International Civil Aviation Organization

Eighth Meeting of the Surveillance Implementation Coordination Group (SURICG/8)

Bangkok, Thailand, 6 – 9 June 2023

Agenda Item 8: Update on surveillance activities and explore potential cooperation opportunity

LONG-RANGE AIR TRAFFIC SURVEILLANCE FOR AIR TRAFFIC FLOW MANAGEMENT

(Presented by Hong Kong, China)

SUMMARY

This paper presents the implementation of long-range air traffic surveillance using Space-based ADS-B to facilitate Air Traffic Flow Management (ATFM) operation in Hong Kong, China by enhancing situational awareness of flow managers and assisting their flow control decision making.

1. INTRODUCTION

1.1 To facilitate Air Traffic Flow Management (ATFM) operation, Hong Kong, China is using an in-house developed long-range air traffic surveillance display system for providing an air traffic overview to flow managers to assess the overall impacts of certain flow restriction imposed by other airspaces and assist in flow control decision making. The system is highly useful in enhancing the accuracy of air traffic demand prediction, especially when departure messages of flights are not received, through real-time visualization of air traffic situation beyond the concerned FIR. Then the flow managers can adjust ATFM measures when the air traffic demand deviates from expectation.

1.2 The Human Machine Interface (HMI) of the display system (Appendix A) has been specially designed for flow managers with an aim to reduce display clutter caused by various HMI elements, such as track labels, leader lines, position symbols, etc., in the situation display. Functions were implemented in the system for emphasizing on the tracks which are of interest to flow managers.

1.3 The long-range air traffic surveillance display system was initially relying on terrestrial ADS-B data service for monitoring air traffic from “departure to destination”. The long-range surveillance source was recently moved to a tailored Space-based ADS-B data service for strengthening the surveillance coverage.

2. DISCUSSION

2.1 Terrestrial ADS-B has limitation on the surveillance coverage over oceanic region or area which is difficult to set up ground-based equipment. Space-based ADS-B can overcome this limitation by monitoring the traffic from space via its ADS-B receivers installed in a global satellite

constellation. With the introduction of Space-based ADS-B, the display system can allow a continuous surveillance of air traffic from "departure to destination" without any coverage gap.

2.2 Based on the operational requirements, the long-range surveillance should cover up to 5 hours of flying time beyond airspace boundary, which is approximately 4000km from the Hong Kong International Airport. As the nearby airspaces under the required coverage are very busy, the amount of flight movements involved in the Space-based ADS-B data stream would be huge while only a portion of air traffic is related to the ATFM operation of Hong Kong, i.e. inbound and overflight traffic of Hong Kong Flight Information Region (HKFIR). Therefore, it is considered more cost effective and efficient, in terms of data processing and transmission, to customize a data stream which includes only air traffic related to our ATFM operation with all the flight movements not relevant to our ATFM operation within the required coverage filtered from the stream.

2.3 To achieve the above objective, Hong Kong, China had been worked closely with the service provider on a solution to perform the filtering of Space-based ADS-B track data via the sharing of operational flight plan data. Instead of setting up dedicated data links for the transmission of flight plan data to the service provider, the flight plan data sharing is achieved via Aeronautical Fixed Telecommunication Network (AFTN). This approach involves only minimal configuration changes in the Air Traffic Services Message Handling System (AMHS) to forward a duplicated copy of relevant AFTN messages to the address of the service provider. It could save the operational cost in maintaining the Space-based ADS-B data stream.

2.4 Although the current usage of customized Space-based ADS-B data stream is mainly for providing a graphical air traffic situation to flow managers in determining flow decision, its usage could be extended to assist a more accurate estimation of FIR entry time of flights and integrate with the ATFM system.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) consider the benefits of using a customized Space-based ADS-B data service for enhancing situational awareness of flow managers and assisting in flow control decision making; and

c) discuss any relevant matter as appropriate.

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Appendix A

In-house developed Long-Range Air Traffic Surveillance Display System of Hong Kong, China