GUIDANCE FOR VERIFICATION BODIES ON REMOTE VERIFICATION OF CORSIA EMISSIONS REPORTS

A) Structure and objective of this guidance

With an increased availability and utilization of information and communication technologies (ICT) such as video conferencing, screen sharing and data cloud services, remote verification techniques have evolved into an effective and efficient tool. This guidance not only identifies the opportunities and risks involved in remote verifications of CORSIA Emissions Reports but also provides some practical best practice approaches.

As the guidance takes a step-wise-approach though the verification process, the guidance can also serve as a starting point for verification bodies to draft the relevant internal procedural documentation for remote verifications under CORSIA. Hence, this guidance can also be used by National Accreditation Bodies (NABs) to assess the related remote verification procedures of a verification body.

In order to not duplicate existing guidance on remote auditing, this guidance was informed and aligned with IAF MD4:2018, Issue 2 (IAF Mandatory Document for the Use of Information and Communication Technology (ICT) for Auditing/Assessment Purposes) and a paper of the ISO 9001 Auditing Practices Group on Remote Audits, Edition 1.

B) Important fundamentals

The main advantages of remote verification include reduced costs and travel time as well as a smaller environmental impact.

However, the remote verification will only be successful if the specific conditions at the aeroplane operator are met with the appropriate remote verification processes and techniques. A set of phone calls and emails that extend over a longer period of time does not constitute what is being referred to as a remote verification. On the contrary, the overall design of a remote verification will be very similar to a "standard" verification which includes a site visit with the small but fundamental difference that the processes during the site visit are substituted with specific remote verification techniques, e.g. live interviews through video conferencing.

Consequently, verifying remotely should not simply shift the "live" components of a site visit into an offline setting, where activities of the verification body and of the aeroplane operator are consecutive activities. Similar to a site visit, remote verification techniques should enable interaction with the aeroplane operator on a direct and instant basis (e.g. video conferencing supported by active screen sharing). Important information and insights, necessary for informing the "professional skepticism" of the verifier, are often gained through these direct interactions. For example, when copies from specific flight logs are requested with a deadline of a couple of days, and the interaction is limited to an email exchange, the verification body may not notice any difficulties the aeroplane operator might have had to provide such copies, e.g. because of a large number of inappropriately sorted or mishandled flight logs. However, requesting the same remotely in a video conference, supported by screen sharing, with a request to access the flight logs in the course of the meeting, the verification body might learn about those difficulties. This would trigger additional questions to the aeroplane operator and might even change the outcome of the risk assessment and sample size. In short, the use of remote verification techniques should not further increase the already existing information asymmetry between the aeroplane operator and the verification body.

In order to minimize the potential for fraud in a remote situation, it is recommended that all information and data be made available before the proper verification starts, to actively select the data to be checked during the remote verification, and to conduct additional checks of flight data against other independent data sources. These strategies are discussed further in the following text.

On the issue of verification duration, and in consideration of the additional challenges which will need to be addressed in an appropriate remote setting, IAF MD4:2018, Issue 2, 4.2.5 states the following: "If ICT is used for audit/assessment purposes, it contributes to the total audit/assessment time as additional planning may be necessary which may impact audit/assessment duration."

C) Remote verification aspects in the CORSIA verification process

The ETM (Doc 9501), Volume IV, section 3.3.4 provides a detailed description of the CORSIA verification process for aeroplane operator's Emissions Reports. While the process itself remains the same, the provided guidance in the following will point out specifics related to remote verification and also refer to best practice examples identified amongst verification bodies accredited to CORSIA.

(1) Pre-contract stage

Before offering remote verifications to aeroplane operators, the verification body should ensure that team members scheduled to conduct the remote verification have successfully completed internal training on remote verification. Consequently, the internal competence matrix should account for such an additional qualification. It is recommended that the training cover the following items at a minimum.

