

Verification Guidance for EU ETS Aviation

Verification of Annual Emissions Reports and Tonne-kilometre Reports for EU Emissions Trading

Table Of Contents

Disclaimer	4
Latest information and contact details	4
1 Introduction.....	5
How to read this guidance?	6
2 Verification requirements for Aviation.....	8
2.1 Objective and subject matter of verification.....	13
2.2 Reasonable assurance.....	14
2.3 Verification activities.....	15
2.3.1 Pre-contract stage.....	15
2.3.2 Strategic analysis.....	16
2.3.3 Risk analysis	19
2.3.4 Verification plan	20
2.3.5 Process analysis in verification process	23
2.3.6 Site visits	25
2.3.7 Assessing the materiality of misstatements and non-conformities	25
2.3.8. Internal verification documentation	27
2.3.9 Verification report	27
2.3.10 Technical review	28
2.3.11 Issuing verification report	28
2.3.12 Registry	29
2.3.13 Addressing non material misstatements and non-conformities after verification	29
3 How to assess the risks in the data flow and control activities?.....	30
3.1 Data flow activities	30
3.2 Verification of the data flow activities	31
3.3 Control activities and procedures for control activities.....	31
3.4 Verification of control activities and procedures for control activities.....	32
3.5 Procedures for data flow activities and control activities in the monitoring plan	36
4 Aviation specific requirements in the verification of annual emissions.....	37
4.1 How to deal with changes to the monitoring plan?	37
4.2 How to identify aircraft operators?	37
4.3 How to check (additional) aircraft types?	39
4.4 How to check completeness of flights?	40
4.5 How to check procedures for determining whether flights are EU ETS flights?	42
4.6 How to check the methodology and procedures used to monitor the fuel consumption?..	43
4.7 How to check fuel density?	45
4.8 How to check deviation from general methodologies for specific aerodromes?	45

4.9	How to check the uncertainty?	46
4.10	How to check the procedures for cross checks between fuel slips and fuel measured? ...	47
4.11	How to deal with emission factors and biofuels?	47
4.12	How to deal with data gaps?	47
4.13	To what extent can the ETS Support Facility be used when filling in data gaps?	48
4.14	How to check roles and responsibilities?	49
4.15	How to check procedures for control activities?	49
4.16	How to data in section 9 AER Template and Annex I AER Template?	49
4.17	How to deal with rounding of data?	49
4.18	How to deal with inherent tension with respect to fuel logging?	50
5	Verifying small emitters using the simplified monitoring methodology, and the role of the ETS Support Facility for all aircraft operators	51
5.1	What steps in the verification process are applicable to small emitters?	51
5.2	What if a small emitter has opted not to use the simplified tool?	52
5.3	What does the verification entail if the simplified tool is used?.....	52
5.4	What does the verification entail if the Eurocontrol ETS Support Facility is used?	54
5.5	What to do if a small emitter exceeds the <i>de-minimis</i> threshold?.....	57
6	Aviation specific issues in the verification of tonne-kilometre data.....	58
6.1	How to check systems and procedures to monitor aerodrome location information?.....	58
6.2	How to check the distance and procedure to monitor GCD?	58
6.3	How to check the mass of passengers and checked baggage?.....	59
6.4	How to check the procedure for monitoring the number of passengers?	60
6.5	How to check mass of freight and mail?	61
6.6	How to check exclusion of pallets, containers and service weight?.....	62
6.7	How to check procedures to monitor the mass of freight and mail?	62
6.8	How to verify missing data for tonne kilometre?	62
7	Competence and impartiality requirements on verifier.....	64
8	Accreditation and mutual acceptance of verifiers	65
	Annex A Competence criteria.....	67
	Annex B References	69

Disclaimer

This guidance has been produced at the request of the Compliance Forum Aviation Task Force (CF ATF). It is drafted to help verifiers, operators, competent authorities and accreditation bodies interpret the verification requirements laid down by the EU ETS Directive and the Monitoring and Reporting Guidelines (MRG). It is intended to be a user friendly interpretation of the verification requirements referred to in the Monitoring and Reporting Guidelines that are implemented through national legislation on emission allowance trading. Furthermore this guidance aims to give practical guidance on how a verifier shall deal with aviation-specific elements in the verification of emission and tonne-kilometre reports. Although this guidance is not legally binding it may be considered an interpretation by the Compliance Forum Task Force Aviation of the MRG requirements on verification in EU ETS Aviation. Please note that national legislation will take precedence and that aircraft operators, and verification bodies shall always contact the Competent Authority in the administering Member State on the national verification requirements. This document shall therefore primarily be seen as a practical interpretation and guidance to assist aircraft operators, competent authorities and verifiers in the interpretation and implementation of the verification requirements.

Latest information and contact details

The European Commission's website

http://ec.europa.eu/clima/policies/transport/aviation/index_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 13th January 2009 Directive 2008/101/EC amending Directive 2003/87/EC was published to include aviation activities in the European Greenhouse Gas Emission Allowance Trading System (the EU ETS).¹ Pursuant to article 15 of that Directive, emission reports and tonne-kilometre reports have to be verified according to the requirements of Annex V of the EU ETS Directive and Annex I, section 10.4 of the Monitoring and Reporting Guidelines.² Verification of these reports has to be carried out by a verifier defined as a competent, independent, accredited verification body or person with responsibility for performing and reporting on the verification process in accordance with the requirements established by the relevant Member State, the EU ETS Directive and the MRG.³ In most administering Member States the verifier has to be a verification body rather than an individual person performing verification activity.

A clear and common understanding of these requirements is crucial to ensure:

- consistent and fair implementation and application;
- appropriate levels of verification in terms of quality and extent;
- meaningful accreditation;
- proportionate verification costs;
- continued credibility of the EU ETS and an appropriate value of carbon.

This will promote Member States' ability to meet the overall objective of verification described in Annex I, section 10.4.1 MRG: to ensure that emissions and tonne-kilometre have been monitored in accordance with the MRG and that reliable and correct emissions as well as tonne-kilometre data are reported.

This guidance is designed to clarify the EU ETS requirements on verification and to give practical advice to verifiers, operators, competent authorities and accreditation bodies on how to interpret these requirements in a uniform manner. It considers how the verification requirements of the EU ETS Directive and the MRG can be met efficiently and effectively, taking into account the scales and geographical spread of many aircraft activities.

The guidance will not only explain the basic steps that a verifier has to follow in the verification process, but it will also elaborate on how a verifier shall assess and deal with some aviation specific monitoring and reporting issues. Special attention is paid to the verification of reports of small

¹ (OJ L 8/3 of 13 January 2009).

² Annex I, section 2 (5) (l) MRG: 'verification' means the activities carried out by a verifier to be able to provide a verification opinion as described in Article 15 and Annex V of the Directive 2003/87/EC;

³ Annex I, section 2 (5) (m) MRG.

non-commercial aircraft operators that are applying the Eurocontrol small emitters' tool according to Annex XIV, section 4 MRG.

How to read this guidance?

Chapter 2 outlines the legal verification requirements laid down in Annex V of the EU ETS Directive and the MRG, explains the steps that a verifier has to carry out to come to a final verification opinion as well as provides guidance on materiality requirements, definition of site visits and other important aspects in the verification process.

A key element for reporting reliable and correct emissions and tonne-kilometre data is mapping out the data acquisition and handling procedures ("data flow") and implementing internal procedures for monitoring and reporting. An aircraft operator has to include in its monitoring plans descriptions of the data flow applicable to its EU ETS activities and the internal control procedures especially those designed to control/mitigate against the risks of misstatements (errors, omissions and misrepresentations) and non-conformities in the monitored and reported data.

Chapter 3 explains how a verifier should assess the data flow activities, control activities and internal procedures that have been implemented by the aircraft operator. This includes what checks the verifier should carry out on IT systems used by the aircraft operator or on outsourced activities like ground handling. This chapter also outlines how the completeness of ETS flights and sources can be checked and in what way Eurocontrol facilities and other tools can be used.

Chapter 4 describes aviation specific requirements and issues in verifying annual emission reports, such as dealing with data gaps, treatment of monitoring uncertainties, fuel density and how to assess consistency between reported data and "mass and balance" documentation.

Aircraft operators operating less than 243 flights per period for three consecutive four-month periods or aircraft operators operating flights with total annual emissions less than 10,000 tonnes CO₂ per year are considered small emitters and may, according to Annex XIV, section 4 MRG and subsequent approval by the Competent Authority, apply a simplified tool to estimate their fuel consumption. At the present time there is only one simplified tool approved by the European Commission, namely the Eurocontrol Small Emitters' tool.

Chapter 5 considers the implications for the verification in situations where the Eurocontrol small emitters' tool is used. This chapter also elaborates on the role of the ETS Support Facility⁴ for all aircraft operators.

Chapter 6 outlines aviation specific issues in verifying tonne-kilometre reports, including examples of how to assess the consistency between reported tonne-kilometre data and the "mass

⁴ The ETS Support Facility made available by Eurocontrol (see chapter 5).

and balance” documentation, how to check which elements are excluded from the payload and how to assess the procedures for monitoring the number of passengers and mass of freight.

Chapter 7 outlines the competence and impartiality requirements for verifiers.

Chapter 8 deals with accreditation requirements for EU ETS verifiers and the options to deal with mutual acceptance of foreign verifiers. This has added implications in the case of aviation and the geographical spread of activities.

2 Verification requirements for Aviation

Background

Article 15 together with Annex V of the EU ETS Directive provides the legal basis for verification of annual emissions and tonne-kilometre reports outlining the basic activities that a verifier has to carry out during the verification of both reports. These general requirements are further elaborated in Annex I, section 10.4 of the MRG which is also mandatory. Both the EU ETS Directive and the MRG must have been implemented in national law.

By 31 March 2011 aircraft operators have to submit a verified tonne-kilometre report to the Competent Authority (CA) of their administering Member State where they are applying for free allowances. This verified tonne-kilometre report is part of the application for free allowances for the first (2012) and second (2013-2020) trading period. In addition each aircraft operator has to submit by 31 March of each year a verified emissions report to the CA of his administering Member State. The first verified emissions report has to be handed in by 31 March 2011. For more information on the timeline please see the *Guidance for the Aviation Industry Monitoring and Reporting Annual Emissions and Tonne-km data for EU Emissions Trading (Guidance for the Aviation Industry)* published on the website of the European Commission.⁵

In order for this deadline to be met it is important for aircraft operators to start the process of reporting and verification early to avoid last minute changes and report writing during February and March because these months are demanding times for aircraft operators, verifiers and CA and could significantly delay the production of final annual emissions or tonne-kilometre reports and their verification.

The verification process should therefore start during the year being reported on, rather than after that year has ended. However, sufficient data is needed to initiate the process, and any subsequent changes to an aircraft operator's systems must be considered in time for the report to be completed by 31 March.

Implementation in Administering Member States and future changes in legislation

Currently Member States have used varying ways to implement the verification requirements in their national law. Most Member States have opted for an accreditation body that is a member of the European Cooperation for Accreditation (EA) that will then be entitled to accredit EU ETS verifiers. In that case these accreditation bodies are required to accredit their verifiers according to verification standards such as ISO 14065, EN 45011 and ISO 17020. They also have to apply the EA Document for Recognition of Verifiers under the EU ETS Directive, the current version is EA-6/03 2010⁶. This document is used by accreditation bodies to assess verifier's conformance with Annex V

⁵ See http://ec.europa.eu/clima/policies/aviation/docs/nl_guidance.pdf

⁶ Wherever EA-6/03 is mentioned in this guidance this is the updated version in 2010 which also includes aviation.

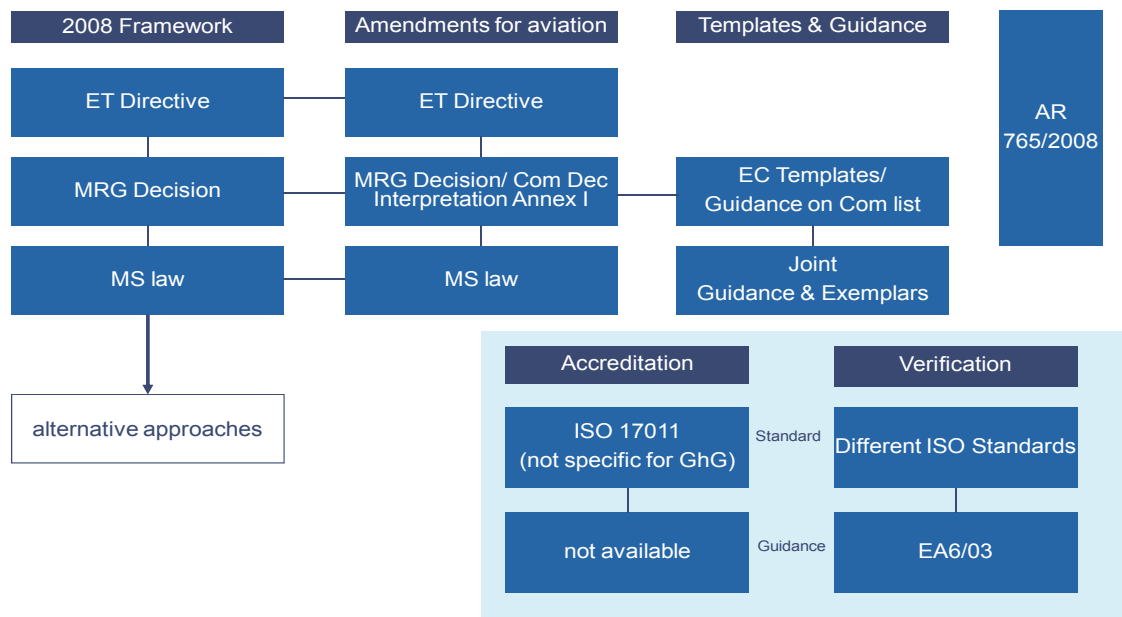
of the EU ETS Directive and the MRG. Indirectly, EA-6/03 also provides guidance to verifiers on how to conduct EU ETS verifications. In 2010, EA-6/03 was updated to also include general guidance on verification with respect to EU ETS Aviation.

In a few Member States accreditation of ETS verifiers is done by accreditation bodies that are not member of the EA. Furthermore in some other Member States the EU ETS Competent Authority authorises verifiers to operate in their country. These Member States may opt not to use EA-6/03. However, in general, their national guidance or requirements do not - if at all - deviate much from the requirements laid down in EA-6/03 which is logical since EA-6/03 is an elaboration of the mandatory MRG requirements on verification.

On the 1 January 2010, the Accreditation Regulation 765/2008 came into force. This regulation provides a general framework for the organisation and operation of accreditation by conformity assessment bodies performing conformity assessment activities. Conformity assessment bodies and conformity assessment activities are referred to in such broad terms within the definitions of the Accreditation Regulation 765/2008 that that the regulation extends itself also to the accreditation of EU ETS verifiers. The Accreditation Regulation 765/2008 therefore has an impact on how the accreditation of verifiers is currently being organized in the European Union. Not only must each Member State appoint a single national accreditation body having public authority, but national accreditation bodies from all Member States also have to seek membership of the EA. The impact on Member States that are already a member of the EA in respect of EU ETS is not that large. However Member States that use an authorization rather than an accreditation process will have to make the necessary structural and legal changes to comply with this regulation.

The figure below explains the relationship between the current legislation and the various relevant documents.

2010-2012 Legal Framework for aviation

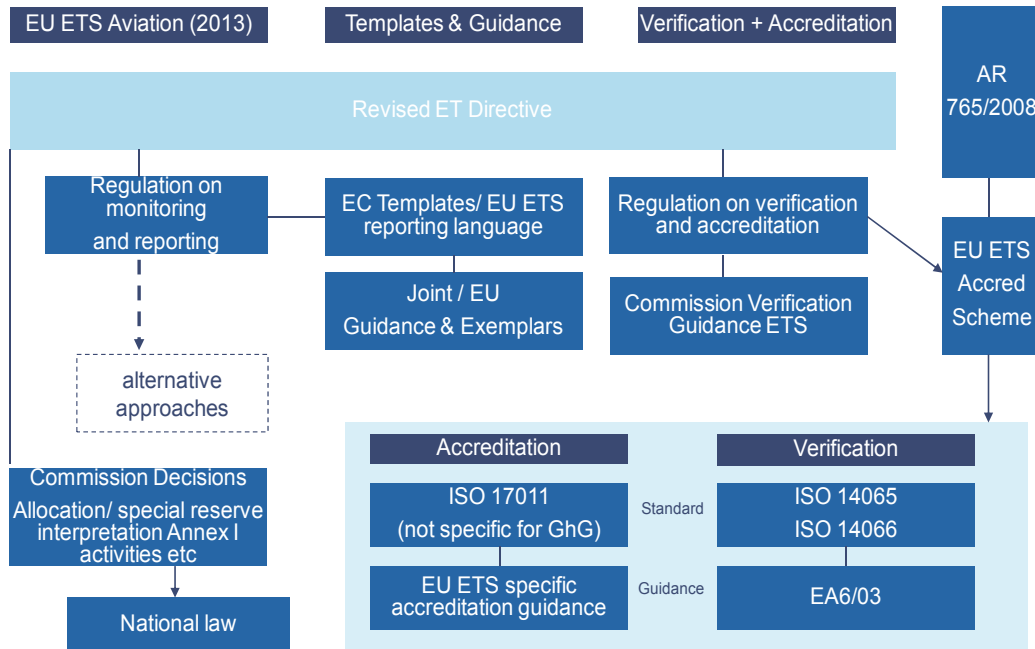


As the requirements in Accreditation Regulation 765/2008 are rather general and not all Member States currently use accreditation as required in this Accreditation Regulation, an EU ETS specific accreditation scheme will need to be set up in which the general framework requirements of regulation 765/2008 will be elaborated in respect of EU ETS.

