



INTERNATIONAL CIVIL AVIATION ORGANIZATION

A United Nations Specialized Agency

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ASBU Block 0 Modules- An analysis

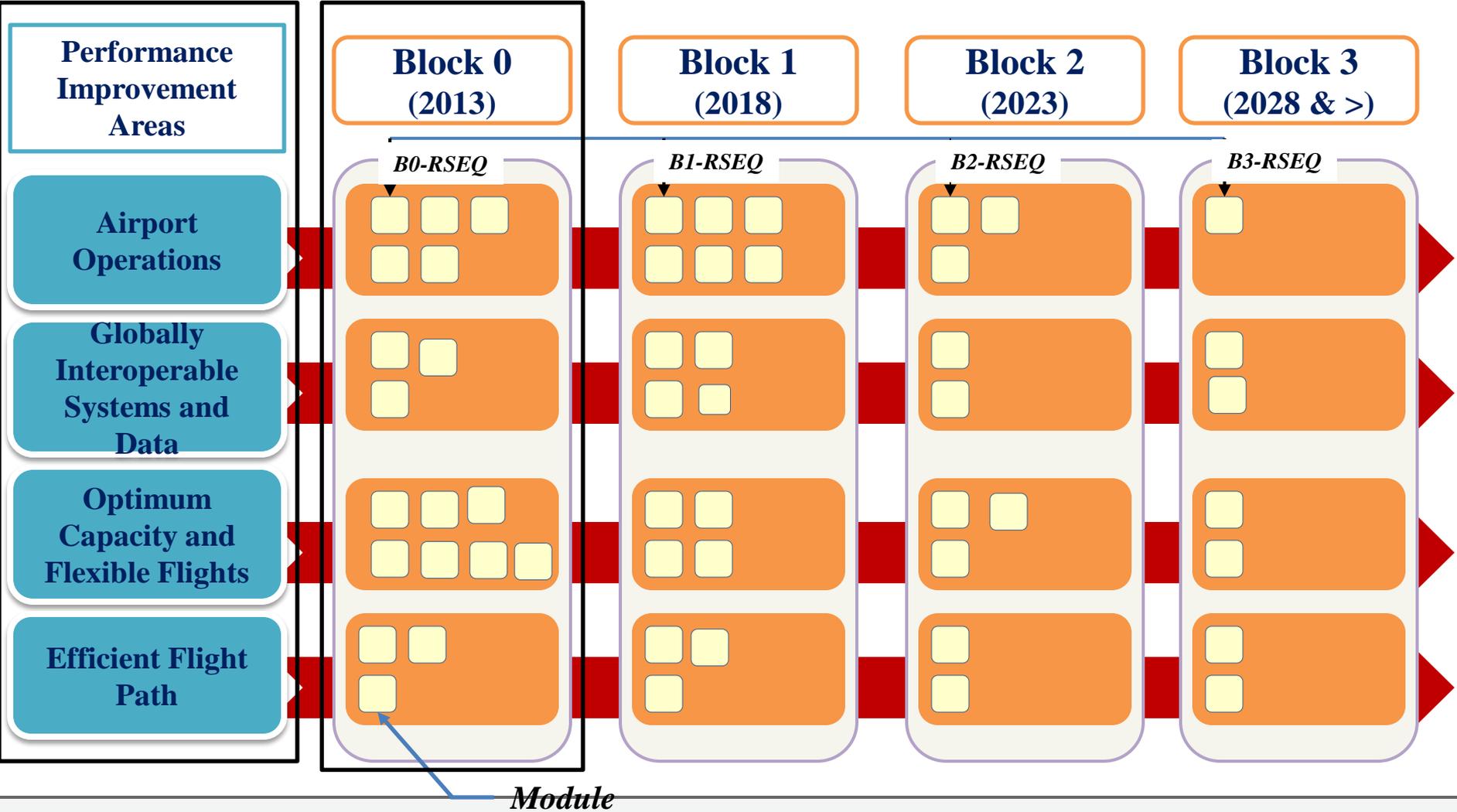
Air Navigation Bureau

Outline

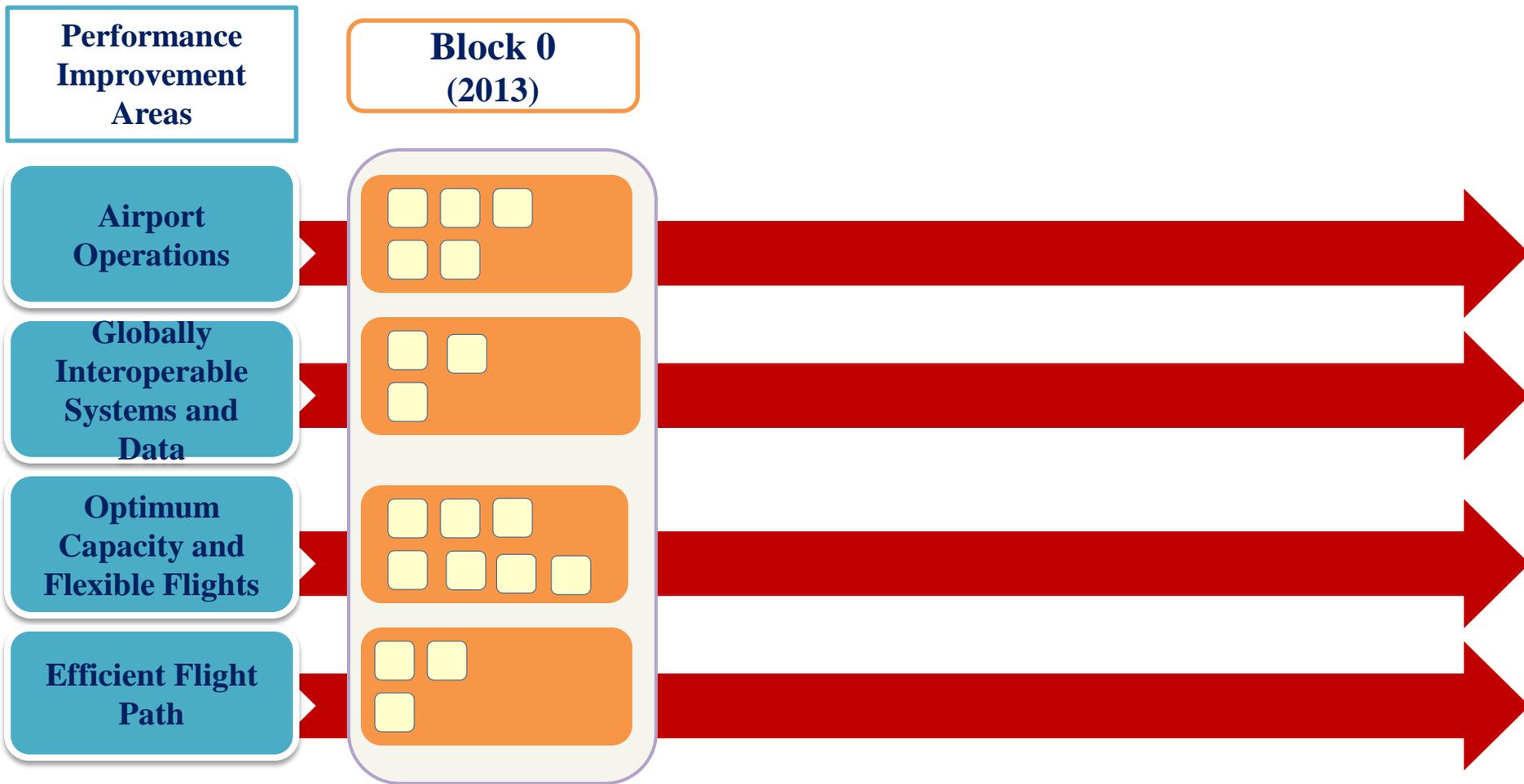
- Block understanding
- Block Maturity cycle
- Block 0 perspective
- Block 0 Modules
- Block 0 implementation



Understanding the Relationships



Focus on Block 0



Global Readiness Checklist



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

- Each Module is evaluated for its readiness
- If any component is not found to be ready it moves to a future Block for implementation
- Those Modules that are not specifically ready at a Block release are noted as “dates of readiness”

All Block 0 Modules Have Met the Readiness Criteria

- 4 Main Performance improvement areas
 - Airport Operations (5 modules)
 - Globally interoperable systems & data (3 modules)
 - Optimum capacity & flexible flights (7 modules)
 - Efficient flight path (3 modules)
- Block 0 will serve as the enabler and foundation for the envisioned future aviation systems.

