



METEOROLOGY PANEL 

Global Air Navigation Plan (GANP)

Aviation Research and Development Project (AvRDP) Meeting and Seminar

19-22 August 2019, Johannesburg, South Africa

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Global Air Navigation Plan (GANP)

- ICAO Doc 9750 – GANP. Currently 5th edition (2016). Working on the 6th edition (2019).
- ICAO's highest air navigation strategic document.
- In line with the Global Air Traffic Management Operational Concept (GATMOC, Doc 9854) and the Manual on Air Traffic Management System Requirements (Doc 9882)
- Aimed at achieving a global interoperable air navigation system for all users, during all phases of flight, that will meet agreed levels of safety, provide optimum economic operations, is environmentally sustainable and will meet national security requirements



WELCOME TO THE GLOBAL AIR NAVIGATION PLAN PORTAL

The GANP Portal is a web portal where all aviation stakeholders will be able to find the most relevant information related to the GANP

THE GLOBAL AIR NAVIGATION PLAN

The Global Air Navigation Plan (Doc 9750) is the ICAO's highest air navigation strategic document and the plan to drive the evolution of the global air navigation system, in line with the Global Air Traffic Management Operational Concept (GATMOC, Doc 9854) and the Manual on Air Traffic Management System Requirements (Doc 9882). It also supports planning for local and regional implementation.

In order to better communicate with technical and high-level managers and to not leave any State or stakeholder behind, a multilayer structure, tailored for the various audiences, is proposed for the sixth edition of the GANP. This multilayer structure of four layers; two global levels, a regional level and a national one, would also provide a framework for alignment of regional, sub-regional and national plans.

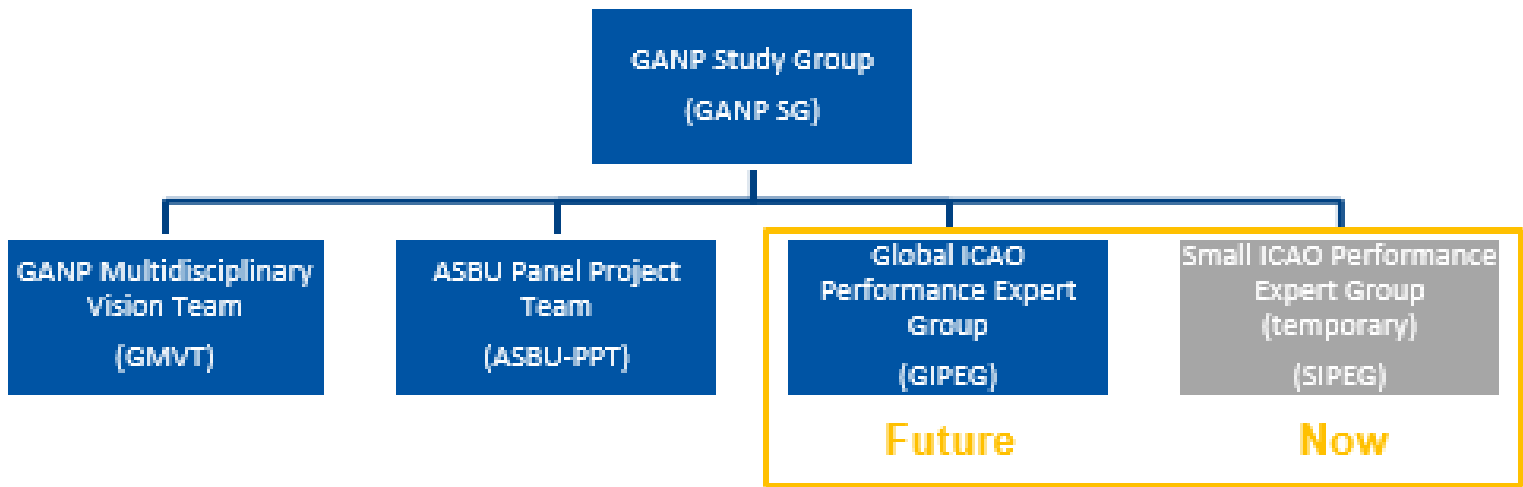
GANP PORTAL

<https://www4.icao.int/ganportal/>



Global Air Navigation Plan (GANP)

Following the 13th Air Navigation Conference a new structure for the development of the GANP was established.

