INTRODUCTION

Purpose: This survey is intended to inform ICAO (and States) of the provision of current and future meteorological (MET) information services by States specifically to support Air Traffic Management (ATM), in particular Air Traffic Flow Management (ATFM).

The survey solicits input from the MET and ATM communities and Airspace Users in the Asia/Pacific Region (APAC) Region with the following terms of reference regarding the initiative and objective of the survey.

- To identify current and future meteorological requirements, in terms of the provision of MET information and communication methods, to support ATM;
- To identify the types and importance of MET information for ATM;
- To identify the gaps between the existing MET information services and the requirements of ATM community and Airspace Users;
- To identify challenges faced by States/Administrations regarding the provision of MET information to support ATM, in particular ATFM;
- To identify other guidance and education material required to support States/Administrations in implementing MET information to support ATFM.
- To remind States/Administrations of the existence of Asia Pacific Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations document.

Benefits: The survey results will assist ICAO APAC Regional Office to:

- Understand States/Administration current status and requirements of MET information to support ATM, in particular ATFM;
- Explore opportunities and enhance MET-ATM integration in APAC States/Administrations;
- Facilitate a coordinated approach for further improvement of MET services in support of ATM, especially ATFM in the APAC Region.
- Seek further input from States/Administrations on other guidance or education material required to assist the implementation of MET information service to support ATFM.

To collect input from BOTH the MET and ATM communities in the APAC Region, each State/Administration would be requested to provide at least **2 separate survey returns,** one from each of the MET and ATM communities.

State/Administrations are also encouraged to invite additional survey returns from their State-based Airspace Users such as airlines, for some of the specific questions indicated in the Questionnaire.

Please select all relevant responses (there may be more than one per question)

PART A – GOVERNANCE AND LEGISLATION (Questions for MET and ATM)

(1) Has your State/Administration enacted primary legislation and supporting regulations to ensure that the implementation of MET service is in accordance with ICAO Annex 3 - *Meteorological Service for International Air Navigation* and any applicable regional air navigation agreements?

a) No
b) Yes (please specify):
_____
_____
_____

(2) Does your State/Administration have a written agreement in place between the air traffic authority/service and the meteorological authority/service defining roles and responsibilities and the MET information to be provided in accordance with ICAO Annex 3 and ICAO Doc. 9377 – *Manual on Coordination between Air Traffic Services, Aeronautical information Services and Aeronautical Meteorological Services*?

a) No
b) Yes (please specify):
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_____
_____

PART B – IMPLEMENTATION OF AIR TRAFFIC FLOW MANAGEMENT (ATFM) – Questions for ATM only

(3) Has your State/Administration implemented ATFM?
a) Yes
b) No

(4) If Yes to Q3, please specify your State's level of implementation of ATFM and provide further details.
Note: Level of implementation defines the phase at which the States are in implementing their ATFM procedures and processes. For example, Level 1, 2 or 3 of Distributed Multi-Nodal ATFM Project or implementation phases of any other ATFM projects the States are involved in.

(5) If No to Q3, is your State/Administrative intending to implement ATFM?
a) Yes
b) No

If yes, please specify the expected timeline and provide further details:

PART C- PROVISION OF MET INFORMATION

PART C1 - CURRENT PROVISION OF METEOLOGICAL INFORMATION (Questions for MET and ATM)

(6) **For ATM and MET:** Indicate below the provision of specific MET information/services in your State/Administration to support ATFM (select more than one options as necessary):

a) Local report, routine/special
b) Aerodrome meteorological report, routine/special (METAR/SPECI)
c) Volcanic activity report
d) Volcano Observatory Notice to Aviation (VONA)
e) Air-report, routine/special (ARP/ARS)
f) Aerodrome forecast (TAF)

g) Trend forecast (TREND)
h) Area forecast for low-level flights (GAMET)
i) Significant weather (SIGWX) forecast; low-level (flight levels below 100)
j) Significant weather (SIGWX) forecast; medium-level (flight levels between 100 and 250)
k) Significant weather (SIGWX) forecast; high-level (flight levels between 250 and 630)
l) Upper-air wind and temperature grid point forecasts
m) Volcanic ash advisory information (VAA)
n) Volcanic ash advisory information in graphical format (VAG)
o) Tropical cyclone advisory information (TCA)
p) Tropical cyclone advisory information in graphical format (TCG)
q) SIGMET information
r) AIRMET information
s) Aerodrome warning (AD WRNG)
t) Wind shear Warning (WS WRNG)
u) Wind shear alert
v) Aeronautical climatological information
w) Other MET information, e.g., tailored service (please specify):

_____
_____

(7) **For ATM only:** Does your State/Administration's ATM/ATFM system(s) utilize automated processing of gridded MET information (e.g. World Area Forecast System (WAFS) information) to support flight planning?

