GLOBAL AIR NAVIGATION AIM/SWIM/AIDC CONSIDERATION

MAYDA ÁVILA
REGIONAL OFFICER
COMMUNICATION, NAVIGATION AND SURVEILLANCE

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ICAO | UNITING AVIATION

✈ ICAO Strategy

✈ Global Air Navigation Plan Overview

✈ ASBU implementation overview

✈ AIM/SWIN/AIDC related ASBU modules

Global Air Navigation Plan

- ICAO's Vision
- Our Mission
- 2017–2019 Strategic Objectives

Aviation System Block Upgrades (ASBUs), Modules and Roadmaps

ICAO

✈ **Vision:** Achieve the sustainable growth of the global civil aviation system.

✈ **Mission:** To serve as the global forum of States for international civil aviation. ICAO develops policies and Standards, undertakes compliance audits, performs studies and analyses, provides assistance and builds aviation capacity through many other activities and the cooperation of its Member States and stakeholders.

GANP and ASBU

✈ The Global Air Navigation Plan's Aviation System Block Upgrades methodology is a programmatic and flexible global systems engineering approach that allows all Member States to advance their Air Navigation capacities based on their specific operational requirements. The Block Upgrades will enable aviation to realize the global harmonization, increased capacity, and improved environmental efficiency that modern air traffic growth now demands in every region around the world.
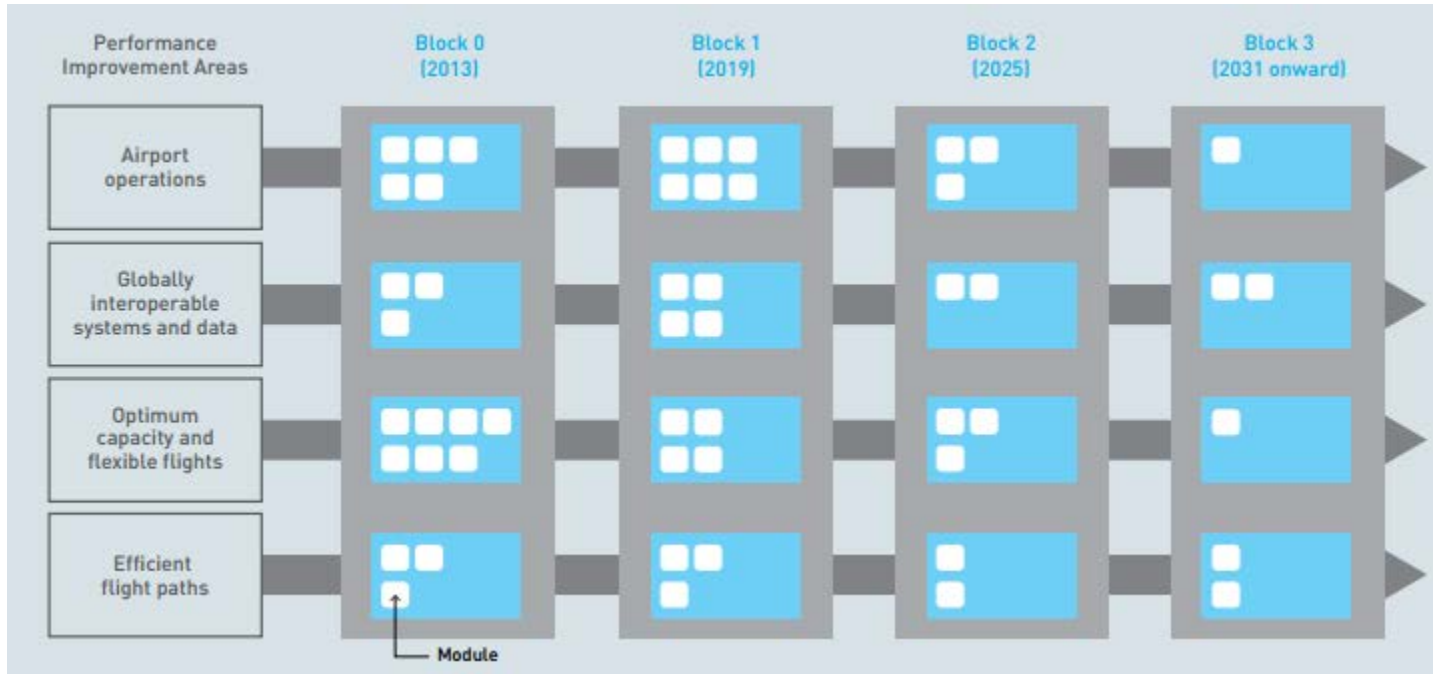
GANP and ASBU

