



EUROPEAN COMMISSION  
DIRECTORATE-GENERAL  
CLIMATE ACTION  
Directorate A - International and Climate Strategy  
CLIMA.A.3 - Monitoring, Reporting, Verification

## Guidance Document

### The Accreditation and Verification Regulation - Verification Guidance for EU ETS Aviation

#### **AVR Explanatory Guidance (GD III), Version of 15 November 2012**

This document is part of a series of documents and templates provided by the Commission services for supporting the implementation of Commission Regulation (EU) No. 600/2012 of 21 June 2012 on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council.

The guidance represents the views of the Commission services at the time of publication. It is not legally binding.

This guidance document takes into account discussions within the meetings of the informal Technical Working Group on the Accreditation and Verification Regulation under the WGIII of the Climate Change Committee (CCC), as well as written comments received from stakeholders and experts from Member States.

*This guidance document was unanimously endorsed by the representatives of the Member States at the meeting of the Climate Change Committee on 15 November 2012.*

All guidance documents and templates can be downloaded from the documentation section of the Commission's website at the following address:  
[http://ec.europa.eu/clima/policies/ets/monitoring/index\\_en.htm](http://ec.europa.eu/clima/policies/ets/monitoring/index_en.htm).

# Contents

<b>1</b>	<b>Introduction .....</b>	<b>4</b>
<b>2</b>	<b>User manual to AVR concepts and guidance material .....</b>	<b>7</b>
<b>3</b>	<b>Verification.....</b>	<b>14</b>
3.1	SCOPE OF VERIFICATION .....	14
3.2	VERIFICATION PROCESS .....	14
3.2.1	Pre-contract stage .....	15
3.2.2	Information provided by the operator or AO .....	16
3.2.3	Strategic analysis .....	17
3.2.4	Risk analysis .....	18
3.2.5	Verification plan .....	18
3.2.6	Process analysis (detailed verification) .....	19
3.2.7	Site visit .....	23
3.2.8	Addressing misstatements and non-conformities .....	24
3.2.9	Assessing the material effect of misstatements and non-conformities .....	25
3.2.10	Concluding on the findings of the verification .....	27
3.2.11	Independent review .....	28
3.2.12	Internal verification documentation .....	28
3.2.13	Verification report .....	29
3.3	Addressing outstanding issues in the verification report.....	31
<b>4</b>	<b>How to assess the risks in the data flow and control activities? .....</b>	<b>34</b>
4.1	DATA FLOW ACTIVITIES .....	34
4.2	VERIFICATION OF DATA FLOW ACTIVITIES .....	34
4.3	CONTROL ACTIVITIES .....	35
4.4	VERIFICATION OF CONTROL ACTIVITIES .....	36
4.5	VERIFICATION OF PROCEDURES APPROVED IN THE MP .....	40
4.6	VERIFICATION OF EVALUATION OF THE CONTROL SYSTEM .....	40
<b>5</b>	<b>Aviation specific requirements in the verification of annual emissions .....</b>	<b>41</b>
5.1	HOW TO IDENTIFY AOs? .....	41
5.2	HOW TO CHECK (ADDITIONAL) AIRCRAFT TYPES? .....	42
5.3	HOW TO CHECK THE COMPLETENESS OF FLIGHTS? .....	43
5.4	HOW TO CHECK PROCEDURES FOR DETERMINING WHETHER FLIGHTS ARE EU ETS FLIGHTS? .....	45
5.5	HOW TO CHECK THE METHODOLOGY AND PROCEDURES USED TO MONITOR THE FUEL CONSUMPTION? .....	45
5.6	HOW TO CHECK FUEL DENSITY? .....	47
5.7	HOW TO CHECK DEVIATION FROM GENERAL METHODOLOGY FOR SPECIFIC EMISSIONS? .....	47
5.8	HOW TO CHECK UNCERTAINTY? .....	48
5.9	HOW TO CHECK THE PROCEDURES FOR CROSS-CHECKS BETWEEN FUEL SLIPS AND FUEL MEASURED? ....	48
5.10	HOW TO DEAL WITH EMISSION FACTORS? .....	49

5.11 HOW TO DEAL WITH BIOFUELS .....	49
5.12 HOW TO DEAL WITH DATA GAPS? .....	50
5.13 TO WHAT EXTENT CAN THE ETS SUPPORT FACILITY BE USED WHEN FILLING IN DATA GAPS? .....	51
5.14 HOW TO CHECK ROLES AND RESPONSIBILITIES? .....	52
5.15 HOW TO CHECK PROCEDURES LISTED IN THE APPROVED MP? .....	52
5.16 HOW TO CHECK EMISSION DATA IN THE EMISSION REPORT? .....	52
5.17 HOW TO DEAL WITH ROUNDING OF DATA? .....	52
5.18 HOW TO DEAL WITH INHERENT TENSION WITH RESPECT TO FUEL LOGGING? .....	53
<b>6 Verifying small emitters using simplified procedures, and the role of the ETS Support Facility for all AOs.....</b>	<b>54</b>
<b>7 Aviation specific issues in the verification of tonne-kilometre data.....</b>	<b>61</b>
7.1 HOW TO CHECK SYSTEMS AND PROCEDURES TO MONITOR AERODROME LOCATION INFORMATION? .....	61
7.2 HOW TO CHECK THE DISTANCE AND PROCEDURE TO MONITOR GCD? .....	61
7.3 HOW TO CHECK THE MASS OF PASSENGERS AND CHECKED BAGGAGE? .....	62
7.4 HOW TO CHECK THE PROCEDURE FOR MONITORING THE NUMBER OF PASSENGERS?.....	63
7.5 HOW TO CHECK MASS OF FREIGHT AND MAIL? .....	63
7.6 HOW TO CHECK EXCLUSION OF PALLETS, CONTAINERS AND SERVICE WEIGHT? .....	64
7.7 HOW TO CHECK PROCEDURES TO MONITOR THE MASS OF FREIGHT AND MAIL? .....	65
<b>8 Competence and impartiality requirements on verifiers.....</b>	<b>66</b>
<b>9 Accreditation and other requirements.....</b>	<b>67</b>
<b>Annex I. Timeline for verification .....</b>	<b>68</b>
<b>Annex II. Internal verification documentation .....</b>	<b>70</b>
<b>Annex III. Detailed user manual to guidance material .....</b>	<b>72</b>
<b>Annex IV. Examples of issues relevant for strategic analysis.....</b>	<b>73</b>
<b>Annex V. Relevant legislation and guidance.....</b>	<b>76</b>
<b>Annex VI. Abbreviations.....</b>	<b>78</b>

# 1 Introduction

Article 15 of the EU ETS Directive<sup>1</sup> instructs the European Commission to develop a regulation on the verification of emissions report and tonne-kilometre reports, the accreditation of verifiers and the supervision of verifiers. On the 12<sup>th</sup> of July 2012 the Accreditation and Verification Regulation (AVR) was published in the Official Journal<sup>2</sup>. Together with the Monitoring and Reporting Regulation<sup>3</sup> (MRR) which was published on the same date, the two regulations will replace the 2007 Monitoring and Reporting Guidelines<sup>4</sup> and its amendments including in relation to aviation<sup>5</sup>. The MRR and the AVR will be applicable to the monitoring, reporting and verification of greenhouse gas emissions and tonne-kilometre data occurring from 1 January 2013.

This Aviation verification guidance (GD III) is part of a suite of guidance documents developed by the Commission services to explain the requirements in the AVR. To allow immediate access to the verification requirements for small emitters without the need to read this Aviation verification guidance, a quick guidance document has been drafted as addendum to this GD III. The suite of guidance documents supports a harmonised interpretation of the requirements by Member States and consists of:

- an explanatory guidance on the articles of the AVR (EGD I), including a user manual providing an overview of the guidance documents and their interrelation with the relevant legislation;
- key guidance notes (KGN II) on specific verification and accreditation issues;
- a specific guidance (GD III) on the verification of aircraft operator's reports;
- templates for the verification report and information exchange requirements;
- exemplars consisting of filled-in templates, checklists or specific examples in the explanatory guidance or key guidance notes;
- frequently asked questions.

This Aviation verification guidance (GD III) is specifically designed to clarify the EU ETS requirements on the verification of aircraft operator's reports and to give practical advice to verifiers, aircraft operator (AOs), competent authorities, national authorities and accreditation bodies on how to interpret the requirements of the AVR in a uniform manner. It considers how the verification requirements can be met efficiently and effectively, taking into account the scales and geographical spread of many aircraft activities. The guidance will

---

<sup>1</sup> Directive 2003/87/EC of the European Parliament and the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2003L0087:20090625:EN:PDF>

<sup>2</sup> Commission regulation No. 600/2012 of 21 June 2012 on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council, OJ EU, 12 July 2012, L181/1.

<sup>3</sup> Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council, OJ EU, 12 July 2012, L181/30.

<sup>4</sup> Commission Decision (2007/589/EC) of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council, OJ EU, 31 August 2007, L229/1.

<sup>5</sup> Commission Decision (2009/339/EC) 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, OJ EU, 23 April 2009, L103/10.

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 AOs. For some issues reference is made to relevant key guidance notes that provide a more in-depth explanation of the subject concerned. This guidance document represents the views of the Commission services at the time of publication. It is not legally binding.

## How to read this Aviation Verification Guidance?

This guidance is structured as follows:

**Chapter 2** explains the general objectives and main concepts of the AVR. It also outlines the roles and responsibilities of the different parties involved in EU ETS, and describes the interrelation between the AVR and other legislation, harmonised standards and the suite of guidance documents. It also provides a user manual to all the guidance documents, templates and exemplars developed to support a common interpretation.

**Chapter 3** outlines the legal verification requirements laid down in Chapter III of the AVR, 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 of 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 AO has to include in its MP descriptions of the data flow applicable to its EU ETS activities and the 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 4** explains how a verifier should assess the data flow activities, control activities and procedures that have been implemented by the AO. This includes the checks that the verifier should carry out on IT systems used by the AO 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 5** 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.

AOs operating less than 243 flights per period for three consecutive four-month periods or AOs operating flights with total annual emissions less than 25,000 tonnes CO<sub>2</sub> per year are considered small emitters and may apply an approved simplified tool to estimate their fuel consumption which can process all air traffic information corresponding to that available to EUROCONTROL and avoid any underestimations of emissions. At the present time there is only one simplified tool approved by the European Commission, namely the EUROCONTROL Small Emitters’ tool.

**Art. 54(2)  
MRR**





**Chapter 6** 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 Facility<sup>6</sup> for all AOs. Furthermore, reference is made to the quick guidance for small emitters.

**Chapter 7** 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 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 8** refers to the guidance on competence and impartiality requirements for verifiers mentioned in Chapter 5 of the Explanatory Guidance (EGD I).

**Chapter 9** addresses accreditation of verifiers, peer evaluation of accreditation bodies, mutual recognition of verifiers and information exchange between the different parties involved. Reference is made to Chapters 6 -10 of the Explanatory Guidance (EGD I).

Throughout the text of this explanatory guidance and the key guidance documents certain symbols have been inserted to highlight new concepts or certain situations. The following symbols have been used.

	This symbol means that the reader should pay specific attention to the requirement or issue mentioned in the text.
	This symbol means the requirement or issue is solely applicable to AOs.
	This symbol means the text next to this icon is applicable to single verifiers. A single verifier is an enterprise involving one individual (one-man business).
	This symbol is intended to flag requirements or guidelines for the verification of a small emitter: i.e. an AO operating fewer than 243 flights per period for three consecutive four-month periods or operating flights with total annual emissions lower than 25, 000 tonnes CO <sub>2</sub> per year.

<sup>6</sup> The ETS Support Facility made available by EUROCONTROL (see Chapter 5 and 6).

## 2 User manual to AVR concepts and guidance material

The MRR and the AVR have direct legal effect in the Member States. This means that the regulations do not require transposition and implementation in national legislation since their provisions apply directly to operators or AOs, verifiers, accreditation bodies and other parties mentioned in the MRR and the AVR. The new regulations define the roles and responsibilities of all these parties more strictly, which strengthens each specific element in the compliance chain.

### 2.1 Roles and responsibilities of the parties in EU ETS

The compliance chain and the roles and responsibilities of each party involved in EU ETS can be summarised by the following figure.

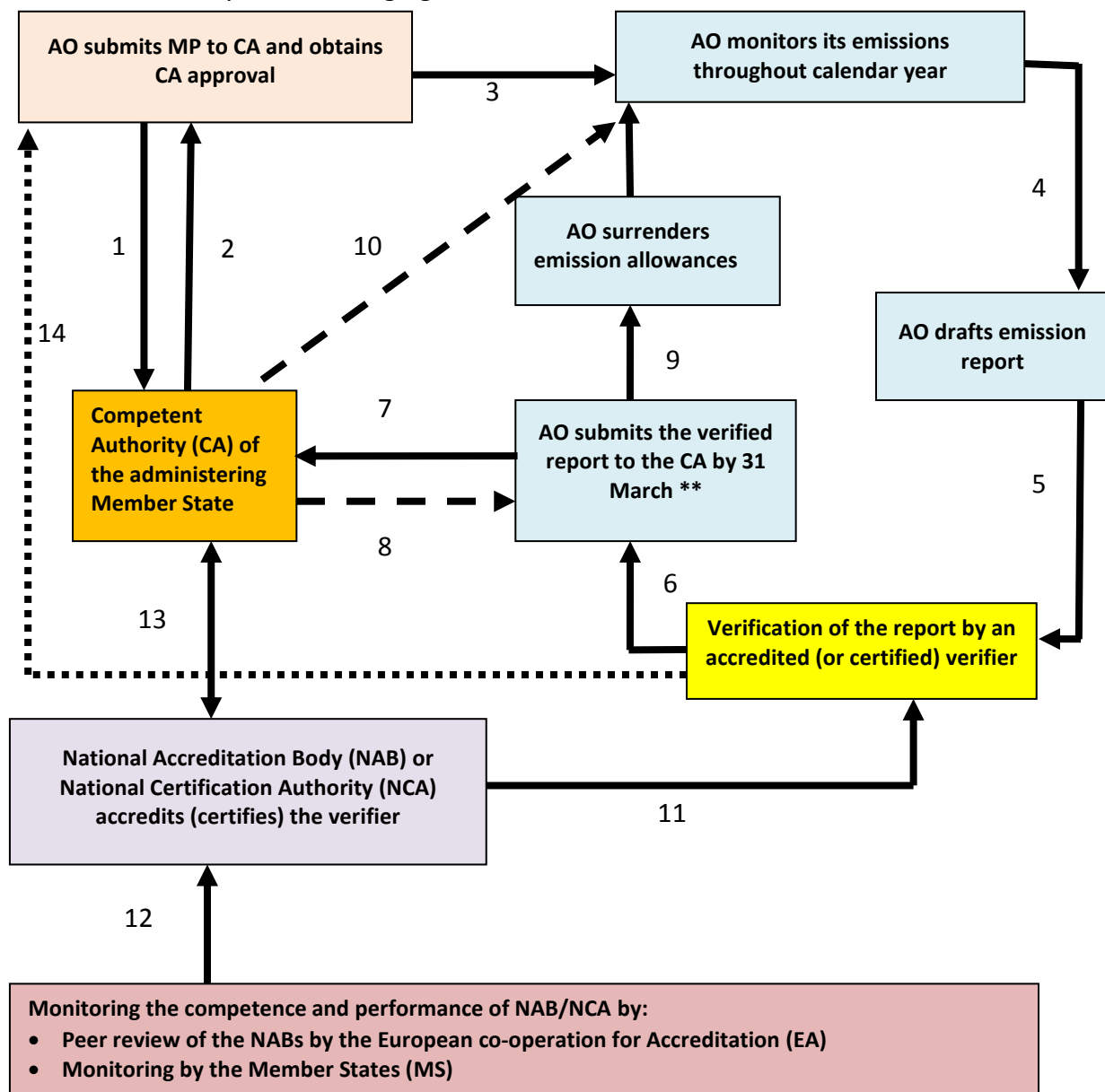


Figure 1: EU ETS Compliance Chain and the roles of parties involved

\*\* See footnote 11

The compliance chain starts with the AO submitting its draft monitoring plan (MP) to the Competent Authority (CA) of their administering Member State<sup>7</sup> for approval (**arrow 1**). If the MP meets the requirements of the MRR and the CA is confident that the AO will be able to monitor in line with the MP, the CA approves the MP (**arrow 2**). Throughout the calendar year the AO must subsequently monitor its emissions in accordance with the approved MP and the MRR (**arrow 3**). At the end of the calendar year the AO has to draft an emissions report that meets the requirements of Annex X of the MRR (**arrow 4**). This report must be verified (**arrow 5**).

If the AO is applying for free allowances, it has to draft an MP for tonne-kilometre data, obtain the CA's approval of that MP and monitor these tonne-kilometre data in accordance with that MP and the MRR. The tonne-kilometre data only have to be monitored for the relevant monitoring year<sup>8</sup>:

- the year 2010 for free allocation for the first (2012) and second (2013-2020) trading period (now expired);
- the year ending 24 months before the start of the next trading period meaning the year 2018 for allocations for the third trading period (2021 onwards);
- the second year of the trading period for applications to the special reserve which means 2014, 2022 etc.

Before or at the latest on 31 March of the year following the relevant monitoring year, the AO has to submit a verified tonne-kilometre report for the tonne-kilometre data monitored in the monitoring year which will serve as a basis for the application for free allowances. This report has to be submitted to the CA of the administering Member State.

**Verification** involves an independent assessment of the way the MP has been implemented, and of the data sources that have been used to collect and collate the data, and the data quality in the AO's report. Verification is an essential instrument in providing confidence to the CA and other relevant parties that the report submitted to the CA, represents a faithful, true and fair account of the emissions or tonne-kilometre data.

Both Article 15 and Annex V of the EU ETS Directive and the AVR require the verification to be carried out by a **verifier**. A verifier is:

- a legal entity or legal person accredited by a national accreditation body (NAB). The verifier could for example be an enterprise with multiple persons and/or departments or an enterprise that is owned by a single individual<sup>9</sup>;
- a natural person that is certified by a National Certification Authority (NCA) according to the requirements of the AVR if a Member State has decided to set up a certification system. The natural person shall in that case not be a legal entity or part of a legal entity.

In most administering Member States the verifier will be a verification body rather than an individual person performing verification activity.

Accreditation involves an independent assessment by the NAB whether the verifier has the competence to carry out the verification, whether it can perform the verification in line with the AVR and whether it meets the requirements in Chapter III of the AVR (**arrow 11**). The

---

<sup>7</sup> Please see section 3.3 of the MRR Guidance document for AOs no.2 (GD.2) for information on administering Member States.

<sup>8</sup> MRR Guidance document for AOs No.2 (GD 2).

<sup>9</sup> The national law of the Member State in which the legal person or legal entity has its registered office or permanent business establishment provides information on what constitutes a legal person or legal entity.



accreditation process concludes with a decision on whether the verifier can be granted accreditation and is thus allowed to perform verification of AO reports. After the accreditation has been granted, the verifier is still continuously monitored by the NAB including through annual surveillance and a reassessment before the accreditation certificate expires.