Such a harmonized accreditation scheme for EU ETS must be in place from 2013 onwards when the EC Commission Regulation on verification and accreditation comes into force. This new regulation will be drafted by the European Commission pursuant to article 15 (1) of the revised EU ETS Directive 2009/29/EC and will contain EU ETS specific requirements on the verification, accreditation and mutual acceptance of foreign verifiers.

The accreditation scheme and the verification and accreditation regulation will lead to a harmonized and common approach throughout the European Union. The figure below indicates the relationships between the legal documents as from 2013 onwards.

Future changes in EU ETS aviation legislation in 2013



Application of EA-6/03 and national requirements

According to Annex I, section 10.4.1 Member States shall consider respective guidance issued by the European Cooperation for Accreditation (EA), the EA-6/03. Whether the application of the EA-6/03 is mandatory may depend on the administering Member State of the aircraft operator whose emission report and tonne-kilometre report the verifier is verifying. A verifier shall always take into consideration the legal framework and national legislation of the Administering Member State in which the verifier is carrying out verification activities. This includes a mandatory check by the verifier as to whether requirements in addition to those in EA-6/03 are imposed by the Administering Member State in question.

In some sections of this guidance relevant text from EA-6/03 is inserted to complement the aviation specific examples so as to explain this EA-6/03 text. To improve the readability only key parts of the EA-6/03 are transcribed into this verification guidance. In some places reference is made to EA-6/03 itself which has to be read for further guidance. Both documents shall be read in conjunction with each other.

Roles and responsibilities of parties within EU ETS

There are different parties involved in EU ETS aviation: aircraft operators, the Competent Authority of the administering Member State, verifiers, accreditation bodies and the Commission. The main roles and responsibilities of these parties are listed below. The roles and responsibilities of a verifier with respect to specific issues are detailed throughout the guidance.

Responsibilities of the aircraft operator

The aircraft operator is required to draft a monitoring plan for emissions, monitor these emissions in accordance with the approved monitoring plan and national law implementing the MRG and update the monitoring plan in the case of changes. This includes notification of changes to the monitoring plan and approval thereof by the Competent Authority, if applicable. Each year, by 31 March, the aircraft operator submits a verified emissions report. With effect from 2013, the aircraft operator has to surrender emission allowances that are equivalent to the verified reported emissions. The surrendering of emission allowances must be done before 1 May each year. If the aircraft operator is applying for free allowances, it has to draft a monitoring plan for tonne-kilometre data and monitor these tonne-kilometre in accordance with that monitoring plan and national law implementing the MRG. By 31 March 2011 the aircraft operator has to submit a verified tonne-kilometre report for the year 2010 which will serve as a basis for the application of free allowances for the first and second trading period. More guidance on timelines is available in the aforementioned *Guidance for the Aviation Industry*.

Responsibilities of the Competent Authority

The Competent Authority is responsible for approving the monitoring plans for emissions and tonne-kilometre data. After submission of the verified emissions and tonne-kilometre reports, the Competent Authority in most Administering Member States will review the emission report and tonne-kilometre report to see whether EU ETS requirements on reporting and verification have been complied with by the aircraft operator and the verifier. In addition the Competent Authority deals with notifications by the aircraft operator of changes to the monitoring plan and is responsible for inspection and enforcement.

Responsibilities of verifier

In general terms, the verifier shall:

- be independent of the aircraft operator and demonstrate impartiality in order to carry out the activities in a sound, objective and professionally sceptical manner;
- be competent to carry out EU ETS verification activities;
- verify the aircraft operator's EU ETS reports and carry out verification activities with an attitude of professional scepticism recognizing that circumstances may exist that cause the information contained in the annual emissions report to be materially misstated.

Abovementioned points must be done in accordance with Annex V EU ETS Directive, the MRG, national legislation and other regulation/ guidance.

Under this, a verifier's responsibilities include provision of:

- a verification opinion statement on whether reported data have been collected in accordance with the approved monitoring plan;
- an opinion on whether the reported data are free from misstatement;

- recommendations by which the aircraft operator could improve their monitoring and reporting performance;

All of the above need to be included in the verification report to be forwarded to the competent authority including the confirmation of the absence of material misstatements/material non-conformities.

Responsibilities of the accreditation body

The accreditation body is responsible for the process that the verifier must go through to become (and remain) accredited to perform EU ETS verifications. As part of this process, the accreditation body reviews the verifier's organisation, procedures and practices, assesses the competence of the verification teams and other relevant personnel and assesses the actual verification performance of the verifier during a witnessed audit. Once satisfied, the accreditation body will publish the name of accredited verifier together with an indication of the scope of accreditation and the accreditation standard (e.g. ISO 14065, EN 45011), and then keep the verifier under periodic monitoring and surveillance to ensure that the required standard and quality of EU ETS verifications is maintained.

2.1 Objective and subject matter of verification

The verifier shall take the monitoring plan approved by the Competent Authority of the administering Member State as the starting point to assess whether the emission reports or tonne-kilometre reports are free from material misstatements and material non-conformities. During the verification process the verifier shall verify the emissions or tonne-kilometre report against the approved monitoring plan for emissions or tonne-kilometre data respectively (also see Annex I, Section 10.4.2 MRG and section 5.1 EA-6/03).

If the verifier identifies that the monitoring plan is not implemented correctly or not in line with the MRG the verifier shall assess whether this impacts upon the accuracy of the reported emissions and tonne-kilometre data and therefore whether it should be considered as a misstatement. Where the non-compliance gives rise to a misstatement the aircraft operator has to correct this misstatement (e.g. correcting the mistake and if necessary going to the Competent Authority to adapt the monitoring methodology and change the monitoring plan). The requirements on how to address and report on misstatements and non-conformities described in the later sections of this guidance and EA-6/03 will apply. Even in the case that the non-compliance does not give rise to a misstatement, the verifier should direct the aircraft operator to the Competent Authority with view to adapting the monitoring plan.

If the approved monitoring plan does not provide sufficient scope or clarity to conclude on the verification process the verifier may decide that the emissions or tonne-kilometre report cannot be verified. In such cases the verifier shall advise the aircraft operator to contact the Competent Authority as soon as possible.

In all situations regarding aviation activities, the verifier shall check and assess:

1. the completeness of flights and aircraft;
2. whether the approved monitoring plan for emission or tonne-kilometre is implemented and up to date;
3. whether the emission data in the emissions report or the tonne-kilometre data in the tonne-kilometre report are correct and complete. This derives from Annex I, section 10.4.1 MRG according to which the objective of verification is to ensure that the emissions or tonne-kilometre data have been monitored in accordance with the MRG and that reliable and correct emission or tonne-kilometre data will be reported pursuant to article 14 (3) EU ETS Directive.

2.2 Reasonable assurance

According to Annex I, section 10.4.1 MRG the verification shall be carried out with a reasonable level of assurance.⁷ The verification follows a risk based approach with the aim of reaching a verification opinion with reasonable assurance that:

1. the data submitted in the emission or tonne-kilometre reports are fairly stated (i.e. that the report is free from material misstatement);
2. there is conformance with the approved monitoring plan; and
3. where appropriate the emissions or tonne-kilometre have been monitored and reported in accordance with the MRG and national legislation of the EU Member State (see section 2.1).

The level of assurance relates to the depth and detail of the verification activities carried out and the wording of the verification opinion statement. There is a difference between a reasonable level of assurance and a limited level of assurance. Reasonable assurance means a high, but not absolute level of assurance. The procedures that are performed with a view to expressing limited assurance are narrower in scope and depth, meaning that the risk of material misstatements or material non-conformities is greater than if reasonable assurance is expressed. With respect to EU ETS the verification steps as described in section 2.3 are carried out taking account of the need for reasonable assurance.

The risk based approach, and the need to demonstrate reasonable assurance, require verifiers to undertake a risk assessment on an aircraft operator specific basis, in order to set an appropriate verification plan for the specific aircraft operator. Depending on the findings as the verification proceeds, the verification activities, referred to in section 2.3, may need to be continually adjusted to meet requirements for achieving reasonable assurance. There shall be traceable evidence clearly linked to tests and results etc., and clear planning, output and decision trails to support the verification conclusion. The evidence as well as the related tests and findings shall be fully documented in the verifier's internal verification documentation (i.e. their own auditable record of the verification carried out).

⁷ The term reasonable assurance is explained in section 3.2 EA-6/03.

The verifier shall finally state with reasonable assurance in the external verification report that the data in the emissions or tonne-kilometre report are free from material misstatement and material non-conformities (concerning the approved monitoring plan). This shall be confirmed via a positively worded form of verification opinion in the verification report that the EU ETS annual emissions report or tonne-kilometre report is free from material misstatements and material non-conformities.⁸

2.3 Verification activities

According to Annex I, section 10.4. MRG the verification process consists of mandatory verification steps which are interconnected to each other and cyclical. Findings during the verification process can mean that a verifier may have to adjust or repeat one or more steps in the verification process. The verification steps outlined in the MRG are the following:

- Strategic analysis
- Risk analysis (leading to a verification plan)
- Verification (the actual detailed verification testing)
- Internal verification documentation
- Completing the verification and findings and issuing a verification report

EA-6/03 breaks down these steps even further into more detailed verification stages (see chapter 5 EA-6/03).

Although the steps can be combined for the verification of the emission data and for the tonne-kilometre data it is important to note that elements that are specific for emissions and tonne-km shall kilometre should be taken into account in all the steps if the verifier verifies both reports. A generic risk analysis would for example not be sufficient to identify the risks with respect to monitoring emissions and tonne-kilometre specifically. Additional guidance concerning the verification of emission reports of small emitters can be found in chapter 5 of this guidance.

2.3.1 Pre-contract stage

To ensure that the verifier has the ability to undertake the verification activities for a specific aircraft operator the verifier has to carry out certain activities during the pre-contract stage (i.e. before a contract is signed with the aircraft operator). This includes the following activities:

1. An evaluation of the risks that are involved for the verifier to undertake the verification activities for the particular aircraft operator (business risks);

⁸ A verification report expressing limited assurance would have been negatively worded and aimed at reducing the risk that the verifier has issued an incorrect verification report to an acceptable level. In that case the verification opinion statement would have been worded as follows: nothing came to the verifier's attention to suggest that it was not free of material misstatements or material non-conformities.

2. Assessment of whether the aircraft operator has provided the verifier with sufficient information to be able to quote an appropriate number of days. The information to be provided by the aircraft operator could include the monitoring plan and an indication whether access will be provided to relevant Eurocontrol data;
3. Undertaking a competency need analysis to select the verification team and contract review. This means that the verifier undertakes a review of the information supplied by the aircraft operator to determine the scope of verification, the competences required (including language skills) and whether the verifier has the accreditation, competence, personnel and resources needed to successfully complete the verification to the specified timescales required. See chapter 7 of this guidance for requirements on technical competence;
4. Internal review of the quotation to ensure an appropriate number of days has been included (regardless of the fee rate);
5. Specification of any contract conditions;
6. Allocation of time to verification activities;
7. Documentation of pre-contract stage.

Each of these steps is further explained in section 5.2 EA-6/03.

When determining the necessary time allocation for a specific verification engagement the verifier has to take certain factors into account such as the extent of an aircraft operator's activities, the complexity of the aircraft operator's activities and fleet, the complexity of the monitoring plan and the monitoring methodology, the applicable materiality threshold, the aircraft operator's data flow activities and its internal control system (QA/QC procedures) and the location of information and data related to the emissions or tonne-kilometre data. In particular the risks associated with multiple locations for records and aircraft and the large data sets have an impact on the time to be allocated. The method used to allocate time should be documented in a transparent way to enable the accreditation body to assess this method during surveillance. Elements specific to the aircraft operator (e.g. holiday charter, number of aircraft, type of flights, method applied for determining fuel consumption, default value for determining the mass of passengers etc.) will enable the verifier to make a time allocation.

Time allocation in the pre-contract stage should not be a fixed number. The contract with the aircraft operator shall allow for the provision of additional days to be allocated if the need for additional time is determined as a result of the strategic and risk analysis or if misstatements, non-conformities and/or insufficient data and errors in the data sets are identified by the verifier during the verification (see section 5.2.6 EA-6/03).

2.3.2 Strategic analysis

The objective of the strategic analysis is to get an understanding of the organisation, its monitoring plan, data flow and the control system with respect to monitoring and reporting. This will enable the verifier to plan the verification for the specific circumstances of an individual aircraft operator. Based on the approved monitoring plan the verifier shall assess the likely nature, scale and

complexity of the verification activity. This is done by document review and interviews (see section 5.3.1 EA-6/03). The strategic analysis provides input into the risk analysis, the verification plan and ultimately to the findings and conclusions of the verification which are incorporated into the verification report.

The aircraft operator shall give at least the following documents to the verifier:

- The approved monitoring plans, including all the Annexes and underlying procedures that are mentioned as references in the monitoring plan;
- Competent Authority's correspondence with respect to critical issues / changes to the monitoring plan;
- Emission report and tonne-kilometre report;
- Changes to the monitoring plan and whether these have been notified to and where relevant approved by the Competent Authority;
- Diagram or chart on the organizational structure of the aircraft operator and a diagram or chart of the data flow.

Based on these documents, the verifier considers the specifics of the aircraft operator (see below).

The verifier should also consider the website of the company and other relevant information.

EA-6/03 contains general requirements and issues that have to be taken into account when doing a strategic analysis. For the verification of emissions and tonne-kilometre data different inputs are relevant. The following aviation specific inputs are examples that are likely to be relevant for the strategic analysis. The verifier shall develop an appropriate methodology to achieve the objectives of the strategic analysis.

Understanding the overall organisation (organisational structure)

- The composition of the fleet (number of aircraft, aircraft types, owned and long term leased aircraft, wet leased aircraft etc.);
- The geographical focus of flights, the number of flights, the type of flights (scheduled flights, flights to and from EU that fall under the responsibility of the aircraft operator and flights that are exempted from EU ETS);
- What business model the aircraft operator is using (cargo, charter, network or mixed). The operating model has an impact on the flight planning processes and the implementation of flight planning. This could involve different internal departments and systems, each with its own risks;
- How the legal and organisational structure of the aircraft operator is set up. The organisational structure can be complex in the aviation industry when different ICAO designators or registration numbers are used by an aircraft operator (e.g. if there was a merger). In that case these would normally be considered as different aircraft operators. Conversely parent companies and subsidiary airlines can use the same ICAO designator which would then be regarded as a single aircraft operator;

- The departments or persons responsible for specific elements in the data flow (e.g. Flight Planning, Operations, Flight Control, IT, pilot, fuel suppliers, fuel management);
- How the flights are allocated to the aircraft operator (ICAO designator or aircraft registration number if the ICAO designator is not available);
- Whether wet and/or dry leases are applied and to what extent these aircraft fall under the responsibility of the aircraft operator;
- Whether the aircraft operator is commercial or not according to the definition of commercial aircraft operator in the EU ETS Directive; this is relevant for aircraft operators that fly less than 243 flights per period for three consecutive four months period or operate flights with total emissions lower than 10,000 tonnes of CO₂ per year. If commercial aircraft operators are below the *de-minimis* threshold they fall outside the EU ETS;
- Type of data collection and management system used.

Understanding the monitoring methodology for emissions

- What method the aircraft operator has chosen to monitor the fuel consumption (method A or B), or whether a simplified monitoring tool has been applied for a small emitter (such as the Eurocontrol small emitters' tool). The consumption of fuel by the auxiliary power unit needs to be included (in case of method A and B);
- An overview of the data needed for the calculation of the total fuel consumption: whether the flight falls under the aircraft operator's ICAO designator, aircraft type and registration number, departure and arrival aerodromes, local time of departure, type of flight, fuel consumption, source stream;
- The source streams used and the relevant emission factor applicable. As commercial aircraft operators often use only jet kerosene, the emission factor is usually 3.15 kg. If another source stream is used other emission factors may be applicable (see Annex XIV, section 2.3 MRG);
- Whether the fuel in tanks and fuel uplift are measured as volumes (not mass) and if this is the case what method is used to determine the fuel density (there is a hierarchy of methods which starts off with measurement of fuel density on board, taking data from the fuel supplier, determining the density based on a temperature correction or as a last resort using a standard factor of 0.8);
- How data gaps are filled (e.g. using, pursuant to Annex XIV, section 4 MRG, Eurocontrol small emitters' tool or another tool approved by the Commission; or using another method justified as conservative).

Understanding the monitoring methodology for tonne-kilometre

- What tool is used to calculate the distance based on WGS84 and the use of AIP data for the aerodromes (e.g. Vincenty or another formula based on WGS84);
- Which method is used to determine the mass of passengers and baggage (tier 1 using a default value of 100kg or taking the mass of passengers and baggage from the "mass and balance" documentation);
- The way active crew members and their baggage are excluded;

- Which method is used to determine the mass of freight and mail (using the actual mass or standard mass from the “mass and balance” documentation);
- The way the “tare weight” of containers and pallets are excluded.