✈ The ICAO Global Air Navigation Plan (GANP) established internationally agreed phases implementation of the new technologies and capabilities through Aviation System Block Upgrades (ASBUs).
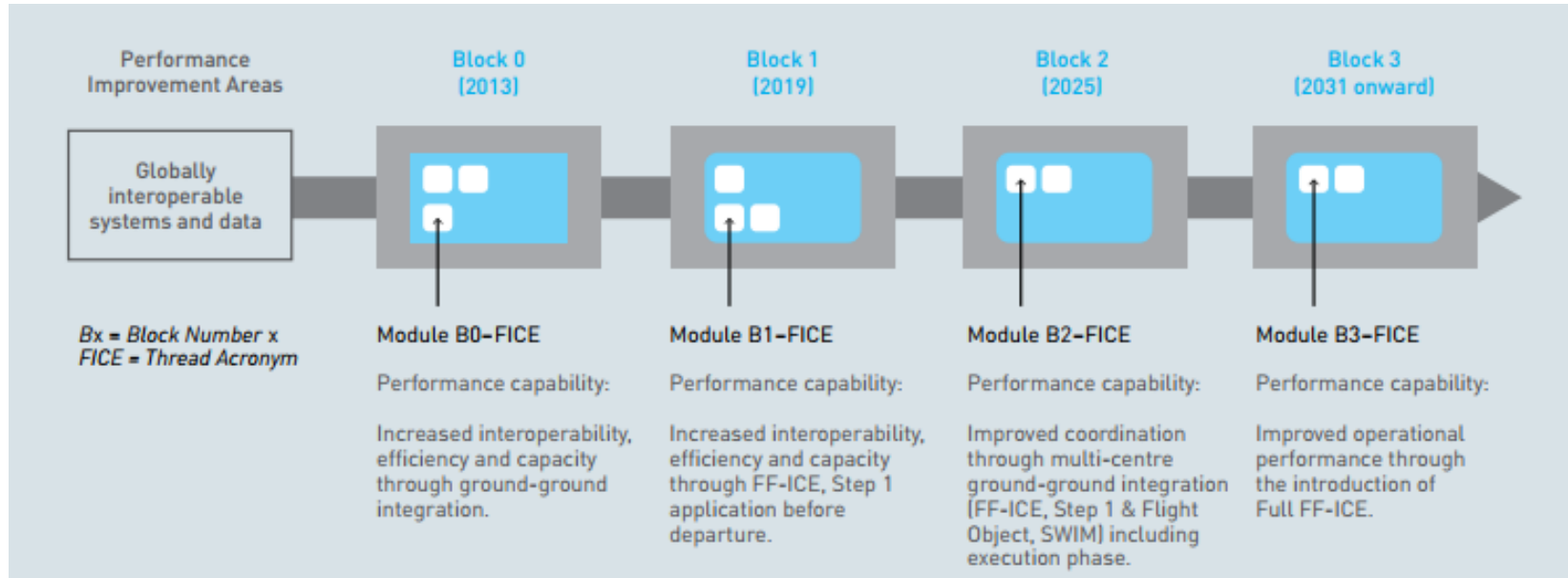
ASBU
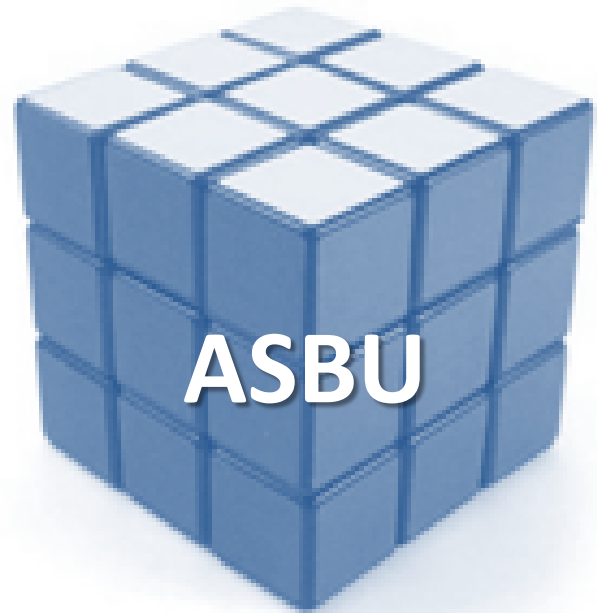
GANP Fifth Edition Aviation System Block Upgrades Methodology

