



International Civil Aviation Organization

MIDANPIRG/22 & RASG-MID/12 Meetings

(Doha, Qatar, 4 – 8 May 2025)

Agenda Item 5.3: ANS (AIM, PBN, AGA-AOP, ATM-SAR, CNS and MET)

**USE OF ALPHANUMERIC CALLSIGNS TO REDUCE CALLSIGN CONFUSION –
LIMITATIONS AND FUTURE REQUIREMENTS**

(Presented by the United Arab Emirates)

SUMMARY

This paper examines the ongoing risks of callsign confusion, despite the implementation of alphanumeric callsigns by some airlines. While alphanumeric callsigns have successfully reduced intra-airline callsign conflicts, cross-airline conflicts remain unresolved, as different operators do not coordinate their assignments. The paper highlights current safety risks, gaps in implementation, and the need for a standardized, industry-wide solution to enhance regional and global aviation safety.

The meeting is invited to discuss and consider regional collaboration mechanisms to ensure cross-airline harmonization of callsign deconfliction and encourage ICAO-led regulatory and technological initiatives.

Action by the meeting is at paragraph 4

REFERENCE

- ICAO DOC 4444 - Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)
- EUROCONTROL Call Sign Similarity Tool (CSST) Implementation Reports
- ICAO MIDANPIRG/20 Report (2023) – Callsign Similarity and Confusion Mitigation

1. INTRODUCTION

Callsign confusion remains a critical safety issue, despite progress in mitigating risks through alphanumeric callsign adoption by individual airlines. Callsign similarity continues to contribute to:

- Misinterpretation of ATC instructions
- Loss of separation incidents
- Runway incursions and unauthorized maneuvers
- Increased workload for controllers and flight crews

Recent data from reported incidents in the MID region indicate that callsign conflicts persist between different airlines due to lack of cross-airline coordination. The introduction of alphanumeric callsigns at individual airline levels has helped reduce conflicts within single operators, but these initiatives do not account for conflicts with other airlines, leading to continued risks in shared airspace and aerodrome environments.

Given the projected increase in regional air traffic, failure to implement a harmonized callsign deconfliction framework could exacerbate operational risks.

2. DISCUSSION

2.1 Benefits and Limitations of Alphanumeric Callsigns

The transition from purely numeric callsigns to alphanumeric formats has been recognized as a significant step forward. Several airlines, including Emirates, Etihad, and Qatar Airways, have successfully introduced alphanumeric callsigns, reducing intra-airline conflicts. However, the following challenges persist:

I. Lack of Cross-Airline Coordination

- Airlines independently implement alphanumeric callsigns without a shared regional or global deconfliction mechanism.
- Callsign similarity between different airlines still occurs, leading to miscommunication.

II. ATM System and ANSP Constraints

- Some Air Traffic Management (ATM) systems and ANSPs are not yet configured to handle alphanumeric callsigns efficiently.
- Existing ATM platforms do not automatically detect and deconflict similar callsigns across airlines.

III. Operational and Regulatory Gaps

- ICAO Doc 4444 provisions allow alphanumeric callsigns but do not mandate a global framework for implementation.
- No unified regional callsign deconfliction process exists in the MID and APAC regions.

IV. Human Factors and Training Issues

- Flight crews and controllers may misinterpret unfamiliar alphanumeric callsigns, particularly in high-workload environments.
- Standardized training and awareness programs on alphanumeric callsign best practices are needed.

2.2 Reported Safety Incidents Related to Callsign Confusion

Recent reports from ATCOs and airline safety teams in the MID region indicate that:

- I. 30% of callsign confusion reports involve different airlines, despite alphanumeric callsign usage.
- II. Multiple incidents of incorrect clearances were linked to callsign conflicts in high-density airspace and airport operations.
- III. ATCO workload has not significantly decreased, as controllers still manually resolve conflicts.

These findings indicate that while airline-level efforts have reduced intra-airline conflicts, they have not solved cross-airline conflicts, which remain a systemic issue.

2.3 Need for a Standardized Industry-Wide Solution

A more structured, industry-wide approach is required to fully mitigate callsign confusion risks. The following actions are proposed:

- I. Establish a Regional Callsign Deconfliction Mechanism
 - ICAO MIDANPIRG should facilitate a shared callsign deconfliction database for regional airlines and ANSPs.
 - A coordinated alphanumeric assignment system should be developed to prevent inter-airline conflicts.
- II. Enhance ATM System Capabilities
 - ANSPs should upgrade ATM systems to support automated callsign similarity detection.
 - Encourage the use of EUROCONTROL's Call Sign Similarity Tool (CSST) or similar solutions.
 - In addition, the incorporation of emerging technologies such as artificial intelligence (AI) and machine learning (ML) should be explored to further enhance callsign deconfliction capabilities. These technologies can significantly improve the automated detection and resolution of callsign conflicts, reduce reliance on manual processes, and minimize human error, ultimately improving overall air traffic safety.
- III. Strengthen ICAO Regulatory Framework
 - ICAO should introduce clearer guidance in Doc 4444 to mandate callsign deconfliction at a regional level.
 - Require State-level implementation plans for harmonized callsign deconfliction.
 - In the absence of standardized global guidance, the development and implementation of such tools remain fragmented. Therefore, there is a clear need for ICAO to provide a regulatory foundation to support harmonized global adoption.
- IV. Conduct Regional Training and Awareness Programs
 - ICAO, IATA, and ANSPs should organize annual callsign safety workshops.
 - Develop ATCO and flight crew training modules on callsign confusion mitigation.

3. CONCLUSION & RECOMMENDATIONS

3.1 The introduction of alphanumeric callsigns has reduced intra-airline conflicts, but the risk of cross-airline callsign confusion remains unresolved. To fully address this issue, it is essential to move beyond individual airline initiatives and establish a standardized regional deconfliction process.

3.2 To ensure a systematic and sustainable solution, the following recommendations are proposed:

- I. MIDANPIRG to initiate the development of a cross-airline callsign deconfliction framework by Q1 2027.
- II. ICAO MID to establish a regional callsign deconfliction database **for** airlines and ANSPs **to cross-check** and coordinate assignments.
- III. Encourage ATM system upgrades to enable **automated** callsign similarity detection.
- IV. Mandate callsign deconfliction in State Safety Plans (SSP) and ANSP operational policies.
- V. Promote regional workshops and training programs to enhance awareness and adoption.

4. ACTION BY THE MEETING

4.1 The meeting is invited to:

- a) recognize the limitations of airline-specific alphanumeric callsign implementation and the need for a cross-airline coordination mechanism;
- b) support the development of a regional callsign deconfliction framework under MIDANPIRG;
- c) encourage ICAO MID, APAC Regions to adopt regulatory provisions for mandatory callsign deconfliction processes building on the European experience;
- d) recommend ANSPs and ATM system providers to integrate automated callsign deconfliction tools;
- e) promote the use of advanced technologies such as artificial intelligence (AI) and machine learning (ML) to enhance the accuracy and automation of callsign similarity detection.
- f) support the conduct of a regional campaign to enhance air traffic controllers and flight crew awareness; and

invite ICAO to establish a standardized global regulatory framework for callsign deconfliction, addressing cross-airline coordination, system support tools, and harmonized implementation procedures taking into account the regional experiences.