

Special Release of:

# Guidance for the Aviation Industry

*Monitoring and Reporting Annual Emissions  
and Tonne km Data for EU Emissions Trading*

Prepared by the Dutch Emissions authority in cooperation with the UK  
Environment Agency

*Provided for the attendees of:*



*Provided by:*

**PRICEWATERHOUSECOOPERS** 



# Guidance for the Aviation Industry

## Monitoring and Reporting Annual Emissions and Tonne km Data for EU Emissions Trading

**1.0**

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## Disclaimer

This guidance on EU ETS Aviation is designed to help compile the monitoring plans of aircraft operators that are included in the EU ETS scheme. It is a business friendly interpretation of the Monitoring and Reporting Guidelines that will be implemented through national legislation on emission allowance trading. Please note that it is **not** a legally binding document and that national legislation will always take precedence. This document may be read on its own for the purposes it has; however aircraft operators should have a good understanding of the relevant legal documents including the EU ETS Directive and the Monitoring and Reporting Guidelines. The guidance does not therefore impose a mandatory explanation or interpretation of the EU ETS Directive or the MRG. It should primarily be considered as a practical interpretation and guidance aimed at assisting aircraft operators and competent authorities in the interpretation and implementation of the monitoring and reporting requirements.

This document was prepared by the Dutch Emissions authority in cooperation with the UK Environment Agency. Other Member States may use this document as a reference. Please check with your competent authority whether you are allowed to use this guidance. If in doubt about specific requirements, aircraft operators should always contact the competent authority of their administering Member State.

## Note on this document

### **Wider regulatory background:**

As part of the obligations under the European Emissions Trading Scheme, aircraft operators will have to monitor and report data regularly from 2010 onwards. There are EU-wide provisions, adopted by the Commission in April 2009, on what data must be monitored and reported, and how this should be done. These are laid down in the Monitoring and Reporting Guidelines (MRG). One of the requirements from the MRG is for aircraft operators to submit a monitoring plan by 31<sup>st</sup> August 2009. The Commission will publish templates for monitoring plans and for reporting. These templates may be adapted by EU Member States provided they contain at least the same data input as the templates published by the European Commission.

### **Document context and history:**

To ensure a level playing field across all EU Member States, the UK, the Netherlands and Germany are leading an initiative to develop EU-wide guidance material for aircraft operators. PriceWaterhouseCoopers was commissioned by the Dutch Emission's Authority to draft this guidance document.

The aim of the guidance material is to help operators understand the (legal) MRG requirements and to help them complete the monitoring plan templates. The following material will be made available to aircraft operators:

- this guidance document, drafted by the Dutch Emission's Authority in cooperation by the UK Environment Agency;
- exemplar monitoring plans, drafted by the German Emissions Trading Authority (Deutsche Emissionshandelsstelle (DEHSt)).

In drafting the documents, stakeholders - EU Member States, but also aircraft operators and industry bodies - were (and continue to be) consulted regularly.

Note that this document is the first version and may be expanded later to address additional questions from the aviation industry or provide further clarification where needed.

### **Latest information and contact details**

The website of the European Commission ([http://ec.europa.eu/environment/climat/aviation\\_en.htm](http://ec.europa.eu/environment/climat/aviation_en.htm)) contains the latest information on EU Emissions Trading for Aviation. On this website you will also find contact details of the Competent Authorities responsible for EU ETS aviation in the EU Member States.

# 1 Introduction

## Background

On 13<sup>th</sup> January 2009 Directive 2008/101/EC amending Directive 2003/87/EC was published to include the aviation sector into the European Greenhouse Gas Emission Allowance Trading Scheme (EU ETS scheme).<sup>1</sup>

The aim of the EU ETS scheme is to reduce emissions in a cost effective manner, allowing airlines to trade emission allowances and thereby determine how and where they reduce emissions. Each allowance represents one tonne of greenhouse gas emissions.

No later than 30<sup>th</sup> April of each year, aircraft operators are required to surrender emission allowances that are equivalent to the amount of emissions that they emitted (and reported to the competent authority) during the previous calendar year. Participants in the ETS scheme who emit more than the emission allowances they have received, can buy allowances from other participating aircraft operators or from operators of stationary installations that also fall within the scope of the EU ETS. Purchasing allowances will ensure that sufficient allowances are surrendered by the 30<sup>th</sup> of April each year. If participants emit less than the emission allowances allocated to them, the surplus of emission allowances can be sold.

### 1.1 Monitoring annual emissions

All aircraft operators falling under the scope of the EU ETS must monitor and report greenhouse gas emissions from 2010 onwards. This involves drawing up a monitoring plan for annual emissions well in advance. As an aircraft operator your emissions monitoring plan is subject to approval by your competent authority. Using the pre-defined template from your competent authority, your emissions monitoring plan must outline how you obtain, process, record and monitor your greenhouse gas emissions. It must also contain information on quality assurance for the entire system. The deadline for submitting your monitoring plan on annual emissions is the **31<sup>st</sup> August 2009**. (Note: It is not a requirement to have your monitoring plan approved by a verifier before it is submitted to the competent authority).

For those aircraft operators that will fall under the EU ETS scheme after the start of 1 January 2010 (new entrants) the timelines for submitting monitoring plans differ. For more guidance on new entrants please contact the competent authority of your administering Member State.

Chapter 5 of this guidance outlines what information should be submitted in the monitoring plan for annual emissions data.

Small emitters may opt to use simplified procedures for monitoring their annual emissions. See Chapter 2 of this guidance for more on eligibility for simplified procedures.

### 1.2 Reporting your verified annual emissions over the year 2010

As an aircraft operator you are required to submit an annual emissions report to the competent authority. This report has to be verified by an independent and accredited verifier prior to submission. In the pre-trading period (2010-2011) you have to submit your first verified emissions report by 31<sup>st</sup> March 2011 and 2012. You are, however, not required to surrender emissions allowances equivalent to your reported emissions for the years 2010 and 2011. The first trading period starts from 1<sup>st</sup> January 2012 onwards. Starting from April 2013 aircraft operators will be required to surrender each year emission allowances that cover the verified reported data for the previous year. See also **Annex C** for the timeline for meeting your requirements to monitor and report your annual emissions.

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<sup>1</sup> (OJ L 8/3 of 13 January 2009).

### 1.3 Review of the monitoring plan for annual emissions

Before the start of each trading period you as an aircraft operator are required to submit a revised monitoring plan for annual emissions. The first time such a review takes place is before 1<sup>st</sup> January 2013. In performing the review you will have to assess whether your monitoring methodology can be changed in order to improve the quality of the reported data without leading to unreasonably high costs. The revised monitoring plan for annual emissions needs to be approved by the competent authority of your administering Member State.

### 1.4 Application for free allowances

For the first (2012) and the second (2013-2020) trading period each aircraft operator may apply for a free allocation of allowances. The free allowances available to the entire sector will be distributed amongst operators via a benchmarking procedure, where the individual allocation for each operator is proportional to the (reported and verified) tonne kilometres that were flown over the course of the year 2010. Each year from 2012 until 2020 the competent authority will issue the number of allowances allocated to each individual aircraft operator.

The timeline for applying for free allowances is shown in **Annex B**. Note that the deadline for submitting this application to your competent authority is 31<sup>st</sup> March 2011. Part of this application is a tonne km report verified by an independent accredited verifier, in which tonne kilometres transported over the year 2010 are reported in a standardised form.

In order to draft such a tonne km report you as aircraft operator must first devise a monitoring plan, in which you are required to outline how your tonne km data are obtained, processed, registered and monitored. The structure of your monitoring plan is pre-determined by the templates published by your competent authority. You are required to submit the tonne kilometre monitoring plan to your competent authority by the **31<sup>st</sup> August 2009** if you want to apply for free allowances. The monitoring plan is subject to approval by your competent authority. (Note: It is not a requirement to have your monitoring plan approved by a verifier before it is submitted to the competent authority).

For those aircraft operators that will fall under the EU ETS scheme after the start of 1 January 2010 (new entrants) the timelines for submitting a monitoring plan for tonne km can differ (some new entrants can apply for the special reserve of free emission allowances). For more guidance on new entrants and the special reserve) please contact the competent authority of your administering Member State.

Chapter 4 of this guidance outlines what information should be submitted in the monitoring plan for tonne km data.

### 1.5 Verification

The verifier has to verify the emissions report and tonne km report according to the MRG. At the end of verification the verifier comes to a verification opinion that states with reasonable assurance whether the emissions report and tonne km report is free from material misstatements and there are no material non-conformities. If that is the case the reports are satisfactory. The findings, verification methodology and verification opinion are submitted by the verifier in the verification report which is sent to the aircraft operator. By the 31<sup>st</sup> of March 2011 the aircraft operator will submit the emissions report and tonne km reports together with the corresponding verification reports to the competent authority.

Note that you as aircraft operator have to commission an accredited verifier to verify your emissions report and tonne km report. Accreditation requirements might differ between Member States. Please contact your competent authority on what requirements apply to verification and accreditation.

## 1.6 Administration of the scheme

All aircraft operators falling within the scope of the EU ETS are assigned an "administering Member State". This Member State's national law will apply, and obligations arising from the scheme (e.g. to report annual emissions or surrender allowances) will be towards this state. Note that your administering Member State does not in any way affect the scope of the scheme - the essence of the EU ETS obligations will be the same across the EU. See also Chapter 2 of this guidance for a more detailed discussion of the EU ETS coverage.

Any reference to "your competent authority" made in this document should be read as the appropriately designated authority/ies in your assigned administering Member State.

## 1.7 Which requirements do you have to meet?

The monitoring plans (MP) for annual emissions and for tonne km data as well as the reports based on these MPs have to meet the requirements for monitoring and reporting arising from the relevant legislation. In its approval process, the competent authority will check if your monitoring plans and reports match these requirements.

You are required to monitor and report your annual emissions and tonne km data according to the approved monitoring plan as well as national legislation implementing the Monitoring and Reporting Guidelines (MRG).

## 1.8 Purpose of the monitoring plans

It is in the interest of the aircraft operator to have robust monitoring plans to ensure compliance with EU ETS requirements. Furthermore the monitoring plans are the reference for supervision by the competent authorities and for assessing whether aircraft operators are monitoring their annual emissions and tonne km data in accordance with the requirements of the legislation and regulations on emission trading. Moreover, the verifier has to use your monitoring plan on annual emissions and the monitoring plan on tonne km data as reference point for verifying the annual emissions report and the tonne km report, respectively. The monitoring plan is thus the translation of the general requirements on monitoring and quality assurance which the aircraft operators are required to implement. The monitoring plans contain references to underlying procedures that should ensure that the reported data is complete, accurate and in line with all relevant provisions of the MRG.

## 1.9 Start of the monitoring year

Whilst the deadline for submitting your monitoring plans is 31<sup>st</sup> August 2009, this does not mean that all procedures must be implemented by this date. Rather, your procedures need to be implemented by the start of the monitoring year beginning 1<sup>st</sup> January 2010. From that moment you are required to monitor your annual emissions and tonne km data according to your monitoring plan. However, please be aware that the procedures described in your monitoring plan should match those implemented. Therefore you need to have completed the planning phase for your MRG related activities by 31<sup>st</sup> August 2009. You have to be able to implement the procedures and carry out the activities that you have described in your monitoring plan by 1<sup>st</sup> of January 2010.

## 1.10 Changes to your monitoring plan

After you have submitted your monitoring plan, changes may occur in your operation, monitoring methodology and your procedures. If there are changes to your monitoring methodology, you may need to notify your competent authority. Please contact your competent authority on which procedure for notification to follow and which of these changes need an update of your monitoring plan. Similarly, the CA can request that you change your monitoring plan if it no longer conforms with the MRG.

Note that the MRG requires you to improve your performance in monitoring and reporting annual emissions. This means that you have to adapt your monitoring methodology if this improves the

accuracy of the reported data, unless this is technically not feasible or would lead to unreasonably high costs.

When submitting your emissions report and tonne km report, you are also required to list in the reports all relevant changes that occurred during the reporting period as regards your operations, as well as deviations from your approved monitoring plan.

### **1.11 Purpose of this guidance**

This guidance aims to help aircraft operators set up their monitoring plan for monitoring and reporting annual emissions and tonne km data. The requirement to submit a monitoring plan for annual emissions data is mandatory for all aircraft operators. The requirement to submit a monitoring plan for tonne km data is only mandatory if you want to apply for free allowances. The monitoring plan templates can be found at the website of your competent authority. Competent authorities can develop their own monitoring plan templates provided that the templates require at least the same data input as the templates approved by the Commission.

You should contact your competent authority on which procedure to follow when submitting your monitoring plan.

Furthermore the guidance contains information on the requirements for monitoring and reporting annual emissions and tonne km data.

### **1.12 Exemplar Monitoring Plans for tonne km data and annual emissions**

Exemplar monitoring plans have been developed to help you draft your monitoring plans. These examples give an indication of what level of information is required when summarising your monitoring methodology and internal procedures. Please contact your competent authority on where to find these examples.

### **1.13 How to read this guidance?**

**Chapter 2** of this guidance explains how you can check which flights you need to monitor as an aircraft operator participating in the scheme and how you can check whether you are eligible for simplified procedures for small emitters.

**Chapter 3** of this guidance provides information on how to set up your monitoring methodology and internal procedures. Before attempting to fill in the mandatory template, please be aware that the monitoring plan should reflect *your* method of monitoring annual emissions and tonne km data. The monitoring plan is a summary of the internal procedures you need to have in place to ensure that the data reported is accurate and monitored in line with all relevant monitoring and reporting provisions. Chapter 3 explains the relation between the setting up of internal monitoring and reporting procedures and the description of these processes in your monitoring plan.

**Chapter 4** gives instructions on what information should be included in the tonne km monitoring plan. It also aims to provide guidance on the monitoring requirements concerning tonne km data.

**Chapter 5** contains instructions on what to incorporate in the monitoring plan for annual emissions and offers guidance on the monitoring requirements concerning emission data.

The Annexes contain specific information relating to issues addressed in the chapters such as the interpretation of Annex I activities and requirements for small emitters. Please see the table of contents on what is in the Annexes.

## 2 The scope of EU ETS Aviation

Before you draft your monitoring plan you are advised to check:

- whether you fall under the scope of the EU ETS Directive and who your administering Member State is;
- which flights have to be monitored by you as an aircraft operator participating in the scheme;
- whether you are eligible for simplified procedures for small emitters.

### 2.1 Are you in the scope of the EU ETS Directive?

The aviation activities that are included in the scheme are listed in Annex I of the EU ETS Directive. All aircraft operators who perform such aviation activities have to participate in the emissions trading scheme, regardless of where they are based.

This means that an aircraft operator falls under the EU ETS scheme if it performs flights which arrive at or depart from an aerodrome situated in the territory of an EU Member State. **Annex H** contains a list of overseas islands that are to be regarded as territory of an EU Member State. Virtually all flights that come from or go to the European Community are included. Please note that this definition also includes aircraft operators that are not established in one of the EU Member States, meaning that they must also participate in the emissions trading scheme if they operate flights to or from an aerodrome of an EU Member State.

If an aircraft operator only operates flights that are subject to the exemptions laid down in Annex I of the EU ETS Directive or if an aircraft operator is a commercial air transport operator falling below the de minimis threshold, the aircraft operator does not fall under the EU ETS scheme.

The European Commission published a list naming aircraft operators whose activities in the past (after 1 January 2006) indicates that they may have to participate in the emissions trading scheme. The list states the EU Member State that has been designated as the 'administering Member State' for each specific aircraft operator. You can find the list at the website of the Commission. The list of participating aircraft operators will be updated each year to allow new aircraft operators to be added.

An aircraft operator is the person who operates an aircraft at the time it performs an aviation activity listed in Annex I of the EU ETS Directive or, where that person is not known or is not identified by the owner of the aircraft, the owner of the aircraft. From an EU ETS point of view, aircraft operators are defined by the call sign used for Air Traffic Control (ATC). In general, this is the unique ICAO designator in box 7 of the flight plan (three letter code, which excludes the flight identifier). When the unique ICAO designator is not available, the aircraft operator will be identified by the registration marking of the aircraft, which should then be used as a call sign for ATC purposes in the flight plan. Usually the registration marking will concern the owner of the aircraft.

For more detailed information about the status of the Commission's list of aircraft operators and whether or not you have obligations under the EU ETS scheme, please see the website of your competent authority.

### 2.2 Which flights should be monitored by the participating aircraft operators?

If you have a unique ICAO designator, you have to monitor all flights under this designator. Where an ICAO designator is not available you are identified as an aircraft operator by the registration markings of your aircraft. In that case you must monitor all flights under this (or these) registration markings. Wherever the paragraphs below mention ICAO designator it should read aircraft registration markings entered in box 7 of the flight plan if the ICAO designator is not available.

The use of the ICAO designator does not necessarily imply that an aircraft operator is commercially or operationally responsible for a particular flight. This depends in most cases on the type of

commercial arrangements between carriers in the aviation sector.

Whether code sharing, dry leasing or wet leasing, long or short term leasing is applied by an aircraft operator has no bearing on identifying the aircraft operator. The unique ICAO designator entered in box 7 of the flight plan determines whether you are the aircraft operator for a particular flight and thus that you have to monitor this particular flight. This means that leased-in aircraft and ad hoc or sub charter flights could still be assigned to you if your ICAO designator is entered in box 7 of the flight plan. If you provide capacity for third parties (e.g. perform ACMI operations, use code sharing or lease in or lease out aircraft), you will have to identify which ICAO designator is used in the flight plans and take only those flights using your own ICAO designator into account.

A daughter company does not have to submit a monitoring plan if all flights of the daughter company are performed under the unique ICAO designator of the parent company or sister company, entered in box 7 of the flight plan. The parent or sister company will in that case be the aircraft operator for flights performed by the daughter company and all flights will have to be covered in the monitoring plan and reports of the parent or sister company.

An aircraft operator having two Air Operator Certificates but only having one unique ICAO designator should submit one monitoring plan.

You could use Eurocontrol data on payment of route charges to check whether this matches your unique ICAO designator in box 7 of the flight plan. Aircraft operators have access to their own data on the website portal of Eurocontrol.

#### **Exemptions from the scope of the EU ETS Directive**

Some flights are excluded from the EU ETS scheme. These exemptions are laid down in Annex I of EU ETS Directive. The European Commission drafted a decision to provide a more detailed interpretation of aviation activities, giving an interpretation of flights for each exempted category, also in relation to exemption codes used by the Eurocontrol's Central Route Charges Office (CRCO). You can find the text of the guidelines in **Annex A** of this guidance.

