



ICAO

UNITING AVIATION

Meeting of Implementation of AIDC (ATS
data communications between facilities)
in the NAM/CAR/SAM Regions

INTRODUCTION TO FF-ICE A CONCEPT TO SUPPORT THE ATM SYSTEM OF THE FUTURE

Lima, Peru, 16-20 April 2017



OVERVIEW

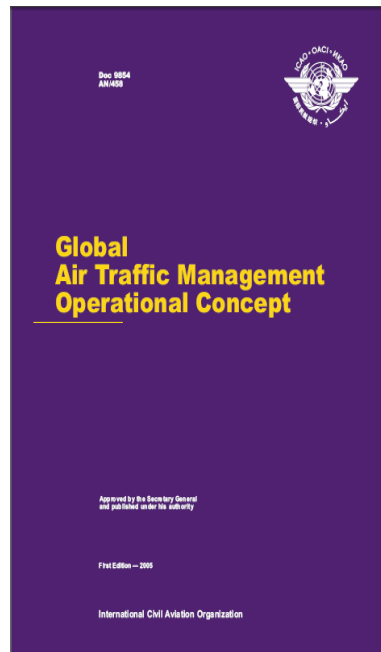
- **BACKGROUND TO FF-ICE**
- **SUMMARY OF CONCEPT**
- **IMPLICATIONS**
- **BENEFITS**



ICAO VISION FOR THE FUTURE NAVIGATION SYSTEM

Global ATM Operational Concept (Doc 9854)

*“To achieve an **interoperable** global air traffic management system, for **all users during all phases of flight**, that meets **agreed levels of safety**, provides for **optimum economic operations**, is **environmentally sustainable** and meets **national security requirements**”*





GLOBAL AIR NAVIGATION PLAN



“Increase the capacity and improve the efficiency of the global civil aviation system”

- Through the **GANP**, offer a **long-term vision** to assist **all aviation stakeholders**, and ensure **continuity** and **harmonization** among modernization programmes
- Through the **Aviation System Block Upgrades (ASBU)**, provide a consensus-driven **modernization framework** for integrated planning based on performance



AIRPORT OPERATIONS

- **APTA** Optimized Airport Accessibility
- **WAKE** Wake Vortex Separation
- **RSEQ** Runway Sequencing
- **SURF** Surface Operations
- **ACDM** Airport Collaborative Decision Making
- **RATS** Remotely Operated Aerodrome Control



GLOBALLY INTEROPERABLE SYSTEMS AND DATA (SWIM)

- **FICE** Flight and Flow Information for a Collaborative Environment
- **DATM** Integration of Digital ATM Information
- **AMET** Integration of Meteorological information
- **SWIM** System Wide Information Management



OPTIMUM CAPACITY AND FLEXIBLE FLIGHTS (GLOBAL COLLABORATIVE ATM)

- **FRTO** Free Routing
- **NOPS** Network Operational Planning
- **ASUR** Initial Capability for Ground Surveillance
- **ASEP** Airborne Separation
- **OPFL** Optimum Flight Levels
- **ACAS** Airborne Collision Avoidance Systems
- **SNET** Safety Nets

