



International Civil Aviation Organization

ASBU Methodology

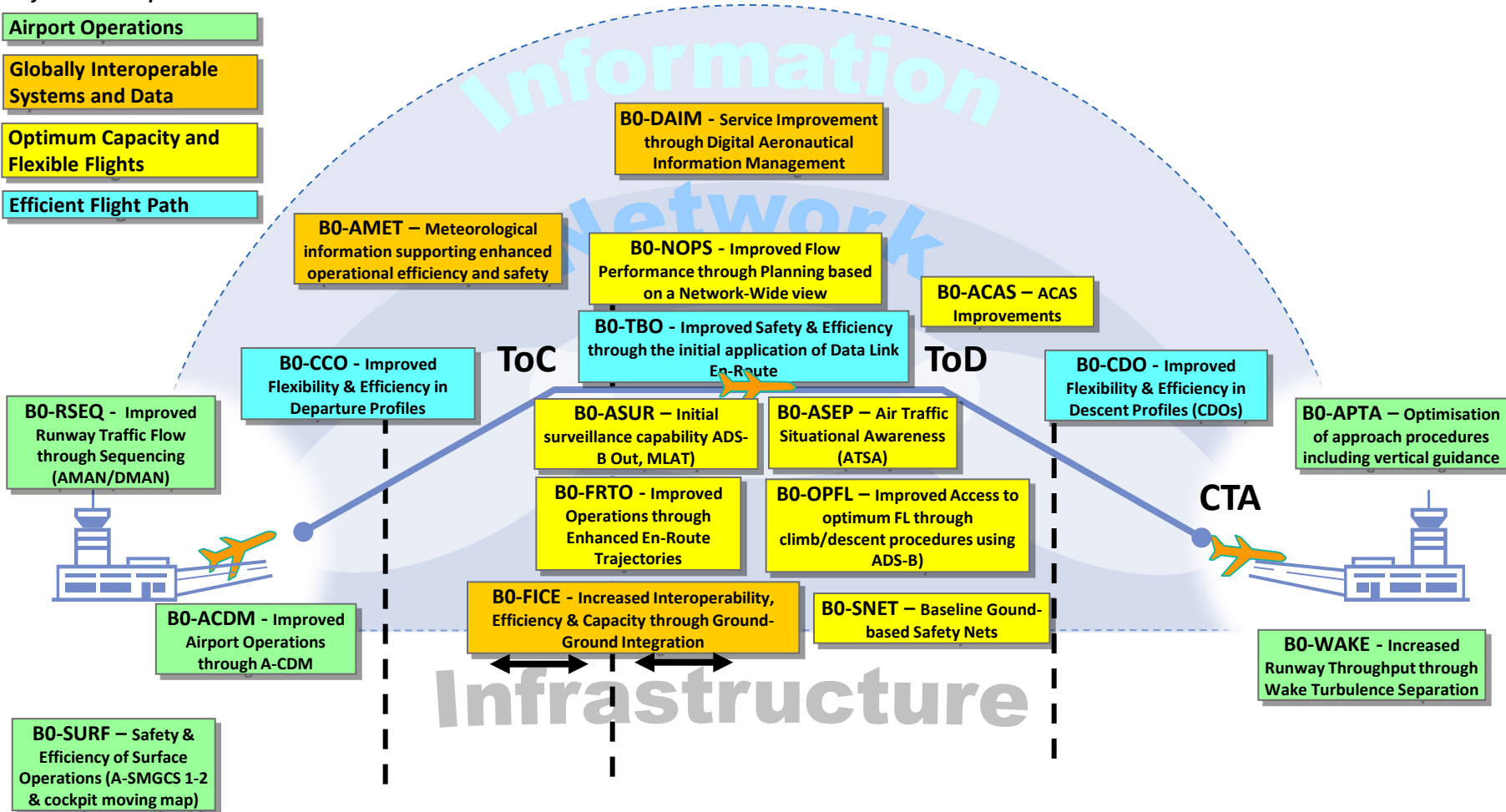
Summary of Block 0, 1, 2, 3 Modules

S M Machobane

Block 0 in Perspective

