International Civil Aviation Organization

Twenty Sixth Meeting of the Communications/ Navigation and Surveillance Sub-group (CNS SG/26) of APANPIRG

Video Tele-Conference, 5 – 9 September 2022

Agenda Item 5: Aeronautical Mobile Communications Service and Aeronautical electromagnetic spectrum utilization

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

IMPLEMENTATION AND APPLICATION OF VHF SELCAL IN CHINA

(Presented by China)

SUMMARY

In order to prevent air-ground communication failure and enhance the safety of civil aviation operation, CAAC has conducted a series of work to improve the selective calling function. Combining the requirements of the latest technical standards of ICAO and relevant research results, CAAC implemented SELCAL function on chief positon of ACC center at VHF frequency as an effective approach to re-establish air-ground communication.

1. INTRODUCTION

1.1 With the selective calling system known as SELCAL, the voice calling between pilot and controller is replaced by the transmission of coded tones to the aircraft over the radiotelephony channels. The pilot will receive audio and visual indication from airborne SELCAL system while the controller trigger the SELCAL code of the aircraft if the controller wish to communicate to pilot but could not reach in the normal way.

1.2 In China, previously SELCAL is mainly used in the field of HF voice communication. Due to the high level of background noise, it is difficult for the crew to keep listening for a long time and usually turn down its volume, so the HF SELCAL function can be used to call the un-listening crew. But with the improvement of the VHF voice communication system and the application of datalink in the remote/oceanic area, HF voice communication technology has gradually receded as a backup or emergency means, so do the SELCAL.

1.3 In China, preventing the risk of air-ground communication failure is highlighted to enhance the aviation safety. Since 2020, SELCAL function on VHF has been implemented in an

efficient way to re-establish air-ground communication in the scenario while the pilot forgets to keep listening or tunes the wrong frequency etc.

2. DISCUSSION

IMPLEMENTATION

2.1 Each aircraft using the SELCAL function needs to be assigned a unique SELCAL code. With the growing number of aircraft, the original coding rules have resulted in a shortage of codes and difficulties in assignment.

2.2 To solve this issue, ICAO has adopted a proposal to amend Annex 10, Volume III of Aeronautical Telecommunications Selective Calling System, requiring that from November 3, 2022, the ground equipment of SELCAL system shall meet the relevant technical requirements that the new assignment of SELCAL code per character option will be increased from the original 16 tones to 32 tones.

2.3 In order to meet the requirements of upgrading from 16 to 32 tones and also the needs to preventing the air-ground communication failure, CAAC has made an investigation of VCS system, VHF system and external SELCAL device. Two technical solution has been implemented according to the technical conditions:

a) Upgrade the software of VCS system.
b) Using external SELCAL device which was in two different ways: connecting to the mic line interface of controller VCS position or connecting to the VHF system. In China there are two manufacturers provide this equipment and the cost is significantly lower than upgrading the VCS.

2.4 Frequency choice: controller could use the SELCAL function at different frequencies (the frequency of the sector or 121.5MHz) depending on the actual circumstances of the failure.

2.5 The Annex 10 Volume II specifies the procedures for the area control. During the tower and approach phases, the communication between pilot and controller is intense, so the probability of “forget listening” is extremely low. It is recommended that SELCAL function will not be implemented in the tower and approach control in the near future.

2.6 Considering communication failure events happens less often, in order to reduce the workload and improve cost effectiveness, the SELCAL function is only implemented in the chief position of area control center. In the case of air ground communication failure, the controller will report to the chief position, and the chief controller will conduct the SELCAL program trying to re-establish communication with the crew.

OPERATION AND SAFETY BENIFFITS

2.7 From January to July 2020, the SELCAL function has been used 26 times, mainly for handling air-ground communication failure as an emergency means of contacting the crew. 15 of the cases, the communication was re-established as the crew receiving a reminder from the SELCAL system, 2 times did not reach the crew, and the rest cases could not be confirmed whether the SELCAL system contributed or not because no feedback was received from the crew.

2.8 According to the feedback from controllers and pilots, the SELCAL function is an effective approach in the case of the “forget listening” or tunes the wrong frequency, but it cannot handle with other situations such as equipment failure etc.

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 appropriate.

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