



| ICAO BANGKOK

UNITING AVIATION

# Meteorological Service for International Air Navigation

*Presented by the Secretariat*

APAC MET/ATM Webinar and MET/R WG/10  
Online, 24 to 28 May 2021





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# Aviation's global impacts

65.5  
million

**Jobs supported by aviation  
worldwide<sup>1</sup>**

\$2.7  
trillion

**Aviation's global economic  
impact (including direct, indirect,  
induced and tourism catalytic)<sup>8</sup>**

[Source: Air Transport Action Group, October 2018, [www.atag.org](http://www.atag.org)]

# Modern air traffic growth

## The pace and resilience of modern air traffic growth

Global air traffic has doubled in size once every 15 years since 1977 and will continue to do so. This growth occurs despite broader recessionary cycles and helps illustrate how aviation investment can be a key factor supporting economic recovery.

Source: Airbus



1977



1992



2007



2022

# The future ...



By 2030 ...

- 6 billion passengers/year
- > 50 million departures/year

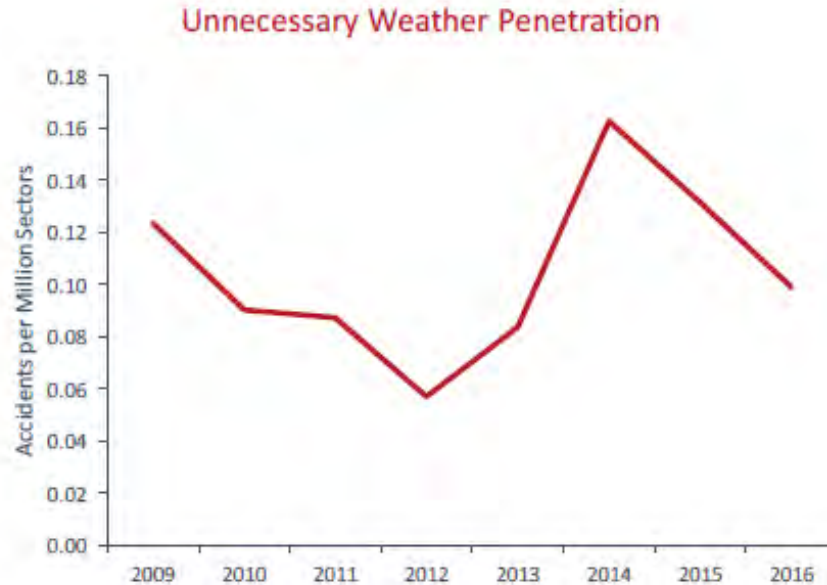
[Source: ICAO, Global Air Navigation Plan, 2016–2030]

# Does MET matter to ATM safety/efficiency?



...absolutely YES

# Weather impacts on aviation safety



[Source: IATA Safety Report 2016]



# ICAO

- Est. 1944
- Chicago Convention





# Why are Standards Necessary?

- Standard and Recommended Practices (SARPs)
  - Universally accepted
  - All aspects of flights handled in uniform manner

*“Without SARPs, our aviation system would be at best chaotic and at worst unsafe” [Source: ICAO]*



# How are SARPs created?

## The four "C's" of aviation

- **Cooperation**
- **Consensus**
- **Compliance**
- **Commitment**

# SARPs for MET service

- Annex 3
- 1<sup>st</sup> Ed. 1948
- Geared towards safe, regular and efficient operations





