International Civil Aviation Organization

FOURTH MEETING OF THE METEOROLOGICAL REQUIREMENTS TASK FORCE (MET/R TF/4)

29 June to 1 July 2015, Tokyo, Japan

Agenda Item 2: Review of follow-up from previous meetings

REVIEW OF MET/ATM SEMINAR 2015

(Presented by the Secretary)

SUMMARY

This paper presents a summary of the 2015 Asia/Pacific Meteorology/Air Traffic Management (APAC MET/ATM) Seminar. Outcomes from the Seminar may be considered in developing possible further action for adoption by the Fourth Meeting of the Meteorological Requirements Task Force (MET/R TF/4).

1. Introduction

1.1 The MET/ATM Seminar 2015 was held in Tokyo, Japan from 29 June to 1 July 2015, and attended by 69 experts from 11 States, 1 Special Administration Region and 3 International Organizations.

2. Discussion

2.1 A summary of presentations, discussions and outcomes arising from the Seminar was presented in SP/20 to the 2015 MET/ATM Seminar, a copy of which is provided in **the Attachment** to this paper.

2.2 The main outcomes from the Seminar presentations and discussions are presented in the following paragraphs.

2.3 Australia noted that the non-participation [in the Seminar] of representative organizations such as CANSO presents difficulties when trying to formulate ATM requirements for MET. The meeting may wish to consider reviewing the membership of the group and participation by appropriate international organizations.

2.4 Several examples of ATM-tailored solutions [discussed in the Seminar] are being developed for the provision of MET information. Noting that ICAO's vision is for sustainable growth [of international civil aviation] and its mission includes the provision of assistance and building of capacity in States, the meeting may wish to consider providing guidance to assist States to develop tailored MET services to meet the [current and future] requirements of ATM.

2.5 Noting that ATM-tailored MET information, which is used for international civil aviation, shall comply with the ICAO Annex 3 "General Provisions", i.e., Annex 3 Chapter 2, the meeting may wish to consider using the general provisions as the basis on which to guide States in developing MET services to support ATM. For example, MET service shall:

a) Contribute to safety, regularity and efficiency;

b) Supply users with information needed;

c) Observe regional agreements;

d) Be provided by or on behalf of the [designated] MET authority;

e) Be provided by MET personnel with qualifications/training [compliant with WMO requirements];

f) Be developed with liaison between providers and users;

g) Be quality assured; and

h) Be developed in a manner consistent with human factors considerations.

2.6 Noting that MET is an enabler for many aspects of air navigation system implementation, the meeting may wish to consider how best to link any guidance for MET services in support of ATM to the APAC regional priorities and Seamless ATM Plan elements and how to strengthen collaboration between regional MET/ATM/ATFM groups.

2.7 Noting that global developments towards MET provisions in support of ATM are to be managed principally by the [ICAO] MET Panel – through a framework of expert groups – the meeting may wish to consider how best to support and coordinate with the MET Panel concerning APAC regional requirements. For example, strengthening the link between APANPIRG's MET and ATM groups and the MET Panel.

3. Action by the Meeting

3.1 The meeting is invited to:

a) review the outcomes of the MET/ATM Seminar 2015; and

b) consider developing actions for the MET/R TF and forwarding information to the appropriate APANPIRG Sub-Group(s) and/or global forum(s).

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ASIA/PACIFIC MET/ATM SEMINAR
TOKYO, JAPAN, 29 JUNE – 1 JULY 2015

SUMMARY OF PRESENTATIONS AND OUTCOMES

Presented by the Secretariat
International Civil Aviation Organization
1 July 2015

1. Keynote Address – JCAB
Collaboration between ATM and MET in Japan
(Takeshi Imagome, Director Air Traffic Control Division)

- JCAB ATM History
- CDM – enables ATM to make better decisions
- ATM and Traffic volume in Japan
- Traffic growth in Japan ↑
- Weather impacts (heavy snow, low pressure, CB, Typhoon)
- DARP, PACOTS, Volcanic Ash Exercises
- CDM web conference
- Sub-Regional ATFM

2. Keynote Address – JMA
MET for ATM and related collaboration in Japan
(Toshihiro Kurauchi, Director, Aeronautical MET Div.JMA

