International Civil Aviation Organization

FIFTH MEETING OF THE ASIA/PACIFIC METEOROLOGICAL REQUIREMENTS WORKING GROUP (MET/R WG/5) OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND MPLEMENTATION REGIONAL GROUP (APANPIRG)

Bangkok, Thailand, 19 – 21 April 2016

Agenda Item 5: Coordination between MET and ATM services

EFFECTIVE METEOROLOGICAL INFORMATION SHARING BETWEEN ATM AND MET IN TERMINAL AREA

(Presented by Japan)

SUMMARY

Tokyo Metropolitan Area Team (TMAT) of Japan Meteorological Agency (JMA) supports Traffic Management Units (TMUs) of Japan Civil Aviation Bureau (JCAB) with dedicated weather information for Tokyo metropolitan terminal area. This paper presents details of weather briefing services provided by TMAT and requirements for briefings from TMUs. An example of when weather briefing was effectively used for ATM is also introduced.

1. Introduction

1.1 In Tokyo metropolitan area, air traffic volume is growing more and more. Accordingly, new flight procedures have been introduced to deal with such increasing air traffic demands. In response to this situation, Japan Civil Aviation Bureau (JCAB) organized the Traffic Management Units (TMUs) as a branch of Air Traffic Management Center (ATMC) in October, 2011 and they were placed at Tokyo International Airport, commonly known as Haneda Airport (called Haneda TMU) and Tokyo Area Control Center (called Tokorozawa TMU) in order to conduct tactical and flexible Air Traffic Flow Management (ATFM) in and around the Tokyo metropolitan area.

1.2 To contribute to appropriate ATM through weather service provision to TMUs, JMA organized the Tokyo Metropolitan Area Team (TMAT) in Haneda Airport as a branch of Air Traffic Meteorology Center (ATMetC) in April, 2014. The outline of the meteorological services provided TMAT is introduced in the MET/ATM Seminar in 2015 (IP/07).

1.3 TMAT provides TMUs with meteorological information and detailed briefings focused on significant weather which affects air traffic flow in and around the Tokyo metropolitan area, including the approach control area of Haneda/Narita Airport and its neighboring area. As the information helps them conduct effective ATFM operations, TMAT indirectly contributes to forming safe and efficient air traffic flow. Forecasters of TMAT work in the same operations room as

forecasters of Tokyo Aviation Weather Service Center, in order to detect sudden changes of weather conditions immediately and obtain amended forecast scenarios as soon as possible.

1.4 The dedicated information and services to TMUs provided by TMAT are as follows:

- Weather Briefings (regular/extra)
  - Providing methods: Video conference, telephone and online chat
  - Regular briefings: 0510, 1130, 2030 and 2250UTC
  - Extra briefings: As necessary (24 hours/everyday)
  - Target areas: Responsibility area of Tokyo ACC and Tokyo approach control area

- Tokyo Metropolitan Area Weather Bulletin for ATM (an example is shown in Figure 1)
  - Target areas: Haneda Airport, Narita Airport, Tokyo approach control area and ATC sectors around Tokyo metropolitan area
  - Contents: Brief comments on phenomena expected to affect air traffic flow, and appropriate images to explain weather conditions and forecast
  - Issuance time: 00 and 06UTC (two times/day)
  - Forecast time: up to 6 hours

- ATM Categorized Impact of weather ELement prediction (ATM CIEL) (an example is shown in Figure 2)
  - Target areas: Haneda Airport, Narita Airport, Tokyo approach control area and ATC sectors around Tokyo metropolitan area
  - Contents: Level of expected impact of significant weather on ATC operations
    - ✧ High : Need to reduce CAPA significantly
    - ✧ Medium : Need to reduce CAPA
    - ✧ Slight : Need to reduce CAPA slightly
    - ✧ None : Not need to reduce CAPA
  - Issuance time: every hour (except from 14 to 16UTC)
  - Forecast time : up to 6 hours (temporal resolution: 10 minutes to 1 hour)
  - Targeted weather phenomena:
    - ✧ Haneda Airport and Narita Airport: Thunderstorm, Visibility, Ceiling, WIND, etc.
    - ✧ In and around the Tokyo approach control area: CBs and convective clouds

1.5 As prompt decision making is required for ATM within terminal area, speedy and appropriate information sharing is necessary. Especially for weather briefing services, TMAT coordinates with TMUs whenever needed using dedicated tool which enables quick information provision.

