CORSIA

EMISSIONS MONITORING PLAN (EMP)

CONTENTS

Template Information

Template provided by:	ICAO
Version (publication date):	2018-07-20

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

Note: This template has been partially filled out in red-colored text and represents an illustrative example of an EMP for demonstration purpose only.

1 VERSION CONTROL OF EMISSIONS MONITORING PLAN

a) Version No.

Please enter version number of the current version.

1

b) Version control

If necessary, please fill in the table.

Version No.	No. of previous version	Date of update	Emissions Monitoring Plan is valid from	Chapters where modifications have been made. Brief explanation of amendments.
1	N/A	2018-09-30	2019-01-01	All chapters - First version of the EMP.
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A

2 AEROPLANE OPERATOR IDENTIFICATION AND DESCRIPTION OF ACTIVITIES

(Annex 16, Volume IV, Appendix 4, 2.1)

a) Name of the aeroplane operator

Please enter the name of the aeroplane operator. This name should be the legal entity engaged in the aeroplane operation, or the legal entity seeking to be the single entity for the CORSIA administration under a parent-subsidiary arrangement.

A1 Airways

b) Address of the aeroplane operator

Please enter the address of the aeroplane operator.

Address line:	Airport Road 1
City:	Airport City
State/Province/Region:	
Postcode/ZIP:	123456
Country:	State A

c) Legal representative

Please enter a contact address of a representative who is legally responsible for the aeroplane operator for official correspondence.

Title:	Director
First name:	Mary
Surname:	Air
Email address:	Mary.Air@A1A.ast
Telephone number:	*(XXX) XX XXX* -111
Address line 1:	Airport Road 1
Address line 2:	
City:	Airport City
State/Province/Region:	
Postcode/ZIP:	123456
Country:	State A

d) Aircraft identification of the aeroplane operator for international flights (Item 7 of the flight plan)

Select the options planned to be used for reporting flight attribution to the aeroplane operator.

ICAO Designator
Does Item 7 (aircraft identification) of the flight plan begin with an ***ICAO Designator*** *according to Doc 8585 —* Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*? If yes, please select "ICAO Designator" from the drop down list and complete d2).*

Registration marks
Does Item 7 (aircraft identification) of the flight plan correspond to the ***nationality or common mark, and registration mark****, as explicitly stated in an* ***AOC*** *(or equivalent)? If yes, please select "Registration marks" from the drop down list and complete d3).*

ICAO Designator and registration marks

ICAO Designator: according to Doc 8585

d1) Responsibility under the CORSIA

Aeroplane operator that has been assigned the ICAO Designator

d2) ICAO Designator

Provide the ICAO Designator (or Designators) used for Air Traffic Control purposes, as listed in Doc 8585 — Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*, if the aeroplane operator has an ICAO Designator(s).*

AXX

d3) List of registration marks

Please list all aeroplanes indicating the nationality or common mark, and registration mark, of the aeroplane. If your fleet exceeds 30 registration marks, please attach a seperate document to the EINF.

No	Registration mark	No	Registration mark	No	Registration mark
1		11		21	
2		12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

d4) Additional information on flight attribution

Please provide additional information to support the approach followed for flight attribution.

ICAO Designator AXX is used in item 7 of the flight plan. The designator AXX is used for all scheduled operations of A1 Airways.

---

e) Do you have an air operator certificate (AOC)?

The air operator certificate (AOC) is a certificate authorizing an operator to carry out specified commercial air transport operations i.e., a document issued to an aeroplane operator by a Civil Aviation Authority which affirms that the aeroplane operator in question has the professional ability and organization to secure the safe operation of the aeroplane for the aviation activities specified in the certificate.

yes

e1) Identification code of the AOC

Please enter the unique identification number of the air operator certificate of the issuing Civil Aviation Authority. If you hold several AOCs, list the additional certificates in the field "Information about the certificate".

A-1 AOC

e2) Date of issue

Please enter the date on which the air operator certificate was issued. Use the entry format yyyy-mm-dd.

2018-01-01

e3) Date of expiry

Please enter the date on which the air operator certificate expires (if applicable). Use the entry format yyyy-mm-dd.

2020-01-01

e4) Competent authority for the AOC

Please enter the address of the authority that issued the AOC.

Name of the authority:	A1 Authority
Address line:	Authority Plaza
City:	Airport City
State/Province/Region:	
Postcode/ZIP:	123999
Country:	State A

e5) Information about the certificate

Please give information about the scope of aviation activities the AOC permits to carry out. Are there any temporal, regional or other restrictions? Have any obligations been imposed?

Types of operations: commercial transport for passengers and cargo/mail; humanitarian, medical, and firefighting operations
Types of Aircraft: A320; AT72; B789; DH8D; E190; MD11
No obligations

e6) Please attach the current versions of the AOCs covered in this Emissions Monitoring Plan; please confirm below

yes

f) Description of the ownership structure of your company

Details of ownership structure relative to any other aeroplane operators with international flights, including identification of whether the aeroplane operator is a parent company to other aeroplane operators with international flights, a subsidiary of another aeroplane operator (or operators) with international flights and/or has a parent and or subsidiaries that are aeroplane operators with international flights. Please describe the ownership structure of the operating company.

Private company. A1 Airways has no parent/subsidiary relationships to other aeroplane operators.

f1) Parent-subsidiary relationship recognized as a single entity for the CORSIA administration?