## Annex 3 – MET provision today

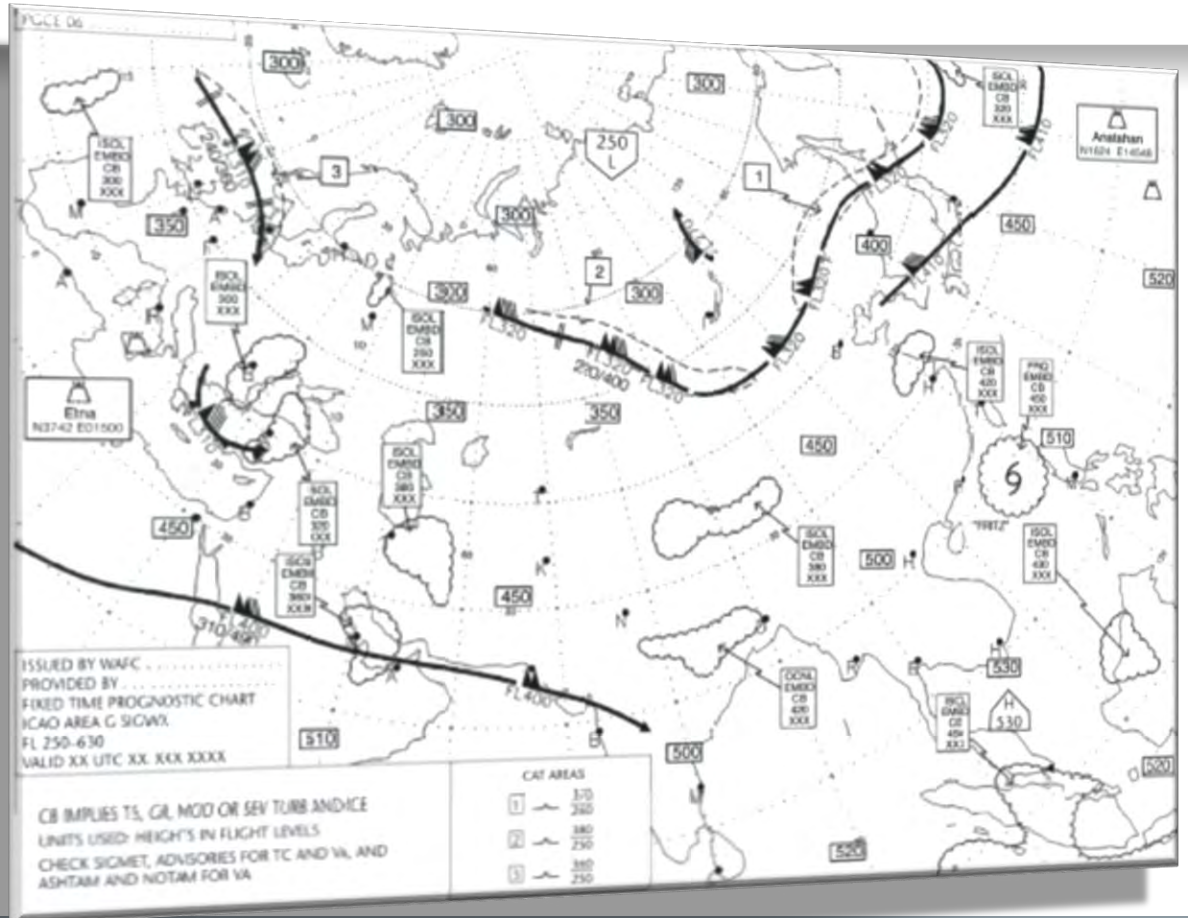
- Highly ‘product-centric’
- Primarily AFTN and AFS delivery to users
- ATS/Pilot oriented
- Limited ATM orientation
- Aerodrome, terminal area en-route focus



# Annex 3 – MET provision today

- WAFS/WAFCs
- VAACs
- State Volcano Observatories
- TCACs
- Space Weather
- Aeronautical MET stations
- Automatic observing systems
- Aerodrome MET Offices
- Meteorological Watch Offices
- Aircraft observations
- ATIS, D-ATIS, VOLMET, D-VOLMET
- Climatological information
- Quality management
- Etc.

