

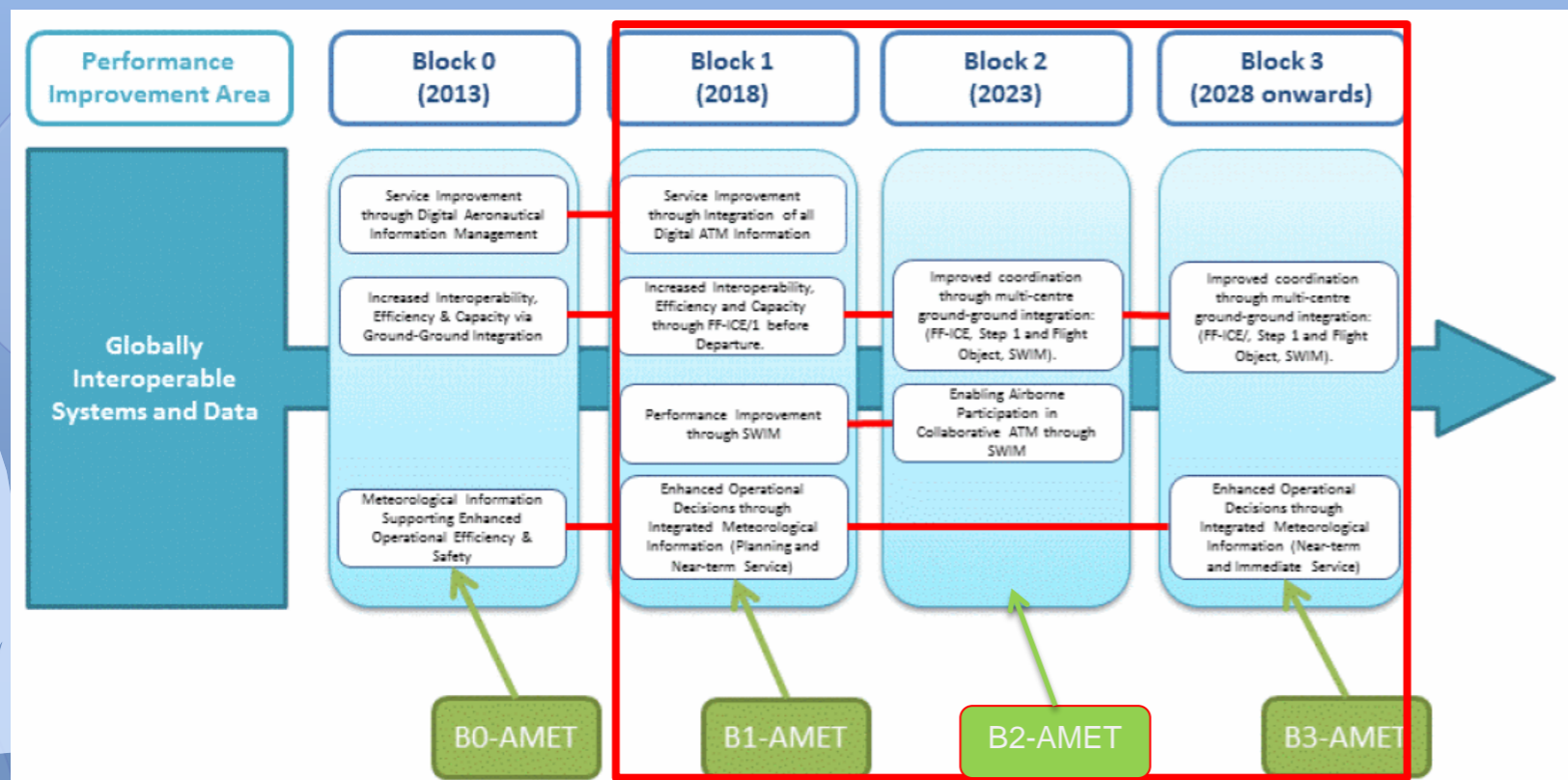
ICAO MET/ATM Seminar 2015

Aeronautical Meteorological Service Provision in Support of Future One Sky Concept and the WMO Aviation Research Demonstration Project (AvRDP) Initiative

Presented by: L.O. Li
Hong Kong Observatory,
Hong Kong, China
29 June 2015

ICAO endorsed the new (fourth) edition of the Global Air Navigation Plan (GANP) in 2013 and the associated Aviation System Block Upgrades (ASBU) methodology to enhance the safety and efficiency in the next 15+ years.

Aviation System Block Upgrade (ASBU) – 2013-2028 onwards



B1-AMET (2018-2023) and B2-AMET (2023-2028)

- Integration of MET information with ATM for global harmonization operations

By 2028 most dense airports are expected to be enhanced with the MET capabilities required under ASBU

The ICAO Meteorology Divisional Meeting (2014) (MET/14) held in Montreal from 7 to 18 July 2014 discussed the new or improved aeronautical meteorological (MET) services under the ASBU methodology.