Please specify whether the aeroplane operator is in a parent-subsidiary relationship which should be recognized as a single entity for the CORSIA administration?

no

f2) Name of the subsidiary company(ies)

If your company heads a group, please specify the names of the subsidiaries which also carry out international aviation activities and detail their aircraft identification of the subsidiary for international flights is managed. Where appropriate, please attach additional explanatory files to the Emissions Monitoring Plan.

Name of the subsidiary	Aircraft identification of the subsidiary for international flights (Item 7 of the flight plan)

f3) Confirmation that parent and subsidiary(ies) are administered by the same State

If the aeroplane operator is a parent-subsidiary relationship seeks to be considered a single aeroplane operator for purposes of the CORSIA, confirm that the parent and subsidiary(ies) are subject to CORSIA administration by the same State.

f4) Confirmation that parent and subsidiary(ies) are wholly-owned by the parent

If the aeroplane operator is a parent-subsidiary relationship seeks to be considered a single aeroplane operator for purposes of the CORSIA, confirm that the subsidiary(ies) are wholly owned by the parent.

f5) Additional information on the subsidiary(ies)

Step 1: On the basis of the provided information in f2), please specify the aircraft identification of the subsidiary(ies) for international flights (Item 7 of the flight plan according to the same kind of detail as requested in d) (e.g., 3-letter ICAO Designator or tail registration marks). Please indicate how flights are assigned to the parent/subsidiary operation.
Step 2: Please specify whether the are any other items covered in this Emissions Monitoring Plan where the subsidiary(ies) deviate from the monitoring of the parent.

In case of insufficient space below, please attach additional documents to your Emissions Monitoring Plan submission.

g) Description of the aeroplane operator´s activities

Please describe the aeroplane operator´s activities. Provide details of main State pairs, typical leasing arrangements, scheduled/non-scheduled, pax/cargo/executive and geographic scope of operations.

A1 Airways is a global full service commercial operator based in State A and attributed to State A. It operates flights between ten different States worldwide. We operate a point-to-point model. Almost all of our operations are passenger flights. Our passenger flights are usually scheduled. Cargo flights are rare and ad-hoc, i.e. non-scheduled. In rare cases, A1 Airways can operate and provide support for international humanitarian, medical, and firefighting operations, as needed.
One aeroplane is modified in a way that cargo or special operations can be performed on an ad-hoc basis. In general, non-scheduled operations are rare.
As a member of A-B Alliance, A1 Airways has a standardized code share agreement with B1 Airlines (see our website at www.A1A.ast/info/partners).
We own eight aeroplanes and operate two aeroplanes that are leased-in. We do not lease-out any of our aeroplanes.

h) Contact person

Please enter the contact information of the person within the aeroplane operator who is responsible for the Emissions Monitoring Plan.

Title:	Mr.
First name:	Peter
Surname:	Paul
Email address:	Peter.Paul@A1A.ast
Telephone number:	*(XXX) XX XXX* -112
Address line 1:	Airport Road 1
Address line 2:	
City:	Airport City
State/Province/Region:	
Postcode/ZIP:	123456
Country:	State A

h1) Alternate contact person

Please enter the contact information of an additional person within the aeroplane operator who is responsible for the Emissions Monitoring Plan.

Title:	
First name:	
Surname:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

3 FLEET AND OPERATIONS DATA

(Annex 16, Volume IV, Appendix 4, 2.2)

a) Fleet declaration

List all aeroplane types, including owned aeroplanes as well as leased aeroplanes, with an MTOM greater than *5 700 kg (12 566 lbs) operated on international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1, at the time of submission of the Emissions Monitoring Plan as specified in Doc 8643* — Aircraft Type Designators.

Additional information about Doc 8643 — Aircraft Type Designators *can be found at:*

http://www.icao.int/publications/DOC8643/Pages/Search.aspx

No.	ICAO type designator	Fuel type	Number of aeroplanes
1	A320	Jet-A	2
2	AT72	Jet-A	2
3	B789	Jet-A	2
4	DH8D	Jet-A	2
5	E190	Jet-A	1
6	MD11	Jet-A	1
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

No.	ICAO type designator	Fuel type	Number of aeroplanes
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			

b) Additional aeroplane types

Will new aeroplane types always be monitored using the same methods as aeroplane types identified in section 4 of this plan?

no

b1) Details about the procedure for defining the monitoring methodologies for additional aeroplane types

Define clearly the methods which are used for monitoring new aeroplane types that are not already in use.

Responsible department	Operations department
Description of procedure	One BCS3 is expected to enter our fleet after 2020 due to a merger with A2 Special Operations Airways (expected in or after 2019). In contrast to all other aeroplane in our fleet (Method A is used for our current fleet), the method Fuel Uplift is intended to be used for the BCS3. The BCS3 is expected to be operated on ad-hoc basis for charter flights.
Location of records	Central A1 Airways IT system

c) Changes in aeroplane fleet and fuel type

Please provide information on the procedure for how changes in aeroplane fleet and fuel used will be tracked and integrated in emissions monitoring.

Responsible department	Operations department
Description of procedure	Changes of operated aeroplanes can be triggered by e.g. the following events: 1) A new aeroplane is ordered; 2) Short-term or ad-hoc charter event; 3) An aeroplane of our fleet is sold to a third party or being grounded. If changes in the aeroplane fleet and/or fuel type occur, all systems and especially the central A1 Airways IT system will be updated immediately and accordingly. Future new aeroplane will adopt the existing monitoring framework. This includes all necessary approvals for operation, updates of operations manuals and the IT system.
Location of records	Central A1 Airways IT system

d) Completeness of all aeroplanes and all flights

Please provide information on the means that will be used to track/document each aeroplane operated and the specific flights of the aeroplane to ensure completeness of monitoring.