For MET only: What gridded MET information (e.g. World Area Forecast System (WAFS) information) is provided to your State's ATM to support flight planning.?

Parameter	WAFS as the information source (Yes / No)	Other sources (Yes / No) (If yes, please specify the source(s))
Wind		
Temperature		
Humidity		
Icing		
Turbulence		
Cumulonimbus cloud		
Other (please specify):		

PART C2 - FUTURE PROVISION OF METEOLOGICAL INFORMATION (Questions for MET, ATM and Airspace Users)

(8) **For ATM and Airspace Users:** Rate the types of aerodrome MET observation and forecast parameters considered useful to support ATM/ATFM operation and rate the impact of these parameters to ATM/ATFM operations. Please use the ratings as follows

- Ratings on usefulness: 5-Very useful / 4-Useful / 3-Less useful / 2-Not useful / 1-Not Applicable
- Ratings on impact: 5-Very high impact / 4- Relatively high impact / 3 – Relatively low impact / 2 – Very low impact / 1-Not Applicable

Aerodrome MET information	Ratings on usefulness	Ratings on impact
Wind speed and direction		
Headwind and crosswind		

Wind Shear		
Visibility		
Runway Visual Range (RVR)		
Temperature		
QNH		
Low clouds		
Fog/Mist		
Haze		
Smoke		
Frost		
Snow (including snowstorm)		
Hail		
Thunderstorm		
Dust (including Duststorm)		
Sand (including Sandstorm)		
Light precipitation (e.g. drizzle, light rain)		
Heavy precipitation (e.g. Heavy showers, rain, snow, etc)		
Volcanic ash		
Flooding / storm surge		
Tropical Cyclone		
Other (please specify):		

(9) **For ATM and Airspace User:** Rate the types of MET observation and forecast phenomena within your Flight Information Region (FIR) considered useful to support ATFM operation and rate the impact of these phenomena to ATM/ATFM operations.
Please use the ratings as follows

- Ratings on usefulness: 5-Very useful / 4-Useful / 3-Less useful / 2-Not useful / 1-Not Applicable
- Ratings on impact: 5-Very high impact / 4- Relatively high impact / 3 – Relatively low impact / 2 – Very low impact / 1-Not Applicable

Airspace (Enroute) MET information	**Ratings on usefulness**	**Ratings on impact**
Wind speed and direction		
Temperature		
Convective Cloud (such as Deep Convection or Towering Cumulus Cloud)		
Thunderstorms		
Duststorms		
Sandstorms		
Icing (moderate or severe)		
Turbulence (moderate or severe)		
Volcanic Ash		
Tropical Cyclone		
Other (please specify):		

(10) **For ATM and Airspace User:** Rate the importance of characteristic descriptions of MET phenomenon for an effective and efficient ATFM in your State/Administration. Please use the ratings as follows and specify the reasons.

(Ratings of importance: 5-Very important / 4-Important / 3-Less important / 2-Not important / 1-Not Applicable)

Characteristic descriptions of MET Information	**Ratings of importance**	**Reason(s)**
Time of issuance and validity		
Observed position, horizontal extent and vertical extent		
Forecast position, horizontal extent and vertical extent		
Observed movement / forecast movement		
Intensity (light, moderate and severe)		
Expected change in intensity (weakening, intensifying or no change)		
Frequency (isolated, scattered, occasional and frequent)		
Probability of occurrence		
Confidence/Uncertainty of forecast		
Other (Please specify):		

(11) **For ATM and MET:** Are there any established objective rules for automatic quantitative translation from MET constraints to ATFM impact (e.g. change in Airport Arrival Rate, Airport Departure Rate, Miles-in-Trail (MIT)/Minutes-in-Trail (MINIT), other flow control measures) developed or planned to be developed in your State/Administration? If yes, please provide implementation details otherwise, please provide additional information on the State's plan.

