WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

Long-term plan for aeronautical meteorology

EN-MHS/1

Pretoria, South Africa

22 and 23 August 2019

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World Meteorological Organization
Organisation météorologique mondiale

Presented by:
WMO Secretariat
and P/CAeM

Content

- Background and rationale
- Introducing the long-term plan
- Next steps

Background and rationale

A global business…

…needs globally standardized, uniform weather information “gate-to-gate” or “enroute-to-enroute”

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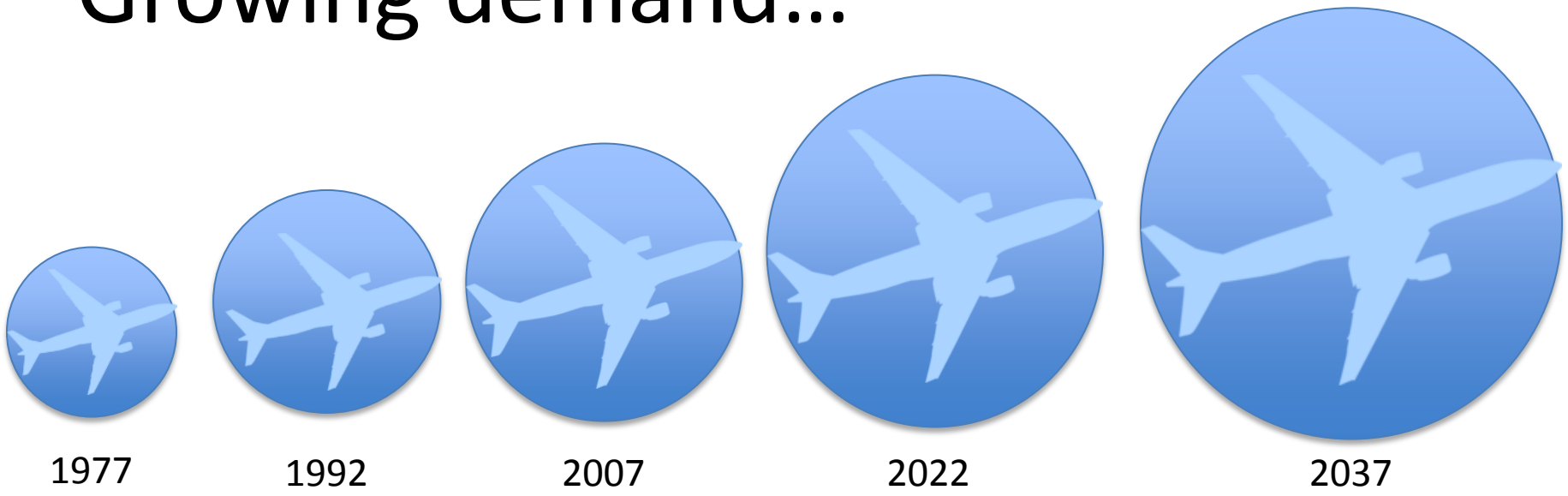
Growing demand…



…to be met by growing supply

The facts:

- Global air traffic has **doubled** in size **once every 15 years** since 1977, despite broader recessionary cycles
- Over **US$ 2 trillion GDP** contribution annually
- Over **3 billion passengers** annually
- Over **US$ 6 trillion value of air cargo** annually

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[Source: ICAO, ATAG, Airbus]

Why is weather important to aviation?








…because it's intrinsically linked with aviation SAFETY, EFFICIENCY, ECONOMY and ENVIRONMENTAL PROTECTION

