International Civil Aviation Organization

WORKING PAPER

Asia and Pacific (APAC)
Eleventh Meeting of the Meteorological Requirements Working Group (MET/R WG/11)

Online, 31 May to 03 June 2022

Agenda Item 4: Collaboration between MET services and ATM stakeholders

UPDATE TO APAC REGIONAL FRAMEWORK FOR COLLABORATIVE ATFM – MET INFORMATION FOR ATFM

(Presented by Australia and Hong Kong, China)

SUMMARY

This paper presents the work plan to update Meteorological Information for ATFM in the document Asia Pacific Regional Framework for Collaborative ATFM.

1. INTRODUCTION

1.1 ATFM Information Requirement Small Working Group (ATFM IR SWG) has been tasked to review the Asia Pacific Regional Framework for Collaborative ATFM (ATFM SG 11 – Task 11/8). The scope of work is provided in ATFM/SG/11 Report of the Meeting – Appendix E.

1.2 The first and second online meetings of ATFM IR SWG were held on 18 March 2022 and 10 May 2022 to discuss the work to review and update the Regional Framework Document. It is intended to submit the updated Regional Framework Document for consideration by ATFM SG/12 meeting to be held tentatively in August 2022.

2. DISCUSSION

2.1 The Asia Pacific Regional Framework for Collaborative ATFM (Version 3.0, August 2017) includes a section of ***Meteorological Information for ATFM*** in paragraphs 5.59-5.67 (attached in the **Appendix** to this paper).

2.2 Australia and Hong Kong China were assigned by ATFM IR SWG to coordinate the following task (Item 21 of Appendix E to the ATFM/SG/11 Report):

- ***Meteorological Information for ATFM*** to be updated to include examples of latest information available to advanced ANSPs, and to include direct reference to the *Regional Guidance for Tailored MET Information to Support ATM*.

2.3 It is recommended to invite members of MET/R WG to review the above section and provide inputs or comments for the update of ***Meteorological Information for ATFM*** in the Asia Pacific Regional Framework for Collaborative ATFM. In view of the short time available before ATFM SG/12, the meeting is invited to consider formulating the following Decision:

Decision MET/R WG/11/x: Update to Meteorological Information for ATFM in the Asia Pacific Regional Framework for Collaborative ATFM

That, MET/R WG members are invited to review *Meteorological Information for ATFM* (paragraphs 5.59-5.67) in the Regional Framework Document for Collaborative ATFM and provide inputs of the latest examples to the ICAO Secretariat and the task coordinators[1] by 17 June 2022.

2.4 The next ATFM IR SWG online meeting will be held in mid-June 2022 to discuss and review the preliminary drafts from each task group.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) consider formulating the proposed Decision in paragraph 2.3; and

b) discuss any relevant matters as appropriate.

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[1] Contacts of task coordinators: Ashwin Naidu (ashwin.naidu@bom.gov.au) and Marco Kok (mhkok@hko.gov.hk).

ATFM Communications by AFS

5.54 Recognizing that States' needs for ATFM may vary, where necessary ATSUs may participate in collaborative ATFM without having the need for dedicated ATFM systems or terminals. The Aeronautical Fixed Service (AFS) may provide a suitable method for distribution of ADP and ATFM measure information to such ATSUs.

5.55 The *EUROCONTROL Specification for ATS Data Exchange Presentation* (ADEXP) provides a format for use in on-line, computer to computer message exchange and for message exchange over switched messaging networks. It is used in current generation ATM automation and supporting systems, and was used in the development of FIXM.

5.56 The ADEXP model provides machine-readable information that is also human-readable, rendering it useable for the distribution of ATFM information on computer-based displays and in text form via AFS.

5.57 ADEXP version 3.1 is the agreed format for ATFM message exchange in the Asia/Pacific Region in cases where an ATFM network interface has not been established, and ATFM information is distributed by AFS. More information is available on the EUROCONTROL website[5].

ATFM Phrases

5.58 ATFM phrases for use in ATFM coordination, and in air-ground communications, are also included in **Appendix D.**

Note: The ATFM phrases are for use as an interim procedure, pending development of globally standardized ATFM-related phraseology.