# SIGWX forecast





FVFE01 RJTD 230130  
VA ADVISORY

DTG:	20080923/0130Z
VAAC:	TOKYO
VOLCANO:	KARYMSKY 1000-13
PSN:	N5403 E15927
AREA:	RUSSIA
SUMMIT ELEV:	1536M
ADVISORY NR:	2008/4
INFO SOURCE:	MTSAT-1R KVERT KEMSD
AVIATION COLOUR CODE:	RED
ERUPTION DETAILS:	ERUPTION AT 20080923/0000Z FL300 REPORTED
OBS VA DTG:	23/0100Z
OBS VA CLD:	FL250/300 N5400 E15930 – N5400 E16100 – N5300 E15945 MOV SE 20KT SFC/FL200 N5130 E16130 – N5130 E16230 – N5230 E16230 – N5230 E16130 MOV SE 15KT
FCST VA CLD +6 HR:	23/0700Z FL250/350 N5130 E16030 – N5130 E16230 – N5330 E16230 – N5330 E16030 SFC/FL180 N4830 E16330 – N4830 E16630 – N5130 E16630 – N5130 E16330
FCST VA CLD +12 HR:	23/1300Z SFC/FL270 N4830 E16130 – N4830 E16600 – N5300 E16600 – N5300 E16130
FCST VA CLD +18 HR:	23/1900Z NO VA EXP
RMK:	LATEST REP FM KVERT (0120Z) INDICATES ERUPTION HAS CEASED. TWO DISPERSING VA CLD ARE EVIDENT ON SATELLITE IMAGERY
NXT ADVISORY:	20080923/0730Z

