

International Civil Aviation Organization

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**Twenty Ninth Meeting of the Communications/
Navigation and Surveillance Sub-group (CNS SG/29)
of APANPIRG**

Bangkok, Thailand, 16-20 June 2025

Agenda Item 6: Aeronautical Mobile Communications Service and Aeronautical electromagnetic spectrum utilization

6.4 Other issues related to aeronautical communications service and aeronautical radio spectrum management, especially on 5G implementation and potential impacts on aircraft radio altimeters

RESEARCH PROGRESS AND IMPLEMENTATION PLANS FOR VOIP AIR-GROUND COMMUNICATIONS IN CHINA

(Presented by China)

SUMMARY

This paper presents the research and validations carried out in recent years by China in the field of VoIP air-ground communications, as well as the implementation plans for the next stage.

1. INTRODUCTION

1.1 Along with the rapid development of air traffic control (ATC) Air-Ground communication technology, the A-G voice communication equipment is accelerating its evolution towards VoIP (Voice over Internet Protocol). The VoIP technology has significant advantages in aspects such as flexible allocation of communication resources, link costs, and maintenance costs.

1.2 China has been paying close attention to and promoting the developments of VoIP and related equipment. In combination with the roadmap of GANP (Global Air Navigation Plan) and the Asia-Pacific Seamless ATC Program, specifically to adapt to the needs of China's ATC applications, it has formulated a strategy for the application of VoIP technology. In the first stage, it is required that the equipment should have VoIP functionality and interoperability. In the second stage, ATC units will carry out applications according to operational needs for emergency and short-term. In third stage, ATC units will carry out applications according to operational needs for main and long-term.

1.3 To ensure the safety and efficiency of implementation of VoIP, China has formulated a series of VoIP standards which kept consistency with the standards recommended by ICAO and based on rich experimental practice and operational experience.

2. DISCUSSION**2.1 VoIP Technology Trials and Validations Conducted by China**

2.1.1 On basis of continuous research, China officially launched a large-scale of VoIP technology validations in 2019, it included: air traffic control based on VoIP, networking between

different control centers via VoIP, testing key indicators based on the currently in-use network, and network planning, etc.

2.1.2 From 2019 to 2020, at Chongqing ACC/APP, research and practice on VoIP were conducted, based on which long-term air traffic control via VoIP has been achieved, marking the first validation of technical feasibility in China successfully. In 2021, between Chengdu Tower and Chongqing Tower (with about 300km), on basis of VoIP networking, the VHF resource sharing between two VCS have been realized. And since 2021, Yinchuan Airport has gradually promoted the application of VoIP, making it a standardized way of ground controls.

2.1.3 From 2021 to 2022, ATMB conducted two large-scale interoperability tests on air-ground communication systems. All manufacturers of VHF, VCS, recording system, and network equipment, tested VoIP-based interoperability between each other, as well as researching networking solutions and testing key parameters in line with China's requirements.

2.1.4 Thus rich practical experience has been accumulated, and in compliance with ICAO-recommended standards in China, it is needed for a unified technical standard conformed to Chinese requirements and technical standards aiming to ensure nationwide system interconnection and resource sharing.

2.2 Research on VoIP technical standard in China

2.2.1 According to the preliminary tests and implementations, China began the research of air-ground communication VoIP standard in 2023. While complying with ICAO-recommended standards, the standard redefines functional requirements, specify parameters and indicators, as well as adjust functional protocols based on Chinese controller's daily operating habits. Meanwhile, to meet large-scale control centers' needs of centralized monitoring, standard protocol based on SNMP (Simple Network Management Protocol) is set to ensure the centralized monitoring of air-ground communication systems.

2.2.2 This standard has been compiled for more than two years, during which all the suppliers of VHF, VCS, recorder and network in China have participated in testing, verification and offering feedback of the standard.

2.2.3 The standard will be officially released soon. It consists of seven parts as follows:

Part 1: Technical requirements for VoIP communication system

Part 2: Interoperability protocol requirements for A/G communication

Part 3: Interoperability protocol requirements for G/G communication

Part 4: Interoperability protocol requirements for recording

Part 5: Protocol requirements for supervision

Part 6: Technical requirements for communication transmission network

Part 7: Test methods

2.2.4 After the official release of standards, the planning, construction and application of air-ground communication systems at all sites of China should meet the same requirements. At the same time, all VHF, VCS, recorder and network equipment sold and used in China should meet the standard's requirements as well.

2.3 Ongoing air-ground Communication Systems Construction Projects and Future Plans

2.3.1 China is promoting the application of VoIP technology in recent projects of 9 ACCs in the emergency scenario.

2.3.2 In addition, ATMB encourages qualified ATC units to gradually promote practical application of VoIP, transitioning from emergency and short-term application to main and long-term application.

2.3.3 Manufacturers in China are also actively carrying out research on VoIP, and will launch the new VCS system based entirely on IP structures complying VoIP standard as soon as possible.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate
