Update on ICAO Meteorology Panel Activities

By: Mike Bettwy, U.S. Federal Aviation Administration

Date: September 2017

Overview

- Background on METP
- METP Requirements Development Process
- Update on Key Initiatives
  - IWXXM
  - Radiological Release in the Atmosphere
  - Space Wx
  - Regional Hazardous Weather Advisory Centers
  - Meteorological Requirements Integration
- State Input/Involvement

Establishment of ICAO MET Panel

- Established by Air Navigation Commission (ANC), September 2014 (First meeting: April 2015)
- Composed of 24 voting Members from invited states and international organizations
  - 18 States
  - 6 International Organizations (ECTL, IATA, IFALPA, IFACTA, ASECNA, WMO)
  - 2 Observers
  - ~ 65 Technical Advisors
  - ICAO Secretariat (1)
- Work assigned by ANC in form of Job Cards (currently 12)
- MET Panel organized around groupings of Job Cards
  - 5 Working Groups (WGs), each headed by Rapporteur
  - Subordinate Work Streams, each headed by Coordinator
- Systems Engineering-based requirements development process

METP Structure and Work Program

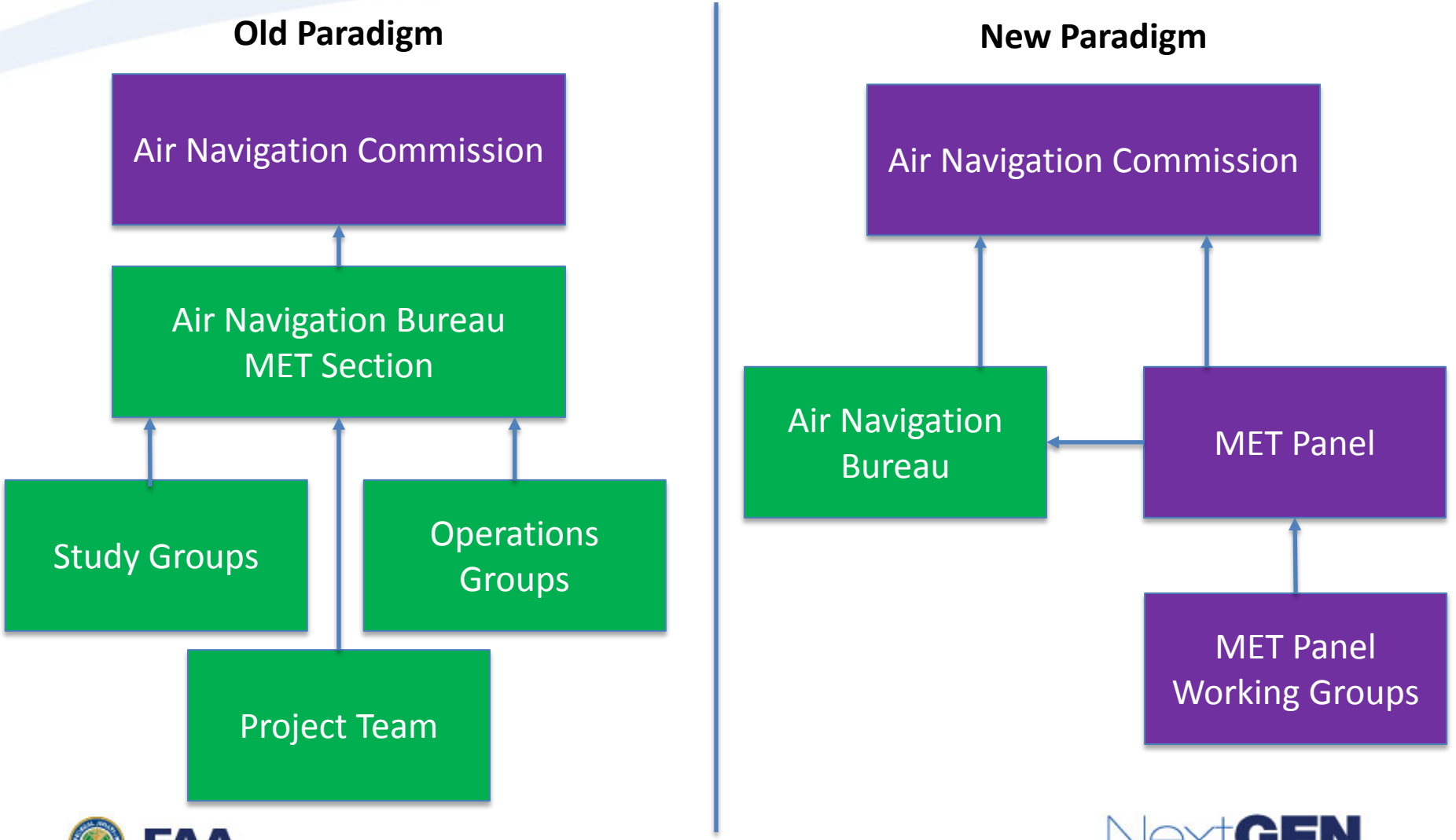
MET Requirements and Integration (WG-MRI) Dennis Hart EUROCONTROL	**MET Information and Service Development (WG-MISD)*** Rick Heuwinkel United States	**MET Information Exchange (WG-MIE)** Sue O'Rourke Australia	**MET Operations Group (WG-MOG)** Colin Hord United Kingdom	**MET Cost Recovery Guidance and Governance (WG-MCR)** Rodrigo Fajardo Chile
MET Module for Aviation System Block Upgrade Block 2	**Development of Information on the Release of Radioactive Material**	**SARPs for Amendment 78 for IWXXM**	**International Airways Volcano Watch (IAVW)**	**Development of Cost Recovery for MET Information**
MET Information for Trajectory Based Operations*	**Development of Regional Hazardous Weather Information**	**Enable Use of Extensions in IWXXM***	**Secure Aviation Data Information Service (SADIS)**	
Reorganization of ICAO MET Provisions	**Development of Space Weather Information***	**Plan for Implementation of MET Information in SWIM Concept***	**World Area Forecast System (WAFS)**	
	Development of Information on Sulfur Dioxide*	**Develop Governance for MET Information in SWIM Concept***		