According to Annex I of the EU ETS Directive the following flights are excluded from the scope of the EU ETS Scheme (for the exact wording of the exemptions see **Annex A**):

1. flights between aerodromes that are not situated in an EU Member State are not included in the EU ETS scheme and do not have to be monitored or reported;
2. flights of a reigning monarch, heads of state, heads of government and government ministers, of a country other than a Member State;
3. military flights performed by military aircraft;
4. flights related to search and rescue, firefighting flights, humanitarian flights and medical service flights;
5. flights performed exclusively under visual flight rules;
6. circular flights (departing and arriving at the same airport without an intermediate stop);
7. training flights;
8. flights performed exclusively for the purpose of scientific research;
9. flights performed by aircraft with a certified maximum take-off mass of less than 5700 kg;
10. flights performed in the framework of public service obligations;
11. flights performed by a commercial air transport operator who falls below the de minimis rule.

Be aware that this exemption applies to **commercial** air transport operators only and not to **non-commercial** air transport operators.

The exemptions mentioned under 1 to 10 relate to flights. If you perform a training flight with the CRCO exemption code T only this particular flight is to be excluded from monitoring and reporting.

The exemption mentioned under 11 is linked to the commercial status of the air transport operator and not to the commercial status of the flight in question. This means that all flights performed by a commercial air transport operator that depart from or arrive at an aerodrome situated in an EU Member State and that are not excluded by the exemptions mentioned under 1 to 10 have to be taken into account in deciding whether the commercial air transport operator falls above or below the de minimis threshold.

The text of Annex I of the EU ETS Directive and the Commission's guidelines in **Annex A** of this guidance will help you determine which flights are included in the scope of the EU ETS scheme and which are not. It also contains information on how to interpret the de minimis threshold for commercial air transport operators.

### 2.3 Are you eligible for simplified procedures for small emitters?

The MRG allow small emitters to apply a simplified procedure for monitoring their annual emissions. If you operate fewer than 243 flights per period for three consecutive four-month periods **or** you operate flights with total annual emissions of less than 10 000 tonnes CO<sub>2</sub> per year you are considered to be a small emitter.

The simplified approach is open only to non-commercial operators below the above thresholds. Commercial air transport operators are altogether excluded from the scope of the EU ETS scheme if they remain below the thresholds.

All commercial air transport operators must hold an Air Operator's Certificate (AOC) under Part I of Annex 6 to the Chicago Convention. If you do not have such a certificate you are not a commercial air transport operator for the purpose of the scheme. Please see for further information the Guidelines on interpretation Annex I of the EU ETS Directive which can be found in **Annex A** of this Guidance.

Please note the following when assessing if you are eligible to use the simplified approach:

- Assessment against the thresholds for small emitters should be made using your predicted activity or estimated annual emissions. You can estimate your annual emissions from your fuel consumption during one year. The estimated annual emissions can be calculated from the fuel consumption by using the following formula for jet kerosene:

$$\text{Estimated annual emissions (ton of CO}_2\text{)} = \text{Annual fuel consumption (tonnes)} \times 3.15 \text{ (tonnes of CO}_2\text{ /tonnes of fuel)}$$

For aviation gasoline and jet gasoline you have to substitute the emission factor (EF) of 3.15 by the EF of 3.10.

- For the purpose of assessing whether you operate less than 243 flights per period, the four month periods are January – April, May – August and September – December. The local departure time of flights determines in which four month-period flights have to be taken into account.
- The flights that are exempted in Annex I of the EU ETS Directive are not to be included in assessing the number of flights or the total amount of annual emissions.

You should also note that the simplified procedures open to small emitters only apply to emissions reporting. The requirements for monitoring and reporting tonne km data by small emitters are the same as for regular aircraft operators that are not small emitters.

The monitoring plan for annual emissions for small emitters can be simplified. **Annex D** of this guidance contains specific information on what small emitters have to do and how they have to complete their monitoring plan for annual emissions.

## 3 How to set up your monitoring methodology and internal procedures?

In order to set up a good monitoring method and plan it is important to assess what actions are needed to enable you to draft your emissions report and tonne km report. Mapping out the data acquisition and handling procedures ("data flow") in your organization and implementing procedures for monitoring and reporting is crucial to ensure that reliable and correct emissions and tonne km data are reported to the competent authority. Before mapping your data flow and setting up your internal procedures you should understand what data you have to submit in your annual emissions report and tonne km report. Reporting templates have been developed by the Commission which indicate precisely what you have to fill in.

The monitoring plan templates requires you to refer to and describe several internal procedures. This chapter explains how to set up your data flow and your procedures and how the actual process of setting up these activities are related to what you have to submit in your monitoring plan.

### 3.1 Relation between data flow and control activities

Annex I, section 10.1 MRG requires you to establish, document, implement and maintain effective data acquisition and handling activities (dataflow activities). The data flow activities concern all operational activities that are necessary to produce an emission report and tonne km report from primary data. This includes measuring, monitoring, analysing, recording, processing and calculating parameters: all steps that are needed to come to a tonne km report and emissions report. Primary parameter data include for example fuel measurement data, fuel density, flight numbers and schedules, aircraft numbers and routes, mass of freight and mail, mass of passengers and checked baggage as well as Great Circle Distance.

Paragraph 3.2 of this guidance explains how you could set up a data flow and what you should submit in your monitoring plans.

To ensure that the annual emissions report and the tonne km report resulting from the data flow activities do not contain misstatements and are in conformance with the corresponding approved monitoring plan and the MRG you have to establish, document, implement and maintain a control system which consists of a risk assessment process and control activities (Annex I, section 10.2 MRG). The term misstatement is defined in **Annex E** of this guidance.

In the risk assessment process you identify and assess the risks in the data flow activities that could lead to misstatements in the emission report and the tonne km report and that could lead to non-conformance with the approved monitoring plan. The outcome of such a risk assessment determines to what extent the control activities should be set up. A risk-based approach will contribute to a better focused effort in managing compliance and should therefore contribute to cost efficiency.

Control activities are activities designed to mitigate risk (reduce the impact and/or the likelihood of misstatements and also of non-conformance to the monitoring plan). If the risks to misstatements and non-conformities in a particular data flow activity are high, the control activities for that activity should be stronger and more robust.

You are required to set up procedures to ensure that your controls are effective and act in a timely manner. More guidance on how to perform a risk assessment and how to implement control activities is provided in paragraph 3.3 and 3.4.

Please consider that you only have to provide a summary of and reference to internal procedures in the monitoring plan. You do not have to attach the whole procedure in your monitoring plan. If the

competent authority wants to check the procedure in more detail it will contact you.

### 3.2 How to set up data flows

According to Annex I, section 10.3.1 MRG the data flow activities should be set up in such a way that there is a clear linkage with the previous and the next activity. The sequence and interaction between those activities should be clear. This could be achieved by mapping the data flow activities in a diagram form or in a flow chart.

You may want to consider drawing up two separate data flow diagrams if you have more than one standard data flow procedure - e.g. if some aircraft are equipped with a direct datalink from on-board IT to a central system, but other aircraft require paper copies of flight documentation and a manual link.

The steps below will help you to set up a data flow and fill in the required sections in your monitoring plan.

Step	Explanation
Step 1	<ul style="list-style-type: none"> <li>▪ understand your competent authority’s monitoring and reporting requirements;</li> <li>▪ understand which flights you have to monitor (see Chapter 2);</li> <li>▪ understand which specific data are needed for monitoring (see Chapter 4/5);</li> <li>▪ understand which data has to be reported precisely in your tonne-km and emissions report (see reporting templates on your competent authority’s website);</li> <li>▪ understand where data is currently kept and what their primary sources are (see paragraph 3.1).</li> </ul> <p>You should for example have an understanding of what is meant by passengers, which weight data should be taken, which mass data is required and whether the sources for these data contain all information required for monitoring.</p>
Step 2	<ul style="list-style-type: none"> <li>▪ identify what steps in the data flow are necessary to produce the required reports (tonne km data and annual emissions);</li> <li>▪ assess which of these are (fully/partially) common practice and what further effort is required to implement these steps;</li> <li>▪ identify what needs to be changed in your current data management system including data from external sources.</li> </ul> <p>You will need to have an understanding to what extent operator-specific circumstances apply and deal with them appropriately. For example, if fuel consumption recording has been largely automated for one half of your fleet and is done manually for the other half, then you will need to work out both scenarios in procedures.</p>
Step 3	<p>Map your data flow diagrams.</p> <ul style="list-style-type: none"> <li>▪ each block in the flow diagram should contain a distinct activity. Apply a chronological order;</li> <li>▪ each task should be allocated to a specific responsible party (job title/ post), have a clear source and lead to a traceable result (record);</li> <li>▪ clearly identify the systems/databases into which records are taken from or uploaded;</li> <li>▪ draft instructions and explanatory texts to enable a sufficient level of understanding for the users of the data flow diagrams (e.g. responsible staff and verifiers).</li> </ul>
Step 4	<p>Make sure that your new data flow diagrams match actual practice.</p> <ul style="list-style-type: none"> <li>▪ update internal roles and responsibilities, procedures;</li> <li>▪ implement new or adjusted data management systems (electronically and manually).</li> </ul>
Step 5	<p>Develop procedures for the data flow activities (According to Annex I, section 10.3.1 MRG you are required to set up procedures for the data flow activities.)</p> <p>These procedures should at least describe the following elements:</p> <ul style="list-style-type: none"> <li>▪ what tasks and/or actions are performed in the activity concerned;</li> <li>▪ the responsible job title for each data flow activity;</li> <li>▪ the information system used for processing and implementing a particular data flow</li> </ul>

Step	Explanation
	activity; <ul style="list-style-type: none"> <li>▪ the frequency with which a particular data flow activity is carried out;</li> <li>▪ how and where the data flow activity is recorded.</li> </ul>
Step 6	Include summary of the procedures in the monitoring plan. <ul style="list-style-type: none"> <li>▪ summarize key elements for the procedures mentioned in table 1. Table 2 shows what you have to complete on the procedure in the relevant MP sections;</li> <li>▪ attach a representation of the data flow for tonne km data in <b>section 7(e)</b> monitoring plan template for tonne km;</li> <li>▪ attach a representation of the data flow for annual emissions in <b>section 11 (e)</b> monitoring plan template for annual emissions.</li> </ul>

As mentioned under step 5 you are required to set up procedures for data flow activities. Table 1 below summarises the procedures for the data flow activities on tonne km monitoring and annual emissions monitoring.

*Table 1 Required procedures for tonne km monitoring and annual emissions monitoring*

Required procedures for TK monitoring	Required procedures for emissions monitoring
Defining the monitoring methodology for additional aircraft types	Defining the monitoring methodology for additional aircraft types
Tracking the completeness of the list of emission sources (aircraft operated) over the reporting year	Tracking the completeness of the list of emission sources (aircraft operated) over the reporting year
Monitoring the completeness of the list of flights operated under the unique ICAO designator by aerodrome pair	Monitoring the completeness of the list of flights operated under the unique ICAO designator by aerodrome pair
Determining whether flights are covered by Annex I of the EU ETS Directive, ensuring completeness and avoiding double counting	Determining whether flights are covered by Annex I of the EU ETS Directive, ensuring completeness and avoiding double counting
Monitoring aerodrome location information	Monitoring fuel consumption per flight, in both owned and leased-in aircraft
Determining the Great Circle Distance between aerodrome pairs	Determining the density used for fuel uplifts and fuel in tanks, in both owned and leased-in aircraft (operated under your ICAO designator).
Monitoring the number of passengers on a flight	Ensuring that the total uncertainty of fuel measurements will comply with the requirements of the selected tier
Monitoring the mass of freight and mail on a flight	Cross checks between uplift quantities from invoices and uplifts from on-board devices
	Determination of emissions factor, net calorific value and biomass content of alternative fuels

Both the template tonne km monitoring plan and the template emissions monitoring plan require you to provide summaries of how you organise each of the above-mentioned procedures. A standard table is provided per procedure. The table below explains in more detail what information you are expected to provide per field. Referring to already existing procedures is allowed. Procedures may either be ETS specific or serve multiple purposes.

Table 2 Explanation on what to describe on table 1 procedures in monitoring plan

Content	Explanation
Title of procedure	Name of procedure.
Reference for procedure	Insert reference for document management and reference to procedure concerned. The reference should be traceable and verifiable.
Brief description of procedure	<p>Insert a brief description of how the procedure guarantees that the objective of the procedure will be achieved. The description should be such that:</p> <ul style="list-style-type: none"> <li>the competent authority is convinced of the effectiveness and actual implementation of the procedure. The competent authority should be able to derive from the generic description how the procedure is functioning in general.</li> <li>it is clear to the verifier how the procedure functions and that the procedure can effectively serve as a basis for risk analysis.</li> </ul> <p>Note on risk assessment (as required in management section 7 MP tonne km and section 11 MP emissions): you should incorporate data-specific risks and control activities here in the table 1 procedures and refer back to them in the management section. This will clarify the relation between control activities and the relevant procedures listed in table 1.</p>
Function or department responsible for data maintenance	Insert the function or department responsible for implementing the procedure and responsible for the data generated from or managed by the procedure.
Location where records are kept	Insert the address and office or department where original hard copy records are kept and where IT systems are located.
Name of system used (where applicable).	Insert the name or reference of the IT system where soft copy records and/or critical data are kept.

### 3.3 How to perform risk assessments

Once you have set up all required data flow diagrams, you should assess the risks to misstatements and non-conformities. The following steps may be useful for you.

Step	Explanation
Step 1	<p>Identify per activity the risks of non-conformance with the monitoring plan and misstatements – mismatches between actual performance and reported data.</p> <p>In terms of the MRG, these risks are the so called inherent risks, i.e. risks assuming no controls have been put in place thus far. After having identified the control activities, the risk assessment should also apply to these control activities, to ensure their effective operation. This is referred to as control risk, i.e. the risk that ineffective controls lead to misstatements or non conformities.</p>
Step 2	<p>Assess the identified risks by determining likelihood (low, medium or high) and possible impact (low, medium or high).</p> <p>One method of numerically determining the level of risk is to assign a score (low=1, medium=2, high=3) to both the likelihood and impact and then evaluate the risk as the product of likelihood x impact.</p>

To ensure that the risk assessment is done accurately the operator is required to set up a written procedure for the risk assessment according to Annex I, section 10.3.1 MRG. The risk assessment itself should be stored in internal records within the company.

The risk assessment will need to be updated whenever there are significant changes in the operation or when it appears to be not sufficiently effective. (This could be concluded on the basis of verification results, internal audits, information from executives, suppliers and/or the competent authority.)

The aircraft operator should submit a traceable reference to the risk assessment in section 11 (b) in the Monitoring Plan for annual emissions and section 7 (b) in the Monitoring Plan for tonne km data.

### 3.4 How to implement control activities

You are required to implement control activities to mitigate the risks to misstatements in the tonne km report and the emissions report, as well as to mitigate non-conformities. Control activities need to be defined depending on the outcome of your risk assessment, so as to ensure a proper and cost efficient focus of your efforts.

According to Annex I, section 10.3.1 of the MRG some of the control activities to be implemented include the following:

- a. Quality assurance of the measurement equipment and information technology;
- b. Internal reviews of reported data;
- c. Outsourced processes;
- d. Corrections and corrective action;
- e. Records and documentation;
- f. Management of the necessary competences for the responsibilities assigned.

**Annex F** provides for more guidance on these control activities.

To ensure that the control activities are effective and to mitigate the risk that ineffective controls lead to misstatements and non-conformities, the MRG requires you to set up procedures for these control activities. **Annex F** provides guidance on what these procedures should guarantee and regulate.

You are required to incorporate a traceable reference (i.e. an internal company reference number) to these procedures for control activities in section 11 (b) monitoring plan for emissions and 7 (b) monitoring plan for tonne km data.

### 3.5 Data retention

According to Annex I, section 10.3.6 of the MRG you are required to keep records of documentation and information relevant for EU ETS for at least ten (10) years.

## 4 How to set up your Monitoring plan for tonne km data?

This chapter explains what information you have to submit in the monitoring plan template for tonne km data. All relevant sections of the monitoring plan template must be completed unless the template specifically states that the particular section is not applicable to you. The sections in this chapter refer to the sections in the tonne km monitoring template.

### **Section 1 MP TK Template: Changes to the Monitoring Plan**

The aim of this section is to provide an audit trail of monitoring plan amendments.

This section will identify the receipt date of the request by the aircraft operator to amend the plan, the date of issue by the competent authority of the amended plan and a brief description of the amendment(s). The description also includes a reference to the MP sections where modifications were made.

### **Section 2 MP TK Template: Identification of Aircraft Operators**

Section 2 of the Monitoring Plan Template requires you to submit information that will identify you as an aircraft operator. The objective is to show your competent authority and verifier what sort of aviation activities you carry out, what the legal status of your operation is and what your operations are.

This section of the guidance outlines information requirements that are common to all Member States. For further information, please refer to the templates on your competent authority's website.

#### **Section 2 (a, b and e): Name of aircraft operator and unique identifier on Commission's list**

You are asked to enter the name of the aircraft operator under section 2 (a). The name that is to be stated in this section is that of the legal entity who operates an aircraft at the time it performs an aviation activity listed in Annex I of the EU ETS Directive.

Only if different, enter in section 2 (e) your aircraft operator name as it appears on the Commission's list of aircraft operators.

In section 2 (b) you have to submit your unique identifier as stated in the Commission's list of aircraft operators.

#### **Section 2 (c): Primary monitoring plan**

Section 2, 3, 4 d - f in the MP for tonne km data are identical to the respective sections in the MP for annual emissions. In order to avoid unnecessary duplication of reporting you may select either the tonne km MP or the MP for annual emissions as the primary document. When you have made your selection you have to fill in the requested information only once in the selected document. You are though strongly advised to select the monitoring plan for annual emissions as your primary document for the following reasons:

- the MP for emissions requires you to fill in additional information in section 4 on fuels;
- the MP for emissions is the basis for the emissions report you have to compile each year;
- the MP for emissions has to be reviewed before each trading period (see Chapter 1 of the guidance). During the review the aircraft operator will be required to complete all sections in the MP for emissions. This also contains an update of section 2, 3 and 4c as appropriate.

#### **Section 2 (d) New or updated monitoring plan**

In this section you are required to fill in whether this is a new or an updated monitoring plan. The monitoring plan to be submitted by the 31<sup>st</sup> of August 2009 is a new monitoring plan.