Certification involves a similar independent assessment of the verifier by the NCA and is only allowed for natural persons intending to carry out verification activities **(arrow 11)**<sup>10</sup>. Legal entities or legal persons cannot apply for certification. The same AVR requirements that apply to the accreditation and monitoring of verifiers are applicable to the certification and monitoring of natural person verifiers by the NCA.

The verifier carries out the various activities required by the AVR to check the implementation of the MP and the data in the AO's report. Once the verifier has concluded on the verification, it issues a verification report to the AO stating whether the AO's report is verified as satisfactory or not **(arrow 6)**. Before or at the latest on the 31<sup>st</sup> of March of each year, the AO must submit both the emission report and the corresponding verification report to the CA of the administering MS **(arrow 7)**<sup>11</sup>. If the AO wants to apply for free allocation of emission allowances, it must submit a tonne-kilometre report and the corresponding verification report to the CA of the administering MS.

Compared to the Monitoring and Reporting Decision<sup>12</sup>, the role of the CA as the overall responsible party for a well-functioning EU ETS compliance chain has been strengthened **(arrow 8)**. If the AO's emission report is not verified as satisfactory, the CA must undertake action (i.e. make a conservative estimation of the emission data and take enforcement action).

By the 30<sup>th</sup> of April of each year the AO must surrender at least the number of emission allowances equivalent to the verified reported emissions that are entered into the Registry **(arrow 9)**. The surrendering of emission allowances does not mean that the roles and responsibilities of the different parties end at that point of time. The CA may carry out inspections on the AO to ensure that the operator is complying with the MRR **(arrow 10)**. Furthermore, the MRR contains requirements for AOs to improve their monitoring methodology under certain circumstances and for them to address outstanding issues that are identified by the verifier **(arrow 14)**.

In addition, new information exchange requirements have been given in the AVR to invite and enable the CA and the NAB or NCA to exchange information between each other and to inform each other on their activities **(arrow 13)**. For example, if the CA identifies significant errors in the verified emission report that have been missed by the verifier, this must be communicated with the NAB. If on the other hand the NAB suspends the verifier, the CA must be informed. These new information exchange requirements between the various parties in the compliance chain will help each of them to carry out their own tasks more efficiently and effectively.

---

<sup>10</sup>According to Article 54(2) of the AVR, Member States may decide to allow certification of natural persons planning to operate as verifiers in EU ETS. It is the prerogative of the MS whether or not to set up such a certification system in its country.

<sup>11</sup>CAs may require an AO to submit the verified emission report earlier than 31 March but by the 28<sup>th</sup> of February the earliest (Article 67 of the MRR).

<sup>12</sup>MRG 2007 and its revision in 2009 to include aviation activities.

To ensure that NABs carry out their activities in line with the AVR and maintain the quality of accreditation so that verification also remains of a high quality, the AVR requires that the competence and performance of the NAB or the NCA is also monitored (**arrow 12**). This monitoring is carried out by the MS that has appointed the NAB or the NCA. In addition, a regular and independent peer evaluation is organised by the European co-operation for Accreditation (EA)<sup>13</sup> to monitor the competence and performance of the NAB. In this peer evaluation process, experts from the EA, NABs and other parties assess whether the NAB that is subject to peer evaluation meets the requirements of the AVR.

All the elements in the compliance chain mentioned above are regulated in the MRR and the AVR. Both regulations are interconnected at several points. This guidance provides an explanation of the requirements in the AVR and their interconnection with MRR on specific issues related to aviation.

## **2.2 Interrelation between the regulations, harmonised standards and guidance**

The EU ETS Directive provides the legal basis for both the MRR and the AVR. The MRR applies to installations and AOs, and contains specific requirements on the monitoring and reporting of aviation activities including in particular Chapter IV, Annex I, section 2, Annex III, Annex IX and X of the MRR. The AVR is applicable to the verification of operator's and AO's reports and to verifiers that are carrying out such verification.

To ensure a common interpretation and application of the requirements in the regulations, two separate suites of guidance documents have been prepared by the European Commission services: one suite of guidance documents supports the interpretation of the MRR and the other one the AVR. For information on the suite of guidance documents prepared for the MRR please see Annex V. The AVR guidance material is outlined in section 2.3.

The AVR itself is closely linked to the general framework regulation, Accreditation Regulation (EC) No. 765/2008), that regulates accreditation of conformity assessment activities. Synergy between both regulations has been created by stating in the AVR that the general requirements of AR 765/2008 apply where they are not covered by the AVR. In addition, some general provisions in AR 765/2008 have been made EU ETS specific in the AVR (e.g. competence requirements for NAB personnel).

The figure below outlines the interrelation between the different regulations, standards and guidance material.

---

<sup>13</sup>The European co-operation for Accreditation (EA) is a regional body that is a member of the International Accreditation Forum (IAF). According to Article 54(4) of the AVR the NAB must be a member of the EA.

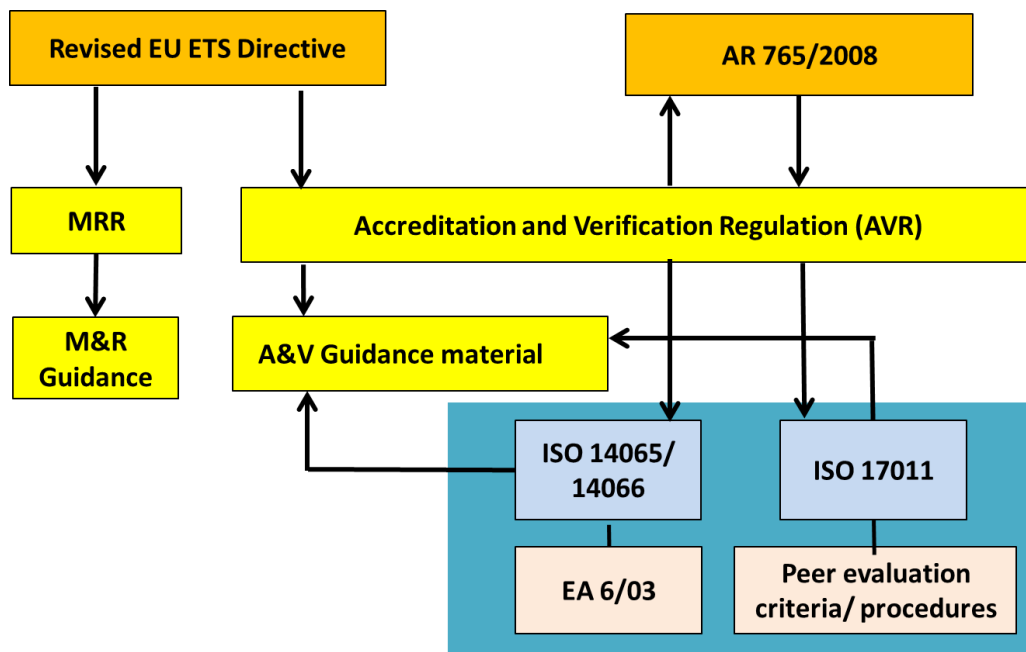


Figure 2: The legislative framework of EU ETS verification and accreditation

The AVR prescribes the application of a harmonised standard in the accreditation of verifiers and the assessment of their competence, i.e. EN ISO 14065, a GHG programme neutral standard. NABs or NCAs must use this standard as well as the EU ETS specific requirements in the AVR on verification, competence, impartiality and procedures to assess the verifier's competence and performance. Similarly, a harmonised standard is prescribed for the NAB, i.e. EN ISO/IEC 17011. The NAB must meet the requirements in this standard as well as the EU ETS specific requirements in the AVR. Compliance with these requirements is regularly monitored by the MS and in the peer evaluations. More detailed information on the interrelation between the AVR and both standards is outlined in:

- key guidance note on the relation between the AVR and EN ISO 14065 (KGN II.8); and
- key guidance note on the relation between the AVR and EN ISO/IEC 17011 (KGN II.9).

Besides the MRR, other legislation is relevant for the monitoring and reporting of emissions and tonne-kilometres (e.g. Commission Decision on the interpretation of aviation activities and EU OPS regulation). The verifier must be aware that changes in legislation may have an impact on the monitoring and reporting process and thus on the verification.

### 2.3 User manual to guidance documents

The suite of guidance documents developed by the Commission services consists of several types of documents. The explanatory guidance is an overall guidance document that provides an explanation of each article in the AVR. Key guidance notes have been developed to address specific issues in verification and accreditation that require an elaborate or more specific explanation of the issue involved. The figure below summarises the different guidance documents, templates and exemplars that have been developed and how these relate to each other.

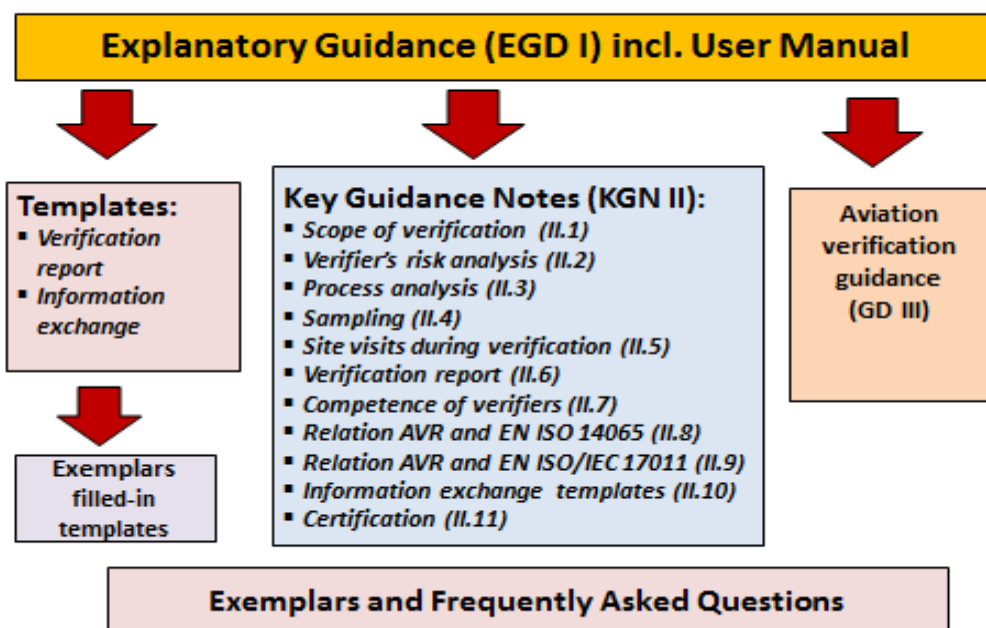


Figure 3: Suite of guidance documents supporting a common interpretation of the AVR


<p><b>The following key guidance notes or parts of these notes are not applicable to EU ETS aviation:</b></p> <ul style="list-style-type: none"> <li>▪ Section 2 and 4 of the key guidance note on process analysis (KGN II.3)</li> <li>▪ Key guidance note on site visits (KGN II.5)</li> </ul>	
--	--

Figure 4 shows where to find guidance or tools on a particular subject in the suite of guidance documents. An overview is presented of the Chapters II to VI of the AVR and the guidance documents that relate to these Chapters and the explanations of the various subjects that are presented in the individual key guidance notes. Annex III provides a detailed overview linking each article in the AVR to the relevant guidance material.

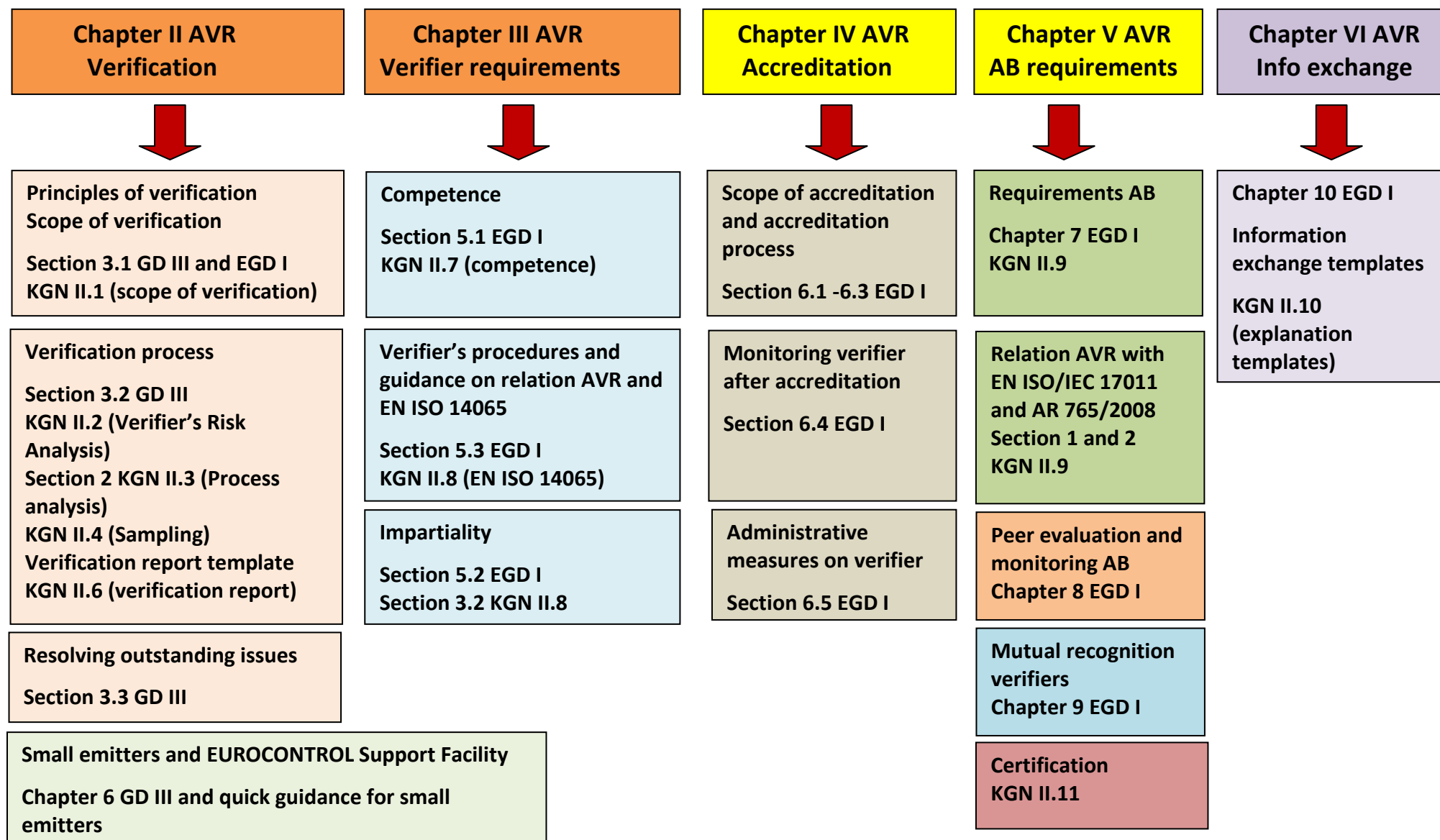


Figure 4: User manual to verification and accreditation guidance documents and templates

## 3 Verification

The objective of verification is to ensure that emissions or tonne-kilometre data have been monitored in accordance with the MRR and that reliable and correct emissions data or tonne-kilometre data are being reported. This objective is underpinned by general verification principles and obligations laid down in Articles 6 and 7 of the AVR. The same principles apply to the verification of AO reports as to installations. Please see section 3.1.1 to 3.1.5 of the Explanatory Guidance (EGD I) for more information. Of particular relevance is Section 3.1.4 of that guidance which explains the required level of assurance for EU ETS verification for AO and installations.

### 3.1 Scope of verification

The scope of verification is defined by the tasks the verifier must perform to achieve the objective of verification: i.e. to ensure that the emissions or the tonne-kilometre data have been monitored in accordance with the MRR and that reliable and correct emission data or tonne-kilometre data are reported. The verifier shall take the MP approved by the CA of the administering Member State as the starting point to assess whether the emission reports or tonne-kilometre reports are free from material misstatements. The key guidance note on the scope of verification (KGN II.1) provides detailed guidance on:

- what elements the verifier needs to assess during the verification;
- what the verifier must do if there is no approved MP, if the MP has not been updated or if the MP does not reflect the actual situation of the AO; and
- what a verifier must do if it has identified non-compliance with the MRR.

Art. 7(4)  
(5) (6)  
AVR

### 3.2 Verification process

The verification process consists of a number of interconnected and interdependent mandatory steps. This means that findings during the verification process can result in the need to reconsider one or more steps taken earlier in the verification process and subsequently adjust those steps. The steps in the verification process outlined in the AVR are sketched in the following figure:

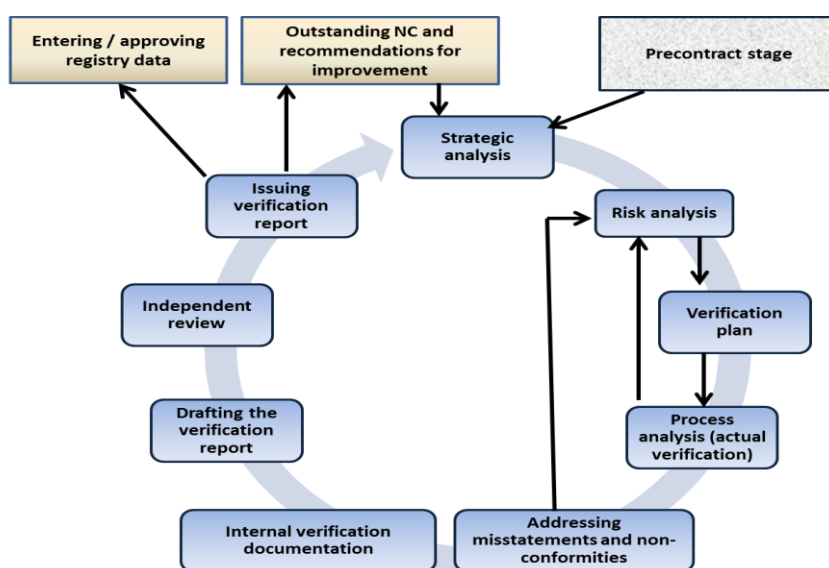


Figure 5: Steps in the verification process

Before or at the latest on 31 March<sup>14</sup> each year, the AO has to submit the verified emission report together with its corresponding verification report to the CA.<sup>15</sup> In order for this deadline to be met, it is important for AOs to start the process of reporting and for the verifier to start the verification early to avoid last minute changes and the writing of the verification report late in February and March when significant demands on AOs, verifiers and the CA could delay the production of the final AO's report and the verification report.

It is further recommended that the verification process starts during the year being reported on, rather than after the year has ended, as this facilitates checking of conformance and compliance, the timely management of issues and addressing possible data gaps, misstatements or non-conformities identified during the verification. However, sufficient data is needed to initiate the process, and any subsequent changes to the AO's systems must be considered well in time for the verified report to be submitted by 31<sup>st</sup> March<sup>16</sup>. By the end of the verification the data for the whole reporting year must be verified. Annex I provides a diagram of the stages and actions involved in the verification against this proposed timeline.