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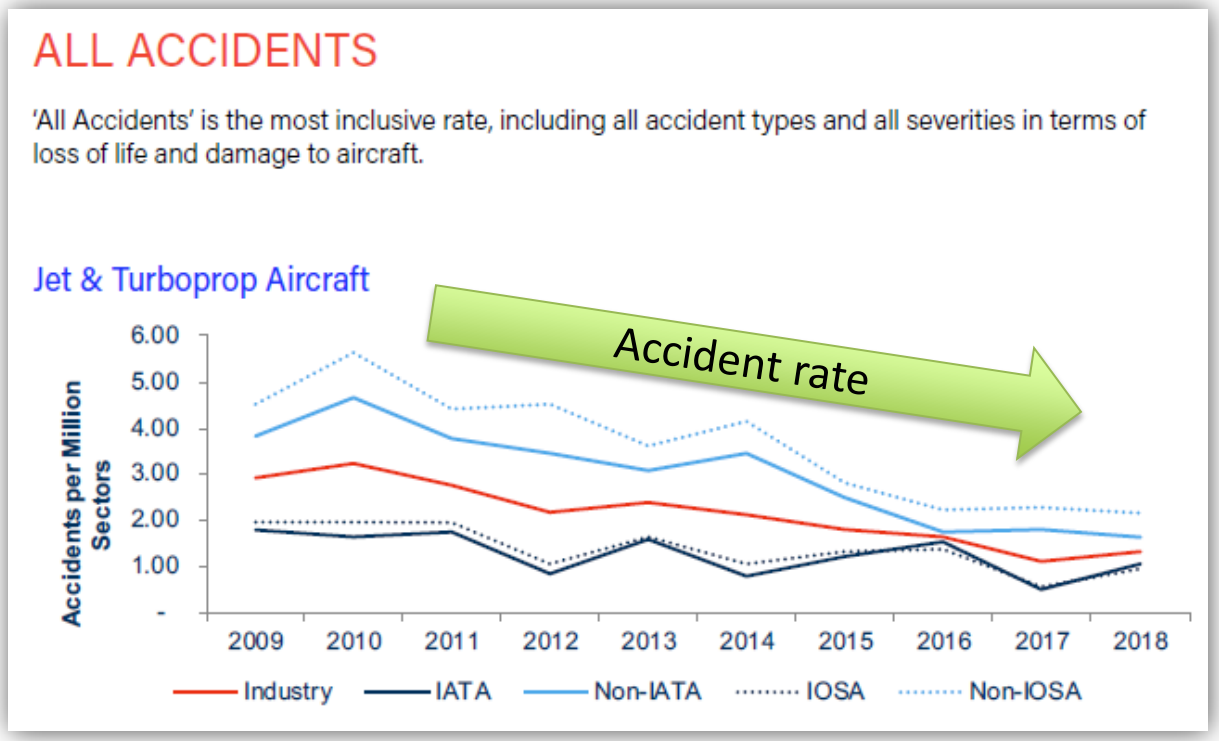
Safety performance in numbers…



- Over the last ten years the world's commercial aviation system industry has **improved its overall safety performance**, with an **accident rate in 2018 of 1.35 accidents per million sectors**, compared to ~3 in 2009

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Source: IATA Safety Report 2018 available via URL: https://www.iata.org/publications/Pages/safety-report.aspx

The weather factor…

- Over the past 5 years, **hazardous weather conditions** has consistently been one of the TOP THREATS to aviation, including:
  - thunderstorms
  - poor visibility/IMC
  - gusty wind/wind shear
  - icing conditions
  - hail

- Primary aircraft 'end-states':
  - Loss of control in-flight (LOC-I)
  - Controlled flight into terrain (CFIT)
  - Runway/taxiway excursion

…in aviation incidents/accidents

[Source: IATA Safety Report]

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…on the ground and in the air…

Complimented by:

- Air Navigation Capacity and Efficiency
- Security and Facilitation
- Economic Development
- Environmental Protection