GANP Fifth Edition Aviation System Block Upgrades Methodology

ICAO's 10 Key Air Navigation Policy Principles

1. Commitment to the implementation of ICAO's Strategic Objectives and Key Performance Areas.
2. Aviation safety is the highest priority.
3. Tiered approach to air navigation planning.
4. Global Air Traffic Management Operational Concept (GATMOC)
5. Global air navigation priorities
6. Regional and State air navigation priorities
7. Aviation System Block Upgrades (ASBUs), Modules and Roadmaps
8. Use of ASBU Blocks and Modules
9. Cost-benefit and financial issues
10. Review and evaluation of air navigation planning.

Phased development approach for ICAO

Until 2019

Agreement on a simple set of Key Performance Indicators (KPIs), based on existing best practices in more mature regions that have already published performance information and on ICAO publications; • Initial development of guidance material, illustrating the benefits of a performance-based approach and explaining the data collection, calculation and analysis required for the selected KPIs.

Until 2022

Illustrate links between ASBU Modules and KPIs and exchange of experience and best practices at regional and subregional levels; • Update of performance related ICAO manuals (Doc 9883 and Doc 9161) and development of additional guidance material on data collection, data analysis, etc.; • Define a global performance baseline, based on States' performance monitoring and reporting, against which future progress will be measured.

2022 and beyond

Standardization of performance data and enhanced data exchanges to automate and reduce the cost of performance data collection and processing. This work could benefit from existing work on exchange models.

ICAO companion publications supporting the GANP

Global Air Traffic Management Operational Concept (Doc 9854)

The Global ATM Operational Concept (GATMOC) was published in 2005. It set out the parameters for an integrated, harmonized and globally interoperable ATM system planned up to 2025 and beyond. Doc 9854 can serve to guide the implementation of CNS/ATM technology by providing a description of how the emerging and future ATM system should operate. The GATMOC also introduced some new concepts:

a. planning based on ATM system performance;

b. safety management through the system safety approach; and

c. a set of common performance expectations of the ATM community.

ICAO companion publications supporting the GANP

Manual on Air Traffic Management System Requirements (Doc 9882)

Doc 9882, published in 2008, is used by PIRGs as well as by States as they develop transition strategies and plans. It defines the high-level requirements (i.e. ATM system requirements) to be applied when developing Standards and Recommended Practices (SARPs) to support the GATMOC. This document provides high-level system requirements related to:

a. system performance-based on ATM community expectations;

b. information management and services;

c. system design and engineering; and

d. ATM concept elements (from the GATMOC).

ICAO companion publications supporting the GANP

Manual on Global Performance of the Air Navigation System (Doc 9883)

This document, published in 2008, is aimed at personnel responsible for designing, implementing and managing performance activities. It achieves two key objectives:

a. it outlines performance framework and performance-based strategy from the performance concepts provided in the GATMOC; and

b. it analyses ATM community expectations and categorizes these into key performance areas (KPAs) from which practical metrics and indicators can be developed.

Doc 9883 also provides organizations with the tools to develop an approach to performance management suited to their local conditions.

Block Upgrade Technology Roadmaps

✈ Technology Roadmaps complement the ASBU Modules by providing timelines for the technology that will support the communications, navigation and surveillance (CNS), information management (IM) and avionics requirements of the global air navigation system. These Roadmaps provide guidance for infrastructure planning (and status) by indicating on a per-technology basis, the need for and readiness of:

✈ existing infrastructure

✈ ICAO Standards and guidance material

✈ Demonstrations and validations

✈ Initial operational capability (IOC) of emerging technologies

✈ global implementation.

