International Civil Aviation Organization

SEVENTH MEETING OF THE ASIA/PACIFIC METEOROLOGICAL SERVICES WORKING GROUP (MET/S WG/7)

Bangkok, Thailand, 22 – 24 March 2017

Agenda Item 3: Planning and implementation of meteorological services

3.6 Other services

DEVELOPMENT OF A WEB-BASED TOOL TO INDICATE REAL-TIME AIRCRAFT POSITIONS AGAINST SIGNIFICANT WEATHER AND AN ELECTRONIC FLIGHT BAG METEOROLOGICAL APPLICATION FOR PAPERLESS COCKPIT

(Presented by Hong Kong, China)

SUMMARY

This paper presents a web-based tool developed by the Hong Kong Observatory (HKO) to facilitate the monitoring of significant weather impacting aircraft operating over the Hong Kong Flight Information Region (HKFIR) and an Electronic Flight Bag (EFB) Meteorological Application to support the "paper-less cockpit" operation concept.

1. INTRODUCTION

1.1 The Hong Kong Observatory (HKO) has installed an Automatic Dependent Surveillance – Broadcast (ADS-B) reception system to track ADS-B equipped aircraft near Hong Kong. A web-based integrated display has been developed to depict real-time aircraft positions and other navigation parameters against the latest satellite and weather radar imageries. The tool aims at facilitating aviation weather forecaster and industry stakeholders to monitor significant weather impacting aircrafts operating in the HKFIR.

1.2 At the same time, the HKO is also developing, in collaboration with Cathay Pacific Airways, an EFB Meteorological Application running on iOS platform to replace paper-based flight documents with interactive presentations to enhance the user experience of pilots in self-briefing during flight preparation.

2. DISCUSSION

Web-based tool to monitor real-time aircraft positions and significant weather over the Hong Kong Flight Information Region (HKFIR)

2.1 The ADS-B reception system installed at Tai Mo Shan, the second tallest hill in Hong Kong, collect navigational information broadcasted from aircraft around Hong Kong up to a range of 600km. The collected second-by-second information from each aircraft are then consolidated into a data stream and forwarded to the Airport Meteorological Office (AMO) for ingestion into a database. At the same time, data received from the weather radar every 6 minutes is converted into 20 vertical layers at 0.5km interval of 256km range Constant Altitude Plan Position Indication (CAPPI) imageries. Deep convection products are also created from satellite imageries received from the Japan Meteorological Agency (JMA) Himawari 8 satellite. All the information are made available through the Open Geospatial Consortium (OGC) Web Feature Service (WFS) or Web Map Service (WMS) to downstream clients.

2.2 Using Geographic Information System (GIS) technologies, a web-based tool (see Figure 1) consolidating the above information through layering was developed. The tool does not only allow aviation forecasters to appreciate possible impact of significant convection to aircraft operating in HKFIR, it also allows aviation stakeholders responsible for flight following to be aware of weather situations ahead of their flights. It is expected that the tool would improve common situation awareness of the aviation forecasters and aviation stakeholders during inclement weather.