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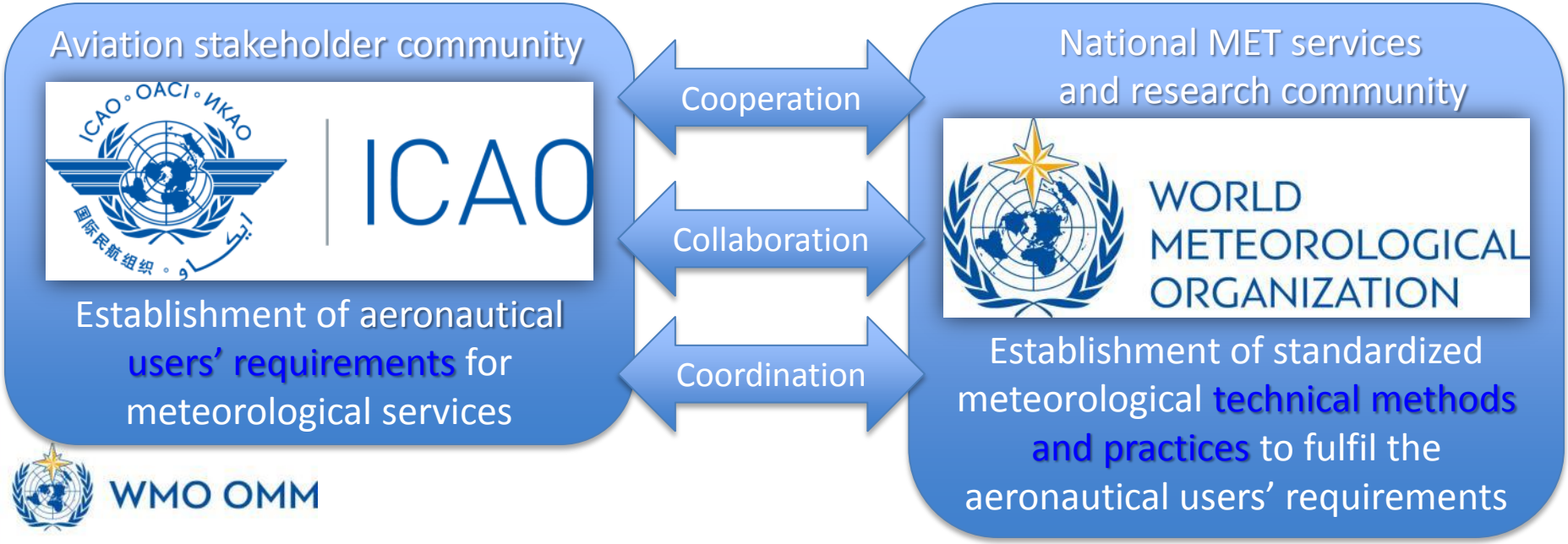
WMO partnership with ICAO

- Working arrangement for 70+ years
  - Broad principles of <u>cooperation, collaboration and coordination</u>
  - Currently under review and update



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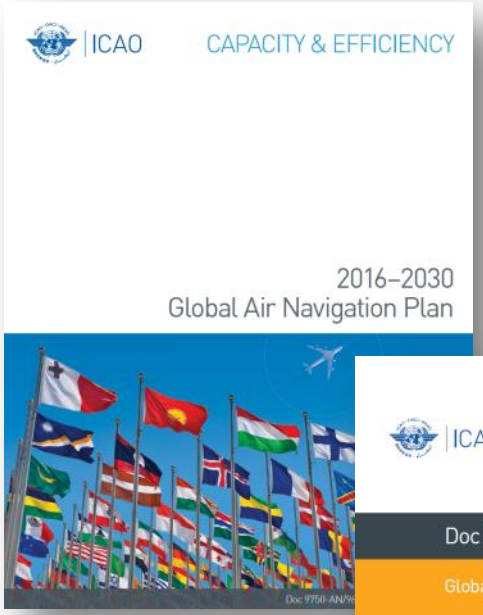
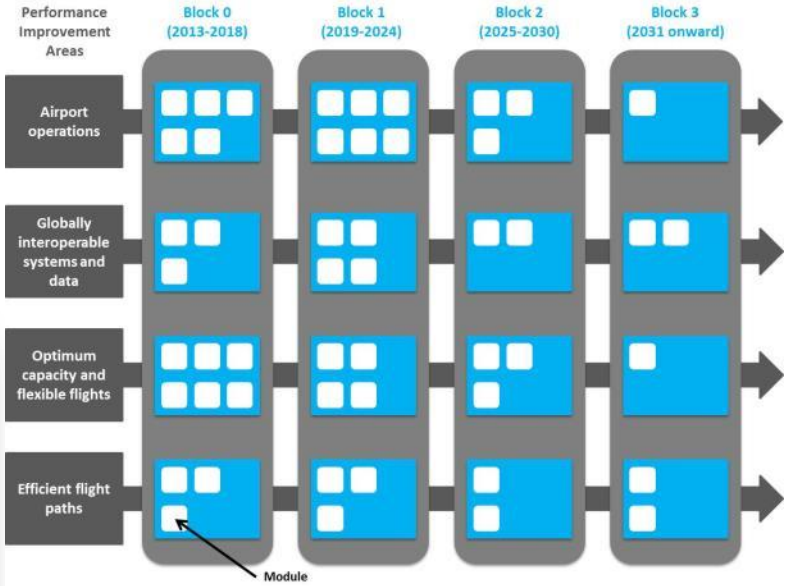
Global plans…





