Aviation System Block Upgrade (ASBU)

Fifth Meeting of the North American, Central American and Caribbean Working Group (NACC/WG) Airspace Optimization Task Force, Seventh Meeting of the Air Traffic Flow Management Implementation Task Force and Ninth Meeting of the CANSO IATA ICAO Free Route Airspace Team (AO/TF/5/ATFM/TF/7/CIIFRA/9)
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Aviation System Block Upgrade (ASBU)

✈ ICAO's ASBU methodology is a flexible, programmatic global approach that allows all Member States to enhance their air navigation capabilities according to their specific operational requirements.

ASBU CONDUCTOR THREAD

INFORMATION

✈ *AMET: Meteorological information*

✈ *DAIM: Digital aeronautical information management.*

✈ *FICE: Flight information and flow for a collaborative environment*

✈ *(FF-ICE). SWIM: System-wide information management.*

TECHNOLOGY

✈ *ASUR: Surveillance system*

✈ *COMI: Communication infrastructure*

✈ *COMS: ATS Communication Service*

✈ *NAVS: Navigation system*

OPERATIONAL

✈ *ACAS: On-board Collision Avoidance System (ACAS)*

✈ *ACDM: Collaborative Decision Making with the Airport*

✈ *APTA: Improve Arrival and Departure Operations*

✈ *CSEP: Cooperative Separation DATS: Digital Aerodrome Air Traffic Services*

✈ *FRTO: Improved operations through enhanced en-route trajectories.*

✈ *GADS: Global Aeronautical Distress and Safety System (GADSS)*

✈ *NOPS: Network Operations*

✈ *OPFL: Improved access to optimal flight levels in oceanic and remote airspace.*