Understanding the data flow

- The documents that serve as a primary data sources for the calculation parameters (for example, aerodrome pairs and fuel used for emissions; or number and weight of passengers and baggage for tonne-kilometre);
- The way the information from primary source data ends up in the emission report or tonne-kilometre report, e.g. paper-based through manual input or electronically via ACARS or for tonne-kilometre SITA ACARS messages and messages from service providers at airports; or a combination of both;
- The way data is input to the central system(s) (manually or electronically or a combination);
- The way the emissions report or tonne-kilometre report is extracted from the central system and whether there is any subsequent manipulation of data to finalise the report).

For more information on the data flow see chapter 3 of this guidance.

Understanding the control system of an aircraft operator

- The type of quality controls used to mitigate the risks in the data flow. Basically two types of controls exist: controls that monitor the data flow to avoid failures, and controls that aim to detect and correct errors. Examples of monitoring controls are the “four eyes principle” (double check by another person) and access controls. Examples of detection control are plausibility checks or routine checks for identifying errors. Both types of controls can be carried out manually or electronically;
- Controls on recording and transmitting data into IT system that have been implemented prior to the introduction EU ETS and are still used;
- Controls on recording and transmitting data into IT system that have been implemented as a result of the introduction of EU ETS;
- The robustness of procedures for data flow activities and control activities (see also chapter 3 of this guidance).

2.3.3 Risk analysis

To ensure that the verifier can assess the risk of misstatements or non-conformities and their likely material effect, the verifier is required to do a risk analysis. The verifier has to assess the likely level of risks of a material misstatement and/or a material non-conformity based on an analysis of the inherent and control risks (see section 5.3.2 EA-6/03).

During the verification the verifier also assesses the verification risk (the risk that the verifier expresses an inappropriate verification opinion and/or fails to undertake for example sufficient testing that enables detection of all relevant issues). In assessing the verification risk the verifier needs to take account of the inherent risks, control risks and detection risks.

Inherent risks are risks linked to the data flow activities assuming that there were no related or otherwise insufficient control activities to mitigate these risks (see definition in Annex I, section 2 paragraph 5 c MRG). Examples of inherent risks are not storing aircraft and flight data in the central database, ACARS messages are missing, non ETS flights are included in reporting data, wrong data taken from the technical log, fuel data is not correctly recorded in the technical log, manual inputs etc.

Control risks are risks that the control system may not be adequate to prevent, detect or correct material misstatements in a timely manner (see definition in Annex I, section 2, paragraph 5 (a) MRG). Examples of control risks are automatic controls in the IT system that are not functioning, internal audits that are not correctly performed, no internal data reviews, the person responsible for those control activities is not sufficiently knowledgeable, cross checks between fuel uplift measured by on board measurement instruments and fuel slips are not correctly performed.

Detection risk means that despite the internal controls and verification activities errors and anomalies are not identified by the aircraft operator and the verifier, if insufficient work is done, will not detect a material misstatement or a material non-conformity. This risk depends on the extent and transparency of internal controls, the overall control environment as well as the scope of the verification activities.

In order to assess these risks it is important for the verifier to fully understand the data flow, the existing and new systems used to manage the data flow as well as the internal control activities implemented by the aircraft operator. The verifier shall consider the aircraft operator's own risk assessment of their internal controls when carrying out his own risk analysis and shall take account of whether it is reasonable in the light of the verifier's analysis.

Different risks and control activities are involved in the verification of tonne-kilometre data compared to the verification of emission data. Both verifier's and aircraft operator's risk analysis shall therefore focus not only on the inherent and control risks related to annual emissions, but also make a separate analysis of the risks related to tonne km if the aircraft operator is applying for free allocation of emission allowances by submitting a tonne km report. Further requirements and guidance on the risk analysis are mentioned in section 5.3.2 EA-6/03.

2.3.4 Verification plan

Based on the risk analysis the verifier drafts a verification plan which comprises at least:

- a verification programme that includes the nature of the verification activities, when and how these activities will be carried out and their scope;
- a data sampling plan which sets out the scope and extent of the data to be tested in order to reach a verification opinion with reasonable assurance that there are no material misstatement or non-conformities. This should include the sampling method and the method used to test the

control activities as well as the action to be taken if the data fails testing (i.e. what additional testing will be done);

- as part of the verification programme, the site visit(s) including a description of what activities will be performed on site and what activities off site, as well as information on the systems and processes to be checked and interviews to be performed. The definition of site visit in EU ETS aviation is different compared to the definition of site visits for stationary installations (see section 2.3.6 for regular aircraft operators and chapter 5 for small emitters);
- as part of the verification programme, the way the verifier plans to check the completeness of flights and aircraft.

If the actual verification shows that the verification plan is not sufficient and additional risks are identified, the verification plan and the verification activities need to be adapted or expanded; it is therefore a living document to be updated as necessary (for further requirements see section 5.3.3 EA-6/03).

Sampling

A risk analysis directs the verification effort to areas of the aircraft operator's data flow, data generation, control environment, control system (QA/QC procedures), management and reporting processes that give rise to an increased risk of misstatement and non-conformity. For instance if the inherent risk to a misstatement in a data flow activity is high (e.g. through lots of manual transactions) and no effective control activities are implemented, it is necessary that the particular data flow activity as a whole and its population will be subject to substantive testing. Robust internal control activities may mitigate this substantive testing since the risks involved will be reduced.

If the risks to misstatements and non-conformities are lower, targeted sampling can be applied by using spot checks. If misstatements are detected by a verifier, Annex I section 10.4.2 (c) MRG requires the operator to check and correct the entire population from which a sample was taken.

Factors that determine the sampling size (for both individual parameters and the overall data set) include the materiality level⁹, the materiality of the contribution of an individual data element to the overall data set, reasonable assurance requirements and the verification risk (as discussed above). If the materiality level is 2 % (as opposed to the 5% relevant to operators with emissions of 500 ktonnes CO₂ or less per year) more samples may need to be taken to ensure that the verifier can state with reasonable assurance that the emission report is free from material misstatement and material non-conformities. The four factors are interlinked and should be considered all together when determining the sample size and sampling approach. It particularly depends on the level of confidence the verifier has in the internal control activities implemented by the aircraft operator to mitigate the risks to misstatements in a particular data flow activity and the overall data set.

⁹ Note this materiality threshold is an indicator to the verifier of whether they may draw a conclusion to give a satisfactory verification statement (see section 2.3.7 of this guidance). It is not an allowance (or error bar) for the aircraft operator to apply to their data. All misstatements and non-conformities that are identified and correctable have to be corrected.

In order for the verifier to give a verification opinion statement with reasonable assurance that the emission report or tonne-kilometre report is free from material misstatements and material non-conformities the verifier has to carry out data sampling as well as testing to confirm that the monitoring plan is being implemented correctly and the control activities are appropriate. A key element of sampling is that the selection is representative of the overall data set in terms of the factors/types of data sampled and the time periods when samples are selected from across the reporting year.

The testing of control activities includes checks on whether the approved monitoring plan has been implemented and whether the control activities are effective (e.g. cross checks with Eurocontrol data, cross checks between fuel consumption measured by on board measurements and fuel slips, service level agreements with ground handling agents). For the testing of the control activities a distinction can be made between automated control activities and manual control activities such as manual checks on whether certain flights are exempted flights. For information on how automated control activities such as IT systems are checked by a verifier please see chapter 3 of this guidance. With respect to testing manual control activities the magnitude of the test depends on:

- the frequency of the control activities (how many times a control activity has been carried out);
- the number of items (how many items are being controlled by the control activities (e.g. how many documents are stored in the document management system, how many flights, how many aerodrome pairs).

Data sampling relates to the checks on the data and information stream to ensure the accuracy of the data in the emissions report and tonne-kilometre report. During data sampling two elements will be checked:

- Verification of the methodology used to determine emissions and tonne-kilometre (by reproduction of data aggregation and using spreadsheet assurance techniques);
- Data verification (statistical sampling may not be possible and is therefore not required).

Data sampling is allowed within the records of emissions or tonne-kilometre data from aircraft and flights. This means that the verifier does not have to go to each aircraft to carry out sampling provided that the sample selected (according to the verifier's risk analysis) is representative of the whole set.

Both control testing and data sampling are carried out by following a specific approach. In selecting the approach the following principles shall apply:

- Sampling shall be representative of the whole data population and key subsets;
- Data sampling shall include horizontal and/or vertical checks;
- Sampling shall take account of the sampling regime of prior year verifications such that over a number of verification cycles all data streams are included with substantive testing and all control activities are included in compliance testing;
- Sampling approach shall be justified and detailed in the verification plan.

In addition the factors in Annex E EA-6/03 should be taken into account (section 5.3.3.2 EA-6/03).

2.3.5 Process analysis in verification process

The objective of the process analysis is to collect and document evidence upon which the verifier's verification opinion will be based. The verifier shall implement the verification plan using the standard auditing techniques of document review, interview, observation and corroboration as well as using data and information from external sources where relevant information is available (see section 5.3.4 EA-6/03). This includes walkthrough tests, sampling and analytical review as well as data review procedures.

The process analysis stage consists of two elements (see section 5.3.4 EA-6/03):

- Assessment of whether the approved monitoring plan is implemented and whether this is up to date. This includes the verification of processes (data flow) and the testing of internal control activities;
- Verification of the data including confirmation of the validity of the information used by the aircraft operator to calculate the uncertainty level as set in the approved monitoring plan.

Please see chapter 4 and chapter 6 on specific issues with respect to the verification of the emissions report and the tonne-kilometre report respectively.

Basically the following aviation specific activities are carried out. Please note that these activities are non-exhaustive:

- Verification of the processes which includes interviews with persons responsible for elements in the EU ETS specific data flow activities and understanding the data flow and processes that are EU ETS specific. The verifier will also interview persons that are responsible for internal audit procedures for EU ETS processes (which may be part of other audit activities e.g. Sarbanes Oxley or ETS specific audits). Next the verifier will track the data flow and the systems in the data flow (e.g. input ACARS in central IT systems, input of technical log into central system(s), interface between the central database and fuel management, filtering data from the databases as well as further preparation and extraction of the emission report from the internal system). For small emitters the data flow and processes can be easily checked especially if the Eurocontrol ETS Support Facility is used to generate an emission report (see chapter 5 of this guidance).
- Testing of control activities and procedures of control activities: through documentation review, interviews with persons responsible for implementing and maintaining these control activities and observing or inspecting (seeing how the persons responsible carry out the control activities), the verifier assesses the procedures for and robustness of the control activities. This includes cross checks and plausibility/ sense checks, checks on outsourced processes (activities performed by third parties), access controls, IT controls, checks on aircraft and flight data input into central system(s), checks on how aircraft operator carries out control activities to ensure

completeness of flights, filtering out non ETS flights, ensuring that the overall uncertainty related to the fuel consumption is not exceeded, service level agreements with ground handling agents, cross checking with Eurocontrol data etc.)

- Data verification: checks on the data by taking samples of the actual data related to emissions reporting and tonne-kilometre reporting. This includes for example:
 - Comparison of primary data sources with data in the central system: e.g. aircraft data (leased and owned), aerodrome pairs, start and destination of flight, dates of flights, comparison with technical log (including also unusual destinations and diverted flights), type of flight (comparison with technical log and flight plan to identify anomalies), fuel level for emissions (comparison with primary source data, ACARS or technical log), fuel uplift and density (cross check with fuel slip), number of passengers, weight of freight and tare weight of containers;
 - Checking data verification that are directly input into the system: e.g. type of flight (completeness of ETS flights, making sure non ETS flights are filtered out), whether the method to determine density as mentioned in the MP is applied correctly, whether method A or B has been applied correctly, whether the APU has been taken into account, whether the approach to data gaps is conservative, whether the method described in the approved monitoring plan to determine the distance, the mass of passengers, freight and mail has been applied correctly, whether AIP data is used in the calculation of distance etc.)
 - Analysing data which means among other things analysis of data based on single flights in order to come to final emission data or tonne-kilometre data: e.g. average density at single airports, minimum, average and maximum fuel consumption for individual aircraft types, analysis of discrepancies that cannot be explained by aircraft operator in a satisfying manner, checking how emissions from the data gap approach relate to actual reported emissions, whether emissions from the data gap approach are conservative, cross check between tonne-kilometre and emissions report (assessing the emission per tonne-kilometre for all aerodrome pairs), cross check with Eurocontrol data from EU ETS support facility, cross check of fuel consumption (for all flights including non ETS flights) with total fuel consumption from other sources, cross check distances for individual aerodrome with external sources, cross check between reported transport capacity with maximum payload, plausibility check on mass of passengers and mass of freight, determining the average utilization of single flight routes, checking passenger kilometre with external sources etc.).
 - Extraction of emission report or tonne-kilometre report from the internal system(s) or collecting/ manipulating the data for the actual drafting of the emission report or tonne-kilometre report.

For further requirements and guidance please see section 5.3.4 and 5.3.5 EA-6/03).

During the process analysis the verifier assesses the likely materiality of the misstatements and non-conformities found (in relation to the overall declared emissions in the report subject to verification) and he will then require the aircraft operator to correct them where possible (or justify

where deemed not possible). The process analysis is completed when all activities described in the verification plan have been carried out.

2.3.6 Site visits

According to EA-6/03 site visits for aircraft operators relate to where the monitoring process is defined and managed including where relevant data, information and records are controlled and stored. This means that a site visit does not necessarily entail a visit to each and every aircraft or various aerodromes. Following the sequence and interaction of the data flow activities as well as testing the control activities can also be carried out by the verifier at the office where the relevant (electronic) databases and procedures for quality assurance and control activities are located. In certain cases the verifier's risk analysis may allow the databases and procedures to be accessed remotely from the desk top of a verifier. This includes the main cross check with Eurocontrol data on flights to assess the completeness of flights (see chapter 4 and 5 of this guidance). This implies that aerodromes and aircraft do not have to be visited by the verifier. For small emitters, guidance on site visits is given in chapter 5 of this guidance.

2.3.7 Assessing the materiality of misstatements and non-conformities

An emission report or tonne-kilometre report is not satisfactory if it is not free of material misstatements and contains material non-conformities. Non-conformities have a qualitative nature which means that it very much depends on the individual circumstances and the professional judgment of a verifier as to whether a non-conformity has material effect. Misstatements are of a quantitative judgement and are more related to the materiality threshold. It must be noted that the materiality threshold is not an allowed margin of errors. Any correctable misstatement or non-conformity identified during the verification process needs to be corrected by the aircraft operator.

The materiality level for aircraft operators with annual emissions equal to or less than 500 ktonnes CO₂ is 5%. For aircraft operators with annual emissions of more than 500 ktonnes CO₂ the materiality level is 2%. These materiality thresholds apply to the verification of emissions. For the verification of tonne-kilometre the materiality threshold is 5% of the total tonne-kilometre (see Annex A EA-6/03 and section 10.4.2 MRG 2007).

Non-conformities

A non-conformity means any act or omission of an act by an aircraft operator being under verification, either intentional or unintentional that is contrary to the requirements in the monitoring plan approved by the Competent Authority (Annex I, section 2 (5) (h) MRG). Whether a non-conformity has material effect, depends on certain factors. An indication of a material effect would be if the non-conformity has an impact on the reported emissions data or tonne-kilometre data and as a result of that would, for example, lead to errors, omissions and misrepresentations in the data that exceed the materiality level. However material non-conformities do not necessarily have to result in an exceedence of the materiality level and do not necessarily have an impact on the emissions or tonne-kilometre data; they are not solely linked to the materiality threshold. Given

the formal definition of material non-conformity in the MRG it could be any act or omission of an act that is contrary to the requirements of the approved monitoring plan and that could lead to a different treatment of the aircraft operator by the Competent Authority.

In general non-conformities are considered to be material if they have or could have a material effect on the methodology or calculation of the emissions or tonne-kilometres and thus the emission figure or tonne-kilometre data. It depends on the specific circumstances and the verifier's judgement whether the effect could lead to a different treatment of the aircraft operator by the Competent Authority. Possible factors that can determine whether a non-conformity has material effect, are:

- If a non-conformity results in errors, misrepresentations and omissions of the data that exceed the materiality threshold (although it should be noted that a non-conformity does not have to exceed this threshold in order to be a material non-conformity);
- The aggregate of non-conformities results in data that exceeds the materiality threshold;
- Whether the non-conformity can be rectified. If non-conformities cannot be rectified before issuing the emissions report or tonne kilometre report or cannot be rectified at all, a verifier could consider this as a material non-conformity if this has an impact on the emission data or tonne-kilometre data;
- The possibility of recurrence together with the impact on the emission data; or
- The duration of the existence of that non-conformity, i.e. a non-conformity in the quality assurance and control procedures that has not been addressed for several years by the operator and has therefore grown into a non-conformity that is no longer acceptable for the verifier because of its potential impact on the emission data.

In some cases a material non-conformity could also exist if the non-conformity relates to non-compliance in the calculation method (e.g. applying method A in practice while the monitoring plan states that method B should be applied). This particular issue would lead to a different treatment by the Competent Authority. This could still be the case if applying method A instead of the required method B has no effect on the emission data.

Misstatements

Misstatements will have material effect when they (in aggregate or individually) exceed the materiality level. However in certain cases misstatements below the materiality threshold can also be regarded as material misstatements because they could change the judgment of the Competent Authority. Therefore verifiers need to consider not only the size but also the nature of any identified misstatements, and the particular circumstances of their occurrence, when evaluating their effect before coming to a conclusion in the verification opinion statement in the verification report. A misstatement below the materiality threshold could for example have material effect if an aircraft operator refuses to correct detected errors for instance when he considers the materiality threshold to be an excuse. In particular where this would lead to a systematic underestimation of emissions, even such small errors can be considered material. In such a case a verifier may issue a verification opinion that the emission report is not satisfactory or not issue a verification opinion

statement on the grounds that the emission report is not satisfactory. This means the verifier need to consider whether misstatements in particular items of lesser amounts than the materiality threshold could be reasonably expected to influence the decision of the Competent Authority.

