IFATCA
INTERNATIONAL FEDERATION OF AIR TRAFFIC CONTROLLERS' ASSOCIATIONS
65TH ANNUAL CONFERENCE
20-24 APRIL 2026, Bucharest, ROMANIA

Agenda Item: B.4.9 **WORKING PAPER** **WP No: 100**
IFATCA'26

Review of Policy ADME 2.6: Responsibility and Functions of Aerodrome Controllers with Regard to Surface Movement

Presented by TOC

SUMMARY

This paper reviews the existing policy ADME2.6 and ADME2.3 in the light of recent advances affecting or replacing visual observation in aerodrome control towers.

1. INTRODUCTION

1.1. The existing IFATCA policy on ADME 2.6 addresses the use of Closed-Circuit Television (CCTV) and other surveillance systems in the tower for visual observation. The policy statement was designed for conventional towers and does not account for virtual tower concepts. The introduction of Visual Surveillance Systems (VSS) in remote and digital tower concepts have necessitated a review of this policy to address current trends and challenges facing ATCOs. This is also to ensure consistency with IFATCA policies such as ADME 2.14 on 'remote and virtual towers' and AMDE2.3 on 'Visual Observation' as well as ICAO Doc 4444 (PANS-ATM).

1.2. This review will focus on the use of Visual Surveillance Systems in the tower for visual observation and the necessary safeguards to prevent obstructions of the ATCO's view. Lastly, there is a proposal to amend the definition of 'visual observation' in policy ADME 2.3 as a result of the proposed changes to ADME 2.6.

1.3. A Brief History of Policy ADME 2.6

1.3.1. This policy was first formulated and accepted at the conference of 1996 in Tunis, Tunisia. There was a review of the policy prepared by PLC for the 2007 Conference in Istanbul, Turkey. The working paper proposed by the committee sought to define the term 'visual observation' and refine the policy statement. This review also introduced caveats under which "any future ATM concepts will be accepted". Thereafter, a review of the ADME section of the TPM presented in WP59 at the 2022 virtual Conference which recommended

a further review of the policy to take account of new advances in digital ATS, remote and virtual tower concepts.

1.3.2. During the Abu Dhabi Conference 2025, TOC's proposal to delete sections of the policy that were opposed to the use of CCTV for visual observation and align with ICAO DOC 4444 was not approved. Many MAs at the committee felt the proposed amendments could leave a gap for some ANSPs to force usage of CCTV for visual observation even in undesirable conditions. The conference generally agreed that the policy should still restrict usage of CCTVs only as a complementary equipment for visual observation at the tower. The working paper was thereafter withdrawn for rework through a new job card for the next conference in 2026.

2. DISCUSSION

2.1. The existing policy ADME2.6 in the IFATCA Technical and Professional Manual (TPM) reads:

ADME 2.6 Responsibility and Functions of Aerodrome Controllers with Regard to Surface Movement

In aerodrome control towers, CCTV shall not be used to replace visual observation. The use of CCTV shall only be accepted to supplement visual observation where:

- **It has been proven by a safety analysis that at least the same level of safety can be guaranteed;**
- **Contingency procedures are in place**

The layout of runways and taxiways and the provision of visual aids should be such as to enable simple and easily understood instructions to be issued and complied with.

Where a separate apron management service is established, personnel engaged in issuing specific ground clearances, instructions and clearance delivery should be trained and licensed to exercise these functions.

Safeguards should be imposed to prohibit the development of any structure that would impede the direct visual observation from the tower.

Where apron management services are established and not provided by an aerodrome ATS Unit, aerodrome controllers shall not be held liable for accidents or incidents that occur whilst aircraft are under the jurisdiction of the Unit providing such a service".

2.2. This paper shall do an analysis of selected parts of the policy statement that affect the use of CCTV and VSS for visual observation, to check for improvements or consistency with IFATCA policies and other ICAO documents.

2.3. **'In aerodrome control towers, CCTV shall not be used to replace visual observation'.**

The first part of the statement expresses IFATCA's opposition to the replacement of visual observation in an aerodrome control tower, with CCTV. Take note that 'visual observation' is required at the tower according to ICAO Doc 4444 (PANS- ATM Chp. 7.1.1.2) which states among other things (ICAO, 2016a):

> *"Watch shall be maintained by visual observation, augmented in low visibility conditions by an ATS surveillance system when available".*

2.4. What is visual observation?

2.4.1. Even though ICAO has no standard definition for visual observation, IFATCA policy (ADME 2.3) states (IFATCA, 2022):

> ***"****Observation through direct eyesight of objects situated within line of sight of the observer possibly enhanced by binoculars"*.