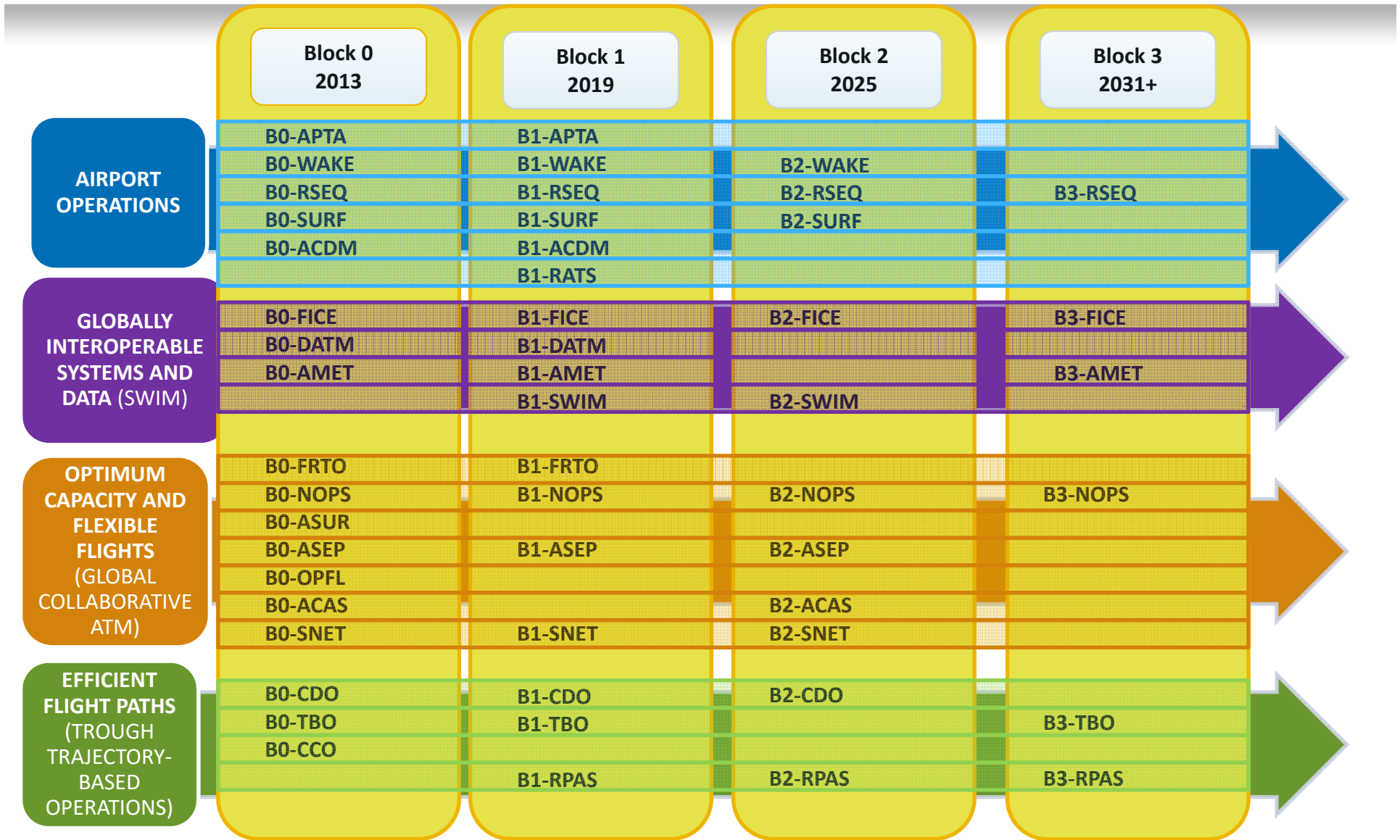


EFFICIENT FLIGHT PATHS (TROUGH TRAJECTORY-BASED OPERATIONS)

- **CDO** Continuous Descent Operations
- **TBO** Trajectory-based Operations
- **CCO** Continuous Climb Operations
- **RPAS** Integration of Remotely Piloted Aircraft