Correcting the misstatement and non-conformity

If a misstatement or non-conformity is identified during the verification, the verifier is required to inform the aircraft operator thereof. The aircraft operator is required to correct this misstatement and non-conformity. This could involve changing the monitoring plan and having this reapproved by the Competent Authority. In case the misstatement or non-conformity cannot be rectified the verifier shall assess the aircraft operator's reasons for not correcting this misstatement or non-conformity, assess whether these reasons are justified and take account of this when forming the verification opinion.

For more guidance please see section 5.3.6, Annex A and I EA-6/03.

2.3.8. Internal verification documentation

At the end of the verification process, the verifier shall prepare the internal verification documentation that contain as a minimum evidence showing that the strategic analysis, the risk analysis, the verification plan, including the data sampling plan, have been performed in full, and that provides sufficient information to support the conclusions on the verification (see section 5.4.1 EA-6/03). The internal verification documentation needs to be transparent and be drafted such that it enables the independent reviewer, the accreditation body and when relevant the Competent Authority to obtain an insight as to whether the verification process has been carried out according to the requirements. Furthermore the internal verification documentation reduces the liability risks of the verifier.

Besides the issues in Annex G EA-6/03 the internal verification documentation should also include the results of all sampling and testing (including both null and negative results), as well as results of cross checks on data, results of assessing control activities and compliance with the monitoring plan, recalculation test, reproduction tests etc.

2.3.9 Verification report

According to Annex I, section 10.4.2 (e) MRG 2007 the verifier shall present the verification methodology, his findings and verification opinion in a verification report. The content of the verification report shall at least contain the elements described in Annex H EA-6/03. Please note that the Competent Authority of the administering Member State may require the verifier to submit additional or other information in the verification report.

The verification report shall refer to the exact emissions report or tonne-kilometre report that has been verified (i.e. date and version number).

An emissions report or tonne-kilometre report can be verified as satisfactory when the data in the emissions report or tonne-kilometre report are free from material misstatements and when there are no material non-conformities (Annex V EU ETS Directive and Annex I, section 10.4.2 (e) MRG 2007).

A verifier may conclude an emissions report or tonne-kilometre report is not verified when there was a limitation of scope of the verification work. This can arise if:

- The approved monitoring plan does not provide sufficient scope or clarity to properly plan and conduct the verification process as well as conclude on it (material uncertainty);
- Data are missing that prevent a verifier from obtaining evidence required to reduce the verification risk to a reasonable level;
- The aircraft operator has failed to make sufficient information available to enable the verifier to carry out the verification assessment (material uncertainty).

The aircraft operator is expected to be able to resolve most misstatements and non-conformities before issuing the final verification report. Misstatements and non-conformities that are resolved before issuing that verification report shall be logged in the verifier's internal verification documentation. Any remaining non-material misstatements and non-conformities that cannot be corrected will be noted in the final external verification report that is submitted to the aircraft operator for passing on to the Competent Authority of the administering Member State.

When submitting these non-material misstatements and non-conformities in the verification report the verifier shall describe them in sufficient detail to be clear where the issues arise. In addition the verifier can make recommendations for improvements regarding the misstatements and non-conformities (for more guidance see section 5.4.2.2 and Annex I EA-6/03).

2.3.10 Technical review

The draft verification report shall be subject to an independent technical review prior to a decision being made to issue the external verification report, unless this is regulated differently in the national legislation of an Administering Member State. The technical review shall be carried out at the very end of the verification and its scope shall encompass the complete verification process (see section 5.5 EA-6/03). There should be no subsequent changes to the opinion statement and associated information unless the changes are reviewed again by the technical reviewer.

2.3.11 Issuing verification report

Once the verification has been finalized the verifier has to submit the verification report to the aircraft operator. There shall be a verification report for annual emissions and a separate verification report for the tonne-kilometre. During a combined verification, as part of the process analysis, the verifier shall perform cross checks between the respective sets of data in both reports. The aircraft operator will subsequently submit to the Competent Authority of the Administering

Member State the final emission report and tonne-kilometre report (in the case of the aircraft operators applying for free allowances) accompanied with the respective verification report(s). Once the verified reports have been submitted to the relevant Competent Authority of the administering Member State, the Competent Authority will usually check these reports. This could include completeness checks of both reports, a check between the monitoring plans and both reports, cross checks between the reports and within each report including a check with Eurocontrol data in the ETS Support Facility.

2.3.12 Registry

According to article 51 of the Registry Regulation the verifier has to input or approve the relevant entries into the EU ETS registry related to the final verified GHG emissions for the period in questions and for the relevant activities. The option to input or to approve the entry depends on the way this has been regulated in the national legislation of the Administering Member State (see section 5.7 EA-6/03).

2.3.13 Addressing non material misstatements and non-conformities after verification

Annex I, section 10.4.2 MRG 2007 requires aircraft operators to address all outstanding misstatements and non-conformities in a timeframe set by the Competent Authority of the Administering Member State. When consulting the Competent Authority not only shall the timeframe for addressing these misstatements and non-conformities be set, but the aircraft operator shall also communicate the details on how they intend to address them and also implement improvements identified in relation to them.

Non-material misstatements and non-conformities that have not been corrected before the date of signing off of the verification report and that have (or could have) an effect on the emissions data or tonne-kilometre data shall be addressed by the aircraft operator within a limited timeframe to be set by the Competent Authority of the administering Member State. This timeframe shall be set such that these misstatements and non-conformities can be resolved as soon as possible.

More trivial and small non material non-conformities that do not have an effect on the emission data can be addressed in a longer timeframe. This could be for example a small error in the management system that has no impact on the emission data and is not relevant for the Competent Authority to know.

The verifier shall check as part of the next year's verification of the emission report how these non-material misstatements and non-conformities have been addressed and he shall take into account the correspondence between the aircraft operator and the Competent Authority on how to address these misstatements and non-conformities.

3 How to assess the risks in the data flow and control activities?

An important aspect for ensuring that reliable and correct emissions and tonne-kilometre data are reported is establishing and implementing clear data flow activities as well as control activities to mitigate the risks to misstatements and non-conformities. This chapter outlines general guidance on how a verifier should deal with data flow activities and control activities implemented by the aircraft operator. More specific information can be found in chapters 4, 5 (for small emitters) and 6 of this guidance.

3.1 Data flow activities

Annex I, section 10.1 MRG 2007 requires the aircraft operator to establish, document, implement and maintain effective data flow activities. Data flow activities concern all operational activities that are necessary to produce an emissions report and tonne-kilometre report from the primary data. This includes measuring, monitoring, analysing, recording, processing and calculating parameters and handling subsequent data: in short all steps that are needed to derive an emissions and tonne-kilometre report. Primary data can come from many different sources and can arise at different points of time involving different departments in the operator's organisation and management structure. Data may be created centrally (allocation of flight types at flight planning) and in a decentralized way (e.g. fuel uplift). Primary data include for example fuel measurement data, fuel density, flight numbers and schedules, aircraft numbers and routes, mass of freight and mail, number of passengers etc.

There is often redundancy in the data. For instance the same or similar data can occur in several documents at the same time which are subsequently stored in parallel systems or modules and possibly consolidated before the data come together in other systems and are eventually processed for reporting emissions or tonne-kilometre data. For commercial aircraft operators in particular several typical data flow variations can exist rather than just one reporting line. The type and number of data flow variations may depend on operating conditions: e.g. specific data flow activities in case of ad hoc charter and leasing arrangements or different data flows per aircraft such as an older aircraft type with manual transmission of fuel data and a new aircraft type using ACARS.

For aviation there are specific procedures for data flow activities that need to be described briefly in the monitoring plan. Please see chapter 3 of the monitoring plan *Guidance for the Aviation Industry*¹⁰.

¹⁰ Guidance for the Aviation Industry Monitoring and Reporting Annual Emissions and Tonne-km data for EU Emissions Trading, 28 May 2009, see http://ec.europa.eu/clima/policies/aviation/docs/nl_guidance.pdf.

3.2 Verification of the data flow

The verifier has to assess whether the data flow as described in the monitoring plan meets actual practice by testing the data flow activities and by trailing data through the data flow following the sequence and interaction of the data flow activities. In addition, the verifier will check which persons are responsible for specific data flow activities. In general aircraft operators already monitor flights for internal planning and management purposes as well as for meeting the requirements that are imposed by civil aviation authorities. To this end commercial aircraft operators who perform several flights a day are used to dealing with large amounts of data emanating from many primary data sources. The general data flow is often highly dependent on IT systems.

The verifier cannot rely solely on existing IT systems and flight safety procedures without testing the EU ETS specific data flow and EU ETS specific alterations to the existing systems, in particular the coverage of type of flights and number of flights differ for EU ETS purposes. Where the Eurocontrol ETS Support Facility or Eurocontrol Small Emitters' tool are used to generate or cross check data, the verifier does not have to check the validity of the facility or the tool. In those cases the verifier only needs to consider the validity of the data entered into the system or tool (see chapter 5 of this guidance).

To assess the data flow the verifier must understand which data from parallel data flows actually end up in the final emissions data or tonne-kilometre data calculations and what the specific primary data sources are. For more guidance on how to understand a data flow please see the *Guidance for the Aviation Industry*.

3.3 Control activities and procedures for control activities

To ensure that the annual emissions report and the tonne-kilometre report resulting from the data flow activities do not contain misstatements and are in conformance with the corresponding approved monitoring plan and the MRG, the aircraft operator has to establish, document, implement and maintain an internal control system which consists of a risk assessment of the process and control activities (Annex I, section 10.2 MRG). The outcome of the risk assessment determines to what extent the control activities need to be set up. These control activities are activities designed to mitigate the risk to misstatements and non-conformance with the approved monitoring plan and the MRG. These include at least the following activities

- Quality assurance of the measurement equipment and information technology;
- Internal reviews of reported data;
- Management of outsourced processes;
- Corrections and corrective actions;
- Records and documentation (as well as document retention);
- Management of the necessary competences for the responsibilities assigned.

To ensure that the control activities are effective and to mitigate the risk that ineffective controls lead to misstatements and non-conformities, the MRG require the aircraft operator to set up written procedures for these control activities. A traceable reference to these procedures has to be incorporated in both the monitoring plans.

3.4 Verification of control activities and procedures of control activities

The verifier is required to assess whether the approved monitoring plan is implemented correctly and whether this is up to date. To this end the verifier shall assess and test the control activities, based on the verifier's analysis of the inherent and control risks involved. Testing these control activities is also relevant for identifying the control risks and their impact on the verification risk. Assessing the control activities not only concerns assessing the establishment of control activities, e.g. persons responsible for data flow activities, systematic cross checks (vertical and horizontal checks, access controls, release checks etc.) but also the documentation, implementation and maintenance of control activities, including appropriate succession planning for where personnel may change or may take leave. The key question is to what extent the control activity is sufficient to mitigate the risk of misstatements and non-conformities. Relevant questions are for example:

- Are control activities set up such that they can function properly and effectively?
- What is the frequency of the control activities?
- Are the control activities carried out manually or electronically?
- Are the control activities implemented correctly so that they can function in practice? Is there a 4-eye principle (double check by another person)?
- Who is responsible for the control activity and does this person have sufficient knowledge and experience to carry out that control activity properly?

There are different types of control testing that could be carried out during verification. This includes the following:

- Inquiry of relevant information (e.g. through interviews). Note that inquiry alone will not provide sufficient evidence to support a conclusion about the effectiveness of a control. Accordingly, while inquiry can be useful, it is best used in combination with other control testing techniques;
- Observation to obtain evidence if there is no documentation of the operation of a control;
- Inspection to determine whether manual controls are being performed. Evidence could include written explanations, check marks, or other indications of follow-up documentation.
- Reperformance testing generally used when a combination of inquiry, observation and inspection of evidence does not provide sufficient appropriate evidence that a control is operating effectively (e.g. cross checking the data itself).

Some existing control activities may have already been tested or verified by others, e.g. billing systems subject to internal audits and subsequently used to retrieve or cross check with EU ETS data. This does not relieve the verifier from testing the control activities and especially the EU ETS adaptations. It is especially relevant for the verifier to assess what the scope and subject matter of

the test performed by others was, e.g. what parts were not checked, what alterations have been made for EU ETS, who has conducted the audits, is documentation available, what audit procedures were carried out by that third party, have recommendations been made in the audit that are also relevant for EU ETS and if so have these recommendations been implemented etc..

This paragraph describes in general how the verifier should assess the aviation specific control activities and procedures for control activities. More specific issues are mentioned in chapter 4 and 6 of this guidance.

Testing of quality assurance of the measurement equipment

If on board measurement instruments are used to determine the fuel consumption and density the MRG require the aircraft operator to calibrate the measurement instruments.¹¹ In this case the verifier should check the manufacturer's specifications and if relevant maintenance plans and routine aircraft maintenance procedures. Where calibration is applied the verifier may decide, based on the risk analysis, to check the calibration certificates or accredited testing supplier information. The main objective is to check whether the aircraft operators have implemented sufficiently robust control activities to ensure that the meters are functioning properly. Furthermore, the verifier will check the procedure for cross checking the fuel uplift quantity measured by on board measurement equipment with the fuel uplift quantity as provided in the fuel invoice, e.g. by testing the cross checks made by the aircraft operator and by performing cross checks himself. The verifier will also check the procedures to ensure that on board equipment and systems are fully functional: by checking for instance whether the procedures for quality assurance of multiple gauges and systems exist and are functioning.

In situations where measurement equipment is used to weigh the mass of freight and mail the aircraft operator often does not calibrate the measurement equipment their self. This activity may be done by ground handling agents or by other means. In those cases the verifier needs to check the service level agreements with ground handling agents, the procedures they use to ensure that the measurement equipment is calibrated (and copies of the certificates if possible), or that other alternative control activities have been implemented to support the accuracy of weighing the mass of freight and mail. The verifier should at least spot check the internal audits performed on the procedures for quality assurance of the measurement equipment. Aircraft operators may consider including requirements for the provision of evidence of calibration as part of future service level agreements.

Testing of IT controls

IT systems play an important role in collecting and manipulating data for emissions or tonne-

¹¹ Irrespective of the MRG requirement in most cases calibration will not be possible or applied by aircraft operators. In those cases the aircraft operator uses alternative control activities to ensure the measurement instruments are functioning (see section 4.9 of this guidance).

kilometre reporting. IT related risks are therefore relevant to assess during the risk analysis. An IT system is more than just hardware and software, it also concerns IT environment/ organization, IT based processes, IT applications and IT infrastructure. The risks related to IT processes include for example lack of transparency in the data flows (black boxes), malfunctioning of the interface(s), risk that control measures only see to part of the processes and not the whole process. Risk in IT applications relate to malfunctioning of IT applications, lack of procedures, lack of input controls, process controls and output controls (in particular where updates or new software are rolled out). Risks related to the IT infrastructure include the vulnerability to interference. There can also be a combination of the above risks. Verifiers need to understand the extent of risks and control of IT systems. Verifiers also need to take into account whether the IT systems and processes are managed under an effective IT Management System such as ISO 20000.¹²

The verifier checks the control measures that are implemented in the IT system and electronic interfaces to ensure:

- Timeliness, availability and reliability of data;
- The correctness and accuracy of data, e.g. to among other things avoid double counting;
- The completeness of data;
- The continuity of the data to avoid data being lost and to ensure traceability of data;
- The integrity of data: i.e. data is not modified unauthorized.

These measures could include a manual check on whether the IT system is functioning and whether the aforementioned principles are met, as well as control activities and maintenance tools built into the IT system such as access controls, backups, recovery, continuity planning, change management and security. The type of testing carried out by the verifier depends on whether these control measures are manual or electronic.

Testing of internal review of data and correction of data

The aircraft operator has to design and implement internal reviews on defined data sets throughout the data flow. This includes horizontal and vertical checks as well as plausibility checks. For more information see Annex F on the *Guidance for ETS aviation Industry*.

Basically two types of control exist: controls that monitor the data flow to avoid failures, and detection controls that aim to detect errors. Examples of monitoring controls are the four eyes principle, i.e. double check by another person, and access controls. Examples of detection control are plausibility checks or routine checks for identifying errors. Both types of controls can be carried out manually or electronically.

The verifier will check that these internal review controls and associated corrective actions are undertaken to rectify the errors in the data. This can include testing of the cross checks and plausibility checks by for instance having the aircraft operator carry out these review checks or by

¹² ISO 20000 - ISO20000.1:2007 - Information Technology—Service Management—Part 1: Specification and Part 2 – Code of Practice.

performing cross checks himself or testing the access controls. The verifier will also assess to what extent these internal review checks and corrective actions are documented and which person is responsible for these checks. This documentation should contain proof that these internal review checks were performed. Examples of such proof are visible sign-off after review, approvals by e-mail or visible reconciliations performed.

Testing of quality assurance in outsourced processes

Major parts of the data flow can be outsourced to external service providers such as flight planning, the check-in at airports, the weighing of mass of freight by ground handling agents and the calculation of distance (GCD). In case of outsourced processes the aircraft operator will remain responsible for the data resulting in the emission report and tonne-kilometre report and has to control the quality of these processes.

