International Civil Aviation Organization

INFORMATION PAPER

Tenth Meeting of the Asia/Pacific Meteorological Requirements Working Group (MET/R WG/10)

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Agenda Item 5: Coordination between MET and ATM services

DEVELOPMENT OF THE AVIATION MULTI-DATA FUSION SYSTEM

(Presented by China)

SUMMARY

This paper presents the development of an Aviation Multi-data Fusion System in the middle-south region of China. The Aviation Multi-data Fusion System supports multi-data storage and analysis, data fusion and display, and integrated weather service. It provides visual products for weather forecasters and ATM controllers to make collaborative decisions through face-to-face or remote consultation, which helps to optimize the regional flights operation.

1. INTRODUCTION

1.1 Large north-south span and adverse weather in the middle-south region of China pose immense challenges to aviation weather forecast and alerts in this area. In order to provide high-quality meteorological services, an integrated platform containing multi-meteorological data and flight operation information is needed. Depending on improvements in detection methods and information technology, a new system called Aviation Multi-data Fusion System is developed.

1.2 The Aviation Multi-data Fusion System includes three main parts, (1) multi-data storage and analysis sub-system, (2) data fusion and display sub-system, (3) integrated weather service sub-system. On one hand, weather forecasters can make analyses and briefings of the convective weather depending on this system. On the other hand, ATM controllers and meteorologists can communicate and consult with each other on the system to make collaborative operational decisions.

1.3 In order to reflect the complex weather from different perspectives, the Aviation Multi-data Fusion System displays various meteorological observation data including METARs, radar mosaics,

satellite images, cloud top height information and lightning positions etc. Aviation weather users can choose different geographic information layers (including air routes, key navigation points, sectors or control zones) to configure a base map freely. Meanwhile, the convective weather and real-time flight tracks can be put on the selected base map to generate an integrated visualization. The visual interface on this system helps to establish the common situation awareness between operational meteorologists and the air traffic controllers, especially during daily weather briefings.

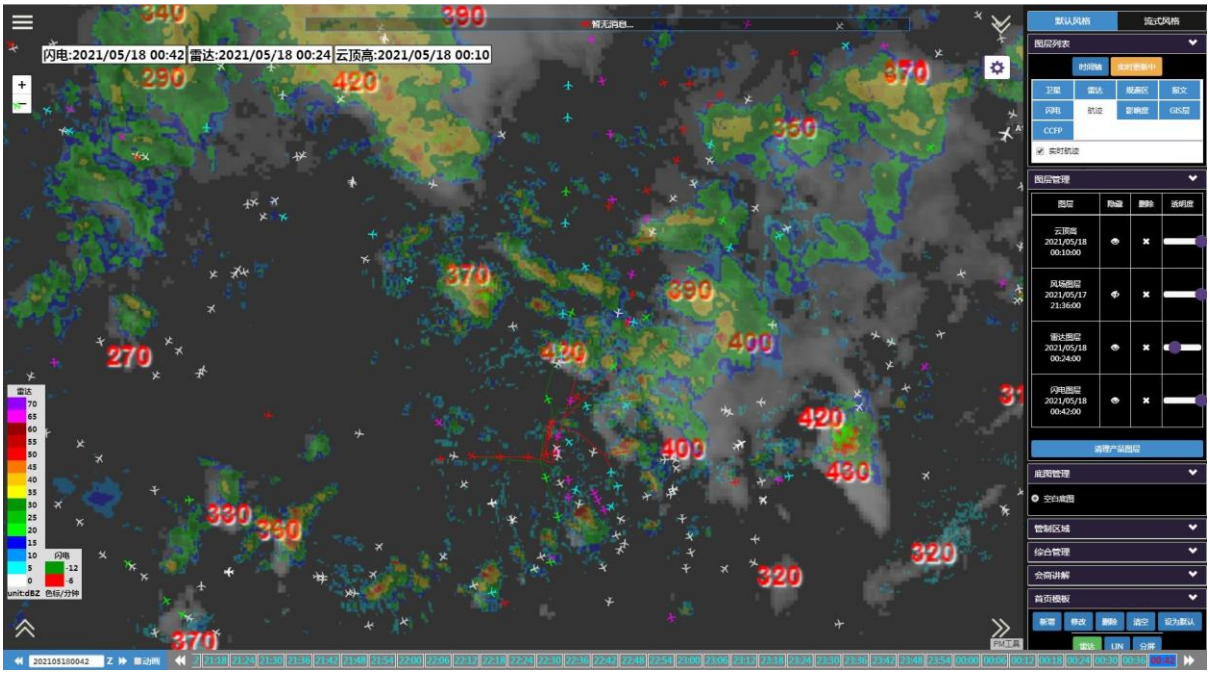

Figure 1 Various meteorological observation data displaying on the Aviation Multi-data Fusion System (including radar mosaics, satellite images and cloud top height information etc)