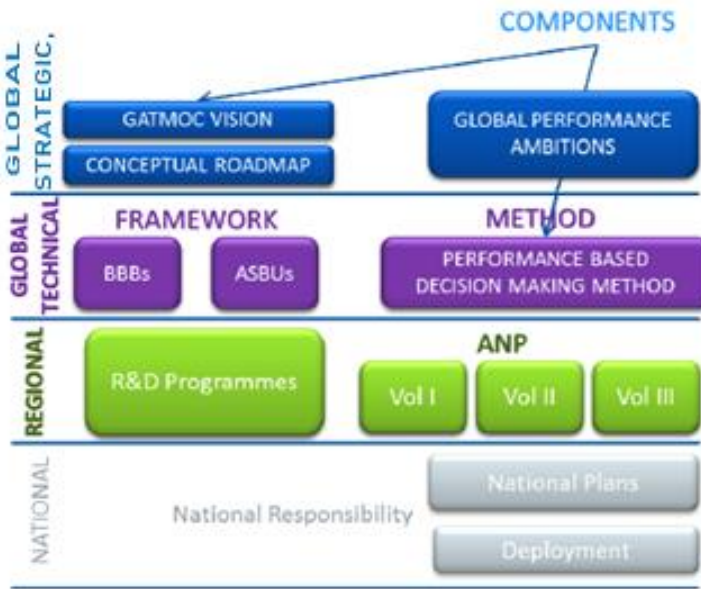
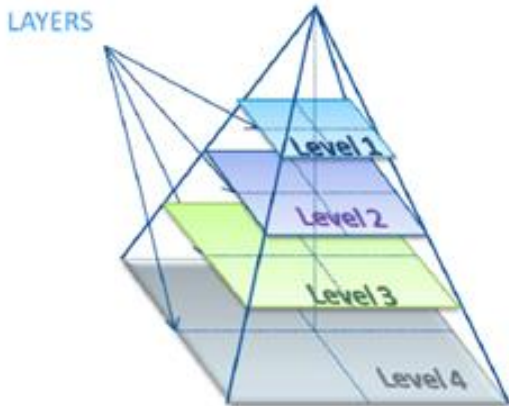




Global Air Navigation Plan (GANP)

In order to better communicate with technical and high-level managers and to not leave any State or stakeholder behind, the GANP will have a multilayer structure, tailored for the various audiences.

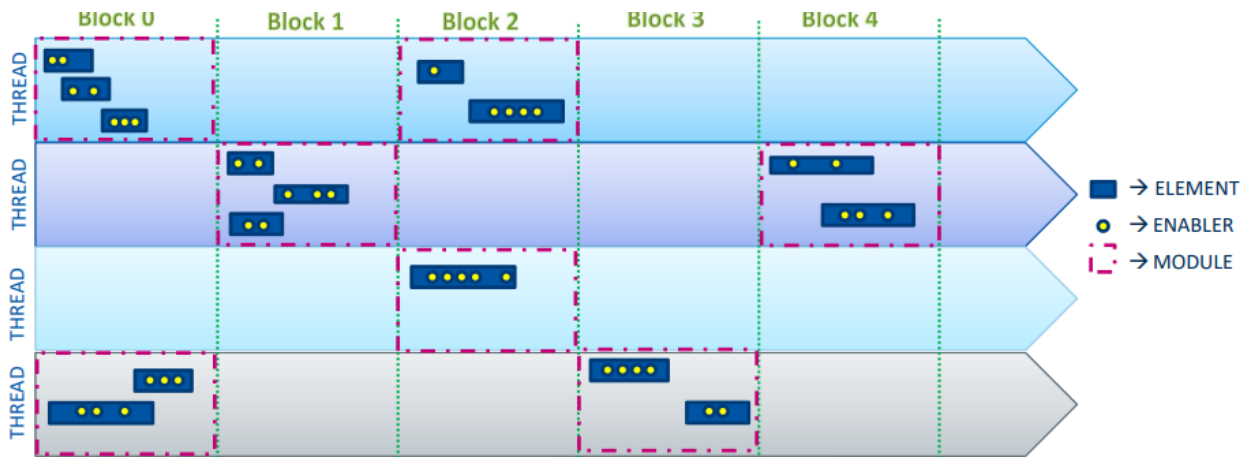
Multilayer Structure





Aviation System Block Upgrade (ASBU)

- BBB = Basic Building Block (baseline)
- Block 0 = from 2013
- Block 1 = from 2019
- Block 2 = from 2025
- Block 3 = from 2031
- Block 4 = from 2037





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Aviation System Block Upgrade (ASBU)

ASBU Thread: key feature area of the air navigation system that needs improvement in order to achieve the vision outlined in the Global ATM Operational Concept (GATMOC).

ASBU Element: a specific change in operations designed to improve the performance of the air navigation system under specified operational conditions.

ASBU Enabler: component (standards, procedures, training, technology, etc) required to implement an element.

ASBU Block: a six-year timeframe whose starting date defines a deadline for an element to be available for implementation.

ASBU Module: a group of elements from a thread that, according to the enablers' roadmap, will be available for implementation within the defined deadline established by the ASBU Block.