The verifier has to check to what extent a certain data flow activity has been outsourced. Moreover he has to test the control activities that the aircraft operator has implemented to ensure the quality of the outsourced processes: e.g. assessing the procedures for procurement, internal audit (including, the frequency of audits), carrying out plausibility checks on the data, checking service level agreements with ground handling agents, instrument engineers, checking how an aircraft operator ensures that his service providers carry out their activities according to the service level agreement etc.

Records and documentation

The verifier checks how information on the monitoring methodology, primary data, data flow activities, control activities and procedures are documented. The MRG require aircraft operator to store information required for the verification of emissions and tonne-kilometre reports for at least 10 years from the date that the relevant verified emissions report or tonne-kilometre report is submitted to the Competent Authority. Section 9 MRG contains a non exhaustive list of what data needs to be stored for 10 years.

Most aircraft operators are only used to retaining primary source data such as fuel slips and flights plans for a couple of months or years. An aircraft operator may be allowed to retain primary source data in IT systems or electronic formats, including scanned copies, electronic load data messages and electronically transferred or generated data, provided that the aircraft operator implements the control measures mentioned under the paragraph above relating to testing IT systems. In all cases the aircraft operator must ensure that the data in the IT system can meet the following principles in the same way as paper based primary source data and that it is of the same quality.

- Timeliness, availability and reliability of data;
- The correctness and accuracy of data;
- The completeness of data;
- The continuity of the data to avoid data being lost and to ensure traceability of data;

- The integrity of data: i.e. data is not modified unauthorized.

It is of particular importance that the primary data end up in the IT system in the correct way. The verifier is in that case required to test these control measures and control activities to assess whether these principles and requirements have been met and the IT system/ interfaces are functioning properly. Of particular note is the need to check that data retained in archives/back up is accessible as IT systems design evolves (in the last 10 years systems have shifted from floppy discs to CDs, DVDs, memory sticks and solid state hard drives, therefore it is important to ensure that the Operator retains capacity to read old stored data). In addition, where mergers/ acquisitions etc may occur, it is important that the retention requirements of ETS are taken into account in the transfer of IT systems and stored data.

Please note that the Competent Authority of the administering Member State should be asked whether retaining primary source data electronically (e.g. scans) in the IT system is acceptable and whether additional requirements apply.

Procedures of control activities

The aircraft operator is required to establish, implement and maintain procedures for control activities. Annex F of the *Guidance for Aviation Industry* contains information on what should be contained in these procedures. The verifier shall verify that these procedures contain this information and that these procedures have been correctly implemented and are up to date.

Evaluation of the control system

Section 10.2 of the MRG requires the aircraft operator to evaluate the control system by for example carrying out internal audits. The verifier is responsible for assessing the quality of these internal audits and evaluation processes, and also whether these processes are properly documented.

3.5 Procedures for data flow activities and control activities in the monitoring plan

The monitoring plans for emissions and tonne-kilometre are required by the MRG to include reference and short descriptions of the procedures an aircraft operator has in place for certain specific data flow activities as well as a reference to the procedures for control activities, see chapter 3 of the *Guidance for the aviation Industry*. The specifics related to the verification of these procedures are explained in chapters 4 and 6 of this guidance.

4 Aviation specific requirements in the verification of annual emissions

This chapter explains some of the aviation specific issues that are relevant in the verification of reported annual emissions. These issues are related to sections in the emissions monitoring plan and emissions report. Please note that this is not a complete list of issues and the verifier needs to check whether additional requirements apply regarding the Administrative Member State concerned.

4.1 How to deal with changes to the monitoring plan? (section 1 MP AE Template and section 4 AER template)¹³

The aircraft operator is required to report in the emissions report any changes and deviations to the monitoring plan. During the strategic analysis the verifier checks whether these changes have been notified to and, if required, approved by the Competent Authority and whether the monitoring plan was updated as a result of these changes.¹⁴ If the monitoring plan or changes requiring approval have not been approved by the Competent Authority, the verifier shall refer the aircraft operator back to the Competent Authority. In principle, the verifier shall not continue with the verification until the matter is resolved, but he may continue to do so as long as the aircraft operator is aware that some verification activities may need to be repeated as a result of the Competent Authority approval or disapproval and the verification opinion may also be subject to change. Changes to the monitoring plan may affect the outcome of the risk analysis and influence the verification process.

4.2 How to identify aircraft operators? (section 2 MP AE Template and section 2 AER Template)

Section 2 MP AE Template and section 2 AER Template require the aircraft operator to fill in data on the identification of the aircraft operator (e.g. unique ICAO designator, AOC number, legal structure company). The ICAO designator in box 7 of the flight plan is the determining factor for assessing who is the aircraft operator and which flights fall under the responsibility of a particular aircraft operator (see Annex XIV, section 2 MRG). If the ICAO designator is not available the registration numbers of relevant aircraft are required and take on added significance regarding identification of flights allocated to a particular aircraft operator. Most aircraft operators involved in EU ETS will not have an ICAO designator and hence verifiers are more likely to encounter aircraft registration numbers. This is particularly the case for small emitters. The verifier should for example be aware of the following:

- The person shown in a state's aircraft register is simply the owner of the aircraft who may not be the aircraft operator;

¹³ See: http://ec.europa.eu/environment/climat/emission/mrg_templates_en.htm

¹⁴ See section 4.3 of this guidance on how a verifier should deal with changes regarding (additional) aircraft types.

- The information in the Eurocontrol ETS Support Facility is based on the fleet list details supplied by aircraft operators. These details could be out of date;
- An aircraft registration can be shown on more than one monitoring plan and report since the aircraft concerned may be operated by a number of aircraft operators during the year;
- Some aircraft registries (e.g. in the USA) reissue aircraft registrations during the year. It is therefore possible for more than one aircraft to carry the same registration during a reporting year.

In cases where the identity of the aircraft operator cannot be determined by the ICAO designator and the registration markings the owner of the aircraft shall be regarded as the aircraft operator unless it has proved to the satisfaction of the competent authority who was the aircraft operator (Annex XIV and XV section 1 MRG).

What is done if a verifier identifies two ICAO designators for one aircraft operator?

Only in exceptional cases where the CA has explicitly approved this can more than one ICAO designator be used (see section 2f in chapter 4 *Guidance for the Aviation Industry*). Aircraft operators are not allowed to add ICAO designators from sister or daughter companies which because of their own ICAO designators are operators in their own right. In other cases the verifier shall direct the aircraft operator to the Competent Authority of the administering Member State.

What is done if a verifier identifies two or more AOC codes for one aircraft operator?

In some exceptional cases an aircraft operator can have two or more AOC codes. The verifier has to direct the aircraft operator to the Competent Authority for further action unless this situation is already approved in the monitoring plan.

What are the implications for wet leased and dry leased aircraft?

Dry leasing occurs when an aircraft is operated under the AOC of the lessee, under commercial control of lessee, using the lessee's ICAO designator and traffic rights. Wet lease means that the aircraft is operated under the AOC of the lessor but operated under the commercial control of the lessee and using the lessee's ICAO designator code. Whether code sharing, dry leasing or wet leasing, long or short term leasing is applied by an aircraft operator it has no bearing on identifying the aircraft operator. The ICAO designator in box 7 of the flight plan or, if the ICAO designator is not available, the registration number of the aircraft is the determining factor for assessing whether a flight falls under the responsibility of an aircraft operator to monitor and report on that particular flight. If it cannot be determined by the ICAO designator or the registration markings that a particular flight falls under the responsibility of an aircraft operator, the flight should be allocated to the owner of the aircraft unless it has been proved to the satisfaction of the competent authority who was the responsible aircraft operator for that flight (Annex XIV and XV section 1 MRG). In some cases Eurocontrol data can be used to cross check leased in data since Eurocontrol possesses data on actual aircraft used (e.g. registration markings) for a given flight).

How to check the accuracy of data when this concerns dry and wet leased aircraft?

When carrying out a risk analysis the verifier shall be aware that short term leasing of an aircraft (either dry or wet leased) in particular can lead to risks (i.e. not including ETS flights that fall under the responsibility of the aircraft operator or including flights that do not belong to the aircraft operator and shall not be reported by that aircraft operator).

The aircraft operator that is responsible for a particular flight has to ensure that the data related to that flight ends up in his internal systems to ensure that the aircraft operator inputs the data in the annual emission report. In general the collection of data is regulated through leasing agreements. During the verification the verifier shall check the control activities the aircraft operator has in place to ensure accurate data is transferred to him (e.g. leasing agreements, cross checks on manual input collected data in internal system, electronic interface if IT systems are used etc.). To ensure reproducibility of the determination of the emissions by verifiers or the Competent Authority, the aircraft operator shall ensure that data on the leased aircraft is documented according to Annex I, section 9 MRG.

4.3 How to check (additional) aircraft types? (section 4 a, b, and d MP AE Template and section 10 AER Template)

Section 10 AER Template requires the aircraft operator to submit to the CA details for each aircraft used during the reporting year for which the aircraft operator is responsible (aircraft type, aircraft subtype, aircraft registration number, owner of the aircraft as well as starting and end dates if the aircraft has not belonged to the aircraft operator's fleet for the whole reporting year). The latter might be the case for aircraft leased to another company. Depending on the verifier's risk analysis for the verification concerned, these reported items shall be checked with the aim of ensuring completeness as well as identifying possible issues of double counting in the data of flights and aircraft.

Consistency between section 4a MP AE Template and section 10 AER Template

In practice the list outlined in section 10 AER Template will not correspond to the number of aircraft submitted in section 4a MP AE Template since the latter number only concerns aircraft that were operated at the time of submission of the monitoring plan. The verifier does not have to check consistency between the monitoring plan and the emission report with respect to this point unless it is of interest to substantiate the activity of the aircraft as approved in the monitoring plan in relation to reported data for example where few of the aircraft listed in the approved MP appeared to have been used during the actual reporting year.

Checking of additional aircraft types

Section 4b MP AE Template requires aircraft operator to provide an indicative list of additional aircraft types that the aircraft operator expects to operate and for which he will be the aircraft operator. This list is indicative. Discrepancies between actual data on aircraft types used and the

data listed in section 4b MP AE Template should in general not lead to non-conformities in the verification process (see chapter 5 *MP Guidance for the Aviation Industry*).

Checking the application of the monitoring methodology for additional aircraft type

The verifier checks whether the monitoring methodology described in the approved monitoring plan under section 4c MP AE Template has been applied for additional and anticipated aircraft.

Checking the completeness of emission sources (aircraft)

The aircraft operator is required to ensure completeness of the emission sources (aircraft). The verifier shall check whether the procedure for tracking completeness of aircraft as described in section 4d MP contains the information as outlined in the *Guidance for the Aviation Industry* (e.g. responsibilities for tracking completeness, systems used, control activities implemented etc.). Furthermore the procedures for tracking completeness of flights as referred to in the MP must be implemented, documented and be up to date. Eurocontrol data should be used to corroborate the data on aircraft and for the aircraft operator to explain discrepancies in the data. This could be by using the EU ETS Support Facility assuming access is authorised.

The verifier shall test the control activities that are implemented by the aircraft operator to ensure completeness of aircraft (e.g. by testing how the aircraft operator checks the completeness, by testing IT controls, by testing the way data from leased in or out aircraft are input in the internal systems of the aircraft operator etc.).

4.4 How to check completeness of flights? (section 4e MP AE Template)

Section 5 and 9 AER Template requires the aircraft operator to submit the total number of flights over the reporting year as well as the aggregate emissions from ETS flights falling under the responsibility of the aircraft operator (while making a distinction between domestic flights, flights from one MS to another MS or a third country and flights arriving at a MS from a third country outside the EU).

According to Annex V EU ETS Directive and Annex XIV, section 9 MRG, the verifier has to check the completeness of the flights and the emissions data. In this task the verifier shall be assisted by timetable data and other data on aircraft operator's traffic from Eurocontrol. This means that the verifier has to request the aircraft operator to provide them access to Eurocontrol data to cross check the data in that system with the reported data on flights and emissions in the emission reports. Alongside the verifier checks the procedures and control activities the aircraft operator has in place to ensure completeness of flights.

Cross checking with Eurocontrol data

When cross checking the reported flights with the Eurocontrol's Route Charges Offices it is important to understand that originally the CRCO data does not entirely match EU ETS data on flights (e.g. not all Member States are covered under CRCO data, the CRCO code does not always

match with Annex I exempted flights etc.). To overcome this original limitation Eurocontrol has provided the possibility in the ETS Support Facility to align (in most cases) the flight exemptions as available from the ATM system with the EU ETS requirements (e.g. requirements on exempted flights in Annex I EU ETS Directive).

The cross check performed by the verifier with Eurocontrol data shall only be used to identify discrepancies. In case of discrepancies the verifier shall ask the aircraft operator the reason for these discrepancies and assess whether the reason is plausible. The verifier may ask the aircraft operator to submit these reasons in the emission report. If the reason for the discrepancy is not plausible or if the aircraft operator cannot give a satisfactory explanation and the reported data is not correct the data needs to be corrected.

Access to the Eurocontrol data and Eurocontrol Support Facility

The aircraft operator should provide the verifier access to relevant Eurocontrol data and this requirement should be considered in the verification contract.

Next to invoiced data from the CRCO database Eurocontrol provide a number of facilities:

- a fuel estimator based on simple excel sheet that allows users to input the details of flight and aircraft (distance and aircraft type) and to get from the system a fuel estimate for each flight (the Small Emitters tool).¹⁵
- the ETS Support Facility (ETS-SF) which is a more complete system that includes the above mentioned fuel estimator but which also provides the user with traffic record details from Eurocontrol and State Sources. As the data on distance and aircraft type (in many cases the registration number of the actual aircraft that has been operated) come from reliable sources, they can be used as a reference for cross checks by verifiers.¹⁶
- a Great Circle Distance tool (GCD tool) which is also available through the ETS Support Facility providing airport city pair precise values based on Airport locations (latitude and longitude) as used for ATM purposes.

It is important to highlight that the ETS Support Facility and the GCD tool are being developed and are not yet available for third parties (or States and Competent Authorities). This is expected to be a temporary limitation that will be resolved in the near future.

Checking the procedures to ensure completeness of flights

The verifier will check whether the procedure for tracking completeness of flights as described in section 4e MP contains the information as described in the *Guidance for the Aviation Industry* (e.g. responsibilities for tracking completeness, systems used, control activities implemented etc.). Furthermore the procedures for tracking completeness of flights as referred to in the MP must be implemented, documented and be fully up to date.

¹⁵ See chapter 5 of this guidance.

¹⁶ See chapter 5 of this guidance.

Testing the control activities to ensure completeness of aircraft and flights

The verifier shall test the control activities that are implemented by the aircraft operator to ensure completeness of flights and aircraft to determine whether flights are EU ETS flights (e.g. by observing and if relevant auditing how the aircraft operator checks the completeness, by testing IT controls, by testing the way flight data are input in the central system etc.).

Issues to be taken into account when checking the completeness of flights

- Only flights that fall under the responsibility of the aircraft operator shall end up in the emission report and tonne-kilometre report. This means that the ICAO designator is the determining factor for assessing and deciding which flights fall under the responsibility of the aircraft operator regardless of whether the aircraft is leased, owned or wet leased. If the ICAO designator is not available the registration markings of the aircraft are the determining factor (please see chapter 2 of the *Guidance for the Aviation Industry* for more information). If it cannot be determined by the ICAO designator or the registration markings that a particular flight falls under the responsibility of an aircraft operator, the flight should be allocated to the owner of the aircraft unless it has proved to the satisfaction of the competent authority who was the responsible aircraft operator for that flight (Annex XIV and XV section 1 MRG);
- The verifier shall be aware that only actual flights shall end up in the emissions report. Planning systems do not contain accurate data;
- The verifier shall be aware of the risk of double counting flights and excluding flights that have to be reported (the data has to be aggregated into different categories: domestic flights/ flights from MS to another MS or third country/ flights arriving at a MS from a third country). An overall check on the total number of flights shall be made;
- Some overseas territories can be regarded as European MS. These are listed in Annex H of the MP guidance for Aviation Industry). On the other hand verifiers need to be aware that some islands within Europe are not considered EU territory such as the Channel Islands, the Isle of Man, and the Faroe Islands;
- The verifier shall check the consistency between data entered in section 5 AER template on total number of flights and section 9 AER Template as well as in Annex I AER Template.

Local time of departure versus actual time of departure

The aircraft operator shall be consistent in what time definition is used for reporting purposes (e.g. actual or local time of departure). If he uses actual time of departure he shall use that time definition for reporting flights for the whole calendar year. The aircraft operator is not allowed to change between local or actual time in and between reporting years. The verifier shall check whether the aircraft operator has applied this time definition consistently over the year.

4.5 How to check procedures for determining whether flights are EU ETS flights? (section 4f MP AE Template)

To ensure completeness of EU ETS flights, avoid double counting and avoid non EU ETS flights

from being included in the report, the aircraft operator has to implement a procedure for determining whether flights are EU ETS flights. The verifier shall check whether this procedure contains the information as described in the *Guidance for the Aviation Industry* (e.g. responsibilities for determining EU ETS flights, systems used, control activities implemented to filter out non ETS flights etc.). Furthermore, the procedures for tracking completeness of flights as referred to in the MP must be implemented, documented and up to date.

Exempted flights

The verifier shall understand how to interpret exempted flights as listed in Annex I of the ETS Directive (Commission Decision 2009/ 450 on interpreting Annex I activities)¹⁷. Difficult issues may arise with respect to the interpretation of training flights (see FAQ on monitoring and reporting annual emissions and tonne kilometre data published on the Commission website¹⁸), public service obligations, humanitarian and emergency medical flights, the *de-minimis* rule (assessing whether the aircraft operator is commercial, see chapter 2 *Guidance for the Aviation Industry*), overseas territories that are considered as EU territory (see Annex H *Guidance for the Aviation Industry*).