- Introduction to the relevant internal procedural instructions for remote verifications
- Remote verification techniques, including benefits and limitations
- Understanding of the enhanced documentation requirements for remote verifications as included in the verification report template provided in ETM (Doc 9501), Volume IV, Appendix 1 (e.g. element (h) in the template)
- Additional requirements for the independent review, e.g. check for appropriateness of applied remote verification techniques (see step 8 below)
- Practical handling of technical tools being used to perform the remote verification
- Specific articles in the agreement between verification body and aeroplane operator referring to remote verification
- Process for changing from a remote verification to a site visit setting during the verification process as a result of new information that changes the risk analysis result

Guidance in the ETM (Doc 9501), Volume IV, section 3.3.4.2 recommends that the verification body coordinate with the State before replacing the site visit with a remote verification approach. The verification body should be prepared to justify its decision. This is also in the interest of the aeroplane operator as it decreases the risk that the verified Emissions Report will not be accepted by the State.

Under normal circumstances, the decision to conduct a remote verification, which is based on the outcome of the risk analysis, cannot be made at the pre-contract stage as the available information is too little to conduct the risk analysis. Even in the case where a remote verification appears highly feasible at this stage (i.e. verification body is familiar with the aeroplane operator through previous audits and the verification body does not expect any concerns from the State in a remote verification approach) it is recommended to include the option for a site visit in the contract. This provides a transparent way forward for both signatories to the contract and avoids the need for potential additional discussions on this during the verification process.

In some instances, a preliminary risk analysis (on the basis of a preliminary strategic analysis using publicly available data) can already exclude the option of remote verification at this stage, especially in cases of obvious technical challenges such as a stable internet connection.

Once it has been decided that a remote verification approach is to be utilized, an important element for consideration in the contract involves data security and whether any additional provisions are required to ensure the continued security and confidentiality of information shared via remote means (e.g. videoconferencing, screensharing, use of screen shots, etc.)

(2) Strategic analysis

When considering a remote verification approach, additional technical aspects should be considered as part of the strategic analysis for the specific verification engagement. It is recommended that these additional technical aspects be provided in a "checklist" form in the internal documentation of the verification body. To some extent the checklist can be seen as a gap analysis mirroring the difference between an ideal remote verification environment and the actual situation at the aeroplane operator.

The checklist should be used to assign to each "gap" an alternative remote verification technique. This alternative should then be evaluated during the risk analysis to provide an initial assessment on whether or not the verification can be performed remotely. This checklist should at least cover the following areas while the list itself provides an ideal remote verification environment to identify gaps.

Subject area	Ideal remote verification environment
On the basis of each required data source (e.g. flight operations systems, datalink service provider), can independent remote access be granted?	Yes, through VPN connections.
On the basis of each required data item (e.g. fuel slips, flight log), can independent remote access be granted to the full primary data?	Yes, through VPN connections or a full upload in a secure data room.
Does the aeroplane operator support video conferencing and screen sharing?	Yes.
Is the aeroplane operator willing to have some staff members responsible for specific parts of the monitoring or reporting process interviewed by the verification body through video conferencing software (clear identification of interviewed staff members)?	Yes, according to an agreed schedule for video conferencing.
Does the monitoring process described in the Emissions Monitoring Plan provide appropriate links for remote verification, e.g. manual vs. automatic processes?	Yes, processes can be observed online through screen sharing.
Can the functioning of the aeroplane operator's control procedures to manage data quality be observed through remote verification techniques? How?	Yes, processes can be observed online through screen sharing.
Do aeroplane operator and verification body have a common and documented understanding of the confidentiality, security and data protection of remotely shared data?	Yes, as specified and agreed in the verification contract.