ICAO Doc 9750 (GANP)
ICAO Doc 10004 (GASP)

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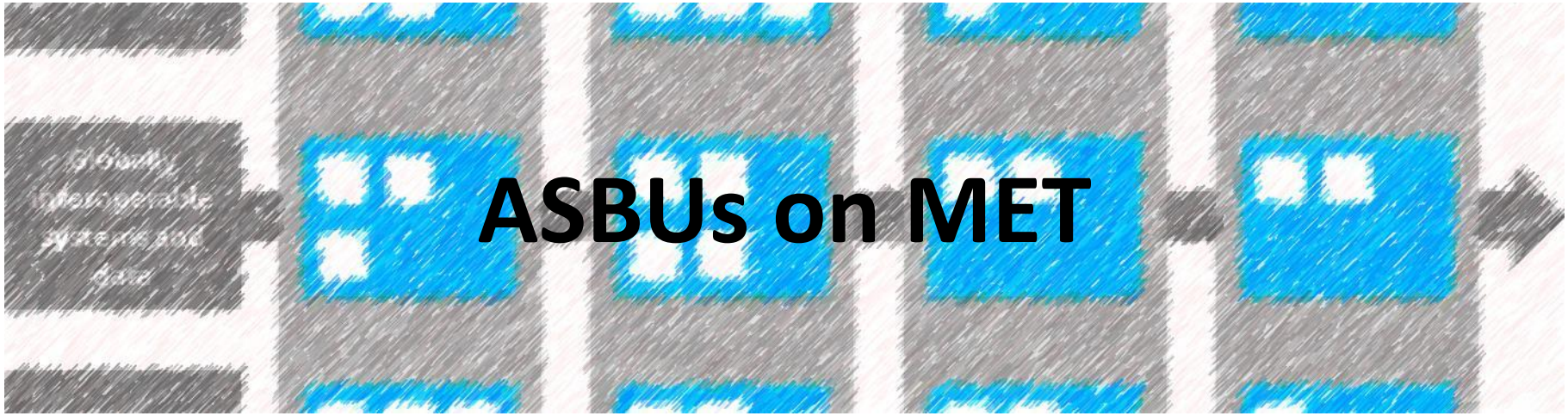
…for evolving a global business



ASBUs on MET

- **AMET-B0 (from 2013):** Global, regional and local meteorological information to support flexible airspace management, improved situational awareness, collaborative decision-making and dynamically optimized flight trajectory planning.

- **AMET-B1 (from 2019):** Meteorological information supporting automated decision process or aids, involving meteorological information, meteorological information translation, ATM impact conversion and ATM decision support.

- **AMET-B2 (from 2025):** Integrated meteorological information in support of enhanced operational ground and air decision-making processes, particularly in the planning phase and near-term.

- **AMET-B3 (from 2031):** Integrated meteorological information in support of enhanced operational ground and air decision-making processes, for all flight phases and corresponding air traffic management operations.

- **AMET-B4 (from 2037):** Integrated meteorological information supporting both air and ground decision making for all phases of flight and ATM operation, especially for implementing immediate weather mitigation strategies

Aviation as a customer-oriented major application area of WMO

Observations – surface, upper air and satellite-based Earth observations

Data-processing, modelling and forecasting – immediate-term (minutes), short-term (hours), longer term (days+)

Standardization – technical regulations and guidance

Seamless service delivery – right time, right place, right format (locally, nationally, regionally, globally)

Technical assistance and capacity development – education and training, competencies and qualifications, QMS, cost recovery, etc.