4.6 How to check the methodology and procedures used to monitor the fuel consumption? (section 6a-c MP AE Template)

Guidance for the verification of emission reports of small emitters is provided in chapter 5. Fuel consumption which shall include fuel used during a flight, fuel consumed by APUs whilst the aircraft is stationary and any fuel that may be dumped during a flight, must be determined by using method A or B (see section Annex XIV, section 2 MRG and section 6 in chapter 5 *Guidance for the Aviation Industry*). The total fuel consumption has to be reported per fuel in section 5b AER Template.

Verifiers shall be aware of the following when assessing the monitoring methodology for determining the fuel consumption:

- During data verification the verifier shall check whether method A or B is applied correctly and that the method applied is actually the method as approved in the monitoring plan;
- The APU shall be included (if an aircraft has been in maintenance and then it is used for an EU ETS flight, there is an elevated risk that the APU will not be included);
- If the underlying procedures of the aircraft operator as referred to in the approved monitoring plan allow a correction factor to be applied for the APU which would lead to the exclusion of the APU, the verifier must assure himself that the competent authority is aware of this and refer the aircraft operator to the Competent Authority. If the issue is not resolved, the verifier should list this as a misstatement and non-conformity (e.g. submission of method A or B in the monitoring plan implies that the APU shall be included). Excluding the APU is not strictly in line with the EU ETS Directive, the MRG and in principle the monitoring plan);

¹⁷ Commission Decision 2009/450 on the detailed interpretation of the aviation activities listed in Annex I to Directive 2003/87/EC of the European Parliament and of the Council, OJ 12 June 2009, L149/69.

¹⁸ See http://ec.europa.eu/clima/policies/aviation/guidance_en.htm.

- When non ETS flights have been performed between two or more ETS flights the verifier shall be aware of added risk that the fuel consumption of the non ETS flight(s) is incorrectly included in the determination of fuel consumption, or fuel consumption of ETS flights is excluded;
- The fuel consumption of each and every flight for which the aircraft operator is responsible shall be taken into account (see issues on completeness of flights).

Correspondence check between “mass and balance” documentation and reported data

According to Annex XIV, section 9 MRG the verifier shall check the consistency between reported data and the “mass and balance” documentation if the aircraft operator has a “mass and balance” documentation. Aircraft operators use different terminology to indicate “mass and balance” documentation (e.g. load sheet, flight logs containing different flight messages per flight etc.). This overall cross check is meant to identify inconsistencies in the data as well as to spot and have the aircraft operator correct the errors in the reported data. The aircraft operators are required to provide the verifier with credible explanations for inconsistencies and to correct errors in the data. The “mass and balance” documentation as specified in international or national implementation of the Standards and Recommended Practices (SARPs) and Annex III Subpart J EU OPS regulation or equivalent international regulations should contain the most accurate data related to single flights. Data in planning systems or documents cannot be regarded as accurate.

Consistency check between aggregated fuel consumption data and data on fuel purchased

According to Annex XIV, section 9 MRG the verifier shall check the consistency between aggregated fuel consumption data and data on fuel purchased or otherwise supplied to the aircraft performing the aviation activity. This could include cross checking the total fuel consumption as purchased from financial and - if applicable in the relevant MS - tax accounting systems versus total fuel consumption as recorded per flights (from operations systems). The verifier should be aware that there might be discrepancies between both data sources since financial accounting systems do not only contain EU ETS data. If this is the case the cross check could be less useful. Another cross check could also be a check between the total fuel uplift data for all departure aerodromes within the EU and the fuel uplift data as recorded per ETS flights.

Checking of monitoring method to determine fuel uplift and fuel contained in tank

When checking the application of the monitoring method used to determine the fuel uplift and fuel contained in tanks the verifier checks:

- the control activities that aircraft operators have implemented to ensure accuracy (e.g. testing of the cross checks aircraft operators do between uplift quantities and pre- and post-uplift tank quantities, and assessment of how aircraft operators deal with inconsistencies/ testing of cross checks by pilots or someone else between fuel slips and fuel measured by on board system).
- The application of the monitoring methodology by cross checking reported data in the system against fuel slips, doing plausibility checks (comparing fuel consumption per aerodrome pair and aircraft for different aerodrome pairs).

4.7 How to check fuel density? (section 6d and 6f MP AE Template)

If the fuel in tanks and fuel uplift is measured in volumes the aircraft operator has to determine the fuel density to convert these volumes to mass terms. The following methods apply in a hierarchical structure - measuring the actual fuel density with on board measurements, using actual density values as recorded on the fuel invoice or delivery note, determining the actual density from the temperature of fuel during fuel uplift, and using a standard density factor of 0.8 kg/ litre if actual values are not available (see Annex XIV section 2 MRG and section 6d in chapter 5 of the *Guidance for the Aviation Industry*).

The verifier checks whether the method to determine the fuel density as described and approved in the monitoring plan has been correctly applied. Special attention shall be given to checking:

- Appropriate maintenance, calibration, if applicable, and adjustment of densitometers where these are part of on board measurement instruments;
- Review of the conversion factors hardwired in the on board measurement instrument software and assessment of whether this meets EU ETS requirements, e.g. all factors are in comparable metric units;
- Appropriate maintenance, calibration and adjustment of related temperature measurement equipment;
- Consistent application of the procedures for measurement of density;
- Consistent and correct application of the approved methodology;
- Alternatives to using the standard factor are not available or feasible (i.e. the standard factor is not being unjustly applied);
- Whether the reasons for applying the standard factor in unforeseen circumstances as described in flight operation manuals or procedures to determine fuel density are plausible (i.e. the data cannot be delivered by the fuel supplier or is not available) and that these procedures have been correctly applied;
- Appropriate application of volume to mass calculations/conversions and records, e.g. comparable metric units.

4.8 How to check deviation from general methodologies for specific aerodromes (section 6g MP AE Template)

In section 6 (g) MP AE Template the aircraft operator can list, where necessary due to special circumstances at specific aerodromes, any deviations from the general monitoring method for fuel consumption and fuel density that the aircraft operator has submitted in the monitoring plan. These deviations relate to circumstances that the aircraft operator knows of at the time of submitting his monitoring plan (see chapter 5 section 6 (g) of the *Guidance for the Aviation Industry* for more information). The verifier checks whether the deviations in the approved monitoring plan have been implemented and whether additional deviations or special circumstances occurred and that this was notified to the Competent Authority leading to an update of the monitoring plan. A deviation from the general monitoring methodology that only occurred once needs to be submitted in the emission report as a temporary deviation from the monitoring plan. The monitoring plan

does not have to be updated unless this deviation is very likely to occur again in which case the verifier directs the aircraft operator to the CA to adapt the monitoring plan. Furthermore the verifier should recommend the aircraft operator to improve his monitoring methodology by avoiding deviations and implementing control activities or other measures that would enable the aircraft operator to apply the general monitoring methodology described in the other sections of the monitoring plan. This arises from the principle concerning improvement of performance in monitoring and reporting emissions (see Annex I, section 3 MRG).

4.9 How to check the uncertainty (section 7a-d MP AE Template)

Section 7b MP AE Template requires the aircraft operators to identify and note the main sources of uncertainty and their associated levels of uncertainty in the monitoring plan. These uncertainties concern mainly uncertainty associated with measurement systems and analytical tests of fuels etc. There can be many sources of uncertainty related to the measurement of fuel uplift, fuel contained in tanks or fuel density. A verifier is not required to assess these or the designated uncertainty levels. Nor is the verifier required to assess whether the overall uncertainty is met.

Instead the verifier will check with respect to this section:

- whether fuel uplift is indeed determined by fuel supplier data or on board measurements;
- the control activities the aircraft operator has in place to ensure that the overall uncertainty related to the applicable tier is not exceeded (e.g. cross checks by pilots between the fuel slips and fuel measured on board, assessment by the aircraft operator of the impact that inaccurate on board measurement systems have on the overall uncertainty, maintenance records if relevant, the corrective action an aircraft operator takes when exceeding the overall uncertainty by taking for example the data from the fuel slip);
- whether the procedure to ensure that the overall uncertainty is met (Annex XIV section 6(8)(c) MRG) contains the information as referred to in the monitoring plan and is sufficiently implemented, up to date and documented.

Unless gross inaccuracies are discovered it is not usual for aircraft operators to check the calibration of on-board instruments, and this may not be possible in all cases, for example, where the type of aircraft does not facilitate dip-stick tests. It is not part of the regular airworthiness checks that aircraft operators are required to undertake and, therefore, the measurement instruments themselves will not have calibration certificates in most cases. Alternatively, the aircraft operator may refer to the aircraft manufacturers' own specifications. Also, it should be ensured that unresolved inaccuracies have not been recorded in the aircraft operators' maintenance records and that there is evidence of routine checks of the satisfactory operation of the fuel measurement systems. This means that the verifier has to check manufacturer's specifications and spot check maintenance procedures and records of an aircraft operator. In addition the verifier will perform several cross checks themselves on the fuel consumption data (e.g. cross checks between the fuel slip and fuel measured, fuel data from financial accounting system against reported data on fuel consumption etc.).

4.10 How to check the procedures for cross checks between the fuel slips and fuel measured (section 7e MP AE Template)

If on board measurements are used to determine the fuel consumption the aircraft operator is required to cross check the fuel uplift quantity as provided by invoices and the uplift quantity indicated by on-board measurement (Annex XIV, section 3 MRG and section 7e of chapter 5 MP *Guidance for the Aviation Industry*). The verifier checks not only whether the procedure is functioning, implemented, up to date and documented. He also checks the margin of difference which indicates when the difference between the measured data and the fuel supplier data is no longer acceptable. This margin is set by the aircraft operator in the procedure. The verifier checks whether the margin of difference is plausible and whether corrective action is taken when the margin of difference is exceeded.

4.11 How to deal with emission factors and biofuels?

Section 8a-e AER Template requires the aircraft operator to provide information on the commercial standard aviation fuels he uses along with details concerning any alternative fuels and the procedure used to determine the associated emission factors, NCVs, and biomass contents (including the sampling, analysis and laboratories employed). The verifier assesses whether the correct factors for the respective fuels as indicated in the monitoring plan have been applied. If alternative fuels are being used the verifier checks whether the monitoring methodology as prescribed in Annex XIV, section 2.3 MRG has been applied correctly to the analysis of the fuel in order to determine its emissions factor.

4.12 How to deal with data gaps (section 10 MP AE Template)

There can be two different scenarios resulting in a data gap (see section 10 MP AE Template in chapter 5 of the *Guidance for the Aviation Industry*).

- Data gaps in determining the emissions of a flight that are beyond the control of aircraft operators and that cannot be determined by an alternative method defined in the monitoring plan (annex XIV, section 5 MRG). The emissions for that flight can be estimated conservatively or by a tool approved by the European Commission. Currently only the Eurocontrol small emitters' tool is approved by the EC.
- Data gaps as a result of downtimes of the measurement systems or the loss of individual primary data sources such as fuel slips (Annex I, section 5.2 MRG). The emissions of those flights can be determined by using a tool approved by the EC or an alternative approach, preferably described in the monitoring plan, by which the emissions are estimated conservatively.

Data gaps can be identified by the verifier or by the aircraft operator himself and filled by the methods described above after which the verifier checks that the result is reasonable.

In either case the verifier checks:

- Whether the data gap is indeed a data gap. To assess this the following questions may be relevant: can the data be retrieved from another primary source? Can the data be reconstructed or can historical data be extrapolated to create the emission data?;
- The frequency of the data gap. If the data gap for instance occurs several times over a longer period of time, the verifier shall check whether the control activities to prevent missing data are functioning correctly or whether the data gap would rather fall under an exemption related to specific aerodrome according to section 6g MP AE Template. In the latter case the monitoring plan would have to be adapted and reapproved by the Competent Authority.
- What tool or approach described in the approved monitoring plan was used to estimate the emissions in case of a data gap, whether this approach or tool was applied correctly and whether this approach was conservative. If the monitoring plan refers generically and also improperly to Pagoda or to Eurocontrol, it is perceived to mean the Eurocontrol small emitters tool that has been approved by the European Commission.¹⁹ However in some cases the aircraft operator might need to seek an update of the monitoring plan where this monitoring plan is not sufficiently clear on what tool is used to estimate the fuel consumption. The verifier will take this into account and where necessary refer the aircraft operator back to the Competent Authority for updating the monitoring plan.

If the Eurocontrol small emitters' tool is used the verifier checks:

- What distance is used (actual distance or the Great Circle Distance, GCD, and how this is determined). The tool requires the actual distance flown to be used, where this is known. Failing this, the tool provides for it to be the GCD + 95 km. The tool does not give details on deriving the actual distance in nautical miles. Eurocontrol use a hierarchy of methodologies in their own calculations, based on data they already hold in their databases enhanced by radar tracking records. They apply the GCD as a last resort;
- The accuracy of flight length in time and the aircraft type used.

If an alternative approach described in the monitoring plan was used, the verifier will check whether this approach was applied correctly. This may include a check that the alternative approach results in a conservative estimate of emissions. The conservative estimate must not lead to an underestimation of the emission data.

4.13 To what extent can the ETS Support Facility be used when filling in data gaps?

The EU ETS Support Facility can be used to provide estimated values for data gaps in most cases, either because of missing flight records or when part of the flight information is missing (actual aircraft or generic aircraft type, actual distance, city pairs, GCD or actual fuel burn). However, this presupposes that aircraft operator and verifier have authorised access to the ETS-Support Facility.

¹⁹ This tool was approved by Commission Regulation No 606/2010 of 9 July 2010 on the approval of a simplified tool developed by the European organisation for air safety navigation (Eurocontrol) to estimate the fuel consumption of certain small emitting aircraft operators, OJ 10 July 2010, L 175/25.

As an interim solution, the CEFA system (CRCO Extranet for Airspace Users) already provides aircraft operators (free of charge) certain data elements which could fill data gaps if they are related to ATM (e.g. aerodromes of departure or arrival) or if they are related to flight completeness. It should be noted that, in contrast to the EU ETS Support Facility, ETS specific values (like ETS exemptions, estimated fuel burns, precise registration marks and identity of actual ETS aircraft operators) are not available in CEFA.

4.14 How to check roles and responsibilities (section 11a MP AE Template)

There are different departments and persons responsible for specific elements in the data flow activities and control activities. These departments could for example include flight planning, operations, Flight Control, IT, pilots, fuel suppliers, fuel management. The verifier should assess the risks involved with personnel responsible for the monitoring and reporting processes in particular including whether they are sufficiently capable of performing the activities assigned to them. This may for example be on the basis of written records, face to face meetings or telephone interviews.

4.15 How to check procedures for control activities (section 11 MP AE Template)

See chapter 3.

4.16 How to check data in section 9 AER template and Annex I AER template?

Section 9 AER Template and Annex I AER Template require the aircraft operator to submit information on the aggregate emissions from ETS flights falling under the responsibility of the aircraft operator while making a distinction between domestic flights, flights from a MS to another MS or a third country and flights arriving at a MS from a third country. The data on total number of flights and emissions per aerodrome pair shall also be submitted. The verifier checks these numbers and assesses whether they are complete and correspond to the overall emissions in section 5 AER Template. The activities in section 2.3 under process analysis data verification are performed in order to make this check including a check against data in the ETS Support Facility.

4.17 How to deal with rounding of data?

The MRG requires an aircraft operator to report emissions as rounded tonnes of CO₂. Rounding should take place at the highest aggregation level. Emission factors shall be rounded to include only significant digits both for emission calculations and reporting purposes. Rounding emission factors is only possible if this does not lead to deviation in the calculation of tonnes of CO₂ emissions and does not lead to a different emission figure. Fuel consumption per flight shall be used with all significant digits for calculation. When the data is recorded through digital instruments the data is usually recorded and reported in whole numbers. In the case of analogue gauges and manual recording, problems have been encountered related to the rounding of figures (e.g. the pilot often has to make an estimate of the actual number). Where the data is manually input in the internal system and ACARS is not used the verifier shall check the procedures the

aircraft operator has in place to ensure that pilots are rounding the figures in the same manner and in a consistent way. This check should include a check on how the pilot actually rounds the figures.

4.18 How to deal with inherent tension between fuel logging by pilots and fuel logging for safety?

There is an inherent tension between fuel logging by pilots for ETS which requires accuracy and for which overstatements are conservative; and fuel logging for safety where it is better to underestimate fuel taken on board thereby providing a buffer for safety. It is expected that pilots will record actual starting and end fuel as the uplift fuel is cross checked with fuel slips and invoices. Pilots have to cross check the actual fuel uplift in the supplier's invoice with the calculated fuel uplift in the fuel quantity indicating system. In addition, cross checks are made by the aircraft operator between the fuel uplift recorded by the pilot and the actual fuel uplift in the fuel supplier's invoice, in the internal systems when working out fuel burns etc. In any case, the aircraft operator has to ensure that there is no (systematic) underestimation of the fuel consumption.

5 Verifying small emitters using the simplified monitoring methodology, and the role of the ETS Support Facility for all aircraft operators

A non-commercial aircraft operator operating fewer than 243 flights per period for three consecutive four-month periods *or* operating flights with total annual emissions lower than 10 000 tonnes CO₂ per year is considered to be a small emitter. According to Annex XIV, section 4 MRG such a small emitter is allowed to apply a simplified monitoring procedure which means that those small emitters may estimate the fuel consumption using tools implemented by Eurocontrol or another relevant organization which can process all relevant air traffic information such as that available to Eurocontrol. However, these tools must be approved by the European Commission.

