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**Discussion Topic 1: Brief review of the organization of Air Traffic Management (ATM) and Meteorological (MET) Services by the States**

**ORGANIZATION OF MET SUPPORT FOR ATM IN JAPAN**

(Presented by Japan)

**SUMMARY**

In Japan, the Japan Meteorological Agency have operated Meteorological support for ATM more than 4 years. Japan Meteorological Agency established the Air Traffic Meteorology Center (ATMetC) and began its operations in Oct. 2005 for the purpose of supporting the Air Traffic Management Center (ATMC) of the Japan Civil Aviation Bureau (JCAB). This paper introduces the coordination arrangements between ATMetC and ATMC, including preparation step for ATM starting states.

**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 meteorological services. Actually, ATMetC forecasters work in the ATMC operations room (Figure 1). They collect the all kinds of meteorological information for air space and airports, and support 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 persons to U.S. to study how MET support for ATM was done. They visited the FAA command center, NOAA's AWC/NWS, and Forecast Laboratory of NCAR, and so on. At this time, FAA and NOAA/NWS had already started ATM operations based on Collaborative Decision Making (CDM). JMA had noticed especially that there both ATM officers and MET forecasters were working in the same operations room, utilizing useful tools and products such as CCFP.



Figure.1 ATMetC's booth in ATMC operating room

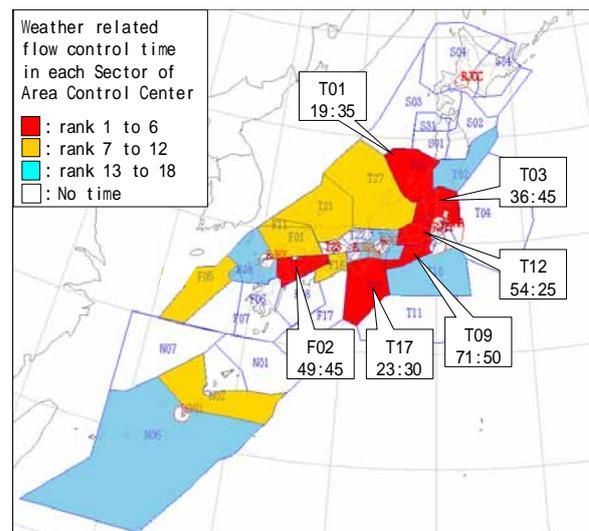


Figure.2 Air traffic flow control time related to weather in every ACC's sector, 2007

2.2 After that, in Oct. 2003, JMA set up the preparation office for ATMetC in JMA headquarters in Tokyo. Just a few months before, JCAB had established the preparation office for ATMC. They started close coordination work to determine how both centers could operate collaboratively and efficiently. Within the limited 18 month, they discussed various kinds of issue, such as operation, products, services, and also systems. The major outcomes of their coordination were as bellow.

- Study on the 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 needs and 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 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 meteorological graphics, brief forecaster's comments, and forecast for major international airports

- Briefings which is available 24-hour a day
  - ✧ direct (face to face),
  - ✧ both routinely and as needed

2.3 In April 2005, the both offices had been moved to Fukuoka, where the new buildings of ATMC operations room had just been built up. They worked for final preparation to begin the operation, such as training on briefings and making products, testing the systems, and also, for ATMetC forecasters, learning the air traffic control rules.

### 3. COORDINATION ARRANGEMENTS BETWEEN ATMETC AND ATMC

3.1 After the 5-months experimental operation which ATMetC had began in Oct. 2005, they started actual operations in February 2006. ATMetC cooperates with ATMC and ATM concerning bodies, through following manner.

- Briefings
  - Three members of ATMetC work together with almost 35 ATMC controllers and three members of Ministry of Defense in the ATMC operations room
  - They make face-to-face briefings.
  - The representatives from each body have a brief meeting twice a day to share information concerning their current situation.
- Sharing ATM and MET information
  - All officers can look at ATM and MET information on eight very-large screens in front of the operations room. ATMetC shows necessary weather information on four of their screens in response to request from ATM officers
  - ATMetC forecasters can see air traffic information on a terminal called “ATM terminal” at their desks
  - ATMC controllers can check meteorological information on a terminal called “ATMet information sharing system”
- Provides ATM-tailored MET Products
  - ATMetC provides 2 types of ATM-tailored products
    - ✧ ATMet Categorized Forecast (1 hourly update)
    - ✧ ATMet Summary (3 hourly update)

3.2 Out of the operations room, ATMC, ATMetC and ATM concerning bodies have been working together closely to maintain and improve their ATM operation.

- Agreements on exchanging information each other.
  - ATMetC provides information about weather, volcanoes and earthquakes to ATMC and ATM concerning bodies
  - ATMC provides information on air traffic to ATMetC
- Studies and verifications on MET information for ATM
  - ATMC provides ATMetC their ATM data such as delays, flow controls, causes of delays, and so on.
  - ATMetC have found out several relationships between air traffic flow and weather conditions quantitatively. (See Figure 2)

- ATMetC reviews the cases of flow control related to severe weather such as Typhoon or heavy snow, with ATMC several times a year.
- ATMetC and ATMC have technical meetings several times a month. The outcomes can be reflected in their operations.
- 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.

3.3 Adding to those above, recently ATMetC and ATMC are working together to train ATM-learned forecasters and MET-learned ATM officers each other, through the technical meetings.

#### **4. FUTURE DEVELOPMENTS**

4.1 This year, JCAB launched the conference on planning the future ATM systems in Japan, which includes various stakeholders such as JMA, Ministry of Defense, airlines, aviation industries, research institutes, universities, and so on. The name of the project is “CARATS”, which is an abbreviation of “Collaborative Actions for Renovation of Air Traffic Systems”.

4.2 In this CARATS project, there will be a working group on Aeronautical Meteorology to support future improved Air Traffic System. JMA should have to play a leading role in this WG.

#### **5. SUMMARY AND CONCLUSIONS**

5.1 Derived from experience on preparation works for almost 3 years and 4-years experimental and actual operations, there are some useful and suggestive information for implementation of MET support for ATM.

5.2 Both JMA and JCAB had established their preparation office, which played a highly important role. They worked closely together to identify the ATM controller’s needs for MET services and to design the ATM operations including MET support for ATM.

5.3 Experimental operation period was also very useful and meaningful especially for efficient migration into actual operations, including tests on operation system.

5.4 To share information is one of the most important things to establish a CDM-based ATM among various stakeholders.

5.5 And also, ATM-tailored MET products should help proper decision making.

5.6 Other than operative cooperation, through co-study or political/technical meetings, ATM, MET, and concerning bodies should be able to obtain common sense and knowledges on ATM operation, and improve quality and efficiency of their operations.

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