Recommendation 2/10 — Development of meteorological service for the terminal area

That ICAO, in close coordination with WMO, be tasked to:

- a) include meteorological service for the terminal area and other relevant operational requirements in Block 1 and subsequent blocks of the aviation system block upgrade methodology to highlight potential related impacts on air traffic flow in consideration of air traffic control and air traffic management (ATM);
- b) develop ATM-tailored meteorological service for the terminal area to meet future ATM requirements identified by the *Global Air Navigation Plan (Doc 9750)* and reflect the appropriate functional and performance requirements in the relevant provisions, noting outcomes from ICAO expert groups on meteorology, ATM and flight operations.;
- c) develop guidance on verification methodology toward the continuous improvement of meteorological information to ATM; and
- d) integrate the information concerning meteorological service for the terminal area into the future system-wide information management environment underpinning the future globally interoperable ATM system.

Meteorology (MET) Divisional Meeting 2014

Agenda (all languages)

Daily Bulletin

Programme

Documentation

Working Papers

Information Papers

List of Documentation

Filmsies

List of WPs and IPs per Agenda Item

Order of Business

Draft Reports

Yellow Cover Reports

Reference Documents

Doc 9750

Doc 10004

Group Photo (1 of 2)

Group Photo (2 of 2)

Information for Delegates

Information Booklet



[French - Français](#)

[Spanish - Español](#)

[Russian - Русский](#)

[Arabic](#)

ICAO Meteorology Divisional Meeting

(in part conjointly with the Fifteenth Session of the World Meteorological Organization (WMO)
Commission for Aeronautical Meteorology (CAeM) including Technical Conference)

In line with the working arrangements between ICAO and the World Meteorological Organization (WMO), WMO will undertake

an Aviation Research Demonstration Project (AvRDP) initiative to demonstrate the capability of nowcasting and mesoscale modelling techniques in support of ASBU.

Noting that MET will be a key enabler to the realization of “One Sky” concept and the emerging information needs of the air traffic management (ATM) systems, some States have already embarked on MET enhancement projects in collaboration with ATM community, e.g. SESAR, NextGen and CARATS.

Apart from these State and regional efforts to enhance the MET services, WMO will undertake the Aviation Research Demonstration Project (AvRDP) initiative to demonstrate the benefits of MET services beyond existing ICAO Annex 3 requirements in support of the development of the next generation aviation initiative as per the Working Arrangements between ICAO and WMO.

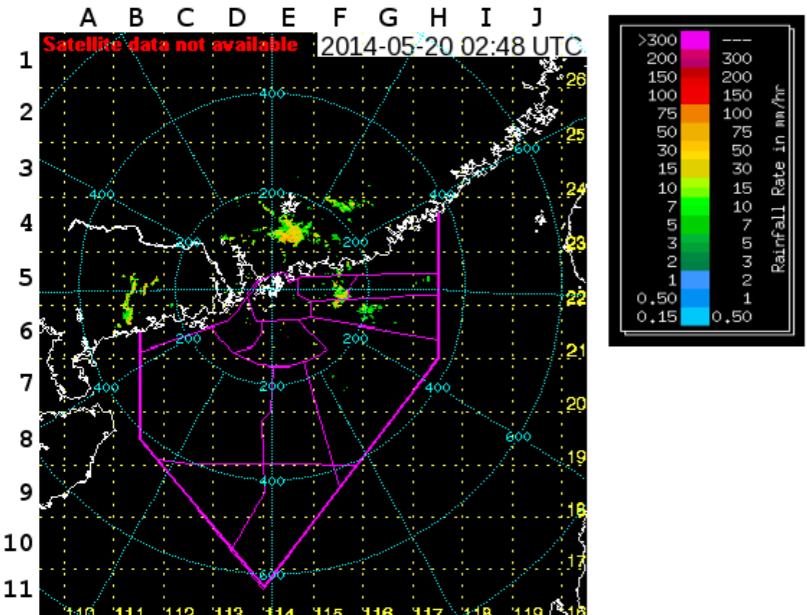
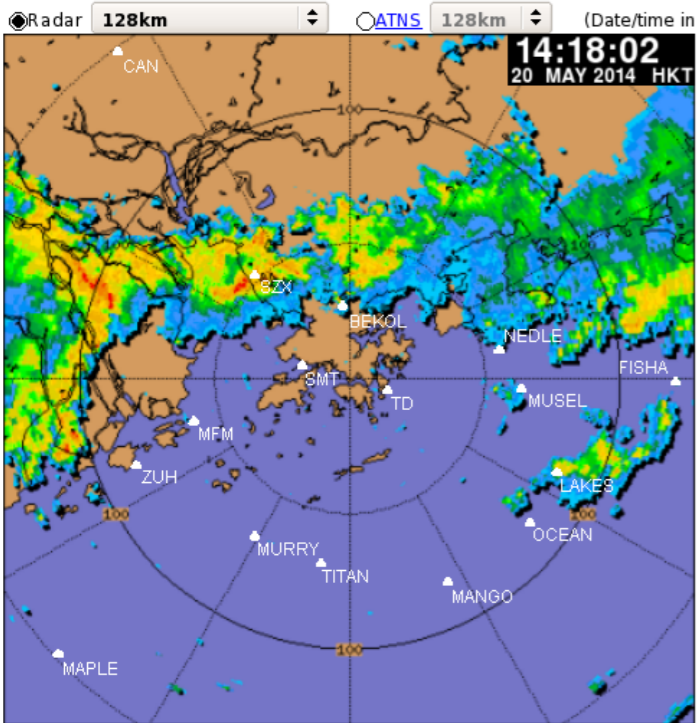
With growing air traffic and further development of the aviation industry, the impact of adverse weather in the terminal area on its operation is becoming more serious.