2.4.2. The definition is supported by a paper presented at the ICAO Middle East Air Navigation Planning and Implementation Regional Group (MIDAPIRG) meeting in 2022, which defined visual observation as:

> *"Observation through direct eyesight of objects situated within the line of sight of the observer, possibly enhanced by external elements" (ICAO CNS SG,2022).*

2.4.3. The definition above implies that visual observation refers to direct human eyesight or out-of-the-window (OTW) observation from the tower. This then excludes use of visual surveillance systems and other media for visual observation except for use in a supplementary role. This is inconsistent with PANS-ATM (ICAO, 2016a amended 2020 chp7.1.1.2.1) which states that:

> *"Visual observation shall be achieved through direct out-of-the-window observation, or through indirect observation utilizing a visual surveillance system which is specifically approved for the purpose by the appropriate ATS authority".*

2.4.4. This indicates that ICAO permits use of VSS to achieve visual observation, aside from the out-of-the-window (OTW) view. IFATCA may need to review its policy on visual observation to align with ICAO provisions, unless other justifications are provided.

2.5. Use of CCTV in Conventional Aerodrome Control Towers

2.5.1. CCTV has been used to supplement visual observation, that is normally achieved through direct eyesight by ATCOs. CCTV has enabled ATCOs to see behind blind spots or areas outside the line of sight of the ATCO that would otherwise be obscured by installations or other obstacles around the aerodrome. In this case the CCTV is playing a supplementary role to visual

observation by direct eyesight (out-of-the-window view). This case is in line with IFATCA's position and does not contradict the policy under review.

2.6. Use of Visual Surveillance System (VSS) in Digital Air Traffic Services (DATS)

2.6.1. Digital Air Traffics Services refers to the concept in which air traffic control services may be provided to an aerodrome from a remote location via digital means without direct visual observation (EASA, 2020). The concept, sometimes referred to as remote towers or digital towers, utilises a VSS that replaces the need for direct out-of-the-window visual observation. The VSS is defined in PANS-ATM as:

> *"An electro-optical system providing an electronic visual presentation of traffic and any other information necessary to maintain situational awareness at an aerodrome and its vicinity"* (ICAO, 2016b).

2.6.2. The VSS is designed to either replicate or complement the 'out-of-the-window' (OTW) view of the conventional tower utilizing an integrated system of sensors, data transmission links, data processing systems and situation displays (EASA, 2020). The system is equipped with high definition (HD) cameras (minimum 1080p) with pan-tilt-zoom (PTZ) capabilities providing binocular views of the airfield. This improves situational awareness and helps in the provision of air traffic services from remote locations consistent with the remote tower concept. It can also integrate other surveillance sources such as the Advanced Surface Movement Guidance and Control System (A-SMGCS) and ADS-B, among others, making it suitable for use at large aerodromes where remote areas cannot be observed directly from the tower (EUROCAE, 2023). VSS are used for digital or remote towers in Sweden (Saab Group, 2023), the UK (NATS, 2023), among others around the world.

2.6.3. In conventional towers the VSS can be used to enhance the direct OTW view of the ATCO by bringing blind spots into their view. Singapore Changi Airport is an example where this is being used to supplement visual observation (Changi Group, 2023). Australia has also amended their regulations to permit the use of VSS for similar purposes (Civil Aviation Safety Authority, 2022).

2.6.4. These examples of the use of VSS seem inconsistent with the policy under review (ADME2.6). It suggests that the level of safety provided by visual observation in the tower and the protection afforded the ATCO may be impaired if it is substituted by a VSS. This implies that it is incapable of meeting the safety standards required even if approved by the appropriate state authority. It is also inconsistent with IFATCA's definition of visual observation stated in ADME 2.3.

2.7. Difference between VSS and CCTV

2.7.1. One major difference is the requirement for regulatory approval for the use of VSS by the appropriate state authority. As an example, the European Aviation Safety Agency (EASA) has developed the 'Rulemaking Task' document

known as RMT.0624 which specifies technical and operational standards for implementation of DATS including use of VSS to replace OTW visual observation (EASA, 2020). ED240-B published by EUROCAE also specifies Minimum Aviation System Performance Standard (MASPS) for remote tower optical systems which details further operational requirements for DATS equipment including VSS (Eurocae, 2023).