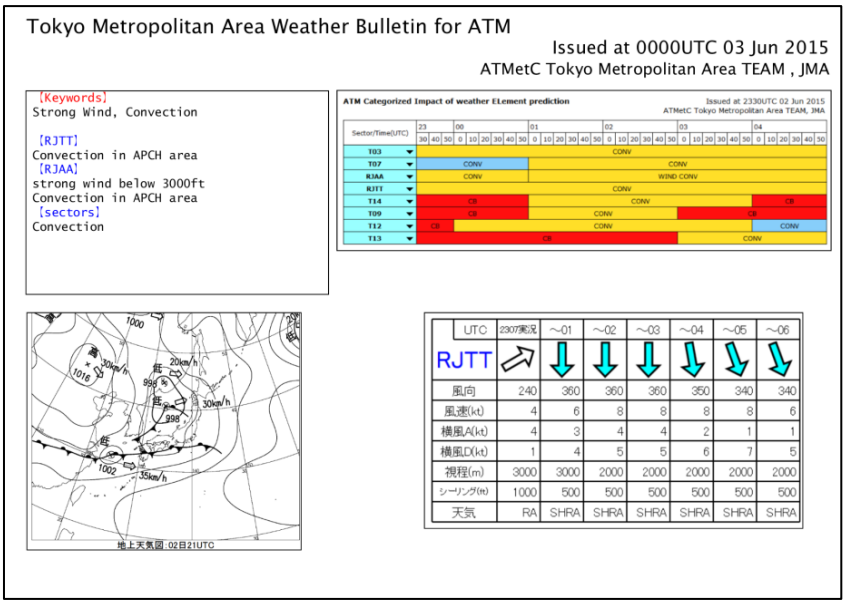

Figure 1. Tokyo Metropolitan Area Weather Bulletin for ATM

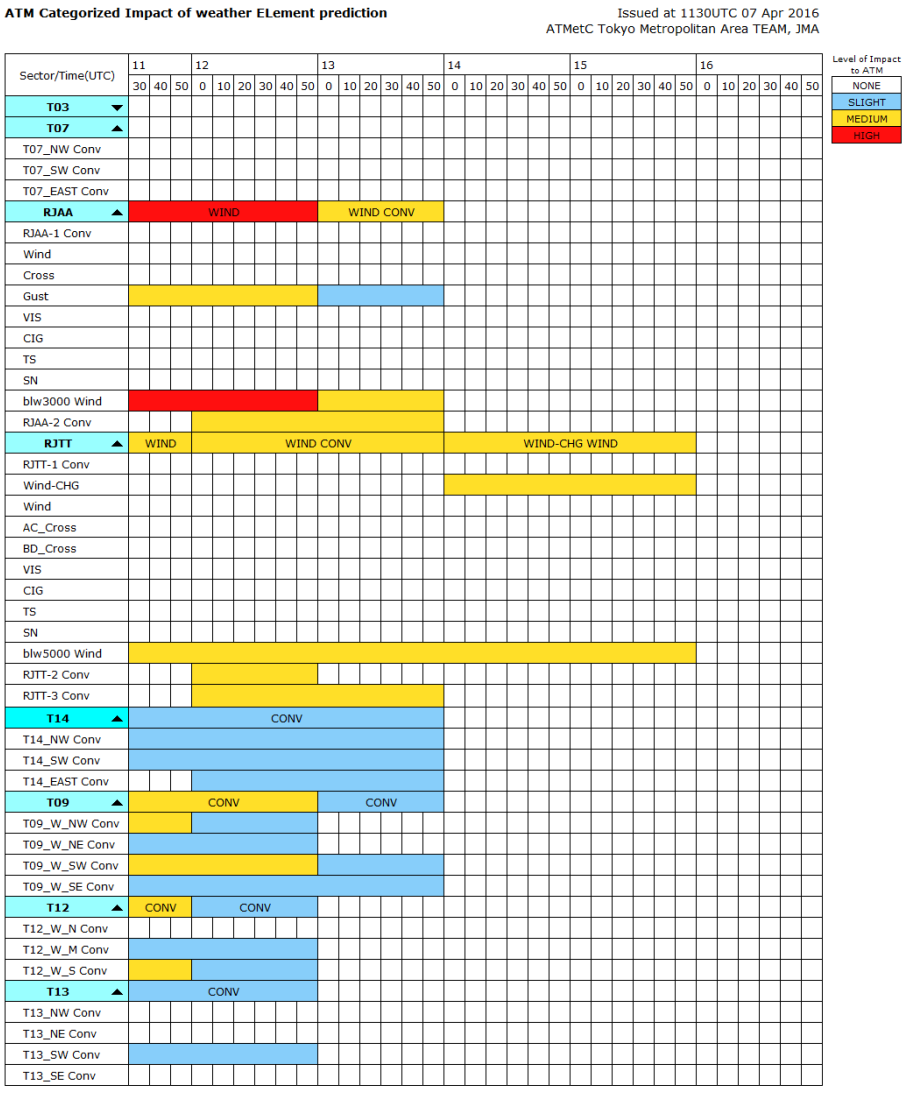

Figure 2. ATM CIEL

2. Weather Briefing Services in TMAT

2.1 Main contents of the weather briefing are shown in Table1. Other than weather conditions around Japan, TMAT provides information on the area forecast within the Tokyo metropolitan area and information on upper wind which is necessary for air traffic management in the area.

Table 1: Main contents of weather briefing provided by TMAT

Contents	Short Explanation
Main point of the briefing	Information on air space and/or major airports where severe weather is expected, such as what phenomenon is expected and occurrence time of severe weather.
Weather conditions around Japan	Surface pressure pattern and weather distribution.
Area forecast within responsibility area of Tokyo Control Center	Main target phenomena are CB, Clear Air Turbulence and Volcanic Ash.
Current weather conditions and forecast within Tokyo metropolitan area	Forecast for wind within Tokyo metropolitan area and time sequence forecast for Haneda/Narita Airports.
Upper wind forecast	Forecast for upper wind within the sectors where arrival route for Haneda Airport is included
Current weather condition and forecast of other countries	Weather information (METAR and TAF) on major airports in East Asia

2.2 Figure 3. shows the number of briefings for TMUs categorized by the weather elements mainly explained during the briefings. Information on CB and wind is frequently required from TMUs.