- Air traffic growth↑
- MET Div Recommendations 2/10 and 2/13
  - MET to support ATM in the terminal area
  - MET in context of CDM and common situational awareness
- Japan provides TC and VA advisory info.
- 4 steps to MET-ATM collaboration:
  - 1. Discuss problem, 2. Understand requirements,
    3. Develop solutions to meet requirements
    4. Develop MET-ATM systems to meet requirements

Programme

Agenda Item 1: Review of MET and ATM coordination in States

Agenda Item 2: Impact of MET on Air Traffic Flow Management (ATFM)

Agenda Item 3: ATM-tailored meteorological services

Agenda Item 4: Future directions

AI.1 (SP/02) Overview of ICAO Provisions for MET supporting ATM (Secretariat)

- Core SARPs (MET) – Annex 3
- Regional Air Navigation Plan Doc 9673
- Amendment of Annex 3 and Doc 9673
- Current MET provisions
  - product-centric, AFTN/AFS delivery, ATS/Pilot oriented, Limited *ATM* orientation
- Global ATM Op. Concept (Doc 9854) provides principles for MET modernization
  - Integration of MET-ATM; benefits to ATM; QA of MET

AI.1 (SP/17) Overview of WMO Activities Supporting MET/ATM (Japan)

- MET Div 2014 Outcomes
  - Integrated MET, GANP/ASBU, user representation
  - Addressing new challenges, e.g., regionalization
  - competition, financial impacts, regulatory, governance, cost recovery
- CAeM
  - CAeM MG structure, priorities
- Technology developments
  - MSTA, TBO, SWIM

AI.1 (SP/03) Overview of CARATS (Japan)

- Collaboration
  - Government, research, manufacturers, airlines
- Integrated MET to support
  - increased air traffic
  - improve safety and efficiency
  - TBO

AI.1 (SP/09) Civil Military ATM System (CMATS) – OneSKY Australia Program

- Scope
  - Integration of current TAAATS APP/Enroute, current remote TCUs and military (ADATS) tower and approach.
- Global interoperability
  - ASBU, NextGEN, SESAR
- New operational and technical capability
  - Comparison of current and future system capabilities
  - Capability readiness, transition and realization 2013-2023+

AI.2 (SP/05) Importance of Information Exchange for cross-border ATFM (Japan)

- Evolution from ATFMC to ATMC (1994 – 2005)
- ATMC Functions
  - ATFM, Oceanic ATM, ASM and CDM
- Air traffic volume trend ↑
- ATMC-ATFM cross-FIR-border (Taibei and Incheon)
  - Importance of information exchange/coordination to prevent excessive airborne holding
  - MET information should be timely with adequate advance notification of MET impacts on traffic flow

AI.2 (SP/04) Volcanic ash advisories for safe ATM (JAPAN)

- Hazardous properties of volcanic ash
- VAA service provided by VAAC Tokyo
- Recent events
  - Erupton of Mt. Ontake 2014
  - VOLKAM 2013-2015 (VOLPHIN 2015)
  - Many challenges: forecast reliability, long-duration eruptions, difficulty in obtaining observation data for concentration of VA cloud, location details highly important
- Volcanic ash avoidance is essential for safety

AI.2 (SP/04) Volcanic ash advisories for safe ATM (JAPAN)

Discussion points generated by the presentation:

- Forecast reliability dependent on observations (density, more advanced measurement instruments,). Best practice workshop London 2015 agreed cooperative development of means of getting more detailed observations → forecast reliability.
- Forecasts providing information beyond current Annex 3 requirements – driven by domestic user request; extension to international environment requires compliance with QM principles.

Special presentation (SP/11) JMA's Next Gen MET satellite (Japan)

Enhanced data/imagery:

- Additional bands, higher frequency, resolution
- Improved detection of volcanic ash, sea surface temp, sea ice, sand
- New ability – target area (1000 km^2)

AI.2 (SP/16) MET for AN in Kamchatka (Russian Federation)

- Overview of MET provided (MWO Yelizovo)
- Overview of volcanoes in Kamchatka
  - VOLKAM experiences
- Importance of communication/coordination
  - E.g. cross-boundary coordination between adjacent VAACs, different VAA and/or SIGMET boundaries.
  - Relevance to APAC VOLCEX.

