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ASBU Block 0 Threads- An analysis

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Dakar, Senegal, September 2017

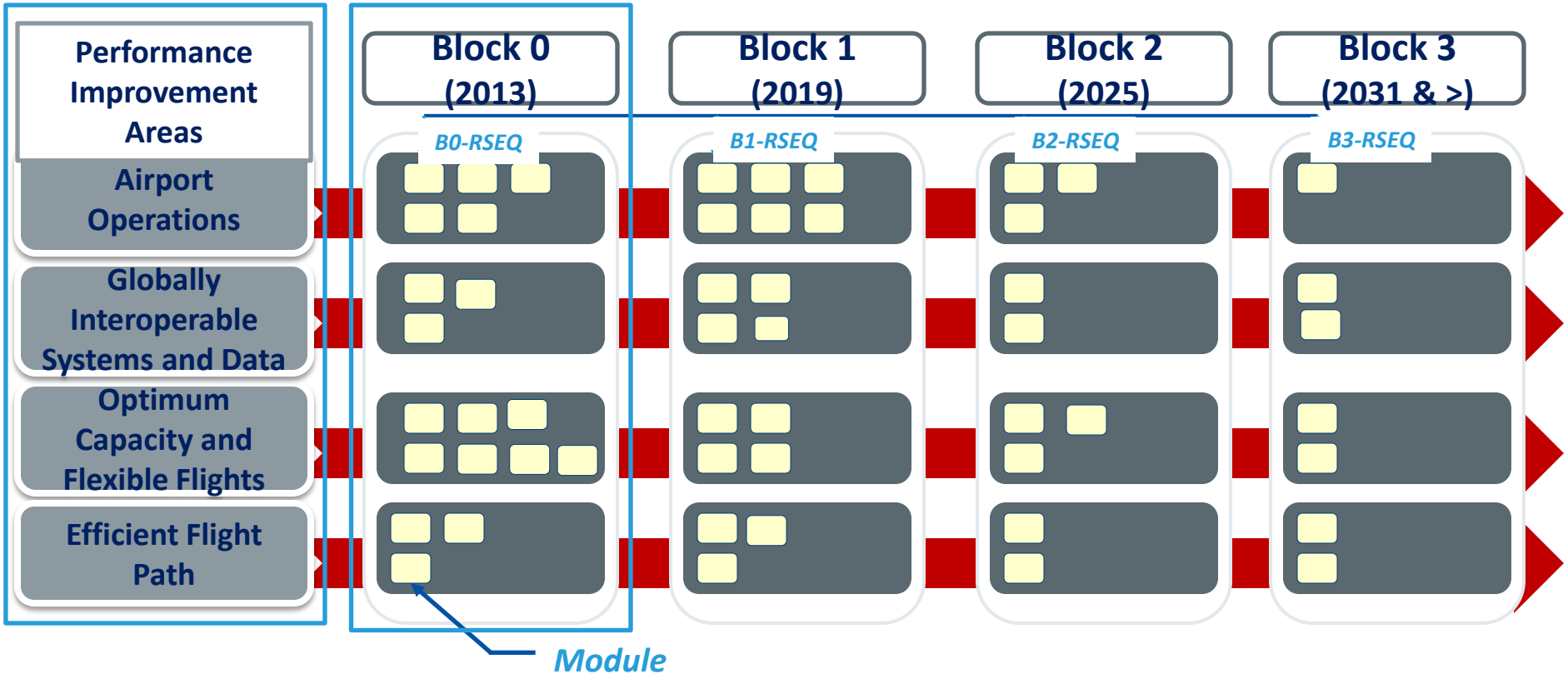
Objective

To show the Block 0 threads and some elements available for implementation as part of the ASBU framework.