Responsible department	Operations department
Description of procedure	A1 Airways owns eight aeroplanes and operates two aeroplanes that are leased-in. We do not lease-out any of our aeroplanes. All information about our fleet and our operations are recorded and stored in the central A1 Airways IT system. Any additional aeroplane purchased/leased/operated by A1 Airways will be included into the IT system at the time of aeroplane delivery. Advanced security measures including system backups ensure that all information is safe, secure and always available. For each flight, the following information is stored: complete schedule for each aeroplane; flight number and flight plan for each flight, passenger/cargo manifest, load data, fuel uplift and density for the flight concerned; and an flight report for each flight (after the flight); any additional relevant information. A1 Airways uses ACARS in its scheduled operations and the data automatically provided through ACARS is been transferred to the central A1 Airways IT system. ACARS data is mainly used to cross check flight and operations information.
Location of records	Central A1 Airways IT system

e) List of State pairs operated by the aeroplane operator

*Please list **all** State pairs where international flights are currently operated. If applicable, please list State pairs from the State of origin to the State of destination (*). If your State pairs exceed 50, please attach a separate document to the Emissions Monitoring Plan.*
(*) For example, flights from State A to State B will require inserting a State pair A-B in the list; flights from State B to State A will require inserting a State pair B-A in the list.

No.	State of origin	State of destination
1	United Kingdom	Latvia
2	Latvia	United Kingdom
3	Kenya	France
4	France	Kenya
5	Fiji	Vanuatu
6	Vanuatu	Fiji
7	Brazil	United Arab Emirates
8	United Arab Emirates	Brazil
9	Cuba	Mexico
10	Mexico	Cuba
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		

f) Determination of all international flights

Please provide information on procedures for determining which aeroplane flights meet the definition of international flights for the purpose of Annex 16, Volume IV, and therefore are subject to the emissions monitoring requirements subject to applicability of Annex 16, Volume IV, Part II, Chapter 2, 2.1.

Responsible department	Operations department
Description of procedure	All scheduled flights of A1 Airways are international flights, all flights have an assigned flight number. ICAO Designator "AXX", as included in the Flight Plan, will be used to identify A1 Airways' international flights. Information on all flights operated by A1 Airways are saved in our central A1 Airways IT system, physically located at the company's headquarters. The IT system includes information from ICAO Doc 7910 and through this automatically determines between international and domestic flights.
Location of records	Central A1 Airways IT system

g) Determination of international flights with offsetting requirements

Please provide information on the procedures for determining which international flights are subject to CO_2 offsetting requirements under the CORSIA as described in Annex 16, Volume IV, Part II, Chapter 3, 3.1.

Responsible department	Operations department
Description of procedure	A1 Airways will use the ICAO Document entitled "CORSIA States for Chapter 3 State Pairs", which will be available on the ICAO CORSIA website, to identify those State pairs that are in the scope of the offsetting requirements. This information will be included in our central A1 Airways IT system so that international flights with offsetting requirements can automatically be marked and filtered. From all information about flights as specified above, the annual Emissions Report will be generated. For the Emissions Report, the template provided by ICAO and available through the ICAO CORSIA website will be used. Correct filter criteria to distinguish flights with and without offsetting requirements under CORSIA, i.e., the correct version for each given year and correct application of the ICAO Document entitled "CORSIA States for Chapter 3 State Pairs" is ensured by regular manual cross checks by a responsible person from the operations department.
Location of records	Central A1 Airways IT system

h) Determination of flights with no monitoring requirements

If the aeroplane operator conducts any domestic flights and/or humanitarian, medical or firefighting international operations that would not be subject to the emissions monitoring requirements, information on the procedures for how those operations will be separated from those subject to the emissions monitoring requirements.

Responsible department	Operations department
Description of procedure	For aeroplane flight categories that are not considered to be within the applicability scope of Annex 16, Volume IV and do not have monitoring requirements under CORSIA, A1 Airways follows the guidance provided in the Environmental Technical Manual, Volume IV, Chapter 2, 2.1.4. Military and State aeroplane flights are not operated by A1 Airways. Humanitarian, medical or firefighting operations as well as the international flights preceding or following a humanitarian, medical or firefighting flight (provided such flights were conducted with the same aeroplane, and were required to accomplish the related humanitarian, medical or firefighting activities or to reposition thereafter the aeroplane for its next activity) only happen on an ad-hoc basis and are identified through the flight plan (Item 18) and consequently through the central A1 Airways IT system. These flights will not be included in the Emissions Report. In case of operation of above listed flights, the following codes would be used in the flight plan to clearly identify these flights: "STS/HUM" for a humanitarian flight according to Doc 4444; "STS/HOSP" for a medical flight declared by medical authorities according to Doc 4444; "STS/MEDEVAC" for a life critical medical emergency evacuation flight according to Doc 4444; or "STS/FFR" for a firefighting flight according to Doc 4444.
Location of records	Central A1 Airways IT system

4 METHODS AND MEANS FOR CALCULATING EMISSIONS

(Annex 16, Volume IV, Appendix 4, 2.3)

a) Fuel Use Monitoring Method and / or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT)

Please specify whether the aeroplane operator plans to use one or more Fuel Use Monitoring Method(s) (as described in Annex 16, Volume IV, Appendix 2) and / or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) (as described in Annex 16, Volume IV, Appendix 3) for the 2019-2020 and 2021-2035 periods. When deciding on the monitoring method, consideration should be given to whether the aeroplane operator is eligible for the same method in the 2019-2020 period as in the 2021-2035 period.