Telecommunications, infrastructure and data exchange – point-to-point, point-to-many, many-to-one, push/pull, METCE←→IWXXM interoperability

WMO/ICAO

TCs/RAs Support

Coordination and partnerships – ICAO, IAEA, IATA, IFALPA, IFATCA, ICCAIA, CANSO, IBAC, IAOPA, WHO, …

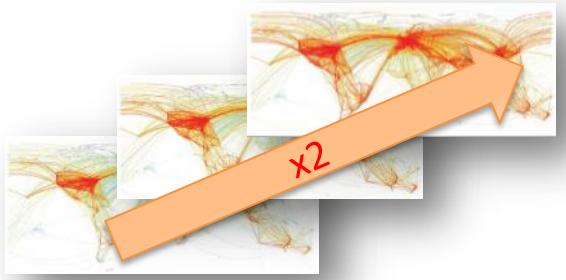
Research and development, science and technology

From product centric to data centric

AERONAUTICAL REQUIREMENTS

METEOROLOGICAL CAPABILITIES

DRIVERS (for change)



Air traffic growth (doubling) 2015-2030

Enhance **safety**, *improve* air navigation **capacity, efficiency and economy,** *reduce* impact on the **environment**

ICAO's Global Air Navigation Plan (**GANP**) and aviation system block upgrade (**ASBU**) methodology

WMO Member responsibilities

- World area forecast centres (WAFC)
- Volcanic ash advisory centres (VAAC)
- Tropical cyclone advisory centres (TCAC)
- Meteorological watch offices (MWO)
- Aerodrome meteorological offices (AMO)
- Aeronautical meteorological stations (AMS)

GLOBAL

REGIONAL

SUB-REGIONAL

NATIONAL

All operated by National Meteorological and Hydrological Services (NMHSs) or other Aeronautical Meteorological Service Providers (AMSPs) of WMO Members

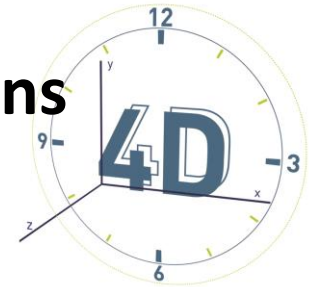
Within the next decade…

- Enhanced World Area Forecast System (**WAFS**)
  - Improved temporal and spatial resolution
  - Use of ensembles
- Enhanced International Airways Volcano Watch (**IAVW**)
  - Improved parameterization, detection, notification, observation and atmospheric transport dispersion modelling
  - SO2 and other volcanic gases
  - Quantitative forecast information
- Enhanced **OPMET** information
  - Decommissioning of METAR/SPECI, TAF, SIGMET, AIRMET, VA Advisory, TC advisory, etc.
  - Transition to IWXXM schema (XML/GML) and meteorological information services

Within the next decade…

- Improved **aerodrome forecasts and warnings**
  - Development of advanced forecast information services for the aerodrome and terminal area
  - Uplink direct to the cockpit
- **En-route** hazards enhanced provision
  - moving towards a holistic, phenomenon-based approach
- Other new and improved services
  - Space weather
  - Releases of radioactive material and toxic chemical clouds

- All to support the transformation of **global ATM performance** through **trajectory-based operations**



Integration of MET

- Aerodrome, terminal area and enroute phases
- In-cockpit and other on-board capabilities
- Collaborative decision-making
  - Airport, ATFM, AOC, MET, etc.
- ATFM and network management
- Trajectory-based operations and user-preferred routing