Block 0 in Perspective

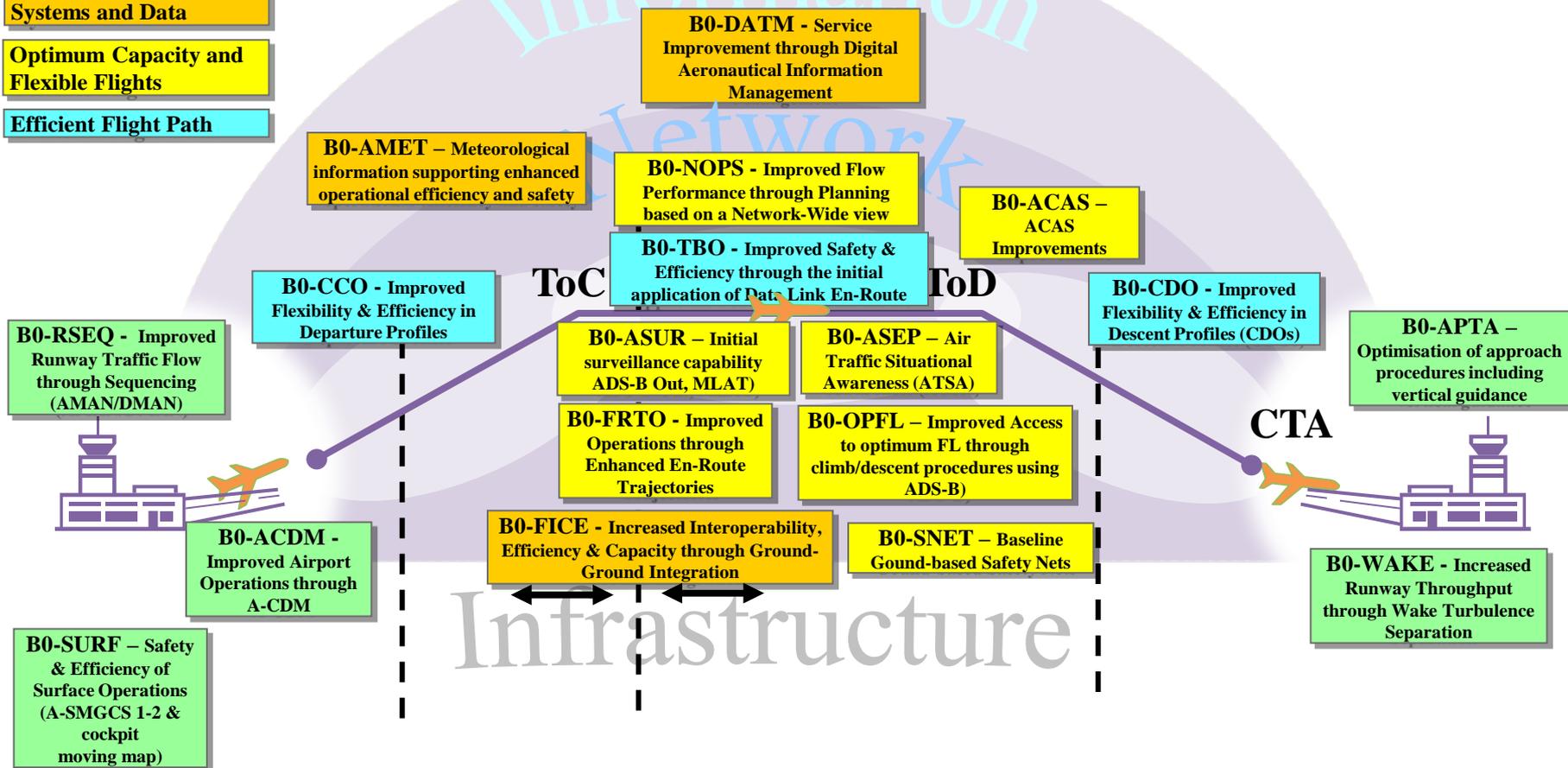
Performance Improvement Areas

Airport Operations

Globally Interoperable Systems and Data

Optimum Capacity and Flexible Flights

Efficient Flight Path



Airport Operations (PIA 1)



B0-15 RSEQ

Improved Runway Traffic Flow through Sequencing (AMAN/DMAN)

Time-based metering to sequence departing and arriving flights

B0-65 APTA Optimization of Approach Procedures including Vertical Guidance

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

B0-70 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)

B0-75 SURF

Improved Runway Safety (A-SMGCS)

Airport surface surveillance for ANSP

B0-80 ACDM

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 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 ICO Document 9694

B0-105 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

B0-30 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

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: 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

B0-35: 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.

B0-101 ACAS ACAS Improvements

This addresses short term improvements to the performance of the existing airborne collision avoidance systems (ACAS). Transition from ACAS II version 7.0 to 7.1. Mandatory by Annex 6 provisions.
New- by 1/1/2014 and all by 1/1/2017

B0-85: 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

B0-86: 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.

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 – ASUR 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 – 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.

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 CDO

Improved Flexibility and Efficiency in Descent Profiles (CDOs)

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

B0-40 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

B0-20 CCO

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)

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
 - The Infrastructure is available
 - Avionics are ready
 - Ground Automation is ready