Performance Improvement Areas

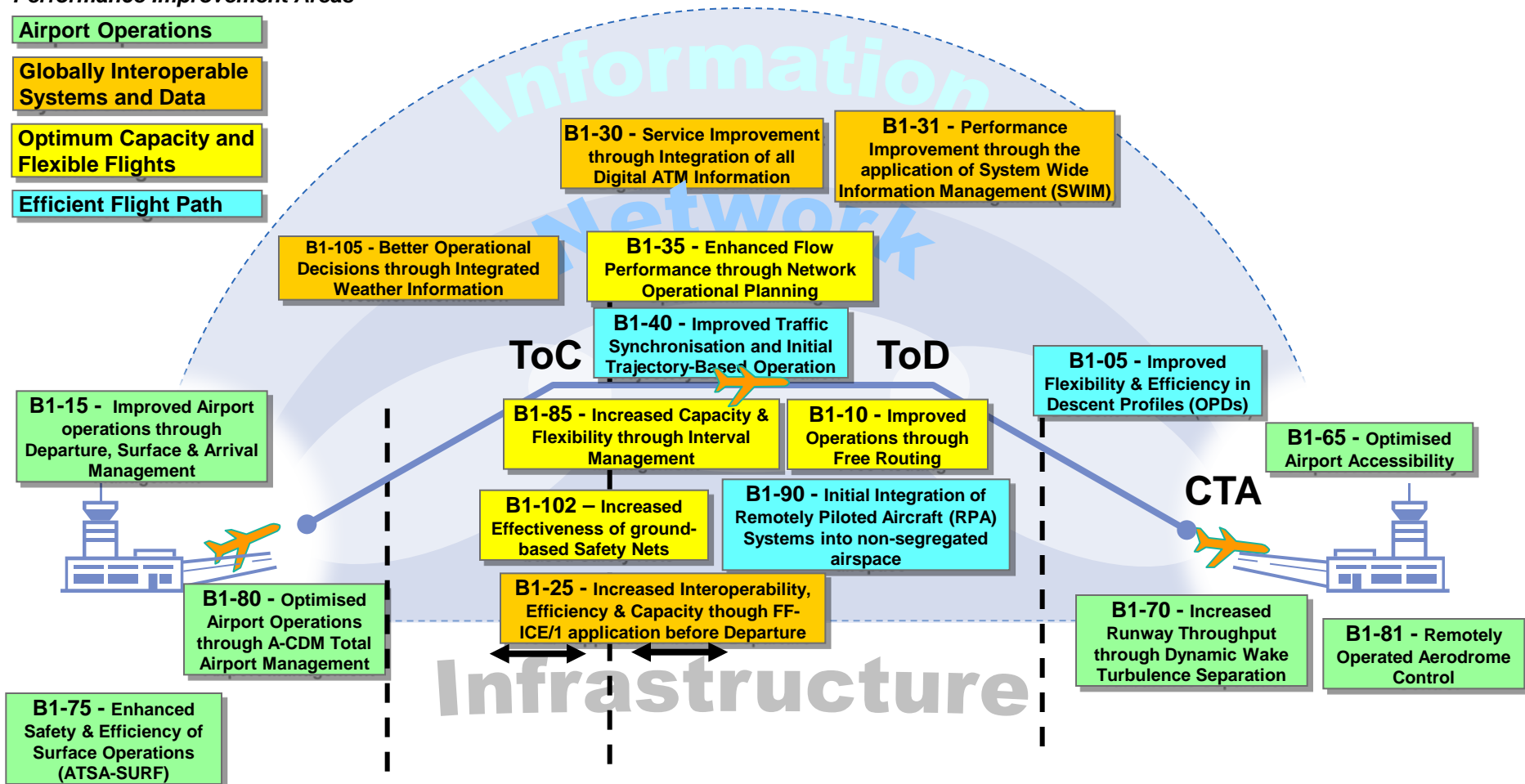
- Airport Operations**
- Globally Interoperable Systems and Data**
- Optimum Capacity and Flexible Flights**
- Efficient Flight Path**