### **Section 2 (f): ICAO designator**

If applicable, you are asked to enter your unique designator used as call sign for Air Traffic Control purposes. The designator is as entered in box 7 of the ICAO flight plan (the 3 letter code, which excludes the flight identifier).

In principle each aircraft operator can only use one unique ICAO designator in the monitoring plan. Aircraft operators are not allowed to add ICAO designators from sister or daughter companies which, because they use their own unique ICAO designator, have to be regarded as different aircraft operators. Otherwise two different aircraft operators would be covered in the same monitoring plan, which is not allowed.

However in exceptional cases the competent authority can allow more than one ICAO designator to be used by the **same** aircraft operator in the same monitoring plan. This will be decided on a case by case basis. It might happen for a specific reason that the aircraft operator uses more than one designator, but all flights fall under the responsibility of the same legal entity and the aircraft operator has one AOC and uses the same procedures and systems. In that case the aircraft operator needs to submit his reasons for using more designators in section 2 (o) MP template. It is not permitted to list the ICAO designator from an aircraft operator assigned to a different Member State or from an aircraft operator that is listed separately on the Commission's list.

You have to ensure that any additional designators are not used by any subsidiary companies that are to submit a separate plan to either your own Member State or other Member State competent authority. This is to avoid any double counting.

If you do not have an ICAO designator then state "n/a" within this section.

### **Section 2 (g) Aircraft registration marking**

This section should be completed only if you don't have a unique ICAO designator. In that case you are required to enter the aircraft registration markings used as call sign for ATC purposes for all aircraft you operate (as entered in box 7 of the flight plan). List all the aircraft registration markings that are within the fleet at the time of submission of the monitoring plan.

### **Section 2 (h) Administering Member State**

Within this section you are required to fill in your administering Member State. Please see Chapter 1 for more guidance on the administering Member State.

### **Section 2 (i) Competent Authority in the administering Member State**

Within this section you are required to fill in your competent authority. If there is more than one competent authority dealing with EU ETS for aircraft operators within a Member State, please enter the name of the appropriate authority.

### **Section 2 (j) AOC and operating licence**

Within this section you are requested to state the Air Operator Certificate (AOC) number, the EU Operating Licence (OL) or the ACOL reference number and the issuing authority, if applicable.

All EU-based commercial operators are required to hold both an EU Operating Licence and an Air Operator Certificate. Aircraft operators based outside the EU will not have an EU Operating Licence. Should this be the case, they are only required to fill in the AOC.

Non-commercial operators will not hold an AOC or OL and hence will not enter any details within this section.

### **Section 2 (m) Ownership structure of your firm**

Within this section you are requested to illustrate the ownership structure of your firm including the unique ICAO designator of any subsidiaries or parent company (or registration marking if an ICAO designator is not available), and indicate the administering Member State of these entities, if applicable. Add attachments to your monitoring plan as necessary to show a diagram of your ownership structure. The diagram can be set up on a high level basis.

### **Section 2 (n) Scope of activities**

Using the drop down boxes, identify what best describes the scope of your activities.

Commercial operators must submit a copy of Annex 1 of their AOC with the monitoring plan.

### **Section 2 (l) Description of activities**

This section requires you to provide a concise description of the activities undertaken within your company (i.e. whether you transport passengers, freight or mail).

You also have to provide general information about your operations such as whether you participate in code-sharing, lease aircraft (dry-lease, wet-lease, short term/long term lease, lease-in/ lease out), perform ad hoc flights etc. Please also specify geographical coverage if it further defines your operations. This description should give the competent authority and verifier a general idea on what activities are carried out within the company.

### **Section 3 MP TK Template: Contact details and address for service**

To enable the competent authority and verifier to contact you, you are required to fill in section 3 of the MP template.

#### **Section 3 (a) Contact details**

This section requests contact details of the person who can be contacted should the competent authority have any technical or administrative queries regarding the monitoring plan submission. These should be persons who have been involved in either completing the plan or co-ordinating the data entry.

If the person is acting on behalf of the aircraft operator (e.g. a consultant) then the person's organisation name needs to be stated. This would also be applicable if you outsource the drafting of your monitoring plan.

#### **Section 3 (b) Address for service**

This section is requesting a contact name and address for the service of notices or appropriate documents (e.g. the issue of approved monitoring plans) in connection with national law implementing the EU ETS Directive. The contact person could be the owner or designated person (e.g. Company Secretary) of the registered company. This would be the legal contact for the aircraft operator and the formal address for service of legal notices. In some cases this could be the same person as defined in section 3 (a).

### **Section 4 MP TK Template: Emission sources and fleet characteristics**

The MRG requires you to include all flights falling within the scope of the EU ETS Directive in the monitoring and reporting process. This means that you have to exclude all flights that are not covered by the EU ETS scheme. Chapter 2 of this guidance explains how you can determine which flights are covered by EU ETS and which are not. To prevent double counting and to ensure that all flights falling under the scope of the EU ETS Directive are reflected in the data reported in the annual emission report, aircraft operators have to fill in section 4 of the monitoring plan for tonne km data.

#### **Section 4 (a) List of aircraft types**

The aim of the first table within this section is to provide a list of aircraft types that you operate at

the time of submission of the monitoring plan. A field is provided to enter the date of submission.

Each aircraft type should be identified by its ICAO alphanumeric aircraft type designator (e.g. A332 is the type designator for an Airbus A330-200). A complete list of ICAO aircraft type designators can be found from the following link: <http://www.icao.int/anb/ais/8643/index.cfm>

The MP template allows you to further specify sub-types of the aircraft type you have entered in the first column. This might be relevant in defining the specific monitoring methodology for new and old versions of the same generic aircraft type, each with different on-board systems. E.g. an older B742 aircraft type might use manual transmission of data, whereas a new B742 sub-type might have ACARS and more accurate on-board measurement equipment that automatically display fuel tank contents in terms of mass.

Enter in the list the number of each generic aircraft type at the time of submission of the monitoring plan. Note: the number entered should include any leased-in aircraft for which you are the aircraft operator.

#### **Section 4 (b) Indicative list of additional aircraft types**

This section requires you to provide an indicative list of additional aircraft types that you expect to operate and for which you are the aircraft operator (aircraft types operated under your ICAO designator or if this is not available your registration markings). The objective of this section is to enable an aircraft operator to provide details of aircraft types which are currently not part of their fleet but might be in the foreseeable future. This would reduce the requirement for regular updates of the monitoring plan. If an aircraft operator cannot foresee the use of certain aircraft types based on their future plans (or historic activities in the case of leased in aircraft), then this table should be left blank.

This table must not include the same generic aircraft types identified in table 4(a). For example, if you expect to purchase or lease in additional B742 aircraft and have already identified this aircraft type in table 4(a), then table 4(b) remains empty.

Using the drop-down list select the number-range that best fits the number of additional aircraft that you expect to use.

You are required to make as accurate an estimate as possible of any additional aircraft types which you expect to operate after submitting your monitoring plan. Discrepancies between actual data on aircraft types used and the data that you have listed in this section will not lead to non-conformities in the verification process or enforcement.

Note that the MRG require you to ensure that data on the actual aircraft types operated is recorded correctly in your internal systems and registers on a continuous basis.

#### **Section 4 (c) Procedure for defining the monitoring methodology for additional aircraft types**

You have to implement a procedure which ensures that the monitoring methodology will be defined and recorded for any additional aircraft types you operate and for which you are the aircraft operator (aircraft types operated under your ICAO designator or if this is not available your registrations markings). This concerns the additional aircraft types which do not appear in your monitoring plan.

The data on the monitoring methodology used for additional aircraft types must be recorded in your internal systems and have to be made available for verifiers and the competent authority.

This procedure should set out your approach to determine which monitoring methodology would be

applied to an aircraft type currently not included in your plan at the time of submission. Criteria decisive for specifying the monitoring methodology for these aircraft types shall also be included in this procedure (e.g. on board measurements are being used unless the additional aircraft type does not have adequate meters).

If the chosen monitoring methodology is the same as for one of the existing aircraft types laid down in section 4 (a) monitoring plan, you can refer to that particular methodology. You should record in your internal systems and registers any additional aircraft types that have been operated and for which you are the aircraft operator and record that you are using the same methodology for these additional aircraft types as for the aircraft types specified in your monitoring plan.

If you are using a new monitoring methodology for an additional aircraft type that is not included in your monitoring plan you are required to contact your competent authority.

#### **Section 4 (d) Procedures for tracking completeness of emission sources**

You have to implement a procedure for tracking the completeness (including registration and de-registration) of any aircraft you operate and for which you are the aircraft operator (aircraft operated under your ICAO designator or if this is not available your registration markings). The objective of this procedure is to ensure that all these aircraft are included in your systems and end up in your tonne km report.

The procedure must guarantee that all these aircraft are recorded in your internal systems and that this list is available, accurate and up to date. The list should include all aircraft for which you are the aircraft operator (under EU ETS). This involves any code shares or leased in aircraft as applicable since the ICAO designator is the determining factor for identifying whether the aircraft falls under your EU ETS responsibility.

The list of aircraft used should also include relevant historical data on your fleet to enable the verifier and the competent authority to check the completeness.

Where applicable, you may refer to the list of aircraft associated with your AOC, provided that this list is accurate, complete and contains all aircraft you operate and for which you are the aircraft operator.

The procedure should also identify how you account for any aircraft in your fleet for which you are not the aircraft operator, to ensure that this information is not reported as part of your tonne km data.

In support of the requirements described in Chapter 3, this procedure must also include reference to the control activities you have implemented to ensure completeness of the list of aircraft used. For instance, one of the control activities could be to check whether the flights recorded in your internal systems match the data contained in invoices of route charges by Eurocontrol Central Route Charges Office (CRCO) for flights you have operated.

Where irregularities are found in your data, these have to be corrected. One of the requirements of the tonne km report is to identify the aircraft used during the reporting period by individual aircraft registration marking. Therefore you should have a system in place that records and stores this information and ensure that the data reported is accurate.

#### **Section 4 (e) Procedures for tracking completeness of the list of flights**

You have to implement a procedure to ensure that all Annex I flights which you operate under your responsibility as aircraft operator and the associated aerodromes of departure and arrival are captured and recorded in a list or in your internal systems. The tonne km report requires among other things data to be disaggregated by aerodrome pair.

The procedure must ensure that the list of flights and aerodrome pairs is kept up to date, is complete

and doesn't contain duplicate data. The procedure should indicate which flight related information is contained in your internal systems (such as flight number, flight routes, aerodrome of departure and arrival etc.).

In addition this procedure has to ensure that you can identify the flights for which you are responsible as aircraft operator (flights under your ICAO designator or if this is not available your aircraft registration markings). For example, a generic description that all wet leases fall always under your ICAO designator may be sufficient, provided that you can trace all wet lease operations and that these are recorded separately as wet lease operations in your system. This will enable the verifier and competent authority to check that flights not operated under your ICAO designator have been excluded from the reported data.

In support of the requirements described in Chapter 3, this procedure must also refer to the control activities you have implemented to ensure completeness of all flights and aerodrome pairs. For example, one of the control activities could be to check whether the flights for which you have been invoiced by Eurocontrol's Central Route Charges Office (CRCO) match the flights recorded within your internal systems. Aircraft operators can access their data on the Eurocontrol web-portal to perform these checks. Where irregularities are found in your data, these have to be corrected and corrective actions initiated to prevent recurrence.

Note that in recording data on the flights performed, you have to take the actual, rather than planned, flight details into account. For example, if a planned flight from Amsterdam to New York is diverted to London, this should be recorded as a flight from Amsterdam to London.

#### **Section 4 (f) Procedures for determining whether flights made are EU ETS flights**

You have to implement a procedure for determining which flights are covered by Annex I of the EU ETS Directive, ensuring completeness and avoiding double counting. The objective of this procedure is to avoid that non EU ETS flights are included in the tonne km report and to avoid that an EU ETS flight is unjustly excluded from your tonne km reported data.

The procedure must guarantee that any flights excluded from Annex I are not reported in your tonne km data. The procedure must also describe what control activities are in place to ensure that only Annex I activities are reported and non EU ETS flights are filtered out. For instance, you could cross check the list of included flights against the data from Eurocontrol route charges invoices. However, exemptions from Eurocontrol Route Charges Conditions 2007 are not in all cases identical to the exclusions referred to in Annex I of the EU ETS Directive. Please refer to **Annex A** of this document for the Commission's guidelines on activities excluded from Annex I EU ETS Directive. Non-Annex I activities should therefore always require an individual check.

#### **Section 5-6 MP TK Template: Monitoring tonne km data**

The MRG requires you to calculate the tonne km of all flights for which you are the aircraft operator and which are included in Annex I of the EU ETS Directive. This section of the guidance outlines the components of the calculation and the requirements for data used in the calculation.

Tonne km data is calculated using the following equation:

$$\text{Tonne kilometres (t km)} = \text{Distance (km)} * \text{Payload (t)}$$

How to determine the distance and the payload is explained in the following sections.

## Section 5 MP TK Template: Distance

Distance must be calculated using the following formula:

$$\text{Distance [km]} = \text{Great Circle Distance [km]} + 95 \text{ km}$$

The MRG defines Great Circle Distance as the shortest distance between any two points on the surface of the Earth, which shall be approximated by using the WGS84 system (referred to in Article 3.7.1.1. of Annex 15 to the Chicago Convention). The two points are the aerodrome of departure and the aerodrome of arrival.<sup>2</sup>

### Section 5 (a) Confirmation of the latitude and longitude of aerodromes

The MRG requires you to take the latitude and longitude of aerodromes either from aerodrome location data published in Aeronautical Information Publications (hereinafter "AIP") in compliance with Annex 15 of the Chicago Convention or from a source using such AIP data. Within this section you are requested to confirm that you are using such data.

### Section 5 (b) Methodology or data source used to determine distance

The MRG requires you to describe the methodology and data source used to calculate the Great Circle Distance per aerodrome pair.

You will need to identify within this section that your calculations are derived from the GCD approximated using the WGS84 ellipsoid. You also need to identify how distances are calculated (e.g. via internal calculations or the use of third party software).

If you calculate the distance by software of a third party, you have to show that you have taken steps to ensure that the calculation methodology is based on the WGS84 system and AIP data.

### Section 5 (c) Systems and procedures to monitor aerodrome location information

You must use the most up to date AIP data as of the 31<sup>st</sup> December 2010 to calculate your tonne km data for the reporting year 2010 (relating to the benchmark for the first and second trading periods).

To ensure that you are using the correct AIP data you are required to implement systems and procedures to monitor aerodrome location information.

This implies that you need to describe within this section the procedures you have in place for monitoring aerodrome location information and for ensuring that the AIP data is recorded in your system and that AIP data which is valid on 31<sup>st</sup> December of the reporting year is used.

If no AIP data are available in case of non standard aerodromes such as oil rigs, the aerodrome location coordinates applicable have to be registered by you and updated if they change. You are also required to submit in this section how aerodrome location coordinates were obtained.

In many cases, aircraft operators will have a link to information sources containing the location of aerodromes based on AIP data. The master data in your internal systems will have to be updated. The procedure and systems you have in place for monitoring AIP data should ensure this. Your system and procedure should define the procedural steps used to incorporate a new aerodrome location and the control activities to guarantee that the AIP data used for calculating the distance is up to date and accurate.

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<sup>2</sup> Eurocontrol planned to provide a tool for calculating the GCD. If this tool will be used approval by the competent authority for the determination of the GCD will be given while not performing a detail check on the GCD calculation methodology.

Systems to monitor the aerodrome location information can also be maintained and kept up to date by a third party (i.e. IT supplier). If you outsource the monitoring of aerodrome location information data you are still responsible for the correctness and accurateness of the data. You should therefore control the quality of these processes by defining appropriate requirements for outputs and review the quality delivered by the third party. You should assure yourself that the database using AIP data is frequently reviewed and kept up to date to ensure AIP data valid on 31<sup>st</sup> December of the reporting year is being used.

#### **Section 5 (d) Procedure to monitor the Great Circle Distance between aerodrome pairs**

You are required to show that you have adequate systems and procedures to monitor Great Circle Distance between aerodrome pairs. In this section of the template you have to describe these systems and procedures to ensure that AIP data is used for the calculation of the Great Circle Distance. They should describe which aerodrome coordinates you use as input and which control activities you have implemented to ensure that the aerodrome pairs are accurate and up to date. Note that the GCD's are not actual flight routes.

If you use a third party system to calculate the Great Circle Distance between aerodrome pairs you should control the quality of these processes by defining appropriate requirements for outputs and review the quality delivered by the third party system. You should assure yourself that the tool used is properly designed, tested, controlled and maintained to ensure reliable, accurate and timely processing of data.

#### **Section 6 MP TK Template: Payload (Passengers and Checked baggage)**

You have to use the following formula to calculate payload:

$$\text{Payload (t)} = \text{mass of passengers and checked baggage (t)} + \text{mass of freight and mail (t)}$$

#### **Section 6 (a): Method for determining the mass of passengers and checked baggage**

The mass of passengers and their checked baggage must be determined by one of the following options:

##### ***Tier 1: Default value***

A default value of 100 kg for each passenger and their checked baggage is used.

##### ***Tier 2: The mass contained in mass and balance documentation (actual or standard mass)***

The mass for passengers and checked baggage contained in the mass and balance documentation for each flight is used.

You are free to choose either tier. However, once you have chosen the tier and confirmed this in your monitoring plan, you are required to apply the chosen tier to **all** flights within the same trading period.

Mass and balance documentation is also known as weight and balance documentation. A definition of mass and balance documentation has been given in **Annex E**. For aircraft carriers established in the EU, specific provisions on mass and balance documentation are laid down in 'EU OPS'. Equivalent international regulations also contain provisions on mass and balance documentation for non-EU operators.

The passenger mass used in the mass and balance documentation can either be the appropriate standard mass value or the actual mass as determined by measurement of each passenger. Similarly the mass of checked baggage contained in the mass and balance documentation can either be the appropriate standard mass value for baggage or the actual mass determined by measurement.

In most cases, it is expected that the standard mass will be applied which can be:

- standard mass as specified in the EU OPS regulation or equivalent international regulation or;
- depending on applicable legislation standard mass as approved by the appropriate civil aviation authority.

Actual mass contained in the mass and balance documentation has to be weighed according to the provisions laid down in the EU OPS regulation or equivalent international regulation. You do not have to carry out a detailed uncertainty assessment if you are determining the actual mass.

