International Civil Aviation Organization

METEOROLOGICAL/AIR TRAFFIC MANAGEMENT (MET/ATM) SEMINAR

Bangkok, Thailand, 26 – 28 November 2013

Discussion Topic 1: Background of MET services for ATM

ESTABLISHMENT OF MET SERVICES IN SUPPORT OF ATM

(Presented by Japan)

SUMMARY

In Japan, the Japan Meteorological Agency (JMA) has operated meteorological services in support of ATM over 8 years. JMA established the Air Traffic Meteorology Center (ATMetC) to support the Air Traffic Management Center (ATMC) of the Japan Civil Aviation Bureau (JCAB), with providing weather briefings and ATM-tailored products. This paper introduces how coordination arrangements between ATMetC and ATMC were established and has been maintained, including preparation process, to help States in a process of planning the establishment of MET support to ATM.

1. Introduction

1.1 Over the decades, the amount of air traffic in Fukuoka FIR has been so increasing that the Japan Civil Aviation Bureau (JCAB) established the Air Traffic Management Center (ATMC) at Fukuoka in Oct. 2005. According to ICAO's global ATM concept, ATMC intended to keep safe and efficient flights through air traffic management in close cooperation with Airspace Management (ASM), Air Traffic Flow Management (ATFM), and Oceanic Air Traffic Management (Ocn ATM). To accomplish their purpose, ATMC asked JMA for meteorological information which would impact on air traffic management.

1.2 Therefore, the Japan Meteorological Agency (JMA) established the Air Traffic Meteorology Center (ATMetC) in the same place as ATMC to support ATM operation with their dedicated meteorological services. Actually, ATMetC forecasters work in the ATMC operations room (Figure 1) and collect the all kinds of meteorological information for air space and airports, to provide necessary support to ATMC and ATM concerning bodies, such as airline companies. (See CNS/MET SG/10 IP11 and CNS/MET SG/13 IP31)

1.3 This paper introduces the coordination arrangements between ATMC and ATMetC to maintain smooth business collaboration with each other, including their preparation works. It can be helpful information for those States who would introduce MET support for Air Traffic Management.

2. Coordination between ATMetC and ATMC preparation offices

2.1 Prior to the establishment of the ATMetC, in March. 2003, JMA sent three experts to the United States to study how MET support to ATM had been implemented. They visited the FAA's Air Traffic Control System Command Center (ATCSCC) where operational forecaster regularly provide direct briefings to ATM controllers and other facilities, such as NWS/NOAA, AWC/NOAA, and Forecast Laboratory of NCAR, and so on. At this time, FAA and NWS had already coordinated and implemented ATM operations based on Collaborative Decision Making (CDM) utilizing meteorological information. JMA was very much impressed this collaborative working relationship especially that both ATM officers and MET forecasters were working in the same operations room, utilizing useful tools and tailored products such as CCFP (Collaborative Convective Forecast Product).

Figure.1 ATMetC forecasters in the ATMC operating room.

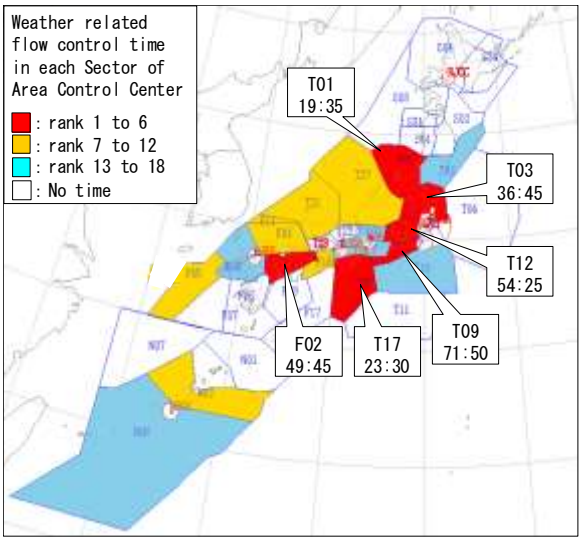

Figure.2 Air traffic flow control time related to weather in every ACC's sector, 2007.

2.2 After that, in Oct. 2003, JMA set up a preparation office for establishment of ATMetC in JMA headquarters in Tokyo, while just a few months before JCAB had established its own preparation office for ATMC. They soon started close coordination to determine how both centers could operate collaboratively and efficiently. Within the limited 18 month, they had more than several meetings and discussed wide variety of issues, including operation, products, services, and also operating systems. The major outcomes of their coordination are listed below.

- Study on the impact of weather condition on the air traffic flow
  - Study on past cases of delays which is mainly caused by weather conditions
  - 70% cases were caused by CBs
  - Delays occurred many in the sectors along the Corridor Air-routes

- Identification of the requirements from ATMC
  - Severe weather information in the area where heavy air traffic are expected
  - Those information should be provided at least two hours before
  - Forecast valid for 6 hours later

- Design of the "ATM-tailored" services and products
  - Time-series and categorized forecast which has similar look-and-feel as ATMC's Air Traffic Flow forecast.
  - Summary information composed of graphical weather images, brief forecaster's comments, and forecast for major international airports
  - Briefings available 24 hours a day
    - Direct (face to face) briefing
    - Both routine and extra (as needed) briefing

2.3 In April 2005, the both offices moved to Fukuoka, where the new buildings of ATMC operations room had just been built up, and begun final preparation of the operation, including training on briefings and product preparation, testing the systems. Additionally, ATMetC forecasters also learned rules of air traffic control.