Block 1 in Perspective

Performance Improvement Areas

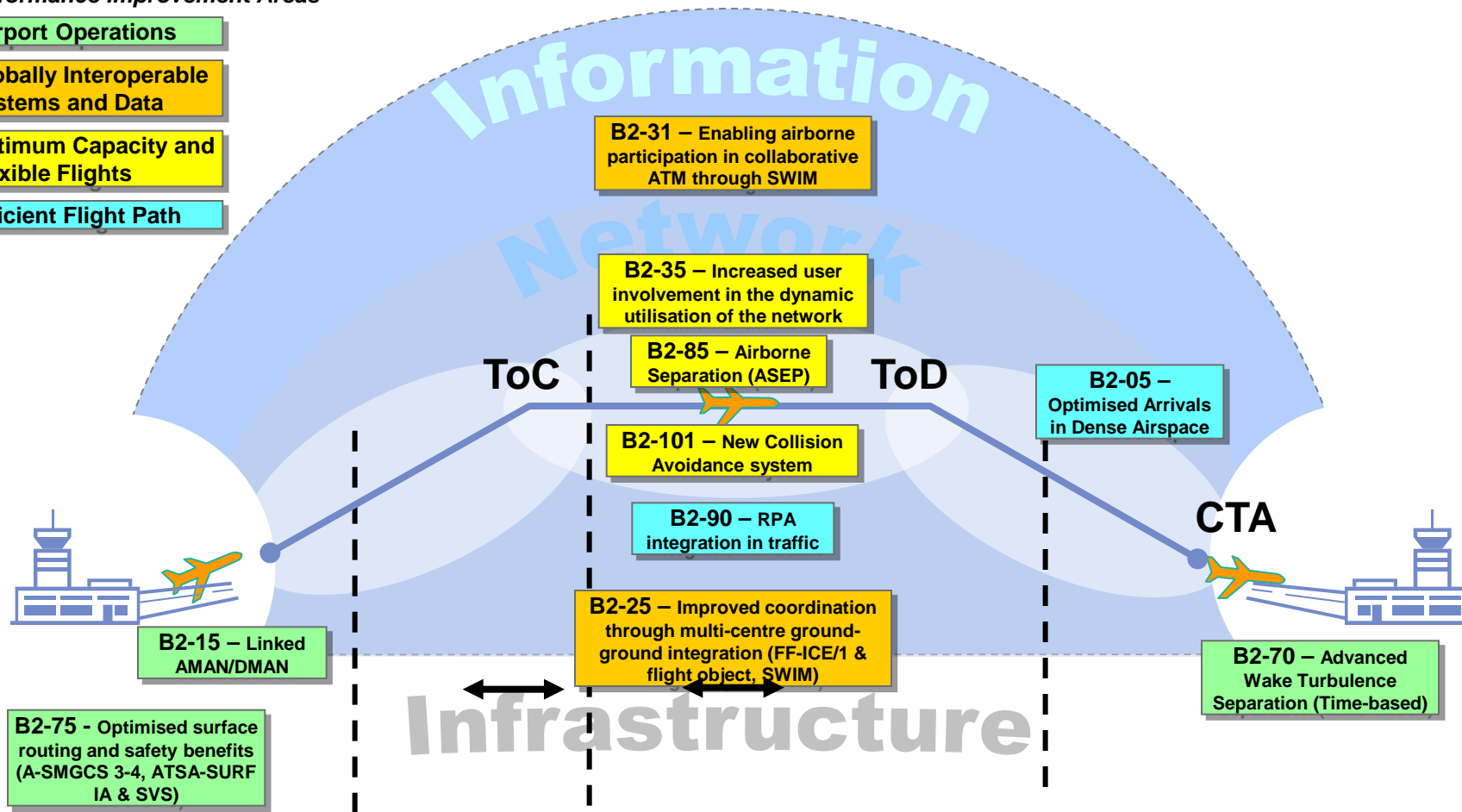
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Block 2 in Perspective

