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THIRTEENTH AIR NAVIGATION CONFERENCE

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COMMITTEE A

Agenda Item 2: Enabling the global air navigation system
2.3: Future provision of aeronautical meteorological service

THE SMART METEOROLOGY PROJECT PLAN IN THE FUTURE PROVISION OF AERONAUTICAL METEOROLOGICAL SERVICE

(Presented by China)

EXECUTIVE SUMMARY

This paper presents the brief introduction of the main content and key tasks of the "Smart Meteorology" Project proposed by Meteorology Department of CAAC.

1. INTRODUCTION

1.1 In the background of the opinion that Safety, Efficiency, Smart and Coordination are the four crucial elements for Air Traffic Control which has been proposed by Civil Aviation Administration of China in 2018, the Meteorology Department of CAAC has been planning to use the program, Smart Meteorology Project, to achieve the goal that the Aviation Meteorology Operation crosses over from tradition to digitalization, smart, and automation, which will speed up the upgrading of service level for Aviation Meteorology of CAAC based on Meteorology Data.

2. DISCUSSION

Smart MET Project" Planning are divided into two stages, which are mid-term stage (2018-2025) and long-term stage (2026-2035).

2.1 Medium Term Development Planning

2.1.1 Improvement of Accurate Forecast Ability. Accurate Weather Forecast would be provided continuously during the Air Operation Process all the way based on the Numerical Model, Operation Platforms, Work Tools and Numerical Weather Prediction Products, as result in the overall progress in Meteorology Service. The following goals would be achieved:

[1] English and Chinese versions provided by China

a) Construction of Area Numerical Forecast System in regional level;

b) Construction of Nowcasting System for Severe Convection Weather tentatively;

c) Construction of Meso-Scale and Micro-Scale Weather Analysis Sub-System based on Aerodrome Doppler Radar Data;

d) Construction of Significant Weather Cases Database tentatively.

2.1.2 Improvement of Meteorology Equipment Maintenance Ability. Weather detection and tracking ability within the range of Airport Terminal and Approaching areas would be enhanced all around China; Timely Detected Data Assimilation should be strengthened and Significant Weather such as Severe Convective Weather, Severe Precipitation and Fog could be identified automatically. The following goals would be achieved:

a) Construction or Upgrade of Automatic Weather Observation System, Doppler Radar and Wind Profile Radar;

b) Construction of Emergency Detection Equipment near Airport Terminal Area;

c) Tentative Construction of Laser Radar, Cloud Radar and Millimeter-wave Radar;

d) Unification of Meteorology Data Format and Completion of its quality control procedure;

e) Construction of the Integrated Platform of Significant Weather en-route Detection combined with Satellite Detection Data and AMADR Data.

2.1.3 Improvement of Technological Innovation. The Ability of using Meteorology Human Talents, Resources in Academy and Research Institution will be improved. The following goals would be achieved:

a) Perfection the General Plan of Meteorology Technological Innovation;

b) Promotion of the Meteorology Data Sharing and Utilization;

c) Development of Multi-Data Aggregation Technology based on Satellite, Doppler Radar, Wind Profile Radar, Automatic Weather Observation System;

d) Construction of Joint Innovation Lab for Aviation Meteorology.

2.1.4 Improvement of Employees Competence. The following goals would be achieved:

a) The study of the Competency Assessment for Weather Forecaster, Observer and Equipment Maintenance personnel;

b) Establishment of Motivation System for Aviation Meteorology Personnel;

c) Support for the Development of Aviation Meteorology Major in Colleges and Universities, and domestic or international exchange Project for Aviation Meteorology human talents.

2.2 Long Term Development Planning

2.2.1 Construction of Foundation Support Platform for Smart Meteorology.

a) Meteorology Data Cloud. Meteorology Data Cloud would be constructed with meteorology exclusive cloud as main body, public cloud as supplement, integrating Internet, calculation and storage and bringing result that utilization rate of resource and response efficiency would be improved;

b) Data Analysis Tool. Meteorology Forecast and Warnings level would be increased along with the construction of Meteorology Big Data AI algorithms Platform based on Cluster Analysis, Deep Learning, and Correlation Model, which would resulted in the Blend of Meteorology Big Data and Data from Multiple Fields;

c) Meteorology VR technology would be constructed;

d) Big Data Sharing Platform would be constructed to provide Users with High-Quality and Time-Sensitive Meteorology Data Service and Information Sharing.

2.2.2 Construction of Smart Meteorology Sharing Service Platform.

a) Meteorology Warning Demand Support System facing with decision-making. The disastrous weather emergency command support platform and Meteorology emergency rescue support platform would be constructed based on Big Data Analysis Technology and Accurate Forecast Product, which would provide Civil Aviation Transportation with data and technology support in case of emergency and the occurrence of disastrous weather in large scale;

b) Sharing Service System faced to Internet. The Sensing Actual Weather and Forecast could be issued, the data open list and standard interface could be provided on Smart Meteorology Platform based on seamless and accurate grid NWP product, making the best of AI, VR and mobile internet technology.

2.2.3 Construction of Smart Meteorology Integrated Detecting Platform.

a) Wind Field near approaching areas Detecting Warning System, Integrated Weather in Terminal area Detecting System and Integrated Weather en-route Detecting System would be constructed;

b) Dimensional integrated observation network in grid based on coordination of sky and land would be constructed;

c) Integrated Atmosphere Detecting Experimental Base would be constructed;

d) Standard Structure of Observation System and Quality Management System would be constructed;

e) Metrological Verification of Observation System would be completed.

2.2.4 Construction of Smart Meteorology Forecast and Warning Platform.

a) The Rapid Calculation of Digital Weather Simulator refer to flight path would be performed based on the optical simulation system of 4-dimensinal flight path, making 3 dimensional analysis field of actual atmosphere;

b) High Resolution NMW operation system would be constructed, whose horizontal resolution would have achieved 1km, achieving the goal that the weather elements and forecast would be updated automatically and seamlessly during all the flight path;

c) Smart Forecast and Risk warning based on operation impact would be achieved;

d) Disastrous Weather Risk Evaluation System. Rapid identification and positioning of disastrous weather and airport, terminal area and air route combined with ADS-B, Satellite Navigation Technology;

e) The Minute Level Quantitative Forecast would be constructed, which would be blended with real weather extrapolation seamlessly.

2.2.5 Standard Scientific Meteorology Management Platform would be constructed.

a) The Operating Mechanism would be constructed to adapt smart meteorology development, blending meteorology operation deeply with new information technology, such as Cloud, Big Data, Internet of Things, AI, etc.;

b) Integral operation management platform would be constructed tentatively, achieving effective management on meteorologists, resources, technology, data information and operation service.

3. CONCLUSION

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

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