Block 0	Block 1	Block 2	Block 3
B0-FICE **Increased interoperability, efficiency and capacity through ground-ground integration** Supports the coordination of ground-ground data communication between ATSUs, based on ATS interfacility data communication (AIDC) defined by ICAO Document 9694.	**B1-FICE** **Increased interoperability, efficiency and capacity through FF-ICE, Step 1 application before departure** Introduction of FF-ICE step 1, to implement ground-ground exchanges before departure using common flight information reference model, FIXM, XML and the flight object.	**B2-FICE** **Improved coordination through multi-centre ground-ground integration (FF-ICE, Step 1 and flight object, SWIM) including execution phase** FF-ICE supporting trajectory-based operations through exchange and distribution of information including execution phase for multicentre operations using flight object implementation and interoperability (IOP) standards.	**B3-FICE** **Improved operational performance through the introduction of Full FF-ICE** Data for all relevant flights is systematically shared between air and ground systems using SWIM in support of collaborative ATM and trajectory-based operations.
B0-DATM **Service improvement through digital aeronautical information management** Initial introduction of digital processing and management of information, by the implementation of AIS/AIM making use of AIXM, moving to electronic AIP and better quality and availability of data.	**B1-DATM** **Service improvement through integration of all digital ATM information** This module addresses the need for increased information integration and will support a new concept of ATM information exchange fostering access via internet-protocol-based tools Exchange models such as AIXM, FIXM, IWXXM and others relate their concepts to the AIRM fostering convergence, re-use, and collaborative alignment.	**B2-SWIM** **Enabling airborne participation in collaborative ATM through SWIM** Connection of the aircraft as an information node in SWIM enabling participation in collaborative ATM processes with exchange of data including meteorology.	
	B1-SWIM **Performance improvement through the application of system-wide information management (SWIM)** Implementation of SWIM services (applications and infrastructure) creating the aviation intranet based on standard data models, and internet-based protocols to maximize interoperability.		

B0-DATM	Service improvement through digital aeronautical information management

The initial introduction of digital processing and management of information from origination to publication through, aeronautical information service (AIS)/aeronautical information management (AIM) implementation, use of aeronautical exchange model (AIXM), migration to electronic aeronautical information publication (AIP) and better quality and availability of data.

Applicability

Applicable at State level with increased benefits as more States participate. States should be able to apply the most optimal exchange formats for the exchange of data as at the global level a standardized format is far more important to ensure global interoperability.

Benefits

| Interoperability	Essential contribution to interoperability.
Safety	Reduction in the number of possible inconsistencies. Module allows for better data quality, safe guarding and validation of the data throughout the process, and harmonization/synchronization with adjacent States, as necessary.

Cost

Reduced costs in terms of data inputs and checks, paper and post, especially when considering the overall data chain, from originators, through AIS to the end users. The business case for the aeronautical information conceptual model (AIXM) has been conducted in Europe and in the United States and has shown to be positive. The initial investment necessary for the provision of digital AIS data may be reduced through regional cooperation and remains low compared with the cost of other ATM systems. The transition from paper products to digital data is a critical pre-requisite for the implementation of any current or future ATM or Air Navigation concept that relies on the accuracy, integrity and timeliness of data.

Road Map 7: Information Management
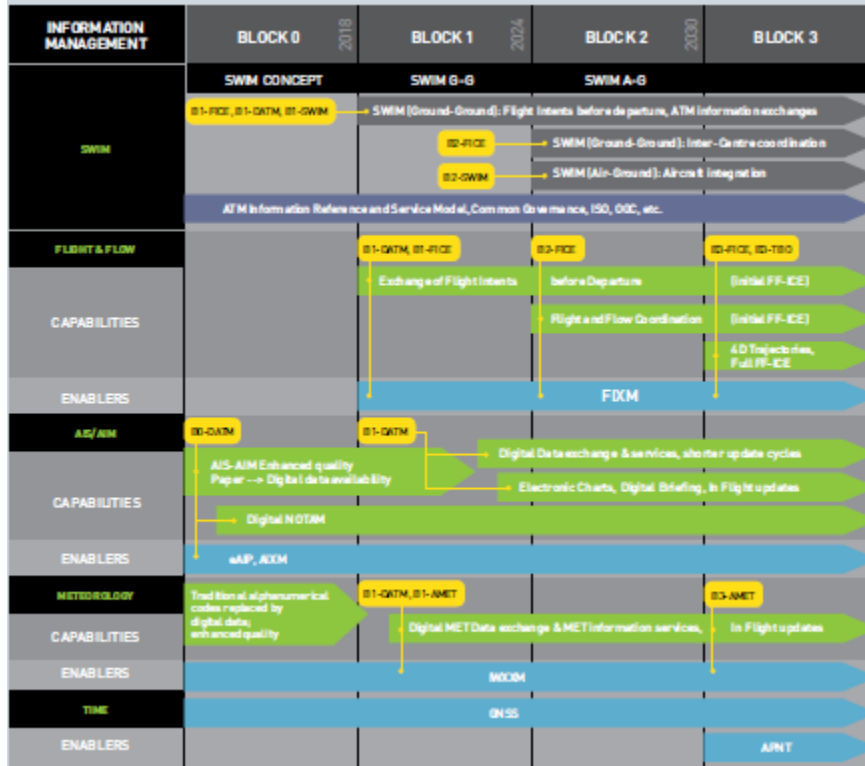
B0-FICE	Increased interoperability, efficiency and capacity through ground-ground integration

