INTERNATIONAL CIVIL AVIATION ORGANIZATION

TWENTY SIXTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/26)

Bangkok, Thailand, 7 – 10 September 2015

Agenda Item 3: Performance Framework for Regional Air Navigation Planning and Implementation

3.2: ATM

IMPLEMENTATION OF SIMULTANEOUS PARALLEL INDEPENDENT DEPARTURE PROCEDURES FOR NARITA INTERNATIONAL AIRPORT

(Presented by Japan)

SUMMARY

This Information Paper summarizes the implementation of a Simultaneous Parallel Independent Departure (SPID) procedures for Narita International Airport using the Wide Area Multilateration (WAM) system to continuous operation during low visibility. As a result, the hourly movements limit has been expanded about 6% since the end of March 2015.

Strategic Objectives:

*A: **Safety** – Enhance global civil aviation safety*

B: ***Air Navigation Capacity and Efficiency**—Increase the capacity and improve the efficiency of the global aviation system*

1. INTRODUCTION

1.1 In order to increase the capacity of Metropolitan Airports, Japan Civil Aviation Bureau (JCAB) have studied the departure and arrival operation procedures of Narita International Airport along with Tokyo International Airport (Haneda). There are two runways placed in Narita International Airport (A runway: 4000m, B runway: 2500m) as shown in **Figure 1**. The interval between A and B runway is approximately 2500m. Between the two runway, Non Transgression Zone (NTZ) for departure and arrival is installed based on ICAO standards. For departure, NTZ called Departure Non Transgression Zone (DNTZ).

1.2 In case of Narita International Airport, due to the noise avoidance regulation, the departure aircraft have to straight along SID course for a while. Therefore it is not possible to introduce simultaneous departure for these runways, because the apprpopriate course divergence cannnot be ensured after depatrure. As a result of consideration to enable the departure from each runway independently with safety ensured, JCAB developed original simultaneous parallel departure procedure named SPID (Simultaneous Parallel Independent Departure) procedures which is not in the ICAO standard and started the operation at Narita International Airport during departure congestion period since October 2011.