For the reporting years 2019 and 2020 (in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.1.2)
• a Fuel Use Monitoring Method is mandatory for aeroplane operators with annual emissions equal to or above 500 000 tonnes of CO_2 from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1.
• an aeroplane operator with annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1 of less than 500 000 tonnes, shall use either a Fuel Use Monitoring Method or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT).

For the reporting years 2021 until 2035 (in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.1.3)
• a Fuel Use Monitoring Method is mandatory for aeroplane operators with annual emissions equal to or above 50 000 tonnes of CO_2 from international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 3, 3.1. For international flights not subject to offsetting requirements, the aeroplane operator shall use either a Fuel Use Monitoring Method or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT).
• an aeroplane operator with annual emissions from international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 3, 3.1, of less than 50 000 tonnes, shall use either a Fuel Use Monitoring Method or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT).

Fuel Use Monitoring Method

a1) Option for simplified monitoring on routes not subject to offsetting requirements

Aeroplane operators which use a Fuel Use Monitoring Method (as described in Annex 16, Volume IV, Appendix 2) for the 2021-2035 period have an option for simplified monitoring with the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) (as described in Annex 16, Volume IV, Appendix 3) on State pairs not subject to offsetting requirements. Please specify whether the aeroplane operator intends to use this option.

no

b) Fuel Use Monitoring Methods

Please provide information on the use of different monitoring methods per sub fleet (by ICAO aircraft type designator).

Monitoring method	Applicable for the following sub-fleets of aeroplanes (by ICAO aircraft type designator)	2019-2020 period	2021-2035 period
Method A	A320; AT72; B789; DH8D; E190; MD11 (all types currently in use)	yes	yes
Method B			
Block-off / Block-on			
Fuel Uplift			
Fuel Allocation with Block Hour			

c) Simplified monitoring method

Please provide information on use of the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT).

2019-2020 period	2021-2035 period

c1) Estimated annual CO_2 emissions

Please demonstrate the eligibility to use the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) by providing an estimate of fuel use in order to calculate an estimate of the total CO_2 emissions for international flights, as defined in Annex 16, Volume IV, Part II, Chapter 2, 2.1. If the ICAO CORSIA CERT was used to estimate the CO_2 emissions, enter the information in the field 'Estimate from the ICAO CORSIA CERT'. For 2019, the estimate can be based on data within the 2017-2019 period or another appropriate period.

Fuel type	Annual fuel use (in tonnes)	Fuel conversion factor	Annual CO_2 emissions (in tonnes)
Jet A		3.16	
Jet A1		3.16	
Jet B		3.16	

AvGas		3.19	

Estimate from the ICAO CORSIA CERT

c2) Supporting information on estimation

Provide supporting information on how the estimation of emissions in c1) has been determined, including on how fuel use has been estimated (in case the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) has been used, a copy of the tool has to be attached and the input method (i.e. Great Circle Distance or Block Time) has to be stated).

c3) Input method for reporting

Please specify for the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) whether Great Circle Distance or Block Time is used to estimate emissions for the reporting periods.

d) Separation of parent-subsidiary related emissions in 2019-2020

If the aeroplane operator is in a parent-subsidiary relationship and intends to be considered a single aeroplane operator for purposes of the CORSIA, identify the procedures that will be used for maintaining separate 2019-2020 fuel and emissions monitoring of the various corporate entities for the purpose of establishing individual 2019-2020 reference CO_2 emissions for the parent and subsidiary (or subsidiaries).

Not applicable.

4.1 Fuel Use Monitoring Method: METHOD A

a) Time of measurement and corresponding documentation for the chosen method

Please specify the exact points in time for the three measurements necessary to calculate the fuel consumption per flight and outline the measurement equipment and procedures for recording, receiving, transmitting and storing of fuel data. Please provide a reference to the corresponding documentation.

To calculate the fuel consumption of a specific flight (flight under consideration - here flight N) according to Method A, data from the flight under consideration and data from the subsequent flight at three different measurement points has to be available:
1) Data from flight under consideration (flight N) - Amount of fuel contained in aeroplane tanks once fuel uplifts for the flight under consideration are complete. The amount of fuel is read on the on-board instruments and expressed as mass in tonnes. The amount of fuel is recorded in the flight report and automatically transferred to the central A1 Airways IT system. In addition, ACARS is used for cross checking the collected data.
2) Data from subsequent flight (N+1) - Amount of fuel contained in aeroplane tanks once fuel uplifts for the subsequent flight are complete. The amount of fuel is read on the on-board instruments and expressed as mass in tonnes. The amount of fuel is recorded in the flight report and automatically transferred to the central A1 Airways IT system. In addition, ACARS is used for cross checking the collected data.
3) Data from subsequent flight (N+1) - Sum of fuel uplifts for the subsequent flight measured in volume and multiplied with the actual fuel density value in tonnes. Fuel Uplift is determined by fuel meter readings of the hydrant carts or fuel trucks used for aircraft-fuelling. The measurements of these meters are the basis for invoicing as well as tax assessment. They are verified and calibrated depending on local legislation, i. e. this uplift-measurements are exact to the litre. Those meters can be considered as the most precise mean to get exact uplift-quantity data. The fuel supplier measures the amount of fuel uplift and density directly during uplift. This is witnessed by an A1 Airways engineer and recorded in the flight report. Please see section 5 for further details regarding the information flow.
The fuel consumption of Flight N is determined by calculating 1-2+3.
Exemption: If no fuel uplift takes place for the flight under consideration, the amount of fuel contained in aeroplane tanks will be determined at block-off for the flight under consideration, determined as the time when first engine is swithced on for the flight. The rule will be applied in the same way in cases where no fuel uplift takes place for the subsequent flight.