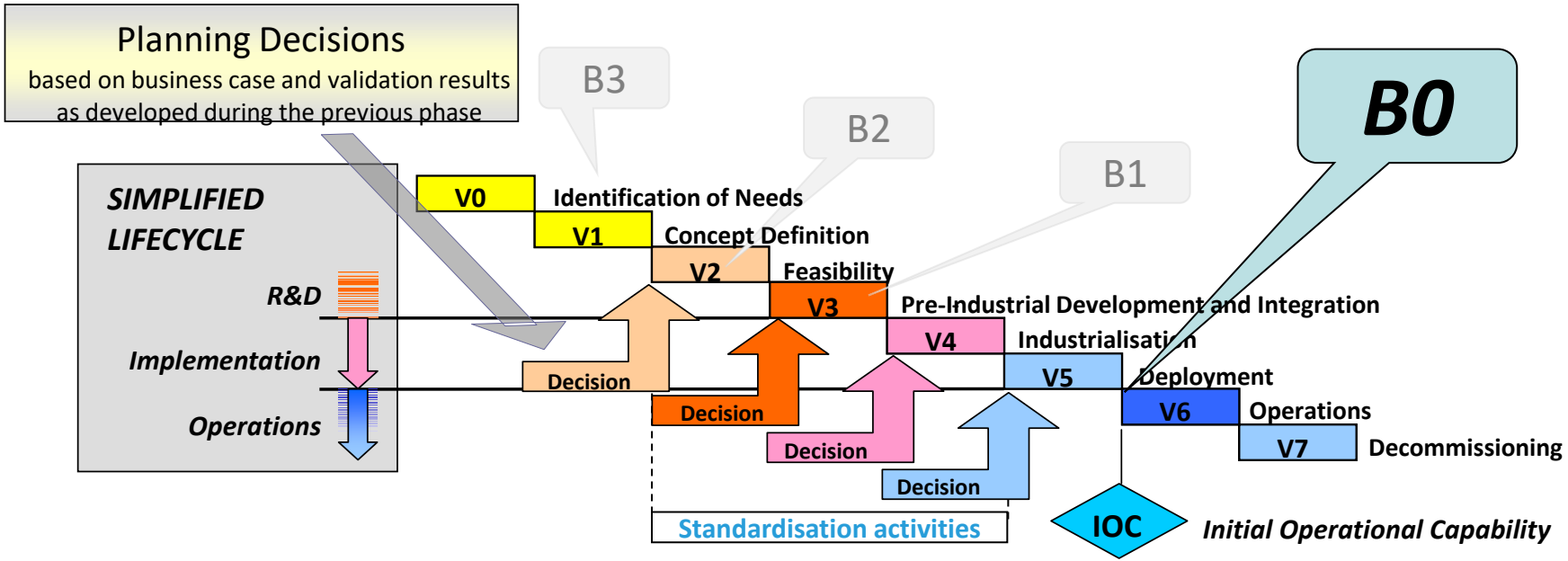
Flight plan

- Block understanding
- Block maturity cycle
- Block 0 perspective
- Block 0 threads
- Block 0 implementation