Although the steps outlined in figure 5 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 to emissions or tonne-kilometre data should be taken into account in all the steps if the verifier verifies both reports concurrently. For example a generic risk analysis would not be sufficient to identify the risks with respect to monitoring emissions and tonne-kilometre specifically.



### 3.2.1 Pre-contract stage

The pre-contract stage is a most important initial phase that precedes the verification process. Before accepting the verification engagement and signing the contract with the AO the verifier shall assess whether it can undertake the verification for that specific AO. This involves the verifier undertaking the following activities:

AVR requirement	Clarification
Article 8(1) (a)	<p>Evaluate the risks involved in undertaking the verification for the particular AO. The verifier should, in particular, consider:</p> <ul style="list-style-type: none"> <li>the AO's MP and the AO's report to see what risks are involved in undertaking the verification engagement;</li> <li>potential risks to impartiality and independence of the verifier;</li> <li>risks involved in terms of time allocated to the verification engagement.</li> </ul> <p>This evaluation should be fully documented in the internal verification documentation and should show how the verifier has addressed these business risks in the contract with the AO, as well as how these risks have been mitigated: e.g. by allocating, if needed, more time to the particular verification engagement, or by developing clear and transparent conditions in the contract.</p>

<sup>14</sup>CAs may require an AO to submit the verified emission report earlier than 31 March but by the 28<sup>th</sup> of February at the earliest (Article 67 of the MRR).

<sup>15</sup>If this concerns a verified tonne-kilometre report, the AO must submit this before or at the latest 31 March of the year following the monitoring year.

<sup>16</sup>See footnote 14.

AVR requirement	Clarification
Article 8(1) (b)	Undertake a review of the information supplied by the AO. The AVR requires the AO to provide the verifier with relevant information to enable it to perform the activities of the pre-contract stage. Relevant information includes, for example, last year's AO's report, the AO's MP and an indication whether access will be provided to relevant EUROCONTROL data <sup>17</sup> .
Article 8(1) (c)	Assess whether the verification of that AO's report falls within the verifier's scope of accreditation. The verifier is only allowed to issue a verification report to an AO if it is accredited for aviation activities.
Article 8(1) (d) and (e)	Assess whether it has the competence, personnel and resources required to select a verification team for this specific verification engagement and to complete the verification activities successfully within the timeframe required. This assessment is highly dependent on the type of AO and the type of AO's activities.  For each particular verification engagement the verifier will select a verification team and check whether the composition of that team holds all the competence required by the AVR. Such an assessment could result in the addition of technical experts or EU ETS auditors to the team as well as the addition of back-up personnel. More information on competence and verification team requirements is provided in section 5.1 of the Explanatory Guidance (EGD I) and the key guidance note on competence (KGN II.7).
Article 8(1) (d) and (f)	Determine the time allocation needed to properly carry out the verification. The verifier should ensure that the scope of the verification work and the time allocated in the contract is consistent with the risks identified. Insufficient contracted time may not be used to reduce the work needed to satisfactorily complete the verification in line with its risks.

**Art. 8(2)  
AVR**

### ***Time allocation***

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 AO's activities, the complexity of the AO's activities and fleet, the complexity of the MP and the monitoring methodology, the applicable materiality threshold, the AO'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.

**Art. 9(1)  
AVR**

Depending on the type and size of the aircraft operation, the verifier will focus on the particularities and characteristics of these elements. In particular the risks associated with multiple locations for records and monitoring methodology and the large data sets have an impact on the time to be allocated. Elements specific to the AO (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. The time allocated is not a fixed number. If during the detailed verification the verifier finds that additional time is needed to properly carry out the necessary verification activities, the time allocation in the contract must be adjusted accordingly. The contract must have a provision for this adjustment. The method used to allocate time should be documented in a transparent way in the internal verification documentation to enable the NAB to assess this method during surveillance.

**Art. 9(2)  
AVR**

<sup>17</sup>The AO and the verifier may want to conclude a non-disclosure agreement to facilitate the exchange of documents during this phase.



### 3.2.2 Information provided by the AO

The AO must provide the verifier with sufficient information so that it can plan and carry out the verification. The AVR outlines which information needs to be submitted before the verifier can start with its strategic analysis and at other points of time during the verification. For more information please see section 3.2.2 of the Explanatory Guidance (EGD 1).

Art. 10(1)  
AVR

### 3.2.3 Strategic analysis

At the start of verification the verifier shall carry out a strategic analysis of all relevant activities of the AO. This analysis enables the verifier to understand the AO's activities and assess the likely nature, scale and complexity of the verification activities to be performed. It also provides input for the next verification step, i.e. the risk analysis. The objective of the strategic analysis is to obtain an understanding of the AO's business and accounting activities: as a minimum the elements in Article 11(3) of the AVR must be considered. For the verification of emissions and tonne-kilometre data different inputs are relevant. The examples in Annex IV give an indication of the possible factors and aviation specific inputs that could be relevant when considering these elements.

Art. 11  
AVR

Art. 11(3)  
AVR

To obtain an understanding of the elements mentioned in Article 11(3) of the AVR, the verifier shall collect and review the information mentioned in Article 10(1) and consider the applicable materiality level according to Article 23 of the AVR. The verifier should also look into the website of the company and other relevant information.

Art. 11(2)  
AVR

If the verifier has carried out the prior year(s) verifications for the same AO, the information from those earlier verification(s) must be considered by the verifier. Major deviations compared to previous verifications should attract particular attention from the verifier. Although the strategic analysis will take less time in a situation where, because of earlier verifications, the verifier is already familiar with the AO: this does not negate the verifier from carrying out that analysis for the present verification engagement.

As part of the strategic analysis the verifier shall check:

- whether the MP has been approved<sup>18</sup>;
- whether changes have occurred to the MP and whether these changes have been approved by the CA (if these changes to the MP are significant according to Article 15 of the MRR);
- if these changes are not significant or are temporary, whether these have been notified to the CA.

Art. 11(4)  
AVR

Section 6.5.1 of the MRR Guidance Document No.2 for AOs (GD2) explains what constitutes a significant change to the MP. During these checks the verifier assesses whether the MP is up to date and complete. If (part of) the MP is not approved or if significant changes to the MP have not been approved by the CA, the verifier directs the AO to the CA to rectify the situation. In principle the verifier should not continue the verification until such approval has been obtained. This is for example the case if a new fuel has been introduced or if there is a change between the Method A or B for calculating the fuel consumption.

---

<sup>18</sup>In some cases the CA MP approval decision may include certain specific requirements and conditions. The verifier must take that information into account when carrying out the strategic analysis.


However, in some cases the verifier may continue to carry out the verification activities so long as the AO is fully aware that some activities may need to be repeated based on the final response of the CA and also that the response could impact the opinion of the verifier as the verification progresses. Following approval by the CA, the AVR requires that the verifier continues, repeats or adapts the verification activities. The key guidance note on the scope of verification (KGN II.1) provides guidance on procedures to be followed when approval from the CA cannot be obtained.

**Art. 7(6)**  
**AVR**

### 3.2.4 Risk analysis

The verifier must assess the risks of misstatements and non-conformities and the likelihood of a material effect on the reported data. The outcome of the risk analysis determines how and to what extent the verification activities should be designed, planned and implemented. The risk analysis centres on identifying, assessing and quantifying two types of risks, i.e. inherent risks and control risks. Together with the detection risk, these risks form the overall verification risk: i.e. the risk that the verifier issues an inappropriate verification opinion. Please see the key guidance note on risk analysis for more information (KGN II.2). The risk analysis is an iterative process and must be changed if the detailed verification in the process analysis shows that the risks are higher or lower than initially assessed. In that case the verification plan also needs to be updated. This means that as the verification proceeds, verification activities may need to be continually adjusted to meet the requirements for achieving reasonable assurance.

**Art. 12**  
**AVR**

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 AO's risk analysis shall therefore focus not only on the inherent and control risks related to the annual emissions, but also make a separate analysis of the risks related to the tonne-kilometre data if the AO is applying for free allocation of emission allowances by submitting a tonne-kilometre report.	
---	---



### 3.2.5 Verification plan

The risk analysis determines how the verifier sets up the verification plan which consists of three elements:

- a verification programme<sup>19</sup> describing the nature and scope of the verification activities as well as the time and manner in which these activities are to be carried out. It involves also a planning of all activities;
- a test plan setting out the scope and methods of testing of control activities and procedures for control activities;
- a data sampling plan setting out the scope and methods of data sampling related to data points underlying the aggregated emissions, in order that the data can be tested for validity.

**Art. 13**  
**AVR**

The verification plan includes information on additional tests and samples to be taken. As part of the verification programme the verification plan includes:

- information on site visit(s) including a description of what activities will be performed on-

<sup>19</sup>The verification programme is not just an agenda for the site visit but should provide sufficient detail of planned tests and activities to inform the team members what activities should be carried out.

site and what activities off-site, as well as information on the systems and processes to be checked and interviews to be performed;

- the way the verifier plans to check the completeness of flights and aircraft.

Please see the key guidance note on risk analysis (KGN II.2) for information on how the risk analysis impacts on the set-up of the verification plan.

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.

### 3.2.6 Process analysis (detailed verification)

The objective of this stage in the verification is to collect and document detailed evidence upon which the verifier can base its verification opinion. During the process analysis the verifier must implement the verification plan<sup>20</sup> and carry out the activities listed in Article 14 of the AVR.

Art. 14  
AVR

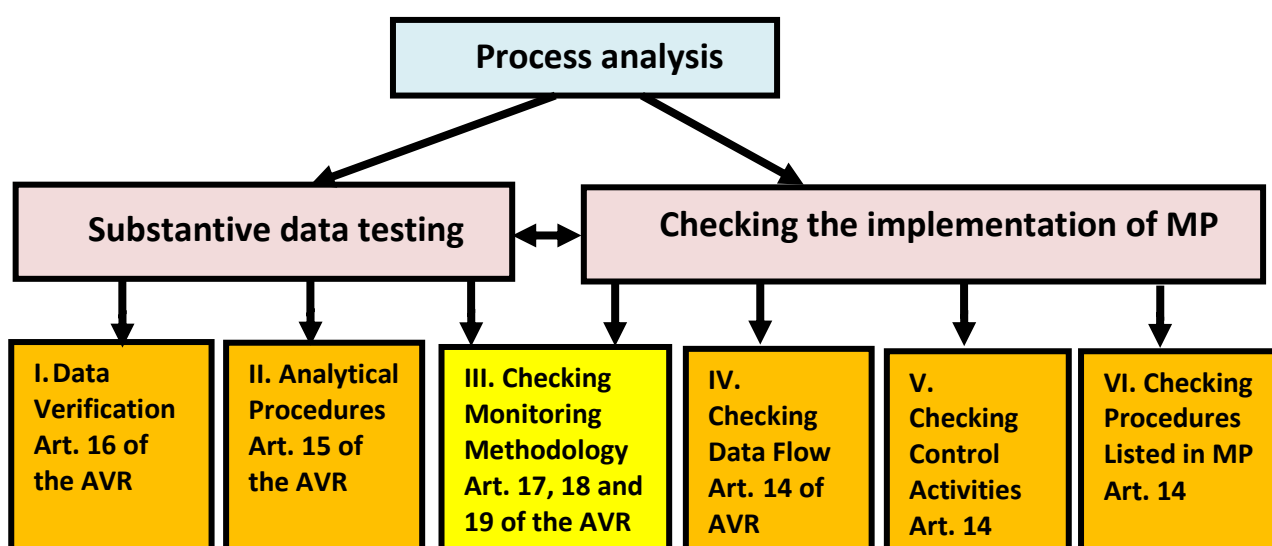


Figure 6: schematic diagram of activities in process analysis

Part of the process analysis is **substantive data testing**. This is detailed data testing and includes:

Activity	Explanation
I. Data verification	Data verification is carried out through applying several methods of testing such as tracing the data back to the primary data source, cross-checking with internal and external data sources, carrying out recalculation of parts of the overall emissions calculation to check certain subsets and elements (e.g. that factors are correctly calculated from source data).

Art. 16  
AVR

<sup>20</sup>The verifier will use standard auditing techniques of document review, interview, observation and corroboration as well as using data from external sources where relevant information is available. This includes walkthrough tests, sampling and analytical review as well as data review procedures.

Activity	Explanation
	<p>Data verification includes for example checking primary source data and comparing these sources to data in the central system<sup>21</sup>:</p> <ul style="list-style-type: none"> <li>▪ cross-checking fuel uplift data and density data with fuel slips;</li> <li>▪ checking the number of passengers, weight of freight and tare weight of containers;</li> <li>▪ checking data that are directly input into the system: e.g. type of flight, aerodrome pairs;</li> <li>▪ checking the completeness of ETS flights and making sure non-ETS flights are filtered out.</li> </ul> <p>Data verification includes also analysing data which means among other things:</p> <ul style="list-style-type: none"> <li>▪ analysis of data based on single flights in order to come to final emission data or tonne-kilometre data: e.g. average fuel density at single airports, minimum, average and maximum fuel consumption for individual aircraft types, analysis of discrepancies that cannot be satisfactorily explained by the AO;</li> <li>▪ checking how emissions determined by using a data gap approach relate to actual reported emissions;</li> <li>▪ cross-check between tonne-kilometre and emission report (assessing the emission per tonne-kilometre for all aerodrome pairs);</li> <li>▪ cross-check with the EUROCONTROL data from the EU ETS Support Facility and other EUROCONTROL data;</li> <li>▪ cross-check of fuel consumption (for all flights including non-ETS flights) with total fuel consumption from other sources;</li> <li>▪ cross-check distances for individual aerodrome with external sources;</li> <li>▪ cross-check between reported transport capacity with maximum payload;</li> <li>▪ plausibility check on mass of passengers and mass of freight, determining the average utilisation of single flight routes, checking passenger kilometres with external sources etc.).</li> </ul> <p>Data verification also involves the process of extraction of the 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.</p>
II. Analytical procedures	<p>Analytical procedures mean an analysis of fluctuation and trends in the data including an analysis of relationships that are inconsistent with other relevant information or that deviate from predicted amounts. This could involve for example comparisons of emissions from the same sources over a period of several years, analysing anticipated emission data, investigation of whether the reported figures can be confirmed by other analytical means.</p> <p>Analytical procedures include for example comparison of primary data sources with data in the central system: e.g.</p> <ul style="list-style-type: none"> <li>▪ aircraft data (leased and owned), aerodrome pairs, start and destination of flight, dates of flights;</li> <li>▪ comparison with technical log data (including unusual destinations and diverted flights);</li> <li>▪ comparison of data with technical log and flight plan to identify anomalies;</li> <li>▪ comparison with primary source data, ACARS or technical log, fuel uplift and</li> </ul>




**Art. 15  
AVR**

<sup>21</sup>The verifier also checks the central system itself, e.g. the management of the system, the person who is responsible for modifying the data, whether the data are locked and required IT standards are met.

Activity	Explanation
	density to check the fuel level for emissions.
III. Checking the correct application of the monitoring methodology	<p>Checking the correct application of the monitoring methodology involves for example using spread sheet assurance techniques, recalculating the reported data, or inserting different input data in the calculation spread sheet/ database to check its correct application (re-performance of data aggregation).</p> <p>It concerns for example checking whether:</p> <ul style="list-style-type: none"> <li>▪ the method to determine density as mentioned in the MP is applied correctly;</li> <li>▪ Method A or B has been applied correctly;</li> <li>▪ the APU has been taken into account;</li> <li>▪ the approach to data gaps is conservative and does not lead to material misstatements;</li> <li>▪ the method described in the approved MP to determine the distance, the mass of passengers, freight and mail has been applied correctly;</li> <li>▪ AIP data is used in the calculation of distance etc.</li> </ul>

**Art. 17  
AVR**

#### Checking implementation of the MP entails the following activities:

Activity	Explanation		
IV. Checking the data flow by tracing the reported data back to its primary source	<p>When checking the data flow and processes the verifier carries out interviews with persons responsible for elements of 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).</p> <table border="1"> <tr> <td>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 6 of this guidance).</td><td></td></tr> </table>	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 6 of this guidance).	
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 6 of this guidance).			
V. Checking that the control activities are appropriately documented, implemented, maintained and effective to mitigate the inherent risks	<p>Testing control activities is carried out through:</p> <ul style="list-style-type: none"> <li>▪ documentation review;</li> <li>▪ interviews with persons responsible for implementing and maintaining these control activities;</li> <li>▪ observing or inspecting (seeing how the persons responsible carry out the control activities).</li> </ul> <p>The verifier assesses the robustness of the control activities. This includes cross-checks and plausibility 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 the AO 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. For more information please see Chapter 4 of this guidance.</p>		

**Art. 14(a)  
AVR**

**Art. 14(b)  
AVR**

Activity	Explanation
VI. Checking the procedures listed in the MP	<p>The MRR requires the AO to implement procedures as mentioned in, for example, section 6.2 of the MRR Guidance Document No.2 for AOs (GD 2).</p> <p>The verifier must check that these procedures:</p> <ul style="list-style-type: none"> <li>▪ are present and properly documented and maintained;</li> <li>▪ reflect the information listed in the summary of the procedures in the approved MP;</li> <li>▪ have been correctly implemented and are up to date;</li> <li>▪ are applied throughout the year;</li> <li>▪ are effective to mitigate the inherent and control risks.</li> </ul>
VII. Checking the correct implementation of the monitoring methodology	The verifier must assess whether all elements in the MP have been correctly applied and whether the MP is up to date. This also includes checking supporting documentation such as information used to calculate the uncertainty assessment.

**Art. 14(c)  
AVR**

Figure 6 shows that substantive data testing and checking of the MP's implementation is interlinked (e.g. checking the monitoring methodology is part of both activities). More guidance on the different tests involved, their impact and clarification in the form of examples is provided in the key guidance note on process analysis (KGN II.3).

### **Sampling**

For the different checks under data verification and analytical procedures as well as the checks on control activities and procedures listed in the MP, sampling of the actual data related to emissions reporting and tonne-kilometre reporting can be applied provided that it is specific to the AO. The use of a sampling technique or method must be justified based on the risk analysis.

**Art. 20  
AVR**

A key element of sampling is that the selection is representative of the overall population set in terms of the factors/types of items<sup>22</sup> sampled and the time periods when samples are selected from across the reporting year<sup>23</sup>. The testing of control activities includes checks on whether the approved MP 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 information on how to test manual and automatic control activities please see Chapter 4 of this guidance. With respect to testing manual control activities the magnitude of the test depends on certain factors. Please see the key guidance note on sampling (KGN II.4).

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. 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.

<sup>22</sup> Data or control activities

<sup>23</sup> Statistical sampling may not always be possible.

More information on sampling is to be found in the key guidance note on sampling (KGN II.4) which explains:

- the principles of sampling;
- how the identification of a misstatement, error or a non-conformity may affect the sampling (e.g. adaptation of the sample size or part of the data population to be sampled);
- what factors play a role in the sampling technique and sample size (an explanation of Article 13(2) and (3) of the AVR);
- examples of different sampling methods.