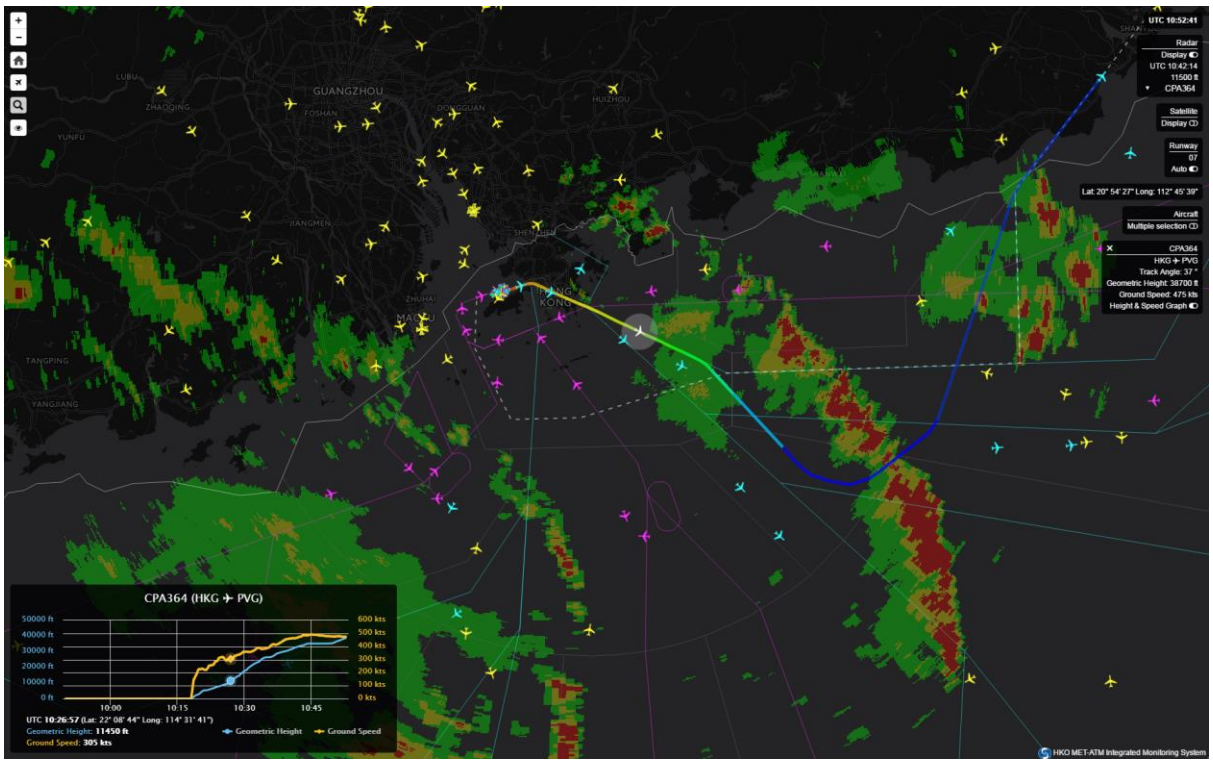

Figure 1. A snap shot of the web-based tool showing trajectories of an aircraft avoiding significant convections in a squall line during its departure

Electronic Flight Bag (EFB) Meteorological Application

2.3 An EFB Meteorological Application (see Figure 2) is being developed by HKO, in collaboration with Cathay Pacific Airways, to support airlines' transition from the use of paper-based flight documents to paperless cockpit operation on newer aircraft like the Airbus A-350 and to address the need for authoritative, fit-for-purpose weather information to pilots

which is consistent with the information being provided to other stakeholders such as ATM. Developed on the iOS platform, the application intends to enhance the efficiency and effectiveness of pilots' appreciation of the weather situation by not only plotting significant weather information graphically on an interactive globe but only those information relevant to their specific flights. In particular, a vertical cross-section showing when and where significant weather intersects with the flight path can relieve pilots from doing mental calculations with information on paper documents. The application will be made available to other airlines operating in Hong Kong.

2.4 A Windows version of the EFB Meteorological Application to be run on EFBs installed on aircraft is also being developed. The possible access to real-time aircraft data (like position wind/temperature, etc) and the air-ground data link should open up further possibilities in developing new real-time meteorological products and services to pilots.

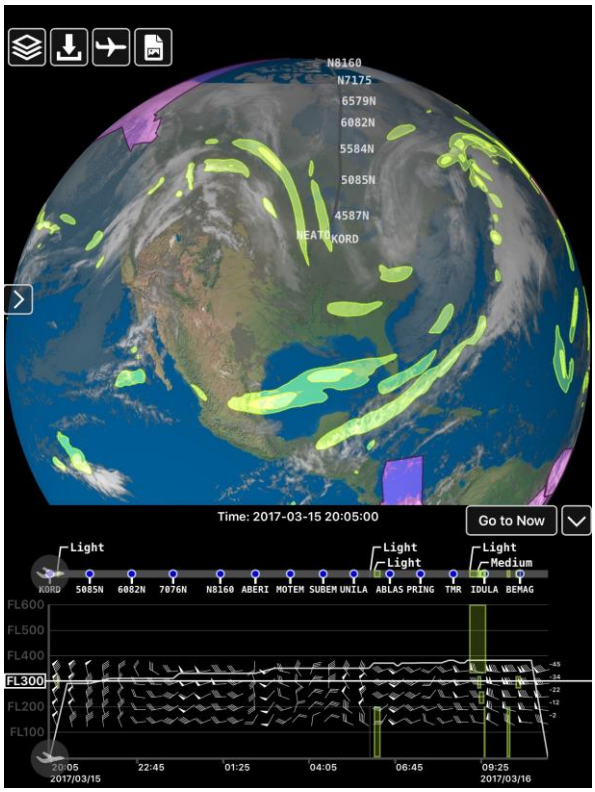

Figure 2. A snap shot of the HKO EFB Meteorological Application showing vertical cross-section of winds and significant weather along the intended flight path

3. ACTION REQUIRED BY THE MEETING

2.1 The meeting is invited to:

a) note the information contained in this papers; and

b) discuss any relevant matters as appropriate.

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