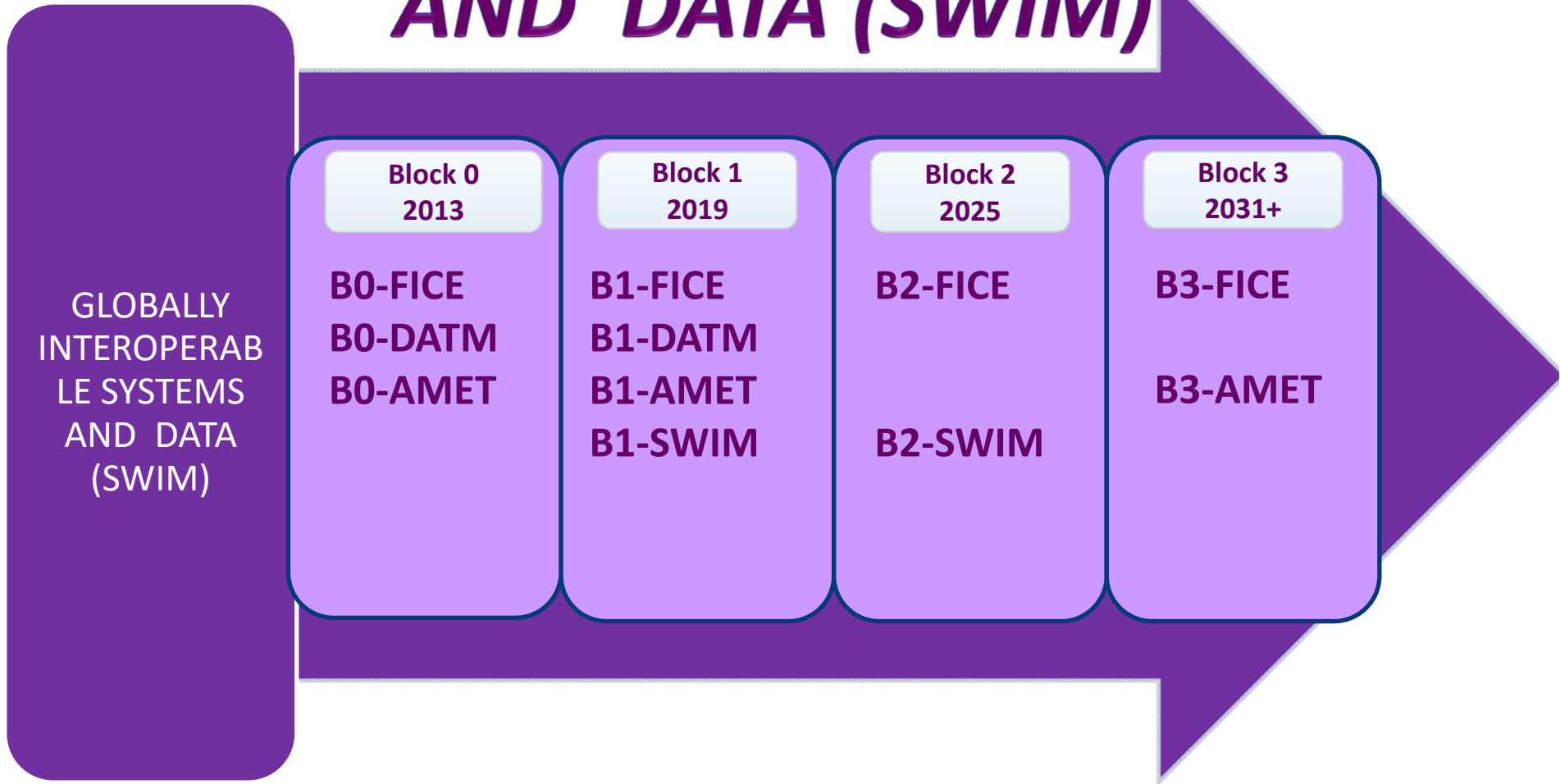


ASBUs FRAMEWORK





GLOBALLY INTEROPERABLE SYSTEMS AND DATA (SWIM)





Block 0 and Block 1

FICE

B0-FICE

Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration

Supports the coordination of ground-ground data communication between

ATSUs, based on ATS Inter-facility Data Communication (AIDC).

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 used.

- New Flight Information Mechanism



Block 2 and Block 3

FICE

B2-FICE: Improved Coordination through multi-operations.
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 multi-centre
operations using flight object implementation and
interoperability (IOP) standards.