In a significant number of verification engagements, no ideal remote verification setting will be identified by the verification body. However, this does not mean that substituting the site visit with a remote

verification technique will not be possible. It is up to the verification body to identify the appropriate measure to close a gap. For example, if for technical or other reasons an aeroplane operator cannot provide direct and independent access to a cost management system that stores electronic fuel invoices and optical character recognition processed fuel slips, an alternative measure could be to upload the raw data of all fuel slips and fuel invoices in a secure data room to allow for independent consistency checks by the verification body. Alternatively, the verification body could be allowed access to the computer screen of the responsible staff member at the aeroplane operator and ask to be shown raw data for a sample of flights. This type of remote access to the aeroplane operator's systems is considered best practice for remote verifications because it allows for the most direct access to the processes and documents to be verified. Alternative recommended remote verification approaches include screensharing and videoconferencing.

In order to increase confidence in the data and the documentation process of the aeroplane operator it is of upmost importance to not communicate the sample of flights before the actual screen sharing session and to not only base the sample on a set of flights with identified anomalies (e.g. remarkably low fuel burn) but to also include fully randomized sampling. The same approach can be used to verify control procedures by actively manipulating data during a screensharing session. In any case it remains important that the verifier has firm positions on which specific items (in which line, cell or for a specific flight) the manipulation takes place.

If an aeroplane operator keeps primary records in stored paper flight logs only, a very basic remote verification technique is to present the sample of flights to the aeroplane operator during video conferencing. This then allows supporting staff members of the aeroplane operator to collect those flight logs within a specific and reasonable amount of time and to send them as scanned attachments to an encrypted email while the video conference is still ongoing. A second sample during the same video conference could then include previous or following flights of the first sample to ensure that the flight logs presented did indeed include credible data (e.g. correct flight log number, fuel consumption of previous or following flight remain reasonable and are consistent with the first sample). Another recommended technique includes conducting an additional check of the sample data against other independent data sources (e.g. air traffic control data).

Consequently, even when the actual situation at the aeroplane operator departs significantly from an ideal setting as included in the internal checklist, in many cases less robust but alternative remote verification techniques are available. In order to clarify the actual technical capabilities for remote verification techniques at the aeroplane operator, it is recommended to schedule a specific preparatory call or to circulate a standardized questionnaire.

Even if not directly applicable, ISO 9001 Auditing Practices Group on Remote Audits, includes some guiding questions for the verification body which have relevance for the technical setting of remote verifications as well. See text box 1.

Text box 1: Excerpt from ISO 9001 Auditing Practices Group on Remote Audits*, Edition 1, page 3:

- *When watching images, are we looking at real time images or are we looking at video records?*
- *Can we capture everything about the remote site or are we being guided by selected images?*
- *When planning for a remote interview, will there be a stable internet connection and the person to be interviewed knows how to use it?*
- *Can the processes and sites to be audited be realistically audited offsite?*
- *Can you have a good overview of the facilities, equipment, operations, controls? Can you access all the relevant information?*

*https://committee.iso.org/files/live/sites/tc176/files/documents/ISO%209001%20Auditing%20Practices%20Group%20docs/Auditing%20General/APG-Remote_Audits.pdf

(3) Risk analysis

The strategic analysis provides the verification body with a specific list of identified remote verification techniques for use during the verification engagement. While assessing the likelihood of risks of misstatements and/or non-conformities (i.e. when quantifying inherent risks and control risks) of the aeroplane operator data, the verification body needs to check whether the intended remote verification technique increases the detection risk[1] such that the overall verification risk no longer meets the level of reasonable assurance.

One potential way to assess this is to document in a list or matrix, the estimated inherent and control risk for each hazard and assign the planned remote verification technique. Line by line, assess the detection risk for each remote verification technique to quantify the overall verification risk (i.e. low, medium or high). In general, proper remote verification techniques should not (or only slightly) increase the detection risk in comparison to a verification that includes a site visit.

When the verification body experiences issues achieving the required level of reasonable assurance, planned remote verification techniques should be modified or exchanged with more robust and reliable approaches (e.g. direct, full and independent access to flight operations system) to arrive at a reasonably low detection risk. This can of course also include other best practice risk mitigation measures such as an increase in sample size or the review of additional independent data sources to meet reasonable assurance.