The MRG require you to put in place suitable control activities as described in Chapter 3 of this guidance and to take immediate corrective and preventative action if irregularities are discovered. This means that you have to indicate in your procedure under section 6 (b) how you will ensure that the data on passengers and checked baggage provided by ground handling agents is accurate (e.g. through provisions in your contracts with ground handling agents etc.).

The MRG require you to consistently apply your monitoring methodology as chosen and laid down in your approved MP. This means that where you have chosen to apply tier 2, you have to use the mass contained in the mass and balance documentation consistently.

All commercial air transport operators are required to have mass and balance documentation according to the applicable regulations. In that case you are free to choose between tier 1 and tier 2 as explained in the abovementioned paragraphs. If you do not have a mass and balance documentation you are required to choose tier 1 (default value) for all flights.

#### **Section 6 (b) Source of the Mass and Balance data**

This section applies only if you have selected a tier 2 approach.

You must indicate which standard weights mentioned in your mass and balance documentation are used, i.e. whether you have used the standard weights for male, female, child and infants as contained in the EU OPS regulation or equivalent international regulation, or whether you use standard weights approved by the civil aviation authority. You have to specify for which type of flights you use the standard mass and if applicable whether they have been approved by the civil aviation authority. You are also required to do this for checked baggage.

If you are using the actual mass in the mass and balance documentation for specific flights you have to describe for which type of flights the actual mass is used and which sort of measurement equipment you have used to measure the mass of passengers and checked baggage. The information on measurement equipment can be a general description.

#### **Section 6 (c) Procedure to monitor the number of passengers on a flight**

To ensure the correct number of passengers on a flight is used you have to implement procedures for monitoring the correct number of passengers on a flight.

Passengers are all persons (both infants and adults individually) onboard the aircraft during a flight, excluding active crew. You have to ensure that actual data on the number of passengers is recorded in your internal systems and used for drafting your tonne km report. As a point of detail, the system for determining passenger numbers should exclude those passengers booked on flights, but who do not board the aircraft.

Crew members on active duty are not considered to be a passenger as defined in the MRG. They must be excluded from the payload and will not be taken into account in the reported data. Positioning crew that is not on duty should be regarded as passengers.

The procedure for monitoring the number of passengers must at least indicate:

- which data sources are used to determine the number of passengers and their checked baggage;

- who is responsible for monitoring the number of passengers and their checked baggage;
- which control activities are implemented to ensure that the correct number of passengers and their checked baggage are used and, if applicable to ensure that the actual mass weighed is accurate and reliable (e.g. calibration or alternative control activities if calibration is not possible). This includes control activities on how crew members on active duty and their baggage are excluded from the reported tonne km data;
- the information system used for processing and transmitting the number and mass of passengers and their baggage;
- whether and how data on mass and number of passengers are input manually in systems;
- how and where the data on the mass of passengers and their checked baggage is recorded.

### **Section 6 MP TK Template: Payload (Freight and Mail)**

The MRG require the mass of freight and mail to be calculated using the actual or standard mass contained in mass and balance documentation for the relevant flights. Some aircraft operators may not be required to have a mass and balance documentation and in such cases, aircraft operators are required to propose an alternative methodology.

#### **Section 6 (d): Requirement to have mass and balance documentation (Freight and Mail)**

This section of the template requires you to confirm whether you are legally required to hold mass and balance documentation for the relevant flights.

Mass and balance documentation for a flight is a requirement on commercial operators resulting from the EU OPS regulation and for non-EU operators equivalent international regulations. The actual mass has to be determined according to these regulations or the standard mass as specified in these regulations have to be used.

#### **Section 6 (e) Suitable monitoring methodology in the case of no mass and balance documentation**

If you are not required to have a mass and balance documentation, you have to propose in this section a suitable methodology for determining mass of freight and mail, how the data is obtained, transmitted and subsequently recorded.

#### **Section 6 (f) Description of measurement devices**

If you are weighing the mass of freight and mail then please provide a short description of the measurement devices used for measuring the mass of freight and mail. Your description should include type of weighing devices (e.g. weigh bridges, weighing platforms, etc) and, if available, state calibration standards and uncertainty margins.

If you have outsourced weighing to ground handling service providers, you should state so here. In this case you should outline how you ensure that measurement devices are sufficiently accurate (e.g. through clauses in contracts). Should you make use of calculations to determine the mass in your mass and balance documentation (e.g. if you use standard masses for mail bags), you should give a brief description of this here.

#### **Section 6 (g) Confirmation of exclusion of pallets, containers and service weight**

The MRG require you to exclude the tare weight of all pallets and containers that are not payload and the service weight from the actual freight and mail mass.

Payload is defined in the MRG as total mass of freight, mail, passengers and baggage carried onboard the aircraft during a flight.

Containers and pallets that are Unit Load Devices (ULD's) usually carry IATA's marking information like type codes, maximum gross weights and tare weight. The tare weight of these Unit Load Devices (ULD's) shall be excluded from the reported mass of freight and mail if they are not part of the consigned freight and mail. In that case they cannot be considered as payload. ULD's that are part of the consigned freight and mail are considered payload and should be included in the reported mass of freight and mail.

Service weight includes catering and removable passenger service equipment as well as potable water and lavatory chemicals. Service weight does not count towards the payload.

Within this section you are requested to confirm that the actual freight and mail mass shall exclude the tare weight of pallets and/or containers that are not payload or service weight.

### **Section 6 (h) Procedures to monitor the mass of freight and mail**

To ensure that the correct (net) mass is used to calculate the payload you have to implement procedures to monitor the mass of freight and mail.

If you use actual mass contained in the mass and balance documentation the procedure should describe how the actual mass is weighed and how the data is retrieved, transmitted and stored in your internal system. Actual mass has to be weighed according to the provisions laid down in the EU OPS regulation or equivalent international regulation. If you use standard mass contained in the mass and balance documentation the procedures should describe which standard masses are used and how they are recorded in your internal system.

In your description of the procedure you should explain how the mass of containers is subtracted (i.e. how net weight will be calculated). Your procedure should also explain how service weight and tare weight of pallets and containers is excluded from the actual mass and guarantee that checked baggage is not double counted in the monitoring of mass and freight. Furthermore you have to ensure that actual data on the mass of freight and mail is recorded in your internal systems and used for drafting your tonne km report.

Summing up: the procedure must at least indicate:

- which data sources are used to determine the mass of freight and mail (how to determine the gross weight, net weight etc.) and which steps are taken from measurement of the mass to recording that information in your internal systems;
- who is responsible for monitoring the mass of freight and mail;
- which control activities are implemented to ensure that the correct mass is used to calculate the payload. This includes control activities on how tare weight of containers, pallets and service weight are excluded and extracted from the system;
- the information system used for processing and transmitting the mass of freight and mail;
- whether and how data on mass on freight and mail are inputted manually in systems,
- how and where the data on the mass of freight and mail is recorded.

### **Section 7 MP TK Template: Management**

This section requires you to describe your data flow activities and to incorporate a traceable reference to procedures for control activities.

#### **Section 7 (a) Roles and responsibilities**

You are asked to identify the key job titles/posts within your organisation with a formal responsibility for monitoring and reporting, and provide a succinct description of their role in relation to implementing the monitoring and reporting plan. These should include:

- responsibility for monitoring and reporting tonne kilometres; and
- responsibility for maintenance and calibration of relevant metering or measurement devices, if applicable.

You may use the additional rows to describe other posts that you feel are relevant. You should only include those functions or posts with a direct role in implementing the monitoring and reporting plan. Please use job titles or functional posts (e.g. "OCC manager") where possible and do not refer to names of individuals.

#### **Section 7 (b-e) Procedures for control activities**

You are asked to identify against each item your procedures for control activities. For more guidance please see Chapter 3 and **Annex F** of this guidance. You should include just the title and reference number of the document, together with an indication as to whether this is part of a certified quality management system.

In section 7c you can identify whether or not your organisation has a documented quality management system and to which standard your system is certified to.

Section 7 (e) of the MP requires you to state the document/file name of the data flow for your calculation of tonne-km data submitted with your plan. See Chapter 3 of this guidance on how to construct a data flow.

#### **Section 8 MP TK Template: List of definitions and abbreviations used**

To aid the review process you are required to define any abbreviations used in your plan submission.

#### **Section 9 MP TK Template: Additional information**

You are requested to identify and reference any additional documentation that is submitted as part of your plan, which you wish the competent authority to take into account when making their assessment. This information must be supplied in the appropriate electronic format and clearly referenced.

#### **Section 10 MP TK Template: Member State specific further information**

Your competent authority may require you to fill in further relevant information under this section. Please contact your competent authority on which information should be added by you.

## 5 Monitoring plan for annual emissions

This chapter explains which information you have to submit in the monitoring plan template that is prescribed to monitor your annual emissions. All relevant sections of the monitoring plan template must be completed unless the template specifically states that the particular section is not applicable to you. The sections in this chapter refer to the relevant sections in the MP for annual emissions.

### **Section 1 MP AE Template: Changes to the Monitoring Plan**

This section is similar to section 1 MP template for tonne km data and has to be completed in the same manner. Please see Chapter 4 for more information.

### **Section 2 MP AE Template: Identification of Aircraft Operators**

This section requires you to identify yourself as aircraft operator and to provide your competent authority with other relevant information on your organization. This section is similar to section 2 in the MP for tonne km data as described in Chapter 4 of this guidance.

### **Section 3 MP AE Template: Contact details and address for service**

This section requires you to provide your competent authority with contact details so that the competent authority and the verifier can reach you. This section is similar to section 3 in the MP for tonne km data as described in Chapter 4 of this guidance.

### **Section 4 MP AE Template: Emission sources and Fleet characteristics**

The MRG require aircraft operators to include all combustion emissions from all emission sources and source streams from flights performed to and from an aerodrome situated in an EU Member State. Only emissions from flights excluded from the scope of the EU ETS Directive do not have to be taken into account. To prevent double counting and to ensure that all emissions and flights falling under the scope of the EU ETS Directive are reflected in the data reported in the annual emission report aircraft operators have to fill in section 4 of the monitoring plan for emissions.

#### **Section 4 (a) List of aircraft types**

The aim of the first table within this section is to provide a list of aircraft types that you operate at the time of submission of the monitoring plan. A field is provided to enter the date of submission.

Each aircraft type should be identified by its ICAO alphanumeric aircraft type designator (e.g. A332 is the type designator for an Airbus A330-200). A complete list of ICAO aircraft type designators can be found from the following link: <http://www.icao.int/anb/ais/8643/index.cfm>.

The MP template allows you to further specify sub-types of the aircraft type you have entered in the first column. This might be relevant in defining the specific monitoring methodology for new and old versions of the same generic aircraft type, each with different on-board systems. E.g. an older B742 aircraft type might use manual transmission of data, whereas a new B742 sub-type might have ACARS and more accurate on-board measurement equipment that automatically display fuel tank contents in terms of mass. For those situations you can submit the appropriate monitoring method for the sub-type aircraft in section 6 of the MP template.

Enter in the third column the number of each generic aircraft type and/or subtype which you operate at the time of submission of the plan and for which you are the aircraft operator. This includes any leased-in aircraft if they fall under your unique ICAO designator or if this is not available your aircraft registration markings.

Assign all relevant source streams (fuel types) that apply to the aircraft type or sub type.

In addition to the three standard aviation fuel types, there is the option to select biofuel or another alternative fuel if you are using these fuels at the time of submittal of the monitoring plan. In this context, an alternative fuel is a fuel which is not one of the three commercial standard fuels, i.e. jet kerosene, jet gasoline and aviation gasoline. A definition of these standard fuels is given in **Annex E**.

If you use an admixture of biofuel and one of the three standard aviation fuel types, you are required to select the biofuel and the appropriate standard aviation fuel type against the appropriate aircraft type (sections 4(a) and 4(b) MP template).

If biofuel or the admixture of biofuel and one of the three standard aviation fuel types is a de minimis source stream an estimation method can be used. A definition of de minimis source stream is given in **Annex E**.

#### **Section 4 (b) Indicative list of additional aircraft types**

This section requires you to provide an indicative list of additional aircraft types that you expect to operate and for which you are an aircraft operator (aircraft types operated under your ICAO designator or if this is not available your registration markings). The objective of this section is to enable an aircraft operator to provide details of aircraft types which are currently not part of their fleet but might be in the foreseeable future. This would reduce the requirement for regular updates of the monitoring plan. If an aircraft operator cannot foresee the use of certain aircraft types based on their future plans (or historic activities in the case of leased in aircraft), then this table should be left blank.

This table must not include the same generic aircraft types identified in table 4(a). For example, if you expect to purchase or lease in additional B742 aircraft and have already identified this aircraft type in table 4(a), then table 4(b) remains empty.

Using the drop-down list select the number-range that best fits the number of additional aircraft that you expect to use.

You are required to make as accurate an estimate as possible of any additional aircraft types which you expect to operate after submitting your monitoring plan. Discrepancies between actual data on aircraft types used and the data that you have listed in this section will not lead to non-conformities in the verification process or enforcement.

Note that the MRG require you to ensure that data on the actual aircraft types operated is recorded correctly in your internal systems and registers on a continuous basis.

#### **Section 4 (c) Procedure for defining the monitoring methodology for additional aircraft types**

You have to implement a procedure which ensures that the monitoring methodology will be defined and recorded for any additional aircraft types you operate and for which you are the aircraft operator (aircraft types operated under your ICAO designator or if this is not available your registration markings). This concerns the additional aircraft types which do not appear in your monitoring plan.

The data on the monitoring methodology used for additional aircraft types must be recorded in your internal systems and have to be made available for verifiers and the competent authority.

This procedure should set out your approach to determine which monitoring methodology would be applied to an aircraft type currently not included in your plan at the time of submission. Criteria decisive for specifying the monitoring methodology for these aircraft types shall also be included in this procedure (e.g. on board measurements are being used unless the additional aircraft type does not have adequate meters).

If the chosen monitoring methodology is the same as for one of the existing aircraft types laid down in section 4 (a) monitoring plan, you can refer to that particular methodology. You should record in your internal systems and registers any additional aircraft types that have been operated and for which you are the aircraft operator and record that you are using the same methodology for these additional aircraft types as for the aircraft types specified in your monitoring plan.

If you are using a new monitoring methodology for an additional aircraft type that is not included in your monitoring plan you should contact your competent authority.

#### **Section 4 (d) Procedures for tracking completeness of emission sources**

You have to implement a procedure for tracking the completeness (including registration and de-registration) of any aircraft you operate and for which you are an aircraft operator (aircraft operated under your ICAO designator or if this is not available your registration markings). The objective of this procedure is to ensure that all these aircraft are included in your systems and end up in your annual emissions report.

The procedure must guarantee that all aircraft which you operate are recorded in your internal systems and that this list is available, accurate and up to date. The list should include all aircraft for which you are the aircraft operator (under EU ETS). This involves any code shares or leased in aircraft as applicable since the ICAO designator is the determining factor for identifying whether the aircraft falls under your EU ETS responsibility.

The list of aircraft used should also include relevant historical data on your fleet to enable the verifier and the competent authority to check the completeness.

Where applicable, you may refer to the list of aircraft associated with your AOC, provided that this list is accurate, complete and contains all aircraft you operate and for which you are the aircraft operator.

The procedure should also identify how you account for any aircraft in your fleet for which you are not the aircraft operator, to ensure that this information is not reported as part of your annual emissions data.

In support of the requirements described in Chapter 3, this procedure must also include reference to the control activities you have implemented to ensure completeness of the list of aircraft used. For instance, one of the control activities could be to check whether the flights recorded in your internal systems match the data contained in invoices of route charges by Eurocontrol Central Route Charges Office (CRCO) for flights you have operated.

Where irregularities are found in your data, these have to be corrected. One of the requirements of the tonne km report is to identify the aircraft used during the reporting period by individual aircraft registration marking. Therefore you should have a system in place that records and stores this information and ensure that the data reported is accurate.

#### **Section 4 (e) Procedures for tracking completeness of the list of flights**

You have to implement a procedure to ensure that all Annex I flights which you operate under your responsibility as aircraft operator and the associated aerodromes of departure and arrival are captured and recorded in a list or in your internal systems. The annual emissions report requires among other things data to be disaggregated by aerodrome pair.

The procedure must ensure that the list of flights and aerodrome pairs is kept up to date, is complete and doesn't contain duplicate data. The procedure should indicate which flight related information is contained in your internal systems (such as flight number, flight routes, aerodrome of departure and arrival etc.).

In addition this procedure has to ensure that you can identify the flights for which you are responsible as aircraft operator (flights under your ICAO designator or if this is not available your aircraft registration markings). For example, a generic description that all wet leases fall always under your ICAO designator may be sufficient, provided that you can trace all wet lease operations and that these are recorded separately as wet lease operations in your system. This will enable the verifier and competent authority to check that flights not operated under your ICAO designator have been excluded from the reported data.

In support of the requirements described in Chapter 3, this procedure must also refer to the control activities you have implemented to ensure completeness of all flights and aerodrome pairs. For example, one of the control activities could be to check whether the flights for which you have been invoiced by Eurocontrol's Central Route Charges Office (CRCO) match the flights recorded within your internal systems. Aircraft operators can access their data on the Eurocontrol web-portal to perform these checks. Where irregularities are found in your data, these have to be corrected and corrective actions initiated to prevent recurrence.

Note that in recording data on the flights performed, you have to take the actual, rather than planned, flight details into account. For example, if a planned flight from Amsterdam to New York is diverted to London, this should be recorded as a flight from Amsterdam to London.

#### **Section 4 (f) Procedures for determining whether flights made are EU ETS flights**

You have to implement a procedure for determining which flights are covered by Annex I of the EU ETS Directive, ensuring completeness and avoiding double counting. The objective of this procedure is to avoid that non EU ETS flights are included in the annual emissions report and to avoid that an EU ETS flight is unjustly excluded from your tonne km reported data.

The procedure must guarantee that any flights excluded from Annex I are not reported in your annual emissions data. The procedure must also describe what control activities are in place to ensure that only Annex I activities are reported and non EU ETS flights are filtered out. For instance, you could cross check the list of included flights against the data from Eurocontrol route charges invoices. However, exemptions from Eurocontrol Route Charges Conditions 2007 are not in all cases identical to the exclusions referred to in Annex I of the EU ETS Directive. Please refer to **Annex A** of this document for the Commission's guidelines on activities excluded from Annex I EU ETS Directive. Non-Annex I activities should therefore always require an individual check.