Understanding the Relationships

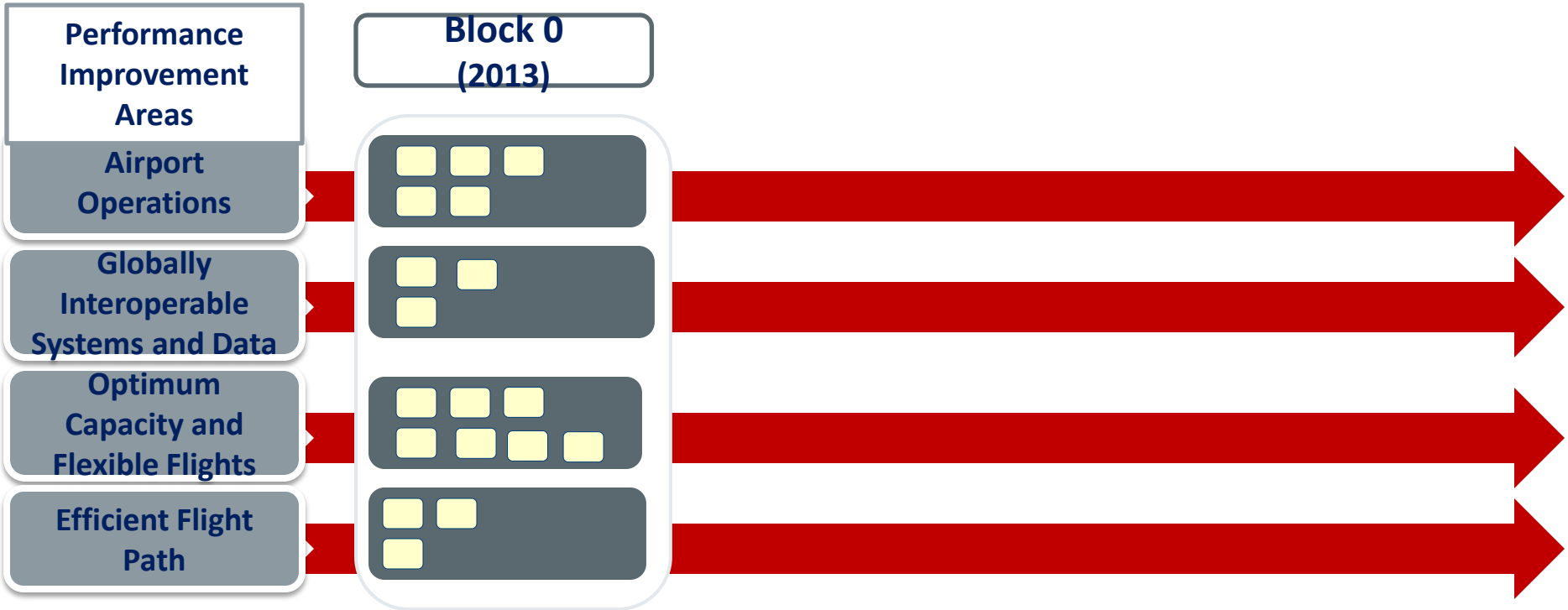


Block Maturity Lifecycle



B0: Capabilities available in 2013

Focus on Block 0



Global Readiness Checklist		Status (ready or date)
	Standards Readiness	√
	Avionics Availability	√
	Infrastructure Availability	√
	Ground Automation Availability	√
	Procedures Available	√
	Operations Approvals	√

- Each element is evaluated for its readiness
- If any enabler to the implementation of the element was not found to be ready it was placed in a future Block

All Block 0 Elements Have Met the Readiness Criteria

Block 0

- 4 Main Performance improvement areas
  - Airport operations (5 threads)
    - ACDM, APTA, RSEQ, SURF, WAKE
  - Globally interoperable systems & data (3 threads)
    - AMET, DATM, FICE

Block 0

- 4 Main Performance improvement areas
  - Optimum capacity & flexible flights (7 threads)
    - ACAS, ASEP, ASUR, FRTO, NOPS, OPFL, SNET
  - Efficient flight path (3 threads)
    - CCO*, CDO*, TBO

Block 0

- Block 0 is the first set of operational improvements that the aviation community delivered in 2013 to modernize and improve the performance of the air navigation system.

