



*International Civil Aviation Organization*

**The Sixth Meeting of ICAO Asia/Pacific Air Traffic Flow Management  
Steering Group (ATFM/SG/5)**

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**Agenda Item 5: Joint Session Meteorology Sub-Group – ATFM Steering Group**

**PROVISION OF NEW MET INFORMATION FOR ATM VIA  
THE WMO AVIATION RESEARCH DEMONSTRATION PROJECT**

(Presented by Hong Kong, China)

**SUMMARY**

This paper presents the progress of the collaboration between MET and ATM via a WMO Aviation Research Demonstration Project (AvRDP) in support of the recommendation of the ICAO Meteorology Divisional Meeting (2014) (MET/14) to include meteorological services for the terminal area in the next update of GANP to demonstrate the capability of nowcasting and mesoscale modelling techniques in support of ATM. The Project has started in 2015 and this paper updates the progress of the Project

**1. INTRODUCTION**

1.1 ATFM/SG/2-WP/11 described the collaborative efforts between the Hong Kong Civil Aviation Department (CAD) and Hong Kong Observatory (HKO) in the initial development of necessary meteorological product to support ATFM operations. In particular, Meteorological Services for the larger Terminal Area (MSTA) products were developed to support runway Capacity estimation, Airspace capacity estimation and increased situational awareness.

1.2 CAD has continued its collaboration with HKO by providing ATM support and input to the Aviation Research Demonstration Project (AvRDP) now undertaken by WMO Commission for Aeronautical Meteorology (CAeM) and its sister commissions which aims at demonstrating the capability of nowcasting and mesoscale modelling techniques in support of MSTA and to providing a ‘fast-track’ transfer of the research results into operational applications to facilitate the national meteorological services under WMO to enhance their aviation weather services to meet the ASBU initiative.

1.3 The initiative of the AvRDP was presented during the MET/ATM Seminar held in Tokyo, Japan, 29 June – 1 July 2015 (MET/ATM Seminar –IP/04). This paper provides an update of the AvRDP since MET/ATM Seminar IP/04.

## 2. DISCUSSION

2.1 A kickoff meeting was held in Shanghai, China, 24-25 June 2015 to kick-started the Project and to adopt the following objectives in 4-year term (2015-2018):

- i. to conduct research in nowcasting and mesoscale modelling at a few selected international airports located in Northern and Southern Hemisphere with a view to demonstrating the MET capabilities in supporting the development of MSTA;
- ii. to collaborate with the respective ANSP to demonstrate the benefits of the MET information to ATM;
- iii. to transfer the knowledge gained in AvRDP to other national meteorological services under WMO who need to enhance their aviation MET services so as to meet the ASBU initiative.

2.2 The Project is implemented in two phases:

- i. Phase I – MET capability research (2015 – 2017), focusing on MET research and development; and
- ii. Phase II – MET-ATM impact translation and validation (2016 – 2018), focusing on translating MET information into ATM impact

2.3 Six airports from different climatological regimes in Northern and Southern Hemisphere impacted by different weather participate in AvRDP (Appendix I): CDG (Paris), HKG (Hong Kong, China), JNB (Johannesburg), SHA (Shanghai), YYZ (Toronto) and YFB (Iqaluit), with the following progresses:

- i. 1st Intensive Observing Period (IOP) for convective weather for airport in Northern Hemisphere has completed at HKG. MET data including nowcast, mesoscale modelling data and ATM data for HKG and within Hong Kong Flight Information Region (HKFIR) have been collected and uploaded onto the AvRDP data server. HKG is preparing for the 2nd IOP for convective weather in the coming summer season. SHG has started collecting convective cases using its radar-based nowcasting systems for evaluating its performance. The MET Services in Shanghai and ATM has partnered to move forward the Project over SHG.
- ii. 1st IOP for winter weather for airports in Northern Hemisphere has started at CDG as well as YYZ to collected data and cases using nowcasting system based on remote-sensing data and high resolution mesoscale modelling systems. Verification will also be undertaken following the IOPs.
- iii. Setting up of MET instrument for preparing the 2nd IOP for winter weather over YFB has also started.
- iv. 2nd IOP for convective weather for airport in Southern Hemisphere has also started. A radar-based nowcasting system in collaboration with HKO has been implemented at JNB for testing the capability of nowcasting convective weather over the airport and its air space. Contacts with aviation clients on possible collaboration to provide better MET information for better decision making and raise awareness of the project with ATM client has also commenced.