### ***Assessing uncertainty and data gaps***

As part of checking the monitoring methodology the verifier checks the reasonableness of methods used to backfill for missing data as well as the validity of the information used to calculate the uncertainty levels as set out in the approved MP. Please see section 5.8 and 5.12 of this guidance.

**Art. 18, 19  
AVR**

### ***Other activities during the process analysis***

During the process analysis the verifier assesses the likely material impact that misstatements and non-conformities identified have on reported data (in relation to the overall declared emissions in the report subject to verification). It will then require the AO to correct them where possible (or justify where deemed not possible). Please see section 3.2.8 and 3.2.9 for more information. The process analysis is completed when all activities described in the verification plan (as updated) have been carried out.

### **3.2.7 Site visit**

The verifier must carry out site visits to the AO at one or more appropriate times during the verification. In general site visits are necessary to gather sufficient evidence to conclude with reasonable assurance that the AO's emission report is free from material misstatements. Activities during site visits include:

**Art. 21  
AVR**

- interviewing staff, reviewing documents and assessing AO's procedures in practice;
- checking the boundaries of the AO's activities and the data flow;
- actual testing of the control activities and assessing the application of procedures mentioned in the approved MP;
- obtaining physical evidence through assessment of monitoring systems and processes and reviewing relevant documentation and records.

The verifier's risk analysis is the determining factor in the selection, planning and organisation of site visit(s), basically determining the number of site visits to be conducted and the activities to be carried out during the site visit(s). If the risk analysis or the process analysis indicates questions or problems that can only be solved by a second or further visit, the verifier shall conduct such a visit to resolve the matter.

For EU ETS aviation the definition of site is provided in the AVR. Site visits for AOs 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, testing the control activities can also be

**Art. 3(13)  
AVR**

carried out by the verifier at the office where the relevant (electronic) databases and procedures for quality assurance and control activities are located.

Where the AO can demonstrate to the verifier that the AO has a sufficiently robust internal control system in place for the monitoring and reporting process, such that reliance can be placed upon that system, the verifier can take this into account in its risk analysis. If the verifier is confident from its risk analysis that the verification risk is sufficiently low, it can access the necessary databases and procedures remotely from the verifier's desk top. This includes the main cross-check with EUROCONTROL data on flights to assess the completeness of flights (see Chapter 5 and 6 of this guidance).

In those cases the relevant electronic databases, procedures and ETS Support Facility constitute the site and an actual physical visit to the AO to assess the data captured in these databases and procedures may not be necessary. This implies that aerodromes and aircraft do not have to be physically visited by the verifier if the AO can demonstrate that the AO has a sufficiently robust internal control system that mitigates the risks of misstatements or non-conformities to the level required for reasonable assurance. The justification for remotely accessing the databases and procedures must be recorded in the internal verification documentation and noted in the verification report.

For small emitters, guidance on site visits is given in Chapter 6 of this guidance.



### 3.2.8 Addressing misstatements and non-conformities

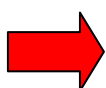
The verifier must inform the AO on a timely basis if it has identified misstatements and non-conformities.

Art. 22(1)  
AVR

Concepts and examples of misstatements and non-conformities	AVR requirement
<p>Misstatement means an omission, misrepresentation or error in the AO's reported data. It is important to note that uncertainty (including the permissible uncertainties related to meeting approved tier levels under the MRR) does not constitute a misstatement. Only known errors, omissions and misrepresentations constitute a misstatement.</p> <p>Errors may result from:</p> <ul style="list-style-type: none"> <li>▪ uncorrected bias in an instrument's measurement or in a measurement data set;</li> <li>▪ measurement instruments that are not installed properly or are not functioning correctly;</li> <li>▪ measurement instruments and systems that are not (properly) maintained or calibrated.</li> </ul> <p>Often it may be difficult to quantify the degree of misstatement associated with such items. For example, the deviation associated with a failure to carry out a scheduled calibration may only become apparent once the calibration is completed (i.e. the results of the calibration are known), and this may not be until after the verification report is required. In such a circumstance, the verifier may be uncertain of the degree of associated misstatement (if any) and will have to apply other information and its best judgement as to how to treat the issue. This might, for example, be based on knowledge of the instrument's</p>	Article 3(27)



Concepts and examples of misstatements and non-conformities	AVR requirement
previous history/typical performance (the results of previous calibrations indicating minimal adjustments are normally required), or that proportion of the AO's overall emissions affected is minimal, or that even the worse-case scenario constitutes a low risk to the verifier's final opinion statement.	
<p>Non-conformity means any act or omission of an act that is contrary to the requirements in the MP approved by the CA.</p> <p><b>Examples of non-conformities:</b></p> <p>The AO applies Method B to determine the fuel consumption whereas Method A is the approved monitoring methodology laid down in the MP; new fuels are not included in the MP; not applying the tier as listed in the MP; a change to the MP.</p> <p>If a non-conformity results in an error, misrepresentation or omission in the reported data, it shall also be regarded as a misstatement.</p>	Article 3(12)(a) (b)



The AO must **correct any identified** misstatement and non-conformity.

If the AO has corrected the misstatements and non-conformities, the verifier must include note of this in the internal verification documentation, marking the item as resolved.

If the AO has not corrected the misstatements and/or non-conformities before issuing the verification report, the verifier must assess the impact of the misstatements and/or non-conformities and their material effect on the reported data and report accordingly in both the internal verification documentation and the final verification report (see 3.2.13 of this guidance for more information).

### 3.2.9 Assessing the material effect of misstatements and non-conformities

Assessing the material effect of misstatements and non-conformities has a quantitative and qualitative aspect, and both have to be taken into account. The quantitative aspect depends on the size and nature of the misstatements and non-conformities and their impact on the reported data, and the user of that data, in particular the CA, whereas the qualitative aspect is determined by factors that can influence the user (e.g. particular circumstances, whether it concerns non-compliance).

Art. 22(3)  
AVR

For the quantitative aspect the materiality level plays an important role. The AVR prescribes the following materiality levels:

Art. 23  
AVR

Type of AO	Materiality level
AOs with annual emissions equal to or less than 500 Ktonnes of fossil CO <sub>2</sub>	5% of the total reported emissions in the reporting period subject to verification
AOs with annual emissions of more than 500 Ktonnes of fossil CO <sub>2</sub>	2% of the total reported emissions in the reporting period subject to verification
Tonne-kilometre reports for AOs	5% of the total reported tonne-kilometre data in the reporting period subject to verification

Errors, omissions and misrepresentations in the reported data compared to the actual data that have been established by the verifier have to be taken into account when assessing the material impact of misstatements and non-conformities on the reported data. The following method shows one way that a verifier can calculate whether the materiality level has been exceeded where the 'actual' value is known.

Item	Reported value	Verifier's value	Difference	Material?
Item 1	A	B	$A - B = C$	$C/Z \%$
Item 2	F	G	$F - G = H$	$H/Z \%$
<b>Total items</b>	<b>Z</b>	<b>X</b>	<b><math>Z - X = Y</math></b>	<b><math>Y/Z \%</math></b>

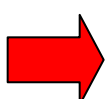
Where the difference between the reported value and the verifier's value is negative, this indicates that the reported value is **understated**; where the difference is positive, this indicates that the reported value is **overstated**. Then, the total difference in value of all items is determined by summation of the individual items, i.e. taking the positive and negative values into account. These positive/negative values need to be taken together into the % calculation to ensure that the total aggregate of the differences is accounted for properly, and the final figure is used by the verifier to assess whether the aggregate of errors and differences is a material over- or under-statement.

A material overstatement of emissions will result in a situation that the AO surrenders more allowances than it needs to. But more important is a material understatement which could lead to an AO surrendering too few allowances.

The example above shows that first the net total difference is to be found which can then be compared against the relevant materiality threshold for the AO concerned. Therefore, it may be that in absolute terms for an individual source stream the difference between a reported and verifier value may be above the relevant materiality threshold, but that taken together with other misstatements, the balance may be below the threshold value. However, this should not be seen as an excuse for leniency. The verifier will continue to look at each individual item and assess the relevance of the difference value for that item with respect to the materiality threshold of that aircraft and source stream<sup>24</sup>.

The quantitative aspect and thus the materiality level alone is not the only factor when assessing whether or not a misstatement or non-conformity has material effect. The qualitative aspect must also be considered. The key question for assessing the qualitative aspect is whether a misstatement or non-conformity (individually or combined) could influence the decision of the CA. This will depend on the size and nature of misstatements and non-conformities as well as on the particular circumstances of their occurrence.

Art. 22(3)  
AVR

 It is important to note that misstatements and non-conformities can have a material effect on the reported data even if the materiality level is not exceeded. This means the verifier needs to consider whether misstatements in particular items of lesser amounts than the materiality threshold could be reasonably expected to influence the decision of the CA and have to be considered as material misstatements given their size, nature and particular circumstances.

<sup>24</sup>It must be noted that the materiality threshold is not an allowed margin for error. Any correctable misstatement or nonconformity identified during the verification process needs to be corrected by the AO.

Factors that can be relevant in determining whether or not a misstatement or non-conformity has a material effect can be the following:

- can the misstatements or non-conformities be corrected;
- does the AO refuse to correct the misstatement or non-conformity identified;
- what is the likelihood of the misstatement or non-conformity reoccurring: e.g. applying Method A in practice while the MP states that Method B should be applied;
- what is the duration of a misstatement or non-conformity: e.g. a systematic underestimation of emissions or a non-conformity in the quality assurance and control procedures that has not been addressed for several years by the AO and has therefore grown into a misstatement or non-conformity that is no longer acceptable to the verifier because of its potential impact on the emissions data;
- are misstatements and non-conformities the result of an act with or without intent;
- does the issue concern non-compliance with the MRR?

### **3.2.10 Concluding on the findings of the verification**

When completing the verification and considering all evidence gathered during the verification the verifier is required to carry out the activities listed in Article 24 of the AVR. A key aspect of this step is that the verifier has to ensure that it has gathered sufficient evidence to support the verification opinion statement.

**Art. 24  
AVR**

Sufficiency of evidence is influenced by the risk of the AO's report being materially misstated: the greater the risk of a material misstatement, the more detailed verification activities and the more evidence is likely to be required. In addition, the quality of the evidence also plays a role (the better the quality of the evidence, the less important the quantity of the evidence is likely to become). However, merely obtaining more evidence may not always compensate for its poor quality<sup>25</sup>.

The reliability of evidence is influenced by its source and by its nature, and is dependent on the individual circumstances under which it is obtained. For example:

- if evidence is obtained from external, independent and knowledgeable sources (e.g. EUROCONTROL data), it could be more reliable than internal sources within the AO's own company.
- evidence that is generated internally is more reliable when the related control activities are effective or if the verification team has directly obtained the evidence (e.g. observing how the AO has carried out a manual cross-check on the data instead of inquiring whether the AO has carried out such a control).

The verifier generally obtains more assurance from consistent evidence obtained from different sources or from evidence of a different nature than from items of evidence considered individually. When evidence obtained from one source is inconsistent with that obtained from another, the verifier will determine what additional verification activities are necessary to resolve the inconsistency.

If the verifier concludes that sufficient evidence cannot be gathered to support the verification opinion statement and it cannot verify the AO's report as satisfactory, it must

---

<sup>25</sup>ISO 14066:2011: Greenhouse gases: Competence requirements for greenhouse gas validation teams and verification teams, Annex A.

record this in the verification report (for information on what to record see section 3.2.13 and the key guidance note on verification report KGN II.6).

### 3.2.11 Independent review

Before the issuing of the verification report, the internal verification documentation and the verification report must be subject to an independent review. The objective of this review is to provide:

**Art. 25  
AVR**

- a quality review function and to look for technical errors or omissions;
- a final check that due professional care and judgement has been applied in the verification process, e.g. that the scope of work is consistent with the AO's activities and to achieve a reasonable level of assurance;
- a final check to confirm that the verification team has carried out the verification in line with the AVR and that the procedures for the verification activities have been correctly applied;
- an assessment of whether the evidence gathered is sufficient to support the opinion stated in the verification report;
- confirmation that all evidence, decisions and their justification have been properly recorded in the internal verification documentation;
- a proof reading function, e.g. to correct simple errors, typographical mistakes and omissions.

If an independent reviewer has identified errors or concludes that insufficient evidence has been gathered, the Lead Auditor needs to correct these and obtain the missing evidence or corroboration. Changes that the verifier makes in the verification report as a result of the independent review must also be reviewed by the independent reviewer, along with the underlying evidence. The independent review must cover all the steps in the verification process.

**Art. 25(4)  
AVR**

An important requirement is that the independent reviewer must not have carried out verification activities that are subject to his review. This means that the independent reviewer shall not be part of the verification team or be involved in any of the verification activities for that particular AO. Chapter 5 of this guidance and section 7 of the key guidance note on competence (KGN II.7) provide information on the required competence for an independent reviewer.

**Art. 25(2)  
AVR**

### 3.2.12 Internal verification documentation

The verifier must compile internal verification documentation to provide a complete trail of evaluation and decisions that enabled the verifier to reach its verification opinion with reasonable assurance. Annex II contains a list of minimum elements to be included in the internal verification documentation.

**Art. 26  
AVR**

The internal verification documentation needs to be transparent and must be drafted in such a manner that the independent reviewer and the NAB can assess whether the verification has been performed in line with the AVR. They have to be able to follow the completed document and data trail and assess the critical decisions and issues that occurred during the verification process. 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).

It is the NAB's responsibility to assess the verifier's internal verification documentation as part of its assessment of the verifier.


In addition to this, the CA may request that the verifier provides access to its internal verification documentation. However, Article 26(3) of the AVR is not a requirement for the CA. The main responsibility for checking the internal verification documentation lies with the NAB.

**Art. 26(3)  
AVR**

### 3.2.13 Verification report

The verifier shall issue a final verification report to the AO for onwards reporting to the relevant CA. Article 27 of the AVR contains requirements on the content of the verification report which are explained in the key guidance note on the verification report (KGN II.6) in relation to the associated template that has been developed by the Commission services. A template covering both emissions and tonne-kilometre data has been developed.

**Art. 27  
AVR**

There shall be a verification report for the annual emissions report and a separate verification report for the tonne-kilometre report. 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 AO will subsequently submit to the CA of the administering Member State the final emission report and tonne-kilometre report (in the case of the AOs applying for free allowances related to a monitoring year) accompanied with the respective verification report(s).	
---	--

Two types of verification opinion statements are possible (verified as satisfactory and verified as not satisfactory), with various justifications. Each of those statements and justifications have their own impact and characteristics.

**Art. 27(1)  
AVR**

AVR requirement	Clarification
The AO's report is free from material misstatement and thus <b>verified as satisfactory</b>	<p>The AO's report can still contain an indication of remaining (i.e. unresolved, at the time of reporting):</p> <ul style="list-style-type: none"> <li>▪ non-material misstatements</li> <li>▪ non-conformities that have no material effect on the reported data</li> <li>▪ recommendations for improvement(s) to the AO's monitoring methodology</li> </ul> <p>If this is the case these must be reported in the verification report and addressed (see section 3.3)</p>
The AO's report contains material misstatements that were not corrected before issuing the verification report The AO's report is <b>verified as not satisfactory</b>	See section 3.2.9 and section 3.3

**Art. 27(1)  
(a) AVR**

**Art. 27(1)  
(b) AVR**

AVR requirement	Clarification
<p>Scope of verification is too limited</p> <p>The AO's report is <b>verified as not satisfactory</b></p>	<p>A limitation of scope of verification may arise from the following situations (Article 28 of the AVR):</p> <ul style="list-style-type: none"> <li>▪ data is missing that prevents a verifier from obtaining the evidence required to reduce the verification risk to the level needed to obtain reasonable level of assurance, e.g. some or all primary source data is missing and data is only available at an aggregated level</li> <li>▪ the MP is not approved by the CA, thus not providing a proper reference document for the verifier to check the report against</li> <li>▪ the MP does not provide sufficient scope or clarity to conclude on the verification, e.g. parts of the monitoring methodology are not properly described in the MP</li> <li>▪ the AO has failed to make sufficient information available to enable the verifier to carry out the verification: e.g. the AO has not provided the verifier with: <ul style="list-style-type: none"> <li>– the latest version of the MP</li> <li>– primary source data needed to check the accuracy of the reported data such as requested fuel invoices, or results of on-board measurements</li> <li>– information on on-board measurement instruments or measurement equipment used to weigh freight and mail and the quality assurance thereof (manufacturer's information, maintenance records, relevant service level agreements)</li> </ul> </li> </ul>
<p>Non-conformities individually or combined with other non-conformities provide insufficient clarity and prevent the verifier from stating with reasonable assurance that the AO's report is free from material misstatements</p> <p>The AO's report is <b>verified as not satisfactory</b></p>	<p>Usually when non-conformities are found during the verification process, it affects the risk analysis and the planned verification activities. In particular, if these non-conformities increase the risk of misstatements creating uncertainty over the accuracy of the data, the verification activities must be more detailed and further tests and checks will be required to achieve more assurance and confidence in the data.</p> <p>If for example inadequate control activities have been implemented (e.g. no procedures ensuring completeness of flights or filtering out non-ETS flights, no proper IT interface that is used to aggregate the data, ACARS is not functioning properly), the verifier will undertake more substantive testing to assess the accuracy of the data. However further testing will not always provide the verifier with sufficient confidence in the data.</p> <p>In some case these non-conformities (individually or combined with other non-conformities) provide too much uncertainty for the verifier to positively state with reasonable assurance that the AO's report is free from material misstatements. This could for example happen if the APU is systematically not included or control activities to ensure that the overall uncertainty threshold is not exceeded, have not been implemented (e.g. performing cross-checks between fuel slips and fuel measured), the non-conformity is repeatedly not corrected and the accurate data cannot be traced back by other means thereby causing the verifier to be uncertain whether the reported data is free from material misstatements.</p>


**Art. 27(1)  
(c) AVR**

**Art. 27(1)  
(d) AVR**

### 3.3 Addressing outstanding issues in the verification report

Outstanding misstatements, non-conformities and non-compliance with the MRR and recommendations for improvement that have been listed in the verification report, have to be addressed by the AO. Several situations can apply:

**Art. 69  
and 70  
MRR**

Type of outstanding issues	How to address	
The verification report contains no indication of remaining misstatements, non-conformities, non-compliance with the MRR or recommendations of improvement	No action required	
The verification report contains non-material misstatements related to an AO's emission report	The CA shall assess those misstatements and make a conservative estimate of the emissions of the AO when it considers that such an estimation is appropriate <sup>26</sup> . The CA shall inform the AO whether and which adjustments are required to the AO's emission report. The AO shall make that information available to the verifier.	
The verification report includes stated non-conformities that do not lead to a non-satisfactory emission report	<p>The AO has to submit to the CA a report by 30 June which must describe how and when the AO plans to correct non-conformities identified by the verifier. The CA must approve that improvement report.</p> <p>The verifier shall assess during the next verification whether these non-conformities have been corrected. If these have not been corrected, the verifier must consider whether this increases or may increase the risk of misstatements. This in turn will affect the planning of the verification and the detail of the verification activities (e.g. the need for further testing). During the verification process the verifier will instruct the AO to correct these non-conformities. If the AO still does not correct the non-conformities, this will be one of the factors to take into account when assessing the materiality of misstatements and non-conformities found during the verification. Continued non-correction may lead to minor issues being escalated to material issues in subsequent verification cycles.</p>	
	Small emitters are also required to submit an improvement report.	
The verification report includes stated non-compliance issues	<ul style="list-style-type: none"> <li>If the non-compliance has led to a non-material misstatement in the emission report, the CA shall evaluate the misstatement and where appropriate, make a conservative estimation of the emission data. The CA will enter this data in the registry according to Article 32(6) of the</li> </ul>	


**Art. 70(2)  
MRR**

**Art. 69(4)  
MRR**

**Art. 29  
AVR**

**Art. 70(2)  
MRR**

<sup>26</sup>This does not mean that the emission report is not satisfactory. A satisfactory report can still contain non-material misstatements provided that these are reported in the verification report (see key guidance note on verification report (KGN II.6). Reportable emissions are in that case the verified emission data, while the outstanding uncorrected non-material misstatements are reported separately in the verification report. However in such a situation the CA is entitled to make a conservative estimation according to Article 70(2) of the MRR.

