbus	A380-800	A388
Antonov	An-140	A140
Antonov	An-148	A148
Antonov	An-158	A158
Antonov	An-24	AN24
Antonov	An-26	AN26
Antonov	An-28	AN28
Antonov	An-32	AN32
Antonov	An-38	AN38
Antonov	An-74-300	A743
ATR	ATR-42-300	AT43
ATR	ATR-42-400	AT44
ATR	ATR-42-500	AT45
ATR	ATR-42-600	AT46
ATR	ATR-72-201	AT72
ATR	ATR-72-211	AT73

Manufacturer	Model	ICAO designator
ATR	ATR-72-500	AT75
ATR	ATR-72-600	AT76
Beech	1900/1900C/1900D	B190
Boeing	717-200	B712
Boeing	727-200	B722
Boeing	737 Max 8	B38M
Boeing	737-200	B732
Boeing	737-300	B733
Boeing	737-400	B734
Boeing	737-500	B735
Boeing	737-600	B736
Boeing	737-700	B737
Boeing	737-800	B738
Boeing	737-900	B739
Boeing	747-200	B742
Boeing	747-300	B743
Boeing	747-400	B744
Boeing	747-400 (domestic, no winglets)	B74D
Boeing	747-8i	B748
Boeing	747-8i Freighter	B748
Boeing	757-200	B752
Boeing	757-300	B753
Boeing	767-200	B762
Boeing	767-300	B763
Boeing	767-400	B764
Boeing	777-200	B772
Boeing	777-200LR	B77L
Boeing	777-300	B773
Boeing	777-300ER	B77W
Boeing	787-10 Dreamliner	B78X
Boeing	787-8 Dreamliner	B788
Boeing	787-9 Dreamliner	B789
Boeing	DC-10 / MD-10	DC10

[6] The table only includes common aircraft type used by airlines. The full list of aircraft type designators is contained in ICAO Doc 8643 and can be consulted at: www.icao.int/publications/DOC8643

Manufacturer	Model	ICAO designator
Boeing	MD-11	MD11
Boeing	MD-81	MD81
Boeing	MD-82	MD82
Boeing	MD-83	MD83
Boeing	MD-87	MD87
Boeing	MD-88	MD88
Boeing	MD-90	MD90
Bombardier	Cseries CS100	BCS1
Bombardier	Cseries CS300	BCS3
British Aerospace	Advanced Turbo-Prop	ATP
British Aerospace	Avro RJ100	RJ1H
British Aerospace	Avro RJ70	RJ70
British Aerospace	Avro RJ85	RJ85
British Aerospace	BAe-146-100	B461
British Aerospace	BAe-146-200	B462
British Aerospace	BAe-146-300	B463
British Aerospace	BAe-3100 Jetstream 31	JS31
British Aerospace	BAe-3200 Jetstream Super 31	JS32
British Aerospace	BAe-4100 Jetstream 41	JS41
Canadair	CRJ 100	CRJ1
Canadair	CRJ 1000	CRJX
Canadair	CRJ 200	CRJ2
Canadair	CRJ 700	CRJ7
Canadair	CRJ 900	CRJ9
De Havilland	CC-138 Twin Otter	DHC6
De Havilland	CC-142 Dash 8	DH8A
De Havilland	Dash 7	DHC7
De Havilland	Dash 8-200	DH8B
De Havilland	Dash 8-300	DH8C
De Havilland	Dash 8-400	DH8D
Dornier	328 Jet	J328
Dornier	228	D228
Dornier	328	D328

Manufacturer	Model	ICAO designator
Douglas	DC-9-10	DC91
Douglas	DC-9-20	DC92
Douglas	DC-9-30	DC93
Douglas	DC-9-40	DC94
Douglas	DC-9-50	DC95
Embraer	EMB 110	E110
Embraer	EMB 120 Brasilia	E120
Embraer	EMB 170	E170
Embraer	EMB 175 (long wing)	E75L
Embraer	EMB 175 (short wing)	E75S
Embraer	EMB 190	E190
Embraer	EMB 195	E195
Embraer	ERJ 135	E135
Embraer	ERJ 145	E145
Fairchild-Swearingen	Merlin	SW2
Fokker	50	F50
Fokker	70	F70
Fokker	100	F100
Fokker	27 Frienship	F27
Fokker	28 Feollowship	F28
Hawker Siddeley	HS.748	A748
Ilyushin	Il-114	I114
Ilyushin	Il-62	IL62
Ilyushin	Il-86	IL86
Ilyushin	Il-96	IL96
Let	Let 410	L410
Mitsubishi	MRJ-90	MRJ9
Saab	340	SF34
Saab	2000	SB20
Short	Short 330	SH33
Short	Short 360	SH36
Sukhoi	Superjet 95/100	SU95
Tupolev	Tu-134	T134
Tupolev	Tu-154	T154
Tupolev	Tu-204 / Tu-214	T204
Yakovlev	Yak-40	YK40
Yakovlev	Yak-42	YK42

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