Annual data gathering exercise
of fuel-burn samples
from volunteer aircraft operators

A) Why fuel and CO_2 emissions model for every aircraft type are needed

In the past years many Aircraft Operators (**AOs**) have provided to EUROCONTROL, on a voluntary basis, the fuel burn monitored for samples of their flights. This valuable data was provided to contribute to the maintenance and evolution of the aircraft emissions models contained within EUROCONTROL's "Small Emitters Tool" (**SET**). Initially intended to be used by small emitters (less than 10kt CO_2 per year), the SET is now used more widely as explained below by many other AOs and actors in the European Union Emission Trading Scheme (**EU-ETS**).

The CO_2 emissions models defined in the SET, one per aircraft type according to International Civil Aviation Organization (**ICAO**) types in Doc 8643, are directly derived from the statistics that are based on the gathered fuel burn data.

Approved on 9 July 2010 by the Commission Regulation (EU No 606/2010), the SET has since been updated on an annual basis in order to represent as accurately as possible aircraft standard operations. This has been possible thanks to the voluntary contributions of AOs.

Emissions models for every aircraft type are keystones of the EU-ETS and of the EUROCONTROL Support Facility (ETSSF) used by AOs as well as by Competent Authorities in their MRV activities (CO_2 Monitoring, Reporting and Verification).

Emission models are also developed under the ICAO Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) to support both airlines and states in their MRV activities as explained below.

1. Aviation Emissions Models for the EU-ETS

The SET is a freely available standalone Excel CO_2 emissions calculator that is updated each year by EUROCONTROL since 2010. It can be downloaded free of charge from EUROCONTROL's small-emitters-tool related website.

The SET is also the CO_2 emissions computing element in EUROCONTROL's ETS Support Facility (ETSSF) which is a set of web applications accessible to AOs, to Verifiers and also to States' Competent Authorities for supporting and assisting them in their respective reporting duties.

The SET is a key element for estimating and reporting aviation emissions at all levels in the EU-ETS regulation, and is used by all concerned parties. EUROCONTROL is responsible for the annual update of the SET in the EU-ETS context.

The SET is capable of estimating accurately the CO_2 emissions (and fuel burn) for one single flight. It doesn't compute emissions per flight phases (take-off, en-route etc..), it computes total

emissions of one flight based on the aircraft type used for that one flight and on the best available estimate of the flight's flown distance.

2. Aviation Emissions Models for CORSIA

At its 39th General Assembly, ICAO adopted resolution A39-3 for CORSIA, a worldwide market based measure aimed at complementing a broader basket of measures to achieve the global aspirational goal of carbon-neutral growth from 2020 onwards (see **ICAO CORSIA**).

The design and implementation of CORSIA is supported by ICAO's Committee on Aviation Environmental Protection (**CAEP**). Due to its experience with the EU ETS, EUROCONTROL is actively supporting its Member States and the European Commission in the technical work of CAEP on CORSIA.

A tool called "ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT)" has been developed for, and made available to, aeroplane operators and States to support the monitoring and reporting of the CO_2 emissions relevant to CORSIA (see CORSIA CERT). The approach and methodology used to develop the CERT underlying fuel burn and CO_2 emissions estimator models (CEMs) is similar to the one successfully used for the SET. In particular, an **anonymised** flight and fuel burn database referred to as the "CORSIA CO_2 Emissions Estimation Tool Input Database" has been established under CAEP The objective of this database is to allow the development of aircraft type specific CEMs to be used by the CERT. Two types of models are being developed:

- a model providing fuel burn and CO_2 emissions as a function of aircraft type (at present the ICAO designator of the aircraft type) and great circle distance between two aerodromes;
- a model providing fuel burn and CO_2 emissions as a function of aircraft type (at present the ICAO designator of the aircraft type) and block time of a flight.

B)   Data expected from AOs

1. Fuel-burn data samples and flight operations

Actual fuel-burn data should be provided to EUROCONTROL by AOs on a flight-by-flight basis. Such individual flight records are normally easily available from AOs' post flight databases.

Time representativeness

It is important to have a representative set of flight information which covers at least one month of summer operations and one month of winter operations.

Should it be simpler for an AO, a full year of traffic data may also be provided by it. EUROCONTROL shall then ensure appropriate filtering to use the recommended set of data required for both the EU-ETS SET or for the CORSIA CERT.

Geographical coverage

Flights from and to all worldwide destinations are welcomed; no geographical restrictions should be applied while providing your data.

Note: for the update of the EU-ETS SET aircraft models only traffic falling in the EU-ETS full scope will be used by EUROCONTROL independently of the nationality of the aircraft operator (all operators are thus invited to provide such traffic). For the update of ICAO's CORSIA CERT

CEMs, only traffic from European aircraft operators will be used by EUROCONTROL (European operators are thus invited to provide worldwide traffic).

2. File format for individual flight records

The data to be submitted to EUROCONTROL should preferably be provided in a Microsoft Excel file or in a comma-separated value text file (csv).

Some fields are of importance for the SET in the EU-ETS and some others for CORSIA. See in the **Annex** a table that explains the scope (EU-ETS or CORSIA) that will make use of each field.