b) Fuel density for international flights

Please provide information on the procedures for determing and recording fuel density values (standard or actual) as used for operational and safety reasons and provide reference to the relevant internal documentation. These procedures shall be applied when calculating the fuel consumption for the CORSIA.

Fuel density information is used as measured by the supplier directly during uplift. The fuel density information from the delivery slip and invoice information is recorded in the flight report and transferred and stored in the central A1 Airways IT system by the person on-duty from the operations department.

If no density information from the supplier is available: A standard fuel density is used with the value of 0.8kg per litre. This should be considered as a very rare situation.

(Note: For the purpose of this demonstration, all Fuel Use Monitoring Methods have been described. In reality an operator needs to describe only those methods that it will use for the fuel use monitoring; there's no need to

4.2 Fuel Use Monitoring Method: METHOD B

a) Time of measurement and corresponding documentation for the chosen method

Please specify the exact points in time for the three measurements necessary to calculate the fuel consumption per flight and outline the measurement equipment and procedures for recording, receiving, transmitting and storing of fuel data. Please provide a reference to the corresponding documentation.

To calculate the fuel consumption of a specific flight (flight under consideration - flight N) according to Method B, data from the flight under consideration and data from the prior flight at three different measurement points has to be available:
1) Data from flight prior to the flight under consideration (flight N-1) - Amount of fuel remaining in aeroplane tanks at time of block-on, i.e., when last engine off of the flight prior to the flight under consideration. The amount of fuel is read on the on-board instruments and expressed as mass in tonnes. The amount of fuel is recorded in the flight report and automatically transferred to the central A1 Airways IT system. ACARS is used for cross checking the collected data.
2) Data from flight under consideration (flight N) - Amount of fuel remaining in aeroplane tanks at time of block-on, i.e., when last engine off of the flight under consideration. The amount of fuel is read on the on-board instruments and expressed as mass in tonnes. The amount of fuel is recorded in the flight report and automatically transferred to the central A1 Airways IT system. ACARS is used for cross checking the collected data.
3) Data from flight under consideration (flight N) - Sum of fuel uplifts for the flight under consideration measured in volume and multiplied with the actual fuel density value in tonnes. Fuel Uplift is determined by fuel meter readings of the hydrant carts or fuel trucks used for aircraft-fuelling. The measurements of these meters are the basis for invoicing as well as tax assessment. They are verified and calibrated depending on local legislation, i. e. this uplift-measurements are exact to the litre. Those meters can be considered as the most precise mean to get exact uplift-quantity data. The fuel supplier measures the amount of fuel uplift and density directly during uplift, witnessed by an A1 Airways engineer and recorded in the flight report.
The fuel consumption of Flight N is determined by calculating 1-2+3.

b) Fuel density for international flights

Please provide information on the procedures for determing and recording fuel density values (standard or actual) as used for operational and safety reasons and provide reference to the relevant internal documentation. These procedures shall be applied when calculating the fuel consumption for the CORSIA.

Fuel density information is used as measured by the supplier directly during uplift. The fuel density information from the delivery slip and invoice information is recorded in the flight report and transferred and stored in the central A1 Airways IT system by the person on-duty from the operations department.

If no density information from the supplier is available: A standard fuel density is used with the value of 0.8kg per litre. This should be considered as a very rare case.

(Note: For the purpose of this demonstration, all Fuel Use Monitoring Methods have been described. In reality an operator needs to describe only those methods that it will use for the fuel use monitoring; there's no need to

4.3 Fuel Use Monitoring Method: BLOCK-OFF / BLOCK-ON

a) Time of measurement and corresponding documentation for the chosen method

Please specify the exact points in time for the two measurements necessary to calculate the fuel consumption per flight and outline the measurement equipment and procedures for recording, receiving, transmitting and storing of fuel data. Please provide a reference to the corresponding documentation.

To calculate the fuel consumption of a specific flight (flight under consideration - here flight N), BLOCK-OFF / BLOCK-ON method requires data from the flight under consideration with the data points BLOCK-OFF / BLOCK-ON. BLOCK-OFF measurement is taken when first engine on, BLOCK-ON measurement is taken when last engine off:
Data from flight under consideration (flight N):
1) Amount of fuel in aeroplane tanks at time of BLOCK-OFF for the flight under consideration. The amount of fuel is read on the on-board instruments and expressed as mass in tonnes. The amount of fuel is recorded in the flight report and automatically transferred to the central A1 Airways IT system. In addition, ACARS is used for cross checking the collected data.
2) Amount of fuel remaining in aeroplane tanks at time of BLOCK-ON of the flight under consideration. The amount of fuel is read on the on-board instruments and expressed as mass in tonnes. The amount of fuel is recorded in the flight report and automatically transferred to the central A1 Airways IT system. In addition, ACARS is used for cross checking the collected data.