2.7.2. Unlike the VSS there is no standard definition or description of what CCTV should be in the context of air traffic control operations. The technology can range from basic systems such as cameras streaming various activities from the airfield onto monitors at the tower, to more sophisticated functionalities like those in the VSS. However, it is not meant to be used for active air traffic control except for enhancing the controller's OTW view.

2.7.3. Use of CCTV is neither standardized nor requires regulatory approval like the VSS. The VSS is more attuned to the future whilst the CCTV seems to be fading into the background especially as DATS keeps developing. This reinforces the argument to refine the policy under review (ADME 2.6) to remove such inconsistencies with current trends.

2.7.4. Summary of basic differences between CCTV and VSS is tabulated below

Aspect	CCTV	VSS
Focus	Usually basic with cameras and monitors enough to observe obscure areas of the airfield	Reproduction of the OTW of the aerodrome
Technology	Could be basic to more sophisticated cameras linked to monitors at the tower. Could have PTZ and other capabilities like the VSS but not necessarily to reproduce OTW.	Fitted with HD, PTZ cameras, cloud/network integration, streaming to remote towers able to reproduce OTW view and can be supplemented with other surveillance sources (eg A-SMGCS, ADS-B etc)
Use	Enhance ATCO's line of sight in conventional towers, not used for active ATC or separation	Technical enabler for DATS for indirect visual observation. can be used for separation. Can also be used in conventional towers.
Standards	Not standardized, usually no regulatory requirements	there are strict technical and operational requirements for regulatory approval

2.7.5. Finally, policy ADME 2.14 on 'Remote and Virtual towers' infers that IFATCA is generally not opposed to the deployment of the DATS concept and hence

must not be seen to be opposed to the use of systems such as VSS for 'visual observation' which is a vital component of the concept.

2.7.6. Given the points above, it will be difficult to oppose the use of VSS for visual observation in both DATS and conventional towers. The requirement for regulatory approval increases the level of assurance of its reliability. We will thus recommend a revision of this part of the policy to achieve consistency with other IFATCA and ICAO policies.

2.7.7. The next statement of the policy says that:

"The use of CCTV shall only be accepted to supplement visual observation where:"

Whereas the first sentence of the policy (examined under paragraph 2.3 above) emphatically states its opposition to the use of CCTV for visual observation, this part provides two conditions under which CCTV can be used in the tower as supplementary aids for visual observation. As a supplementary aid it still excludes use of CCTV for visual observation of the entire aerodrome (especially the manoeuvring area). This still restricts use of CCTV only as an additional aid to the direct visual observation of the airfield in cases where the controller's view is obstructed by some structure or to eliminate blind spots.

2.7.8. The statement nevertheless does not recognise the use of VSS for indirect visual observation in the digital ATS. We argued in paragraph 2.4.3 above that the PANS-ATM permits the use of VSS for visual observation in both conventional and DATS towers. The policy should be updated to reflect this fact, align with ICAO's position, and remain consistent with the 'Remote and Virtual Towers' policy.

2.8. Use of VSS to Create a Complex Hybrid Environment

2.8.1. The use of an approved VSS in the conventional tower could introduce an unintended complex hybrid environment adversely affecting ergonomics of the ATCOs working conditions. This situation could arise when several VSS are installed in the tower to enhance situational awareness from different parts of the aerodrome that were blocked by structures. This would present areas of OTW for direct visual observation with pockets of other areas depending on indirect views using VSS. Furthermore, installation of VSS (and other equipment) could be positioned in an obstructive way between the ATCO's line of sight and the airfield thereby impairing visual observation. These conditions would be unacceptable and inconsistent with PANS ATM (8.10.1.4) which clearly prohibits such a situation (ICAO, 2016b).

2.8.2. The policy should be amended to reinforce this view to provide further protection for the ATCO and preserve situational awareness.

"It has been proven by a safety analysis that at least the same level of safety can be guaranteed:"

2.8.3. Safety analysis (or assessment) is a standard requirement prior to the implementation of new concepts or installation of new equipment. There are ICAO documents (such as DOC 9859) that give details about safety assessment in this regard (ICAO, 2018). This caveat is then consistent with such requirements and still valid. The requirement for safety assessment is also inferred in PANS-ATM 7.12 which states that:

> *"Visual surveillance systems used in the provision of aerodrome control services shall have an appropriate level of reliability, availability and integrity. The possibility of system failures or significant system degradations, which may cause complete or partial interruptions of service, shall be assessed and taken into account in the definition of the level of service provided in order to ensure that there is no degradation in the safety level of the services rendered. Backup facilities or alternative operational procedures shall be provided"* (ICAO, 2016a).

