



Agenda Item 3: Report on activities, deliverables and implementation progress of the Interop WG and Subgroups

**PROGRESS IN THE REGIONAL IMPLEMENTATION OF ATM
VOICE OVER IP (VoIP) IN THE SAM REGION**

(Prepared by SG CNS/VoIP)

SUMMARY

This working paper presents the progress achieved by the CNS/VOIP Subgroup of GT Interop in the transition of aeronautical voice services from conventional technologies to IP-based architectures in the SAM Region.

The results of activities conducted during 2026 are presented, including the implementation status reported by States, regional interoperability tests, the different interconnection scenarios identified, the use of Session Border Controllers (SBCs) and Cisco Unified Border Element (CUBE), contingency solutions implemented, development of a regional database, and the actions planned to continue harmonizing ATM VoIP implementations in accordance with EUROCAE ED-137.

References:

- Regional Project RLA/06/901;
- Action SAM/IG/33-03;
- EUROCAE ED-137;
- ICAO Doc 9896;
- Second 2026 Meeting of the CNS/VOIP Subgroup (SG CNS/VOIP/2), 16 June 2026; and
- Technical activities of the CNS/VOIP Subgroup conducted during 2026.

1. Background

1.1 The CNS/VOIP Subgroup of GT Interop conducts activities aimed at facilitating the regional transition from aeronautical voice communication systems based on analogue and TDM technologies to interoperable IP architectures, taking into account EUROCAE ED-137 standards and the evolution of regional telecommunications infrastructure.

1.2 SAM/IG/33 adopted Action SAM/IG/33-03, aimed at promoting the implementation of ATM VoIP links based on EUROCAE ED-137 in the SAM Region and the development of regional guidance related to interoperability, quality of service and cybersecurity.

1.3 In this context, during 2026 the Subgroup continued work related to regional interoperability, migration of VCS and ATM telephony systems to IP architectures, SIP/RTP configurations, quality of service (QoS), cybersecurity, cross-testing among States, and use of REDDIG as the regional transport infrastructure.

1.4 On 16 June 2026, the Second 2026 Meeting of the CNS/VOIP Subgroup (SG CNS/VOIP/2) was held, at which progress achieved, States' implementation experience and test results were reviewed, and new activities were defined to continue the progressive migration of legacy services to VoIP solutions.

2. Analysis

Progress in regional implementation

2.1 The information presented by States shows different levels of maturity in the transition to VoIP. Some States have predominantly IP-based infrastructure, while others maintain hybrid configurations or analogue systems and are developing modernization programmes.

2.2 The following reported progress is highlighted:

- a) Argentina continues its internal transition toward a fully IP-based architecture, using an Asterisk virtual PBX as an interim solution while requirements associated with recording systems are being addressed;
- b) Bolivia has ED-137-compatible radios and is implementing a new IP telephone exchange, with interoperability tests planned once its systems have been upgraded;
- c) Brazil has achieved a high degree of migration to VoIP and continues activities to progressively withdraw legacy services, with specific tests having been conducted from Curitiba;
- d) Chile has IP VCS systems at several centres and a high percentage of its national infrastructure has been migrated, while activities continue to resolve interoperability issues between platforms and telephone exchanges;
- e) Colombia continues the operational migration of its systems and has fully VoIP implementations on certain links, as well as IP infrastructure that has supported regional tests and solutions;
- f) Ecuador currently maintains analogue interconnections to REDDIG and plans to progress toward digital solutions in coordination with its technology renewal programmes;
- g) Guyana maintains a hybrid architecture and is evaluating alternatives for renewing its infrastructure, with a progressive transition toward VoIP;
- h) Peru currently maintains analogue systems at the ACC and is carrying out upgrading activities that will subsequently enable progress with IP testing;
- i) Uruguay continues arrangements for renewal of its systems and preparation of regional tests with support from Colombia and the REDDIG Administration; and
- j) Venezuela envisages progressive migration toward IP systems within its national planning and has coordinated contingency solutions using regional VoIP infrastructure.

Regional interoperability scenarios

2.3 As a result of the technical work conducted, five main interconnection scenarios, among others, were identified for consideration during the regional transition:

- a) IP VCS – IP VCS;
- b) IP VCS – IP PBX;
- c) IP PBX – IP PBX;
- d) analogue channel/router – IP PBX; and
- e) analogue channel/router – IP VCS.

2.4 These scenarios make it possible to accommodate the different configurations existing in States during the transition period, preventing technological differences between systems from becoming an impediment to progress in regional interoperability.

2.5 Tests were conducted between IP VCS and IP PBX systems with the participation of COCESNA and Colombia, enabling analysis of SIP session establishment, SDP negotiation, the codecs used, and addressing and connectivity requirements between the different network elements.

2.6 A solution was also implemented between Curitiba and Foz de Iguazú using an analogue channel connected to a router and an IP PBX. The solution maintained transparent operation for users and preserved the existing numbering. The experience confirmed the feasibility of implementing hybrid solutions during the transition period toward fully IP-based architectures.

