



International Civil Aviation Organization

ICAO

Fourteenth Meeting of the Air Traffic Management Sub-Group (ATM/SG/14) of APANPIRG

Bangkok, Thailand, 3 – 7 August 2026

Agenda Item 6: ATM Coordination and Implementation

6.2: ATC Separation

SEPARATION BETWEEN TAXIING AIRCRAFT AND VEHICLE DURING LOW VISIBILITY OPERATIONS

(Presented by Pakistan)

SUMMARY

This working paper discuss the standard requirement of prescribing separation minima between taxiing aircraft and ground vehicles during Low Visibility Operations. While ICAO Annex 11 – *Air Traffic Services* mandates this requirement, defining numerical or distance metrics remains practically challenging. During such operations, safety margins are maintained through risk-based frameworks combining procedural mitigations, such as geographical block isolation with advanced surveillance technologies (where applicable). Since guidance material is fragmented across multiple ICAO documents, this paper also proposes reviewing existing standard for clarity and issuance of single consolidated ICAO guidance manual. The meeting is invited to note the analysis, discuss the harmonization proposal, and exchange State implementation experiences.

1. INTRODUCTION

1.1 ICAO Annex 11 requires ATS authorities to prescribe separation minima between taxiing aircraft and vehicles during Low Visibility Operations. The requirement is further included in PANS-ATM (ICAO Doc 4444) for determination of longitudinal separation taking into account the aids available and development of requisite procedures to ensure separation between aircraft and vehicles.

2. DISCUSSION

ICAO Requirements

2.1 Reference is made to following requirement of ICAO Annex 11:

3.8.1 *The movement of persons or vehicles including towed aircraft on the manoeuvring area of an aerodrome shall be controlled by the aerodrome control tower as necessary to avoid hazard to them or to aircraft landing, taxiing or taking off.*

3.8.2 *In conditions where low visibility procedures are in operation:*

- a) *persons and vehicles operating on the manoeuvring area of an aerodrome shall be restricted to the essential minimum, and particular regard shall be given to the requirements to protect the ILS/MLS sensitive area(s) when Category II or Category III precision instrument operations are in progress;*

- b) *subject to the provisions in 3.8.3, the minimum separation between vehicles and taxiing aircraft shall be as prescribed by the appropriate ATS authority taking into account the aids available;*

....

3.8.3 *Emergency vehicles proceeding to the assistance of an aircraft in distress shall be afforded priority over all other surface movement traffic.*

2.2 *Procedures for Air Navigation – Air Traffic Management (PAN-ATM, ICAO Doc 4444)* further specify the given requirement reproduced as below:

7.13.1.1.2 *The longitudinal separation on taxiways shall be as specified for each particular aerodrome by the appropriate ATS authority. This separation shall take into account the characteristics of the aids available for surveillance and control of ground traffic, the complexity of the aerodrome layout and the characteristics of the aircraft using the aerodrome.*

....

7.13.5 *Provisions regarding low visibility operations should specify:*

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- f) *special procedures for the control of traffic on the manoeuvring area, including:*

....

- 4) *procedures applicable to the separation of aircraft and vehicles;*

Guidance Material

2.3 The above-referred ICAO Standards require the Appropriate ATS Authorities to determine minimum separation between vehicles and taxiing aircraft taking into account the aids available during low visibility operations. The note(s) underneath these requirements refers to the *Manual of Surface Movement Guidance and Control Systems (SMGCS)* (ICAO Doc 9476), *Air Traffic Services Planning Manual* (ICAO Doc 9426) and the *Manual of All-Weather Operations Manual* (ICAO Doc 9365) as guidance documents on low visibility operations at an aerodrome.