# Volcanic ash advisory information

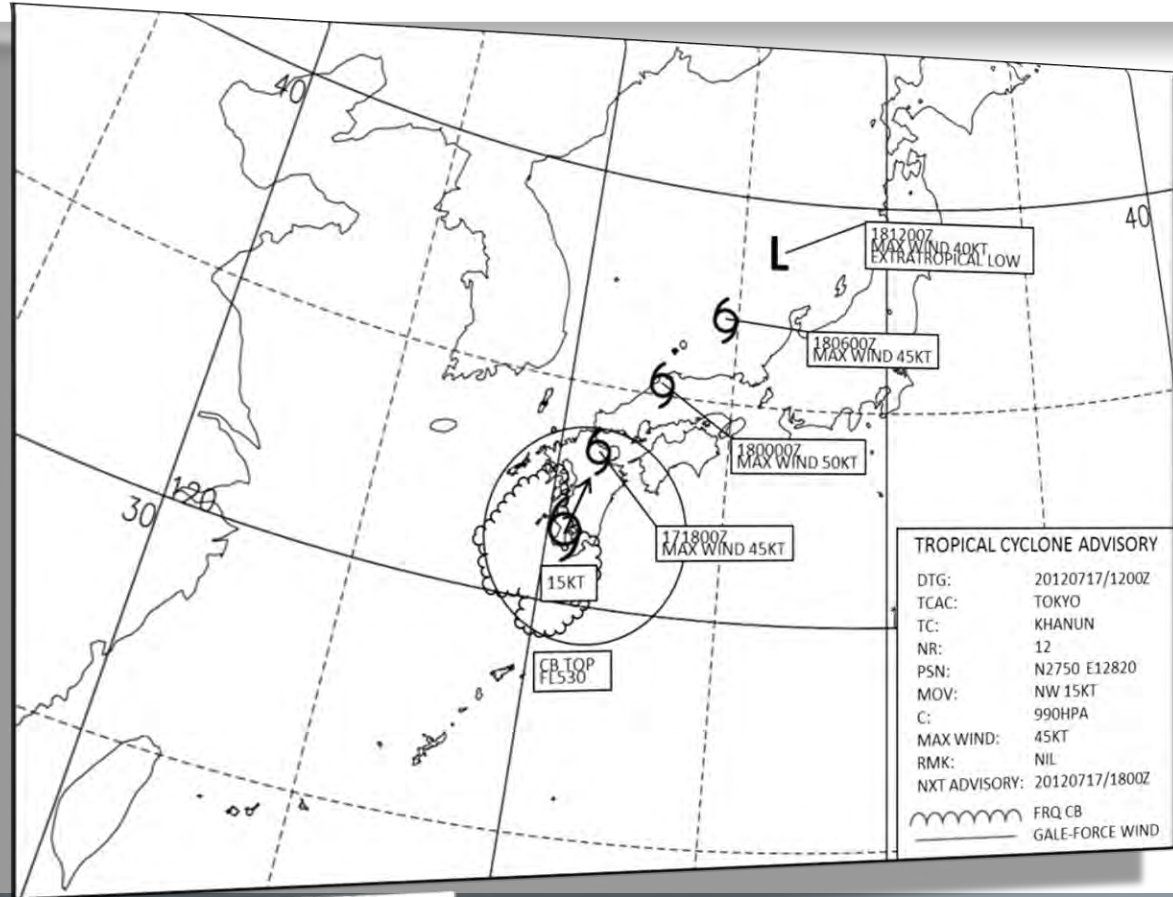


# Volcano Observatory Notice for Aviation VONA

## VOLCANO OBSERVATORY NOTICE FOR AVIATION (VONA) FORMAT

- (1) VOLCANO OBSERVATORY NOTICE FOR AVIATION — **VONA**
- (2) Issued: Universal (Z) date and time (YYYYMMDD/HHMM(Z)).
- (3) Volcano: Name and number (per Smithsonian database at <http://www.volcano.si.edu/>)
- (4) Current aviation colour code: **GREEN, YELLOW, ORANGE OR RED** in upper-case bold font
- (5) Previous aviation colour code: Lower-case font, not bold
- (6) Source: Name of volcano observatory (volcanological agency)
- (7) Notice number: Create unique number for each VONA that includes year
- (8) Volcano location: Latitude, longitude in NOTAM format (N or S deg min W or E deg min)
- (9) Area: Regional descriptor
- (10) Summit elevation: nnnnn FT (nnnn M)
- (11) Volcanic activity summary: Concise statement that describes activity at the volcano. If known, specify time of onset and duration (local and UTC) of eruptive activity. If the eruption is ongoing at the time of VONA release, indicate "eruption and ash emission is continuing".
- (12) Volcanic cloud height: Best estimate of ash-cloud top in nnnnn FT (nnnn M) above summit or AMSL (specify which). Give source of height data (ground observer, pilot report, radar, etc.). "UNKNOWN" if no data available or "NO ASH CLOUD PRODUCED" if applicable.
- (13) Other volcanic cloud information: Brief summary of relevant cloud characteristics (colour of cloud, shape of cloud, direction of movement, etc.) Specify if cloud height is obscured or suspected to be higher than what can be observed clearly. "UNKNOWN" if no data available or "NO ASH CLOUD PRODUCED" if applicable.
- (14) Remarks: Optional. Brief comments on related topics (monitoring data, observatory actions, volcano's previous activity, etc.)
- (15) Contacts: Names, telephone and fax numbers, e-mail addresses.
- (16) Next notice: "A new VONA will be issued if conditions change significantly or the colour code is changed." Include URL of website where latest volcanic information is posted.

