

# Current Status and Measures of Civil Aviation Communication Technology

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**ABSTRACT.** *In the new era environment, with the continuous improvement of the social and economic level, communication technology has effectively promoted the development of the civil aviation industry, and with the continuous innovation and progress of science and technology, the civil aviation communication technology has been obtained. Effective improvement. Communication technology not only provides effective protection for civil aviation flight safety, but also promotes the development of communication technology in the aviation field. This paper mainly expounds the application status of civil aviation communication technology from the perspective of the application environment of civil aviation communication technology, and analyzes it from three angles, and effectively discusses the application status of communication technology in civil aviation, and finally on civil aviation. The future development of communication technology has been analyzed and discussed, which provides a reference for the exploration of the status quo and development measures of civil aviation communication technology.*

**KEYWORDS:** *Civil aviation, Communication technology, Aviation communication*

## 1. Introduction

In the process of civil aviation operation and work, communication work plays an important role and status. The application of communication system technology has an important impact on the development of the entire civil aviation industry. Therefore, it is necessary to effectively protect the efficiency of civil aviation communication technology and thus enhance The communication efficiency between different units and departments of civil aviation effectively promotes the development of civil aviation transportation industry and improves the safety and efficiency of civil aviation operation. Once a civil aviation communication system fails, it not only affects the normal flight of civil aviation aircraft, but also passengers of civil aviation. The safety of life and property poses a threat. Therefore, it is necessary to thoroughly explore new civil aviation communication technologies, promote the development of the civil aviation industry, and provide guarantees for the safe and effective operation of civil aviation.

1Analysis of the application environment of civil aviation communication technology

With the increasing demand for social development and the opening of policies, a large number of flight routes have been applied to civil aviation, which has been increasing in air traffic passenger traffic, but it has also brought certain challenges to air traffic safety management. Civil aviation is running. In the process of development, its internal communication system plays an important role. Therefore, in order to improve the safety of civil aviation in the operation process, it is necessary to raise awareness of civil aviation communication technology and continuously explore and apply mature communication technologies. Civil aviation needs to transmit a large amount of data during the operation, and the transmitted data is relatively complicated, and the requirements for the communication environment are very high. Therefore, the communication technology applied by civil aviation is the most secure and stable technology at the moment, and data is being carried out at the same time. During the transmission process, civil aviation should work with multiple departments and units to carry out communication management work. These departments and units have a major relationship with the safety operations of civil aviation, including aviation administration, airlines and computer centers. Effective coordination and cooperation between different departments is required to ensure the safe and effective operation of civil aviation.

## **2. Analysis of Current Status of Application of Civil Aviation Communication Technology**

2.1 Application analysis of VHF ground-to-air data communication technology in civil aviation system. The VHF ground-to-air communication network technology mainly has the following aspects. First, the VHF remote-controlled ground station mainly serves to ensure the connection between the terrestrial data communication network and the aircraft, and the data communication of the ground data communication network node, using the radio transceiver. It is composed of a machine, a VHF antenna and a network interface device to realize data transmission between terrestrial data information networks. Second, the network management and data processing system, referred to as NMDPS, utilizes high-performance servers and computer process Ethernet topology mechanisms to build a computer wide-area network of remote-controlled ground stations through the IP/TCP protocol group to realize the processing and management of ground-to-air data.

Third, the user subsystem utilizes the ground-to-air data network to ensure that the ground controller and the airline's dispatcher can visually see the relevant data messages and use the GIPS information service for downlink data processing and distribution. Fourth, the data transceiver device records that the system collects different types of flight parameter information, and the data transceiver device can transmit the data to the ground remote control ground station, and at the same time, can obtain the data information sent by the ground network. ATM technology in civil aviation communication system is one of the important communication technologies. This technology enables the LANE interface in the switch to connect to the LAN in the civil aviation system through the LAN simulation technology standard in the ATM network, even in the multi-modal traditional LAN. It can play

an effective communication role, such as being able to be effectively compatible with FDDI, Ethernet, etc. It can be seen that ATM plays an important role in the backbone network of civil aviation communication, and can effectively over-extend the old and new data transmission networks. Through the penetration of ATM into the existing data network, the narrowband data transmission network constructs a parallel ATM broadband transmission network. The civil aviation related departments select different data transmission networks according to the actual needs of data transmission during use, thereby achieving effective communication purposes. At the same time, the ATM circuit simulation method can integrate the narrowband service into the broadband network, and the data information uses the simulation excuse and the ATM machine to transmit information, thereby achieving the effect of ATM high-speed transmission. The ATM technology is mainly applied to large international airports and comprehensive through this method. Business building for effective air communications.