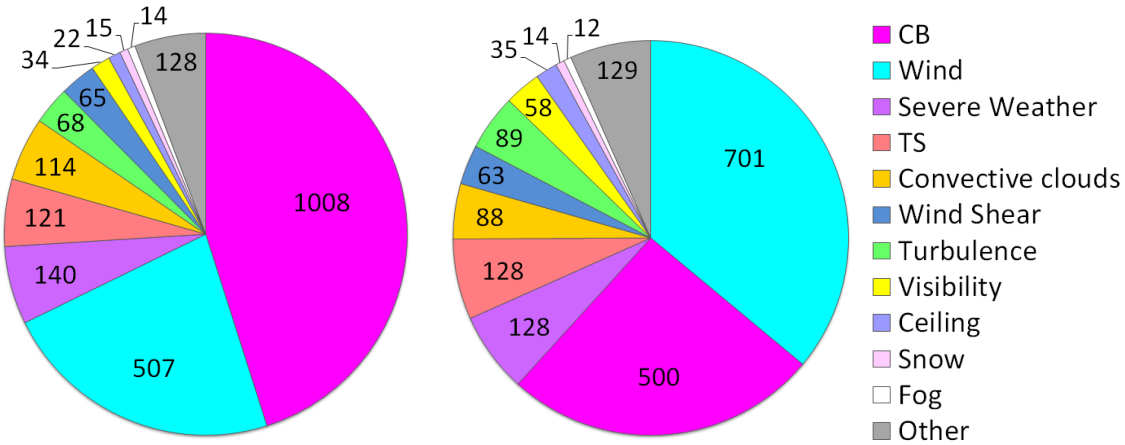

Figure 3. Number of weather briefing categorized by weather elements
(Left) Tokorozawa TMU (Right) Haneda TMU

2.3 TMAT conducts regular weather briefings four times a day. As air traffic volume changes depending on the time, the demands for the contents of briefings are different at each briefing time. TMAT has confirmed TMUs their requirements for weather briefings. For example, forecast for

visibility at Narita Airport in the next day morning, CBs expected to affect arrival routes for Haneda and Narita Airport and information on significant weather which would disrupt international air routes are required in the morning briefings. In the night time briefing, information on significant weather in the sectors which include arrival route for Haneda Airport is needed, since many aircrafts arrives at the airport after the briefing. In winter, information on upper wind and CBs which affect the air route for East Asia is also requested.

2.4 TMAT uses video conference system for regular briefings and telephone or online chat for extra briefings. JMA has developed online chat tool dedicated for TMAT briefing service. As text information remains in the chat tool, TMU officers can reaffirm the contents of briefings at any time. Also, graphical information can be posted on the tool. This function helps TMU officers to easily understand the weather condition which is sometimes difficult to grasp only by the explanation on the telephone. Screen shots of chat tool and graphical information posted in the tool are shown in Figure 4.

3. Example of effective meteorological information sharing between ATM and MET

3.1 Weather briefing services from TMAT described above are effectively used for ATM operations within terminal area. Figure 5. shows radar echo around Haneda Airport at 0440UTC and 0500UTC on 24th July 2015. CBs were approaching Haneda Airport from northwest of the airport. It was expected these CBs would affect the air traffic around Haneda Airport, Haneda TMU requested TMAT to provide weather briefing on the forecast for these CBs.

3.2 As CBs were moving toward to Haneda Airport, they were expected to disrupt the air route which is used in a south wind operation. However, it was also expected that north wind would not become so strong that south wind operation is needed. (North wind operation can be conducted in Haneda Airport if south wind speed does not exceed 10KT.) Examples of usual approach routes for Haneda Airport are shown in Figure 6.TMAT mentioned not only the movement of CB but also the forecast for wind around Haneda Airport during the briefing. After this briefing, runway operation was changed to north wind operation at 0530UTC, before CBs reached Haneda Airport. As a result, no holding occurred and the negative impact of these CBs on air traffic management was held to a minimum. In this case, briefing on multiple weather phenomena contributed to the smooth ATM operation.