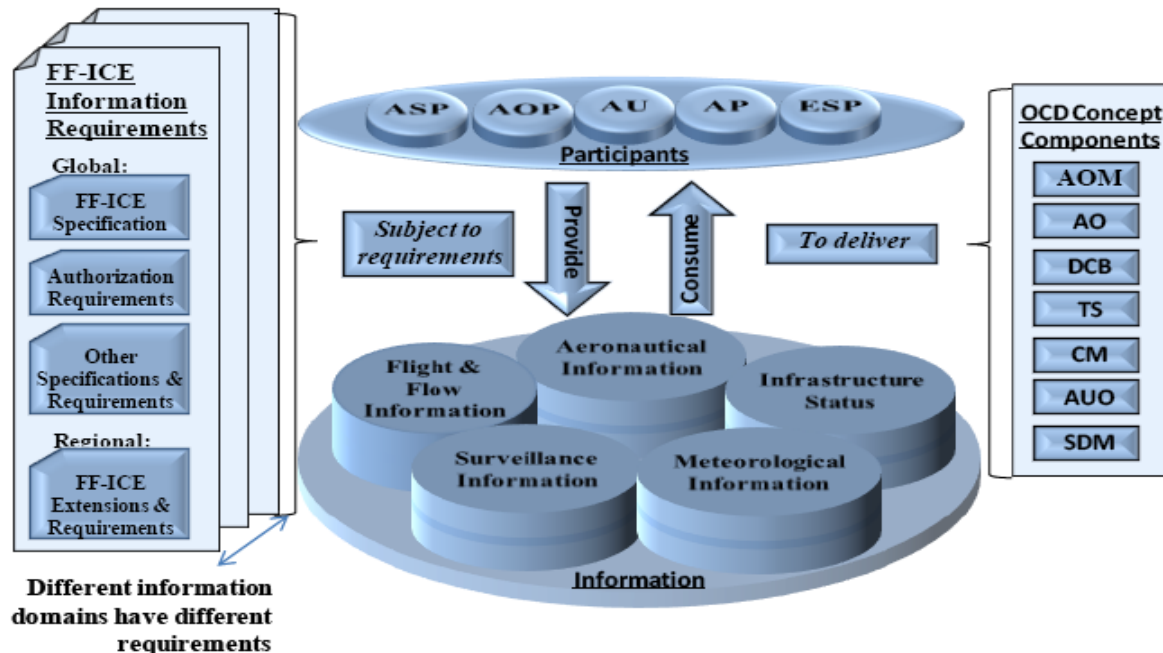
Extension of use of FF-ICE after departure supporting
trajectory-based operations

**B3-FICE Improved Operational Performance
through the introduction of Full FF-ICE**

Data for all relevant flights systematically shared
between the air and ground systems using SWIM in
support of collaborative ATM and trajectory-based

FF-ICE

- 2004 – ICAO Started developing future flight plan concept of ‘information for a collaborative environment’.





FLIGHT PLANNING PROVISIONS LIMITATIONS

- **Sharing flight information**
- **Advance notification**
- **Inconsistent information**
- **Information distribution**
- **Information security**
- **Flexible information set.**



PRINCIPLES OF FF-ICE(1)

- **Flexible concept allowing new technologies & procedures to be incorporated as necessary**
- **Detailed indication of a/c performance capabilities**
- **Early indication of intent**
- **Information for increased & more automated CDM**
- **Avoidance of unnecessary limitations on information**



PRINCIPLES OF FF-ICE (2)

- **Support for 4D trajectory management**
- **Avoidance of filing unnecessary/ambiguous info**
- **Provision of info security requirements**
- **Consideration of cost impact**
- **Ensures information is machine readable**
- **Globally standardised definitions of information elements.**



INFORMATION ELEMENTS

- **Flight identifying information**
- **Flight SAR information**
- **Flight permission information**
- **Flight preferences and constraints information**
- **Trajectory type**
- **Surface segment type**
- **Airborne element type**
- **Performance information**
- **Aircraft intent**
- **Flight trajectory information**