Performance Improvement Areas

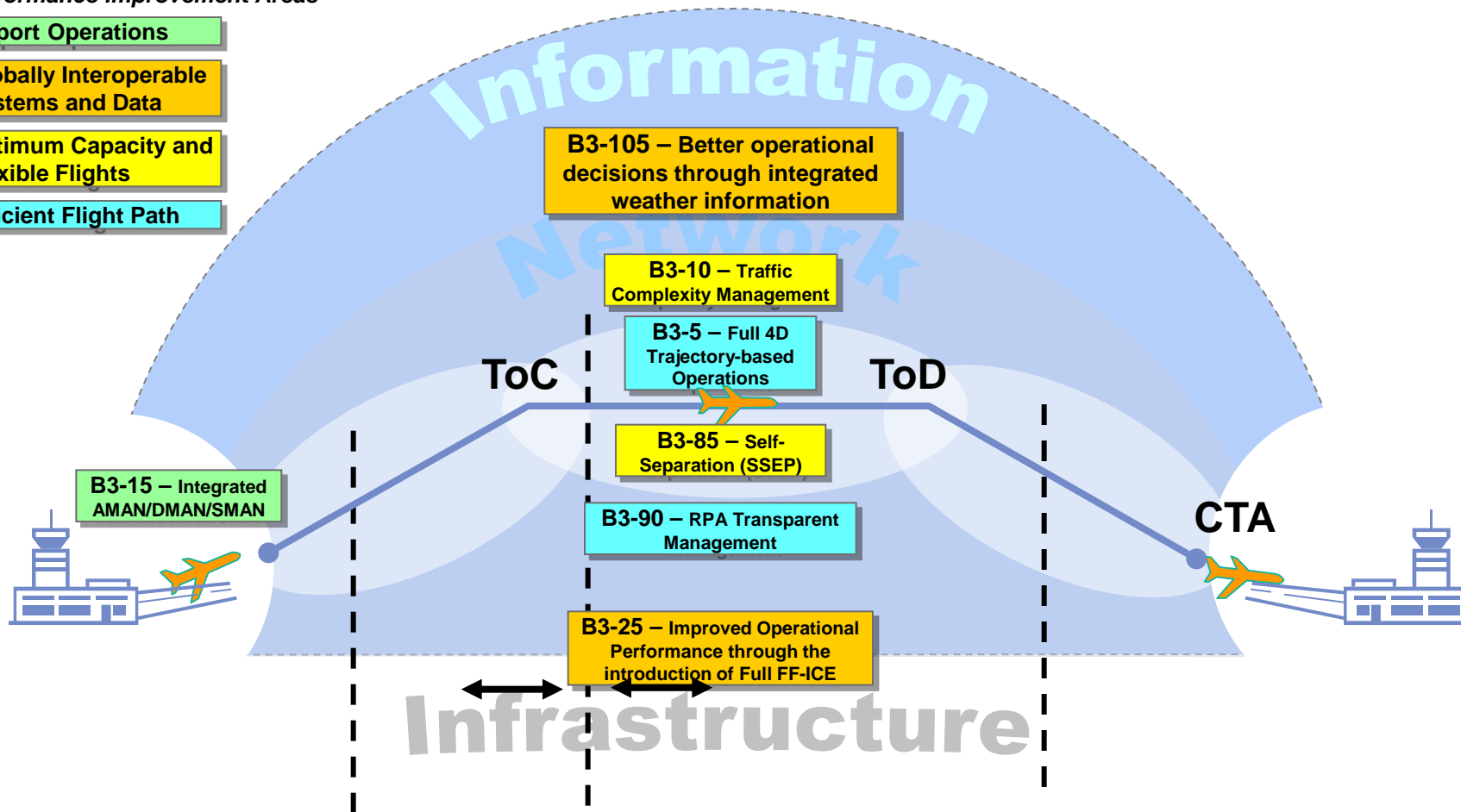
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Block 3 in Perspective

Performance Improvement Areas

- Airport Operations**
- Globally Interoperable Systems and Data**
- Optimum Capacity and Flexible Flights**
- Efficient Flight Path**



Airport Operations (PIA 1)

B0-15

Improved Runway Traffic Flow through Sequencing (AMAN/DMAN)

Time-based metering to sequence departing and arriving flights

B0-65 - Optimization of Approach Procedures including Vertical Guidance

This is the first step toward universal implementation of GNSS-based approaches

B0-70

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 (re-categorisation, CSPR and WIDAO)

B0-75

Improved Runway Safety (A-SMGCS)

Airport surface surveillance for ANSP

B0-80

Improved Airport Operations through ACDM

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

The combined Block 0 Modules reduce fuel consumption and noise by improving arrival efficiencies and improving information sharing

Globally Interoperable Systems and Data (PIA 2)

B0-25

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 ICO Document 9694

B0-30

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

B0-105 – Meteorological information supporting enhanced operational efficiency and safety

This module includes meteorological information supporting automated decision processes or aids such as meteorological information translation, ATM decision support. This module enables the reliable identification of applicable ATM solutions when meteorological conditions are impacting (observed) or expected to impact (forecast) aerodromes or airspace

In Block 0 we improve overall operations and continue to enable Collaborative Decision Making through improved interfacilities communications using standard information formats and baseline Met Services

Optimum Capacity and Flexible Flights (PIA 3)

B0-10: 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

B0-85: 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:

B0-86: 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.

B0-35: 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.

B0-101 ACAS Improvements

This addresses short term improvements to the performance of the existing airborne collision avoidance systems (ACAS).

Using procedural concepts (e.g. RNP, FUA, etc.) and Air Traffic Situational Awareness - combined with enhanced planning tools and information sharing, the enroute phase of flight supports additional capacity and flexibility using the Modules of Block 0

Optimum Capacity and Flexible Flights (PIA 3) - Continued



B0-84 – Initial surveillance capability ADS-B Out, MLAT

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

B0-102 – 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.