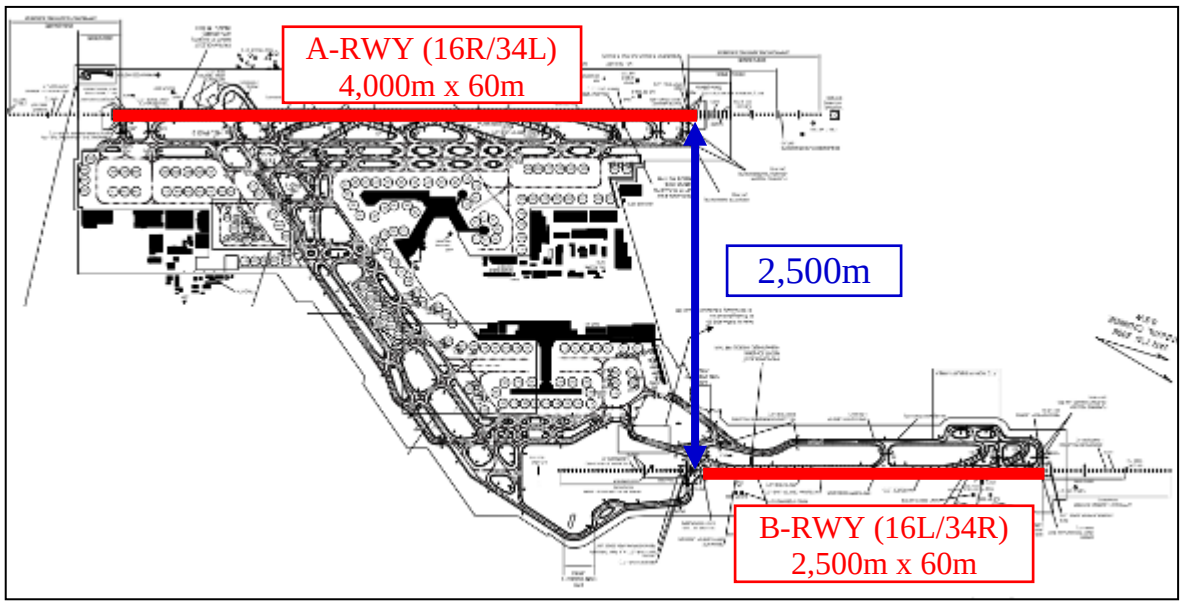


Figure 1 : Narita International Airport

2. DISCUSSION

2.1 Under SPID operation, the course convergence of departure aircraft from each runway is most significant safety hazard. So, as the prerequisite for SPID, the specified tower controller who is assigned as position for Simultaneous Departure Monitoring (SDM) have to visualy observe the departure aircraft until it is identified by radar, and when the course deviation is observed, the avoidance instruction have to be immedietely notified verbally to the Local Controller (LCL). Therefore, SPID operation cannot apply under the low visivility condition where controller cannot observe the departure aircraft visually.

2.2 In order to ensure the equivalent monitoring with visual observation for controller under low visivility, JCAB decided to install WAM to provide the position of departure aircraft from the parallel runway at a high frequency and high precision.

Presicion monitoring by WAM (Wide Area Multilateration)

2.3 While Multilateration (MLAT) is a monitoring system for displaying the calculated position of the aircraft from the difference between the received reception time at three or more receiving stations and it has been mainly in practical use for airport ground control, WAM is detected by at least four or more receiving ground stations in wide range receives Mode S reply signal, acquisition squitter, or extended squitter, transmitted from the aircraft transponder and it is an aircraft monitoring system of a new method of calculating the position of the aircraft as shown in **Figure 2**. It has an advantage that no additional equipment required to aircraft.

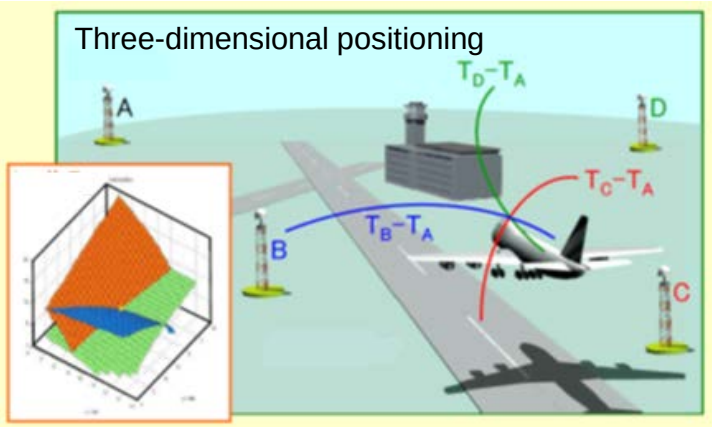


Figure 2 : Structure of WAM

2.4 Detection performance of the aircraft monitoring within the coverage of WAM-12 type which had been installed in Narita international airport are as follows.

a) Horizontal position accuracy (Mode S transponder-equipped aircraft only): that does not exceed 30m.

b) Update interval of aircraft position information (Mode S transponder-equipped aircraft only): the average update interval per a single track within 1 second, however 3.3 seconds or more undetected target should be below 0.1%.

c) Maximum simultaneous processing targets: 30 aircrafts.

d) Altitude information update interval (Mode S transponder-equipped aircraft only): average within 1 second.

e) Initial detection (Mode S transponder-equipped aircraft only): aircraft enter and come up in the coverage should be detected without delay (within 1 second). It should be noted, that it does not generate a false image due to erroneous detection.

2.5 The coverage of WAM in Narita international airport is composed of a circle radius of 7.4NM, rectangle width 5.4NM of 14NM north side and 21NM south side from airport reference point as shown in green line in **Figure 3**.