2.8.4. It can be concluded that this is well covered by PANS-ATM and may not be needed in the policy. We will nevertheless recommend that this statement be maintained due to apprehension by many MAs of IFATCA that deleting this sentence may weaken the position of the ATCO. A further requirement in the policy statement for regulatory approval by the appropriate ATS authority will enhance the level of assurance of safety standards and enhance the ATCO's position.

2.8.5. **"…contingency procedures are in place."**

To prevent equipment degradation or service impairment, backup facilities or alternative procedures are recommended. ICAO DOC4444 (PANS-ATM 7.12.1.1- ICAO, 2016a) recommends such a practice in the implementation of VSS technology. IFATCA policy WC10.2.7 also covers the provision of equipment *"***on hot standby***"* in case of degradation or unserviceability of primary equipment. This part of the policy is then appropriate and consistent with best practices.

2.8.6. "**Safeguards should be imposed to prohibit the development of any structure that would impede the direct visual observation from the tower".**

The statement above recommends protecting the view of the ATCO from being obstructed as to impede visual observation which is required under ICAO Doc4444 (PANS- ATM chp. 7.1) for provision of aerodrome control services. This situation is applicable to both conventional towers and digital or virtual towers. In both cases unregulated structures could be erected in the way of the ATCO's line of sight or the visual surveillance system which will impair situational awareness of the ATCO providing aerodrome control service. Both situations are to be avoided, and safeguards are then necessary to prevent this condition from occurring. Furthermore, it helps to assure ATCOs that ANSPs cannot use this to justify replacing 'direct line of sight' with

VSS in the future. This statement is valid, still relevant and requires no amendment.

2.8.7. Summary of different positions between ICAO and IFATCA on the use of VSS and CCTV in aerodrome control operations for visual observation is tabulated below.

ISSUE	ICAO	IFATCA POLICY
Definition of Visual Observation	No explicit definition	Defines visual observation as strictly OTW
Use of VSS or CCTV	Permits VSS as part of DATS implementation	Opposed to use for visual observation except to enhance OTW
Policy evolution	Supports use of VSS for DATS. can also be used to enhance situational awareness in conventional aerodromes	ADME2.6 opposed to use of VSS in DATS as well as conventional towers for visual observation
Contingency	PANS-ATM recommends redundancy system	IFATCA demands explicit fallback procedures in case of technical failure affecting controller situational awareness (ref WC10.2.7)
Operational Acceptance	ICAO permits use of VSS for indirect visual observation	Current policy does not accept VSS

2.9. Consistency with IFATCA's definition of Visual Observation in ADME2.3

ADME 2.3 defines visual observation as: **Observation through direct eyesight of objects situated within line of sight of the observer possibly enhanced by binoculars.**

2.9.1. This definition for visual observation given in ADME 2.3 does not recognise use of VSS for visual observation in DATS as legitimate and therefore inconsistent with policy ADME 2.6 and ADME 2.14. The inconsistency arises from the original intent of the definition, which was developed for conventional towers where ATCOs are expected to maintain direct visual contact with the manoeuvring area. The concept of indirect visual observation, such as VSS in virtual towers, was not accounted for in this definition. Bear in mind that in DATS direct visual observation is impractical as the component aerodromes would be at remote locations far beyond human 'line of sight' and OTW is impossible.

2.9.2. Considering that neither ICAO Doc. 4444 nor IFATCA policy prohibits the development or use of remote or virtual towers, it is essential to revise this definition to ensure harmonization.

2.9.3. Additionally, referencing only binoculars in the definition is insufficient, as it fails to acknowledge other relevant equipment, such as a monocular, CCTV etc, which may serve as supplementary aids to enhance direct visual observation as practised in some countries. A more inclusive term would be appropriate to enrich the definition.

2.9.4. Therefore, it is recommended to reword policy ADME 2.3 to make it consistent with both ADME 2.14 (Remote and Virtual Towers) and ADME 2.6 (this paper under review).

2.9.5. Additionally, since it is the definition of a technical term it would be more suitable to place this under the Terms and Acronyms section of the TPM. The rest of the policy remains unchanged.

3. CONCLUSIONS

3.1. This paper has examined sections of the policy statement ADME 2.6 from the TPM concerning the "Responsibility and Functions of Aerodrome Controllers Regarding Surface Movement" specifically focusing on the use of CCTV and VSS for visual observation. After analysing the sections of the policy under review we conclude as follows:

3.2. **"In aerodrome control towers, CCTV shall not be used to replace visual observation.**

VSS are in use in several countries around the world for indirect visual observation or to supplement the same. Their use in the tower for visual observation aligns with provisions in the PANS-ATM. It was also noted that the policy as it is currently written does not make room for digital ATS. The statement should be reworded to capture use of VSS for visual observation in DATS and make it relevant for the current trends.