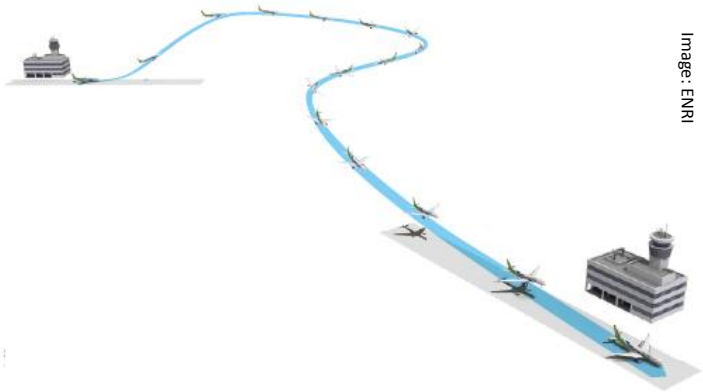


Image: ENRI

Evolving service provision

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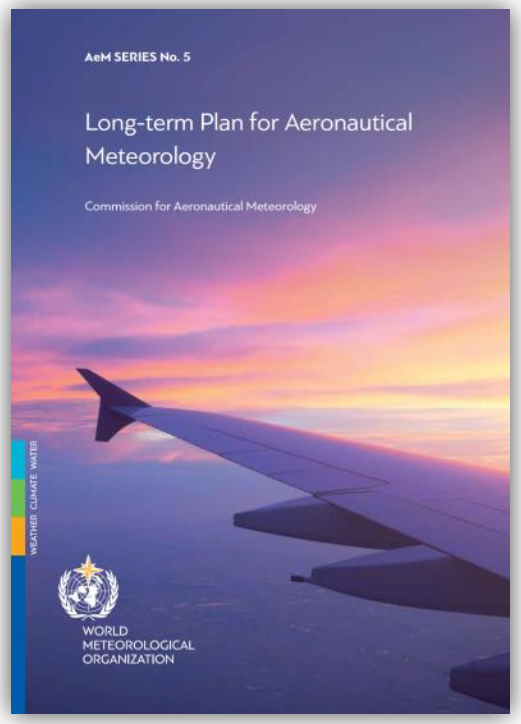
Introducing the long-term plan

Long-term plan

- Published July 2019 ✓
- Framework to plan the progressive transformation from a conventional “product-centric” approach to a modern “information-centric” approach to meteorological service provision for aviation through to 2030 and beyond

WMO AeM SERIES No. 5 (English only)



https://www.wmo.int/aemp/LTP-AeM

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Long-term plan

Content

- Drivers for change ✓
- Science and technology ✓
- Performance improvement ✓
- Strategic guidance for Members ✓

Headlines

- Seamless regional/global models of service delivery
- Driven by user requirements
- It's all about the (best) data
- Integration and interoperability
- WMO key roles in science, technology, data and observations, including aircraft-based observations
- Roles of AMSPs – public and private sector

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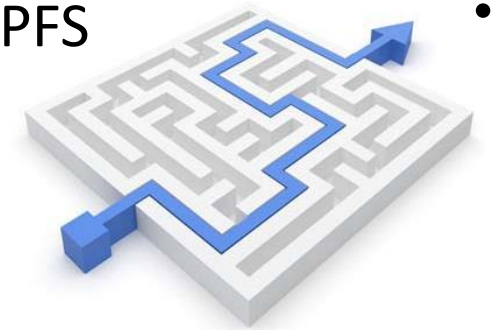
Target audience

- First and foremost:
  - WMO Members, in particular their aeronautical meteorological service providers
    - Public and private sectors, as appropriate
- Other interested stakeholders (non-exhaustive):
  - Aviation partner organizations such as ICAO, IATA, IFALPA and others
    - CAAs, airline operators, pilots, ATC/ANSPs, etc.
  - Development partners such as World Bank
  - Academia

Complementary strategies and concepts

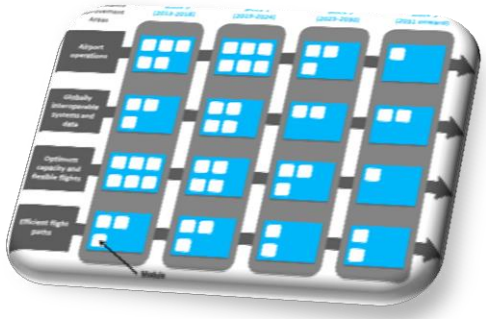
WMO side

- Strategic Plan (2020-2023)
- Service Delivery Strategy
- Rolling Review of Requirements (RRR)
- WIGOS Vision 2040
- GBON Concept
- WIS 2.0 evolution
- Seamless GDPFS
- Etc.