To improve coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by ICAO's *Manual of Air Traffic Services Data Link Applications* (Doc 9694). An additional benefit is the improved efficiency of the transfer of communication in a data link environment.

Applicability

Applicable to at least two area control centres (ACCs) dealing with en-route and/or terminal control area (TMA) airspace. A greater number of consecutive participating ACCs will increase the benefits.

Benefits

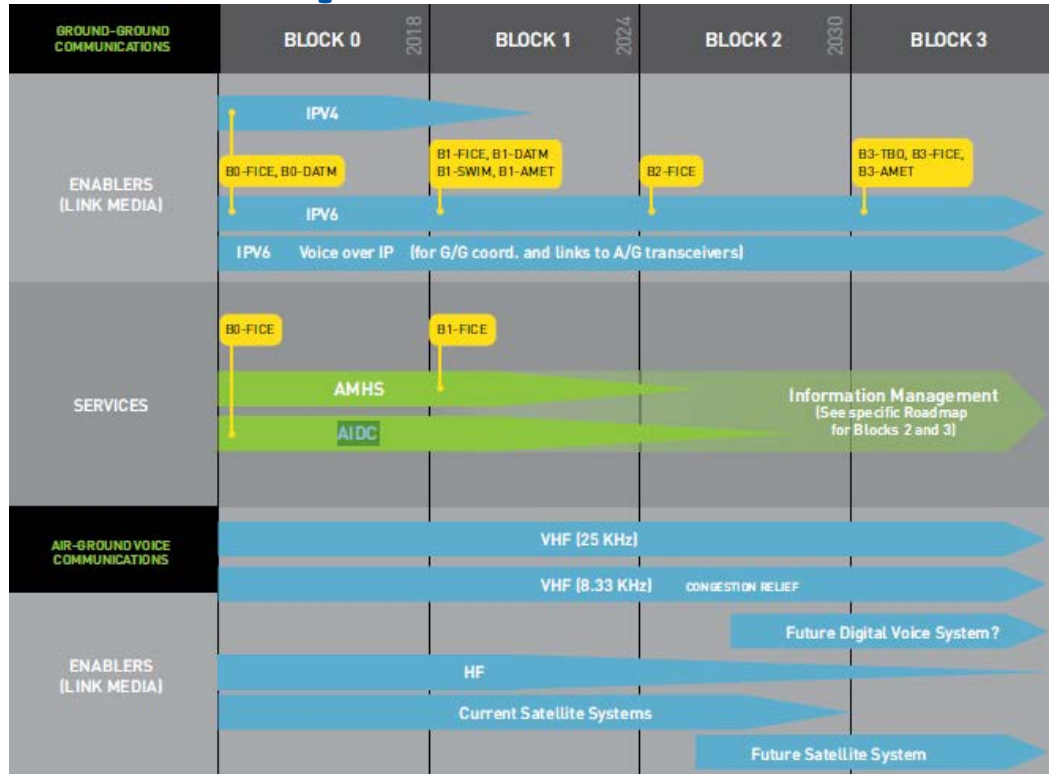|	
Capacity	Reduced controller workload and increased data integrity supporting reduced separations translating directly to cross sector or boundary capacity flow increases.
Efficiency	The reduced separation can also be used to more frequently offer aircraft flight levels closer to the flight optimum; in certain cases, this also translates into reduced en-route holding.
Interoperability	Seamlessness: the use of standardized interfaces reduces the cost of development, allows air traffic controllers to apply the same procedures at the boundaries of all participating centres and border crossing becomes more transparent to flights.
Safety	Better knowledge of more accurate flight plan information for receiving ATS units and reduced risk of coordination errors.

Cost

Increase of throughput at ATS unit boundary and reduced ATC workload will outweigh the cost of ground system software changes. The business case remains dependent on the environment.

Road Map 2: Communication