INTERNATIONAL CIVIL AVIATION ORGANIZATION

TWENTY SIXTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/26)

Bangkok, Thailand, 7 – 10 September 2015

Agenda Item 3: **Performance Framework for Regional Air Navigation Planning and Implementation**

3.4: **CNS**

INTRODUCTION OF VOIP TO THE VOICE COMMUNICATION SYSTEM FOR ATC IN JAPAN

(Presented by Japan)

SUMMARY

JCAB is now making efforts toward the introduction of VoIP technology to voice communication system in Japan, and this information paper explains the background, planning process, the need for assessment and method of implementation, as well as the current situation.

1. INTRODUCTION

1.1 Current situation

The roadmap for the introduction of VoIP (Voice over Internet Protocol) to ground-to-ground communication was presented in the GANP, which was adopted by the 38th Session of ICAO Assembly. (Fig-1)

Fig-1 GANP Roadmap

The ground-to-ground voice communication network configuration in Japan is as shown in Fig-2. The voice communication is being done through the Point-To-Point dedicated line (P2P) with duplex lines in preparation for network failures. It is anticipated that the maintenance of the existing communication lines will become increasingly difficult and that JCAB needs to cut down the ever-increasing line costs and that it is getting more and more difficult to enter into a contract with a Communication Service Provider (CSP) who is scaling down its operations in dedicated lines.

Since 2010, for these reasons, JCAB has been pushing forward with the migration to VoIP communication system which is cheaper and disaster-resistant, starting with the ATC backup

voice communication line which is not being used under normal conditions. And JCAB is implementing VoIP to the regular ATC communication line in sequence, according to the ATN using IPS Standards and Protocols (DOC9896).

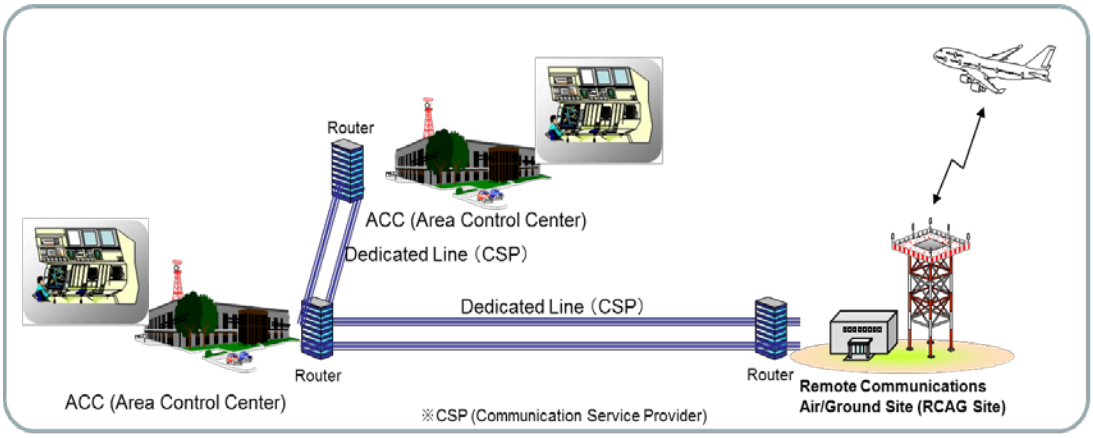
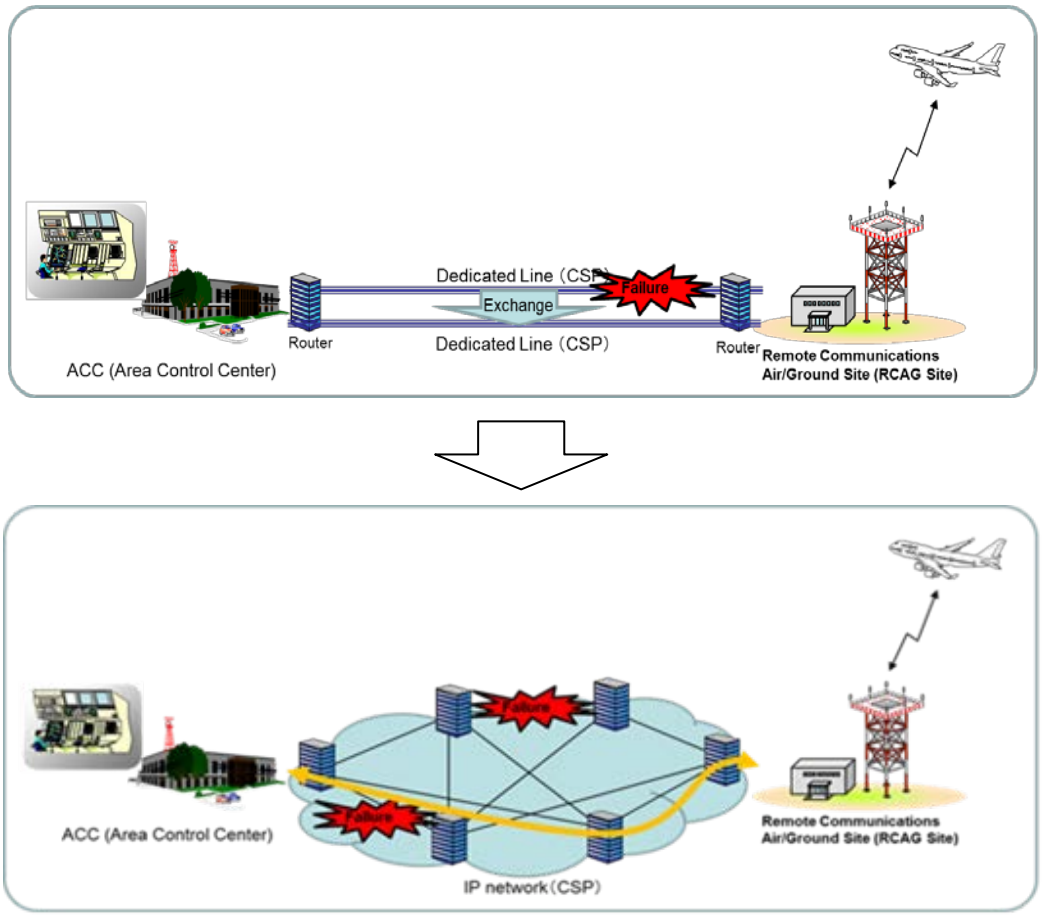