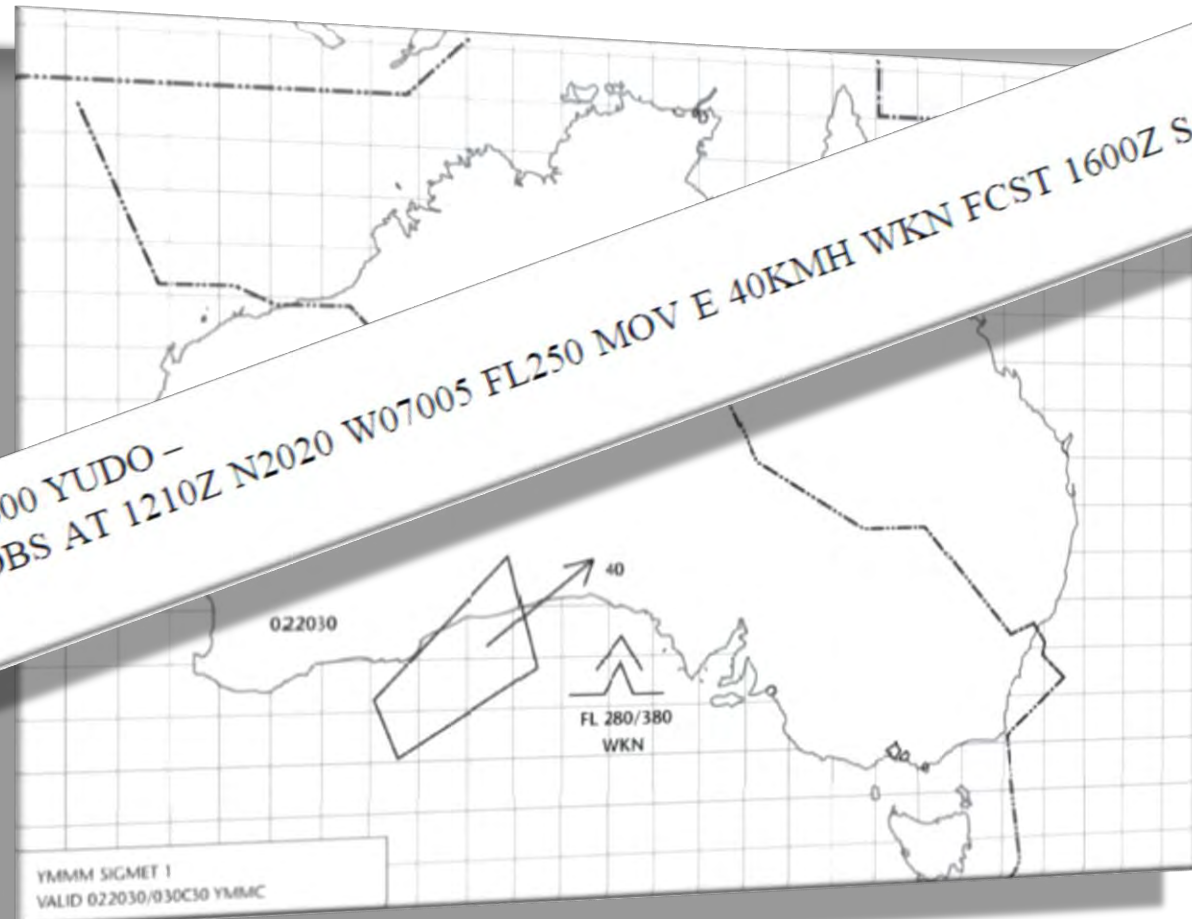
# Tropical cyclone advisory information Graphical format





# SIGMET

graphical and  
Text format



YUCC SIGMET 5 VALID 221215/221600 YUDO -  
YUCC AMSWELL FIR SEV TURB OBS AT 1210Z N2020 W07005 FL250 MOV E 40KMH WKN FCST 1600Z S

YMMM SIGMET 1  
VALID 022030/030C30 YMMC



Routine  
report

MET REPORT YUDO 221630Z WIND 240/4MPS VIS 600M RVR RWY 12 TDZ 1000M MOD DZ FG CLD  
SCT 300M OVC 600M T17 DP16 QNH 1018HPA TREND BECMG TL1700 VIS 800M FG BECMG AT1800  
VIS 10KM NSW

METAR

METAR YUDO 221630Z 24004MPS 0600 R12/1000U DZ FG SCT010 OVC020 17/16 Q1018 BECMG TL1700  
0800 FG BECMG AT1800 9999 NSW

TAF

TAF YUDO 160000Z 1606/1624 13005MPS 9000 BKN020 BECMG 1606/1608 SCT015CB BKN020 TEMPO  
1608/1612 17006G12MPS 1000 TSRA SCT010CB BKN020 FM161230 15004MPS 9999 BKN020



# Annex 3 – MET provision today

- **Traditional** means of dissemination:
  - AFTN, AFS, public Internet (including SADIS and WIFS), data-link service, broadcasting
- Supplied to **traditional** users:
  - Operators, flight crew members, air traffic service providers, MET service providers
- For use in **traditional** forms:
  - Briefing, consultation and display, flight documentation

# Future trends

- ICAO's Global Air Navigation Plan (GANP)
- Fully-harmonized global air navigation system
- MET → globally interoperable systems and data
- System-wide information management (SWIM)