ASBU Operational Threads

- ACAS - Airborne collision avoidance system
- ACDM - Airport collaborative decision making
- APTA - Improve arrival and departure operations
- ASEP - Airborne separation
- FRTO - Improved operations through enhanced en-route trajectories
- GADS - Global aeronautical distress and safety systems
- NOPS - Network operations
- OPEL - Improved access to optimum flight levels in oceanic and remote airspace
- RATS - Remote aerodrome air traffic services
- RSEQ - Improved traffic flow through runway sequencing
- SNET - Ground-based safety nets
- SURF - Surface operations
- TBO - Trajectory-based operations
- WAKE - Wake turbulence separation



ASBU Enabler Threads

- AMET - Meteorological information
- DAIM - Digital Aeronautical Information Management
- FICE - Flight & flow information for a collaborative environment
- SWIM - System wide information management

ASBU Network / Infrastructure Threads

- ASUR - Surveillance Systems
- COMI - Communication Infrastructure
- COMS - ATIS Communication systems
- NAVS - Navigation systems



AMET Module

- Meteorology is an **enabler** for the majority of the other Threads.
- Challenge is to ensure that **all the other ASBU threads** and related modules are able to fully articulate the requirements they have for MET information in the future.
- This means looking at the **MET information required**, rather than existing products.
- Information includes phenomenon/parameter and data characteristics such as severity, accumulation, intensity, probability of occurrence, confidence/uncertainty of forecasts and reliability, etc.
- Evolution driven by the transition to the **system wide information management (SWIM) environment** and by the need for more **interoperability** allowing **integration of MET information** in ATM systems



AMET Module

AMET BBB: Meteorological information provided to support operational efficiency and safety.

AMET Block 0: Global, regional and local meteorological information to support flexible airspace management, improved situational awareness, collaborative decision-making and dynamically optimized flight trajectory planning.

AMET Block 1: Meteorological information supporting automated decision process or aids, involving meteorological information, meteorological information translation, ATM impact conversion and ATM decision support.

AMET Block 2: Integrated meteorological information in support of enhanced operational ground and air decision-making processes, particularly in the planning phase and near-term.

AMET Block 3: 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 Block 4: Integrated meteorological information supporting both air and ground decision making for all phases of flight and ATM operations, especially for implementing immediate weather mitigation strategies.



AMET Modules

AMET	/1	/2	/3	/4
B0	Meteorological observations products	Meteorological forecast and warning products	Climatological and historical meteorological products	Dissemination of meteorological products
B1	Meteorological observations information	Meteorological forecast and warning information	Climatological and historical meteorological information	Dissemination of meteorological information
B2	Meteorological observations information	Meteorological forecast and warning information	Climatological and historical meteorological information	Meteorological information service in SWIM
B3	Meteorological observations information	Meteorological forecast and warning information	Climatological and historical meteorological information	Meteorological information service in SWIM
B4	Meteorological observations information	Meteorological forecast and warning information	Climatological and historical meteorological information	Meteorological information service in SWIM



AMET Module - AMET Bx/1 - Observations

AMET B0/1: Meteorological Observations Products

Provision of observations of additional meteorological parameters/elements. More automated observations. Higher temporal and spatial resolution for lightning, radar and satellite information.

AMET B1/1: Meteorological Observations Information

Commencement of change from product-centric to data-centric information. Commencement of space weather and sulphur dioxide (SO₂) services. Enhanced hazardous weather services. Introduction of new and enhanced space-based observations. Introduction of new observational information from both un-manned and manned aircraft (i.e. observations from lidar).

AMET B2/1: Meteorological Observations Information

Further development of space weather and radioactive material services. Further development of services for terminal areas. Implementation of a data-centric information set. Higher spatial and temporal resolution of meteorological observations. Automated user-defined observation products derived from meteorological information in ICAO Meteorological Information Exchange Model (IWXXM) form.

AMET B3/1: Meteorological Observations Information

Further development of space weather information service and of observation services for terminal areas. Higher spatial and temporal resolution of meteorological observations.



AMET Module - AMET Bx/2 - Forecasts and Warnings

AMET B0/2: Meteorological Forecast and Warning Products

Improved visualisation of meteorological forecast products. Greater resolution (spatial and temporal) of gridded WAFS information (e.g. wind, temperature, icing, turbulence, CB clouds).

AMET B1/2: Meteorological Forecast and Warning Information

Commencement of change from product-centric to data-centric information. Commencement of space weather and sulphur dioxide (SO₂) services. Enhanced hazardous weather services. First steps in the provision of probabilistic information derived from ensemble prediction systems.