Noting that weather forecast products for the terminal area would be highly effective in meeting the pressing need from air navigation services provider (ANSP), pilots and other ATM users, some States have developed some experimental/operational MET products with a view to filling the gap between TAF and en-route forecast and providing better services to support ATM.

For example, the Hong Kong Observatory (HKO), as the MET authority of Hong Kong, China has developed a suite of significant convection forecast products to support air traffic flow management.

The traditional convection nowcasting product has been translated into various impact levels on aircraft operation for ATFM to forecast the airport and airspace capacity (MET/R TF/3 – WP/07)

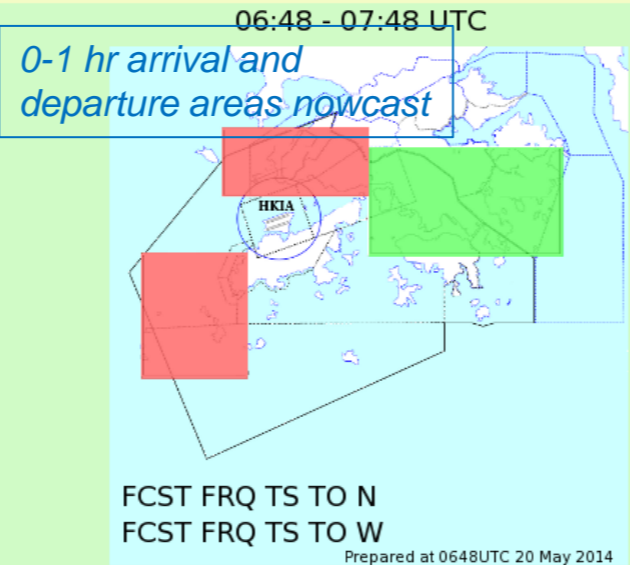
Weather radar reflectivity animation



Weather radar overlaid on satellite imagery

Significant Convection Monitoring and Forecast (trial)

Forecast valid from 06 UTC 20 May 2014 to 18 UTC 20 May 2014



Forecast for HKIA

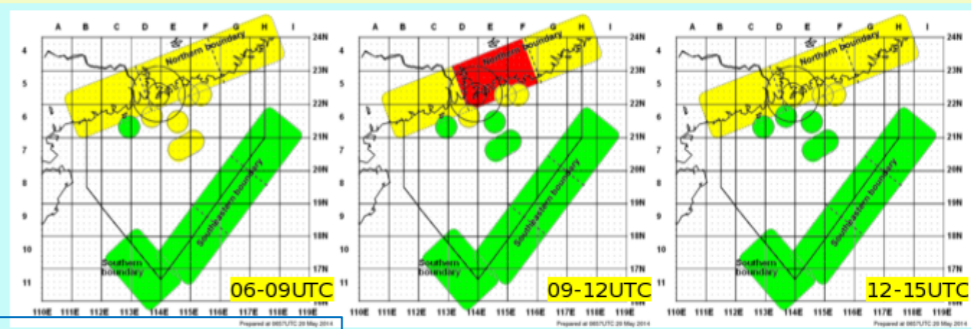
UTC	07	08	09	10	11	12	13	14	15
Overall	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green
07 Headwind	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
25 Headwind	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green
Crosswind	Green	Green	Green	Green	Green	Green	Green	Green	Green
Visibility	Green	Green	Green	Green	Green	Green	Green	Green	Green
Ceiling	Green	Green	Green	Green	Green	Green	Green	Green	Green