### 2.3 Analysis of the application status of civil aviation communication technology in airport scenes.

The first is the application of the airport data link. The application field of the airport data link is relatively simple. It is mainly for the communication between the aircraft and the tower during the take-off and landing of the aircraft. It can implement high-speed large-capacity communication through the airport data link. Synchronously supports 100 users online communication, the communication range can reach 50km. In the process of aircraft take-off and landing and taxi control, the multi-carrier code division multiple access technology is mainly applied, and the extension of the length factor can reach 8, wherein the protection monitoring is 10 ms, the carrier interval is 4 kHz, and the orthogonal frequency division multiplexing symbol The duration is up to 250ms, the modulation system used is QPSK, and the bandwidth of the entire system application reaches 8192kHz. Secondly, the pan-European digital trunking system is applied. The system is a professional mobile communication system. It is mainly based on time-division multiple access technology. The channel spacing of the whole system is 25 kHz when applied, and the gap between the RF channels reaches 4 And can be applied to three different modes, namely voice plus data mode, packet data optimization mode and direct mode. When performing airport scene communication, different working frequencies can be used, including 380-520MHz and 806. -866MHz and so on.

### 2.4 Analysis of the application status of civil aviation communication technology in terrestrial airspace communication.

The first is the application of VHF analog voice communication technology. When the technology was first applied, the dual-band analog voice modulation and the channel spacing of 200 kHz were mainly used, which increased the number of channels provided by 70, but with the application of other channels. For example, 8.33 kHz, 25 kHz, 50 kHz, 100 kHz, etc., the capacity of the entire communication is effectively improved, and the voice communication between the broadcast voice service and the pilot can be realized by the controller during the VHF analog voice technology, for the aviation voice Scheduling is an important communication technology. Secondly, the application of aeronautical short-wave communication technology is adopted. This technology has a long application time in aeronautical communication. In the process of implementing short-wave communication, the modulation mode of the application is single-sideband analog modulation. If the

communication is implemented in a long-distance situation, then Ionospheric reflection to achieve communication purposes, so that effective coverage is achieved when implementing transoceanic communication and remote area communication, but short-wave communication technology has certain defects, such as large Doppler frequency shift, spectrum congestion, and low data transmission rate. And serious interference. If there is no VHF system applied in some areas, aeronautical shortwave communication technology is the main choice.

### **3. Analysis of the Future Development of Civil Aviation Communication Technology**

First, in the future development process, the communication and management needs of civil aviation will continue to expand, and efforts should be made to meet the aviation communication needs of the next decade. For example, when discussing the NEWSKY plan, the future aviation network communication system architecture will be carried out. The analysis uses the link layer to implement the management of different logistics layer links, provides QoS services using seamless handover technology and routing technology, and discusses data communication and aeronautical navigation surveillance over the Atlantic Ocean. All of the above are aviation communication technologies. New exploration. Second, in the future development, civil aviation communication technology is mainly developed in the direction of high-capacity and high-speed transmission. It develops new services and applications through data communication, and further develops air passenger communication, allowing people to be on the plane. Can be applied to mobile communication services. Thirdly, in terms of management operations, the network is mainly centered, and the network system is used to ensure information exchange and collaborative decision-making between different aviations, so as to carry out system-wide information management and ensure that different services can be integrated with each other. Fourth, the effective application of multi-link coexistence, multiple wireless links are used on the same aircraft, and QoS services are implemented through multi-link scheduling and management.

### **4. Conclusion**

In summary, with the continuous development of the civil aviation transportation industry and the gradual increase of air traffic flow, it has brought certain challenges to the operation of the air traffic management system. At the same time, with the continuous liberalization of air passenger communication services. It also poses certain challenges for aeronautical mobile communication technology. Therefore, in the future development process, aeronautical communication technology must have a large capacity and high transmission capacity, and gradually move toward the direction of unified technical standards. In-depth exploration is needed to meet the needs of aeronautical communications, thereby ensuring that civil aviation communication technologies can achieve global seamless coverage.

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