SBC/CUBE and interconnection security

2.7 The tests conducted identified the importance of incorporating border-control elements between different SIP domains. In particular, Session Border Controllers (SBCs) and equivalent functionalities, such as CUBE, make it possible to delimit signalling domains, conceal internal addressing, manage NAT, apply security policies, and facilitate SIP/SDP interoperability.

2.8 In this regard, it is considered appropriate to continue evaluating the use of existing CUBE capabilities as a short-term solution, where technically feasible, and to progressively move toward architectures based on dedicated Session Border Controllers (SBCs). It is also appropriate to evaluate solutions integrating media gateway capabilities in order to facilitate interoperability between legacy infrastructure and IP systems during the transition period. Such solutions would strengthen interconnection security, facilitate interworking between different implementations, and provide adaptation and transcoding capabilities where required.

2.9 The experience gained also confirms the need to define common regional criteria for SIP signalling, codec use, addressing, numbering, network segmentation, QoS and cybersecurity mechanisms, avoiding direct exposure of States' internal networks.

Operational experience and contingency solutions

2.10 The Subgroup's activities have demonstrated that VoIP technologies can be used not only as part of modernization processes, but also to increase resilience and provide contingency solutions in the event of unavailability of conventional systems.

2.11 Colombia has provided capabilities from its IP infrastructure to implement interconnection and contingency solutions with other States. In the case of Suriname, a solution was implemented through Colombia's IP PBX that enables communications with REDDIG participants using applications installed on remote devices.

2.12 In the case of Venezuela, and as part of the actions adopted to strengthen communications continuity in contingency situations, a solution was implemented, with support from Colombia, based on

extensions of an IP PABX platform accessible through IP telephony applications (softphones) installed on mobile devices with Internet connectivity. The solution provides alternative communications capabilities for different ATS units and, at certain sites, also enables access to and from REDDIG.

2.13 This experience, together with solutions implemented in other States, provides a reference for the development of regional VoIP-based contingency mechanisms complementary to conventional operational communications, thereby contributing to increased resilience and continuity of ATS communications.

REDDIG as a regional platform

2.14 REDDIG is a fundamental element for the implementation of interoperable ATM VoIP services among States. For this reason, the Subgroup's activities are being coordinated with the evolution of the regional infrastructure and with the future REDDIG III.

2.15 In this context, it is important for the regional infrastructure to provide the connectivity, quality of service, security and performance conditions required to support aeronautical voice applications and progressively facilitate implementations compatible with EUROCAE ED-137.

Regional database

2.16 In order to maintain up-to-date information on the situation of each State, a regional database was developed integrating information related to VoIP, interoperability and cybersecurity.

2.17 The tool will enable State focal points to directly keep information on their systems, configurations and implementation progress up to date, facilitating regional monitoring and reducing the need to manually consolidate different spreadsheets.

2.18 It was agreed to continue completing and refining this database, incorporating pending information from States and presenting progress during upcoming Subgroup activities.

Next activities

2.19 The Subgroup's work will continue to focus on conducting interoperability tests among States, evaluating SBC/CUBE configurations and dedicated SBC solutions with media gateway capabilities, developing common configurations and documenting the experience gained, including alternative VoIP-based contingency solutions, with the objective of progressively achieving a harmonized, secure and resilient regional architecture.

2.20 Training activities and technical workshops are also planned to strengthen the capabilities of State specialists and facilitate the exchange of experience among ANSPs, manufacturers and regional specialists.

2.21 These activities will enable continued development of a regional roadmap for the progressive transition from legacy voice services to an interoperable, secure and resilient ATM VoIP environment supported by the regional telecommunications infrastructure.

3. Suggested actions

3.1 The Meeting is invited to:

- a) take note of the progress achieved by the CNS/VOIP Subgroup and the status of the transition toward ATM VoIP services in the SAM Region;
- b) encourage States to continue updating information on their infrastructure, configurations, equipment versions and migration plans in the regional database;
- c) support continuation of bilateral and multilateral interoperability tests, taking into account the different technological scenarios existing during the transition period;
- d) promote the definition of common regional technical guidance for ATM VoIP interconnections, taking into account EUROCAE ED-137, SIP/RTP signalling, codecs, numbering, QoS, cybersecurity and the use of SBC/CUBE;
- e) continue using REDDIG and consider the evolution toward REDDIG III as the regional platform to support interoperable, secure and resilient ATM VoIP services;
- f) promote the exchange of experience and technical cooperation among States, particularly to support those in the initial or intermediate stages of migration;
- g) continue developing and documenting VoIP solutions that can contribute to the resilience and contingency of regional ATS communications; and
- h) support continuation of CNS/VOIP Subgroup activities during the second half of 2026 and in 2027, including interoperability tests, training activities, technical workshops and consolidation of a regional roadmap for the transition toward IP-based aeronautical voice services.

END