#### **Section 4 (g) Estimation or prediction of annual CO<sub>2</sub> emissions**

Within this section you are required to provide an estimation or prediction of your annual CO<sub>2</sub> emissions. The estimate should only take into account Annex I activities which you expect to undertake (i.e. emissions from excluded flights should not be taken into account). The figure is indicative. Discrepancies between actual data on annual emissions and the estimated figure in this section do in principle not lead to non-conformities in verification or enforcement.

The estimated emissions will give the competent authority an indication on what level of uncertainty is applicable and whether you are eligible for the simplified approach for small emitters. This is the only objective of this section. Please see section 5 MP AE Template on the eligibility criteria for small emitters and section 7 MP AE Template on the application of the levels of uncertainty.

If however the actual reported emissions compared to the estimated figure in this section indicate you are not a small emitter or you have to apply a different level of uncertainty you will have to contact your competent authority. This could lead to an amendment of your monitoring plan if the respective thresholds in section 5 and 7 MP AE Template have been exceeded.

## Section 5 MP AE Template: Eligibility for simplified procedure for small emitters

The MRG allows small emitters to apply a simplified procedure for monitoring their annual emissions. If you are operating fewer than 243 flights per period for three consecutive four-month periods **or** you are operating flights with total annual emissions lower than 10 000 tonnes CO<sub>2</sub> per year you are considered to be a small emitter.

In deciding whether you operate below the thresholds you should only consider the Annex I activities you undertake. For example, if you are a non-EU operator with 700 flights per period, of which only 100 are to/from aerodromes within the EU, then you may be eligible to apply the simplified procedures.

Section 9 MP AE Template of this guidance explains which simplified procedure you can use to monitor your annual emissions. **Annex D** provides more guidance on what small emitters have to do and how they have to set up their data flow and control activities.

### Section 5 (a) Confirmation eligibility for simplified procedure for small emitters

This section requests you to state whether you meet the criteria as a 'small emitter' and hence qualify to adopt simplified procedures to determine your annual emissions. Please see Chapter 2 on when you are a small emitter and eligible for applying the simplified procedure.

If you do not qualify as a small emitter then answer "no" to this section and proceed to Section 6 of the monitoring plan template.

### Section 5 (b) Intention to use simplified procedures

Within this section you are requested to state whether you intend to use the simplified approach, even though you qualify as a small emitter. The MRG does not preclude small emitters adopting a calculation approach. Some small emitters may have detailed fuel monitoring systems in place which meet the requirements of a calculation approach, which they may wish to use.

### Section 5 (c) Evidence to support eligibility as small emitter

If you choose to use the simplified approach you have to provide information to support your eligibility as a small emitter. This information may be based on your own internal records of flight information or fuel usage, or data acquired from Eurocontrol systems. Your assessment should be based on the most recent data available and/or predictive data and should be to the satisfaction of the competent authority. The competent authority may ask you to provide additional information to prove your eligibility as a small emitter.

If you qualify as a small emitter and wish to adopt a simplified approach, please proceed to section 9 MP AE Template, where you are required to outline the tool used to determine total annual CO<sub>2</sub> emissions.

## Section 6-9 MP AE Template: Monitoring annual emissions

The MRG requires you to monitor all flights included in Annex I of the EU ETS Directive which are performed by you during the reporting period. This means that you have to take into account all CO<sub>2</sub> emissions from all aircraft and fuels that belong to flights that are covered by the EU ETS Directive.

You have to calculate your CO<sub>2</sub> emissions from flights covered by the EU ETS Directive using the following equation:

$$\text{CO}_2 \text{ emissions (t CO}_2\text{)} = \text{Fuel consumption (t)} * \text{emission factor (t CO}_2\text{ / tfuel)}$$

How to determine the fuel consumption and the emission factor is explained in the following sections.

### Section 6 MP AE Template: Calculation of fuel consumption

You are required to monitor your fuel consumption for each flight and for each fuel. The fuel consumption you are required to report on includes that used during a flight, the fuel consumed by the auxiliary power units whilst the aircraft is stationary and any fuel that may be dumped during a flight.

Fuel consumption must be determined by using one of the two methods described below (method A or B).

#### Calculation formula Method A:

Actual fuel consumption for each flight (tonnes) = Amount of fuel contained in aircraft tanks once fuel uplift for the flight is complete (tonnes) – Amount of fuel contained in aircraft tanks once fuel uplift for subsequent flight is complete (tonnes) + Fuel uplift for that subsequent flight (tonnes)

#### Additional requirements when using Method A

If there is no fuel uplift for the flight or a subsequent flight, you have to determine the amount of fuel contained in the aircraft tanks at block-off for the flight or subsequent flight. This would apply in the case of a new flight starting without fuel uplifting in between.

In the exceptional case that an aircraft performs activities other than a flight, such as undergoing major maintenance involving the emptying of the tanks after the flight whose fuel consumption has been or is being monitored, you may substitute the following figures in the calculation formula.

The figure “Amount of fuel contained in aircraft tanks once fuel uplift for subsequent flight is complete + fuel uplift for that subsequent flight” can be replaced by the “Amount of fuel remaining in the tanks at the start of the subsequent activity of the aircraft”.

This would be the end measurement in the aircraft. This can be used because there is no subsequent flight, for example if the aircraft is taken out of service for extended maintenance. In such cases, you have to take the amount of fuel remaining in the tanks as recorded in technical logs at the start point for subsequent activities.

#### Calculation formula Method B

Actual fuel consumption for each flight (tonnes) = Amount of fuel remaining in aircraft tanks at block-on at the end of the previous flight (tonnes) + Fuel uplift for the flight (tonnes) – Amount of fuel contained in tanks at block-on at the end of the flight (tonnes)

#### Additional requirements when using Method B

For method B the moment of block-on may be considered equivalent to the moment of engine shut down. Note that this is not the exact definition of block-on.

When an aircraft did not perform a flight previous to the flight whose fuel consumption is being measured, you may substitute the following figures in the calculation formula.

The “Amount of fuel remaining in aircraft tanks at block-on at the end of the previous flight” may be replaced by the “Amount of fuel remaining in aircraft tanks at the end of the previous activity of the aircraft”.

You have to take the amount of fuel remaining in the aircraft tanks at the end of the previous activity that is recorded by technical logs.

### **Difference between method A and B**

Whilst the calculation for both methodologies is fundamentally the same, the two methods differ by reference to the point at which the fuel in the aircraft tanks is measured. For Method A measurements are taken immediately after fuel uplifts, whereas in Method B these are taken immediately after block-on at the end of each flight. For both methods the fuel consumption is expressed in mass units (tonnes). Please see **Annex G** on further guidance on the difference between method A and B.

### **How to determine the fuel uplift and fuel contained in the tank?**

The fuel uplift may be determined in one of two ways:

1. the fuel uplift may be measured directly by the fuel supplier; or
2. the fuel uplift may be calculated by the aircraft operator using aircraft on-board measurement equipment systems.

Where the fuel uplift is measured by the fuel supplier, you have to ensure that the data as documented in the fuel delivery notes or the invoices for each flight will be used in your calculations of emissions.

The fuel contained in aircraft tanks must be determined using aircraft onboard measurement systems.

### **Methods for retrieving, transmitting and recording information**

You are required to specify the means by which data on the fuel uplift and the fuel remaining in the aircraft tanks is retrieved, transmitted and recorded, which may include one of the following options:

- the data can be taken from the measurements recorded by the fuel supplier; otherwise from on-board measurements where these are used to calculate the uplift quantity
- the data can be recorded in the mass and balance documentation;
- the data can be recorded in the aircraft technical log;
- the data can be transmitted electronically from the aircraft to the aircraft operator.

The data flow you have to set up for all your operational activities will show how the data on fuel uplift and fuel contained in tank is retrieved, transmitted and recorded in your internal systems. The method you choose will affect the traceability of data. The data has to be recorded in your internal systems or records.

### **Section 6 (a) Methodology used to determine fuel consumption**

Within this section you are requested to identify the method for determining the fuel consumption by generic aircraft type i.e. the ICAO aircraft type designator. If you have opted to also specify aircraft sub-types in section 4 (a) MP AE Template you can identify your monitoring method per sub-type. You must select either method A or B in the second column against each generic aircraft type or sub type if you have entered the subtype in this section.

Also, for each generic aircraft type or subtype, you are required to identify the method for determining the fuel uplift (i.e. as measured by fuel suppliers **or** calculated from on-board measurement systems) and finally how the data on fuel uplift and fuel contained in tanks is transmitted, stored and retrieved. Select your approach from the options in the drop-down boxes.

In section 6 (g) MP AE Template you can list any deviations from the monitoring method that you have entered in this section where necessary due to special circumstances at specific aerodromes. These deviations relate to circumstances that you know of at the time of submittal of your monitoring plan (please see section 6 (g) MP AE Template for more information).

### **Section 6 (b) Justification if chosen methodology is not applied to all aircraft types**

The MRG requires you to ensure that the monitoring methodology you have chosen is consistently applied. If the same method for determining fuel usage (A or B) is not selected for all aircraft types then you are required to provide a justification for the different approaches.

### **Section 6 (c) System and procedures to monitor fuel consumption**

To ensure that the fuel consumption is determined correctly you have to implement systems and procedures to monitor fuel consumption.

Your procedures and systems must at least incorporate the following information on:

- how fuel uplift is monitored (using supplier data or on-board measurement systems) and how the fuel contained in the tanks is measured using on-board measurement systems;
- who is responsible for measuring fuel uplift and fuel contained in tank, who performs checks on data etc.;
- which control activities are implemented to ensure that the fuel consumption data is accurate and avoid that incomplete or incorrect data is input in the internal systems and technical logs are lost;
- the information system used for processing and transmitting measured fuel uplift and other fuel data (e.g. whether the aircraft is equipped with ACARS and whether the data is transmitted via an ACARS datalink to an internal IT system);
- whether and how data on fuel uplift and fuel contained in tank are input manually in systems;
- how and where fuel uplift and fuel contained in tank is recorded.

A control activity could be that uplift quantities are checked against pre- and post uplift tank quantities whereby inconsistencies in the data are tracked down and corrected. When using on board measurement systems to determine the fuel consumption cross checks should be made between fuel supplier invoices and fuel uplift as stored in the central systems (please see section 7 (e) MP AE Template for more guidance on cross checks).

As well as owned aircraft your procedures and systems must incorporate fuel consumption from leased-in aircraft.

### **Section 6 (d) Method for determining fuel density used for fuel uplifts and fuel in tanks**

If the amount of fuel uplift or the amount of fuel remaining in the tanks is determined in units of volume (litres, US gallons or m<sup>3</sup>), you have to convert this amount from volume to mass by using actual density values. This also applies to the situation when you use fuel supplier invoices to determine your fuel uplift and the fuel supplier has measured the fuel uplift in volumes. Actual density means density expressed as kg/litre and determined for the applicable temperature.

If the fuel uplift or fuel remaining in the tanks, is determined in kg, the fuel density does not have to be taken into account. This will be the case if the fuel uplift is measured using on-board equipment and the measurement systems are converting the volume to mass automatically (by using compensators or densitometers). When assessing the uncertainty related to these meters, the whole measurement system has to be taken into account. The quality assurance measures described in section 7 MP AE Template have to be implemented in order to guarantee that the whole measurement system is sufficiently robust and reliable.

The options for determining the fuel density are the following (in hierarchical order):

- actual density of measured fuel in tanks using on-board measurement systems;
- actual density of each fuel uplift as recorded on the fuel invoice or delivery note;
- actual density determined from the temperature of fuel during fuel uplift. The temperature is being provided by the supplier or specified for the aerodrome where the uplift took place. The actual density is determined using standard density-temperatures correction tables;
- the use of a standard density factor of 0.8 kg/litre only in cases where the actual values are not available.

In some airports the fuel density is not determined per fuel supply. In those situations a daily average of the fuel density can be determined by the fuel depot and submitted to the pilot for calculating the fuel uplift or fuel contained in the tanks. This daily average can be regarded as the actual density that has been provided by the fuel supplier (second bullet point).

If the flight operation manuals contain procedures on how pilots must convert the fuel uplift from volume to mass for the purpose of the load sheet, reference can be made to those procedures for determining the fuel density. The procedure must be set up and implemented according to the requirements laid down in the MRG. This means that in principle the actual density value has to be used. Only in case the actual density value cannot be determined because the data cannot be delivered by the supplier or is not available, can the standard density value 0.8 kg/ litre can be used.

Within this section you are required to justify the situation(s) where the standard density value (0.8 kg/litre) is used. The reason has to be to the satisfaction of the Competent Authority. If the procedure on fuel density laid down in your flight operation manual describes that the standard density value can only be used in the cases as explained in the previous paragraph and is in conformance with the MRG, reference can be made to the exemptions in your flight operation manual. A short description of what is in the flight operation manual on when to use the standard density value should also be submitted in this section.

In section 6 (g) MP AE Template you can list deviations from the actual density method that you have entered in this section where necessary due to special circumstances at specific aerodromes. These deviations relate to situations that you know of at the time of submittal of your monitoring plan (please see section 6 (g) MP AE Template for more information).

#### **Section 6 (e) Source temperature density correlation table**

If the temperature of the fuel during the uplift is used to determine density for any aircraft type then state the source(s) of your density-temperature correlation tables.

#### **Section 6 (f) Procedures for measurement of the density used for fuel uplifts and fuel in tanks**

Your procedures and systems for measuring the density for fuel uplifts and fuel in tanks must at least incorporate the following information:

- how actual fuel density value for fuel uplifts or fuel remaining in the tank is determined. This includes information on whether on-board measurement equipment used to measure fuel uplift and fuel in tanks automatically makes the conversion from litres to kg so that determination of fuel density is not needed;
- how to deal with unpredictable situations in which you cannot determine the actual density value (this relates to situations that you do not know of during submittal of your monitoring plan: e.g. if the fuel supplier inadvertently fails to provide you with the necessary data and the actual density cannot be determined in the other ways). The procedure should in that case also state under what conditions you can apply another method or even use the standard density factor if the actual density value cannot be determined in another way;
- who is responsible for determining the actual density value (fuel supplier, pilot etc.);
- which control activities are implemented to ensure that the fuel density data is accurate and to avoid that incomplete or incorrect data is input in the internal systems and data from the technical logs are lost;
- the information system used for processing and transmitting actual density value;
- whether and how data on fuel density are input manually in systems;
- how and where fuel density data is recorded;
- justifications were applicable for using standard values.

As well as for owned aircraft, your procedures and systems must incorporate fuel density from leased aircraft.

### **Section 6 (g) Deviation from general methodologies for determining fuel uplift fuel contained in the tank and density for specific aerodromes**

There may be special circumstances at certain aerodromes or specific types of aerodromes where you cannot comply with the monitoring method as laid down in sections 6 (a) and 6 (d) MP AE Template. This concerns situations in which you know at the time of submittal of your monitoring plan that you cannot determine the fuel uplift, the fuel contained in the tank or the density according to your general monitoring methodology. For example it is known to you that fuel supplier data is not available or not all the necessary data can be delivered to the aircraft operator on a particular type of aerodrome. In that case you can regard this as a deviation from your general monitoring method listed in section 6 (a) and 6 (d) MP AE Template. For example if actual density values are not available the alternative method could be to use the standard density value, which is a deviation for any aircraft type.

Within this section you must therefore state the type of deviation, the justification of the special circumstances, the alternative methodology that is adopted and at which aerodromes or specific types of aerodrome it is applicable. If it concerns a specific type of aerodrome you have to list in the second column the characteristics of that aerodrome and indicate the reasons for not being able to apply the general monitoring method at that particular type of aerodrome.

### **Section 7 MP AE Template: Uncertainty assessment**

Aircraft operators shall have an understanding of the main sources of uncertainty when calculating emissions. The main sources of uncertainty are in principle related to measurement instruments that are being used to measure fuel uplift or fuel contained in tanks and instruments that are being used to determine the actual value of the fuel density. The MRG does not require aircraft operators to carry out a detailed uncertainty assessment, **provided** they identify the main sources of uncertainty and their associated uncertainty levels in the monitoring plan.

You may apply different 'tier' levels (levels of maximum uncertainty) to different fuel types. A tier must be attributed to each source stream (fuel type) with the exception of de minimis source streams. The choice of tier that may be applied depends on the total annual emissions and the emissions apportioned to each specific fuel type used.

The following tiers are applicable to the quantification of fuel consumption:

Tier 1:

Fuel consumption over the reporting period is determined with a maximum uncertainty of less than  $\pm 5.0\%$

Tier 2:

Fuel consumption over the reporting period is determined with a maximum uncertainty of less than  $\pm 2.5\%$

For an aircraft operator with an average annual fossil CO<sub>2</sub> emission over the trading period of  $\leq 50,000$  tCO<sub>2</sub>, the maximum level of uncertainty for determining fuel used over a reporting period is less than  $\pm 5\%$  for major and minor fuel source streams (i.e. a tier 1 approach). Such an aircraft operator is free to apply a higher tier 2 meaning lower uncertainty level even though he is entitled to apply tier 1. For a de minimis fuel source stream a 'no-tier' approach can be applied, where there is no requirement to state a level of uncertainty for the fuel over a reporting period. The estimation method has to be described in the monitoring plan and needs to be approved by the competent authority.

For an aircraft operator with an average annual fossil CO<sub>2</sub> emission over the trading period of  $> 50,000$  tCO<sub>2</sub>, the maximum level of uncertainty for determining fuel used over a reporting period is less than  $\pm 2.5\%$  for a major source stream (i.e. a tier 2 approach). For a minor source a tier 1

approach (i.e.  $< \pm 5.0\%$ ), as a minimum, must be applied. For a de minimis fuel source a 'no-tier' approach can be applied. The estimation method has to be described in the monitoring plan and needs to be approved by the competent authority.

A definition of the terms major source stream, minor source stream and de minimis source stream is given in **Annex E** of this guidance.

You have to ensure that the total uncertainty of all fuel measurements over the reporting period complies with the requirements of the tier applicable. This means that the overall uncertainty of the fuel consumption over the reporting period must not exceed 5% or 2.5% depending on the tier applicable. If an individual meter does not meet the uncertainty threshold of 2.5% this does not necessarily mean that the total uncertainty over the reporting period cannot be met. For example, if 25 independent meters with an uncorrelated uncertainty of 4% for each meter are used for the fuel measurements, the uncertainty of the total fuel consumption could be less than 2.5%.