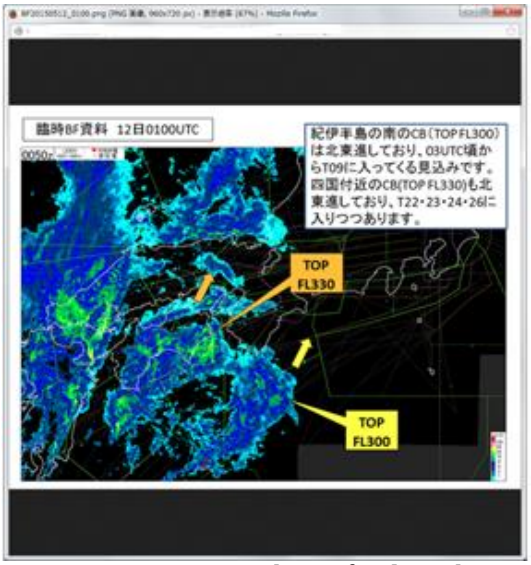

Figure 4. Screen shots of online chat tool

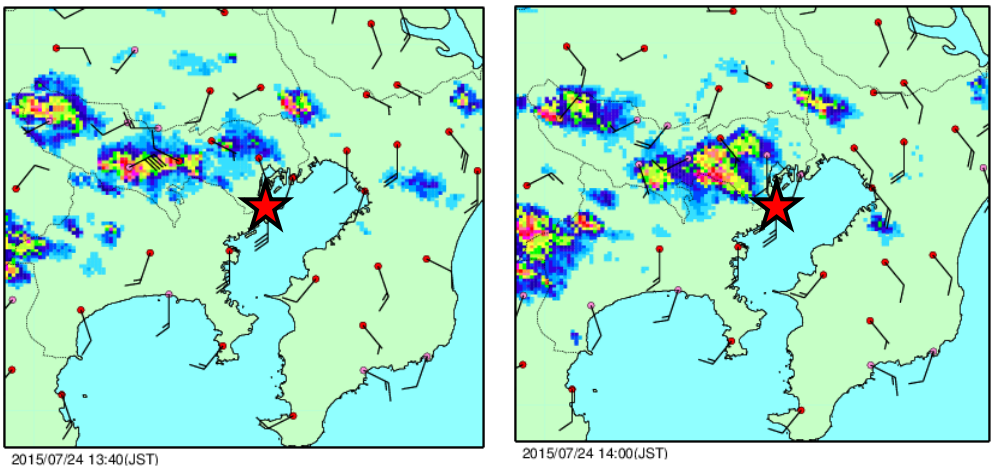

Figure 5. Radar echo around Haneda Airport on 24th July 2015
(Left) 0440UTC (Right) 0500UTC ★:Haneda Airport

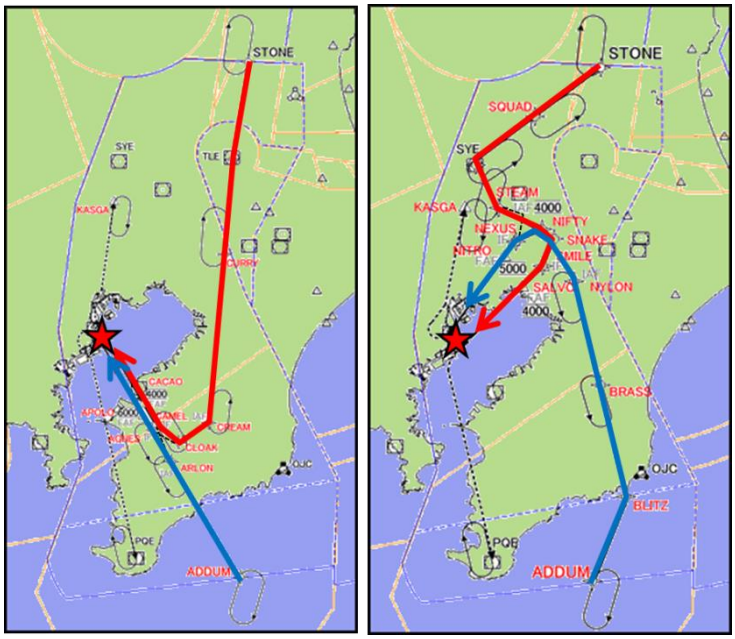

Figure 6. Examples of usual approach routes for Haneda Airport
(Left) North wind operation (Right) South wind operation ★:Haneda Airport

4. Summary

4.1 TMAT provides meteorological information and services tailored to requirements from TMUs. Especially for weather briefings, TMAT promptly shares meteorological information with TMUs whenever needed using dedicated tool and the information is effectively used for ATM operations in Tokyo metropolitan area. This kind of service is beneficial for ATM operations within terminal area where speedy meteorological information sharing and situation awareness between ATM and MET are required.

4.2 The meeting is invited to note the information contained in this paper.

– – – – – – – – – – – – –