The fuel consumption of Flight N is determined by calculating 1-2.

(Note: For the purpose of this demonstration, all Fuel Use Monitoring Methods have been described. In reality an operator needs to describe only those methods that it will use for the fuel use monitoring; there's no need to describe all methods in the Emissions Monitoring Plan.)

4.4 Fuel Use Monitoring Method: FUEL UPLIFT

a1) Measurement of the block hours (per flight) and corresponding documentation for the chosen method

Please specify the exact points in time for the measurement of block hours per flight (necessary to calculate the fuel consumption per flight for international flights with zero uplift and for the following flight) and outline the measurement equipment and procedures for recording, receiving, transmitting and storing of fuel data. Please provide a reference to the corresponding documentation.

To calculate the fuel consumption of a specific flight (flight under consideration - here flight N), Fuel Uplift Method requires data from the flight under consideration. The only data point is the amount of fuel uplift per flight.
If fuel uplift data is available for flight under consideration (flight N), the amount is the fuel uplift as measured by the supplier of the flight. Fuel uplift is determined by fuel meter readings of the hydrant carts or fuel trucks used for aircraft-fuelling. The measurements of these meters are the basis for invoicing as well as tax assessment. They are verified and calibrated depending on local legislation, i. e. this uplift-measurements are exact to the litre. Those meters can be considered as the most precise mean to get exact uplift-quantity data. The fuel supplier measures the amount of fuel uplift and density directly during uplift. This is witnessed by an A1 Airways engineer and recorded in the flight report. Please see section 5 for further details. After considering the actual fuel density, the amount of fuel will be expressed as mass in tonnes.

Block hours per flight are measured from BLOCK-OFF to BLOCK-ON. BLOCK-OFF measurement is taken when first engine on, BLOCK-ON measurement is taken when last engine off.

a2) Assignment and adjustment for flights with zero fuel uplift

Please explain the data handling and calculations necessary to meet the adjustment requirement for flights with zero fuel uplift.

For flight(s) without a fuel uplift (i.e., flight N+1, …, flight N+n,), A1 Airways will allocate fuel use from the prior fuel uplift proportionally to block hour (according to Appendix 2 of Annex 16, Volume IV). This distribution will be done also if one of the flights is a domestic flight.

---

b) Fuel uplift

Please specify which fuel uplift record will be used.

The uplift-quantity is measured by the supplier. The entire uplift-data (quantity, density & supplier) is printed on the supplier's delivery slip which is issued for each event. In addition, fuel invoices are used as backup. The delivery slip and invoice information is recorded and stored in the central A1 Airways IT system by the person on-duty from the operations department.

---

c) Fuel density for international flights

Please provide information on the procedures for determing and recording fuel density values (standard or actual) as used for operational and safety reasons and provide reference to the relevant internal documentation. These procedures shall be applied when calculating the fuel use for the CORSIA.

Fuel density information is used as measured by the supplier directly during uplift. The fuel density information from the delivery slip and invoice information is recorded in the flight report and transferred and stored in the central A1 Airways IT system by the person on-duty from the operations department.

If no density information from the supplier is available: A standard fuel density is used with the value of 0.8kg per litre. This should be considered as a very rare case.

(Note: For the purpose of this demonstration, all Fuel Use Monitoring Methods have been described. In reality an operator needs to describe only those methods that it will use for the fuel use monitoring; there's no need to describe all methods in the Emissions Monitoring Plan.)

4.5 Fuel Use Monitoring Method: FUEL ALLOCATION WITH BLOCK HOUR

a) Option for calculating the specific fuel burn

Please choose from the options listed below and enter the ICAO type designators and the model for each option. Should one option for all aeroplane types be used, simply enter "all".

	Option	ICAO aircraft type designator / model
☑	1st Option for aeroplane operators which can clearly distinguish between fuel uplifts for international and domestic flights on a flight by flight basis. In case this option is selected, please also complete section 4.4 (Fuel uplift, a1 and a2), as this monitoring method is used to calculate the total fuel burn on international flights for a specific ICAO type designator or aircraft model.	all
☐	2nd Option for aeroplane operators which cannot clearly distinguish between international and national fuel uplifts on a flight by flight basis.	

b) Measurement of the block hours (per flight) and corresponding documentation for the chosen method

Please specify the exact points in time for the measurement of block hours per flight and outline the measurement equipment and procedures for recording, receiving, transmitting and storing of fuel data. Please provide a reference to the corresponding documentation.

To calculate the fuel consumption of a specific flight (flight under consideration - here flight N), Fuel Allocation with Block Hour method requires data from the flight under consideration as well as data from other flights of a specific aeroplane type of the reporting year: Data from flight under consideration (flight N): Block hour of the flight under consideration (BH). Block hours per flight are measured from BLOCK-OFF to BLOCK-ON. BLOCK-OFF measurement is taken when first engine on, BLOCK-ON measurement is taken when last engine off. Data from other flights: Actual fuel consumption for all international flights of the aeroplane type in the reporting year defined as fuel uplift per flight. A clear distinction between fuel uplifts for domestic and international flights is possible through the central A1 Airways IT system that uses information from Doc 7910 to distinguish between international and domestic flights. As A1 Airways only operates international flights, we monitor through our central A1 Airways IT system all fuel uplifts per aeroplane type plus all block hours per aeroplane type (see above for exact measurement). All data is recorded and stored through our central A1 Airways IT system. From this data, average fuel burn ratio (AFBR) in tonnes per hour, i.e., the specific fuel consumption per hour, is calculated for each aeroplane type by dividing the sum of all fuel uplifted for international flights through the sum of all international flights block hours per aeroplane type in the specific reporting year. To compute the fuel use of the flight under consideration, the AFBR is multiplied by the block hour of flight N. The amount of fuel will be expressed as mass in tonnes and stored in the central A1 Airways IT system.

c) Fuel uplift

Please specify which fuel uplift record will be used.