Through ground based safety nets combined with ground surveillance the enroute phase of flight supports additional capacity, flexibility and safety

Efficient Flight Path (PIA 4)

B0-05

Improved Flexibility and Efficiency in Descent Profiles (CDOs)

Deployment of performance-based airspace and arrival procedures that allow the aircraft to fly their optimum aircraft profile taking account of airspace and traffic complexity with continuous descent operations (CDOs)

B0-20

Improved Flexibility and Efficiency in Departure Profiles

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

B0-40

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

The use of procedurally based Optimized Profile Climbs and Descents as well as an initial Data Link Capability helps to establish a Block 0 capability for improved operational efficiencies

Block 0: Priority

- Block 0 initiatives must leverage on existing on-board avionics
- 3 Priorities have been agreed to by the Global community:
 - Performance Based Navigation (PBN)
 - Continuous Descent Operations (CDO)
 - Continuous Climb Operations (CCO)



Challenges - How to Get There?

- It is all about managing risk
- Block 0 risks are minimum
 - Global Readiness Checklist is complete
 - The Modules are well understood and supported
- But risks do exist
 - States may not be capable of ensuring successful deployment of Block 0
 - If Block 0 is not implemented as a foundation, certain functionalities may not be available as enablers for future blocks
 - We must Identify and resolve policies necessary to enable the future blocks now

Implementation – The Time is Now

- The Modules 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 regional implementation of the Blocks or the Modules are well described and ready for implementation

Module N° B0-40

Improved Safety and Efficiency through the initial application of Data Link En-Route



Summary	Implementation of an initial set of data link applications												
Main Performance Impact	KPA-02 Capacity; KPA-04 Efficiency; KPA-10 Safety												
Operating Environment/Phases of Flight	En-route flight phases, including areas where radar systems cannot be installed such as remote or oceanic airspace.												
Applicability Considerations	Requires good synchronisation of airborne and ground deployment to generate significant benefits, in particular to those equipped. Benefits increase with the proportion of equipped aircraft.												
Global Concept Component(s)	IM – Information Management SDM – Service Delivery Management												
Global Plan Initiatives (GPI)	GPI-9 Situational awareness GPI-17 Implementation of data link applications GPI-18 Electronic information services												
Main Dependencies	(excerpt from dependency diagram to be included in V3). Predecessor of: B1-40 (but can also be combined with it)												
Global Readiness Checklist	<table border="1"> <thead> <tr> <th></th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Standards Readiness</td> <td>Ready</td> </tr> <tr> <td>Avionics Availability</td> <td>Ready</td> </tr> <tr> <td>Ground Systems Availability</td> <td>Ready</td> </tr> <tr> <td>Procedures Available</td> <td>Ready</td> </tr> <tr> <td>Operations Approvals</td> <td>Ready</td> </tr> </tbody> </table>		Status	Standards Readiness	Ready	Avionics Availability	Ready	Ground Systems Availability	Ready	Procedures Available	Ready	Operations Approvals	Ready
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- Prior to this module, air-ground communications used voice radio (VHF or HF depending on the airspace)
 - Known limitations in quality, bandwidth and security and areas with no radar surveillance.
- High density airspace controllers spend 50% of their time talking to pilots on the VHF voice channels where frequencies are a scarce resource
 - This represents a significant workload for controllers and pilots



- **Element 1 → ADS-C over Oceanic and Remote Areas**
 - ADS-C provides an automatic dependent surveillance service over oceanic and remote areas, through the exploitation of position messages sent automatically by aircraft over data link at specified time intervals (ADS-Contract).
- **Element 2 → Continental CPDLC**
 - The applications allow pilots and controllers to exchange messages with a better quality of transmission.

Module N° B0-40 –Intended Performance Operational Improvement



Element 1

ADS-C over Oceanic and Remote Areas

Capacity	Reduced separations allow increasing the offered capacity.
Efficiency	Routes/tracks and flights can be separated by reduced minima, allowing to apply flexible routings and vertical profiles closer to the user-preferred ones.
Flexibility	permits to make route changes easier
Safety	Increased situational awareness; better support to SAR
CBA	The business case has proven to be positive

Element 2

Continental CPDLC

Capacity	Reduced communication workload & better organisation of controller tasks allow to increase sector capacity
Safety	Increased situational awareness; reduced occurrences of misunderstandings; solution to stuck mike situations
CBA	The European business case has proven to be positive due.

ICAO

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