According to Annex 16, Volume IV, Appendix 6, paragraph 3.10.1 g), the verification body is required to present the main results of the strategic and risk analysis in the Verification Report. Therefore, the verification body should provide the estimates of its risk analysis under the appropriate prompt in the Verification Report template. This enhances the State's understanding of why a specific remote verification technique was utilized.

If reasonable assurance cannot be met through the applied remote verification techniques, the verification body will need to inform the aeroplane operator and discuss the next steps to schedule a site visit. Having agreed already on the terms and conditions of the site visit in the pre-contract stage should help the situation. Given that the aeroplane operator and verification body might have signed a contract for multiple verifications, the verification body could potentially point out to the aeroplane operator that the results of the risk analysis might be different in the next year. This would be for instance the case if the item which cannot be verified remotely at the moment has then been fully assessed by the verification body and simple cross checks (which could be done remotely) are sufficient to meet reasonable assurance in the upcoming years.

It is also not unusual that findings during the verification result in changes to the original risk assessment. This can lead to a situation that reasonable assurance cannot be met anymore with the planned set of remote verification techniques and the physical presence of the verification body is required.

(4) Verification plan

Planning for a remote verification involves additional tasks which are usually not required in verifications involving a site visit. Hence, the verification body should take into account sufficient time for preparatory activities.

With regards to the verification programme, the general approach to the verification remains the same. This means that similar to a typical site visit, the verification activities take place within a fixed period of time during the remote verification. Different time zones for the verifier and the aeroplane operator do not serve as a reason to lose the momentum of a "live" audit and to move the verification into an "offline" setting without the possibility to directly interact with the aeroplane operator in real time. This could result in a situation where the verification team would need to work at night in its own time zone.

[1] Defined as the risk that the verifier will not detect a material discrepancy (ISO 14064-3:2006 2.29)

The test plan and data sampling plan should consider the specifics of a remote verification. Identified remote verification techniques (from the strategic analysis, potentially revised in the risk analysis) should be assigned to specific verification tasks in the test plan and communicated to the aeroplane operator. Verification tasks should be clearly defined, especially in cases where more than one verifier interacts with the aeroplane operator at the same time.

The verification programme should include the type of technical arrangements needed for each step of the remote verification. This will allow the aeroplane operator to appropriately prepare from a technical and organizational perspective for each item on the agenda and to potentially introduce staff members to the specific technology in advance or to ensure availability at defined times. When technical issues start to dominate or to significantly delay the verification, the verification body must judge whether the original timeline is still sufficient for gaining the necessary confidence in the processes and data. Where additional time may be required, the verifier should acknowledge the situation with the aeroplane operator and schedule additional online meetings.

The verification programme should also include the requests for access to a specific data source (e.g. flight logs) without providing a reference to a specific sample (e.g. flight logs between airport pairs on a specific date).

(5) Verification

Technical hurdles are possible when first connecting to the aeroplane operator, e.g. via video conferencing. In order to not waste actual scheduled verification time, it is recommended to schedule a pre-meeting for at least 30 minutes. This buffer can be used to address technical issues and to also spend some time on introductions and informally getting to know one another as meeting remotely has the tendency to increase the communication barrier. A verifier should not expect a staff member of an aeroplane operator to immediately answer highly technical questions without building up a minimum of personal relationship. This small investment of time to build up the relationship before beginning the verification process, could help to save time later on as issues are often more easily addressed and solved in an open atmosphere. This aspect is important as small talk and gestures while e.g. moving from one room to another during a site visit, do not happen automatically in a remote verification setting. As with site visits, cultural dimensions should be kept in mind at all times.

Verifying remotely is more demanding for both the verifier and the aeroplane operator. Therefore, a higher number of small breaks is recommended. Those breaks can be simply built into the agenda without naming them as such, e.g. by scheduling verification tasks and interview partners.