*Efforts led by U.S. Resources

FAA

NextGEN

Management of MET within ICAO



FAA

NextGEN

ICAO METP Working Groups

- Meteorological Information & Services Development (MISD) Working Group
  1. **Release of Radioactive Material Work Stream**: Developing provisions for information on the release of radioactive material into the atmosphere.
  2. **Regional Hazardous Warning Advisory System Work Stream**: Developing provisions to support the implementation of a phenomenon-based, regional advisory system for select en-route hazardous meteorological conditions considering user needs and long-standing requirements for States where notable SIGMET-related deficiencies persist.
  3. **Space Weather Work Stream:** Developing provisions for information on space weather to international air navigation.
  4. **Volcanic Ash Work Stream**: Further-developing requirements for the International Airways Volcano Watch, consistent with the Global Air Navigation Plan (Doc 9750).
  5. **World Area Forecast System Work Stream**: Further-developing requirements for the World Area Forecast System, consistent with the Global Air Navigation Plan (Doc 9750).
- Meteorological Requirements Integration (MRI) Working Group
  1. **MET Information for TBO Work Stream**: Requirements to support capabilities identified in the Global Air Navigation Plan and Aviation System Block Upgrades with an emphasis on Trajectory-Based Operations (TBO).
- Meteorological Information Exchange (MIE) Working Group
  1. **Extensions Work Stream**: Policy and requirements for exchange of MET information in XML-GML format (known as IWXXM).
  2. **Inclusion of MET in SWIM Work Stream**: Development of MET plan for implementation of System-Wide Information Management (SWIM).