Type of outstanding issues	How to address		
concerning the MRR	<p>Registry Regulation</p> <ul style="list-style-type: none"> <li>▪ If the non-compliance has led to a material misstatement in the emission report, the CA shall make a conservative estimation of the emission data according to Article 70(1) of the MRR, and enter the corrected data in the registry according to Article 32(6) of the Registry Regulation</li> <li>▪ If the non-compliance does not lead to a misstatement, the CA may request that the AO changes the MP, or consider taking enforcement action</li> </ul>		Art. 70(1) MRR
The verification report states that the AO's emission report cannot be verified as satisfactory	<ul style="list-style-type: none"> <li>▪ The CA shall make a conservative estimation of the emission data according and enter the estimated data in the registry according to Article 32(6) of the Registry Regulation</li> <li>▪ The verifier shall not enter nor approve the emission figure in the Registry</li> </ul>		Art. 70(1) MRR
The verification report includes recommendations for improvement	<p>The AO has to submit to the CA a report by 30 June which must describe how and when the AO has rectified or plans to address the recommendations for improvement identified by the verifier<sup>27</sup>.</p> <p>Recommendations for improvement can cover a whole range of topics. It not only includes suggested improvements to the AO's risk assessment, data flow, control activities and procedures but it could also involve recommendations concerning monitoring and reporting emissions such as:</p> <ul style="list-style-type: none"> <li>▪ recommendations to improve the accuracy of determining the emission factor for mixed fuels containing biomass</li> <li>▪ where a verifier considers that the procedures and methods for completing data gaps can be improved</li> <li>▪ recommendation to determine the actual density instead of applying a standard density factor</li> <li>▪ recommendations to improve the procedures to ensure completeness or aircrafts and flights</li> <li>▪ recommendations to improve procedures on cross-checks between fuel uplift quantities from invoices and fuel uplift from on-board measurement instruments</li> <li>▪ recommendations to improve procedures ensuring the uncertainty of measurements comply with the applied tier.</li> </ul> <p>In the following verification year the verifier shall check whether the AO has implemented those recommendations for improvement and the manner in which this has been done. If those recommendations have not been implemented the verifier must consider whether this increases or may increase the risk of misstatements and non-conformities. This in turn will affect the planning of the verification and the detail of the verification activities (e.g. further testing).</p>		Art. 69(4) MRR
	Small emitters are also required to submit an improvement report.		

<sup>27</sup> However, whilst the verifier should identify weaknesses in control activities as part of the recommendations and inform the operator why it is considered a weakness, the verifier shall not communicate in any way how the AO should resolve the weakness, as that would place the verifier in a consultancy role, presenting a conflict of interests and compromising its independence.



## 4 How to assess the risks in the AO's 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 AO. More specific information can be found in the Chapters 5, 6 (for small emitters) and 7 of this guidance.

### 4.1 Data flow activities

The AO must establish, document, implement and maintain effective data flow activities. Data flow activities concern all operational activities that are necessary to produce an emissions report or 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 or tonne-kilometre report.

**Art. 57  
MRR**

Primary data can come from many different sources and can arise at different points of time involving different departments in the AO's organisation and management structure. Data may be created centrally (allocation of flight types at flight planning) and in a decentralised 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 AOs 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 the 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 MP. Please see section 6.2 of the MRR Guidance Document No. 2 for AOs (GD 2).

### 4.2 Verification of the data flow

The verifier has to assess whether the data flow as described in the MP 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. The verifier traces the data back to the primary sources, checks the existence, consistency and validity of these primary source data, follows each step in the data flow and checks the activities related to that step in the data flow (e.g. what is done, when it is done, which data it concerns, the inputs and outputs etc.). In addition, the verifier will check which persons are responsible for

**Art. 14(a)  
AVR**

specific data flow activities. An important aspect which the verifier shall take into account when assessing the inherent risks related to the data flow activities, is whether these persons are accustomed and competent to deal with these specific data flow activities. In general AOs 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 AOs that 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 and the consistency and validity of the output (see Chapter 6 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 MRR Guidance document No. 6 on data flow activities and control system (GD 6).

#### 4.3 Control activities

An AO must avoid misstatements in the reported data and mitigate the risks related to the data flow 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 MP and the MRR, the AO has to establish, document, implement and maintain a sufficiently robust control system. A control system consists of two components: the AO's risk assessment and the AO's control activities.

**Art. 58  
MRR**

An AO's risk assessment is an assessment of its inherent risks<sup>28</sup> and control risks<sup>29</sup>. The outcome of the risk assessment determines which and how the control activities need to be set up to mitigate the inherent risks related to the data flow. These control activities include at least the following activities:

**Art. 58(2)  
MRR**

- quality assurance of the measurement equipment and information technology;
- internal reviews of reported data;
- control of outsourced processes;
- corrections and corrective actions;
- records and documentation (as well as document retention);

---

<sup>28</sup>Inherent risks means the susceptibility of a parameter in the operator's or AO's report to misstatements that could be material, individually or when aggregated with other misstatements, before taking into consideration the effect of any related control activities (Art. 3(15) of the AVR). These are risks related to the data flow activities without taking into account the effect of control activities.

<sup>29</sup>Control risks means the susceptibility of a parameter in the operator's or AO's report to misstatements that could be material, individually or when aggregated with other misstatements, and that will not be prevented or detected and corrected on a timely basis by the control system (Art. 3(16) AVR). These are risks that the control system is not functioning properly.

- segregation of duties;
- management of the necessary competences for the responsibilities assigned.

#### 4.4 Verification of control activities

The verifier is required to assess whether the approved MP is implemented correctly and whether this is up to date. To this end the verifier must assess the AO's risk assessment and inform the AO if it has failed to identify the relevant inherent risks and control risks properly. Please see the key guidance note on the verifier's risk analysis (KGN II.2).

**Art. 12(3)**  
**AVR**

The verifier must also carry out its own assessment and test the control activities, based on the verifier's analysis of the inherent and control risks involved. Assessing the control activities not only concerns assessing the establishment of control activities, e.g. identifying the persons assigned to be responsible for data flow activities and carrying out systematic cross-checks (vertical and horizontal checks, access controls, release checks etc.). It also involves an assessment of the AO's documentation, implementation and maintenance of these control activities including appropriate succession or planning of replacement to accommodate situations when personnel change jobs or 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:

**Art. 14(b)**  
**AVR**

- 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?
- Are the outcomes of the execution of control activities documented?

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 consists of looking at a process or procedure being performed by the AO. Observation provides evidence about the performance of a process or procedure, but is limited to the point in time at which the observation takes place, and by the fact that the act of being observed may affect how the process or procedure is performed;
- Inspection to determine whether, when and how manual controls are being performed. It involves:
  - Examining records or documents, whether internal or external, in paper form, electronic form, or other media, for example, manufacturer's specifications or service level agreements. Inspection of records and documents provides evidence of varying degrees of reliability depending on their nature and source and, in the case of internal records and documents, on the effectiveness of the controls over their production. Examples are written explanations, manuals detailing information on collection procedures and internal control activities, reports prepared by management, indications of follow-up documentation; or

- Physical examination of, for example, a measurement equipment.
- Re-performance testing is generally used when a combination of inquiry, observation and inspection of evidence does not provide sufficient or appropriate evidence that a control activity is operating effectively. In the case of re-performance, the verifier carries out the control activity itself to assess its effectiveness (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..

The following 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 5 and 7 of this guidance.

### ***Testing of quality assurance of the measurement equipment***

Article 59(1) of the MRR requires the AO to ensure that all relevant measurement equipment is calibrated, adjusted and checked at regular intervals. However, in most cases calibration will not be possible or applied by AOs to on-board measurement instruments used to determine the fuel consumption and density. In this case the verifier should check the manufacturer's specifications and if relevant maintenance plans and routine aircraft maintenance procedures<sup>30</sup>. Where calibration is applied the verifier may decide, based on its risk analysis, to check the calibration certificates or accredited testing supplier information. The main objective is to check whether the AO has 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 AO 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.

**Art. 59(1)  
MRR**

In situations where measurement equipment is used to weigh the mass of freight and mail, the AO often does not calibrate the measurement equipment itself. 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 current certificates), 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

---

<sup>30</sup>In cases where calibration is not possible or applied, the AO should use alternative control activities to ensure that the measurement instruments are functioning properly (see section 5.9 of this guidance).

equipment. AOs 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 handling data for aviation emissions or tonne-kilometre reporting. Assessment of IT related risks is therefore relevant during the risk analysis. An IT system is more than just hardware and software, it also includes the IT environment/ organisation, the 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), the risk that control measures only see part of the processes, not the whole process, and computer system failures resulting in a failure to collect data from automated monitoring equipment during the time of system failure.
- Risk in IT applications relate to malfunctioning of IT applications, lack of back-up procedures, lack of input controls, process controls and output controls (in particular where updates or new software are rolled out), and potential software coding or scripting errors that could lead to misstatements.
- Risks related to IT infrastructure include the vulnerability to interference and breaches of information security which may lead to increased risk in the collation, transfer, processing, analysis, aggregation, storage and reporting of data.
- Other risks are related to human errors in the computer information system e.g. overwriting a spread-sheet containing last month's data with this month's data before backing up the data.

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/IEC 20000<sup>31</sup>. In addition verifiers will also consider the proper use of calculation formulae and access controls, the possibility of recovering data, continuity planning and security with respect to IT.

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 avoid, among other things, double counting;
- the completeness of data;
- the continuity of the data to avoid data being lost and to ensure traceability of data;
- access rights: i.e. who has the right to access and modify data;
- the integrity of data: i.e. data are not modified unauthorized.

These measures could include a manual check on whether the IT system is functioning and whether the aforementioned points are met. It will include 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.

---

<sup>31</sup> ISO /IEC 20000.1:2011 - Information Technology—Service Management—Part 1: Specification and ISO /IEC 20000.2 2012 Information Technology—Service Management—Part 2 – Code of Practice.

### ***Testing of internal review of data and correction of data***

The AO must 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 MRR Guidance Document No. 6 Data flow activities and control system (GD 6).

**Art. 62  
MRR**

Basically two types of control activities performed by the AO 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. data entry 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 errors identified in the data. This can include testing of the cross-checks and plausibility checks by for instance having the AO carry out these review checks or by 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 and that clear criteria for rejecting data have been documented. Examples of such proof are visible sign-offs after review, approvals by email 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 the case of outsourced processes the AO still remains responsible for the data resulting in the emission report and tonne-kilometre report and has to control the quality of these processes.

**Art. 64  
MRR**

The verifier has to check to what extent a certain data flow activity has been outsourced. Moreover it has to test the control activities that the AO 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 AO ensures that his service providers carry out their activities according to the service level agreement etc.

### ***Corrections and corrective action***

If any part of the data flow activities or control activities is found not to function effectively or is outside boundaries that are set in the procedures for data flow activities or control activities, the AO must make appropriate corrections and correct rejected data.

**Art. 63  
MRR**

The verifier checks for example whether:

- corrective action is indeed taken in those situations and that the emissions are not underestimated;
- effective control activities have been implemented to prevent data flow activities and control activities from not functioning properly or functioning outside the boundaries set in procedures;

- the criteria in the procedures for data flow activities and control activities are addressed and met by the AO, and whether the details of these procedures are effective to avoid malfunctions;
- the AO has notified the CA of any equipment failure during the reporting period, and that efforts were made to correct the failure as promptly as possible.

### ***Records and documentation***

The verifier checks whether and how information on the monitoring methodology, primary data, data flow activities, control activities and procedures are documented and whether the document management system to retain the information is effective. The AO must store information required for the verification of emissions and tonne-kilometre reports for at least 10 years after the date that the relevant verified emissions report or tonne-kilometre report is submitted to the CA. Annex IX of the MRR contains a non-exhaustive list of what data needs to be stored for 10 years.

**Art. 66  
MRR**

**Annex IX  
MRR**

Most AOs are only used to retaining primary source data such as fuel slips and flights plans for a couple of months or years. An AO 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 AO implements the control measures mentioned under the paragraph above relating to testing IT systems. In all cases the AO 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 systems remain accessible as IT system design evolves (in the last 10 years systems have shifted from floppy discs to CDs, DVDs, memory sticks and solid state hard drives. It is therefore important to ensure that the AO retains capacity to read stored data in old systems). 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 CA of the administering Member State should be asked by the AO whether retaining primary source data electronically (e.g. scans) in the IT system is acceptable and whether additional requirements apply.

### ***Segregation of duties***

The verifier checks whether the persons responsible for the data flow activities and control activities are competent and do not perform conflicting duties (e.g. the responsibilities for recording, processing and reporting are carried out by different persons). The verifier checks how the AO manages the competencies for the persons responsible for the data flows and

**Art. 61  
MRR**

control activities, and the verifier takes that into account when assessing the inherent and control risks.

#### **4.5 Procedures mentioned in the approved MP**

The MRR requires several elements to be put into written procedures. The objective of these procedures is to ensure that the control activities are effective and to mitigate the risks that ineffective control activities lead to misstatements and non-conformities. A summary of these procedures must be listed in the approved MP. Examples of such procedures are mentioned in section 6.2 of the MRR Guidance No.2 on AOs (GD 2).

**Art. 12  
MRR**

The verifier must check that these procedures:

- are present and properly documented and retained;
- reflect the information listed in the summary of the procedures in the approved MP<sup>32</sup>;
- have been correctly implemented and are up to date;
- are applied throughout the year;
- are effective to mitigate the inherent and control risks.

**Art. 14(c)  
AVR**

The specifics related to the verification of some of these procedures are explained in Chapters 5 and 7 of this guidance.

If the verifier considers that the procedures are inadequate, the weaknesses of these procedures should be clearly described and noted in the verification report in order that the AO can make improvements. If improper procedures lead to misstatements or if the verifier comes across a procedure that is not in line with the MRR, this should be reported in the verification report (please see the key guidance note on the scope of verification (KGN II.1)).

#### **4.6 Evaluation of the control system**

The AO must monitor the effectiveness of the control system by for example carrying out internal audits using an internal auditor that is not involved in the data gathering, monitoring and reporting process, and by taking into account the findings of the verifier. The verifier is responsible for assessing the quality of these internal audits and evaluation processes, and whether these processes are properly documented and also that findings related to these procedures from prior verifications have been followed up.

**Art. 58(4)  
MRR**

---

<sup>32</sup> For information on the content of these procedures please see the MRR Guidance Document for AOs No.2 (GD 2).



## 5 Aviation specific requirements in the verification of the 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 MP and the emissions report. Please note that this is not a complete list of issues: the verifier needs to check whether additional requirements apply regarding the administering Member State concerned.

### 5.1 How to identify AO?

AOs are required to fill in data on the identification of the AO (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 AO and which flights fall under the responsibility of that particular AO. If the ICAO designator is not available, the registration numbers of relevant aircraft are required, and these take on added significance. Most AOs 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 AO;
- The information in the EUROCONTROL ETS Support Facility is based on the fleet list details supplied by AOs. For a particular AO these details could be out of date;
- An aircraft registration can be shown on more than one MP and report, since the aircraft concerned may be operated by a number of AOs 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 AO cannot be determined by the ICAO designator or the registration markings, the owner of the aircraft shall be regarded as the AO unless it is proved to the satisfaction of the CA who is the responsible AO.

#### ***What is to be done if a verifier identifies two ICAO designators for one AO?***

Only in exceptional cases where the CA has explicitly approved this, can more than one ICAO designator be used<sup>33</sup>. AOs are not allowed to add ICAO designators from sister or daughter companies which because of their own ICAO designators are AO in their own right. In other cases the verifier shall direct the AO to the CA of the administering Member State.

#### ***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 AO, it has no

---

<sup>33</sup> See MRR Guidance document No.2 on AOs (GD.2).

Art. 50(3)  
MRR

Art. 50(4)  
MRR

bearing on identifying the AO. 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 AO 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 AO, the flight should be allocated to the owner of the aircraft unless it has been proved to the satisfaction of the CA who was the responsible AO for that flight. 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 aircraft (either dry or wet leased) can lead to risks (i.e. not including ETS flights that fall under the responsibility of the AO or including flights that do not). The AO that is responsible for a particular flight has to ensure that the data related to that flight is accounted for in its AO 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 AO has in place to ensure accurate data is transferred (e.g. leasing agreements, cross-checks on manual input of collected data in internal systems, electronic interface if IT systems are used etc.). To ensure reproducibility of the determination of the emissions by verifiers or the CA, the AO shall ensure that data on the leased aircraft is documented.

### **5.2 How to check (additional) aircraft types?**

The AO must submit to the CA details for each aircraft used during the reporting year for which the AO 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 AO'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 the number of aircraft in the MP and the number of aircraft in the emission report***

In practice the list outlined in the emission report will not correspond to the number of aircraft submitted in the MP, since the latter number only concerns aircraft that were operated at the time of submission of the MP. The verifier does not have to check consistency between the MP 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 MP 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<sup>34</sup>. If the verifier has decided to check the consistency between the MP and the emission report and identified discrepancies, and these are not corrected by the time the verification report is issued, the verifier must report this in the verification report.

---

<sup>34</sup>Changes to the number of aircraft in the MP must be notified to the CA. The CA may allow the AO to notify these non-significant changes by 31 December of each year (Article 15(1) of the MRR).

### ***Checking of additional aircraft types***

The AO must provide an indicative list of additional aircraft types that the AO expects to operate and for which it will be the AO. This list is indicative. Discrepancies between actual data on aircraft types used and the data listed in the MP should in general not lead to non-conformities in the verification process<sup>35</sup>.

### ***Checking the application of the monitoring methodology for additional aircraft type***

The verifier is responsible for checking whether the monitoring methodology described in the approved MP for different aircraft types has been correctly applied for additional and anticipated aircraft.

### ***Checking the completeness of emission sources (aircraft)***

The AO is required to ensure completeness of the aircraft listed. The verifier shall check whether the procedure for tracking completeness of aircraft as described in the MP reflects the information required. This includes responsibilities for tracking completeness, systems used, control activities implemented, etc.. Furthermore the procedures must be implemented, documented and up to date. See section 4.5 of this guidance for information on how the verifier checks these procedures.