Currently only the Eurocontrol simplified fuel consumption estimation tool (Eurocontrol small emitters' tool) has been approved by the European Commission.²⁰ In addition Eurocontrol is developing the Eurocontrol ETS Support Facility (ETS Support Facility) that is proposed for wider use by the competent authorities and which may be used also by aircraft operators and verifiers. However, it is important to realise that the ETS Support Facility is not the approved simplified tool but that the ETS Support Facility actually integrates this simplified tool for the fuel estimation function. The ETS Support Facility also integrates validated traffic records, aircraft operators' and ETS related data for all aircraft operators and states that fall under the scope of the EU ETS directive. This chapter explains the verification requirements for small emitters where the Eurocontrol small emitters' tool is being applied and also where the ETS Support Facility can play a role for all aircraft operators.

For guidance on what requirements apply to small emitters see chapter 2.3, sections 5 and 9 of chapter 5, and Annex D of the MP Guidance for the Aviation Industry²¹.

5.1 What steps in the verification process are applicable to small emitters?

Basically the same verification steps apply to small emitters. Irrespective of whether a small emitter is using an approved simplified procedure, the verifier is still required to do a strategic analysis and risk analysis as well as draft a verification plan and carry out other verification activities.

However, in some cases these steps can be more straightforward than in other situations, for example, where:

²⁰ This tool was approved by Commission Regulation No 606/2010 of 9 July 2010 on the approval of a simplified tool developed by the European organisation for air safety navigation (Eurocontrol) to estimate the fuel consumption of certain small emitting aircraft operators, OJ 10 July 2010, L 175/25.

²¹ See: http://ec.europa.eu/environment/climat/aviation/pdf/nl_guidance.pdf

- The aircraft operator's data flow activities are more confined and the procedures for determining completeness of flights, the eligible aircraft and determining ETS flights are less complex;
- The required control activities to guarantee completeness and to avoid double counting are less extensive because the risks of misstatements and non-conformities are relatively low;
- The risk to data integrity is reduced by inherent data security within the approved simplified procedure, e.g. where the procedure involves reduced or no direct data inputs by the aircraft operator and an independently generated output.

Where the aircraft operator has opted for a simplified monitoring procedure in the approved monitoring plan, assessment of the application of the monitoring methodology by the verifier shall focus on whether the tool has been applied correctly (see section 5.3).

Subject to final Eurocontrol developments, verification may be straightforward for aircraft operators for which the Competent Authority has approved in their monitoring plan the use of the Eurocontrol small emitters' tool; and aircraft operators that have chosen to accept the Eurocontrol generated version of the output rather than make their own entries (see section 5.4 below for more detail).

5.2 What if a small emitter has opted not to use the simplified tool?

The aircraft operator is not obliged to use the simplified tool for estimating the fuel consumption. If the approved monitoring plan confirms the aircraft operator's decision to apply the standard monitoring methodology (involving completion of section 6 to 8 of the Monitoring Plan AE Template), the verifier will have to check the application of the approved monitoring methodology and perform the checks described in section 2.3 and chapter 4 (e.g. checking whether method A or B has been applied correctly etc.).

The verifier also has to check all the data flow activities, test the internal control activities and associated procedures as mentioned in chapter 3.

5.3 What does the verification entail if the simplified tool is used?

Subject to the final confirmation of availability of the ETS Support Facility, there are three options available to aircraft operators whose approved monitoring plan states that they use the Eurocontrol small emitters' tool:

1. The aircraft operator can acquire the output from the Eurocontrol small emitters' tool directly from Eurocontrol. Eurocontrol already hold in their databases the necessary data relating to flights, flight distances and the aircraft involved, and can automatically produce a report that is free from aircraft operator inputs. Acceptance of this report by the aircraft operator and its submission for verification by the aircraft operator without any changes to the report is likely to result in a very straightforward verification process.

2. The aircraft operator can acquire the output direct from Eurocontrol and submit this with alterations for verification. The larger the number and complexity of the alterations, the more potentially complicated the verification will be. However, this will to a large extent also depend on the quality of the justifications provided by the operator in connection with the alterations. The verifier should check if alterations introduced by the operator are fully substantiated and traceable (e.g. in the case of an aircraft operator demonstrating that a flight shall be exempted according to the EU ETS rules).
3. The aircraft operator can also complete the Eurocontrol small emitters' tool spreadsheet and submit it for verification. However, verification in this case may be considerably more complicated.

In all these three cases the verifier shall plan to compare the report submitted by the aircraft operator against Eurocontrol's version generated from the ETS Support Facility. Where inconsistencies are identified between the two reports the verifier will need to ask the aircraft operator to clarify the reasons for the inconsistencies, and assess whether these are reasonable and whether corrective action needs to be taken by the aircraft operator.

The Eurocontrol simplified procedure tool involves listing of aircraft types and flight distances (in nautical miles) against an aircraft operator's ICAO designator or registration markings. The tool subsequently calculates the estimated fuel burn in kg according to the various aircraft type involved, and can also estimate the emissions by simple multiplication of the fuel consumption with the standard emission factor for the fuel. The distance flown shall be the actual distance flown where this is known or, if necessary, the Great Circle Distance + 95 km. The distance in Eurocontrol's version of a report can be expected to be based on the best data they have available. They will also match the actual aircraft involved in a given flight with either the same aircraft type or the nearest relative.

Besides the elements in section 4.1 to 4.5 of this guidance (completeness of flights and aircraft) the verifier will also check the data flow activities, test the internal control activities and associated procedures as mentioned in chapter 3 of this guidance when option 2 and 3 (above) are used. Where option 1 is applicable, the flight distances and aircraft are a direct output from the ETS Support Facility which are accepted unchanged by the aircraft operator. In that case the completeness check consists in principle of the comparison between the report submitted by the aircraft operator and Eurocontrol's output. If the verifier detects that the report submitted by the aircraft operator does not reflect the situation in the Eurocontrol output he assesses whether this leads to misstatements and whether the aircraft operator needs to take corrective action (either by resolving the matter with the Competent Authority or by correcting the misstatement himself).

In the case of option 2 the verifier shall check which changes the aircraft operator has made to Eurocontrol's direct output, whether these can be substantiated and whether they are justified, while in the case of option 3 the verifier shall check also whether the simplified tool has been applied correctly by the aircraft operator.

In particular in the case of option 3 the verifier shall check what flight distance has been used (actual distance or the GCD and how this is determined). The monitoring plan itself does not provide information on how to calculate the distance in nautical miles in the Eurocontrol small emitters' tool. The verifier shall check that the distance used is based on the best available data and a correct conversion to nautical miles has been carried out where necessary. It can be assumed that distances used by Eurocontrol are the best that they have available, and that these only need to be checked further where the operator proposes an alteration. The verifier shall be aware of inconsistencies that could arise when calculating the distance.

Site visits for small emitters using the simplified tool

Based on the verifier's risk analysis the verifier may decide that small emitters using the simplified tool do not require a site visit to verify the annual emission report (bearing in mind the EA-6/03 definition of 'site'²² for aircraft operators); this is acceptable provided that the aircraft operator has given the verifier access to the aircraft operator's own data in the ETS Support Facility to check the completeness of the flights as well as whether the aircraft operator has provided sufficient information to assess the accuracy of the flight length and aircraft type.

5.4 What does the verification entail if the Eurocontrol ETS Support Facility is used?

The Eurocontrol ETS Support Facility is mainly a data repository system built on all the traffic data acquired from Eurocontrol's Central Route Charge Office (CRCO); this is updated daily. Its objective is to assist competent authorities in reviewing the emissions reports and tonne kilometre reports. However it can also be used by aircraft operator to perform cross checks with flight data recorded in their own internal systems. As almost all flight data are available in the ETS Support Facility, automated emission reports can be generated for small emitters (including complete reports in relation to the Eurocontrol small emitters' tool). Subject to approval by the aircraft operator, verifiers can be provided access to the aircraft operator's own data in the ETS Support Facility as this is expected to be a most valuable resource for verifiers to carry out corroborative checks on the data submitted by aircraft operators; if the Operator does not grant access, the verifier may not be in a position to complete the verification fully and may be prevented from issuing a positive verification opinion.

What data is stored in ETS Support Facility?

²² According to EA-6/03 site visits for aircraft operators relate to where the monitoring process is defined, managed including where relevant data and information are controlled and stored. The ETS Support Facility could be regarded as the place where the monitoring and reporting process is defined.

The ETS Support Facility contains Eurocontrol CRCO data from 41 States. This includes the flights performed (planned and/or actually carried out including time of departure and arrival of flights), data on the aircraft operator (AOC, operating licence, ICAO designator or registration number) and the aircraft type used for each flight as well as the Central Flow Management Unit (CFMU) operational data, e.g. actual route length. CFMU information is extracted from the updated or Initial Flight plan maintained in CFMU. These traffic and administrative data are further complemented by environmental data such as CO₂ emissions, which are calculated by Eurocontrol algorithms using the type of aircraft used, the original traffic data of CRCO and actual route length. Sections 2, 5, 6 (in part), 9, 10 and 12 (in part) of the AER Template can be automatically generated from the ETS Support Facility. This may be of use to aircraft operators and verifiers wishing to corroborate the primary data feeding into the submitted report. It shall be noted that this corroborative data cannot be used as a substitute for data acquired in accordance with the monitoring methodology approved under the monitoring plan, but it may indicate potential misstatements (errors, omissions and misrepresentations) requiring further investigation and correction.

How can an emission report be generated from the ETS Support Facility?

As mentioned above, sections 2, 5, 6 (in part), 9, 10 and 12 (in part) AER Template and, therefore, the annual emission reports themselves on the basis of the Eurocontrol small emitters' tool can be automatically generated from the ETS Support Facility. It should be noted that some Member States have their own reporting templates or specific reporting IT systems. Where this is the case it is important for the verifier to assess the comparability and accurateness of the data rather than the automatically generated report.

Where the aircraft operator is approved to apply the Eurocontrol small emitters' tool, he should check the data generated against data from his internal systems and ensure that any incomplete data/remaining sections are filled in before submission to the verifier. This should be a minimal exercise mainly focused on justifying changes in the data that might have occurred and that are relevant for the verification of emission data.

At present, the CRCO is not completely aligned with the EU ETS on all ETS flights. Exempted CRCO flights, for example, do not entirely match the exempted flights in Annex I EU ETS Directive. The ETS Support Facility has built in an automatic control to identify non-ETS flights. Every effort is made to include actual flight data in the Eurocontrol ETS Support Facility. However there may still be differences in the data that the aircraft operator may wish to correct when reviewing the generated emission report.

How to verify an emission report that is generated by the ETS Support Facility for an operator (i.e. a small emitter) who has been approved to apply the simplified procedure?

After the aircraft operator has reviewed and corrected the automatically generated emission report he gives the verifier access to the ETS Support Facility. The verifier only has to cross check the

emission report generated from the ETS Support Facility and, if situation 2 mentioned in 5.3 above applies, check the report corrected by the aircraft operator to the actual information in the ETS Support Facility. Furthermore he assesses the reasonableness of the justifications of the changes the aircraft operator has made in the automatically generated emission report.

As the monitoring and reporting process is facilitated by the ETS Support Facility the verifier is not required to check the procedures for completeness of flights, aircraft and determining ETS flights, where the aircraft operator is approved to apply the Eurocontrol small emitters' tool, and the reported data is that generated by the ETS Support Facility and has been accepted unchanged by the aircraft operator.

Eurocontrol can be expected to use the best available distance data to calculate the fuel consumptions and emissions using their simplified procedure. Therefore, the verifier does not need to check how the distance is determined in the case of data in an emissions report corresponding with Eurocontrol reported values (scenario 1 as outlined in section 5.3 of this guidance).

How to interpret a site visit in respect to the ETS Support Facility?

According to EA-6/03, site visits for aircraft operators relate to the location where the monitoring process is defined and managed including where the relevant data and information are controlled and stored. The ETS Support Facility may be regarded as one such place where the monitoring and reporting process is defined and relevant data and information are controlled and stored. As the verifier can access the ETS Support Facility from a web based portal, there is no need to physically visit the aircraft operator (unless the verifier's risk analysis has identified other reasons that may require such a site visit).

Who has access to the ETS Support Facility?

The verifier will be granted access to the ETS Support Facility through an authorisation by the aircraft operator. The contract between the verifier and the aircraft operator should set out the relevant conditions and other details that allow the verifier to access the data in the ETS Support Facility pertaining to the aircraft operator. However, if access is not granted, then the verifier may not be in a position to complete its work and may be prevented from issuing a positive verification opinion statement.

Can the ETS Support Facility be used for tonne-kilometre reports?

Unlike in Annex XIV MRG for emissions (fuel consumption), the MRG do not make a provision to allow aircraft operators to apply a simplified tool for the monitoring and reporting of tonne-kilometre data. An automated tonne-kilometre report cannot be generated from the ETS Support Facility and the standard verification activities have to be carried out by the verifier in order to verify the tonne-kilometre reports. However, the ETS Support Facility can be used to check the completeness of the ETS flights and the aircraft used for those flights.

Data on payload (total mass of freight, mail, passengers and baggage carried onboard the aircraft during a flight) are not stored in the ETS Support Facility since flight plans do not contain the accurate number of passengers and mass of freight and mail. These are submitted in the flight log and load sheet.

The verifier shall decide the need for site visits on the basis of their bespoke risk analysis for the operator involved while taking into account the EA-6/03 definition for the site of an aircraft operator. Based on the risk analysis the verifier may plan to waive a site visit to an operator (including a small emitter) provided the verifier has sufficient confidence in the internal control activities that are implemented in the aircraft operator's systems to monitor the number of passengers and determine the mass of freight and mail. The aircraft operator has to provide the verifier with the information needed to assess these internal control procedures and control activities. Depending on national legislation of the administering Member State waiving a site visit in these cases shall either be subject to the approval of the Competent Authority or based on a list of criteria set by that Competent Authority. The waiving of a site visit shall be justified and recorded in the internal verification documentation.

If the risk analysis or the process analysis indicates questions or problems that can only be solved by a site visit the verifier shall conduct such a visit to resolve the matter. If a site visit is made the same requirements and guidance as mentioned in section 2.3 of this guidance apply.

5.5 What to do if a small emitter exceeds the *de-minimis* threshold?

According to Annex XIV, section 4 MRG an aircraft operator making use of the simplified procedure and exceeding the threshold for small emitters during a reporting year must notify this fact to the Competent Authority of the Administering Member State. The ETS Support Facility also contains a functionality that will flag an aircraft operator that is getting close to the *de-minimis* threshold (either in number of total yearly flights (243) or in total CO₂ emitted (10,000)). This functionality enables the Competent Authority to set a percentage value for those aircraft operators in relation to the threshold so that the status of that aircraft operator is closely monitored and the possible exceeding of the *de-minimis* threshold is detected early on.

If the aircraft operator can demonstrate to the satisfaction of the Competent Authority, that the threshold will not be exceeded again from the following reporting period onwards, the aircraft operator does not need to update the monitoring plan to meet the regular monitoring requirements for aircraft operators. The ETS Support Facility can help the Competent Authority to assess the information provided by the aircraft operator since the facility enables trend analyses.

If the aircraft operator cannot demonstrate to the satisfaction of the Competent Authority that the threshold won't be exceeded, the monitoring plan must be updated to meet the monitoring requirements laid down in Annex XIV sections 2 and 3 MRG. The revised monitoring plan must be submitted without undue delay to the Competent Authority for approval.

6 Aviation specific issues in the verification of tonne-kilometre data

This chapter explains some of the aviation specific issues that are relevant in the verification of tonne-kilometre data. For guidance on the assessment of changes to the monitoring plan for tonne-kilometre, identification of the aircraft operator, the completeness of aircraft type, flights and procedures for determining ETS flight, see chapter 4.1 to 4.5 of this guidance. Please note that this chapter does not contain a complete list of issues and the verifier needs to check whether additional requirements apply in relation to the Administrative Member State concerned.

6.1 How to check systems and procedures to monitor aerodrome location information (section 5c MP TK Template)

Aircraft operators are required to use the most up to date AIP data as of the 31st December 2010 to calculate the tonne-kilometre for the reporting year 2010. The verifier shall assess whether up to date AIP data were used and whether the procedures, the control activities and systems that are implemented by the aircraft operator, are functioning, implemented and documented. The most recent AIP data on 31st of December is published on the ICAO website.

If the system to monitor the aerodrome location information is maintained and kept up to date by a third party (i.e. IT supplier), it shall be considered an outsourced process for which the aircraft operator is still responsible. The verifier shall in that case check how the aircraft operator has assured himself that the database using AIP data is frequently reviewed and kept up to date to ensure that the AIP data is valid on the 31st of December 2010 for the reporting year 2010.

6.2 How to check the distance and procedure to monitor GCD (section 5b and d MP TK template)

Aircraft operators use different methods to calculate the Great Circle Distance (GCD) based on WGS 84. The verifier shall check whether the tool that is used to calculate the GCD is the tool that is approved by the Competent Authority in the monitoring plan. The verifier has to ensure that the calculated distance is based on the WGS 84 ellipsoid model. This can be checked in several ways: by checking the certificate of an independent third party on the tool used, by checking the design of the calculation tool or source code if available or by checking the distance against external sources: i.e. external websites, or if available the definitive Eurocontrol distance regarding the GCD for the aerodrome pair concerned. Eurocontrol is expected to make a means of GCD comparison available through the ETS Support Facility, i.e. provision of automated GCD data for aerodrome pairs based on airport locations (latitude and longitude) as used for ATM purposes.