# ICAO Global Air Navigation Plan (GANP)

## MULTILAYER STRUCTURE OF THE GANP

Click a level to navigate

GLOBAL STRATEGIC

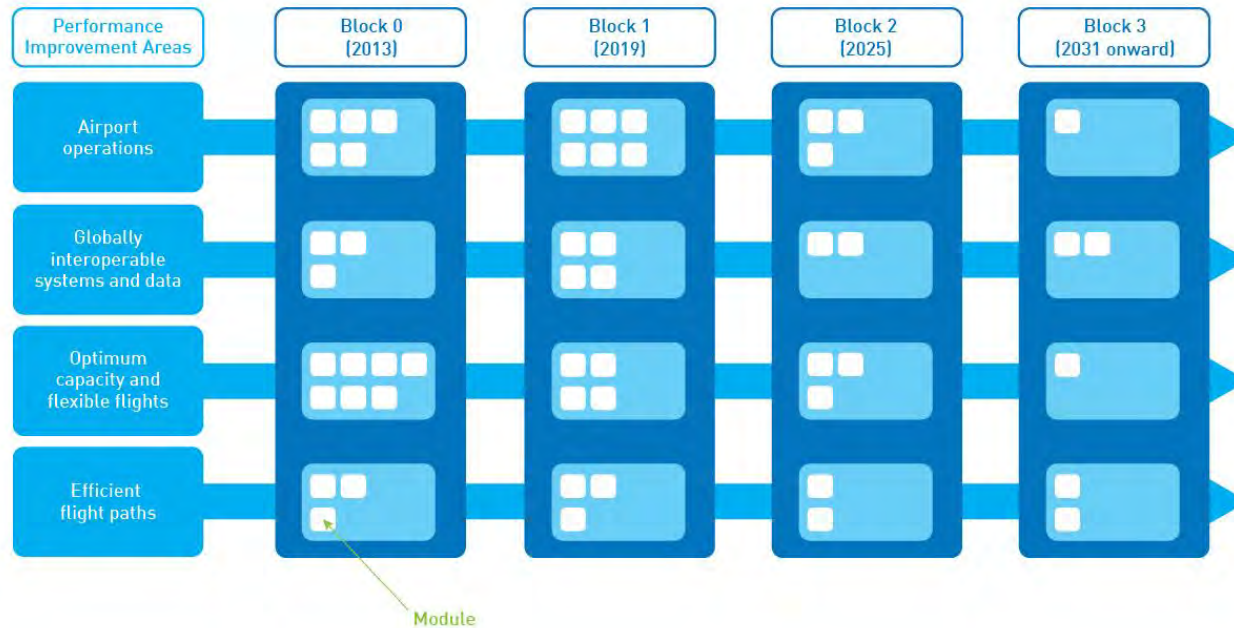
GLOBAL TECHNICAL

REGIONAL

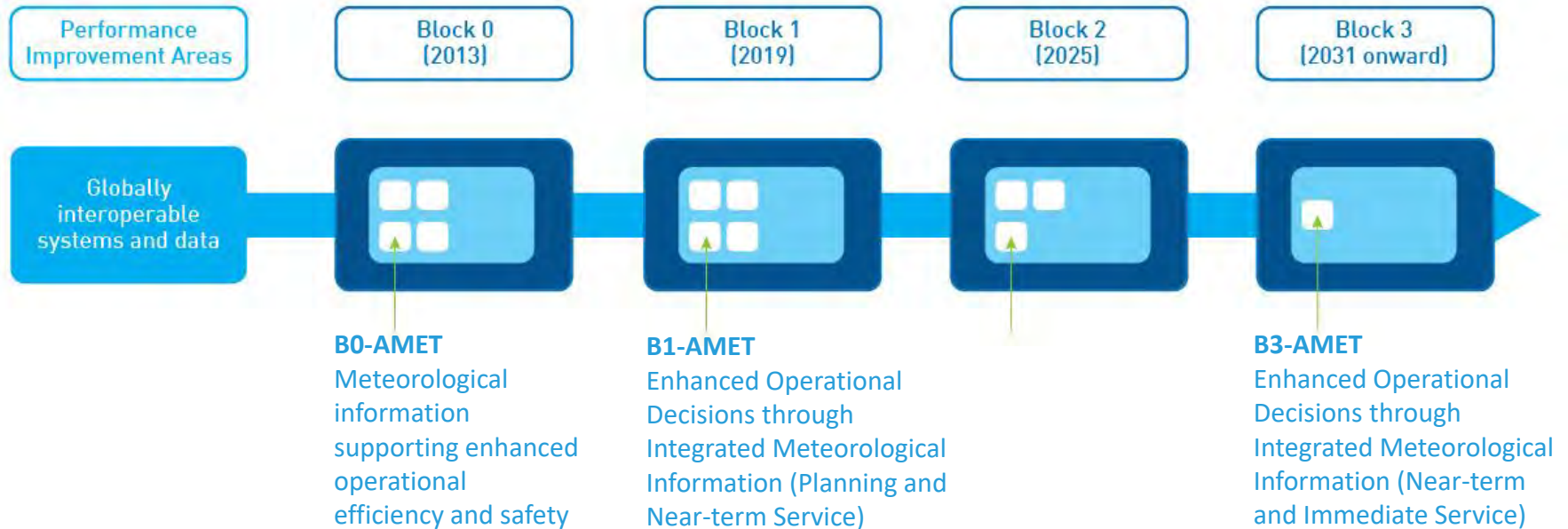
NATIONAL



# GANP / Aviation System Block Upgrades



# GANP / Aviation System Block Upgrades





# Future trends

- Exchange of digital information (IWXXM)
- Digital MET to support SWIM
- Amendment 79 to Annex 3





# ICAO Doc 10003

# ICAO Meteorological Information Exchange Model





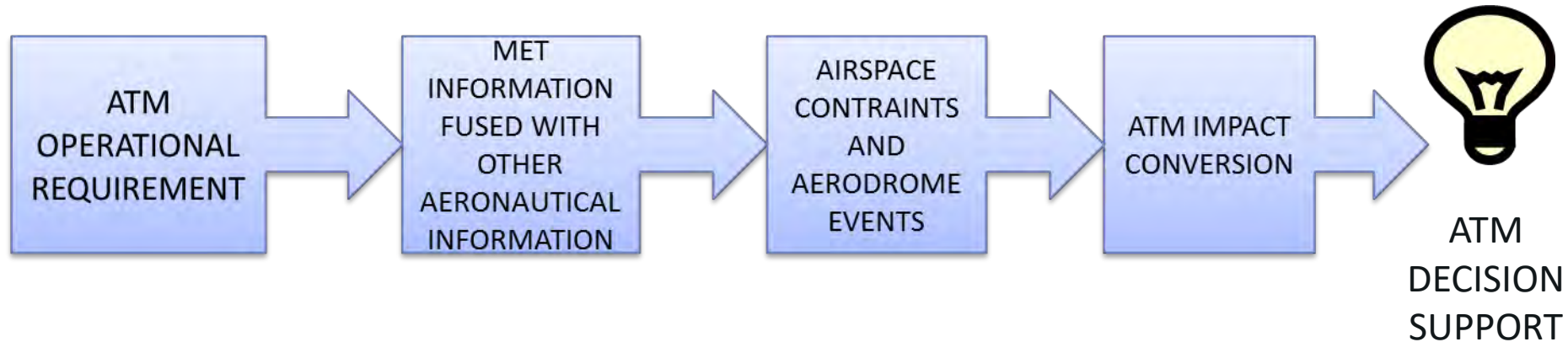
- **ICAO Standard:** Dissemination of MET in IWXXM form, in addition to TAC
- IWXXM envisaged to become the only standard in 2026



# Annex 3 – MET provision tomorrow

- Availability of shared, timely, high-quality MET information
- Enhanced decision-making capability
- Full ATM-MET integration is necessary

# Annex 3 – MET provision tomorrow





# Digital exchange of MET

- Platform independent
- Harmonized
- Interoperable
- Single representation/common view
- Alignment – ISO standards and OGC best practices
- Modularity to support future requirements





North American  
Central American  
and Caribbean  
(NACC) Office  
Mexico City

South American  
(SAM) Office  
Lima

ICAO  
Headquarters  
Montréal

Western and  
Central African  
(WACAF) Office  
Dakar

European and  
North Atlantic  
(EUR/NAT) Office  
Paris

Middle East  
(MID) Office  
Cairo

Eastern and  
Southern African  
(ESAF) Office  
Nairobi

Asia and Pacific  
(APAC) Sub-office  
Beijing

Asia and Pacific  
(APAC) Office  
Bangkok



THANK YOU