



ICAO

UNITING AVIATION

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 (Taipei 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
 - Eruption 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 km²)

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 tropical 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



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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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