2.4 A dedicated website (<https://avrddp.hko.gov.hk>) has been established for providing background information of the project, progress, meetings, documentation and forum. A related AvRDP data server has also been established for facilitating data exchange.

2.5 As mentioned in MET/ATM Seminar IP/04, the next Phase of the Project is the research on Integration of MET and ATM information and to demonstrate the benefits of the enhanced MET services via evaluating the ATM-impact parameters, such as airport capacity, air traffic delay, etc. Close collaboration between the MET and ATM community would be required. Support from ATM community, airlines and pilots, in particular in the form of advices in the evaluation methodology and the provision of necessary ATM and flight data for evaluation and validation, would be the key for the success of the AvRDP.

2.6 To better support the integration of MSTA with information for Trajectory Based Operation information, WMO has plan to upgrade the AvRDP into a core project. A proposal to expand the project scope and extend the project period to study the integration and extension of MSTA information to become part of TBO to support multiple decision horizon including tactical, pre-tactical as well as strategic needs and allow for more airports to participate in the project is going to be submitted. The proposal would be discussed at the upcoming WMO Executive Committee meeting EC-68.

2.7 Some preliminary results from Phase I of AvRDP will be presented in a coming WMO 4th International Symposium on Nowcasting and Very-short-range Forecast (WSN16, <https://wsn16.hk>). To train up some MWOs who might need to improve their aviation meteorological technologies for MSTA purposes, an AvRDP Training Workshop will be held on 20-22 July 2015 in Hong Kong back-to-back with the Symposium.

2.8 **Attachment A** provides information on AvRDP participating airports, climatological regime and weather elements to be studied, and a timetable of AvRDP related meetings. For more information about the AvRDP, the WSN16 as well the AvRDP Training Workshop, the meeting can contact Dr Peter Ping-wah LI, [pwli@hko.gov.hk](mailto:pwli@hko.gov.hk), the lead of the Project.

### 3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper
- b) lend its support to the AvRDP initiative
- c) discuss any relevant matters as appropriate.

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AvRDP Airport		Climatological regime	Weather elements to be studied in AvRDP
Charles de Gaulle Airport (CDG)		Mid-latitude in Northern Hemisphere Location: Inland	Winter weather - snowfall, icing, low temperature Fog
Hong Kong International Airport (HKG)		Subtropical in Northern Hemisphere Location: Surrounded by water Next to high mountain	Convection and Thunderstorm Low visibility and ceiling
O.R. Tambo International Airport (Johannesburg Airport) (JNB)		Subtropical in Southern Hemisphere Location: Inland	Convection Fog
Shanghai Hongqiao Airport (SHA)		Subtropical/mid-latitude in Northern Hemisphere Location: Inland not far away from River Estuary and East China Sea	Convective weather
Toronto Pearson International Airport (YYZ) and Iqaluit Airport (YFB)		Mid-latitude in Northern Hemisphere Location: Inland but not far away from Lake High-latitude in Northern Hemisphere Location: On Frobisher Bay	Winter weather - snowfall, icing, precipitation type and amount, visibility, wind speed, direction shear, and gust, turbulence, and low ceilings Convective Weather Arctic weather - Winds, blowing snow, fog, visibility, ceiling

**Figure 1** AvRDP Participating Airports and its associated impacting weather

Meeting	When & Where	Who
WMO/WWRP & CAeM AvRDP Training Workshop	20-22 July 2016 Hong Kong, China	Invited experts as trainers MWOs as participants
WMO/WSN16 (with special session on AvRDP)	25-29 July 2016 Hong Kong, China	CAeM representative AvRDP Airports, Invited speakers on Aviation Meteorology, Verification and ATM experts

**Table 1:** Time table of the AvRDP related meetings