International Civil Aviation Organization

Fifth Meeting of the Surveillance Implementation Coordination Group (SURICG/5)

Web-conference, 22 – 24 September 2020

Agenda Item 3: Review of regional requirements for Surveillance in the e-ANP, Seamless ANS Plan and the reported implementation status

LONG-RANGE AIR TRAFFIC SURVEILLANCE DISPLAY SYSTEM FOR AIR TRAFFIC FLOW MANAGEMENT

(Presented by Hong Kong China)

SUMMARY

This paper presents the design of long-range air traffic surveillance display system developed in-house by Civil Aviation Department of Hong Kong China. The system, which is capable of displaying surveillance tracks up to 5 hours of flying time beyond airspace boundary, increases situational awareness of flow managers on the air traffic and assist in flow control decision making.

1. INTRODUCTION

1.1 Hong Kong China has developed an in-house system for displaying long-range air traffic surveillance tracks up to 4000km from the Hong Kong International Airport, which is approximately 5 hours of flying time beyond airspace boundary. The system is designed to enhance the situational awareness of flow managers on the air traffic and assist in flow control decision making. It is currently used by Air Traffic Flow Management (ATFM) Unit of Hong Kong China in assessing the overall impacts of certain flow restriction imposed by other airspaces.

2. DISCUSSION

2.1 The long-range air traffic surveillance display system is based on terrestrial ADS-B data service for monitoring air traffic from "departure to destination". Space-based ADS-B data is planned to be integrated into the system to strengthen the coverage by early 2021. 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. This enables the flow manager to adjust ATFM measures if the air traffic demand deviates from anticipation.

2.2 To handle the display of large amount of air traffic data, 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. The following functions are implemented in the system for emphasizing on the tracks which are of the interest to flow managers:

- Color-coded track labels to emphasize on types of flights, e.g. inbound, outbound or overflight traffic
- Track filtering based on types of flights
- Track filtering based on departure/destination aerodrome pairs with wild card inputs
- Auto suppression of close-range tracks when viewing long-range traffic
- Simplified track labels and hidden of leader lines to reduce clutters on screen
- Search of track by callsign or ICAO 24-bit Aircraft Address

2.3 In a typical use case of this long-range traffic display system by flow managers, aircraft intending to enter into the Hong Kong FIR would be filtered by departure/destination aerodromes and types of flights in order to visualize certain air traffic stream up to 5 hours prior to their entry. The flow manager can then ascertain the air traffic demand suggested by ATFM system via real-time visualization of air traffic situation and adjust flow control decision if necessary.

2.4 Terrestrial ADS-B has limitation on the surveillance coverage over oceanic region or area which are difficult to set up ground equipment. To further enhance the long-range surveillance coverage, space-based ADS-B data are planned to be integrated into the long-range air traffic surveillance display system by early 2021 in order to supplement the surveillance gaps of terrestrial ADS-B.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information in this paper;

b) consider the benefits in making use of terrestrial or spaced-based ADS-B data for enhancing situational awareness of flow managers and assisting in flow control decision making; and

c) discuss any relevant matters as appropriate.

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Appendix A
HK CAD's In-house developed long-range air traffic surveillance display system