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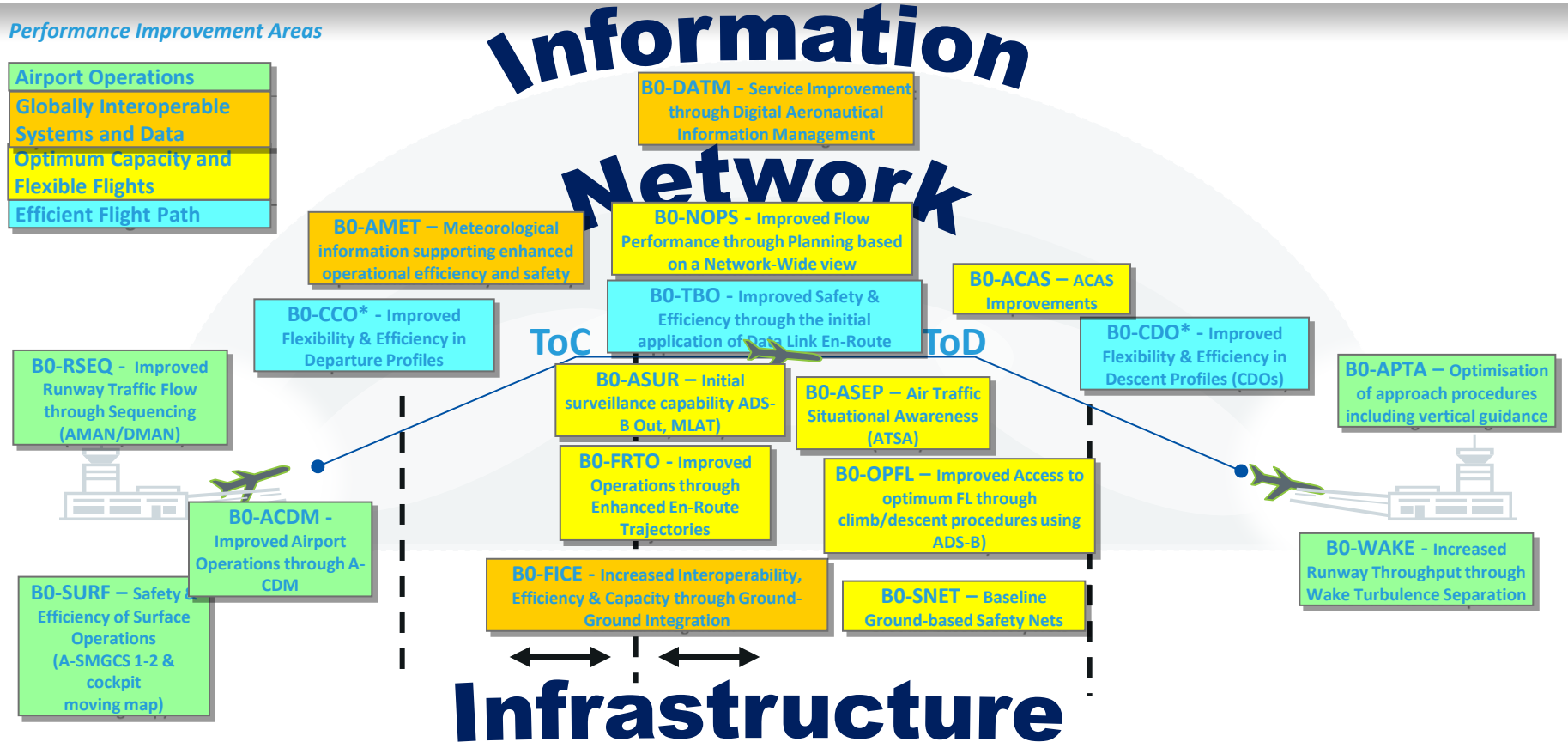
Block 0 in Perspective



Airport Operations (PIA 1)

B0-RSEQ
Improved Runway Traffic Flow through Sequencing (AMAN/DMAN)
Time-based metering to sequence departing and arriving flights.

Elements: AMAN, DMAN, Point merge

KPAs: Capacity, Efficiency, Environment, Predictability, Flexibility

B0-SURF
Improved Runway Safety and Efficiency(A-SMGCS)
Airport surface surveillance.

Elements: Surveillance, Surveillance + Alerting, EVS

KPAs: Access and Equity, Capacity, Efficiency, Environment, Safety

B0-APTA Optimization of Approach Procedures including Vertical Guidance
The flexibility inherent in PBN design can be exploited.