**Art. 14(c)  
AVR**

EUROCONTROL data should be used to corroborate the data on aircraft subject to the AO explaining discrepancies. This can be done by using the EU ETS Support Facility assuming access is authorised. The verifier shall test the control activities that are implemented by the AO to ensure completeness of aircraft (e.g. by testing how the AO checks the completeness, by testing IT controls, by testing the way data from leased-in or leased-out aircraft are input in the internal systems of the AO etc.).

## **5.3 How to check completeness of flights?**

The AO must submit the total number of flights over the reporting year as well as the aggregated emissions from ETS flights falling under the responsibility of the AO (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).

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 AO's traffic from EUROCONTROL. This means that the verifier has to request the AO to provide access to EUROCONTROL data to allow a cross-check of the data. The verifier needs to be mindful that EUROCONTROL and EU ETS data may not always be a perfect match, e.g. because Central Route Charges Office (CRCO) data may not be totally aligned with exempted flights under Annex I of the EU ETS Directive or because the geographical scope of EUROCONTROL may not be fully consistent with the geographical scope of EU ETS. The verifier also needs to check the procedures and control activities that the AO has in place to ensure completeness of flights.

**Art. 16(1)  
(c) AVR**

The cross-check performed by the verifier with EUROCONTROL data shall only be used to identify discrepancies bearing in mind that EUROCONTROL data may not always be complete. In case of discrepancies the verifier shall ask the AO the reason for these

---

<sup>35</sup>See MRR Guidance document No.2 on AOs (GD.2).

discrepancies and assess whether the reason is plausible. The verifier may ask the AO to submit these reasons in the emission report. If the reason for the discrepancy is not plausible or if the AO cannot give a satisfactory explanation and the reported data is not correct, the reported data needs to be adjusted.

#### ***Access to the EUROCONTROL data and EUROCONTROL Support Facility***

The AO 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:

- the fuel estimator based on a 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 - SET)<sup>36</sup>.
- the ETS Support Facility which is a far more comprehensive system that includes the above mentioned fuel estimator (SET) but provides the user also with a complete set of traffic record details per individual AO derived from the EUROCONTROL data bases and State Sources. As the data on distance, time flown 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<sup>37</sup>. This ETS Support Facility includes a Great Circle Distance tool (GCD tool) providing airport city pair values based on Airport locations (latitude and longitude) as used for ATM purposes.

#### ***Checking the procedures to ensure completeness of flights***

The verifier will check whether the procedure for tracking completeness of flights as described the MP, reflects the information described in the approved MP, and as required by the MRR and the MRR Guidance document No.2 on AOs (GD.2) (e.g. responsibilities for tracking completeness, systems used, control activities implemented etc.). Furthermore, the procedures must be implemented, documented and be fully up to date. See section 4.5 of this guidance for information on how a verifier checks these procedures.

#### ***Testing the control activities to ensure completeness of aircraft and flights***

The verifier shall test the control activities that are implemented by the AO 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 AO 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 AO shall be taken into account in the emission report and tonne-kilometre report. This means that (subject to section 5.1) the ICAO designator is the determining factor for assessing and deciding which flights fall under the responsibility of the AO regardless of whether the aircraft is leased, owned or wet leased. The verifier needs to check that only actual flights end up in the emissions report. Planning systems do not contain accurate data;
- The verifier needs to 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:

**Art. 50(4)  
MRR**

---

<sup>36</sup> See Chapter 6 of this guidance.

<sup>37</sup> See Chapter 6 of this guidance.

domestic flights/flights from one 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<sup>38</sup>. 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.

### ***Application of time of departure***

The AO must attribute all flights to the calendar year according to the time of departure measured in coordinated universal time. The verifier must check whether the correct time is used for the flights and accordingly, whether flights are attributed to the correct reporting year.

**Art. 50(1)  
MRR**

## **5.4 How to check procedures for determining whether flights are EU ETS flights?**

To ensure completeness of EU ETS flights and to avoid double counting and avoid non EU ETS flights from being included in the report, the AO has to implement a procedure for determining whether flights are EU ETS flights. Please see section 4.5 of this guidance on how a verifier checks this procedure.

### ***Exempted flights***

The verifier shall understand how to interpret exempted flights as listed in Annex I of the ETS Directive in accordance with Commission Decision 2009/450 on interpreting Annex I activities<sup>39</sup>. Complicated circumstances may sometimes arise with respect to the interpretation of training flights (see the FAQ on monitoring and reporting annual emissions and tonne-kilometre data published on the Commission website<sup>40</sup>), public service obligations, humanitarian and emergency medical flights, military flights, the *de-minimis* rule (assessing whether the AO is commercial, see Chapter 3 MRR Guidance document No.2 for AOs (GD.2)).

## **5.5 How to check the methodology and procedures used to monitor the fuel consumption?**

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 unless the AO is approved to apply the simplified monitoring methodology discussed in Chapter 6<sup>41</sup>. The total fuel consumption has to be reported per fuel type in the emission report.

**Art. 52(2)  
Annex III  
MRR**

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 MP;

---

<sup>38</sup>The following overseas territories belong to the “territory to which the Treaty applies”: Guadeloupe, French Guiana, Martinique, Réunion, the Azores, Madeira, the Canary Islands, Åland Islands.

<sup>39</sup>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.

<sup>40</sup>See [http://ec.europa.eu/clima/policies/aviation/guidance\\_en.htm](http://ec.europa.eu/clima/policies/aviation/guidance_en.htm).

<sup>41</sup>Section 5.4.3 and 5.4.4 of the MRR Guidance Document No.2 for AOs, (GD 2).

- The APU shall be included (verifiers should be aware that there is an increased risk that the APU will be omitted if an aircraft has been in maintenance);
- If the underlying procedures of the AO as referred to in the approved MP, 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 CA is aware of this and refer the AO to the CA if necessary. 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 MP implies that the APU shall be included). This must also be noted as a non-compliance with the MRR in the verification report. Excluding the APU is not in line with the EU ETS Directive, the MRR and in principle the MP);
- When non-ETS flights have been performed in-between 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 AO is responsible shall be taken into account (see issues on completeness of flights).

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

The verifier shall check the consistency between reported data and the “mass and balance” documentation if the AO has a “mass and balance” document. AOs 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 AO correct any errors in the reported data. The AOs are required to provide the verifier with credible explanations for inconsistencies and subsequently to correct errors in the data. The “mass and balance” documentation should contain the most accurate data related to single flights. Data in planning systems or documents cannot be regarded as accurate.

**Art. 16(2)  
(d) AVR**

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

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 for flights (from operations systems). The verifier should be aware that there might be discrepancies between the 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 for ETS flights.

**Art. 16(2)  
(e) AVR**

***Checking of the 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 the AO has implemented to ensure accuracy (e.g. testing of the cross-checks AOs do between uplift quantities and pre- and post-uplift tank quantities, and assessment of how AOs deal with inconsistencies/testing of cross-checks by pilots or someone else between fuel slips and fuel measured by on-board systems);

- In the case of fuel uplift measurement by on-board measurement systems, the appropriate time of measurement made by the flight crew (e.g. checking whether a representative measurement takes place instantly before and after fuel uplift);
- 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).

### 5.6 How to check fuel density?

If the fuel in tanks and fuel uplift is measured in volumes, the AO has to determine the fuel density to convert these volumes to mass terms. The following methods apply: measuring the actual fuel density with on-board measurements, or using actual density values as recorded on the fuel slip or delivery note. If the actual density is not available a standard density factor of 0.8 kg/litre must be applied assuming approval by the CA (see section 5.4.6 of the MRR Guidance Document No.2 for AOs (GD 2)).

**Art. 52(6)  
MRR**

The verifier checks whether the method to determine the fuel density as described and approved in the MP, 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;
- whether 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 and order of magnitude changes.

### 5.7 How to check deviation from general methodologies for specific aerodromes?

The AO 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 AO has submitted in the MP. These deviations relate to circumstances that the AO knows about at the time of submitting his MP (see MRR Guidance Document No.2 for AOs, (GD 2), for more information). The verifier checks whether the deviations in the approved MP have been implemented and whether additional deviations or special circumstances occurred, and that this has been notified to the CA leading to an update of the MP.

Deviations from the general monitoring methodology that are not mentioned in the approved MP are non-conformities and have to be corrected. If these deviations cannot be corrected, the verifier must assess the material impact of these non-conformities on the reported data and report these non-conformities in the verification report.

**Art. 29  
AVR**

Furthermore, the verifier should recommend the AO to improve its monitoring methodology to avoid deviations and to implement control activities or other measures to enable the AO to apply the general monitoring methodology described in the other sections of the MP. Recommendation for improvement must be listed in the verification report.

### **5.8 How to check the uncertainty?**

The AO must identify and note the main sources of uncertainty and their associated level in the MP. 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 is required to check:

- whether fuel uplift is indeed determined by fuel supplier data or on-board measurements;
- the control activities the AO 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 AO of the impact that inaccurate on-board measurement systems have on the overall uncertainty, maintenance records if relevant, the corrective action an AO 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, reflects the information as referred to in the MP and is correctly implemented, effective to mitigate the risks involved, up to date and properly documented.

Unless gross inaccuracies are discovered it is not usual for AOs 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 AOs are required to undertake, and therefore the measurement instruments themselves will not have calibration certificates in most cases. Alternatively, the AO may refer to the aircraft manufacturers' own specifications. Also, it should be ensured that unresolved inaccuracies have not been recorded in the AO's 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 AO. In addition, the verifier will itself perform several cross-checks 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.).

### **5.9 How to check the procedures for cross-checks between the fuel slips and fuel measured?**

If on-board measurements are used to determine the fuel consumption, the AO is required to cross-check the fuel uplift quantity as provided by invoices and the uplift quantity indicated by on-board measurement. 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 should be set by the AO in the procedure. The verifier checks whether the margin of difference is plausible and whether corrective

**Art. 55(1)  
MRR**

**Art. 55(5)  
MRR**



action is taken when the margin of difference is exceeded. Furthermore, the verifier checks whether corrective action has been taken where notable deviations have been observed.

### **5.10 How to deal with emission factors?**

The AO must provide information on the commercial standard aviation fuels it 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 MP have been applied. If alternative fuels are being used, the verifier checks whether the monitoring methodology has been applied correctly to the analysis of the fuel in order to determine its emissions factor. For information on the monitoring methodology required for alternative fuels please see section 5.4.7 of the MRR Guidance Document No.2 for AOs (GD 2).

### **5.11 How to deal with biofuels?**

The MRR contains new requirements on the use of biofuels. First of all, biofuels must meet sustainability criteria laid down in Article 17 of the RES Directive<sup>42</sup> in order to be zero rated under EU ETS. If the criteria are not satisfied for these fuels, the biomass may not be zero rated and must therefore be treated as a fossil source stream<sup>43</sup>.

The verifier must check:

- whether the biofuels used by the AO are fuels that meet the sustainability criteria;
- the delineation of biofuels: if the operator uses biofuels that are delivered in batches, the verifier should check whether these batches of biofuels have, where necessary, been distinguished as different source streams<sup>44</sup>.

When checking the AO's demonstration of compliance with the sustainability criteria, the verifier should consider:

- whether the certificate is issued through a voluntary scheme approved by the Commission or is issued through a national certification system;
- whether the certificate is still valid;
- whether the sustainability criteria of the biofuels are covered by the system or scheme concerned;
- whether the geographical scope of biofuels is in line with the scope identified in the systems.

AOs are allowed to take calculation factors of biofuels from purchasing records. The verifier needs to check:

- the evidence the AO has provided to trace back the origin of the biofuel;
- whether the purchase records are properly documented;

---

<sup>42</sup>Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, OJ EU 5 June 2009, L 140/16.

<sup>43</sup> For more guidance please see the MRR Guidance document No. 3 on Biomass (GD3).

<sup>44</sup> Section 3.2 of the the MRR Guidance document No. 3 on Biomass (GD3).

- the data flow activities and control procedures the AO has implemented to ensure that only quantities of biofuels used for EU ETS flights are taken into account. The verifier will in those cases check whether:
  - the procedures are present and properly documented and retained;
  - the procedures have been correctly implemented and are up to date;
  - the procedures have been applied throughout the year;
  - the procedures have been effective to ensure that only quantities of biofuels used for EU ETS flights are taken into account and that biofuels for non-EU ETS flights are excluded;
  - the procedures cover evidence about physical sales of biofuels to third parties;
  - the fuel correlating to data gaps is conservatively assumed as fossil fuel if data gaps are found;
  - only biofuels meeting sustainability criteria are taken into account in the case of zero-rating (application of an emission factor equal to zero).
- whether the corroborating calculation has been correctly applied and the total quantity of biofuels accounted for under EU ETS does not exceed the total quantity of fuel uplifts at that aerodrome for flights covered by EU ETS in the reporting year, or the total quantity of biofuel physically purchased minus the total quantity of biofuels physically sold to third parties at this aerodrome by the AO;
- the use of laboratory analysis is excluded;
- where the AO relies on the evidence of a fuel supplier, in particular, the evidence of the fuel supplier that an AO is required to provide (see section 6.2 under point 3 of the MRR Guidance No.3 on biomass (GD 3)). This includes a check of whether the records of biofuels were verified.

### 5.12 How to deal with data gaps?

If data relevant for the determining the AO's emissions for one or more flights are missing, the AO must use surrogate data for the time period for which the data is missing. The surrogate data must be determined by an alternative method described in the MP approved by the CA. Where the data cannot be determined by that method, the emissions for that flight or those flights may be estimated by the AO by using the simplified monitoring methodology tools approved by the European Commission. Currently only the EUROCONTROL small emitters' tool is approved by the EC.

**Art. 65(2)  
MRR**

Data gaps must be identified and missing data filled in by the AO itself using the methods described above after which the verifier checks that the result is reasonable. In addition, verifiers can identify data gaps when they are carrying out verification activities. Figure 7 shows what the verifier is required to check in the case of data gaps.

**Art. 18  
AVR**

A data gap occurring several times over a longer period of time may show that the control activities are not functioning correctly. The verifier will therefore assess the frequency of data gaps occurring and the control activities implemented to avoid these data gaps. The verifier needs to assess whether the control activities are effective. (e.g. whether IT systems, automatically transferring data, are secure and functioning properly, whether the operator has built in manual controls to ensure that no data gaps occur).

**Art. 18(2)  
AVR**

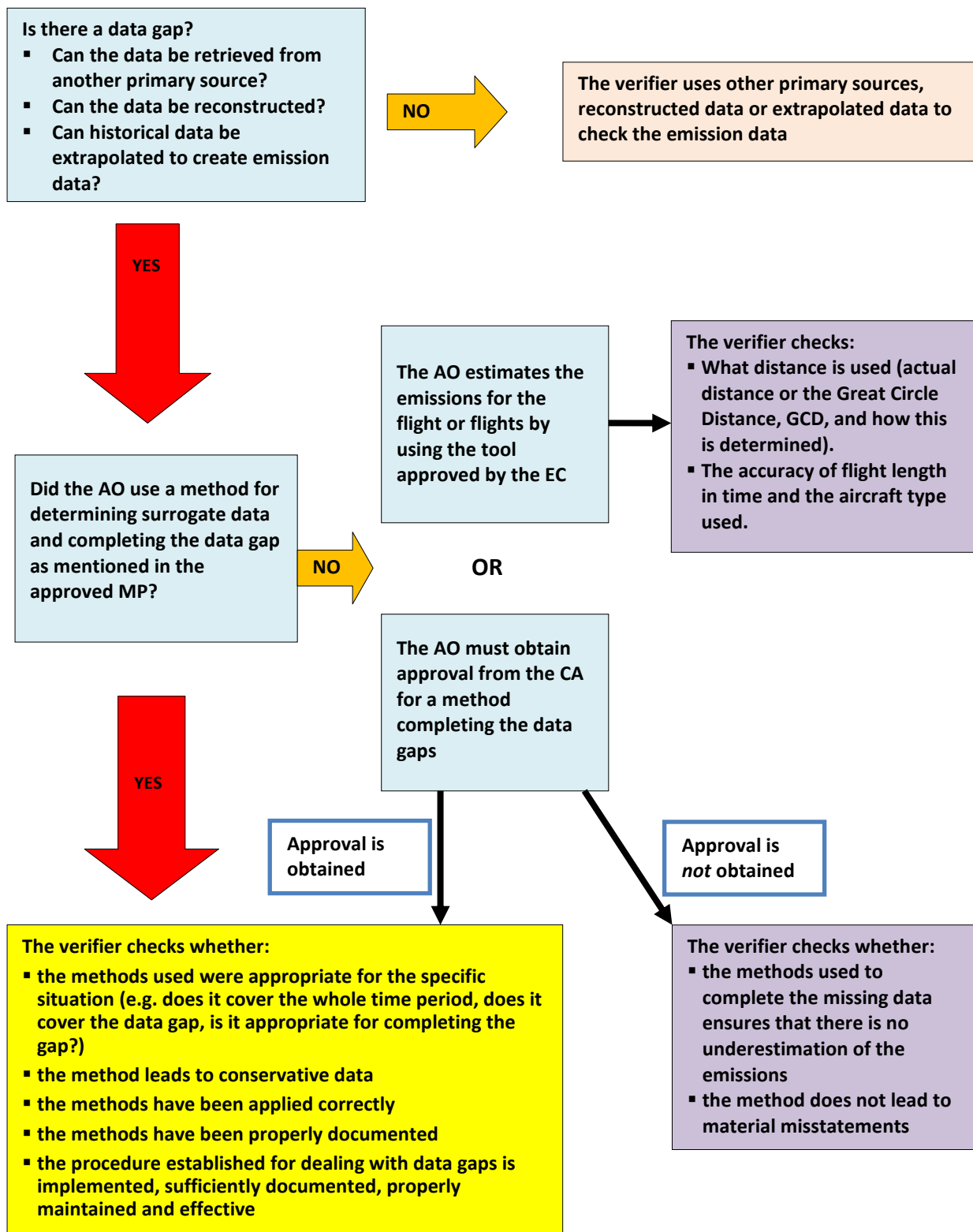


Figure 7: schematic diagram of how the verifier deals with data gaps

### 5.13 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, assuming that the AO and verifier have authorised access to the facility. Irrespective of access to the ETS Support Facility, the CEFA system (CRCO Extranet for Airspace Users)

provides AOs (free of charge) certain data elements which could be useful in filling in 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 AOs) are not available in CEFA.

#### **5.14 How to check roles and responsibilities?**

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 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.

#### **5.15 How to check procedures for data flow and control activities?**

See Chapter 4 of this guidance.

#### **5.16 How to check emission data in the emission report?**

The AO must submit information on the aggregated emissions from ETS flights falling under the responsibility of the AO 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. The data on the 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 the emission report. The activities in section 3.2.6 under process analysis (detailed data verification) are performed in order to make this check including a check against data in the ETS Support Facility.

#### **5.17 How to deal with rounding of data?**

The MRR requires an AO to report emissions as rounded tonnes of CO<sub>2</sub>. 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 CO<sub>2</sub> 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 are not used, the verifier shall check the procedures the AO 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. This also applies to the rounding of data per flights required for calculating the distance and payload.