1-9 hr airport performance based forecast

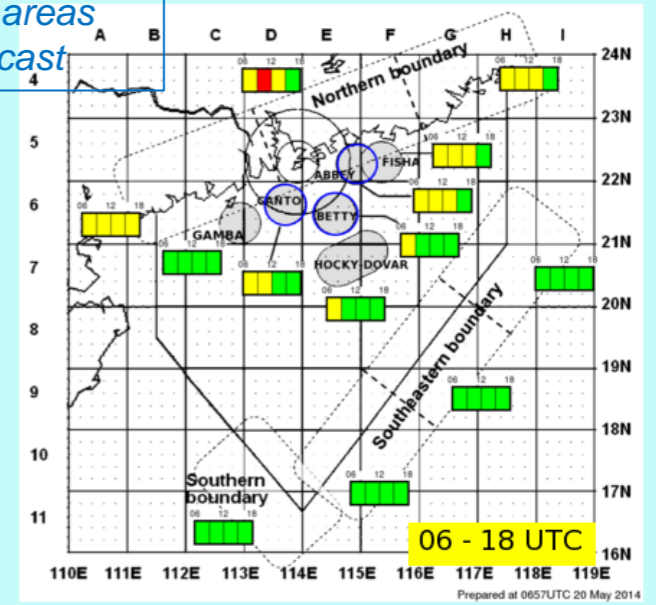
TS/CB forecast for adjacent areas

UTC	07-08	08-09	09-10	10-13
20nm of ARP	Red	Red	Yellow	Yellow
ABBEY	Yellow	Yellow	Green	Green
BETTY	Yellow	Yellow	Green	Green
CANTO	Yellow	Yellow	Green	Green

1-6 hr significant points nowcast



12 hr significant areas meso-scale forecast



CAPACITY RELATED INFORMATION VHHH (FOR ARRIVALS)
 VALID: 200600 to 201600 UTC
 CAPACITY LEVEL: 2
 AIRPORT ACCEPTANCE RATE: 28 flights per hour
 EXPECTED DELAY: Up to 30 mins
 REASON: CB in vicinity of Aerodrome
 REMARK: Convective activities are expected to affect the holding areas and HKIA.
 Prepared at: 0523UTC 20 May 2014

Notes

Predicted Airport Arrival Rate based on convection nowcast and airport constraints

MET/14 meeting recommended that ICAO, in close collaboration with WMO, be tasked :

- to include meteorological service for the terminal area and other relevant operational requirements in ASBU methodology;
- to develop ATM-tailored meteorological service for the terminal area to meet future ATM requirements; and
- to develop guidance on verification methodology toward the continuous improvement of meteorological information to ATM.

To support the development effort, the WMO Commission for Aeronautical Meteorology (CAeM) and its sister commissions are jointly taking forward AvRDP which has been endorsed and being implemented under the leadership of HKO.

The purpose of the AvRDP includes consolidation of efforts by a number of States in:

- developing new aviation meteorological products for terminal area;
- demonstration of the capability of the latest forecasting techniques in support of the development of the next generation aviation initiative under GANP; and
- provision of a more systematic assessment of the benefits to the aviation community.

These States include:

- Canada,
- China,
- France,
- Hong Kong, China and
- South Africa



To cater for different high impact weather at different locale, projects would be conducted at a number of airports with high air density over different parts of the world with different climatological conditions.

Currently, the following airports participate in the Project:

- Charles de Gaulle Airport (CDG),
- Hong Kong International Airport (HKG),
- O.R. Tambo International Airport (JNB),
- Shanghai Hongqiao Airport (SHA), and
- Toronto Pearson International Airport (YYZ)

AvRDP Airports (initial)

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

The AvRDP will be conducted in 2 phases.

Phase I will be conducted from summer 2015 till summer 2017 and focus mainly on the scientific aspect.

This will be followed by Phase II from summer 2016 till summer 2018 which will focus on the MET/ATM integration and operational issues.

An International Symposium on Nowcasting and Very-short-range Forecast (WSN16) with an aviation theme will also be held in Hong Kong in the summer of 2016 to share the experience gained.

An important element of the project is the final integration of the initiative into an operational component to enhance service delivery following a successful demonstration of capability.

As such, the AvRDP will also look into operational issues including:

- the translation of MET forecast into aviation impact and its validation;
- the integration of MET information into ATM operation/decision; and
- the quantification of the benefits of the new MET information from ATM perspective.



Support from ATM community, airlines and pilots would be the key for success of the AvRDP, in particular,

- in the form of advices in the evaluation methodology; and
- the provision of necessary ATM and flight data for evaluation and validation.

These will help the MET and ATM community as a whole to face the future challenges and to harness the opportunities to deliver better services to the aviation industry in the decades to come.

For more information about the AvRDP, the meeting can contact the lead of the Project:

Dr Peter Ping-wah LI,
Hong Kong Observatory,
Hong Kong, China
Email: pwli@hko.gov.hk.

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