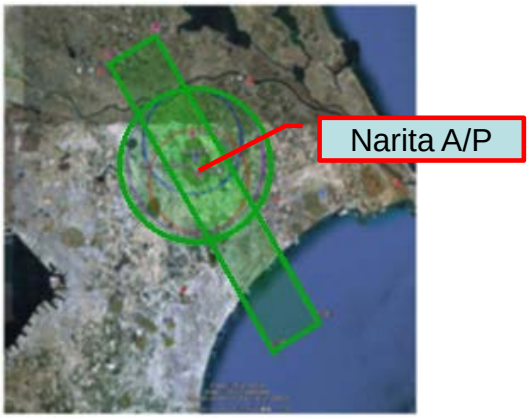
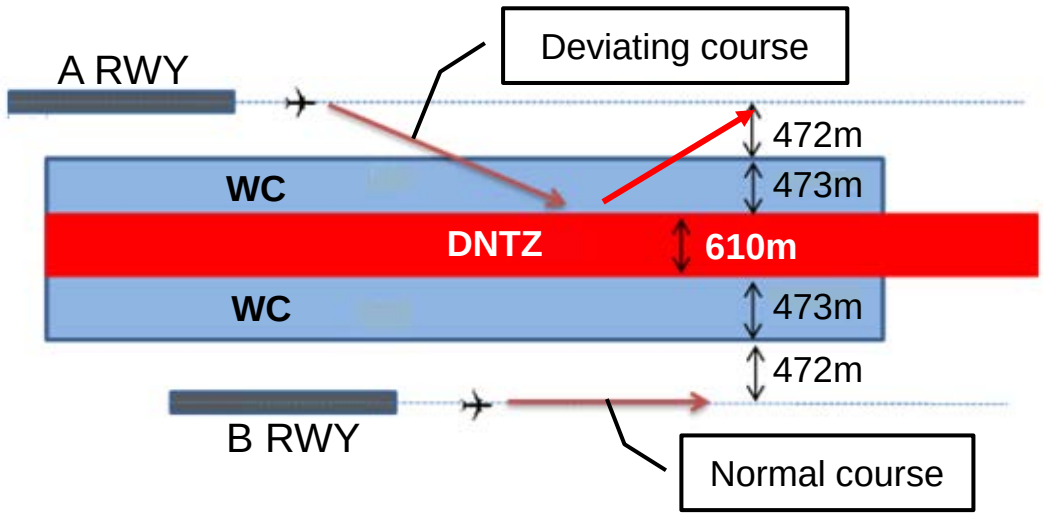


Figure 3 : The Coverage of WAM

Safety Assesment

2.6 JCAB estabilised the study group consisted of JCAB HQ, controllers at Narita, and airlines to examine the operation using WAM and conducted a safety assesment based on the ICAO Safety Management Manual, etc. The study group extracted and examined the hazards and discussed about the risk reduction measures against each hazards and related documents including for setting of the Warning Criteria (WC) area. While it is unable to apply at the time of route deviations due to bad weather avoidance and so on, but it was verified that it is possible to operate safely the simultaneous parallel departure and arrival operation even in a low visibility under conducting appropriate risk reduction measures.

2.7 As the risk reduction measures against the hazard for the departure observation procedures by WAM, Warning Criteria (WC) was set up between extended runway center line and the edge of DNTZ in order to allow easily to conduct a modification instruction of the aircraft movement due to crosswind effects and airborne equipment errors or input errors. The range of WC was developed by taking into account the theoretical value and flight inspection measured deviation value in the departure route and studied by the Electrical Navigation Reserch Institute (ENRI).



3. CONCLUSION

3.1 Through the successfully improvement of observation performance by implementation of WAM, SPID has been applied even under the low visibility. Thanks to the contribution of WAM bringing about 6% increase of hourly movements limit, the capacity of Narita International Airport has been achieved by the end of March 2015.

4. ACTION BY THE MEETING

4.1 The Meeting is invited to note this information.

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