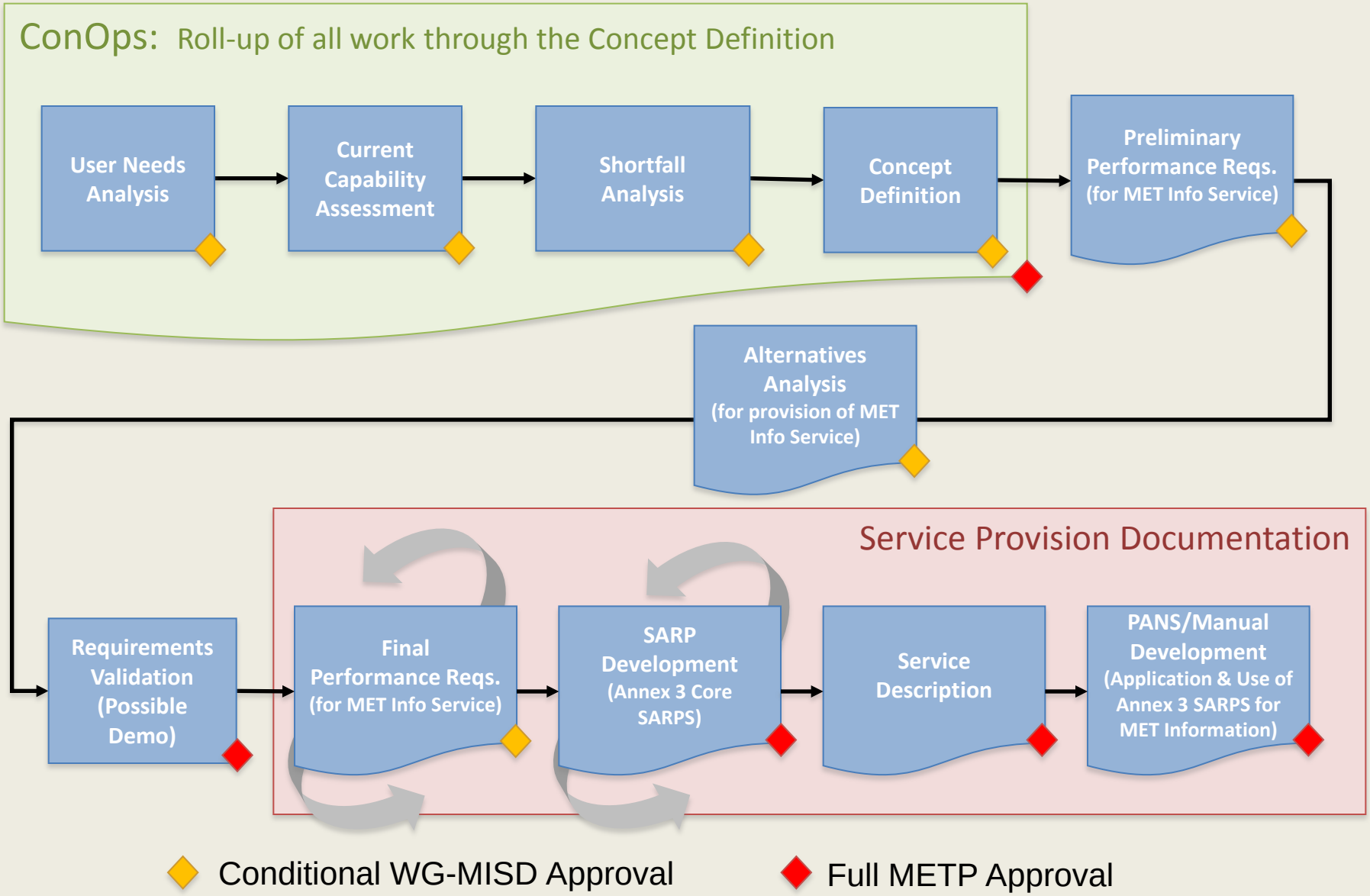
FAA

NextGEN

ICAO METP Deliverables

- Primary deliverable(s) for each Job Card include draft SARPs and any additional necessary documentation:
  - Concept of Operations documents
  - Roadmap(s)
  - Functional & Performance Requirements, and/or
  - Service Provider Selection Criteria (in the case of entirely new MET services)
- Each effort is expected to culminate in formal amendment of ICAO Annex 3
  - Amendment 78 to be in effect 2018, and/or
  - Amendment 79 in 2020
- In addition, the ANC has directed that any new amendments to the SARPs broadly consider SWIM integration

METP Requirements Development Process (Systems Engineering-Based Approach)



WXXM/IWXXM

- ICAO METP has been very active in development
  - Extensible Markup Language – Geography Markup Language (known as IWXXM) Version 2.0 implemented Aug. 2016
  - For Annex 3
    - Currently recommended practice
    - Mandatory in 2020 (Was originally 2018)
  - Freezing Traditional Alphanumeric Code (TAC)
    - Unless a safety issue

- MET Panel with primary support from WMO
  - Maturing the code and extensions standards
    - Will support state/regional added value information
  - Actively coordinating with the IMP Panel
    - Alignment with AIXM and FXXM
    - Aligning with global SWIM concepts
- Add value
  - E.g., METAR rounding
- Will see both TAC and IWXXM for some time