AI.3 (IP/04- SP/22) MET for future One Sky concept, WMO AvRDP (Hong Kong China)

- Integration of MET services into future ATM system
- ATM-tailored MET service for the terminal area
  - Graphical, categorized convective activity impact forecast for significant points (holding, IAF, FIR boundaries)
  - ATM capacity determination based on forecasts
  - In addition to Annex 3, but high priority for ATC
  - Resource demands to deliver tailored services
- AvRDP (Paris, Hong Kong, Johannesburg, Shanghai, Toronto)
- Support needed from ATM/airline/pilot community

AI.3 (SP/21) MET-CDM (Australia)

- MET-CDM trials
  - 4 X airports, managed though ANSP NOC
  - Trial identified benefits to ATFM, but issues were raised
  - Competing priorities for regulated products, TAF not suitable for ATFM, time management, mismatch between Annex 3 and information needed to optimize ATFM
- Proposed model for MET-CDM
  - First implementation expected SEP/OCT 2015

AI.3 (SP/06-IP/06) Weather phenomena affecting air traffic management operations (Japan)

- Tokyo international airport
  - Busiest airport in Japan, significant number of ATFM measures due weather phenomena
- Four weather causes of ATFM measures
  - Strong crosswinds, CB within or around approach control airspace, vertical wind change (wind shear)
- ATM and MET forecaster
  - collaboration on occurrences of weather phenomena
  - Importance of precise, accurate weather information to meet ATM requirements

AI.3 (SP/15) Graphical MET Products (Australia)

- Graphical SIGMET
  - Provided to improve situational awareness
  - Low level (BLW F100) and high level (ABV F100)
- Graphical Area Forecasts (GAFs)
- Graphical AIRMET
- Volcanic ash and tropoical cyclone advisory information in graphical format
- Others - SIGWX, grid point wind and temp, wind and temp

AI.3 (SP/10) Strategic Radar Enhancement Project – Forecast Demonstration Project (Australia)

- 5 year project commenced 2009
  - New radar technology to enhance weather forecasts/warnings
- Forecast demonstration project
  - Evaluate the integrated weather radar/numerical weather prediction system for improved aviation weather forecasts (principally applied to thunderstorm and wind changes)
  - To optimize airport capacity and airline ops (Sydney)
  - Supports risk-based approach
  - Performs well for onset and clearance of thunderstorm and timing of sea-breeze wind change

AI.3 (SP/7-IP/7) MET for Terminal Area (Japan)

- Tokyo Metropolitan Area Team (TMAT) supports Traffic Management Unit (TMU)
  - MET information supports capacity decisions
  - Tokyo and Narita Aviation Weather Centres communicate via TMAT to support TMU in safe and efficient ATFM
  - TMAT operations include: weather briefing, Tokyo Metropolitan Area Weather Bulletin for ATM, ATM Categorized Impact of weather element prediction (ATM CIEL) – specifically to support TMU operations
  - ATM CIEL: temporal/spatial/MET tailored →TMAT
  - Collaborative effort between MET and ATM

AI.3 (SP/8-IP/8) Improvement of Low-Level Wind Information of JMA (Japan)

- Collaborative research project (users, research organization and service providers)
  - Low Level Turbulence Advisory System (LOTAS)
  - Airport low-level wind information (ALWIN)
  - User defined criteria for wind information for airline operation staff and pilots, ACARS distribution to aircraft
  - User evaluated
  - Accuracy measured
  - Utilization of technology to suit requirements
  - Scheduled to start operations April 2016

AI.3 (SP/14) Airport Weather Matrix (Australia)

- Automatic generation of multiple forecast products
  - Annex 3 and additional ATM-tailored information
- Efficiency and consistency
  - Forecaster concentrates on MET – not different forecast products – end result is consistency
  - Detail of information generated is tailored to user
- Limited to technological capabilities
- Opportunity to improve quality, accuracy and better address user requirements

AI.3 (SP/23) Different ATM Unit has Different Demands for MET Services (China)

- Considerations
  - MET capability, ATM capability, CDM/ATM processes
- ATM demands for MET
  - Strategic – 2-6 months
  - Pre-tactical – 1 day before
  - Tactical – on the day
  - ATFM **across** regional/FIR boundaries, MET trend > 2 hrs
  - ATFM **within** regional/FIR boundaries, MET trend < 3 hrs
  - ATFM for terminal areas, MET trend < 2 hrs
  - Post-operations analysis of factors including MET