MIGRATING OF FPL ELEMENTS TO FF-ICE ELEMENTS

FPL Item	FPL data	Flight identification	Registration markings	Aircraft operator	Type of flight	Formation characteristics	Type of aircraft	24-bit aircraft address	Performance-based wake	Performance-based communications	Performance-based navigation	Performance-based surveillance	Flight status	Endurance	Persons on board	Emergency and survival equipment	Pilot-in-command	Flight rules	Departure aerodrome	Destination aerodrome	Alternate aerodrome	Included in a grid 4D trajectory	Overall performance	FF-ICE originator	Remarks
7	Aircraft identification	x																							
7	Registration marking		x																						
8	Flight rules																	x							
8	Type of flight				x																				
9	Number of aircraft					x																			
9	Type of aircraft						x																		
9	Wake turbulence category							x																	
10	Radio communication, navigation, approach aid equipment and capabilities								x	x															
10	Surveillance equipment and capabilities										x														
13	Departure aerodrome																		x						
13	Departure time																						x		
15	Cruising level																						x		
15	Cruising speed																						x		
15	Route																						x		
16	Alternate aerodrome																				x				
16	Destination aerodrome																			x					
16	Elapsed time																						x		
18	ALTN/																								
18	CODE/							x																	
18	COM/									x															
18	DAT/									x															
18	DEP/																		x						
18	DEST/																			x					
18	DLE/																						x		
18	DOF/																						x		



INFORMATION ELEMENT DESCRIPTION

<i>Nombre del campo</i>	<i>Descripción del campo</i>	<i>Observaciones</i>	<i>Requisitos del sistema ATM</i>
Dirección de 24 bits de la aeronave	Este campo incluye la dirección de 24 bits de la aeronave.		R7, R11
Información del explotador de aeronaves	Actualmente OPR/ Nombre e información de contacto del explotador de la aeronave. También debería ser posible incluir número de teléfono, fax y dirección de correo-e.	No es necesario que sea la misma información que la del piloto al mando.	R131, R162
Identificación del vuelo	Designador de la OACI para la organización que explota la aeronave seguido del número de identificación del vuelo o la matrícula de la aeronave.	Identifica el vuelo en fichas de vuelo, listas de presentación, bloques de datos. Se usa en comunicaciones con la aeronave.	R7, R11
Originador FF-ICE	Nombre e información de contacto del originador de la información de vuelo.		R131, R162
Identificador único de vuelo a escala mundial (GUF1)	Este campo especifica una referencia única mundial para el vuelo, permitiendo que todos los miembros calificados de la comunidad ATM se refieran sin ambigüedades a la información pertinente a un vuelo.		
Código en Modo A	Este campo especifica una referencia local única para el vuelo en la forma de un código de 4 dígitos en octal. Esta información puede usarse para correlacionar los datos de vigilancia con la información de vuelo.		
Marca de matrícula	Marca de matrícula de la aeronave.		



TECHNICAL ENVIRONMENT

- **Data model**
- **System Wide Information Management (SWIM)**
- **Supporting infrastructure**



INFRASTRUCTURE

- **Communication network**
- **Safety and security features**
- **Data exchange formats – will use XML**