Fig-2 Ground network outline in JAPAN

1.2 Advantages and disadvantages of the VoIP introduction

1.2.1. Advantages

By migrating to VoIP, JCAB can reduce line costs and its flexibility in crisis management at the time of disaster will be enhanced. Also, it is expected that JCAB can reduce the Japan's maintenance cost of ground-to-ground communications as a whole about 20% by doing so. Beyond that, routing flexibility will be enhanced as the communication link is secured on a network.



1.2.2. Disadvantages

As compared to the current dedicated lines, VoIP network system may cause path length variation or packet losses. Therefore, depending on the quality of the line to be used, an issue in communication quality due to "data delays" or "jitters" may arise.

2. DISCUSSION

2.1 Issues in introducing VoIP

When introducing VoIP, it is essential to ensure the operating conditions to maintain the service quality equivalent to the current system, and to develop a plan for a step-by-step introduction of new technologies, maintaining the current communication service.

- Ensuring a high-quality communication lines
- Prior assessment
- Step-by-step introduction

2.1.1. Ensuring a high-quality communication lines

In order to secure a high-quality communication lines, JCAB seeks competing bids to select the best communication service provider and concludes the Service Level Agreement (SLA) with it as a way of quality assurance.

2.1.2. Prior Assessment

The VoIP communication line is not based on P2P, but on a VoIP network. Hence, when a disruption of communication happens in a disaster-stricken area, communication path automatically bypass the point of failure. In such a case, the path taken by each packet to reach their respective destinations may be different, causing data delays or jitters. Due to concerns about the consequent deterioration in the voice quality, a multidimensional evaluation of the VoIP communication lines must be performed. Hence, JCAB has conducted the evaluation on the following items, according to the ATN using IPS Standards and Protocols (DOC9896).

- Evaluation of Connectivity
  Evaluate voice data movements, i.e. the sending and receiving movements by an air traffic controller.
- Objective assessment by a third person
  Evaluate voice quality in terms of delays or fluctuations
- Subjective assessment by air traffic controllers
  Evaluate voice quality by practical tests.

2.1.3. Step-by-step introduction

At the beginning, JCAB distinguished the ATC backup voice communication line which is not being used under normal conditions, from the regular ATC communication line, according to the importance of message contents so that it may start the introduction to the former first.

- In order to migrate to the VoIP network system as early as possible without modifying existing equipment during the initial introduction phase, JCAB will get the network connected using a VoIP adapter.

- After that, JCAB will achieve the full-scale implementation of the VoIP network system by introducing radio equipment and communication control unit that are compatible with VoIP.

*During the transitional period from the existing to VoIP network system, JCAB needs to work on the existing service "using VoIP adapter" and its final goal "full-scale VoIP network system" in parallel.

2.2 Future Plans

2.2.1. JCAB has developed a plan for introducing a high-quality VoIP network on a step-by-step basis during the next three years starting from 2016, dividing Japan into three blocks.

2.2.2. Also, JCAB has a plan to introduce VoIP to RCAG (Remote Center Air/Ground communications) in sequence starting from 2016.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to :

a) Note the information contained in this paper; and

b) Note the advantages, disadvantages and issues relating to the VoIP introduction to the voice communication system for ATC.

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