If each individual measurement instrument that is used in the monitoring of the fuel consumption has an uncertainty that does not exceed the maximum uncertainty of 5% or 2.5% depending on the tier applicable, the overall uncertainty of the fuel consumption will not exceed the uncertainty threshold and will meet the tier requirements.

However if one or more individual measurement instruments that are used in the monitoring of the fuel consumption have an uncertainty that exceeds the maximum uncertainty of 5% or 2.5% depending on the tier applicable, this may have an impact on the overall uncertainty and it could lead to the possibility that the overall uncertainty of the fuel consumption exceeds the applicable uncertainty threshold. In that case the competent authority or the verifier could conclude that the tier requirements have not been met.

In those situations you need to check the inaccurate measurement instruments and see how they impact the overall uncertainty (by using the error propagation laws in Annex I, section 7.1 MRG), since this could lead to non compliance with the tier requirements. You are however not required to do a full uncertainty assessment and submit this in your monitoring plan.

If the on-board instruments cannot be made more accurate but the impact on the overall uncertainty is minor (meaning the required uncertainty threshold will not be exceeded), the tier requirements will still be met.

If the inaccurate on-board instrument causes the overall uncertainty of the fuel consumption to exceed the threshold you have to take measures to avoid non compliance by using fuel uplifts provided by the fuel supplier. Usage of the inaccurate measurement data to calculate the fuel uplift is not allowed in that case.

### **Section 7 (a) Monitoring Plan Template**

If fuel uplifts are determined solely on invoices or from other information provided by the supplier, such as delivery notes for uplift per flight, then no further proof of uncertainty is required.

Therefore, if fuel uplifts were used as a means of determining fuel usage then for the purpose of completing the table you would identify via the drop-down box that fuel uplifts are determined by invoiced quantities.

Where the on-board devices are used to quantify the amount of fuel remaining in the tanks or the fuel uplifts you are required to state the uncertainty of the measurement. The source of this uncertainty should be taken from either the device calibration certificate or from manufacturer's specifications for each aircraft type.

If calibration certificates are available for invoiced fuel quantities. If calibration certificates are available you would state "yes" and then provide the uncertainty value, with no need to populate the column titled "location and type of evidence of routine checks."

If calibration certificates are not available MRG requires you to provide:

- the aircraft manufacturer's specifications determining uncertainty levels of on-board fuel measurement systems; and
- evidence of carrying out routine checks of the satisfactory operation of the fuel measurement systems (e.g. maintenance expositions stating plans approved by the appropriate competent authority).

In that case you would state "no" to calibration certificates, and state the uncertainty value from the manufacturer's specifications and then state the location and type of evidence within the record systems where the data on routine checks could be found.

### **Section 7 (b) Main sources of uncertainty**

The MRG requires aircraft operators to have an understanding of the main sources of uncertainty and their associated levels.

This section is therefore requiring you to identify your **main** sources of uncertainty and to state their associated uncertainty levels. When completing this section you should consider areas of uncertainty arising from supplier fuel uplifts, on-board measurement systems, temperature measurements (if applicable), calibration procedures etc. The table should only reflect a general description of your average uncertainty related to your main sources of uncertainty and explain in general how they affect the overall uncertainty.

Your comments on the level of uncertainty may include the source of your uncertainty information (e.g. fuel supplier accuracy standards, calibration certificates, manufacturer's specifications, routine device checks). Uncertainties for other components of the monitoring methodology than fuel uplift and fuel remaining in tank (i.e. uncertainty of fuel density measurement devices and temperature measurement) may be based on conservative expert judgment.

### **Section 7 (c) Fuel measurement uncertainty**

This section requires you to confirm the fuel measurement uncertainty for each source stream (fuel type). How this is completed will be dependent on the size of your predicted annual fossil fuel emissions (from section 4 (g) MP AE Template and the predicted fossil fuel emissions contribution from each fuel type).

In order for the competent authority to assess the category of each fuel stream you are required to provide an approximate annual CO<sub>2</sub> emission (tCO<sub>2</sub>) value for each source stream (fuel type). The template provided by the European Commission will then calculate the % source for each fuel based on the overall emission stated in section 4(g) MP AE Template (note: this could be different from the template you may be required to use in your administering Member State (please contact your competent authority)).

### **Section 7 (d) Procedure to ensure total uncertainty is met**

In accordance with the MRG the monitoring plan has to provide information on your procedure to ensure that the total uncertainty of measurement for each fuel will comply with the requirements of the selected tier (e.g. > 50,000 tCO<sub>2</sub> operators determines fuel consumption over the reporting period to less than  $\pm 2.5\%$  for major source streams).

As an example, your procedures may state the use of calibration certificates from your supplier(s) as a means of demonstrating the uncertainty of fuel uplifts. These certificates may be evaluated on

receipt to ensure that they are 'consistent' between calibrations and that the metering uncertainties do not degrade the overall uncertainty required by the tier selection.

Alternatively, your fuels may be delivered to relevant national or international standards that ensure fuel is metered to a minimum defined uncertainty.

Furthermore the procedure should include information that you are checking whether there are inaccurate measurement instruments exceeding the threshold and assessing the impact of this on the overall uncertainty of the fuel consumption whereupon measures should be taken to avoid non-compliance of the overall tier requirements. These measures could for example be carrying out cross checks between the fuel uplift measured on-board and the fuel supplier invoice data and take the fuel supplier data as starting point to determine the fuel uplift.

In completing this section it is important that you state aforementioned in respect of both owned and leased aircraft.

### **Section 7 (e) Procedure for cross checks**

The MRG require you to regularly carry out cross checks between fuel uplift quantity as provided by invoices and uplift quantity indicated by on-board measurement. These cross checks have to be made when on board measurement systems are used to determine the fuel consumption. These cross checks can be carried out through random samples covering all aircraft and suppliers. The objective is that in each case a check is being done per measuring instrument whether the data meet the fuel uplift data (invoice). This can be done afterwards if both types of information have been registered, but also immediately after the fuel has been loaded as part of the operational procedures. In case there is an implausibility or inconsistency in the data, cross checks should always be made. These cross-checks shall avoid data being used that are based on systematical measurement errors.

When deviations are detected in the cross checks between the measured data and the fuel supplier data it needs to be assessed whether corrective action should be undertaken. You have to define in this procedure which difference between the measured data and fuel supplier data is no longer acceptable to you and should lead to corrective action by using the fuel supplier data as basis for determining the fuel consumption. The MRG requires you to improve your monitoring methodology over time as to ensure more accurate data and to reduce the acceptable margin of difference. Control activities have to be implemented to guarantee this.

Your procedure should state the frequency of checks, how the data is evaluated and what corrective actions are taken if deviations are observed. Reference can be made to the operational flight procedure according to which cross checks are carried out by the pilot and a maintenance call follows in case of a malfunctioning.

### **Section 8 MP AE Template: Emission factors**

For the following three aviation fuels in the table below standard emission factors, expressed as t CO<sub>2</sub>/t fuel have to be used. You are not required to use a net calorific value in this case. The following standard factors apply:

<b>Aviation fuel type</b>	<b>Emission factor (tCO<sub>2</sub>/t fuel)</b>
Aviation gasoline (AvGas)	3.10
Jet gasoline (Jet B)	3.10
Jet kerosene (Jet A1 or Jet A)	3.15

If you use other fuels than the three aviation fuels in the table you are required to determine your activity specific emission factor and your net calorific value in accordance to Annex I, section 5.5 and 13 Annex I MRG. These fuels are named alternative fuels.

If the alternative fuel contains biomass, the requirements for monitoring and reporting of biomass content as set out in Annex I MRG shall apply. This guidance will be adapted in the future if the use of biofuels will become more common.

If the alternative fuel can be considered as a de minimis source stream, you can use an estimation method to determine your emission factor, net calorific value or biomass content.

If the alternative fuel is a commercially traded fuel you may use the purchasing records for the respective fuel provided by the fuel supplier to derive the emission factor, carbon content, biomass content and net calorific value. You are only allowed to do this if these parameters have been derived based on accepted international standards.

### **Section 8 (a) Standard emission factors**

This section requires you to confirm the standard emission factors used for the commercial aviation fuel identified in section 4(a) and (b) of the monitoring plan.

Note: If your plan identifies only the use of any of the 3 standard fuels, then please proceed to section 11 MP AE Template.

### **Section 8 (b) Procedure used to determine the emission factor and NCV and biomass content of alternative fuels**

If alternative fuels or biofuels are used you are required to outline your procedures used to determine alternative fuels emission factors (EF) and net calorific values (NCV), or in the case of biofuels the biogenic content of the fuel.

Your procedure could outline a number of options, which could be:

- the use of IPCC reference values, stating the value, if available, for the alternative fuel(s);
- the determination by sampling and analysis of the fuels (for NCV, EF or biomass fraction) in accordance with the requirements of Annex 1, Section 13 MRG. In this case you will need to state your approach to the taking of representative samples (e.g. methodology and frequency) and your approach to the subsequent analysis (e.g. methodology, frequency, accreditation status of laboratory);
- the use of an estimation method, (i.e. a “no-tier” approach) for NCV and EF, where the alternative fuel is classified as a de minimis source stream;
- purchasing records for the respective fuel provided by the fuel supplier to derive the emission factor, carbon content, biomass content and net calorific value. This is only allowed if the alternative fuel is a commercially traded fuel and if the parameters have been derived based on accepted international standards.

### **Section 8 (c) Approach used for sampling of batches of alternative fuels**

This section requires you to summarise your approach to sampling of alternative fuels or fuels containing biofuels. Within the aviation industry there may be a set of procedures/protocols associated with the sampling of fuels. If so then these should be stated within the “Description” or “Standard” sections of the table. For the determination of emission factor, net calorific value, carbon content and biomass fraction generally accepted practice for representative sampling must be followed.

Guidance on how to sample can be found within Annex I, Section 13.1 to 13.6 MRG.

### **Section 8 (d) Approach used to analyse alternative fuels**

This section requires you to summarise your approach to the analysis of alternative fuels and fuels for biofuel fraction. You are asked to provide a description of the analytical approach together with any relevant standards that apply, whether the analysis is undertaken by an ISO17025 accredited/non-accredited laboratory and the frequency of the analysis undertaken.

The analysis methods, where available, should be in accordance with standard methods that limit bias and have known uncertainty. CEN standards shall be used if available, but if not then suitable ISO standards or national standards shall be applied. If no applicable standards exist analysis can be carried out in accordance with draft standards or industry best practice.

#### **Section 8 (e) List of laboratories**

If fuels are analysed then you are required to give details of the analytical laboratory. The requirements for having an ISO 17025 accredited lab or non accredited determine your emission factor, net calorific value, biomass fraction and carbon content are to be found in Annex I, section 13.5 MRG.

Within the section state the name of the laboratory, the analytical procedures (these may be referenced to standard methods or the laboratory's own internal methods) and whether the laboratory holds accreditation to ISO 17025 for the specific analysis. If the analysis is not accredited to ISO 17025, then specify other quality measures that the laboratory has in place. These may be that they hold certification to other standards (e.g. EN ISO 9001:2000) and that methods have been initially validated and are checked via inter-comparison exercises.

#### **Section 9 MP AE Template: Simplified calculation for small emitters**

Aircraft operators that are small emitters may estimate the fuel consumption using tools implemented by Eurocontrol or another relevant organisation, which can process all relevant air traffic information such as that available to Eurocontrol. Tools implemented by Eurocontrol are for example PAGODA.

The applicable tools shall be used only if they are approved by the Commission including the application of correction factors to compensate for any inaccuracies in the modelling methods.

#### **Section 9 (a) Use simplified procedure**

Based on a 'Yes' response to Section 5 (a) & (b) of the plan, you may wish adopt the use of a simplified approach to determining your annual emissions.

Within this section you are required to describe the tool used to estimate fuel consumption. The tool needs to consider all aircraft types identified in the plan.

#### **Section 9 (b) Confirmation of tool used to estimate fuel consumption**

This section requires you to confirm that your tool used to estimate fuel consumption is approved by the Commission. These tools may be implemented through Eurocontrol (e.g. PAGODA) or another relevant organisation which can process all relevant air traffic information such as that available to Eurocontrol.

#### **Section 9 (c) Emission factors**

This section requires you to confirm the emission factors used for the standard aviation fuels identified in section 4(a) and (b) of the monitoring plan.

#### **Section 9 (d) Emission factors and NCV for alternative fuels**

If you are using an alternative fuel (including biofuel), state the proposed emission factor and net calorific value to be used and justify the methodology used to assign the value. Please see section (section 8 (b) MP AE Template for the options for determining emissions factor and net calorific value.

#### **Section 10 MP AE Template: Data gap approach**

There are two distinct scenarios resulting in data gaps:

##### **Major gaps beyond the control of aircraft operators**

If a competent authority, aircraft operator or verifier detects that part of the data used to determine

emissions for a flight covered by EU ETS Directive are missing as a result of circumstances beyond the control of the aircraft operator and cannot be determined by an alternative method defined in the monitoring plan, emissions for that flight may be estimated by the operator using the following tools:

- tools implemented by Eurocontrol such as PAGODA;
- tools implemented by another relevant organisation, which can process all relevant air traffic information such as that available to Eurocontrol.

You can only use the tools if they are approved by the Commission including the application of correction factors to compensate for any inaccuracies in the modelling methods.

This data gap approach is also applicable in situations for which there is no monitoring plan (e.g. in cases where the administering Member State is not clear so that the aircraft operator cannot submit a monitoring plan or in cases where the de minimis threshold is exceeded for a commercial air transport operator and the aircraft operator has not been able to submit his monitoring plan yet due to circumstances beyond his control).

#### **Downtimes of measurement systems or the loss of individual primary data**

Downtimes of measurement systems or the loss of individual primary data sources such as fuel slips may lead to occasional data gaps in your system. In that case the MRG require you to estimate your annual emissions conservatively (i.e. such that your annual emissions are not underestimated). You can fill these data gaps either by using the approved tool from Eurocontrol (PAGODA) or another relevant organization which can process all relevant traffic data such as that available to Eurocontrol. In addition you can develop an alternative set of procedures. Should you choose *not* to use PAGODA, or another tool, your alternative approach must be approved by your competent authority in advance, together with the rest of your monitoring plan.

#### **Section 10 (a) Tool used to estimate fuel consumption when data is missing**

This section requires you to specify the name and a brief description of the tool used to determine fuel consumption in case of data gaps. You have to specify the quantity of emissions for which such a data approach is used in the annual emissions report.

#### **Section 10 (b) Confirmation that the tool is approved by the Commission**

You are required to confirm that the tool mentioned under section 10 (a) MP AE Template has been approved by the Commission if emissions for flights are to be estimated using tools mentioned in Section 4 of Annex XIV MRG.

#### **Section 10 (c) Description of methodology to treat data gaps**

To submit your alternative approach for approval, please attach a description in this section.

#### **Section 11 MP AE Template: Management**

This section is similar to section 7 MP template for tonne km data. The content of the procedures of control activities and the reference to these are different but the sections need to be completed in the same manner. Please see Chapter 3 and section 11 MP TK Template for more information.

## A. Commission Decision on interpretation Annex I activities

This Annex provides the text of Annex I to the EU ETS Directive and the Commission Decision's text on the interpretation of these Annex I activities. You can use the text in the boxes to assess whether your flights fall under one of these exemptions and should therefore be excluded.

### Flights of a reigning Monarch (Annex I (a) Directive 2008/101)

Annex I subparagraph a states that the following flights are excluded:

#### **Annex I (a) EU ETS Directive 2008/101**

flights performed exclusively for the transport, on official mission, of a reigning Monarch and his immediate family, Heads of State, Heads of Government and Government Ministers, of a country other than a Member State, where this is substantiated by an appropriate status indicator in the flight plan;

According to section 2.1 European Decision on interpreting Annex I activities the following provisions apply to this category of flights.

#### **Section 2.1 Exemption under subparagraph (a)**

5. This exemption shall be interpreted according to the exclusive purpose of the flight.
6. Immediate family comprises exclusively the spouse, any partner considered as equivalent to the spouse, the children and the parents.
7. Government Ministers are the members of the government as listed in the national official journal of the country concerned. Members of regional or local governments of a country do not qualify for exemption under this subparagraph.
8. An official mission means a mission in which the person concerned is acting in an official capacity.
9. Flights for the positioning or ferrying of the aircraft are not covered by this exemption.
10. Flights that EUROCONTROL's Central Route Charges Office has identified for route charges exemption applicability (hereinafter 'CRCO exemption code') as 'S' are presumed to be flights performed exclusively for the transport, on official mission, of a reigning Monarch and his immediate family, Heads of State, Heads of Government and Government Ministers substantiated by an appropriate status indicator in the flight plan.

### Military flights (Annex I (b) EU ETS Directive 2008/101)

Annex I subparagraph b states that the following flights are excluded:

#### **Annex I (b) EU ETS Directive 2008/101**

military flights performed by military aircraft and customs and police flights;

According to section 2.2 European Decision on interpreting Annex I activities the following provisions apply to this category of flights.

#### **Section 2.2. Exemption under subparagraph (b)**

##### *2.2.1. Military flights*

11. Military flights mean flights directly related to the conduct of military activities.
12. Military flights performed by civil registered aircraft are not covered by this exemption. Similarly, civil flights performed by military aircraft are not exempted under subparagraph (b).
13. Flights with the CRCO exemption code 'M' or 'X' are presumed to be exempted military flights.

##### *2.2.2. Customs and police flights*

14. Customs and police flights performed by both civil registered and military aircraft are exempted.
15. Flights with the CRCO exemption code 'P' are presumed to be exempted customs and police flights.

### Flights related to search and rescue (Annex I (c) EU ETS Directive 2008/101)

Annex I subparagraph c states that the following flights are excluded.

#### **Annex I (c) EU ETS Directive 2008/101**

Flights related to search and rescue, firefighting flights, humanitarian flights and emergency medical service flights authorised by the appropriate competent authority;

According to section 2.3 European Decision on interpreting Annex I activities the following provisions apply to this category of flights.

#### **Section 2.3. Exemptions under subparagraph (c)**

16. In relation to the below categories of flight, flights for the positioning or ferrying of the aircraft and the flights carrying exclusively equipment and personnel directly involved in providing the related services are covered by the exemption. Furthermore, these exemptions do not distinguish between flights performed through the use of public and private resources.