**Art. 72  
MRR**

### **5.18 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 the 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 from on-board measurement systems is cross-checked with fuel slips and invoices. In addition, cross-checks are made by the AO 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 AO has to ensure that there is no (systematic) underestimation of the fuel consumption.

## 6 Verifying small emitters using the simplified monitoring methodology and the role of the EU ETS Support Facility for all AOs

An AO operating fewer than 243 flights per period for three consecutive four-month periods **or** with operating flights with total annual emissions lower than 25,000 tonnes CO<sub>2</sub> per year is considered to be a small emitter. A small emitter is allowed to apply a simplified monitoring procedure which means that the small emitter may estimate the fuel consumption using tools implemented by EUROCONTROL or another relevant organisation that 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 - SET) has been approved by the European Commission<sup>45</sup>. In addition, EUROCONTROL has developed the ETS Support Facility that is available for wider use by the CAs that have subscribed to the ETS Support Facility. The ETS Support Facility may also be used by AOs and verifiers.

Art. 54(1)  
MRR

Art. 54(2)  
MRR

The ETS Support Facility integrates the approved simplified tool (SET), for the fuel estimation function with validated traffic records, AOs' and ETS related data for all AOs and States that fall under the scope of the EU ETS directive. This Chapter explains the verification requirements for small emitters where the SET is being applied and also where the ETS Support Facility can play a role for all AOs.

Section 5.6 of the MRR Guidance No. 2 for AOs (GD.2) provides guidance on the requirements that apply to small emitters.

### 6.1 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:

- The AO'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 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 AO and the output is independently generated.

Verification may be straightforward for AOs for which the CA has approved in their MP the use of the SET; and AOs that have chosen to accept the EUROCONTROL generated version of the output rather than make their own entries (see section 6.4 below for more detail).

---

<sup>45</sup>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 AOs, OJ 10 July 2010, L 175/25.

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

The AO is not obliged to use the simplified tool for estimating the fuel consumption. If the approved MP confirms the AO's decision to apply the standard monitoring methodology, the verifier will have to check the application of the approved monitoring methodology and perform the checks described in section 3.2.6 and Chapter 4. The verifier carries out the same activities as prescribed for the verification of large AO's emission reports.

## 6.3 What does the verification entail if the simplified tool is used?

Subject to the availability of the ETS Support Facility, there are three options available to AOs whose approved MP states that they can use the SET:

1. The AO can acquire the output from the SET<sup>46</sup> directly from EUROCONTROL. EUROCONTROL already hold in their databases the necessary data relating to flights, flight distances and the aircraft involved, and can through the ETS Support Facility automatically produce a report that is free from AO inputs. Acceptance of this report by the AO and its submission for verification by the AO without any changes to the report is likely to result in a very straightforward verification process.
2. The AO can acquire the output direct from EUROCONTROL through the ETS Support Facility 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 AO in connection with the alterations.
3. The AO can also complete the SET spread-sheet and submit an emission report based on the fuel consumption estimated by the SET tool. However, verification in this case may be more complicated than option 1 and 2.

In all these three cases the verifier shall plan to compare the report submitted by the AO 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 AO to clarify the reasons for the inconsistencies, and assess whether these are reasonable and whether corrective action needs to be taken by the AO.

### **Please note with respect to all options:**

The AO remains responsible for correcting all misstatements and non-conformities identified. If the AO has discovered that EUROCONTROL data is not complete or correct, the AO must correct this and ensure that the emission report contains corrected data.



### **Option 1: automatic generation of the emission report from the ETS Support Facility**

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 AO and thus independent from the AO's input. In that case the completeness check carried out by the verifier consists in principle of the comparison between the report submitted by the AO and EUROCONTROL's output. As the monitoring and reporting process is facilitated by the ETS Support Facility the verifier may decide not to carry out:

<sup>46</sup>The ETS Support Facility can automatically generate an emission report without any input from the AO. Please see section 6.4 for further information.

- checks on the data flow activities, control activities and procedures listed in the approved MP, including procedures for checking completeness of flights, aircraft and determining ETS flights;
- data verification;
- checks on the application of the monitoring methodology.

Art. 32(2)  
AVR

These checks are not needed since the reported data and emissions are automatically generated independently from any AO input. Likewise verification of data gaps should not be needed.

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.

If the verifier detects that the report submitted by the AO does not reflect the situation in the EUROCONTROL output, it assesses whether this leads to misstatements and whether the AO needs to take corrective action (either by resolving the matter with the CA or by correcting the misstatement itself).

Option I can only be applied if:

- EUROCONTROL has not been requested to change the data in the emission report;
- the AO has not identified any errors in the report generated by EUROCONTROL from the ETS Support Facility. If the report generated by ETS Support Facility is not complete or correct, the AO must correct these errors in the emission report (see Option 2);
- the AO has implemented sufficiently robust procedures and data management system to ensure that it finds discrepancies in the data and corrects these discrepancies.

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

Site visits for AOs 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 AO (unless the verifier's risk analysis has identified other reasons that may require such a site visit).

Art. 3(13)  
AVR

### **Option 2: automatic generation of the emission report from the ETS Support Facility but the AO amends the data in that report**

After the AO has reviewed and corrected the automatically generated emission report it gives the verifier access to the ETS Support Facility<sup>47</sup>. The verifier shall check which changes the AO has made to direct output from the ETS Support Facility, whether these can be substantiated, whether they are traceable and whether they are justified. Depending on the results of the assessment and AO's explanation of the changes made, the verifier must carry out checks on data flow activities, control activities and procedures listed in the approved MP and carry out data verification. Compared to option 1, the effort needed to verify the emission report in this option 2 is increased.

<sup>47</sup> Provided that the AO has subscribed and been authorised to use the ETS Support Facility



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

See under option 1. However it depends on the changes made and the results of the risk analysis whether a site visit needs to be carried out.

### **Option 3: Using the SET that is published as an Excel tool<sup>48</sup>**

The SET is published as an Excel tool and involves the listing of aircraft types and flight distances (in nautical miles) against an AO'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 as recorded by on-board systems 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. It will also match the actual aircraft involved in a given flight with either the same aircraft type or its nearest relative.

Besides the elements in section 5.1 to 5.4 of this guidance (completeness of flights and aircraft) the verifier will also check the data flow for that type of aircraft activity, test the control activities and associated procedures as mentioned in Chapter 4 of this guidance.

Furthermore the verifier shall check whether the SET has been applied correctly by the AO. This means that the verifier shall assess what flight distance has been used (actual distance or the GCD and how this is determined). The MP itself does not provide information on how to calculate the distance in nautical miles in the SET. 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. The verifier shall be aware of inconsistencies that could arise when calculating the distance. The verification effort can be expected to be considerably more burdensome than in option 1 and 2.

### ***Site visits for small emitters using the SET published as an Excel 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 definition of 'site'<sup>49</sup> for AOs); this is acceptable provided that the AO has given the verifier access to the AO's own data in the ETS Support Facility to check the completeness of the flights as well as whether the AO has provided sufficient information to assess the accuracy of the flight length and aircraft type.

## **6.4 The use of the ETS Support Facility by all AOs?**

The ETS Support Facility is mainly a data repository system built on all the traffic data acquired from EUROCONTROL's Central Route Charge Office (CRCO). Its objective is to assist competent authorities in reviewing the emissions reports and tonne-kilometre reports. However AO may subscribe to using the ETS Support Facility for their own flight data and it can therefore also be used by the AO to perform cross-checks with flight data recorded in

---

<sup>48</sup> <http://www.EUROCONTROL.int/articles/small-emitters-tool>

<sup>49</sup> Site visits for AOs relate to where the monitoring process is defined, managed including where relevant data and information are controlled and stored. The ETS Support Facility can be regarded as the place where the monitoring and reporting process is defined.

their own internal systems. This control activity is relatively robust which will give the verifier more confidence in the completeness and accuracy of the reported data.

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's SET). Please see section 6.3 for more information. Automatically generated reports can also be a type of control activity which the AO may use to check the accuracy of its emission reports.

#### ***What data is stored in ETS Support Facility?***

The ETS Support Facility contains traffic and AO data contained and stored in the EUROCONTROL data bases. EUROCONTROL's CRCO data are complemented with traffic information provided by States with EU ETS relevant traffic not covered by the CRCO and by other information provided by AOs, EU ETS CA and other sources. This information includes time of departure and arrival of flights, data on the AO (AOC, operating license, ICAO designator or registration number), the aircraft type involved as well as some of 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 ETS relevant data such as CO<sub>2</sub> emissions, which are calculated using the small emitters tool methodology. Specific sections of the emission report template can be automatically generated from the ETS Support Facility. This may be of use to AOs and verifiers wishing to corroborate the primary data feeding into the submitted report. It is noted that this corroborative data cannot be used as a substitute for data acquired in accordance with the monitoring methodology approved under the MP, but it may indicate potential misstatements requiring further investigation and correction.

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

As mentioned above, the annual emission report can be automatically generated from the ETS Support Facility. It should be noted that some Member States may 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 accuracy of the data rather than the automatically generated report.

Where the AO is approved to apply the SET, it 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, CRCO traffic does not completely cover all the traffic falling under the EU ETS. Exempted CRCO flights, for example, do not entirely match the exempted flights in Annex I EU ETS Directive. The ETS Support Facility has a built-in automatic control to identify non-ETS flights. Every effort is made to include actual flight data in the ETS Support Facility. However there may still be differences in the data. The AO remains responsible for correcting these errors when reviewing the generated emission report.

### ***Who has access to the ETS Support Facility?***

The verifier will be granted access to the ETS Support Facility through an authorisation by the AO, assuming that the AO has paid the entry fee to the facility. The contract between the verifier and the AO 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 AO. However, if access is not granted, then the verifier may not be in a position to complete its work as efficiently and in the worst case may be prevented from issuing a positive verification opinion statement.

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

The MRR does not make a provision to allow AOs 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 tonne-kilometre reports. Data on payload (total mass of freight, mail, passengers and baggage carried on-board the aircraft during a flight) are not recorded by the CRCO, and thus 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. However, the ETS Support Facility can be used to check the completeness of the ETS flights and the aircraft used for those flights.

The verifier shall decide the need for site visits on the basis of their bespoke risk analysis for the AO involved while taking into account the definition of the site of an AO. Based on the risk analysis the verifier may plan to waive a site visit to an AO (including a small emitter) provided the verifier has sufficient confidence in the internal control activities that are implemented in the AO's systems to monitor the number of passengers and determine the mass of freight and mail. The AO has to provide the verifier with the information needed to assess these internal control procedures and control activities. A verifier may decide not to carry out a physical visit to the site of a small emitter where the verifier has concluded based on its risk analysis that the relevant data can be remotely accessed. The CA's approval is not required. The waiver of a site visit shall be justified and recorded in the internal verification documentation and verification report. 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.

**Art. 32(2)**  
**AVR**

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

An AO making use of the simplified procedure and exceeding the threshold for small emitters during a reporting year must notify this fact to the CA of the administering Member State. The ETS Support Facility also contains a functionality that will flag an AO that is getting close to the *de-minimis* threshold (either in the total number of flights of 243, or in the total CO<sub>2</sub> emitted, 25,000 tonnes). This functionality enables the CA to set a percentage value for those AOs in relation to the threshold so that the status of that AO is closely monitored and the possible exceeding of the *de-minimis* threshold is detected early on.

**Art. 54(4)**  
**MRR**

If the AO can demonstrate to the satisfaction of the CA, that the thresholds have not already been exceeded within the past five reporting periods and will not be exceeded again from the following reporting period onwards, the AO does not need to update the MP to meet the regular monitoring requirements for AOs. The ETS Support Facility can help the CA to assess

**Art. 54(5)**  
**MRR**

the information provided by the AO since the facility enables trend analyses. If the AO cannot demonstrate to the satisfaction of the CA that the threshold won't be exceeded, the MP must be updated to meet the additional monitoring requirements laid down in the MRR. The revised MP must be submitted without undue delay to the CA for approval.

## 7 Aviation specific issues in the verification of tonne-kilometre data

This Chapter explains some of the aviation specific issues that are relevant to the verification of tonne-kilometre data. For guidance on the assessment of changes to the MP for tonne-kilometre, identification of the AO, the completeness of aircraft type, flights and procedures for determining ETS flights, see sections 5.1 to 5.4 of this guidance. Please note that this Chapter does not contain a complete list of issues and that the verifier needs to check whether additional requirements apply in relation to the administering Member State concerned.

### 7.1 How to check systems and procedures to monitor aerodrome location information?

AOs are required to use the most up-to-date AIP data as of the 31<sup>st</sup> of December of the monitoring year to calculate the tonne-kilometre for the relevant monitoring year<sup>50</sup>. The most recent AIP data on 31<sup>st</sup> of December is published on the ICAO website<sup>51</sup>. 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 AO, are functioning, implemented and documented. 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 AO is still responsible. The verifier shall in that case check how the AO 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 31<sup>st</sup> of December of the monitoring year.

### 7.2 How to check the distance and procedure to monitor GCD?

AOs 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 distance is the tool that is approved by the CA in the MP. 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 the definitive EUROCONTROL distance regarding the GCD for the aerodrome pair concerned. EUROCONTROL has made available a means of GCD comparison 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. The verifier can use these values to cross-check the GCD applied by the AO. The verifier shall be aware that it is not allowed to use tools that are based on WGS 84 assuming the Earth as a sphere rather than an ellipsoid.

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 AO is still responsible for the quality and accuracy of the calculation methodology, based on WGS 84

---

<sup>50</sup> Please see Chapter 2 for guidance on the meaning of monitoring year.

<sup>51</sup> The verifier should be aware that the most recent AIP data can also be consulted through other channels.

ellipsoid and using AIP data.<sup>52</sup> The verifier shall check the control activities the AO has implemented to ensure that this is the case (see Chapter 4 of this guidance). Moreover the verifier shall assess whether the tool is WGS 84 compliant. 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 ETS 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<sup>53</sup>. The verifier can compare the AO calculated GCD between aerodrome pairs with the definitive GCD values for aerodrome pairs advised by EUROCONTROL.

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.

**7.3 How to check the mass of passengers and checked baggage?** The mass of passengers and their checked baggage must be determined by following either tier 1: a default value of 100 kg for each passenger and their checked baggage, or tier 2: the mass of passengers and checked baggage contained in the “mass and balance” documentation.

**Art. 56(4)  
MRR**

The verifier shall check whether the applicable tier as approved in the MP 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 passengers 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:

- multiplying the number of PAX 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<sup>54</sup>.

Further information is published in the FAQ on the monitoring and reporting of annual emissions and tonne-kilometre data for EU Emissions Trading<sup>55</sup>. Most AOs multiply the number of PAX with the specific mass of PAX type. The verifier shall check whether AOs have applied either of the above-mentioned 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.

<sup>52</sup> Aeronautical Information in compliance to Annex 15 of the Chicago Convention or from a source using such AIP data.

<sup>53</sup> 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).

<sup>54</sup> PAX means passengers in the airline industry. The definition of passengers according to the MRR means the persons on board the aircraft during a flight excluding its crew members.

<sup>55</sup> See [http://ec.europa.eu/clima/policies/aviation/guidance\\_en.htm](http://ec.europa.eu/clima/policies/aviation/guidance_en.htm)

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 excluded 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 MP shows that tier 1 is applied, the verifier shall be aware that the 100 kg 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;
- Last minute changes can occur in the data concerning passengers and checked baggage. The verifier must therefore check the processes applicable in the case of last minute changes, e.g. checking the weight and balance documentation, flight log, planned data against actual data.

#### **7.4 How to check the procedure for monitoring the number of passengers?**

The AO must 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 control activities 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 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.

#### **7.5 How to check mass of freight and mail?**

The mass of freight and mail must be calculated using the actual or standard mass contained in the “mass and balance” documentation for the relevant flights. If an AO is not required to have “mass and balance” documentation, the approved MP 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 AO was legally required to have “mass and balance” documentation and has used the mass indicated in this document;

**Art. 56(3)  
MRR**

- 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 the approved MP.

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 is 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 that other control activities have been implemented to support the accuracy of weighing the mass of freight and mail. These control activities could include 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-checks in the verification report.

One special circumstance arises in relation to passengers and freight – the repatriation of bodies. Under this circumstance, the body and its coffin are deemed to be freight.

#### **7.6 How to check exclusion of pallets, containers and service weight?**

AOs must 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 verifier shall check that the tare weight of these ULDs is excluded from the reported mass of freight and mail if they are not part of the consigned 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 on board flights for transportation purposes. The verifier shall check that the service weight is not included in the reported mass of freight and mail. AOs 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 FAQ published by the Commission.

#### **7.7 How to check procedures to monitor the mass of freight and mail?**

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).

## 8 Competence and impartiality requirements

Verifiers that carry out verification of AO's reports must meet the same competence and impartiality requirements as verifiers that are verifying installation emission reports. For guidance on required verifier competence, please see Chapter 5 of the Explanatory Guidance (EGD I) on ways to demonstrate competence and impartiality. Specific competence requirements of the verification team, EU ETS lead auditors, EU ETS auditors, independent reviewers and technical experts are explained in a key guidance note on competence (KGN II. 7). This includes aviation specific examples.