✈ *RSEQ: Improving traffic flow through runway sequencing*

✈ *SNET: Safety Nets on the Ground*

✈ *SURF: Surface operations*

✈ *TBO: Trajectory Based Operations*

✈ *WAKE: Wake Turbulence Separation*

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OPERATIONAL

INFORMATION
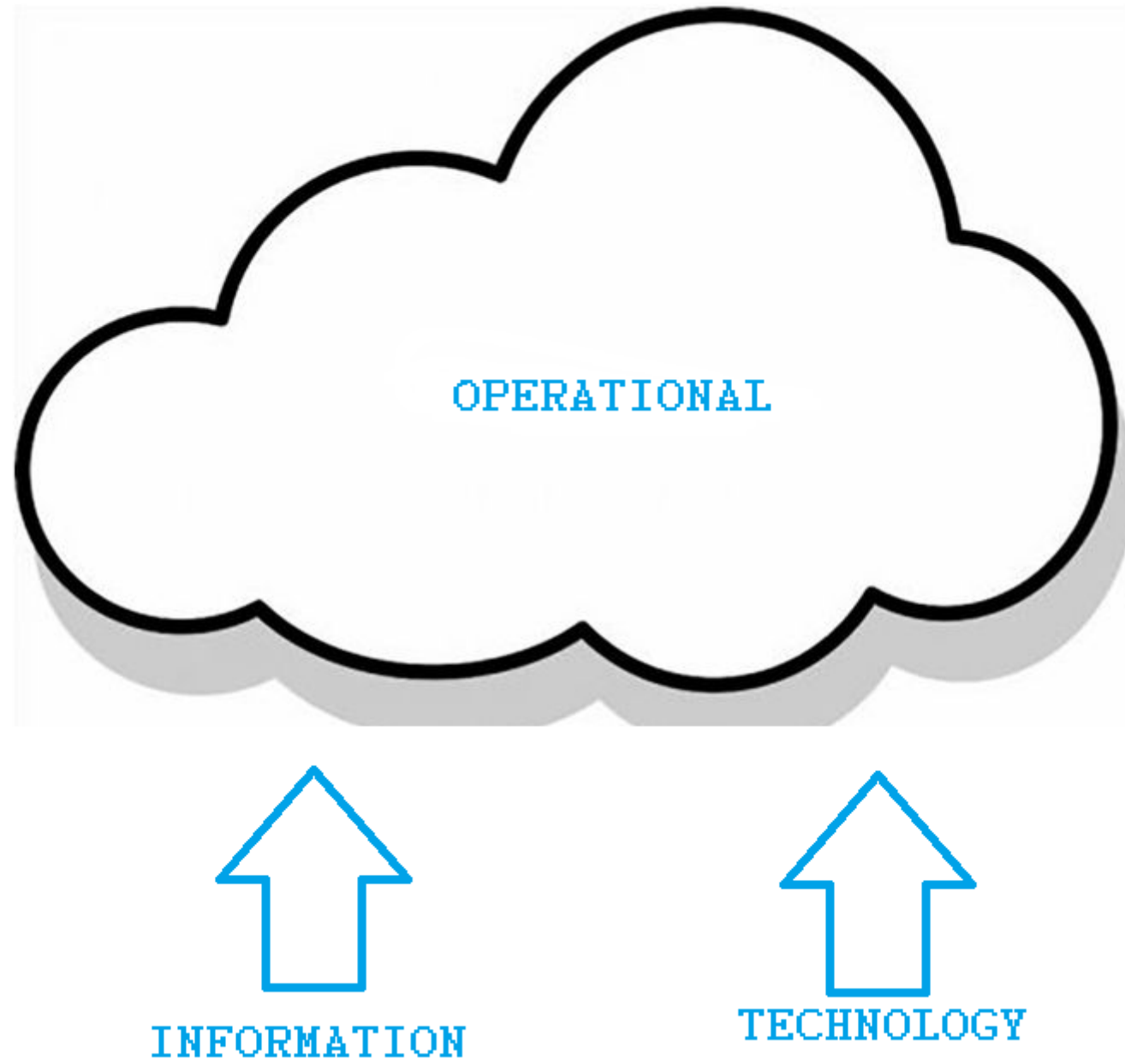
TECHNOLOGY

¿WHY?

The implementation of the ASBU elements is not mandatory; each implementation is intended to satisfy an operational need or fill a gap.

It is up to the operational teams to define the operational objectives and the technological and information enablers to support the implementation.

Aviation System Block Upgrade (ASBU)

✈ ***The ASBU Elements have different levels of maturity:***

✈ *Ready for implementation: this maturity level focuses on the end of system development and initial worldwide operational capability.*

✈ *Standardization: this maturity level focuses on the definition of the necessary provisions for system interoperability and harmonization of procedures.*

✈ *Validation: this maturity level focuses on industrial research and validation and includes proof-of-concept validation, stand-alone prototype implementation and testing, testing and prototyping in a representative environment, and full engineering feasibility demonstration in real system application.*

✈ *Concept: This maturity level focuses on exploratory research and includes scientific investigation, investigation of basic principles observed and reported, and concept definition.*

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ENABLES

CATEGORIES:

✈ *Regulatory provisions, regulations.*

✈ *Operating procedures*

✈ *Onboard systems capability (avionics)*

✈ *Ground infrastructure*

✈ *Training*

✈ *Operational*

✈ *Authorization*

✈ *Other*

ENABLE TYPE:

✈ *National regulatory framework.*

✈ *Information exchange*

✈ *Aircraft on-board systems*

✈ *Ground infrastructure*

✈ *Training*

✈ *Certification*

✈ *Other*

Operational ASBU Elements
ACDM (Airport Collaborative Decision Making)

1. ACDM-B0/1

Airport CDM Information Sharing (ACIS) Operational

PLANNING LAYERS ❓

Pre-tactical | Tactical-Pre ops | Tactical-During ops

OPERATIONS ❓

Taxi-out | Departure | Arrival | Taxi-in | Turn-around

2. ACDM-B0/2

Integration with ATM Network function

Operational

PLANNING LAYERS ❓

Pre-tactical | Tactical-Pre ops | Tactical-During ops

OPERATIONS ❓

Taxi-out | Departure | Arrival | Taxi-in | Turn-around

DEPENDENCIES AND RELATIONS ❓

Type of Dependencies	ASBU Element
Relation-operational need	RSEQ-B0/1 - Arrival Management
Relation-operational need	RSEQ-B0/2 - Departure Management
Relation-benefit	SURF-B0/2 - Comprehensive situational awareness of surface operations
Relation-benefit	FICE-B0/1 - Automated basic inter facility data exchange (AIDC)
Relation-operational need	NOPS-B0/4 - Initial Airport/ATFM slots and A-CDM Network Interface

Enables:
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APTA (Airport Accessibility)

1. APTA-B0/1 `Arrival`

PBN Approaches (with basic capabilities)

Operational

2. APTA-B0/2 `Departure` `Arrival`

PBN SID and STAR procedures (with basic capabilities)

Operational

3. APTA-B0/3 `Arrival`

SBAS/GBAS CAT I precision approach procedures

Operational

4. APTA-B0/4 `Arrival`

CDO (Basic)

Operational

5. APTA-B0/5 `Departure`

CCO (Basic)

Operational

6. APTA-B0/6 `Departure` `Arrival`

PBN Helicopter Point in Space (PinS) Operations

Operational

7. APTA-B0/7 `Arrival`

Performance based aerodrome operating minima – Advanced aircraft

Operational

8. APTA-B0/8 `Arrival`

Performance based aerodrome operating minima – Basic aircraft

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Operational ASBU Elements
APTA (Airport Accessibility)

Enablers within the ASBU elements:

- **Informative: Meteorological Data**

- **Technology: Air navigation ground systems**

Other enablers specific to the elements:

- **Operational Procedures**

- **Training**

- **Avionics on board.**

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Operational ASBU Elements
CSEP (Cooperative Separation)

CSEP-B1/1
Basic airborne situational awareness during flight operations (AIRB)
Operational

CSEP-B1/2
Visual Separation on Approach (VSA)
Operational

Considerations

2. Does it imply processing of new information by the user? Yes

3. Does it

4. Does it

The look-ahead horizon for which the element is applicable (is used and/or delivers benefits). The following options are possible:
- ATM planning: years in advance/before operations
- Strategical: seasonal, months in advance/before operations
- Pre-tactical: up to the day before operations
- Tactical: on the day of operations
  - In case of flight phases (air navigation perspective), then
    - Pre-operations is the period before off-blocks
    - During operations is the period after off-blocks
  - In case of turnaround (airport operations perspective), then
    - Pre-operation is the period before in-blocks
    - During operations is the period after in-blocks
- Post-operations

PLANNING LAYERS ❓

Tactical-During ops

DEPENDENCIES AND R

Type of Dependencies

OPERATIONS ❓ All phases **directly** affected by the element.