Element: GNSS + Baro VNAV, GNSS + SBAS, GNSS + GBAS

KPAs: Access and Equity, Capacity, Efficiency, Environment, Safety

Airport Operations (PIA 1)

B0-ACDM

Improved Airport Operations through ACDM

Airport operational improvements through the way operational partners at airports work together.

Elements: Procedures, tools

KPAs: Capacity, Efficiency, Environment

B0-WAKE Increased Runway Throughput through Wake Turbulence Separation

Improved throughput on departure and arrival runways through the revision of current ICAO wake vortex separation minima and procedures (from 3 to 6 categories :re-categorization and CSPR).

Elements: Revision of the current ICAO wake turbulence separation minima, Increasing aerodrome arrival operational capacity (parallel operations), Increasing aerodrome departure operational capacity (parallel operations - WIDAO, WTMD)

KPAs: Capacity, Flexibility

Airport Operations (PIA 1)

The combined Block 0 Threads reduce fuel consumption and noise by increasing arrival, departure and surface movement efficiencies and improving information sharing.

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Globally Interoperable Systems and Data (PIA 2)

B0-FICE
Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration
Supports the coordination of ground-ground data communication between ATSU based on ATS Inter-facility Data Communication (**AIDC**) defined by ICAO Document 9694.

Elements: AIDC

KPAs: Capacity, Efficiency, Global Interoperability, Safety

B0-DATM
Service Improvement through Digital Aeronautical Information Management
Transition from product centric to data centric. 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.

Elements: AIS/AIM, AIXM, eAIP

KPAs: Cost-effectiveness, Environment, Global interoperability, Safety

Globally Interoperable Systems and Data (PIA 2)

B0-AMET

Meteorological information supporting enhanced operational efficiency and safety

This module includes meteorological information **supporting ATM decision** support such as WAFS, IAVW, TCAC, Aerodrome warnings, Wind shear and SIGMET. This module enables the reliable identification of applicable ATM solutions when meteorological conditions are impacting (observed) or expected to impact (forecast) aerodromes or airspace.

Elements: WAFS, IAVW, Tropical cyclone watch, Aerodrome warnings, Wind shear warnings and alerts, SIGMET and other operational meteorological (OPMET) information

KPAs: Capacity, Cost-effectiveness, Efficiency, Environment, Flexibility, Global interoperability, Participation by the ATM community, Predictability, Safety

Globally Interoperable Systems and Data (PIA 2)

In Block 0 we improve overall operations and continue to enable Collaborative Decision Making through improved inter-facilities communication using standard information formats and baseline Met Services.

Optimum Capacity and Flexible Flights (PIA 3)

B0-FRTO Improved Operations through Enhanced En-Route Trajectories

Implementation of performance-based navigation (PBN concept) and **flex tracking** to avoid significant weather and to offer greater fuel efficiency, flexible use of airspace (**FUA**) through special activity airspace allocation, airspace planning and time-based metering, and collaborative decision-making (**CDM**) for en-route airspace with increased information exchange among ATM stakeholders.

Elements: Airspace planning, Flexible use of airspace (FUA), Flexible routing (ADS, CPDLC)

KPAs: Access & Equity, Capacity, Efficiency, Environment, Flexibility, Predictability

B0-NOPS Improved Flow Performance through Planning based on a Network-Wide view

Collaborative ATFM **measure to regulate** peak flows involving departure slots, **managed rate** of entry into a given piece of airspace for traffic along a certain axis, requested time at a waypoint or an FIR/sector boundary along the flight.

Elements: Slots, ATFM

KPAs: Access & Equity, Capacity, Efficiency, Environment, Participation by the ATM community, Predictability

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Optimum Capacity and Flexible Flights (PIA 3)

B0-ASEP Air Traffic Situational Awareness (ATSA)

ATSA provides a cockpit display of a graphical depiction of traffic to assist the pilot in out-the-window visual acquisition of traffic: **AIRB** and **VSA**.