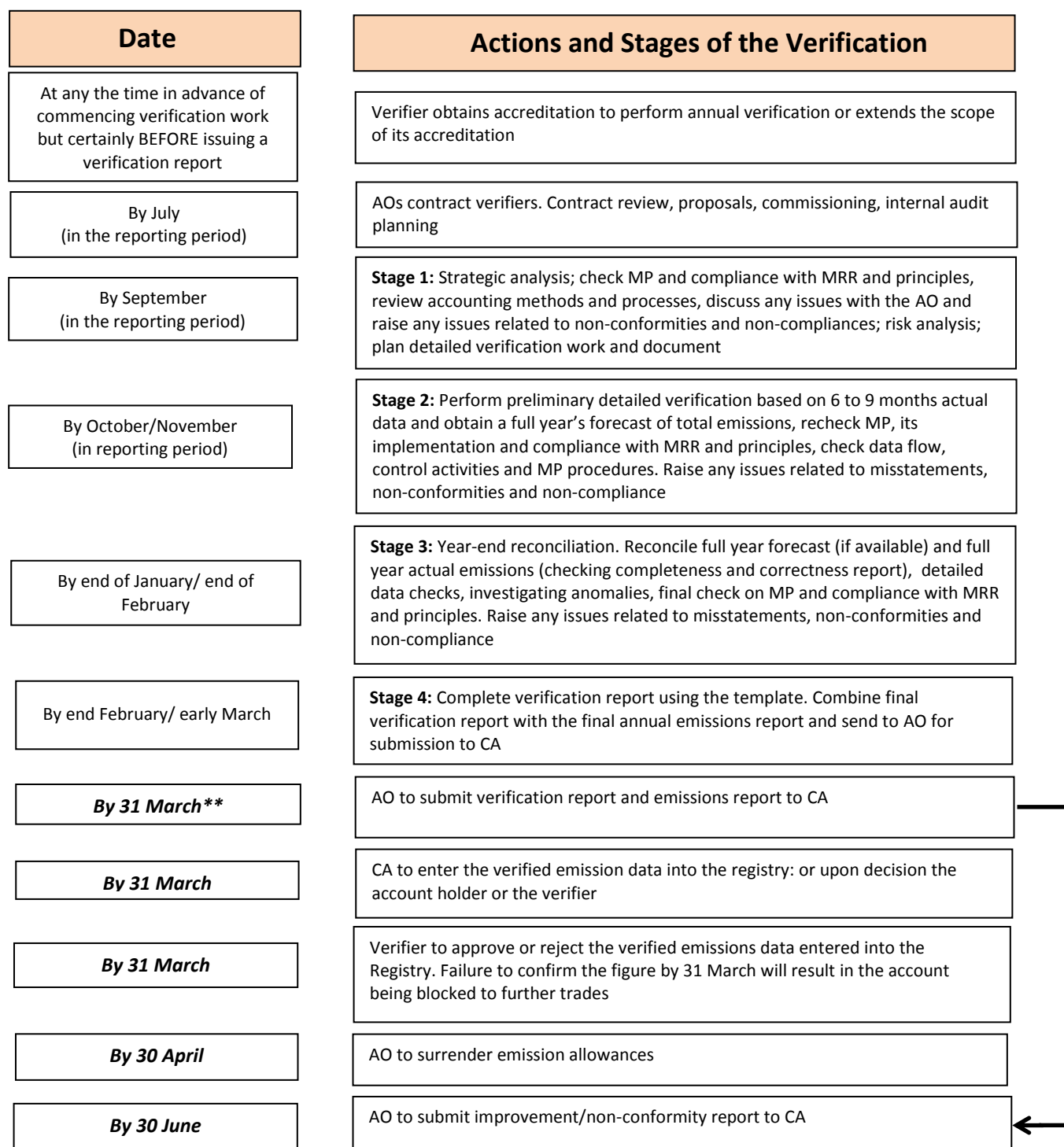
## 9 Accreditation and other AVR requirements

The AVR contains specific requirements on the accreditation and certification of verifiers, the requirements on NABs or NCA, peer evaluation, mutual recognition of verifiers and the exchange of information between NABs, NCAs and verifiers. Please see the following Chapters of the Explanatory guidance (EGD I):

- Chapter 6: guidance on the accreditation process and monitoring of the verifier
- Chapter 7: requirements on NABs
- Chapter 8: peer evaluation
- Chapter 9: mutual recognition of verifiers
- Chapter 10: information exchange between verifiers, NABs, NCAs and CAs.

## Annex I. Timeline for verification

The figure below provides a flow diagram of the stages and actions involved in the verification against a proposed annual time line. Dates in ***bold italics*** are compulsory and set by legislation. Dates in normal text are suggested to keep the process on track and ensure verifications are completed on time and within the available verifier resources. Please note that the suggested timelines are not mandatory and may not be applicable for all AOs.



**\*\* The CA may require the AO to submit the verified emission report earlier than by 31 March, but by 28 February the earliest (Article 67 of the MRR)**

Figure 8: Flow chart showing verification process and due or proposed dates

Once the verifier has been contracted by the AO, the formal verification process begins. Stage 1 involves the strategic analysis, site visit, risk analysis and development of the verification plan by the verifier. Stage 2 involves performing a preliminary verification of available data (six to nine months' worth) to determine any potential issues of concern that may need to be resolved between the AO and CA. This important step aims to reduce the amount of work required towards the end of the year. Stage 3 involves the verifier checking the remainder of the year's data and recommending improvement opportunities, and assuring that the AO's annual emissions report is complete and correct. A thorough, independent review is also required before the verification report is finalised. Stage 4 requires the verifier to submit the final verification report (incorporating the verified annual report) to the AO.

## Annex II. Internal verification documentation

The internal verification documentation of the verifier should at least cover the following elements:

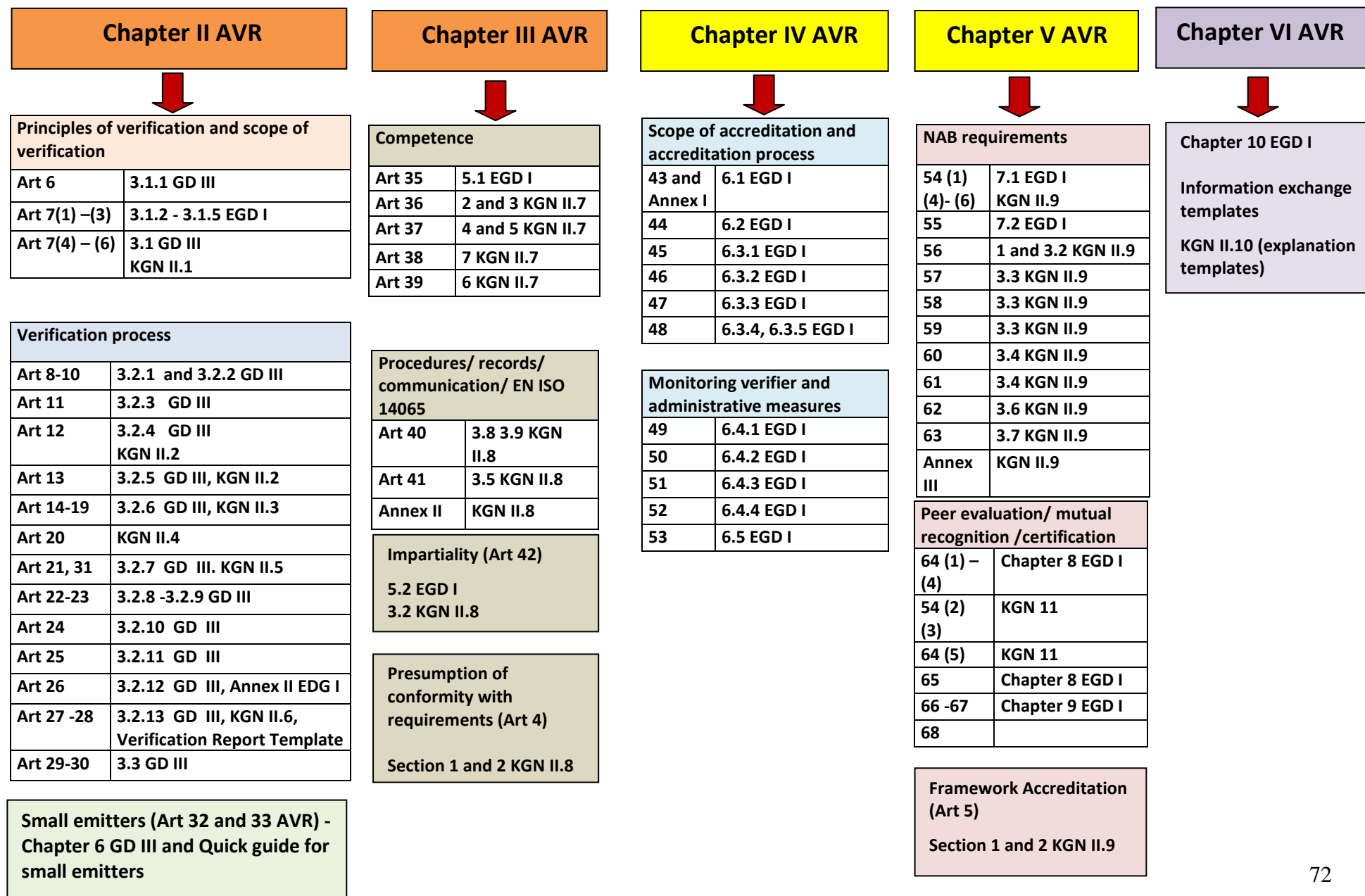
- Results of the evaluation of risks of undertaking the verification during the pre-contract stage and the evaluation itself;
- The time allocation as well as any revisions in the time allocation and reasons for such a revision;
- The contract with the AO and any other relevant information used to prepare the verification;
- Information on the verification team that has performed the verification and how this team was compiled:
  - names of the EU ETS Verifier, EU ETS Lead Verifier and other relevant team members;
  - competence of the team to cover the scope of accreditation in which the operator's activities are covered;
  - roles and responsibility of each verification team member;
  - time spent on verification activities by each team member.
- Conclusions on the independence and impartiality checks and clearance of the independence of reviewers at the start the verification;
- Scope of the verification. This should in principle be in line with the scope of the verification activities that have been indicated in the verification plan unless changes have occurred during the verification process;
- The identification of the criteria against which the emissions report or tonne-kilometre report was verified so as to understand the basis for the verifier's verification conclusion;
- Conclusions on follow-up of points/recommendations from previous audits;
- What AO's information the verifier has used to cross-check data and carry out other verification activities
- The AO's emissions report or tonne-kilometre report;
- The conclusions of the strategic analysis, risk analysis and process analysis and these analyses in full;
- The verification plan, any revisions and updates of that plan and reasons for amending the plan, additional activities to be carried out and other conclusions related to the verification plan and process analysis;
- The verification activities undertaken and results of checks made on the control activities, procedures and data. The activities described in the internal verification documentation should in principle be in line with the verification plan unless changes have occurred during the verification process;
- Relevant evidence gathered during the verification;
- Information on what activities are performed on site and which off site;
- If a site visit has been waived, reasons for waiver of the site visit, how the data has been checked and verification has been carried out without the site visit;
- Changes that have occurred during the verification process;
- Information and evidence on the sample size, samples taken and what sampling method was used;

**Art. 26  
AVR**

**Section  
3.2.12**

- Reasons for increasing or decreasing the sample size and resolution of all issues identified which required further investigation and their eventual outcome, as well as evidence on the rationale for the conclusions reached on the emissions report or tonne-kilometre report;
- 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 MP, recalculation test, reproduction tests etc.
- Conclusions on data quality and materiality with regard to the approval of the AO's data in the emissions report or tonne-kilometre report. This includes the materiality threshold that has been applied and a justification for judgments made concerning the quantitative and qualitative assessment of whether misstatements or non-conformities have material impact on the reported data;
- Non-conformities and misstatements that have been identified by the verifier, and a description on how these have been resolved. If these misstatements and non-conformities are closed during the verification, this should be marked as such;
- Justifications for the verification opinion made by the verifier;
- Where appropriate, a description of any significant, inherent limitation associated with the verification of the emissions report or tonne-kilometre report against the criteria. It should be clear whether there is a limitation of scope in the verification, whether there were circumstances or whether a restriction was imposed that prevented the verifier from obtaining evidence required to reduce the verification risk to a reasonable level;
- The conclusions on the verification of the emissions report or tonne-kilometre report;
- Results of the independent review and the name of the independent reviewer.

## Annex III. Detailed user manual to guidance material





## Annex IV Examples of issues relevant for strategic analysis

This table includes example of issues that could be relevant for the strategic analysis.

Element in article 11(3) AVR	Example of issues that could be relevant for the strategic analysis
<p><i>Size and nature of the AO, the distribution of information in different locations and the number and type of flights (point b)</i></p>	<ul style="list-style-type: none"> <li>▪ The composition of the fleet (number of aircraft, aircraft types, owned and long term leased aircraft, wet leased aircraft etc.);</li> <li>▪ 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 AO and flights that are exempted from EU ETS);</li> <li>▪ What business model the AO is using (cargo, charter, network or mixed). The business 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;</li> <li>▪ How the legal and organisational structure of the AO is set up. The organisational structure can be complex in the aviation industry when different ICAO designators or registration numbers are used by an AO (e.g. if there is a merger). In that case these would normally be considered as different AOs. Conversely parent companies and subsidiary airlines can use the same ICAO designator which would then be regarded as a single AO;</li> <li>▪ 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);</li> <li>▪ How the flights are allocated to the AO (ICAO designator or aircraft registration number if the ICAO designator is not available);</li> <li>▪ Whether wet and/or dry leases are applied and to what extent these aircraft fall under the responsibility of the AO;</li> <li>▪ Whether the AO is commercial or not according to the definition of commercial AO in the EU ETS Directive; this is relevant for AOs 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 CO<sub>2</sub> per year. If commercial AOs are below the de-minimis threshold they fall outside the EU ETS;</li> <li>▪ Whether the AO is a small emitter, as defined in Article 54(1) of the MRR or not;</li> <li>▪ Type of data collection and management system used.</li> </ul>
<p><i>MP (point c)</i> Understanding the MP gives an indication of the complexity of the AO and the accounting process and hence the type and size of</p>	<ul style="list-style-type: none"> <li>▪ The type of procedures described in the approved MP giving an analysis of their robustness in terms of controlling accounting processes and risks;</li> <li>▪ The locations where documents are stored and where monitoring and reporting activities are carried out.</li> </ul>

Element in article 11(3) AVR	Example of issues that could be relevant for the strategic analysis
verification tasks necessary to complete the verification.	
<i>Specifics of the monitoring methodology and the monitoring equipment used (point d)</i>	<p><b><i>Understanding the monitoring methodology for emissions</i></b></p> <ul style="list-style-type: none"> <li>▪ What method the AO 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;</li> <li>▪ An overview of the data needed for the calculation of the total fuel consumption: whether the flight falls under the AO's ICAO designator, aircraft type and registration number, departure and arrival aerodromes, local time of departure, type of flight, fuel consumption, source stream;</li> <li>▪ The source streams used and the relevant emission factor applicable. As commercial AOs 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);</li> <li>▪ Whether the fuel uplift is measured as volumes (not mass) and if this is the case what method is used to determine the fuel density (preference is for actual measurement of fuel density on board or from fuel supplier data; the alternative as a last resort is using a standard factor of 0.8);</li> <li>▪ How data gaps are filled (e.g. based on the method defined in the MP or by using the EUROCONTROL small emitters' tool or another tool approved by the Commission).</li> </ul> <p><b><i>Understanding the monitoring methodology for tonne-kilometre</i></b></p> <ul style="list-style-type: none"> <li>▪ What tool is used to calculate the distance based on WGS84 (elipsoid) and the use of AIP data for the aerodromes (e.g. Vincenty<sup>56</sup> or another formula based on WGS84);</li> <li>▪ Which method is used to determine the mass of passengers and baggage (tier 1 using a default value of 100kg or tier 2 taking the mass of passengers and baggage from the "mass and balance" documentation, the same tier being applied for all flights);</li> <li>▪ The way active crew members and their baggage are excluded;</li> <li>▪ 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);</li> <li>▪ The way the "tare weight" of containers and pallets are excluded.</li> </ul>
<i>Dataflow, its</i>	<b><i>Understanding the data flow</i></b>

<sup>56</sup> Vincenty's formulae are two related iterative methods used in geodesy to calculate the distance between two points on the surface of a spheroid, developed by Thaddeus Vincenty (1975a) They are based on the assumption that the figure of the Earth is an oblate spheroid, and hence are more accurate than methods such as great-circle distance which assume a spherical Earth.

Element in article 11(3) AVR	Example of issues that could be relevant for the strategic analysis
<i>control system and the control environment (point e)</i>	<ul style="list-style-type: none"> <li>▪ 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);</li> <li>▪ 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;</li> <li>▪ The way data is input to the central system(s) (manually or electronically or a combination);</li> <li>▪ 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.</li> </ul> <p><b><i>Understanding the control system of an AO</i></b></p> <ul style="list-style-type: none"> <li>▪ The AO's established, documented, implemented and maintained risk assessment and control activities;</li> <li>▪ The type of quality controls used to mitigate the risks in the data flow (see section 4.4 for examples of quality controls);</li> <li>▪ Controls on recording and transmitting data into IT systems that have been implemented prior to and as a result of the introduction EU ETS and are still used;</li> <li>▪ The robustness of the AO's procedures for data flow activities and control activities (see also Chapter 4 of this guidance).</li> </ul>

## Annex V. Relevant legislation and MRR guidance

### Relevant legislation

Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, most recently amended by Directive 2009/29/EC. Download consolidated version: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2003L0087:20090625:EN:PDF>

Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council, OJ EU, L 181/30: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:181:0030:0104:en:PDF>

Commission Regulation (EU) No 600/2012 of 21 June 2012 on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87, OJ EU, L 181/1: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:181:0001:0029:en:PDF>

Regulation (EC) No 765/2008 of the European Parliament and of 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 EU, L 218/30.

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 AOs, OJ 10 July 2010, L 175/25.

### Guidance documents developed to support the interpretation of the MRR

Guidance document No. 2: “The Monitoring and Reporting Regulation – General guidance for AOs”. This document outlines the principles and monitoring approaches of the MRR relevant for the aviation sector. It also includes guidance on the MP templates provided by the Commission.

Guidance document No. 3: “Biomass issues in the EU ETS”: This document discusses the application of sustainability criteria for biomass, as well as the requirements of Articles 38, 39 and 53 of the MRR. This document is relevant for operators of installations as well as for AOs.

Guidance document No. 4: “Guidance on Uncertainty Assessment”. This document for installations gives information on assessing the uncertainty associated with the measurement equipment used, and thus helps the operator to determine whether he can comply with specific tier requirements.

Guidance document No. 5: “Guidance on sampling and analysis” (only for installations). This document deals with the criteria for the use of non-accredited laboratories, development of a sampling plan, and various other related issues concerning the monitoring of emissions in the EU ETS.

Guidance document No. 6: “Data flow activities and control system”. This document discusses possibilities to describe data flow activities for monitoring in the EU ETS, the risk assessment as part of the control system, and examples of control activities.

**Other relevant legislation and guidance are published on the Commission’s website:**

[http://ec.europa.eu/clima/policies/aviation/index\\_en.htm](http://ec.europa.eu/clima/policies/aviation/index_en.htm) and  
[http://ec.europa.eu/clima/policies/transport/aviation/index\\_en.htm](http://ec.europa.eu/clima/policies/transport/aviation/index_en.htm)

On this website you will also find contact details of the Competent Authorities responsible for EU ETS aviation in the EU Member States.

## Annex VI. Abbreviations

Abbreviation	Explanation
AO	Aircraft Operator
ACARS	Aircraft Communications Addressing and Reporting System
AIP	Aeronautical Information Publication
AOC	AO's certificate
APU	Auxiliary Power Unit
ATM	Air Traffic Management
AR	General framework regulation, Accreditation Regulation (EC) No. 765/2008
AVR	EU ETS Accreditation and Verification Regulation (A&V Regulation)
CA	Competent Authority
CEFA	CRCO Extranet for Airspace Users
CFMU	Central Flow Management Unit
CRCO	Central Route Charges Office
EA	European cooperation for Accreditation
EU ETS	EU Emission Trading Scheme
GCD	Great Circle Distance
ICAO	International Civil Aviation Organization
IATA	International Air Transport Association
MP	Monitoring Plan
MRG 2007	Monitoring and Reporting Guidelines
MRR	EU ETS Monitoring and Reporting Regulation (M&R Regulation)
MS	Member State(s)
NC	Non-conformity in figure 5
NCA	National Certification Authority
NAB	National Accreditation Body
SET	EUROCONTROL small emitter's tool
SITA	A multinational information technology company specialising in providing IT and telecommunication services to the air transport industry
ULD	Unit Load Devices