3.3. **"The use of CCTV shall only be accepted to supplement visual observation where:**

- **It has been proven by a safety analysis that at least the same level of safety can be guaranteed;**
- **Contingency procedures are in place"**

3.4. The use of VSS in the tower aligns with PANS-ATM provisions, rendering this policy section outdated and subject to deletion. The intent of this statement is sufficiently addressed within the PANS-ATM and can be inferred from WC10.2.7 of the Technical and Professional Manual (TPM).

3.5. Overall, the policy is still relevant and enjoys wider support among IFATCA MAs even though it fails to capture current trends in Digital ATS.

3.6. We emphasize that the intent of this section of the policy ADME2.6 is sufficiently covered in the PANS-ATM, especially chapter 7 and the IFATCA TPM under WC10.2.4 and WC10.2.7 (IFATCA, 2022).

3.7. To make the policy stronger we would propose amendments to prevent the creation of a complex hybrid working environment in the tower as described in section 2.8.

3.8. "**Safeguards should be imposed to prohibit the development of any structure that would impede the direct visual observation from the tower".**

3.9. This section is still relevant and should remain in the policy to ensure the ATCO's situational awareness is not impaired. The required safeguards should further ensure that ANSPs do not unnecessarily replace direct line-of-sight with VSS or position essential equipment to block the direct OTW view of the ATCO in the tower. It further ensures that different kinds of equipment are not positioned in the tower to create a complex hybrid working environment as described in paragraph 2.8.1 of this paper.

3.10. Lastly, the phrase "the direct" in the statement excludes indirect visual observation as applied to remote towers. By deleting the words 'the direct' in the second line the inconsistencies will be removed and render the statement applicable to both conventional and remote towers.

3.11. Definition for Visual Observation

It is suggested to revise IFATCA's stance on using VSS for visual observation to align with ICAO DOC4444 and TPM policy ADME 2.14 on 'Remote and Digital Towers'. This will necessitate a review of the definition of 'visual observation' in policy ADME 2.3

3.12. The definition for visual observation stated under policy ADME 2.3 is inconsistent with ADME 2.4 on 'remote and virtual towers' as well as ICAO Doc 4444. Additionally, a more encompassing term should replace 'binoculars' as used in the definition. Lastly it has been argued that this definition would find better accommodation under the Acronyms and Terms section of the TPM.

4. DRAFT RECOMMENDATIONS

4.1. It is recommended that existing policy ADME 2.6 is amended as shown below:

ADME2.6 Responsibility and Functions of Aerodrome Controllers with Regard to Surface Movement
IFATCA Policy is: **In aerodrome control towers**, Visual Surveillance Systems (VSS) may be used for visual observation when authorised by the appropriate ATS authority. When VSS is used for visual observation: ~~**CCTV shall not be used to replace visual observation. The use of CCTV shall only be accepted to supplement visual observation where:**~~

- ~~**It has been proven by a safety analysis that at least the same level of safety can be guaranteed;**~~
- it shall guarantee at least the same level of safety as direct visual observation
- **Contingency procedures are in place**
- It shall not introduce a complex hybrid work environment

Electro-optical systems, such as CCTV, shall not be used to replace visual observation unless it is a part of an approved VSS.

Safeguards should be imposed to prohibit the development of any structure that would impede ~~the direct~~ visual observation from the tower.

The layout of runways and taxiways and the provision of visual aids should be such as to enable simple and easily understood instructions to be issued and complied with.

Where a separate apron management service is established, personnel engaged in issuing specific ground clearances, instructions and clearance delivery should be trained and licensed to exercise these functions.

Where apron management services are established and not provided by an aerodrome ATS Unit, aerodrome controllers shall not be held liable for accidents or incidents that occur whilst aircraft are under the jurisdiction of the Unit providing such a service".

4.2. The definition of 'visual observation' in the existing policy ADME 2.3 'Visual Observation and New Tower Concepts' is amended to read

~~**Observation through**~~ **Direct** out-of-the-window observation ~~**eyesight of objects situated within line of sight of the observer**~~ **possibly** ~~**enhanced**~~ aided **by** visual enhancement tools, such as **binoculars,** or achieved indirectly with the aid of visual surveillance systems (VSS).

And is moved to the Acronyms and Terms section of the TPM.

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