The uplift-quantity is measured by the supplier. The entire uplift-data (quantity, density & supplier) is printed on the supplier's delivery slip which is issued for each event. In addition, fuel invoices are used as backup. The delivery slip and invoice information is recorded and stored in the central A1 Airways IT system by the person on-duty from the operations department.

d) Fuel density for international flights

Please provide information on the procedures for determing and recording fuel density values (standard or actual) as used for operational and safety reasons and provide reference to the relevant internal documentation. These procedures shall be applied when calculating the fuel use for the CORSIA.

Fuel density information is used as measured by the supplier directly during uplift. The fuel density information from the delivery slip and invoice information is recorded in the flight report and transferred and stored in the central A1 Airways IT system by the person on-duty from the operations department.

If no density information from the supplier is available: A standard fuel density is used with the value of 0.8kg per litre. This should be considered as a very rare case.

(Note: For the purpose of this demonstration, all Fuel Use Monitoring Methods have been described. In reality an operator needs to describe only those methods that it will use for the fuel use monitoring; there's no need to describe all methods in the Emissions Monitoring Plan.)

4.6 ICAO CORSIA CO_2 ESTIMATION AND REPORTING TOOL (CERT)

(Annex 16, Volume IV, Appendix 3)

a) Description of relevant input data

Please specify whether Great Circle Distance and/or Block Time is used as input into the ICAO CORSIA CERT. If applicable, please specify the procedures for determining Block Time and potentially aggregating them to be used in the ICAO CORSIA CERT. This includes specifying the exact points in time for the two time measurements per flight necessary to calculate the Block Time.

Great Circle Distance will be used as input into the CERT.

(Note: For the purpose of this demonstration, all monitoring methods have been described. In reality an operator needs to describe only those methods that it will use for the fuel use monitoring; there's no need to describe all methods in the Emissions Monitoring Plan.)

5. DATA MANAGEMENT, DATA FLOW, CONTROL SYSTEM, RISK ANALYSIS AND DATA GAPS

(Annex 16, Volume IV, Appendix 4, 2.4)

a) Description of data management

Please provide a description of each step in the data flow and data processing, including controls to assure data quality, beginning with the source data up to the Emissions Report. Please reference the responsible departments. Please attach a data flow chart to the Emissions Monitoring Plan summarizing the systems used to record, store and control the quality of data associated with the monitoring and reporting of emissions.

All of our operations under A1 Airways ICAO Designator AXX are recorded and stored in our central A1 Airways IT system. This IT system contains all flight related information including operation dates; flight numbers; departure and arrival aerodromes; fuel on board at block-off and block-on; fuel uplift information, including fuel density; as well as block hours per flight. The flow of CORSIA-related information from an individual flight to an annual Emissions Report will be as follows:
1) After the flight under consideration, the pilot in command of the flight completes and signs the flight report, which includes initial fuel on board, fuel uplifted and density of fuel uplifted, total fuel on board before the start of the flight and the fuel remaining at the end of the flight.
2) The pilot in command submits the flight report to the central A1 Airways IT system (this requirement has been included in A1 Airways' after flight checklist).
3) Operations department is responsible of ensuring that every flight operated by A1 Airways is being recorded in the central A1 Airways IT system. Operations department will contact the pilot in command if a report is missing.
4) A1 Airways' Quality Manager (QM) is responsible for auditing the completeness of data contained in the central A1 Airways IT system. QM will perform cross-checks once a month, at a minimum. ACARS data and fuel slips will be used as a reference information for the cross-checks.
5) Once the reporting year has ended, A1 Airways' CORSIA Manager (CM) is responsible for extracting the relevant information from the central A1 Airways IT system for the purposes of populating and preparing a draft annual Emissions Report.
6) A voluntary pre-verification will be performed before submitting the Emissions Report to the third-party verifier. CM will select an internal auditor, who has not been directly involved in the drafting of the Emissions Report, but who is in possession of basic knowledge of CORSIA MRV requirements and A1 Airways' data management processes, to perform the internal pre-verification.

b) Threshold for data gaps

If employing a Fuel Use Monitoring Method, please provide a description of the systems and procedures for identifying data gaps and for assessing whether the 5 per cent threshold for significant data gaps has been reached (in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.5.1).

Data transferred from flight reports to the central A1 Airways IT system is verified and cross-checked against fuel receipts and ACARS data. A different person than the person transferring the data into the IT system is responsible for cross-checking the entered data for consistency and completeness. In addition, the IT system provides statistical data for all operations performed. Automatic cross-checks have been built into the IT systems, and automatic alerts will be issued should inconsistencies or missing data be identified.
Considering the above measures and past experience, we are certain that data gaps will only occur well below 2%. A most likely scenario of data gaps is when a new aeroplane type is introduced which is a very rare case. Appropriate measures to avoid data gaps for the introduction of the new aeroplane after 2019 are already underway.

b1) Description of available secondary sources

Please specify data sources that can be alternatively used for reporting purposes.