FAA

NextGEN

Radiological Release Material (RRM)

- METP/2
  - Provision for SIGMET/AIRMET
    - “RDOACT CLD” SIGMET/AIRMET type
  - Cylindrical SIGMET
    - When detailed release information is ***not*** available:
      - Radius up to 30km (from SFC to upper limit of flight)
      - Based on IAEA recommendation for surface contamination
    - When release information is available:
      - Update general notice with dispersion/release information
      - May be initial issuance if source terms known
  - Guidance document to be developed in 2018

Space Weather

- METP agreed to focus on the impacts of space weather events on:
  - HF communications
  - Satellite navigation, communication, surveillance
  - Radiation exposure
- Format similar to advisory messages issued for volcanic ash clouds and tropical cyclones:
  - Type of Space Wx impact
  - Expected onset, or event in progress, and duration of the event
  - Generalized description of the spatial extension affected for the next 24 hours
  - General description on the severity of the space weather activity in moderate (MOD) or severe (SEV) terminology

Space Weather, Cont.

- Guidance Material
  - Manual on Space Wx information being developed
- Process to designate Space Wx Service Providers
  - WMO to conduct evaluation of States wishing to be a provider, based on criteria developed by METP
    - Institutional
    - Operational
    - Technical
    - Communications/Dissemination
  - Will only report whether a State meets the criteria
  - ICAO Council will then designate the provider States
    - METP and ANC will make recommendations based on technical merit

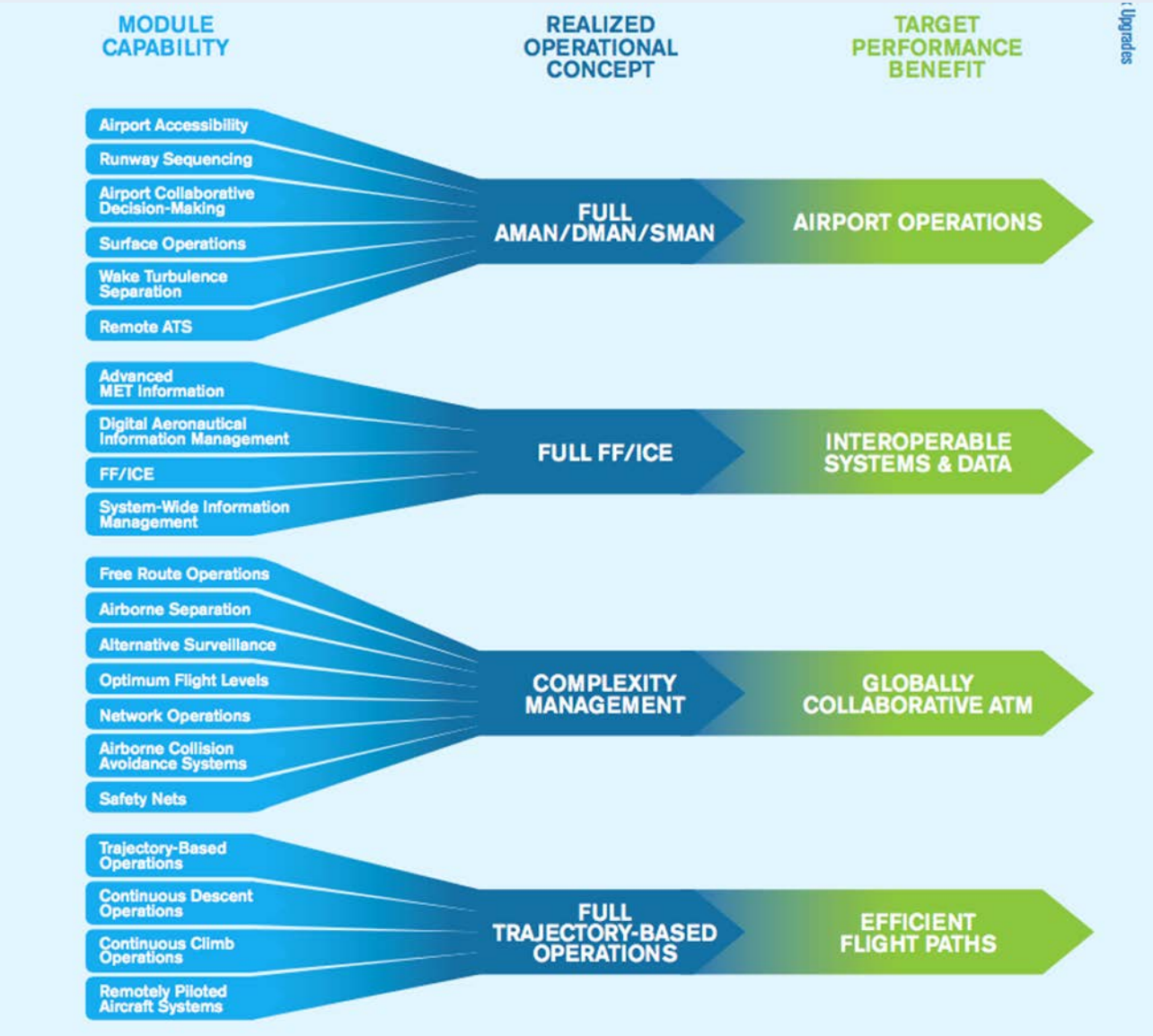
Regional Hazardous WX Center (RHWAC)