If that is the case, the verifier can use these values to cross check the GCD applied by the aircraft operator. The verifier shall be aware that it is not allowed to use tools that are based on WGS84 assuming the earth as a sphere rather than an ellipsoid (Annex XV, section 4.2 MRG).

In most cases the distance is calculated by using software of a third party and by entering data in an external website. This shall be considered an outsourced process. The aircraft operator is still responsible for the quality and accuracy of the calculation methodology, based on WGS84 ellipsoid and using AIP data²³. The verifier shall check the control activities the aircraft operator has implemented to ensure that this is the case (see chapter 3 of this guidance). Moreover the verifier shall assess whether the tool is WGS84 compliant while considering the earth as a sphere. This can be done by checking whether the tool is properly designed, tested and maintained to ensure reliable and timely processing of data, whether there are contractual agreements to ensure the quality, by doing cross checks with distances calculated in the Eurocontrol Support Facility or in some cases using an external distance tool to corroborate the distance calculated. The verifier shall be aware that some of these external systems require one or more corrections to be applied before the data can be cross checked.²⁴

The verifier can compare the aircraft operator calculated GCD between aerodrome pairs with the definitive GCD values for aerodrome pairs advised by Eurocontrol assuming they are available.

In cases of doubt about the correctness or reliability of reported GCD data a conservative approach has to be chosen to ensure the distance is not overestimated in a single case.

6.3 How to check the mass of passengers and checked baggage (section 6a MP TK Template)

The mass of passengers and their checked baggage must be determined by following either tier 1: i.e. a default value of 100kg for each passenger and their checked baggage, or tier 2: i.e. the mass of passengers and checked baggage contained in the “mass and balance” documentation. Different terminology can be used for the “mass and balance” documentation: e.g. load sheet, flight logs containing different flight messages per flight. The verifier shall assess whether the most accurate data is used for reporting purposes.

The verifier shall check whether the applicable tier as approved in the monitoring plan has been consistently applied through the whole reporting year and whether the method related to the tier was applied correctly: e.g. using the right default value, including the most accurate mass from the “mass and balance” documentation. This implies that the verifier checks the data sources from which the mass of passenger and checked baggage is taken. The check is carried out to the level established necessary by the risk analysis and is detailed in the verification plan.

If tier 2 is chosen the mass of passengers can be calculated by:

²³ Aeronautical Information in compliance to Annex 15 of the Chicago Convention or from a source using such AIP data..

²⁴ If for example Lido Systems are used to cross check the data on distances the verifier shall be aware that this system is approximately 0.23% off compared to the GCD since it takes the earth as a sphere and not as an ellipsoid (calculating distances 1,000 of meters above the ground).

- multiplying the number of PAX²⁵ with the specific mass of PAX type: i.e. the individual mass of the passenger is taken from the “mass and balance” documentation and the number of passenger is taken from another source; or
- taking the total PAX for all passengers from the “mass and balance” documentation.

Further information is published in the FAQ on the monitoring and reporting of annual emissions and tonne-kilometre data for EU Emissions Trading, this is published on the Commission’s website.²⁶ Most aircraft operators are multiplying the number of PAX with the specific mass of PAX type. The verifier shall check whether aircraft operators have applied either of the abovementioned methods consistently throughout the reporting period. If the verifier identifies inconsistencies in the application method the verification plan including the data sampling plan may need to be adapted.

The verifier shall be aware of the following when checking the mass of passengers:

- Active crew members and their checked baggage shall not be included. The verifier shall check the control activities in place to ensure that active crew are not included and non active crew are counted in the mass of passengers;
- Infants are included and the proper mass is assigned to those infants. If the approved monitoring plan shows that tier 1 is applied the verifier shall be aware that the 100kg value is applied also to infants. When tier 2 is applied the verifier shall check whether the standard mass or actual mass indicated in the “mass and balance” documentation has been used. This could be 0 kg for infants (standard mass applicable according to EU OPS regulation) or mass approved by the civil aviation authorities.
- If standard mass from the “mass and balance” documentation is taken the verifier shall check whether the correct standard mass is applied: i.e. either standard mass according to EU OPS regulation or standard mass approved by civil aviation authorities.
- If the actual mass from the “mass and balance” documentation is taken the verifier shall check the control activities in place to ensure that the actual mass was measured correctly: e.g. contractual agreements with agents that weighed the mass of passengers, specifications and maintenance records of the measurement equipment used and interface to reporting system.

6.4 How to check the procedure for monitoring the number of passengers (section 6c MP TK Template)

Section 6 TK Template report requires aircraft operators to report the total number of passengers. The verifier shall check whether the procedure for monitoring the number of passengers exists, is documented and is implemented as well as kept up to date. Likewise the verifier checks the key controls to ensure that the number of passengers is monitored correctly by assessing whether these control activities are functioning and are effective. The verifier shall focus on what primary data

²⁵ PAX means passengers in the airline industry. The definition of passengers according to the MRG means the persons onboard the aircraft during a flight excluding its crew members.

²⁶ See http://ec.europa.eu/clima/policies/aviation/guidance_en.htm

sources are used to monitor the number of passengers (e.g. boarding passes), the information system used for processing and transmitting the number of passengers and how they are input in the system (e.g. by an electronic interface or by manual input). Anyway, the verifier shall ensure that only actual data (the real number of passengers transported) are considered in the reported data).

6.5 How to check mass of freight and mail (section 6d 6e and 6f MP TK Template)

The MRG requires the mass of freight and mail to be calculated using the actual or standard mass contained in the “mass and balance” documentation for the relevant flights. “Mass and balance” documentation is required for commercial aircraft operators. If an aircraft operator is not required to have “mass and balance” documentation, the approved monitoring plan will include a suitable methodology for determining the mass of freight and mail, how the data is obtained, transmitted and subsequently recorded. The verifier checks:

- what data source is used to determine the actual or standard mass of freight and mail;
- whether the aircraft operator was legally required to have “mass and balance” documentation and has used the mass indicated in this document;
- whether the methodology used, where there is no “mass and balance” documentation, has been applied correctly.

Where standard mass is used for e.g. mail bags the verifier checks what standard mass is used and how the total mass is calculated and whether this is in line with what has been outlined in section 6f of the approved monitoring plan.

If actual mass is used the verifier shall check the control activities implemented to ensure that the mass of freight and mail is weighed accurately. The calibration standards and uncertainty margins applied for the measurement equipment are checked by the verifier, or a reasonable justification provided as to why it has not been checked. Where weighing is outsourced to ground handling agents the verifier must check the service level agreements with the ground handling agents to assess how the quality of the measurement is ensured, whether the measurement equipment is sufficiently calibrated and maintained or other control activities have been implemented to support the accuracy of weighing the mass of freight and mail. These control activities could include regular tares, keeping proper records, and specific conditions in the service level agreements. The verifier should also check the internal audits performed on the procedures for quality assurance of the measurement equipment.

The verifier should be aware that it may be difficult to trace the mass of freight and mail back to specific scales. For several reasons, freight and mail can be repacked and distributed to other aircraft. This means that a verifier may not be able to easily discern which package was weighed on what scale. The verifier shall take this into account when assessing how the reported data corresponds with records on payload kept for safety purposes. The focus shall be on how the mass of freight and mail in the most accurate “mass and balance” documentation ends up in the

reported data. Anyway, the verifier shall ensure that only actual data (the correct weight of freight and mail transported in reality) is considered in the reported data. It may be relevant for a verifier to mention problems relating to the aforementioned cross check in the verification report.

6.6 How to check exclusion of pallets, containers and service weight (section 6g MP TK Template)

The MRG requires aircraft operators to exclude the tare weight of all pallets and containers that are not payload as well as the service weight from the actual freight and mail mass.

Containers and pallets that are Unit Load Devices (ULDs) usually carry IATA's marking information like type codes, maximum gross weights and tare weight. The tare weight of these Unit Load Devices (ULDs) shall be excluded from the reported mass of freight and mail if they are not part of the consigned freight and mail. The verifier shall check that the ULDs that are not part of consigned freight and mail have not been included in the reported mass of freight and mail.

Service weight includes catering and removable passenger service equipment as well as portable water and lavatory chemicals. Service weight is meant for use during the flight and is not carried onboard flights for transportation purposes. The verifier shall check that the service weight is not included in the reported mass of freight and mail.

Aircraft operators are required to design and implement control activities to ensure that tare weights of pallets and containers (that are not part of the consigned freight and mail) as well as service weight are excluded from the reported mass of freight and mail. The verifier checks whether the control activities are designed and implemented effectively. For more information on how to interpret service weight as well as pallets and containers see the MP guidance for the Aviation Industry and the FAQ.

6.7 How to check procedures to monitor the mass of freight and mail (section 6h MP TK Template)

The verifiers shall check whether a procedure for monitoring the mass of freight exists, is documented and is implemented as well as kept up to date. Likewise the verifier checks the key controls to ensure the mass of freight and mail is monitored correctly by assessing whether these control activities are functioning and effective. The verifier shall focus on what primary data sources are used to monitor the mass of freight and mail, the information system used for processing and transmitting the mass of freight and mail and how they are input in the system (e.g. by an electronic interface or by manual input).

6.8 How to verify missing data for tonne kilometre?

Where primary data sources for tonne-kilometre reporting are missing, the aircraft operator may apply a conservative estimate of the tonne-kilometre for the part of the data that is missing provided the aircraft operator has gained the Competent Authority's approval for this in the

monitoring plan or through a notification of change to the monitoring plan. The verifier shall assess in that case whether the aircraft operator has gained the Competent Authority's approval for conservatively estimating the data gap, whether the estimate for that specific data source is conservative and does not overestimate the tonne kilometre data. In some cases it may be necessary to assume a value of zero for the missing data (i.e. where a less conservative estimate is not possible).

7 Competence and impartiality requirements on verifier

According to the EU ETS Directive the verifier shall be competent to perform verification activities. To ensure competence, the verifier shall establish, document, implement and maintain a competence process that demonstrates through records that all personnel used for the verification are competent for the tasks allocated to them (see section 6.1 EA-6/03). This process includes the determination and implementation of:

1. Competence criteria for each verification activity related to the technical scope and competence areas mentioned in Annex A. Based on these generic competence criteria the verifier should develop specific competence criteria taking account of the specific technical and organisational issues in the administering Member States the verifier is operating in (see section 6.1.1 and 6.1.2 EA-6/03).
2. A method for initial competence evaluation of available individuals to carry out EU ETS verification: this should occur before work has been contracted and normally will be carried out at the stage of accreditation. For personnel undertaking the activities in the verification process, the verifier must determine the method of evaluating their competence against the competence criteria established, and maintain records that demonstrate how an individual demonstrated achievement of his competence to a competent evaluator (see section 6.1.3 EA-6/03);
3. A method to ensure continued competence and regular evaluation thereof including monitoring of individuals involved in EU ETS. All competent personnel shall be subject to routine monitoring of performance to confirm ongoing competence. The verifier shall establish the most appropriate means of monitoring applicable to the tasks being undertaken, and the risks of unsatisfactory outcomes influencing the final verification opinion (see section 6.1.4 EA-6/03);
4. A competence needs analysis to select competent persons and, where applicable, the team for a each verification (see section 5.2.3 EA-6/03); this is normally done as part of the contract review;
5. Regular evaluation of the overall competence process to ensure it is updated and maintained (see section 6.1.5 EA-6/03); and
6. A system for recording the results of 1-5.

Note: Experience and training do not demonstrate an individual is competent, but provide the appropriate routes to acquire competence. A formal qualification, when obtained by passing an examination, can be demonstration of knowledge. This may demonstrate compliance with a part of the competence criteria.

8 Accreditation and mutual acceptance of verifiers

8.1 Accreditation of verifiers

The verifier should be accredited by an accreditation body based in the European Union. The accreditation process must be based on the same principles and requirements indicated in the EA-6/03 to assess a verifier's performance. It shall be noted that although the accreditation body must be based in the European Union, this does not preclude their accreditation of appropriate verifiers based outside of the European Union as long as these verifiers are also subject to the same accreditation requirements (preferably meeting EA-6/03).

Special note shall be given to the fact that Accreditation Regulation 765/2008 entered into force on 1 January 2010 and that most Member States have implemented or are in the process of implementing EA accreditation of verifiers. This can be expected to become mandatory for EU ETS when the Accreditation and Verification Regulation pursuant to article 15 Revised EU ETS Directive has come into force (see chapter 1).

8.2 Mutual Acceptance of verifiers

Under a harmonized quality of EU ETS verification, verifiers should be allowed to operate across national borders provided they are accredited by an EU-based Accreditation Body following EA 6/03.

Depending on national legislation, the verifier accredited in another Member State should provide, before performing verification activities, to the accreditation body and competent authority in the Member State in which he is going to operate, advance notification of:

- Accreditation details, competences and team composition if appropriate;
- When and where the verification work will occur: address and contact details of the verifier, measures taken to deal with legal and language knowledge if necessary.

The notification procedure should not be used to delay the arrival of the verifier to perform the verification activities.

When showing his accreditation details to the 'local' accreditation body and to the competent authority, the verifier should at least make it clear that:

- The scope of accreditation includes EU-ETS verifications;
- The scope includes the sector in which the verifier has clients in the Member State;
- The certificate includes a reference to the accreditation scheme and standards used for the accreditation process and the accreditation of the verifier;
- The competences of the verifier are suitable to act in the Member State;
- The certificate is valid for the period in which the verification work in your Member State is being performed;
- The certificate includes the same legal entity as is seeking acceptance.

For future reference accreditation Regulation 765/2008 regulates mutual acceptance of verifiers (article 11 (2)). According to that article the accreditation certificates of verifiers have to be accepted if the accreditation body is a member of the EA and has undergone a successful peer evaluation process through the EA. Member States are not allowed to refuse verifiers in that case. More specific requirements on mutual acceptance addressing EU ETS specific elements and conditions for supervising foreign verifiers will be incorporated in the EU ETS Accreditation and Verification regulation to be drafted and adopted in 2011. This regulation will enter into force from 1 January 2013 onwards.

Annex A Competence criteria

In accordance with section 6.1.1 EA-6/03, the verifier must be able to demonstrate technical knowledge of the verification requirements associated with aviation emissions and tonne-kilometre data including unique parameters, testing techniques, measurement/monitoring arrangements, calculation methodologies and relevant legislative requirements.

Technical sector competence:

The technical sector competence criteria should include at least knowledge of the following aspects:

1. Sectoral aspects of monitoring plans, procedures, data flow and control systems including the overall organization with respect to monitoring and reporting as well as the control environment in which the aircraft operator operates;
2. The aircraft operator's typical activities, equipment and relevant processes (flights, aircraft, aerodrome pairs etc.),
3. The origin and application of emission factors and any other parameter or method used in the determination of aviation emissions or tonne-kilometre data;
4. Techniques relevant to monitoring, measurement (including device calibration and verification), calculation, analysis and reporting of aviation emissions and tonne-kilometre data;
5. Knowledge and understanding of the requirements of Directive 2008/101/EC, Commission Decision 2009/450/EC on the detailed interpretation of the aviation activities listed in Annex I to the Directive 2003/87/EC, Decision 2009/339/EC Monitoring and Reporting Guidelines for EU ETS aviation (MRG) in particular, Annexes XIV and XV.
6. Knowledge of the Guidance for Aviation Industry, this guidance, national specific requirements of the Administering Member States the verifier is operating in, the templates published by the European Commission
7. Specific understanding concerning use and interpretation of data from Eurocontrol and other data sources; the integrity of data obtained from external sources; EU ETS excluded flights; aircraft fuelling systems; maintenance of metering instruments and estimation techniques; use of the Eurocontrol simplified procedure and other approved tools for estimating fuel consumption for small emitters; use of approved simplified procedures in relation to data gaps; calculation methods; and tonne-kilometre data.

8. If relevant, IT expertise and competence in the case the verifier checks, for example, source codes of distance tools.

Annex B References

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 of 8 June 2009 on the detailed interpretation of the aviation activities listed in Annex I to Directive 2003/87/EC of the European Parliament and of the Council, OJ 12 June 2009, L 149/69.

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.

Commission Regulation (EU) No 606/2010 of 9 July 2010 on the approval of a simplified tool developed by the European organisation for air safety navigation (Eurocontrol) to estimate the fuel consumption of certain small emitting aircraft operators, OJ 10 July 2010, L 175/25.

Regulation (EC) No 765/2008 of the European Parliament and the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93, OJ 13 August 2008, L 218/30 (Accreditation Regulation 765/2008).

EA Document for Recognition of Verifiers under the EU ETS Directive, EA-6/03, 2010.

Guidance for the Aviation Industry Monitoring and Reporting Annual Emissions and Tonne-km data for EU Emissions Trading (Guidance for the Aviation Industry) published on the website of the European Commission, http://ec.europa.eu/clima/policies/aviation/docs/nl_guidance.pdf

FAQ on monitoring and reporting annual emissions and tonne kilometre published on the Commission website: See http://ec.europa.eu/clima/policies/aviation/guidance_en.htm

Other relevant legislation and guidance as well as the monitoring plan templates and the reporting templates are published on the Commission's website:

http://ec.europa.eu/clima/policies/aviation/index_en.htm