Elements: ATSA-AIRB (Enhanced Traffic Situational Awareness during Flight Operations), ATSA-VSA (Visual Separation on approach)

KPAs: Efficiency, Safety

B0-OPFL Improved access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B

The use of In Trail Procedure (**ITP**) facilitates en-route climb or descent to enable better use of optimal flight levels in environments where a lack of ATC surveillance and/or the large separation minima currently implemented is a limiting factor.

Elements: ITP, ADS-C/CDP

KPAs: Capacity, Efficiency, Environment, Flexibility, Safety

Optimum Capacity and Flexible Flights (PIA 3)

B0-ASUR Initial surveillance capability ADS-B Out, MLAT

Ground surveillance supported by **ADS-B OUT** and/or wide area **multilateration** systems will improve safety, search and rescue and capacity through separation reductions and position awareness.

Elements: ADS-B, Multilateration

KPAs: Capacity, Safety

B0-SNET Baseline Ground-based Safety Nets

To monitor the operational environment during airborne phases of flight, the alerts such as **Short Term Conflict Alert, Area Proximity Warnings and Minimum Safe Altitude Warnings** are proposed in this module. Ground-based safety nets make an essential contribution to safety and remain required as long as the operational concept remains human-centred.

Elements: Short-term conflict alert (STCA), Area proximity warning (APW), Minimum safe altitude warning (MSAW)

KPAs: Safety

Optimum Capacity and Flexible Flights (PIA 3)

B0-ACAS ACAS Improvements

This addresses short term improvements to the performance of the existing airborne collision avoidance systems (ACAS). Transition form ACAS II version 7.0 to 7.1. Mandatory by Annex 6 provisions.

New- by 1/1/2014 and all by 1/1/2017.

Elements: ACAS

KPAs: Safety, Efficiency

Optimum Capacity and Flexible Flights (PIA 3)

Through ground based safety nets combined with ground surveillance and the enroute procedures for optimization of separation B0 elements will support additional capacity, efficiency, flexibility and safety.

Efficient Flight Path (PIA 4)

B0-CDO*

Improved Flexibility and Efficiency in Descent Profiles (CDOs)

It is aircraft operating technique. CDO allows the aircraft to descend continuously from ToD with minimum engine thrust.

Elements: PBN, Procedures

KPAs: Efficiency, Environment, Predictability, Safety

Efficient Flight Path (PIA 4)

B0-CCO*

Improved Flexibility and Efficiency in Departure Profiles

Deployment of departure procedures that allow the aircraft to fly their optimum profile taking into account airspace and traffic complexity with continuous climb operations (CCOs).

Elements: PBN, Procedures

KPAs: Capacity, Efficiency, Environment, Safety

Efficient Flight Path (PIA 4)

B0-TBO

Improved Safety and Efficiency through the initial application of Data Link En-Route Implementation of an initial set of data link applications for surveillance and communications in ATC.