Meteorological Information for ATFM

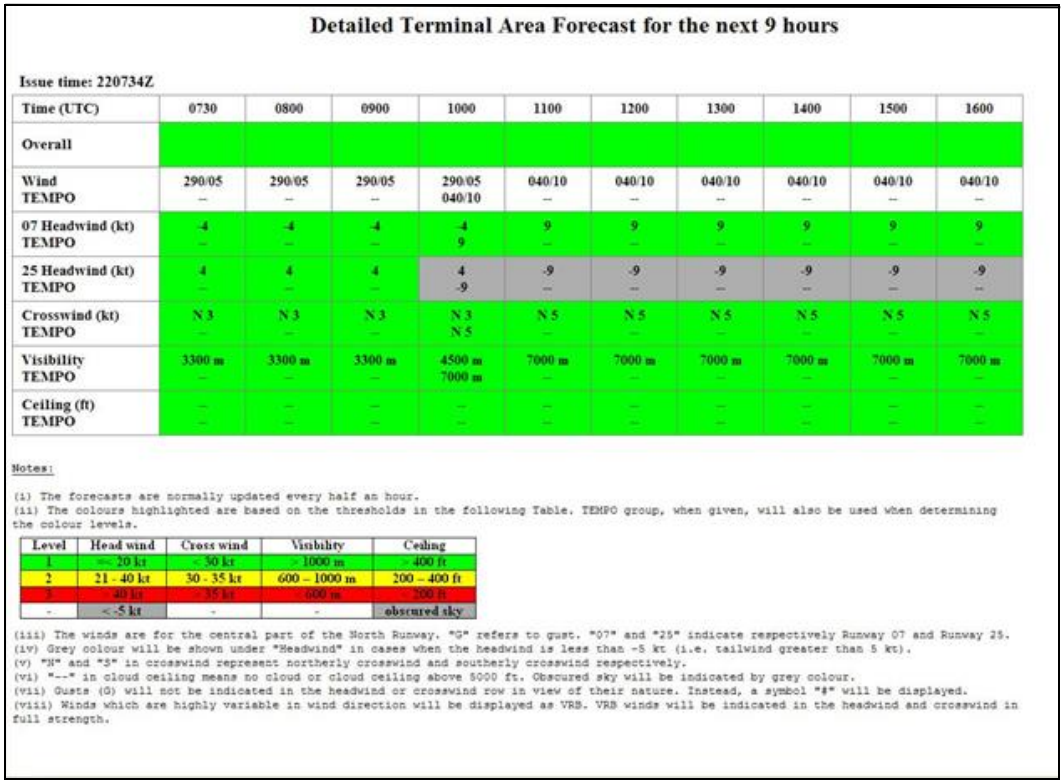
5.59 The accuracy of pre-tactical and tactical demand and capacity assessment is reliant on the predictability of events that will impact capacity. In the case of weather-related constraints, the traditional Annex 3 services in support of aerodrome operations and FIR/Global operations do not fully address the needs of ATFM. While globally, MET authorities are working steadily towards the institutional provision of Meteorological Services to support the Terminal Area (MSTA), there is a greater urgency for ATFM providers to collaborate closely with Met service providers to develop products that bridge the gap between the traditional information.

5.60 When predicting the capacity of an airport with regard to forecast meteorological conditions, it is important to not only consider the runway/s and immediate airport surroundings, which are covered by the Aerodrome Forecast (TAF) to a distance of 8km, but to also take into consideration the ability for air traffic to flow via the terminal area on the normal arrival routes and instrument approach procedures to that airport. In particular, weather affecting the airspace in the vicinity of the primary holding areas and initial approach fixes can have a significant impact on the delivery of flights into the approach airspace and onto the runway.

[5] https://www.eurocontrol.int/publications/ats-data-exchange-presentation-adexp-specification

5.61 The current Annex 3 provisions do not include provisions for meteorological information that specifically support the determination of weather impact on capacity. OPMET information is typically pilot and/or tactical ATC oriented, with limited ATFM orientation. , and are largely produced in coded text format, which makes rapid interpretation difficult for ATM officers.

5.62 ICAO Annex 3 requires that each Contracting Sate shall determine the meteorological service which it will provide to meet the needs of international air navigation, and that this shall consist of the provision of meteorological information to users that is necessary for the performance of their respective functions. Therefore, to enable rational and quantifiable capacity determination, ANSPs and Meteorological service authorities should collaborate closely to define meteorological services to be provided to support ATM and ATFM decisions, based on specific impact to operations. Such targeted MET information should address key thresholds for various weather criteria which have a quantifiable impact on airport and terminal airspace capacity, such as headwind, crosswind, visibility, ceiling, wind shear, and convective weather at the initial approach fix (IAF) or in the vicinity of critical arrival fixes, holding points and sequencing areas. An example of the simple type of matrix that could be produced, with intuitive colour coding for quick recognition by ATM staff, is shown in **Figure 3**. In terms of the wider Terminal area, similar defined criteria, thresholds and colour coding can enable rapid interpretation of impact on operations.



Detailed Terminal Area Forecast for the next 9 hours

Issue time: 220734Z

Time (UTC)	0730	0800	0900	1000	1100	1200	1300	1400	1500	1600
Overall										
Wind TEMPO	290/05 --	290/05 --	290/05 --	290/05 040/10	040/10 --	040/10 --	040/10 --	040/10 --	040/10 --	040/10 --
07 Headwind (kt) TEMPO	-4 --	-4 --	-4 --	-4 9	9 --	9 --	9 --	9 --	9 --	9 --
25 Headwind (kt) TEMPO	4 --	4 --	4 --	4 -9	-9 --	-9 --	-9 --	-9 --	-9 --	-9 --
Crosswind (kt) TEMPO	N 3 --	N 3 --	N 3 --	N 3 N 5	N 5 --	N 5 --	N 5 --	N 5 --	N 5 --	N 5 --
Visibility TEMPO	3300 m --	3300 m --	3300 m --	4500 m 7000 m	7000 m --	7000 m --	7000 m --	7000 m --	7000 m --	7000 m --
Ceiling (ft) TEMPO	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --

Notes:

(i) The forecasts are normally updated every half an hour.
(ii) The colours highlighted are based on the thresholds in the following Table. TEMPO group, when given, will also be used when determining the colour levels.