EXAMPLE TIMELINE FOR INFO PROVISION

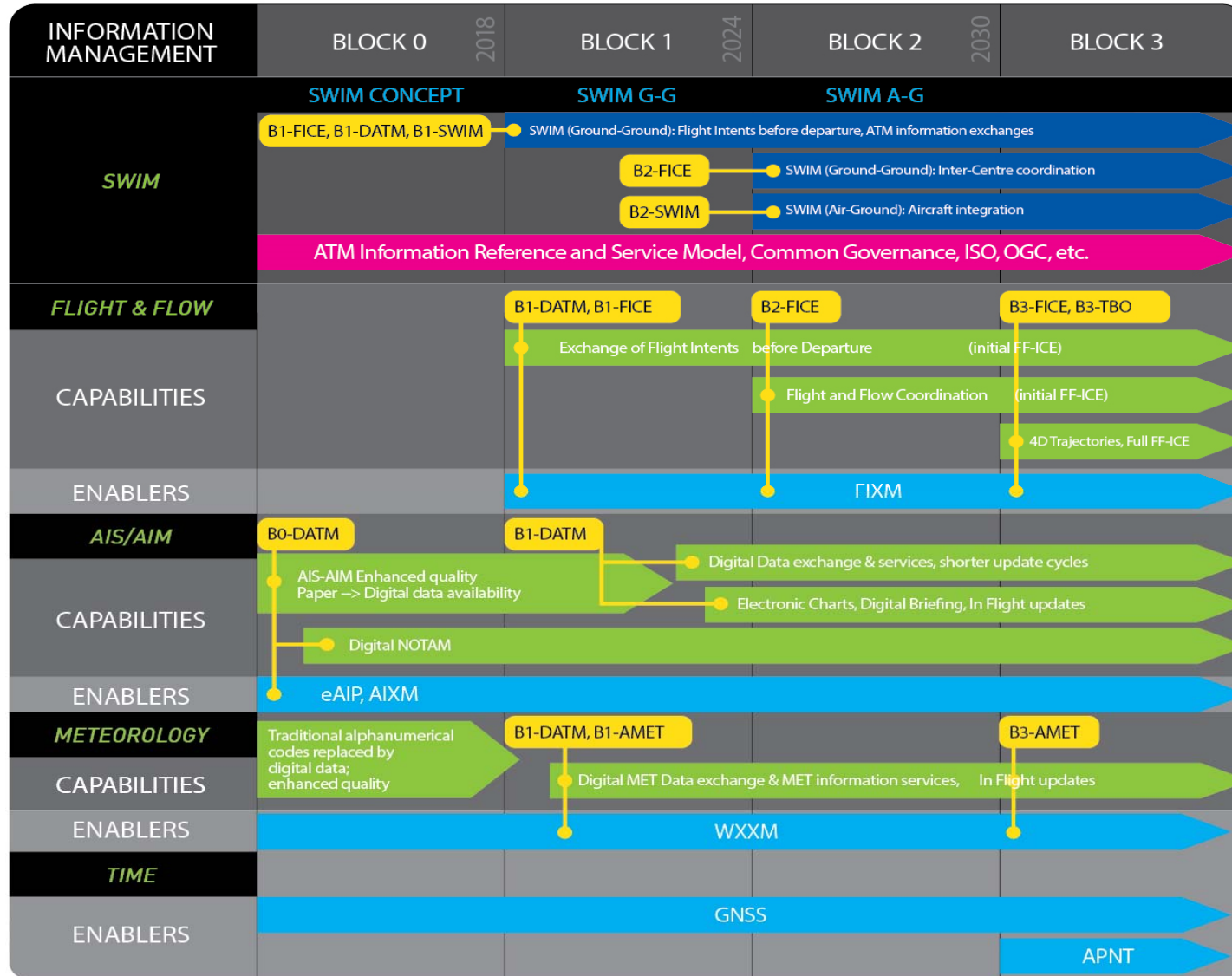
- **Scheduling and strategic activities**
- **Pre-tactical operational planning**
- **Tactical operational planning**
- **Flight operation**



TRANSITION & IMPLEMENTATION

- **Operator flight planning systems - will require changes to extract and process info to facilitate the collaborative process**
- **ASP and AOP systems – modifications to implementing systems to facilitate interaction**
- **Documentation & training – changes to procedures & systems will necessitate new documentation & training.**

INFORMATION MANAGEMENT





BENEFITS

- ***Cost Effectiveness*** - Standard information will reduce cost of system development
- ***Efficiency*** - Better knowledge of trajectory information will allow more optimum flight profile
- ***Global Interoperability*** – Global interoperability is facilitated by easier connection of all stakeholders



Benefits

- ***Participation by the ATM community*** - Participation of all stakeholders is facilitated through real-time data sharing
- ***Predictability*** - The sharing of information between aircraft and ground systems will enhance the predictability
- ***Safety*** - System wide data sharing will allow early detection of inconsistencies and updated information which will improve situation awareness..



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