Similar as with site visits, the verification body should record all documents used during the verification. Verifying remotely has the appealing technology advantage that screen shots can be done very easily. In addition, interviews can be recorded as well. Depending on the data being shared and the staff members being interviewed, screenshots and recordings might not be acceptable. The verifier should not only clarify in advance but also every time when taking screen shots or recording statements.

Impressions on the progress and success of the verification can be very different between the verification body and the aeroplane operator, especially in remote verifications. Therefore, the verification body should provide a very short feedback after each verification activity or offer an intermediate online meeting with the responsible manager during the day. This is also an opportunity for the aeroplane operator to address issues as early as possible.

While implementing the verification plan, the verification body needs to not only assess the material impact of identified misstatements and non-conformities on the reported data but also, if required, update the risk analysis. In this regard, it is important for the verifier to remember that the risk analysis was drafted under an assumption that a specific remote verification technique would deliver a specific level of effectiveness and robustness. It is of paramount importance to revisit the risk analysis during the

verification and to confirm that each applied technique does not exceed the originally assumed detection risk and that a reasonable level of assurance is met.

In the strategic analysis section above, guidance was provided on best practice remote verification techniques, including how to confirm the proper functioning of control procedures. These techniques are particularly effective when they are used to systematically walk the verifier through the aeroplane operator's entire data monitoring, collection, management, manipulation and reporting system. Furthermore, going through data together with the aeroplane operator in this manner can also provide important insights into how diligently processes are followed by staff.

(6) Addressing misstatements and non-conformities

In order to confirm that the aeroplane operator corrected all identified misstatements and non-conformities discovered during the verification, the verification body might, depending on the actual data item corrected, not just witness the data correction but also the effect on the reported data (e.g. emissions on the specific State pair). This is important as in some cases it might be challenging to confirm a data correction remotely.

(7) Verification Report

According to Annex 16, Volume IV, Appendix 6, paragraph 3.10.1 h), the verification body is required to provide a description of the verification activities that were undertaken, in the Verification Report. For a remote verification this would also include the remote verification technique applied for each verification activity. A detailed description supports State understanding of the approach taken by the verification body and can help to limit the need for unnecessary additional communication between the State and the verification body or aeroplane operator.

According to Annex 16, Volume IV, Appendix 6, paragraph 3.10.1 g), the verification body is required to provide the main results of the strategic analysis and assessment of risk in the Verification Report. For a remote verification, the verification body should provide the results of its risk analysis under the appropriate field in the Verification Report template. This enhances the State's understanding of why a specific remote verification technique was utilized.

(8) Independent review

The internal documentation of the verification body should include specific aspects for the independent reviewer to confirm with regards to the remote setting of the verification. Despite obvious aspects (such as appropriate split between actual auditing time and desk research), the following points are recommended to be covered as well.

- Did the contractual setting with the aeroplane operator allow the verifier to switch to a site visit if the risk analysis would have revealed the need? If not, what was the reason?
- Did the coordination with the State raise any concerns with the remote verification approach?
- Was there inappropriate pressure from the aeroplane operator or from the management of the verification body to conduct the verification remotely? Was the verification still handled in a professional manner despite this pressure? If the pressure had not existed, would the verification have included a site visit?
- Is the risk analysis complete, transparent and reasonable with regards to the inclusion of the additional risk of verifying remotely? Did the use of remote verification techniques increase the detection risk? Has every verification activity that was supported by remote verification technique been assessed separately?

- Despite the remote verification, do the results of the risk analysis support that the verification statement is made with reasonable assurance?
- Are there any lessons learned which would need to be included in the internal documentation of the verification body on remote verifications under CORSIA?

(9) Authorization to forward Emissions Report

No specific guidance necessary as this downstream process is usually done remotely already.

(10) Submission of Verification Report and Emissions Report

No specific guidance necessary as this downstream process is usually done remotely already.

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