



ICAO

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Navigation and Surveillance Sub-group (CNS SG/29)
of APANPIRG**

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Agenda Item 4: Aeronautical Fixed Service (AFS)

**FUTURE BANDWIDTH REQUIREMENTS FOR COMMON AERONAUTICAL VIRTUAL
PRIVATE NETWORK (CRV) BASED ON OUTCOMES OF A DEMONSTRATION EVENT
HOSTED BY HONG KONG CHINA**

(Presented by Hong Kong China)

SUMMARY

The Joint Event of SWIM over CRV Demonstration and Surveillance Data Sharing in SWIM Trial, conducted by Surveillance Study Group under Surveillance Implementation and Coordination Group (SURICG), has identified the need to conduct a study on the future bandwidth requirements for surveillance data sharing for the planning of the CRV. The paper presents the key findings of the study and the way forward.

1. INTRODUCTION

1.1 During CRV Operations Group (OG) meetings, the significance of understanding the bandwidth usage on the CRV across participating States/Administrations has been repeatedly emphasized. Insight into these usage enables proactive infrastructure planning which helps ensure the CRV remains effective to accommodate evolving needs.

1.2 The CRV was originally designed to support voice and messaging services. After its operational launch in 2018, consent was sought from the CRV OG to also support data exchange associated with System Wide Information Management (SWIM). With the impending end of the current CRV contract in 2028, planning for the next generation CRV is underway.

1.3 Bandwidth is a critical element of the CRV, especially for States/Administrations that are geographically remote or having high demands for data sharing. This paper presents the key findings from a bandwidth study, conducted by Hong Kong China, based on outcomes of a demonstration event in May 2024, that explored future bandwidth requirements for surveillance data sharing, particularly ADS-B data, over a simulated SWIM environment.

1.4 The study also supports the regional priorities stipulated in the Delhi Declaration arising from the Second Asia and Pacific Ministerial Conference on Civil Aviation held in September 2024, specifically Section 4.2(d) on common ground/ground telecommunication infrastructure, and Section 4.2(e) on expediting SWIM implementation.

2. DISCUSSION

Setup for the Joint Event

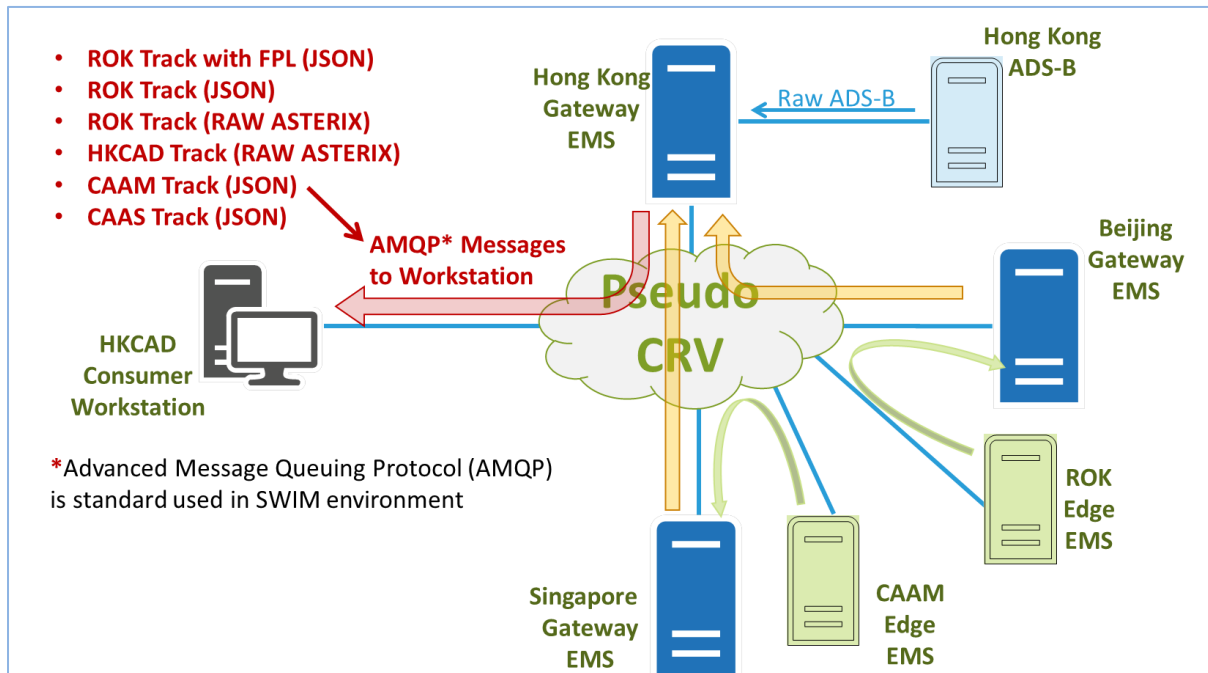


Figure 1 - Setup for Capturing SWIM AMQP Message Containing ADS-B Data

2.1 For the Joint Event, a test environment simulating a CRV-like network was set up in Hong Kong China for sharing of surveillance data. The goal was to observe data volumes and patterns when sharing surveillance data among States/Administrations, which is essential for future infrastructure planning.

2.2 Key Findings

- Messages that include both aircraft tracking and flight planning information are generally larger in size.
- An average message containing detailed surveillance data is approximately 1.2 KB.
- During peak hours, if Hong Kong's system were to share data for 300 nos. aircraft per second, approximately 3 Mbps would be required.

These findings provide a practical reference for future bandwidth planning.

2.3 CRV as a Strategic Enabler

In line with the Delhi Declaration, the CRV is an essential tool for:

- developing common ground/ground telecommunications infrastructure that supports an increasing range of air navigation applications; and
- accelerating the implementation of SWIM, which requires secure, high-capacity and reliable data exchange.

By leveraging the CRV, States/Administrations can acquire harmonized, reliable and cost-effective communication capabilities that support collaborative decision-making and SWIM-based modernized applications.

2.4 Planning for the Future

As the region prepares for the next CRV tender, it is essential to:

- consider future bandwidth growth driven by surveillance and SWIM applications;
- ensure scalability and flexibility in CRV specifications to accommodate emerging technologies; and
- align CRV development with ICAO's global and regional plans.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) incorporate findings of the bandwidth study conducted by Hong Kong China into consideration for future CRV planning and development;
- b) recognize the significance of CRV's strategic role in providing a common telecommunications infrastructure that expedites SWIM implementation and supports emerging technologies in accordance with the Delhi Declaration (Section 4.2(d) & (e)); and
- c) discuss any relevant matter as appropriate.