Level	Head wind	Cross wind	Visibility	Ceiling
1	=< 20 kt	< 30 kt	> 1000 m	> 400 ft
2	21 - 40 kt	30 - 35 kt	600 – 1000 m	200 – 400 ft
3	> 40 kt	> 35 kt	< 600 m	< 200 ft
-	<-5 kt	-	-	obscured sky

(iii) The winds are for the central part of the North Runway. "G" refers to gust. "07" and "25" indicate respectively Runway 07 and Runway 25.
(iv) Grey colour will be shown under "Headwind" in cases when the headwind is less than -5 kt (i.e. tailwind greater than 5 kt).
(v) "N" and "S" in crosswind represent northerly crosswind and southerly crosswind respectively.
(vi) "---" in cloud ceiling means no cloud or cloud ceiling above 5000 ft. Obscured sky will be indicated by grey colour.
(vii) Gusts (G) will not be indicated in the headwind or crosswind row in view of their nature. Instead, a symbol "#" will be displayed.
(viii) Winds which are highly variable in wind direction will be displayed as VRB. VRB winds will be indicated in the headwind and crosswind in full strength.

Figure 3: Example Colour-Coded Matrix of Met Information

5.63 An example of IAF and holding stack prediction based on weather intensity and coverage area is shown in **Figure 4**, using similarly defined criteria and thresholds to facilitate rapid interpretation of the impact on operations.

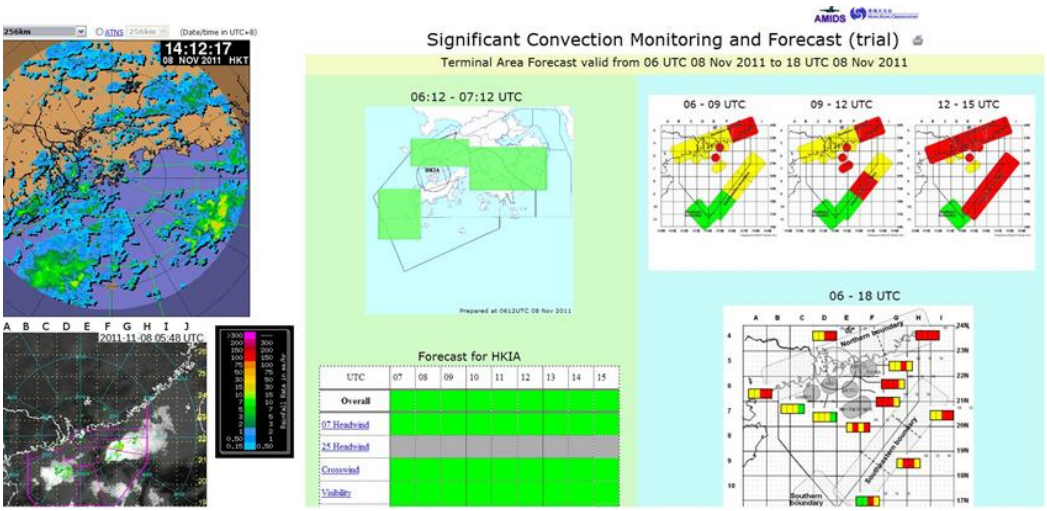


Figure 4: IAF and Holding Stack Weather Prediction.

5.64 When identifying criteria to be used in determining MET services, consideration should be given to thresholds for meteorological elements that result in a change of runway operating mode, such as:

- a change of runway dependency;
- a change of spacing between arriving aircraft;
- a change in nominal aircraft approach speeds;
- an exceedance of aircraft operating limitations for significant numbers of aircraft (eg maximum crosswind component);
- an inability to commence an approach via the IAF; or
- an inability to hold in the primary published holding areas, etc.

5.65 When considering the lead time requirements for such forecast products, it is necessary to strike a balance between the desired probability and accuracy and the target ATFM aircraft population.

5.66 Given the direction towards Regional ATFM through ground delay programs, it is therefore desirable that the forecast period cover at least 6-8 hours ahead to encompass the majority of regional length flights with notification of ATFM measures an acceptable time before estimated off blocks time (EOBT).

5.67 In accordance with Annex 3 requirements, including the requirement that close liaison shall be maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of meteorological services for international air navigation, States should ensure that the MET service provides sufficient detail and accuracy.