AI.4 (SP/12) DAPs Potential and an analysis on weather uncertainty for TBO (Japan – ENRI)

- Research into use of Mode S SSR Downlink Aircraft Parameters (DAPs)
  - New means for MET observation
- Weather uncertainty effect on flight time
- Study Plan – Arrival Manager
  - How to apply weather data to minimize weather uncertainty effect

– International workshop on Aviation Weather & ATM/CNS related areas (Nov 2015)

AI.4 (SP/13) Space Weather, Extreme Weather, Weather Impacts on ATM near Airport (Japan – ENRI)

- Space Weather
  - Ionospheric effects on GNSS, development of threat mitigation algorithm, support ISTF
- Extreme weather
  - Impacts on airports and air traffic flow/capacity, clarification of requirements for future monitoring, and forecast information, investigation of air traffic flows vs rainfall obs (XRAIN), local weather/wake vortex
- Weather impacts near airport
  - local weather/wake vortex, relationship separation/headwind

AI.4 (SP/18) APAC Seamless ATM Plan and draft Regional ATFM Framework (Secretariat)

- ICAO/APANPIRG Structure and Roles
- Seamless ATM Plan
  - Drivers, hierarch of docs, performance objectives
- Regional Framework for Collaborative ATFM
  - History/drivers, relationship to Seamless ATM Plan, performance improvement plan, need for regional guidance for near-term (now-casting) forecasts of convective weather for MSTA, future en-route ATC sector requirements.

AI.4 (SP/19) Global developments towards MET supporting ATM (Secretariat)

- MET Divisional Meeting 2014
  - MET supporting One Sky concept (enhanced/integrated)
- Future Developments
  - MET in GANP/ASBU, MET Panel
  - MET supporting ATM in the terminal area
  - MET in ASBU Block 2
  - MET in SWIM, CDM, information exchange, TBO/PBO
  - WAFS, Comms, volcanic ash, space weather, radioactive material, toxic, other hazardous phenomena
  - MET provisions, Cost recovery, Human Factors

SEMINAR OUTCOMES

www.youtube.com

OUTCOMES

Australia noted that the non participation of representative organizations such as CANSO presents difficulties when trying to formulate ATM requirements for MET

- Membership and participation by appropriate international organizations could be reviewed
- ???
- ???

OUTCOMES

- Several examples of ATM-tailored solutions being developed for the provision of MET information
- Noting that ICAO's vision is for sustainable growth and its mission includes the provision of assistance and building of capacity:
  - The MET/R TF may consider providing guidance to assist States to develop MET services to meet the (current and future) requirements of ATM

OUTCOMES

ATM-tailored MET information used for international civil aviation shall comply with Annex 3 “General Provisions”

Annex 3 Chapter 2.

OUTCOMES

General Provisions

- Contribute to safety, regularity and efficiency
- Supply users with information needed
- Observe regional agreements
- Be provided under the auspices of the MET authority; by MET personnel with qualifications/training (WMO); with liaison between providers and users
- Be quality assured; consistent with human factors

OUTCOMES

- Safety, regularity and efficiency
  - All examples addressed these objectives
  - Should be highest priority consideration in guidance
- Supply users with information needed
  - All examples were driven by user requirement
  - Should be highest priority consideration in guidance
- Observe regional agreements
  - MET is an enabler for AN system implementation
  - APAC regional priorities and Seamless ATM Plan elements
  - Strengthen collaboration between regional MET/ATM/ATFM groups

OUTCOMES

- Provided by/on behalf of the MET authority
  - Should be encouraged in any guidance
- Qualifications/training of MET personnel
  - Should be encouraged in any guidance
- Liaison between providers and users
  - Was a major component of some examples
  - Should be high priority consideration in guidance
- Quality management and Human factors
  - Detailed in some examples
  - Should be high priority consideration in guidance

OUTCOMES

Global developments towards MET supporting ATM to be managed principally by the MET Panel – through a framework of expert groups:

- APANPIRG and MET SG may consider how best to support and coordinate with MET Panel concerning APAC regional requirements
- Link between APANPIRG, MET and ATM groups, and MET Panel ????

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