1.4 Besides, the Aviation Multi-data Fusion System can also provide short-term prediction and analysis of convective weather. In addition to identifying the convection areas, it can calculate the movement speed/direction of the convective clouds. Convections nowcasting in the next 2 hours and short-term prediction (in the next 2-8 hours) is also available on the platform.

1.5 It is worth noting that the Aviation Multi-data Fusion System promotes integration between ATM and MET. To assist ATM controllers evaluating the weather impacts on operation, integrated information like convection avoidance areas and convections influences on key navigation points can be shown on the system. Impacts of convective weather on key air routes navigation points in the next 6 hours are indicated via sequential forecasting in three colour-coded categories. ATM controllers can also highlight air traffic control (ATC) sectors which they focus on and analyze how the convective weather affects the flights in the sectors.

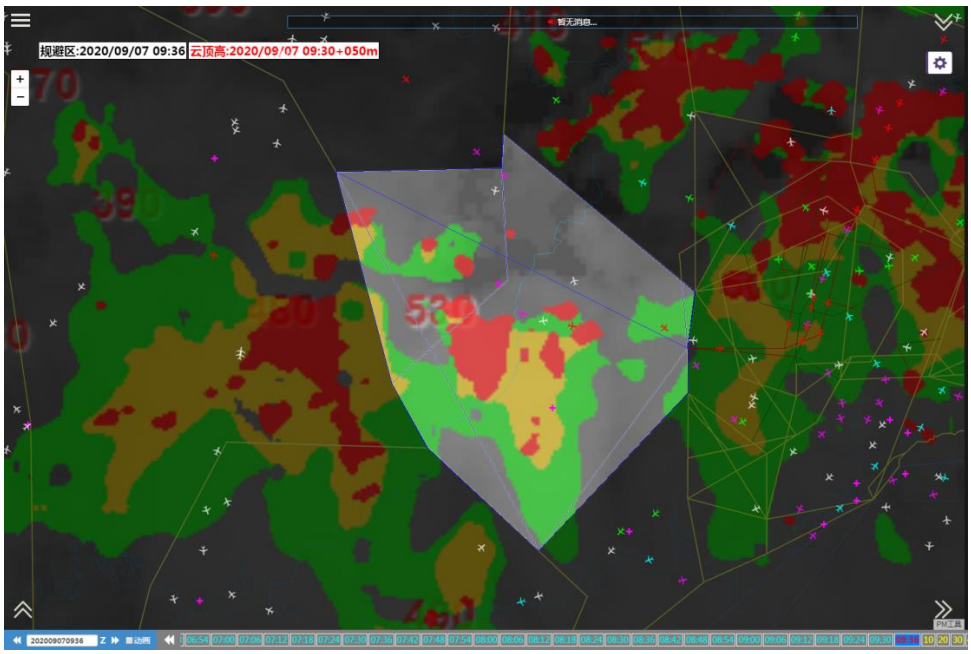

Figure 2 Convection avoidance areas and the highlighted air traffic control sector on the Aviation Multi-data Fusion System

1.6 The Aviation Multi-data Fusion System has been put into use in operational offices since April 2020 and has achieved great progress in ATM and MET consultation. ATM controllers and aviation weather forecasters can hold the face-to-face MET-ATM consultation based on this platform. Besides, it also benefits aviation weather users to realize remote consultation. Through functions of remote interaction and the chat room, meteorologists can share the same screen with ATM controllers to make weather briefings and collaborative consultation remotely online.

2. DISCUSSION

2.1 The Aviation Multi-data Fusion System shows meteorologists and ATM experts the convective weather visually and comprehensively. It also supports ATFM officers to make operational decisions and adjustments.

2.2 The Aviation Multi-data Fusion System supports face-to-face or remote consultation between MET and ATM experts, and finally benefits common situation awareness establishment.

Figure 3 Weather briefings from the aviation weather forecaster based on the Aviation Multi-data Fusion System

3. ACTION BY THE MEETING

3.1 Note the information contained in this paper.

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