Review and Application of Standard and Guidance Material

2.4 Generally, operations at an aerodrome are dependent on controllers, pilots and vehicle drivers using visual observations to estimate the respective relative positions of aircraft and vehicles. Pilots and vehicle drivers rely on visual aids (lighting, markings and signage) to guide them along their assigned routes and to identify intersections and holding positions. During periods of low visibility, controllers rely on pilots' reports and surface movement radar (where installed) to monitor spacing and to identify potential conflicts. Under these conditions, pilots and vehicle drivers find that their ability to operate "see and be seen" is severely impaired. There are no prescribed separation minima, and controllers, pilots and vehicle drivers share the responsibility that operations will not create a collision hazard.

2.5 The primary means of control and surveillance of ground traffic in low visibility conditions can be procedural, using radio voice communication between the aerodrome controller and the pilot or vehicle operator, supplemented by visual information for the pilot and vehicle drivers in the form of lights, surface markings, and guidance signs. In order to ensure safe spacing between taxiing aircraft and vehicle, the required minimum separation may be geographical (aerodrome layout dependent) wherein either vehicle or aircraft is allowed to move in a particular area. Enhanced situational awareness through surveillance systems can further ensure safe operation.

2.6 The designated low visibility taxi routes may be used and published/depicted on aerodrome charts available to pilots and vehicle operators. The airfield lighting systems such as stop bars and runway guard lights may be used to assist ATC in controlling access to active runways. Landing aircraft can be required to exit the runway at specific taxiways and follow the taxi instructions from the ground controller. Access of ground vehicles is required to be strictly controlled, and only essential vehicles are to be permitted on the manoeuvring area ensuring that vehicle(s) are fit to operate and vehicle drivers have appropriate training/briefing(s).

2.7 Persons and vehicles operating on the manoeuvring area of an aerodrome shall be restricted to the essential minimum, and particular regard shall be given to the requirements to protect the ILS sensitive area(s) when Category II or Category III precision instrument operations are in progress. During low visibility operations, vehicles preferably fitted with transponders or ADS-B squitter beacon SQUID (vehicle locators) should only be permitted on the manoeuvring area, where applicable.

2.8 Drivers of ground vehicles must comply with aerodrome regulations and ATC instructions. Notwithstanding this, drivers are responsible for exercising due care and attention so as to avoid collisions between their vehicles and aircraft, and between their vehicles and other vehicles. All vehicle drivers who are required to drive on the movement area should receive formal training. Such training should include all rules and procedures applicable to the aerodrome and knowledge of those aspects of LVPs and SMGCS procedures, which apply to vehicle drivers, including the use of radiotelephony, when applicable. Aerodromes wherein Surface Movement Radar (SMR) is installed, and induction loop system is being utilized as augmentation devices/systems, the local procedure should include the use(s) of said aids and facilities.

2.9 The control and operations of vehicle traffic in normal operating environment and during Low Visibility Operations has been discussed in various ICAO Annexes/Docs such as ICAO Annex 11, Annex 14, Doc 4444, Doc 9157 Part 4, Doc 9365, Doc 9476, and Doc 9830. The ICAO standard requires ATS authorities to prescribe minimum separation between vehicles and taxiing aircraft taking into account the aids available. The review of guidance documents establishes that determination of such separation minima in terms of numerical value/distance may not be practicable. Rather, set of procedures/protocols can ensure the safe distance/spacing between vehicles and taxiing aircraft.

2.10 It may be concluded that establishment of separation minima or longitudinal separation between taxiing aircraft and vehicle or between aircraft during low visibility operations using numerical values may be very difficult. To ensure safety, aerodromes must rely on specific operational procedures that are tailored to the unique layout, visual aids, and associated facilities of each airport.

Proposal for Consideration

2.11 In view of above, it is recommended that ICAO Annex 11 standard requirement contained at para 3.8.2(b) may be reviewed to provide more clarity to States and ATS authorities. ICAO may also like to consider issuance of dedicated guidance material for more effective implementation of the required standard while combining and improving the existing guidance contained in relevant ICAO Docs.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) discuss the proposal contained at para 2.11;
- c) share the experience of application of referred standard; and
- d) discuss any relevant matters as appropriate.

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