The following **fields** must be present in the data file preferably in the following order so as to facilitate their integration and further processing by EUROCONTROL:

Field 1: **FLIGHT PLAN FIELD 7 (the CALL SIGN)**
The value appearing in field 7 of the flight plan for the flight (field 7's content is either the aircraft operator 3-letter ICAO designator followed by up to 4 alphanumeric characters or the aircraft registration markings)

- Field 2: **ADEP**
4-letter code ICAO designator of Airport of Departure

- Field 3: **ADES**
4-letter code **ICAO designator of Airport of Destination**

- Field 4: **Aircraft type**
  - **Aircraft type designator** in accordance with ICAO Doc 8643

- Field 5: **Fuel burn**
The fuel burn monitored for the concerned flight in kilograms

- Field 6: **Block-off date and time**
Any time, in UTC (Coordinate Universal Time) between last door closed and first engine on. Any deviation to this definition should be explained with a separate explanatory note in order to precise to which operational moment the date and time correspond to

  o format: yyyy-mm-dd hh24:mm

- Field 7: **Block-on date and time**
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Any time, in UTC (Coordinate Universal Time) between last engine out and first door open. Any deviation to this definition should be explained with a separate explanatory note in order to precise to which operational moment the date and time correspond to.
NOTE: this field is not mandatory but recommended for use in the CERT CEMs block time based models.
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  o format: yyyy-mm-dd hh24:mm

- Field 8: **Block times conformity flag**

   "Yes" or "Y" to confirm that block times provided in fields 6 and 7 are conform to the block time definitions stated above, "No" or "N" otherwise (see important note below).

- Field 9 : **Fuel Monitoring Method**

   The method used for monitoring the reported fuel consumption amongst the following values:

   o "Method A" text if fuel tanks measurements are taken immediately after fuel uplifts of two consecutive flights/legs,

   o "Method B" text if fuel tanks measurements are taken immediately after block-on at the end of each flight of two consecutive flights/legs,

   o "Block-off / Block-on" text if fuel is the difference of the fuel before take-off with the fuel after landing (no APU) of the same flight,

   o Other text values, please provide explanation in a separate document if needed.

- Field 10 : **Any Comments**

IMPORTANT NOTES

1. It has been noted from past data submissions that the (time) values in field 6 and field 7 for "block-off" and "block-on" (also referred as "off-block" or "on-block") do not conform to the definitions given above.

   It may also occur that the meaning of these times varies from one aircraft type to another (different login protocols or on-board fuel monitoring systems), hence the importance to indicate for each flight if the values conform to the given definitions.

2. Data in fields 6 and Field 7 which do not conform to the definitions given above may still be provided.

   In cases where the provided block times deviate from the given definitions (with "NO" or "N" in field 8), it is necessary to explain in a short text/document to be sent together with the data file what is the correct meaning and interpretation of the time values submitted in field 6 and field 7.

3. It is very important to provide both the block-off and block-on values in UTC (Coordinated Universal Time):

   - Block-off is required for the SET as it is needed by EUROCONTROL to identify in its systems the specific flight and to further compute for it the best estimate of the actual flown distance based on the flight's radar-based trajectory as known to

EUROCONTROL. In case block-off is missing or not usable, the flight cannot be used to build the SET.

- Block-off and block-on are necessary to compute the flight's block time required for the CERT's block-time based CEMs in CORSIA. In case either of the two values is missing or not usable, the flight cannot be used to build the related block-time based CEMs.

Example of Excel (or CSV) records file expected:

file format in Excel (or CSV)

ATC CALL SIGN	ADEP	ADES	AICRAFT TYPE	TOTAL FLIGHT FUEL BURN IN KG	OFF-BLOCKS DATE and TIME UTC	ON-BLOCKS DATE and TIME UTC	BLOCK TIMES CONFORM TO DEFINITIONS	Method used for calculating fuel consumption	Comments
ABC1234	LFPG	LFBO	A310	6640	01-11-2016 00:04	01-11-2016 01:04	YES	Method A	
N123456	EBBR	LFBO	A319	5225	02-09-2016 10:04	02-09-2016 11:04	YES	Method B	

C)   Contact persons and date for data submission

All data and files must be sent to ets.info@eurocontrol.int.

Data received by EUROCONTROL by 1st November 2018 shall be considered in the development of the SET for 2018 and CERT for 2019. Data received later may also be used, and shall be used for the development of future versions of the SET and CERT.

Please send any technical questions to ets.info@eurocontrol.int or contact by phone at +32 2 729 33 74.

D) Data fields need and usage for EU ETS' SET and ICAO's CORSIA CERT

Function for which the identified fields are necessary	Field 1 ATC CALL SIGN	Field 2 ADEP	Field 3 ADES	Field 4 AICRAFT TYPE	Field 5 TOTAL FLIGHT FUEL BURN IN KG	Field 6 BLOCK-OFF DATE and TIME UTC	Field 7 BLOCK-ON DATE and TIME UTC	Field 8 Block times conform to definitions	Field 9 Method used for monitoring the reported fuel consumption
EU ETS (SET)									
Determine if the flight is within the full scope of the EU ETS		X	X						
Determine whether or not the monitored fuel burn can be used.									X
Identify the related flight in EUROCONTROL's systems to calculate the best estimate of its actual route length	X	X	X	X		X			
Compute the Great Circle Distance		X	X						
Determine for which aircraft type model the flight data will be used				X					
Use, together with the best estimate of the actual route length, in the aircraft type model development				X	X				X
ICAO CORISA (CERT's CEMs)									
Determine whether or not the monitored fuel burn can be used.									X
Determine whether or not the monitored fuel burn can be used for the block-time based CEM.						X	X	X	
Compute the Great Circle Distance (for the GCD based CEMs)		X	X						
Determine for which aircraft type model the flight data will be used				X					
Use, together with the calculated GCD, in the aircraft type GCD-based CEM model development				X	X				
Use in the aircraft type block-time based CEM model development				X	X	X	X		