##### *2.3.1. Search and rescue flights*

17. Flights related to search and rescue mean flights offering search and rescue services. Search and rescue service means the performance of distress monitoring, communication, coordination and search and rescue functions, initial medical assistance or medical evacuation, through the use of public and private resources, including cooperating aircraft, vessels and other craft and installations.

18. Flights with the CRCO exemption code 'R' and flights identified with STS/SAR in field 18 of the flight plan are presumed to be exempted search and rescue flights.

##### *2.3.2. Fire-fighting flights*

19. Fire-fighting flights mean flights performed exclusively to provide aerial firefighting services, which means the use of aircraft and other aerial resources to combat wildfires.

20. Flights identified with STS/FFR in field 18 of the flight plan are presumed to be exempted firefighting flights.

##### *2.3.3. Humanitarian flights*

21. Humanitarian flights mean flights operated exclusively for humanitarian purposes which carry relief personnel and relief supplies such as food, clothing, shelter, medical and other items 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 to a safe haven in the same State or another State willing to receive such persons.

22. Flights with the CRCO exemption code 'H' and flights identified with STS/HUM in field 18 of the flight plan are presumed to be exempted humanitarian flights.

##### *2.3.4. Emergency medical service flights*

23. Emergency medical service flights mean flights the exclusive purpose of which is to facilitate emergency medical assistance, where immediate and rapid transportation is essential, by carrying medical personnel, medical supplies, including equipment, blood, organs, drugs, or ill or injured persons and other persons directly involved.

24. Flights identified with STS/MEDEVAC or STS/HOSP in field 18 of the flight plan are presumed to be exempted emergency medical service flights.

### Visual flight rules

Annex I subparagraph d states that the following flights are excluded.

#### **Annex I (d) EU ETS Directive 2008/101**

Any flights performed exclusively under visual flight rules as defined in Annex 2 to the Chicago Convention;

### Circular flights

Annex I subparagraph e states that the following flights are excluded.

#### **Annex I (e) EU ETS Directive 2008/101**

Flights terminating at the aerodrome from which the aircraft has taken off and during which no intermediate landing has been made;

If flights are coming back to the same aerodrome from which the aircraft has taken off because of technical reasons this is regarded as a circular flight and should be excluded.

### Training flights

Annex I subparagraph f states that the following flights are excluded.

#### **Annex I (f) EU ETS Directive 2008/101**

Training flights performed exclusively for the purpose of obtaining a licence, or a rating in the case of cockpit flight crew where this is substantiated by an appropriate remark in the flight plan provided that the flight does not serve for the transport of passengers and/or cargo or for the positioning or ferrying of the aircraft;

According to section 2.4 European Decision on interpreting Annex I activities the following provisions apply to this category of flights.

#### **Section 2.4. Exemption under subparagraph (f)**

Flights with the CRCO exemption code 'T' and flights identified with RMK/"Training flight" in field 18 of the flight plan are presumed to be exempted under subparagraph (f).

### Scientific research

Annex I subparagraph g states that the following flights are excluded.

#### **Annex I (g) EU ETS Directive 2008/101**

Flights performed exclusively for the purpose of scientific research or for the purpose of checking, testing or certifying aircraft or equipment whether airborne or ground-based;

According to section 2.5 European Decision on interpreting Annex I activities the following provisions apply to this category of flights.

#### **Section 2.5. Exemptions under subparagraph (g)**

25. In relation to the below categories of flight, flights for the positioning or ferrying of the aircraft are not covered.

##### *2.5.1. Flights performed exclusively for the purpose of scientific research*

26. This category exempts flights the only purpose of which is to carry out scientific research. The scientific research must be partially or totally performed in-flight for the exemption to apply. The transport of scientists or research equipment is not in itself sufficient for a flight to be exempt.

##### *2.5.2. Flights performed exclusively for the purpose of checking, testing or certifying aircraft or equipment whether airborne or ground-based*

27. Flights with the CRCO exemption code 'N' and flights identified with STS/FLTCK in field 18 of the flight plan are presumed to be exempted under subparagraph (g).

### Flights with certified maximum take-off mass of less than 5700 kg

Annex I subparagraph h states that the following flights are excluded.

#### **Annex I (h) EU ETS Directive 2008/101**

Flights performed by aircraft with a certified maximum take-off mass of less than 5 700 kg;

## Public service obligations

Annex I subparagraph i states that the following flights are excluded.

### **Annex I (i) EU ETS Directive 2008/101**

Flights performed in the framework of public service obligations imposed in accordance with Regulation (EEC) No 2408/92 on routes within outermost regions, as specified in Article 299(2) of the Treaty, or on routes where the capacity offered does not exceed 30 000 seats per year;

This exemption sees to:

- flights performed in the framework of public service obligations on routes with outermost regions as specified in Article 299(2) of the Treaty; or
- flights performed in the framework of public service obligations on routes where the capacity offered does not exceed 30 000 seats per year.

According to section 2.6 European Decision on interpreting Annex I activities the following provisions apply to this category of flights.

### **Section 2.6. Exemption under subparagraph (i) (public service obligation flights)**

28. The exemption of public service obligation (PSO) flights within outermost regions shall be interpreted as applying to the regions listed in Article 299(2) of the EC Treaty and comprises exclusively PSO flights within one outermost region and flights between two outermost regions.

## De minimis rule

Annex I subparagraph g states that the following flights are excluded.

### **Annex I (g) EU ETS Directive 2008/101**

Flights which, but for this point, would fall within this activity, performed by a commercial air transport operator operating either:

- fewer than 243 flights per period for three consecutive four-month periods; or
- flights with total annual emissions lower than 10 000 tonnes per year.

Flights performed exclusively for the transport, on official mission, of a reigning Monarch and his immediate family, Heads of State, Heads of Government and Government Ministers, of a Member State may not be excluded under this point.

According to section 2.7 European Decision on interpreting Annex I activities the following provisions apply to this category of flights.

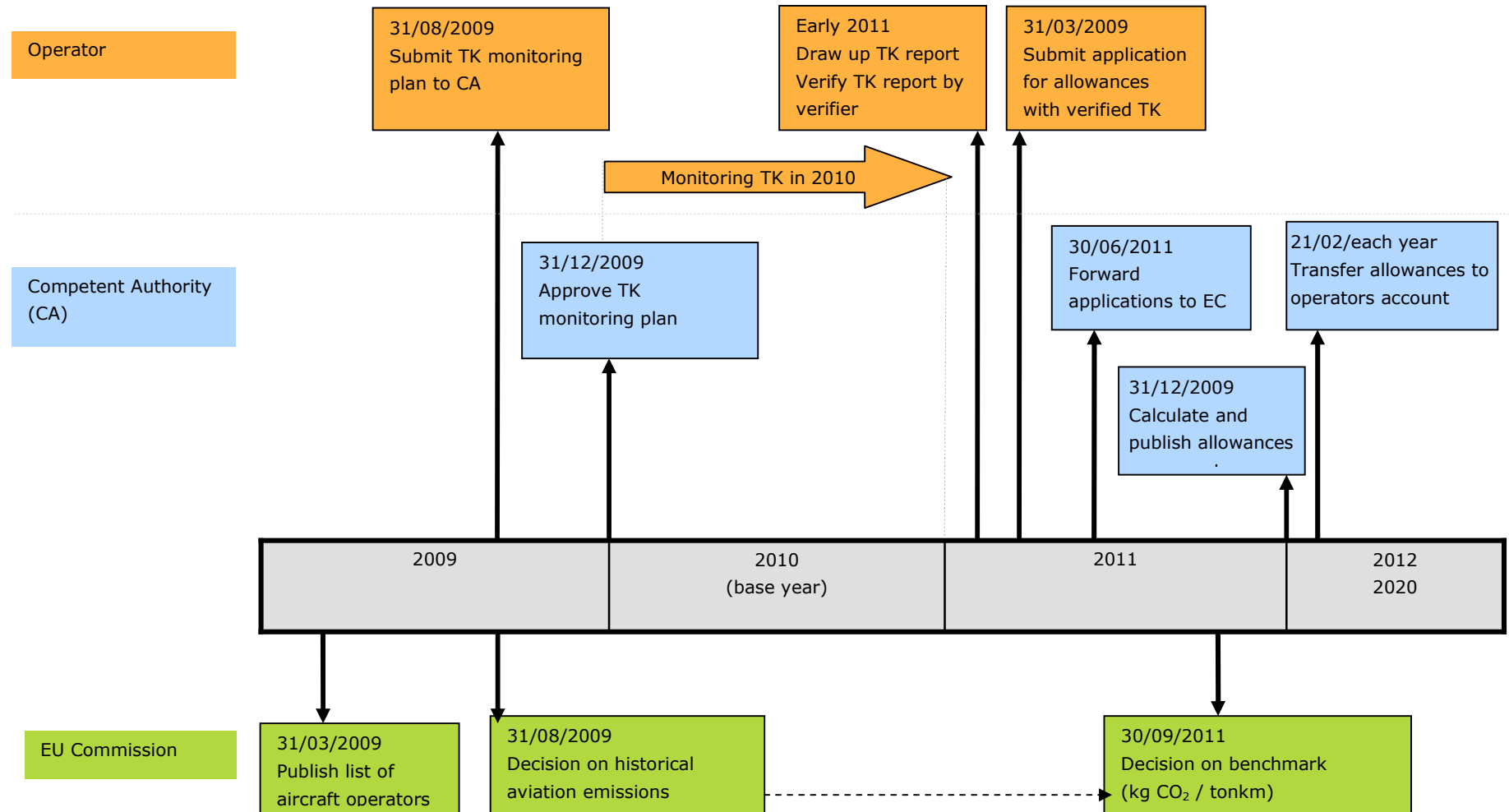
### **Section 2.7. Exemption under subparagraph (j) ("de minimis rule")**

29. All commercial air transport operators must hold an air operator's certificate (AOC) under Part I of Annex 6 to the Chicago Convention. Operators without such a certificate are not "commercial air transport operators".
30. For the application of the de minimis rule, the characteristic of being commercial is linked to the operator and not to the flights in question. That means in particular that the flights provided by a commercial operator shall be taken into account for deciding whether that operator falls above or below the exemption thresholds even if those flights are not provided for remuneration.
31. Only flights which depart from or arrive in an aerodrome situated in the territory of a Member State to which the Treaty applies shall be taken into account for deciding whether the aircraft operator falls above or below the exemption thresholds of the de minimis rule. Flights exempted under subparagraphs (a)-(j) shall not be taken into account for the same purposes.
32. Flights performed by a commercial aircraft operator operating fewer than 243 flights per period for three consecutive four-month periods are exempted. The four-month periods are: January to April; May to August; September to December. The local time of departure of the flight determines in which four-month period that flight shall be taken into account for deciding whether the aircraft operator falls above or below the exemption thresholds of the de minimis rule.

33. A commercial operator operating 243 flights per period or more is included in the Community scheme for the whole calendar year in which the threshold of 243 flights is reached or exceeded.
34. A commercial operator operating flights with total annual emissions equal or higher than 10 000 tonnes per year is included in the Community scheme for the calendar year in which the threshold of 10 000 tonnes is reached or exceeded.

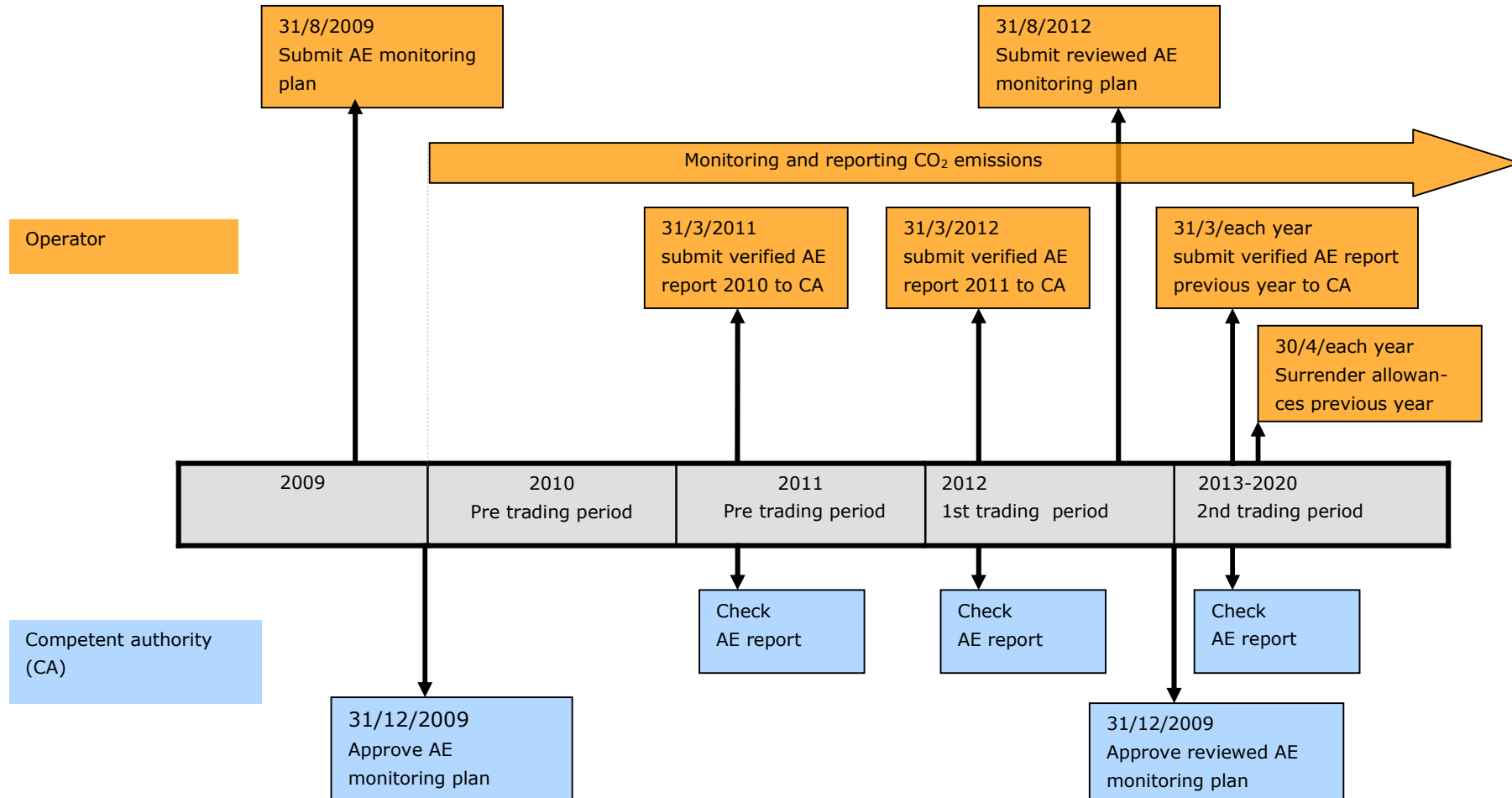
## B. Timeline for allocating free emission allowances

(all dates are deadlines, TK = tonne-kilometre)



### C. Timeline for monitoring and reporting emissions

(all dates are deadlines, AE = Annual emissions)



## D. Requirements for small emitters

When you are a small emitter (please see Chapter 2 of this guidance) you are eligible for simplified monitoring procedure.

If you are operating fewer than 243 flights per period for three consecutive four-month periods **or** you are operating flights with total annual emissions lower than 10 000 tonnes CO<sub>2</sub> per year you are considered to be a small emitter. The monitoring plan of small emitters for tonne km has to be completed in the same manner as the monitoring plan for regular emitters. As the number of flights will be less than large emitters, the content of the monitoring plan will in most cases be less complex.

The monitoring plan for emissions and the daily monitoring activities for small emitters have been simplified since they are allowed to use a more flexible regime.

### Monitoring plan for annual emissions for small emitters

The monitoring plan emissions for small emitters must contain the following components.

#### **Section 1 MP: List of MP versions**

#### **Section 2 MP: Identification aircraft operator**

#### **Section 3 MP: Contact details and address for service**

#### **Section 4 MP: Description of emission sources, source streams and flights**

Small emitters are required to fill in the same boxes as regular emitters. As the number of flights will be less and the data flow in your organization will be considerably less complicated, the content of the descriptions in the procedures laid down in section 4 will be more concise. Like regular emitters you are required to ensure the completeness of your emission sources and flights and to ensure that non EU ETS flights are excluded from your monitoring process and your emissions report. However the list of aircraft and flights will be confined and the procedure to update this list will be simplified. If for example you operate only one aircraft:

- you don't have to set up a procedure to monitor your list of aircraft. You can mention in section 4 (d) MP that you operate a single aircraft and that you keep records internally on when you replace your aircraft with another one;
- you can have a very concise procedure to list your flights and refer to the records you are keeping to ensure that the list is complete.

The control activities to guarantee completeness and to avoid double counting will in most cases be less extensive as the risk to misstatements and non-conformities are not as high. The requirement that the unique ICAO designator entered in box 7 of the flight plan determines which flights are assigned to you also applies to small emitters unless the ICAO designator is not available. In that case the registration markings of the aircraft have to be used. Like large emitters you are required to store your data in your internal systems or records.

#### **Section 5 MP: Eligibility of small emitters for simplified procedures**

In this section you are required to show that you are a small emitter and you are eligible to use a simplified procedure (please see Chapter 2 and section 5 MP AE Template).

#### **Section 9 MP: Simplified calculation for small emitters**

You can use the simplified calculation for small emitters as explained in section 9 MP AE Template. If you choose not to do so, then you are required to fill in sections 6 - 8 MP AE Template.

#### **Section 11 MP: Description of data flow activities and control activities (management)**

Small emitters are required to fill in the same boxes as regular emitters. However the procedure for control activities in section 11 MP AE Template will be less complicated and detailed than for large emitters.

**Section 12 MP: List of abbreviations**

**Section 13 MP: Additional information**

If you are making use of the simplified procedure and exceed the threshold for small emitters during a reporting year you are required to notify this fact to the competent authority. In that case you have to update your monitoring plan to meet the monitoring requirements for regular aircraft operators (explained in section 6 to 8 MP AE Template). The revised monitoring plan shall be submitted without undue delay to the competent authority for approval.

You are not required to update your monitoring plan and can keep on using the simplified approach if you can demonstrate to the satisfaction of the competent authority that the respective thresholds will not be exceeded again from the following reporting period onwards.

## E. Definitions

This Annex contains a list of relevant definitions for EU ETS aviation which has been used in this guidance.