3. Collaborative operations between ATMetC and ATMC

3.1 After the 5-months experimental operation since in Oct. 2005, they finally started formal operation in February 2006. Since then, ATMetC continued to support ATMC and ATM concerning bodies, through following manner.

- Briefings
  - Three ATMetC forecasters work together with almost 35 ATMC officers and three representatives from the Ministry of Defense in the ATMC operations room.
  - ATMetC forecasters make routine briefings twice a day to share weather conditions of the day and expected impact on air traffic flow. Additionally, before ATM officers start their shift work.
  - When meteorological conditions change or forecast is amended, ATMetC forecasters also provide extra briefings as necessary.

- Provides ATM-tailored MET Products
  - ATMetC provides 2 types of ATM-tailored products
    - ATMet Category Forecast (1 hourly update)
    - ATMet Summary (3 hourly update)

- Sharing ATM and MET information
  - ATM and MET information is shared on eight very-large screens in front of the operations room. ATMetC can show necessary weather information on four of their screens in response to request from ATM officers.
  - ATMetC forecasters can see air traffic flow information on a dedicated terminal called "ATM terminal" at their desks.
  - ATMC controllers can check meteorological information on a dedicated terminal called "ATMet information sharing system".

3.2 Besides the operation, ATMC, ATMetC and ATM concerning bodies coordinate closely together to maintain and improve their ATM operation.

- Exchanging information with each other
  - ATMetC provides information about weather, volcanoes and earthquakes to ATMC and ATM concerning bodies
  - ATMC provides information on air traffic flow to ATMetC

- Regular technical meetings held several times a month
  - The outcomes can be reflected in their operations
  - Review of the cases when significant disturbance on air traffic flow happened due to severe weather conditions, such as typhoon or heavy snow,

- Studies and verifications on MET information for ATM
  - ATMC provides ATMetC their ATM data such as delays, flow controls, causes of delays
  - ATMetC investigates relationship between air traffic flow and weather conditions quantitatively. (See Figure 2)
  - Consider revision of the criteria of categorization in the ATMet Category forecast

3.3 ATMC holds the meeting to discuss ATM operational policy with attendees from ATMetC, Area Control Centers (ACCs), Controllers of some major airports and several airline companies, twice a year.

3.4 ATMetC and ATMC are working together to train ATM-learned forecasters and MET-learned ATM officers each other, so that operational collaboration become more efficient through better understandings of each other's operation.

4. Future developments

4.1 Based on knowledge and experience so far, below services were newly provided.

- ATM information sharing system
  - Dedicated display system allocated at each ATM controller's desk. ATM controllers can easily check weather conditions within the area of responsibility. This is also used for extra weather briefings provided by ATMetC forecasters under paperless circumstances. With implementation of this system, the ATMet Summary was replaced by web-based information.
- SIGWX Briefing Sheet
  - More detailed "Scenario-based" forecast information of air traffic disturbance caused by typical significant weather phenomena at major aerodrome. Currently this is issued only for strong wind condition at Tokyo International Airport (RJTT) and heavy snow condition at New-Chitose Airport (RJCC).

4.2 In response to the global trends towards future air transportation system, JCAB held the conference on planning the future ATM systems in Japan in 2009, which includes attendees from wide variety of stakeholders, such as JMA, Ministry of Defense, airlines, aviation industries, research institutes, universities, and so on. The project is named "CARATS (Collaborative Actions for Renovation of Air Traffic Systems". In the CARATS project, working group on Aeronautical Meteorology have been established to discuss future improved meteorological services and information to meet the requirement from such future air traffic systems.

5. Summary

5.1 In Japan, JCAB and JMA had established preparatory offices and discussed plans to establish MET services in support of ATM operations collaboratively. They worked closely together to identify the ATM controller's needs for MET services and to design the ATM operations which utilize MET support to maximize safety and efficiency of air traffic system.

5.2 Experimental operation period was also very useful and meaningful especially to assure efficient and secure migration into actual operations, including tests of their operation systems.

5.3 In addition to the operative cooperation, through regular meeting and cross-trainings, ATMC and ATMetC make continuous efforts to enhance better understandings of each operation and improvement of quality and efficiency of their services.

5.4 To share ATM and MET information among all relevant organization is very important to establish effective ATM operations based on CDM. Especially timely weather briefings and ATM-tailored MET products help ATM controllers and other relevant organizations make appropriate decision making immediately.

5.5 With reflecting global discussions on future ATS planning like GANP and ASBU, JMA will continue to coordinate with JCAB and various stakeholders for further improvement of its MET services to support ATM.

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