Departure   En-route   Arrival

Operational ASBU Elements
FRTO (Improved operations through enhanced en-route trajectories)

FRTO-B0/1

Direct routing (DCT)

Operational

FRTO-B0/2

Airspace planning and Flexible Use of Airspace (FUA)

Operational

FRTO-B0/3

Pre-validated and coordinated ATS routes to support flight and flow

Operational

FRTO-B0/4

Basic conflict detection and conformance monitoring

Operational

PLANNING LAYERS ❓

| ATM planning | Strategical | Pre-tactical | Tactical-Pre ops |

Tactical-During ops

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Enablers within the ASBU elements:

• **Informative: Meteorological Data**

• **Technology: Air navigation ground systems**

Other enablers specific to the elements:

• **Operational Procedures**

• **Training**

• **Avionics on board.**

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Operational ASBU Elements
OPFL (Improved access to optimum flight levels in oceanic and remote airspace)

OPFL-B0/1

In Trail Procedure (ITP)

Operational

OPFL-B2/1

Separation minima using ATS surveillance systems where VHF voice communications are not available

Operational

RSEQ (Improved traffic flow through runway sequencing)

RSEQ-B0/1

Arrival Management

Operational

RSEQ-B0/2

Departure Management

Operational

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Operational ASBU Elements

SNET (Ground-based Safety Nets)

SURF (Surface operations)

SNET-B0/1
Short Term Conflict Alert (STCA)
Operational

SNET-B0/2
Minimum Safe Altitude Warning (MSAW)
Operational

SNET-B0/3
Area Proximity Warning (APW)
Operational

SNET-B0/4
Approach Path Monitoring (APM)
Operational

| B0	B1
SURF-B0/1 Basic ATCO tools to manage traffic during ground operations Operational	
SURF-B0/2 Comprehensive situational awareness of surface operations Operational	SURF-B1/2 Comprehensive pilot situational awareness on the airport surface Operational
SURF-B0/3 Initial ATCO alerting service for surface operations Operational	

TBO (Trajectory-based operations)

TBO-B0/1
Introduction of time-based management within a flow centric approach.
Operational

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Recommendations

1. Analysis of ASBU elements
2. Analysis of available enablers
3. Analysis of required enablers
4. Planning
5. **Objectives**
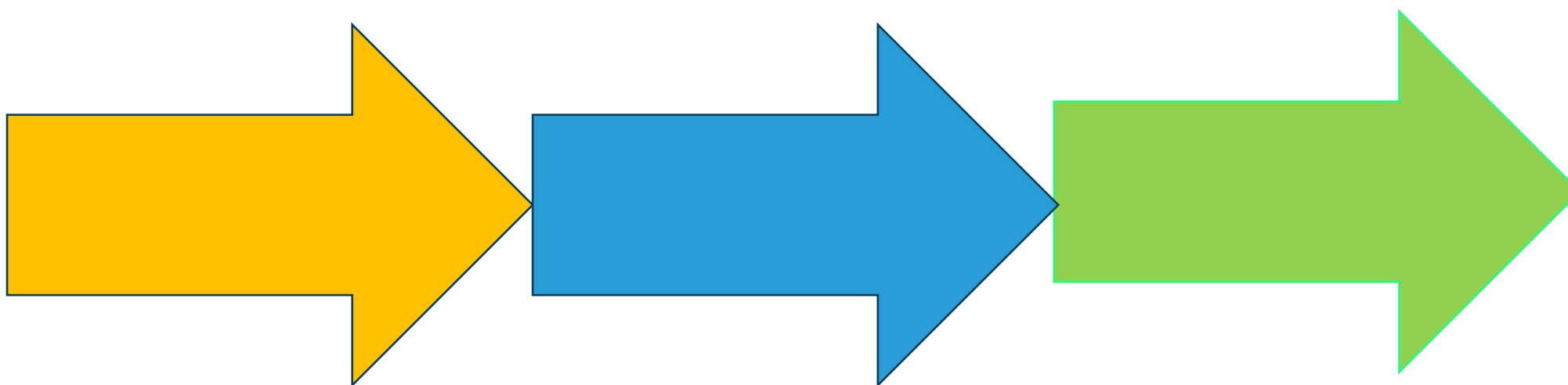
¿What can we do at this point?
Data!

What can we do in the short term?
Data!

What can we do in the long term?
Data!

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Gracias!