Elements: ADS-C, CPDLC

KPAs: Capacity, Safety, Efficiency

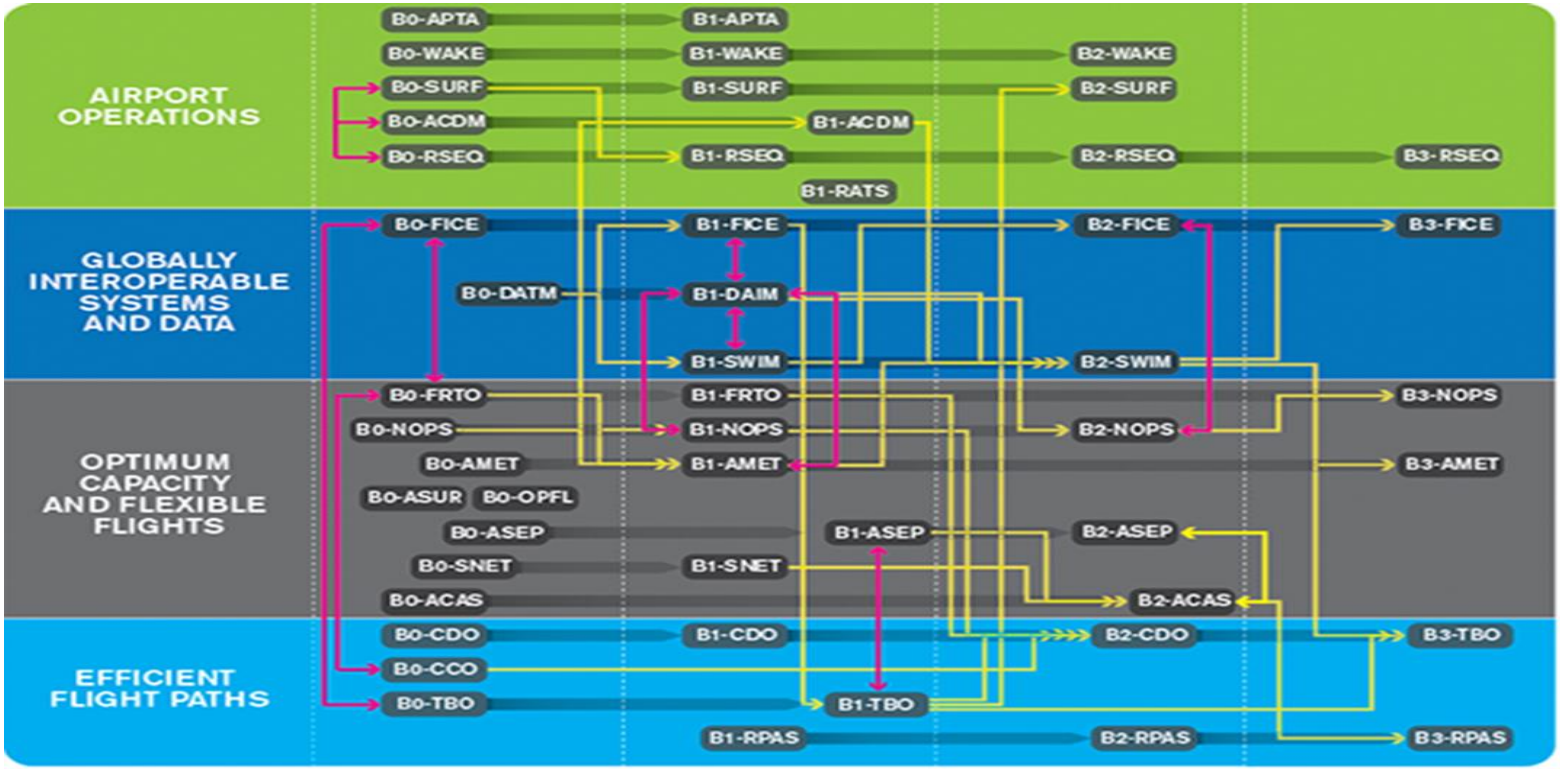
Efficient Flight Path (PIA 4)

The use of optimized profile for climbs and descents as well as an initial Data Link Capability helps to improve operational efficiency and safety.

Challenges - How to Get There?

- It is all about managing risk
- Block 0 risks are minimum
  - Global Readiness Checklist is complete
  - The elements are well understood and supported
- But risks do exist
  - States may not be capable of ensuring successful deployment of Block 0 elements
  - We must identify and resolve policies necessary to enable the future blocks now

Challenges - Dependencies



Implementation – The Time is Now

- The elements of Block 0 are ready for implementation today
  - Standards are ready
  - Avionics are ready
  - Procedures and Operational Approvals are in place
  - The Infrastructure is available
  - Ground Automation is ready

- Establishing the foundation for the future is now
- Care was taken to ensure that elements are well described and ready for implementation..

Flight plan

- Block understanding
- Block maturity cycle
- Block 0 perspective
- Block 0 threads
- Block 0 implementation

Objective

To show the Block 0 threads and some elements available for implementation as part of the ASBU framework.

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