Terms	Definitions	Source
Aerodrome	A defined area on land or water, including buildings, installations and equipment, intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.	Guidelines on scope Annex I (commission)
Aerodrome of departure	The aerodrome at which a flight constituting an aviation activity listed in Annex I of Directive 2003/87/EC begins.	Annex I section 2 (6) (a) MRG
Aerodrome of arrival	The aerodrome at which a flight constituting an aviation activity listed in Annex I of Directive 2003/87/EC ends.	Annex I section 2 (6) (b) MRG
Aerodrome pair	A pair constituted by an aerodrome of departure and an aerodrome of arrival.	Annex I section 2 (6) (c) MRG
Air Operator's certificate (AOC)	A document issued to an airline by a competent authority which affirms that the aircraft operator in question has the professional ability and organization to secure the safe operation of the aircraft for the aviation activities specified in the certificate.	EU OPS regulation
Aviation gasoline	Aviation gasoline is motor spirit prepared especially for aviation piston engines, with an octane number suited to the engine, a freezing point of -60°C, and a distillation range usually within the limits of 30°C and 180°C. Known as AvGas, it is used only in small piston engine aircraft, and which generally represents less than 1 percent of fuel used in aviation. It has a range of designations, most commonly Avgas 100 and Avgas 100LL (low lead). Avgas is typically supplied against Def Stan 91-90 or ASTM D910 standards.	IPCC guidelines 2006
Commercial standard fuel	The internationally standardised commercial fuels which exhibit a 95 % confidence interval of not more than $\pm 1$ % for their specified calorific value, including gas oil, light fuel oil, gasoline, lamp oil, kerosene, ethane, propane, butane, jet kerosene, jet gasoline and aviation gasoline.	Annex I, section 2 (2) (h) MRG
Commercially traded fuels	Fuels of specified composition which are frequently and freely traded, if the specific batch has been traded between economically-independent parties, including all commercial standard fuels, natural gas, light and heavy fuel oil, coal, petroleum coke;	Annex I, section 2 (2) (f) MRG
De minimis source streams	Those source stream selected by the operator to jointly emit 1 kilotonnes of fossil CO <sub>2</sub> or less per year or contribute less than 2% (up to a total maximum contribution of 20 kilotonnes of fossil CO <sub>2</sub> per year), whichever is the highest in terms of absolute emissions.	Annex I, section 2 (4) (c) MRG
Distance	The great circle distance between the aerodrome of departure and the aerodrome of arrival plus an additional fixed factor of 95km.	Annex I section 2 (6) (g) MRG
Emission source	An individual aircraft (for aviation activities).	Annex I section 2 (1) (c) MRG
Flight	One flight sector, that is a flight or one of a series of flights which commences at a parking place of the aircraft and terminates at a parking place of the aircraft.	Guidelines scope Commission
Jet kerosene	Also known as AvTur, this is medium distillate used for aviation turbine power units. It has the same distillation characteristics and flash point as kerosene (between 150°C and 300°C but not generally above 250°C). In addition, it has particular specifications (such as freezing point) which are established by the International Air Transport Association (IATA). The most common jet kerosenes in use are Jet A1 and Jet A, which are typically produced to the	IPCC guidelines 2006

Terms	Definitions	Source
	requirements of Def Stan 91-91 and ASTM D1655, respectively. However, at many commercial airports where joint storage and hydrant systems are in place, industry has settled on using the Joint Fuelling System 'Check List' to define fuel quality (more fully known as the Aviation Fuel Quality Requirements for Jointly Operated Systems – AFQRJOS), which is a combination of the most stringent requirements of Def Stan 91-91 and ASTM D1655. Fuel supplied to this standard is designated 'Jet A1 to checklist'.	
Jet Gasoline	This includes all light hydrocarbon oils for use in aviation turbine power units. They distil between 100°C and 250°C. It is obtained by blending kerosenes and gasoline or naphthas in such a way that the aromatic content does not exceed 25 percent in volume, and the vapour pressure is between 13.7 kPa and 20.6 kPa. Additives can be included to improve fuel stability and combustibility. This type of wide-cut kerosene (a blend of gasoline and kerosene) is rarely used except in very cold climates – Jet B is the most common designation and is produced against a variety of standards such as the Canadian Specification CAN/CGSB 3.23.	IPCC guidelines 2006
Non-conformity	Any act or omission of an act by the installation being under verification, either intentional or unintentional, that is contrary to the requirements in the monitoring plan approved by the competent authority under the installation's permit.	Annex I, section 2 (5) (h) MRG
Major source streams	A group of source streams which do not belong to the group of 'minor sources streams'.	Annex I, section 2 (4) (d) MRG
Mass and balance documentation	The documentation as specified in international or national implementation of the Standards and Recommended Practices (SARPs) as laid down in Annex 6 (Operation of Aircraft) to the Chicago Convention <sup>4</sup> , including as specified in Council Regulation (EEC) No 3922/91 ('EUOPS'), as amended by Commission Regulation (EC) No 859/2008 of 20 August 2008, in Annex III Subpart J, or equivalent international regulations.	Annex I section 2 (6) (d) MRG
Material non-conformity	A non-conformity to the requirements in the monitoring plan approved by the competent authority under the installation's permit, could lead to a different treatment of the installation by the competent authority.	Annex I, section 2 (5) (i) MRG
Material misstatement	A misstatement (omissions, misrepresentations and errors, not considering the permissible uncertainty) in the annual emissions report or tonne km report that, to the professional judgment of the verifier, could affect the treatment of the annual emissions report by the competent authority, e.g. when the misstatement exceeds the materiality level.	Annex I, section 2 (5) (j) MRG
Minor source streams	Those source stream selected by the operator to jointly emit 5 kilotonnes of fossil CO <sub>2</sub> or less per year or contribute less than 10% (up to a total maximum contribution of 100 kilotonnes of fossil CO <sub>2</sub> per year), whichever is the highest in terms of absolute emissions.	Annex I, section 2 (4) (e) MRG
Misstatements	Omissions, misrepresentations and errors in the emissions report or tonne km report.	
Non-conformity	Any act or omission of an act by the installation being under verification, either intentional or unintentional, that is contrary to the requirements in the monitoring plan approved by the competent authority under the installation's permit.	Annex I, section 2 (5) (h) MRG
Operating Licence	An authorization granted to an airline, permitting it to carry out Carriage by air of passengers, mail and/or cargo, as stated in the	EU OPS regulation

<b>Terms</b>	<b>Definitions</b>	<b>Source</b>
	operating licence, for remuneration and/ or hire.	
Passengers	The persons onboard the aircraft during a flight excluding its crew members.	Annex I section 2 (6) (e) MRG
Payload	Total mass of freight, mail, passengers and baggage carried onboard the aircraft during a flight.	Annex I section 2 (6) (f) MRG
Reasonable assurance	A high but not absolute level of assurance, expressed positively in the verification opinion, whether the emissions report subject to verification is free from material misstatement and whether the installation does not have material non-conformities.	Annex I, section 2 (5) (e) MRG
Tonne km	A tonne of payload carried a distance of one kilometre.	Annex I section 2 (6) (h) MRG

## F. Control activities and procedures for control activities

This Annex contains guidance on what control activities you are required to implement according to the MRG and what you should submit in your procedures for control activities. Be aware that the control activities have to be performed in accordance with the risk based approach as explained in Chapter 3.

### **Quality assurance of the measurement equipment and information technology**

If you use measurement instruments to determine your fuel consumption, your emission factors and other parameters or your payload, you have to calibrate, adjust and check these measurement instruments in accordance with measurement standards. For this you could refer to maintenance expositions/plans and outline routine aircraft maintenance procedures.

If measurement instruments cannot be (re-)calibrated you have to propose alternative control activities that require approval of the competent authority. This may be the case with on-board measuring equipment. When the measurement instrument is not functioning properly you have to take immediate action to correct these. For this you could refer to procedures already in place to ensure that on-board equipment and systems are fully functional, e.g. multiple gauges / systems. Records of the results of calibration and authentication shall be retained for the period of 10 years.

If you use IT data links to transmit your data from the aircraft to your internal systems and you use IT systems to analyse, process, calculate and store these data, you have to ensure that these systems are designed, tested, implemented, controlled and maintained in such a way that reliable, accurate and timely processing of data is guaranteed. The control of information technology shall include access control, back up, recovery, continuity planning and security.

### **Internal reviews of reported data**

For managing the data flow, you have to design and implement internal reviews on defined data sets throughout the data flow. Examples of internal reviews include horizontal checks between several systems containing same or comparable data, vertical checks, trend analysis, plausibility checks, etc.

Horizontal checks could include:

- total fuel consumption as purchased (from financial accounting systems) vs. Total fuel consumption as recorded per flight (from operations systems);
- fuel uplift as measured on board versus fuel uplift as on fuel slip;
- planning data versus actual data (for passengers, freight and mail);
- flights invoiced by Eurocontrol versus flights recorded in operations.

Vertical checks / trend analyses could include:

- fuel consumption per aerodrome pair and aircraft over time;
- occupancy rates;
- transported passengers versus sold tickets.

Plausibility checks:

- compare fuel consumption per aerodrome pair and aircraft for different aerodrome pairs;
- CO<sub>2</sub> per RTK or passenger kilometre.

Note that these examples are not exhaustive and that other control activities may replace reviews of data depending on the outcome of the risk assessment. Internal reviews are though usually among the strongest control activities (e.g. mitigating the risk that individual data gaps occur).

These internal reviews may be conducted either manually or electronically and need to be recorded for the sake of internal audits, verification and inspection.

### Outsourced processes

If you outsource any process in the data flow (e.g. using an external tool to calculate the GCD, usage of measurement data from fuel suppliers, weighing of baggage and freight at aerodromes, fuel density/ uplift etc.), you have to control the quality of these processes and the reliability of the outcome in these processes. You have to define appropriate requirements for your inputs and your methods to review the quality delivered for each dataset or activity that you have outsourced. This could include clauses in contracts laying down accuracy standards.

### Corrections and corrective action

When any part of the data flow activities or control activities (device, equipment, staff member, supplier, procedure or other) is found not to function effectively or to function outside set boundaries, you have to correct the data. You are required to assess the validity of the outputs of the applicable steps through internal reviews, determine the root cause of the malfunctioning or error, and take appropriate corrective action.

### Records and documentation

To be able to show and ensure compliance, and to be able to reconstruct emissions data reported, you have to keep records of all control activities, information related to the monitoring methodology and all information required for the verification of tonne km reports and emissions reports for at least 10 years.

### Management of the necessary competences for the responsibilities assigned

The MRG requires you to assign responsibilities to all data flow activities and to all control activities. Conflicting duties shall be segregated, including handling and control activities, where possible and otherwise alternative controls shall be put in place.

### Procedure for control activities

You may describe your control activities in the procedures for data flow activities as mentioned in table 1 in Chapter 3 or in a separate procedure for a certain type of control activity (such as calibration). You will need to ensure the control activities are effective. A procedure for control activities should include the following:

- what tasks and/ or actions are performed with respect the control activity concerned (e.g. maintenance, calibration of measurement equipment that are under your control, clauses in contract with ground handling activities to ensure the quality of weighing mass of freight by third parties);
- how control activities are performed (e.g. on what data sets are corrective actions being carried out and how are errors in data being identified by using internal reviews, information from third parties and internal audits;
- procedures for implementing control activity;
- at what time and/or with what frequency the tasks and/or actions are performed;
- responsible party for implementing each control activity;
- what resources, if any, are used for the tasks and/or actions concerned. A resource could for example be a calculation system, information system, spreadsheet etc.;
- how and where the control activity is recorded.

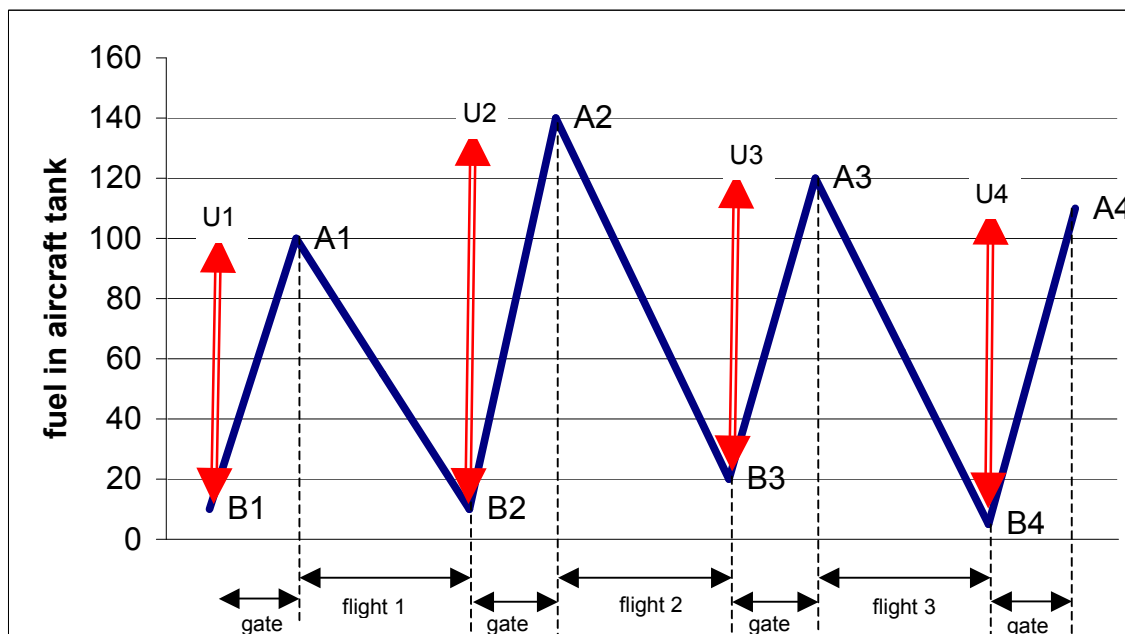
The following steps are useful when implementing your control activities.

Step	Explanation
Step 1	Formulate suitable, workable control activities that will at least mitigate those identified risks of which you estimate either likelihood or impact to be considerable.
Step 2	Go back to your process flow diagrams and insert the internal controls as additional activities if you would like to use data flow logistics.
Step 3	Assure that process managers adhere to the procedures. Perform periodic internal audits to assess whether the formulated internal controls (a) are executed and (b) are sufficient

	to mitigate the observed risks. Adapt internal audits to EU ETS requirements.
Step 4	<p>Include summary of the control activities and procedures for control activities in the MP</p> <ul style="list-style-type: none"> <li>▪ include the key control activities for the procedures mentioned in Table 1 (Chapter 3). Table 2 in chapter 3 shows what you have to complete on the procedures in the relevant MP sections;</li> <li>▪ summarize the procedures for the control activities in section 7 (b) monitoring plan template for tonne km;</li> <li>▪ summarize the procedures for the control activities in section 11 (b) monitoring plan template for emissions;</li> <li>▪ ensure that, in case reference is made to existing procedures (e.g. as part of an EMAS or ISO 14001 certified management system) for control activities, these procedures are indeed relevant to work for the EU ETS (e.g. document management should include the EU ETS specific activities on density measurements, records of internal checks, fuel records).</li> </ul>
Step 5	Assess whether control activities have been effective and whether they have led to misstatements by using for example internal audits (as part of the evaluation of the control system required by MRG).

## G. Explanation of the difference between Method A and B

The difference between Method A and B can best be explained by the following example highlighted in the figure below which shows that method A has different end and starting points for the monitoring of the fuel consumption compared to method B.



This figure represents the changes in the fuel in the aircraft tank and highlights which measurements have to be taken for calculating fuel consumption with method A or B. Measurements "A" are taken after the fuel uplift. Measurements "B" are taken on block-on at the end of the previous flight or engine shut down.

In this example the fuel consumption according to Method A and according to method B respectively would be calculated in the following manner

	Method A	Method B
Fuel consumption flight 1	$A1 - A2 + U2$	$B1 + U1 - B2$
Fuel consumption flight 2	$A2 - A3 + U3$	$B2 + U2 - B3$
Fuel consumption flight 3	$A3 - A4 + U4$	$B3 + U3 - B4$

In both methods you have to link subsequent EU ETS flights to each other. When monitoring the fuel consumption of a flight, the data from the previous flight and subsequent flights have to be available and taken into account.

### Non EU-ETS flights

If a non EU ETS flight has been performed between two or more EU ETS flights, you should not calculate the fuel consumption of the non-EU ETS flight. However you could still need some data from this flight.

If for instance flight 2 is a non-EU ETS flight in the example, you will still need the measurement after the uplift 2 (A2) for method A, or the block-on measurement (B) after flight 2 for method B.

#### **No fuel uplift between flights**

If there is no fuel uplift for the flight or subsequent flight, the amount of fuel contained in aircraft tanks (measurement A) is to be determined at block-off.

#### **Fuel mixture**

If for some specific reason a different type of fuel (e.g. a biofuel) with a different emission factor is uplifted, and there is still fuel remaining in the tanks, the mixture will be burned during the next flight. However when calculating the fuel use, the methods and formulas should be applied consistently:

If for instance uplift 2 is an occasional uplift of a biofuel mixture in the example, the fuel consumption of the flights should be calculated by using the formulas in a straight forward manner.

- In method A the biofuel is related to the actual fuel consumption of flight 1
- In method B the biofuel is related to the actual fuel consumption of flight 2

For the subsequent flights the actual fuel consumption is calculated once more consistently according to the formulas in Method A or B. The fact that there might still be biofuel left in the aircraft tanks after the flight is thus not taken into account.

## H. EU MS territory

The following overseas islands belong to EU MS territory:

- Guadeloupe;
- French Guiana;
- Martinique;
- Réunion;
- The Azores;
- Madeira;
- The Canary Islands;
- Åland Islands;
- Akrotiri and Dhekelia.

If a third country would fly to these areas they would land in EU MS territory and fall under the scope of the EU ETS scheme provided that the flight is not exempted based on Annex I of the EU ETS Directive.

## I. Legal Background

Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community, 13 January 2009, L 8/3.

Commission Decision of 16 April 2009 amending Decision 2007/589/EC as regards the inclusion of monitoring and reporting guidelines for emissions and tonne-kilometre data from aviation activities, 23 April 2009, L 103/10.

Commission Decision on the detailed interpretation of the aviation activities listed in Annex I to Directive 2003/87/EC.

Council Regulation (EEC) No 2407/92 of 23 July 1992 on licensing of air carriers as amended by Commission Regulation (EC) No. 859/2008 of 20 August 2008.

Convention on International Civil Aviation and its Annexes signed in Chicago on 7 December 1944.