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_____

(12) **For ATM and Airspace Users:** In relation to MET information, rate the importance of the following components for an effective and efficient ATFM in your State/Administration. Please provide your expectations from MET service providers for each component. Please use the ratings as follows and provide further details.
(Ratings of importance: 5-Very important / 4-Important / 3-Less important / 2-Not important / 1–Not Applicable)

Needs of ATFM operation	**Ratings of importance**	**Please provide further details**
Timeliness, such as forecast lead time and update frequency		
Quality of forecast, such as accuracy and reliability		
Provision of MET information as an information service, such as through secured web services, in SWIM environment ***Note:*** *SWIM information can be found at* *https://www.icao.int/APAC/Pages/swim.aspx*		
Integration of MET information, provided through information service in SWIM, with other information domain, such aeronautical		

information and flight information to enable a data-centric operational environment.		
SWIM-compliant meteorological information to be more readily exchanged with the aircraft to improve operational awareness and decision-making using air/ground data connectivity and aircraft on-board systems.		
Capability to translate MET constraint into ATFM impact is required for decision support tool.		
Optimized flight trajectory planning		
Information on the state of the runway as provided by the appropriate airport authority, such as runway deposits, the extent of runway contamination, the depth of deposit and the estimated surface friction.		
Other (please specify):		

(13) **For ATM and Airspace User:** Based on the response from Q8 to Q12, what the challenges that your organization may have encountered, if any, regarding the development, implementation and/or utilisation of enhanced MET services to better support ATFM operation?

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_____
_____

(14) **For MET only:** In reference to Q8 to Q12, what are the challenges your organization may have encountered (or may encounter), if any, regarding the development and implementation of enhanced MET services to better support ATFM operation?

_____
_____
_____

(15) **For ATM and MET:** What initiatives does your State/Administration currently undertake, or will undertake in future, to enhance MET service provision specifically in support of ATFM operations? Indicate the expected implementation timeline for these initiatives.

Future Initiatives	**Expected Timeline (2020-2021) / (2022-2023) / (2024-2025)**	**Brief Description of the Initiative**
Collaborative decision-making process, including MET information to support of ATFM operations.		
MET–ATM integration (Integration of forecast data supporting ATM (ATFM and Air Traffic Services (ATS)).		
MET for FF-ICE (Flight and Flow Information for		

Collaborative Environment – Reference ICAO Doc 9965) (link the brochure)		
Other (Please Specify):		

PART D – COMMUNICATION METHODS (Questions for MET, ATM and Airspace Users)

(16) **For ATM and MET:** By which mode does your State/Administration disseminate aeronautical MET information to ATS units, Airspace Users and other stakeholders (select more than one option as necessary)?

a. Aeronautical Fixed Telecommunications Network (AFTN)
b. ATS Message Handling System (AMHS)
c. Telephone
d. Facsimile
e. Internet
f. Web/video conferencing
g. System to system Interface, e.g. web-based technology.
h. Other (please specify): _____

(17) **For ATM and MET:** What is the most effective means of representing MET information in support of AFTM in your State/Administration? Please use the ratings below for your preference.
(Preference: 5-Most preferred / 4-Preferred / 3-Less preferred / 2-least preferred / 1- Not Applicable)

Form of MET information presentation	Preference
Text	
Chart / Graphical	
Animation / Video	
Briefing	
Other (please specify):	

(18) **For ATM, MET and Airspace Users:** What are the challenges that your State/Administration may have encountered, if any, for an effective collaboration and communication between ATM and MET while developing and implementing ATFM?
_____
_____
_____

PART E – EDUCATION (Questions for MET, ATM and Airspace Users)

A document titled *Asia Pacific Regional Guidance for Tailored Meteorological Information and Services to Support Air Traffic Management Operations* is now available on the ICAO APAC eDocuments web-page. <Put a link here once final version is made available>. The aim of the document is to foster States' implementation and enhancement of MET information and services for ATM within APAC region.

The guidance captures most of the necessary processes from preparatory to operational phases. A stepwise (process-wise) structure of the guidance is expected to allow each State to refer to chapters, sections or subsections useful for the commencement, implementation or improvement of its MET information and services to support effective ATM. This guidance is expected to support State implementation of the Regional Framework for Collaborative ATFM.

(19) Was your State/Administration aware of this document?
a) No
b) Yes

(20) How do you think your State/Administration can benefit from the guidance in implementation or enhancement of MET information and services for ATM?

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_____

(21) What other guidance or education material required to support State/Administration in implementing or improving provisions of MET information and services to support effective ATFM?

_____

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Thank you for your time to complete this survey

Respondent Information

State/Administration: _____
Organization: _____
Name: _____
Post title: _____
Email: _____
Work nature: (ATM operation / MET service / Airspace User)