A1 Airways keeps record of several sources of secondary data that can support reporting purposes, including but not limited to: fuel delivery slips, fuel invoices, flight reports, ACARS data, and statistical and average data of performed flights.

b2) Handling of data gaps and erroneous data values

Aeroplane operators using a Fuel Use Monitoring Method shall use the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) to fill data gaps, in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.5.1, where the secondary data sources listed above are not available. For aeroplane operators not using a Fuel Use Monitoring Method, please provide a description of the method that will be used to fill data gaps in the event a secondary data reference source listed above is not available.

In cases of missing data, and non-availability of secondary sources of data as outlined above, the ICAO CORSIA CERT is used to fill data gaps.

In a hypothetical case where data gaps exceed the 5% threshold of international flights in 2019 and 2020 (or 5% of international flights covered by the offsetting requirements starting in 2021), A1 Airways will immediately contact the State to address the issue. The percentage of data gaps and measures to address the gaps will also be reported in the annual Emissions Report.

b3) Data gaps despite secondary sources

Does the existing data management system allow for data gaps when secondary data sources exist?

no

b4) Explanations of data gaps for which existing secondary sources cannot be used

Please describe the conditions (e.g. cost, time) to resolve data unavailability, data quality under which this occurs.

c) Documentation and record keeping plan

Please specify where process directives are stored. Please indicate the IT system used, if applicable. List of applied data management and IT standards, where relevant.

Documentation and recordkeeping will be organized as per A1 Airways Corporate Documentation Manual.
The central A1 Airways IT system stores all information for at least 10 years.
Secondary data sources are stored separately for at least 10 years.

d) Explanation of risks

Data management systems and controls are critical for ensuring data completeness, security, quality and minimizing the risk of a material error or mistatement in the emissions report. Please provide a list of the risks associated with the data management system and the corresponding internal or external control activity(ies) for addressing each.

A1 Airways has identified the following points as a part of its risk analysis:
- Failure to update the A1 Airways master data when changes occur regarding owned (and especially leased-in) aircraft and their technical specification, leading to aircraft not being monitored, even though they are flying under the ICAO designator "AXX". --> *Control activity to address the risk: Operations department will track every flight operated by A1 Airways. Failures of updating the master data will be identified during the regular maintenance process, or at the latest during the audit performed by the QM.*
- Data loss from automated aeroplane systems. --> *Control activity to address the risk: Secondary data sources are saved in a separate location, and are available in a hypothetical case of data loss from automated aeroplane systems.*
- Manual input into central A1 Airways IT system of information about single flights and aerodrome pairs (e.g. lost flight logs or manual input error). --> *Control activity to address the risk: ACARS data is used to cross-check and to complete, if necessary, single flight information.*
- Procedure to distinguish between CORSIA relevant flights and flights not relevant under CORSIA, e.g. the responsible department mistakenly sets a special flight marker (service type), so that this flight is filtered out even though it should not be. --> *Control activity to address the risk: Central A1 Airways IT system will record every flight operated by the company, and if an error is being identified in the flight classification, the status of this flight can be changed in the IT system. Errors in flight classification are identified during the internal audits performed by the QM.*
- Fuel information at engine on and/or engine off: The one and only data-source for the shutdown- or remaining-fuel-quantity is the aircraft. In case of electronic data transmission from the aeroplane to A1 Airways IT system, sometimes no-com-situations can occur - the aircraft just does not get any connection at the time of sending. --> *Control activity to address the risk: Flight reports are also being printed out by the pilot in command, and these hard copies can be used to inputs the necessary information into the central A1 Airways IT system in a case where electronic transfer fails.*
- Fuel uplift data: different sources for uplift-data. --> *Control activity to address the risk: A critical analysis on the conflicting information will be performed by the Operations department in coordination with the QM. Fuel uplift data used for technical logs will be analysed against average data to figure out correct fuel uplift amount.*
- Detection of wrong data. --> Control activity to address the risk: Automatic cross-checks will flag wrong data inputs, and secondary data sources will be used to correct erroneous data.
- Re-fuellings and de-fuellings during aircraft's maintenance (mostly C-Checks) as well as engine-run-ups. --> *Control activity to address the risk: alternative data points will be used for monitoring, as recorded in technical logs (e.g. block-on fuel before heavy maintenance requiring emptying the fuel tanks).*

e) Revisions of Emissions Monitoring Plan

Please provide information on procedures for identifying: i) material changes to the Emissions Monitoring Plan requiring revision and resubmission to the State and ii) non-material changes to the Emissions Monitoring Plan for disclosure in the Emissions Report.

A1 Airways will follow the guidelines as documented in the Environment Technical Manual, Volume IV, Chapter 3, 3.1.3. Possible changes to this version of the Emissions Monitoring Plan will be reviewed regarding their materiality or non-materiality and in this regard the EMP checklist (ETM, table 3-2) will be followed. If changes occur that are defined as 'material changes', the A1 Airways' Emissions Monitoring Plan will be revised where necessary and re-submitted to State A for approval. In case of minor changes, defined as 'non-material changes', State A will be notified as part of the annual Emissions Report. In addition, all non-material changes will be collected and communicated to State A at least once a year (if any changes occur).