- Two distinct issues that may need to be addressed separately
  - SIGMET provision in deficient areas
    - Guidance for bi-lateral or regional provision for deficient areas
    - Center(s) to cover deficient areas OR Center(s) for global SIGMET provision
      - Permanent? Temporary?
  - Phenomena based global hazard information
    - Weather doesn't stop at FIR boundaries
    - Role of WAFS Hazard forecasts?
- Users need to get involved

Meteorological Requirements Integration (MRI)

- Looking at MET information for future operational capabilities
- MET information to support trajectory-based operations (TBO)
  - MET is an enabler
  - The METP needs to know what information is needed (*besides "give us better forecasts"*)
- Following METP Requirements Development Process
  - Supporting documentation
    - "MET Information for TBO" ICAO Doc.
    - ICAO Global Air Navigation Plan (GANP)

Meteorological Requirements Integration (MRI)



Meteorological Requirements Integration (MRI)

Performance Improvement Area 1: **Airport Operations**	***ASBU Module***	***Module Scope***	***Panel Addressing Module***
	B1-WAKE	**Increased Runway Throughput through Dynamic Wake Turbulence Separation** - Improved throughput on departure and arrival runways through the dynamic management of wake vortex separation minima based on the real-time identification of wake vortex hazards	**ATMOPS**

MET Information Needs:

- Better wind information around the aerodrome (*taken from the GANP*)
- More accurate crosswind prediction (*GANP*)
- Downlink and real-time processing of aircraft observed wind information will be required (*GANP*)

MET Functional Requirements	***MET Preliminary Performance Requirements***
WAKE.MET.FR.1: The provider shall supply wake turbulence now-casts at select aerodromes. • …FR.1.1: with parallel runways that have centre lines separated less that <TBD, but e.g., 760 m (2500 ft)> apart • …FR.1.2: using a detection and forecast algorithm with input from: • …FR.1.2.1: existing and, where needed, additional aerodrome surface wind sensors • …FR.1.2.2: real-time downlinked wind information from aircraft	WAKE.MET.PR.1: Wake turbulence now-casts with: • …PR.1.1: temporal resolution of <TBD, e.g., 3 -minutes> • …PR.1.2: updates every <TBD, e.g., 3 -minutes> • …PR.1.3: spatial resolution of <TBD, e.g., 500 m> • …PR.1.4: latency of <TBD, e.g., 1-minute> • …PR.1.5: accuracy <TBD>
WAKE.MET.FR.2: The ANSP shall supply wake turbulence now-casts to: • …FR.2.1: ATC control tower • …FR.2.2.: <TBD>	WAKE.MET.PR.2: Wake turbulence now-casts to be provided to: • …PR.2.1: ATC control tower within <TBD, e.g., 1-minute> • …PR.2.2: <TBD>

FAA NextGEN

Input Is Needed

- There is a focus within ICAO to make changes that are truly “user” based
- Improved METP organization & establishment of Work Streams and Working Groups is making it more efficient to advance initiatives
- Assist States with technological and infrastructure challenges
- IATA is a key user, providing input to new and modified requirements
  - Input also provided by IFALPA, IFATCA, ASECNA
  - Airline and other customer input valued and very much needed