AMET B2/2: Meteorological Forecast and Warning Information

Further development of space weather and radioactive material services. Further development of forecast and warning services for terminal areas. Phenomena-based meteorological information is no longer constrained by Flight Information Regions (FIRs). Implementation of a data-centric information set. Higher spatial and temporal resolution of meteorological forecasts and warnings. Automated user-defined forecast and warning products derived from meteorological information in ICAO Meteorological Information Exchange Model (IWXXM) form. Further development of probabilistic information derived from ensemble prediction systems.

AMET B3/2: Meteorological Forecast and Warning Information

Further development of space weather information service and of forecast and warning services for terminal areas. Higher spatial and temporal resolution of meteorological forecasts and warnings. Further development of probabilistic forecast information. Further development towards a fully integrated meteorological forecast service fit for the purpose of all flight phases and ATC operations, in support of gate-to-gate seamless operations.



AMET Module - AMET Bx/4 - Climate

AMET B0/3: Climatological and Historical Meteorological Products

Provision of climatological products including: Aerodrome climatological tables and Aerodrome climatological summaries. Provision of historical products including meteorological observations, forecasts, advisories and warnings.

AMET B1/3: Climatological and Historical Meteorological Information

Climatological and historical information for the range of meteorological parameters and phenomena and their associated characteristics (metadata), including: En-route winds; Airport parameters (i.e. air and surface temperature, wind, precipitation, etc.); Characteristics of the climatological information such as averages and extremes).

AMET B2/3: Climatological and Historical Meteorological Information

Climatological data (including satellite-based and in-situ climatological data, and a combination of the two) and climate change information available for more locations and more frequently updated.

AMET B3/4: Climatological and Historical Meteorological Information

Climatological data and climate change information available for more locations and more frequently updated. Climatological information services will support the design and planning of infrastructure, flight routes and airspace management.



AMET Module - AMET Bx/4 - Dissemination

AMET B0/4: Dissemination of Meteorological Products

Commencement of IWXXM, being the conversion of TAC using an IWXXM schema into XML/GML.

AMET B1/4: Dissemination of Meteorological Information

IWXXM form starts to replace TAC products. Human-readable products start to be derived from the IWXXM information (rather than the other way around). The introduction of web services allows for progressive replacement of fixed line dissemination systems.

AMET B2/4: Dissemination of Information Services in SWIM

Implementation of a data-centric MET information into a SWIM environment. User-defined products derived from meteorological information in IWXXM. Wider use of secure web services and decommissioning of fixed line and satellite dissemination systems. Commencement of the use of business-to-business services, allowing integration of MET information into ATM systems. Increased use of air-to-air datalink for transmission of upper air meteorological observation in near real-time.

AMET B3/4: Dissemination of Information Services in SWIM

Continued implementation of a data-centric meteorological information service into SWIM. Enhancement of IWXXM with further schemas and formats for meteorological information exchange. User-defined products automatically derived from meteorological information IWXXM form. Extensive use of secure web services, in particular business-to-business services that allows full integration of meteorological information.



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Air Navigation Conference

Recommendation 2.3/2 — Further Development of IWXXM for the Exchange of Aeronautical Meteorological Information

That States:

- a) provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020;

That ICAO:

- a) promote the importance of exchanging meteorological information for aeronautical purposes in compliance with the IWXXM;
- b) in close coordination with the World Meteorological Organization (WMO),
 - 1) ensure that the **IWXXM** format is the **only standard exchange format by 2026**;
 - 2) develop the policies and procedures necessary to ensure a smooth transition from traditional alpha numeric code (TAC) format to IWXXM format for the purpose of data exchange to support international air navigation, as an interim step toward full IWXXM implementation;
 - 3) promote awareness of the changes brought about by the IWXXM data format, production, dissemination and data exchange among operators; and
 - 4) monitor the status of implementation of IWXXM at State and regional levels.



Meteorology Panel

Recommendation 5/3: Roadmap for IWXXM and TAC

That the MET Panel:

- a) Agree to propose a change to Annex 3 – *Meteorological Service for International Air Navigation* provisions to **remove traditional alphanumeric code (TAC) forms from the Annex not later than 2026**, ensuring adequate lead-time of this change.
- b) Create a Roadmap document outlining the different steps to be considered so that the current legacy TAC products are no longer required to be distributed internationally after 2026.
- c) Determine mechanisms to ensure TAC is secondary information and promote the use of ICAO Information Meteorological Exchange Model (IWXXM) data, particularly leading up to full system-wide information management (SWIM) implementation.

Decision 5/1: MET information visualisation/representation

That, in light of METP/4 Recommendation 5/3, the MET Panel consider what level of visualization/representation of meteorological information should be managed in a system-wide information management (SWIM) environment by ICAO and the World Meteorological Organization (WMO) when traditional alphanumeric code (TAC) is removed from Annex 3 - *Meteorological Service for International Air Navigation*



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- Global Technical
- ASBUs & PF
- Edit Filters
- AMET



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Thank you!