 - Procedures and Operational Approvals are in place
- 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

New ASBU Modules Identifiers



Old ASBU Modules Numbering System	New ASBU Modules Identifiers	
65	APTA	Airport Accessibility
70	WAKE	Wake Turbulence Separation
15	RSEQ	Runway Sequencing
75	SURF	Surface Operations
80	ACDM	Airport Collaborative Decision Making
81	RATS	Remote Air Traffic Services
25	FICE	FF/ICE
30	DATM	Digital Aeronautical Management
31	SWIM	System Wide Information Management
105	AMET	Advanced Meteorological Information
10	FRTO	Free Route Operations
35	NOPS	Network Operations
84	ASUR	Alternative Surveillance
85	ASEP	Airborne Separation
86	OPFL	Optimum Flight Levels
101	ACAS	Airborne Collision Avoidance Systems
102	SNET	Ground-Based Safety Nets
05	CDO	Continuous Descent Operations
40	TBO	Trajectory-Based Operations
20	CCO	Continuous Climb Operations
90	RPAS	Remotely Piloted Aircraft Systems

i(implementation) kits – Detailed guidance



<http://www.icao.int/sustainability/Pages/ASBU-Framework.aspx>

VERSION 4 SAMPLE TEMPLATE OF THE AIR NAVIGATION REPORT FORM (ANRF)

	Access & Capacity	Capacity	Efficiency	Environment	Safety
Applicable	Y	Y	Y	Y	Y

i(implementation) kits – Detailed guidance <http://www.icao.int/safety/pbn/ASBU%20iKit/story.html>



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and Caribbean
(NACC) Office
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Central African
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Dakar

European and
North Atlantic
(EUR/NAT) Office
Paris

Middle East
(MID) Office
Cairo

Eastern and
Southern African
(ESAF) Office
Nairobi

Asia and Pacific
(APAC) Office
Bangkok

Thank You

A world map is shown in a light blue color. Eight colored dots are placed on the map, each connected by a thin line to a text label describing an ICAO office. The ICAO Headquarters in Montreal is marked with an orange dot, while all other regional offices are marked with blue dots. A large, rounded rectangular box with a gradient background and a black border is positioned in the lower center of the map, containing the text 'Thank You' in a bold, dark blue font.