ICAO side

- Global Air Navigation Plan (2019-2033)
- METP 'White Paper on Future Aeronautical Meteorological Information Service Delivery' (2018)
- 'MET in SWIM' plan and roadmap
- ConOps and Roadmaps (various)
- Etc.



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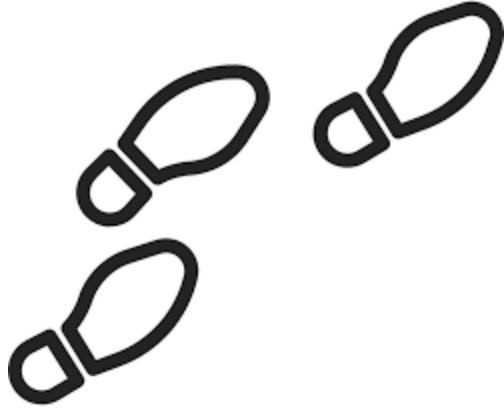
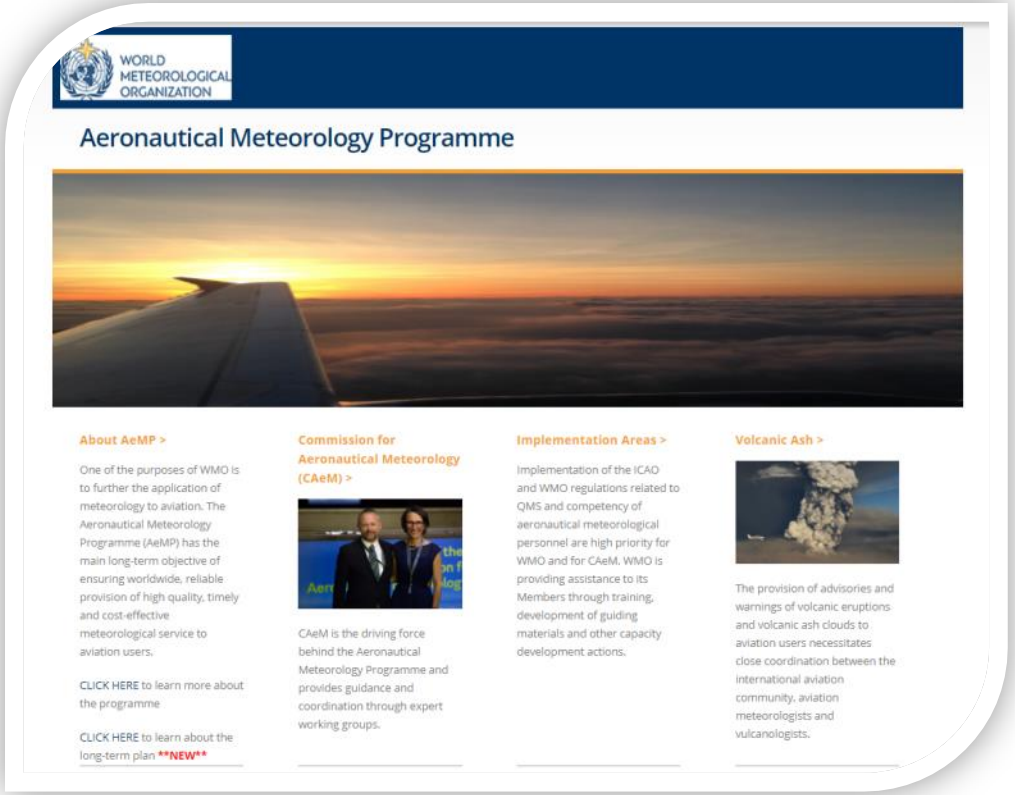
Next steps

Next steps



- Resolution 28 (Cg-18) requested …
  - Living document, regular review, periodic update
  - P/CAeM then P/APPCOM to establish mechanisms for its future maintenance and development
- Second edition of long-term plan
  - 2020 to 2022: Drafting
  - 2023: Endorsement by Cg-19 and publication
- Outreach (continuous)
  - PTCs and PRAs
  - (C)AeM Newsletters, etc.
  - Working groups of WMO, ICAO and others concerned

More information …



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…on the web

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— END —

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