



International Civil Aviation Organization

SIP/2012/ASBU/Dakar-WP/6

# Aviation System Block Upgrade (ASBU) Methodology – An Overview

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Workshop on preparations for ANConf/12 – ASBU methodology  
(Dakar, 16-20 July 2012)

# Outline



- Today's Challenges
- Tomorrow's Needs
- Why ASBU methodology
- ASBU explanation
- Next Steps



# Today's Challenges (1/2)



- While 2010 was the safest year on record; the accident rate is flat
  - Without intervention; given growth - accidents will begin to increase exponentially in all parts of the world
- New technologies can serve to decrease number of accidents
  - If introduced in a globally harmonized and consistent manner
  - Over US\$ 12 billion is expected to be spent on new technology/systems over the 10 ten years worldwide
- The need for the aviation system to evolve is a given
  - And harmonization of the aviation system worldwide is necessary
  - But this is not easy and the path is not clear
  - Technical and operational challenges are relatively easy to tackle



# Today's Challenges (2/2)



- Economic/Political challenges will limit progress
  - New methods of working will be required
- Technical/Operational challenges need to be considered together in the design of the future systems work
  - Consensus, endorsement and public advocacy will be necessary
- Aviation's decision makers have a unique opportunity, and responsibility, to work together
  - To bring a globally interoperable aviation system into reality
- ICAO is bringing together senior aviation decision makers
  - to develop some consensus and advocacy to move the aviation system of the future into out today

# Tomorrow's Needs



- Global framework is needed to ensure:
  - Safety is maintained and enhanced
  - ATM improvement programs are harmonized
  - Barriers to future efficiency and environmental gains are removed, at reasonable cost



# Step 1

## Get Harmonization on the Global Agenda



- Initial NextGen/SESAR Symposium (2008)
- Convened Standards Organization Roundtable (2009)
- Established working agreements with Standards Organizations on shared work programmes (2010)

# Step 2

## Global Aviation System Block Upgrades



- Define global aviation system block upgrades
- For interoperability purposes
- Independent of when and where specific ATM improvement programs are introduced

Why this approach?

# What is the Basis for Block Upgrades?



- Foundation of blocks originates from existing, near term implementation plans and access to benefits that already exist
- Blocks are based on operational concepts extracted from:



- Aligned with ICAO ATM Operational Concept
- Intent is to apply key capabilities and performance improvements across other regional and local environments
  - with same level of performance and associated benefits worldwide
- Block upgrades will allow structured approach to meet needs of individual aviation communities worldwide
  - while considering associated business cases
- They reflect recognition that all modules are **not** required in all airspaces



# What is the difference between current and ASBU methodology?



- Current methodology
  - Scope covers only ground equipment for ANSPs
  - Planning based on short and medium term
  - Implementation process is through GPIs
- ASBU methodology
  - Scope extends to airspace users and regulators involving Airlines and CAAs
  - Planning based on short, medium and long terms
  - Implementation process is through Blocks and corresponding modules



## What are the advantages of ASBU methodology?

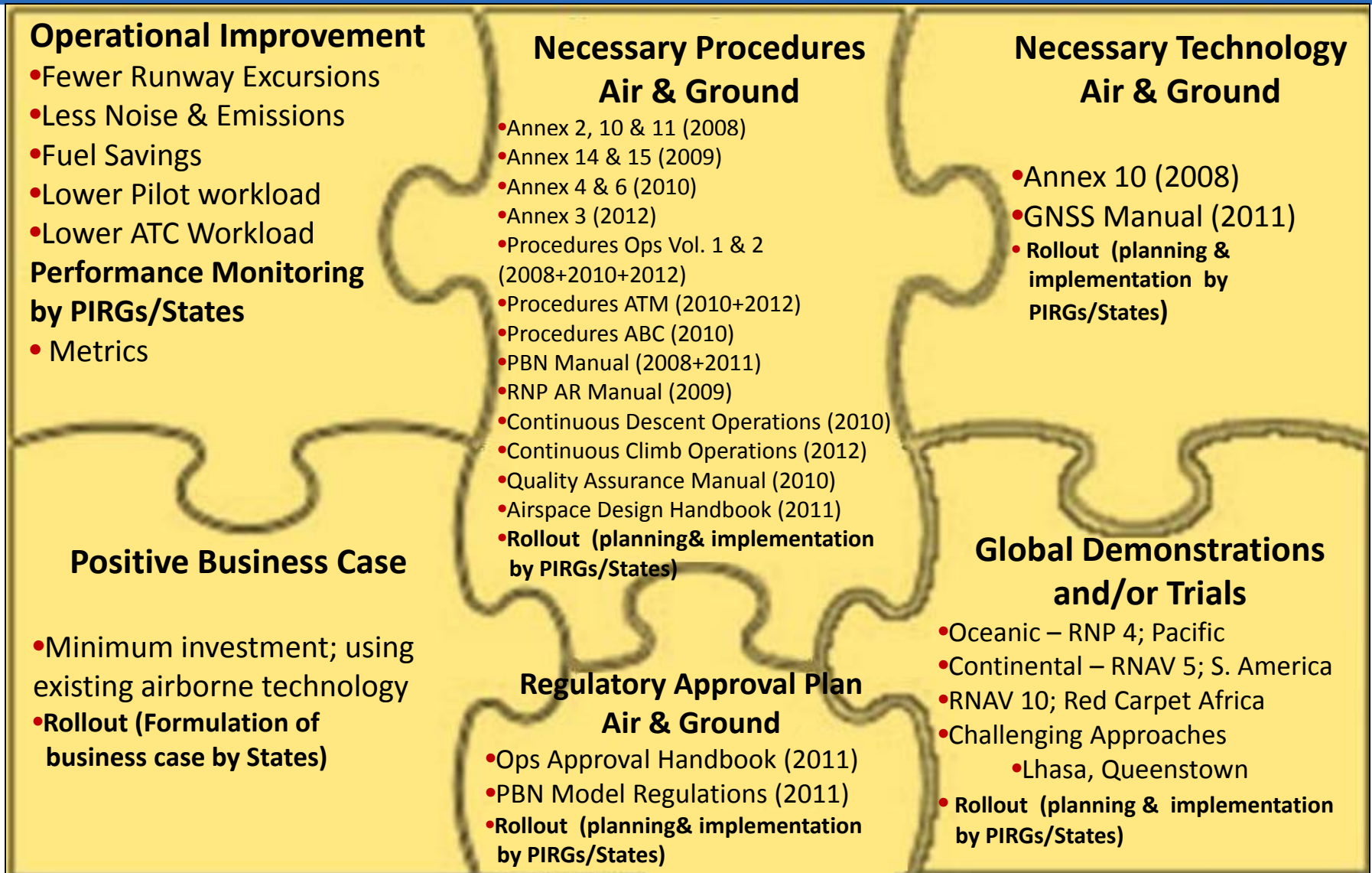
- All partners approach involving service providers, regulators and users facilitating a harmonized planning and implementation of air navigation infrastructure
- Takes into account all related issues such as air/ground Systems, air/ground procedures, air/ground regulatory requirements and business case formulation,
- One stop planning at the same time flexible and scalable
- Modules provide a series of measurable, operational performance improvements, which could be introduced as needed



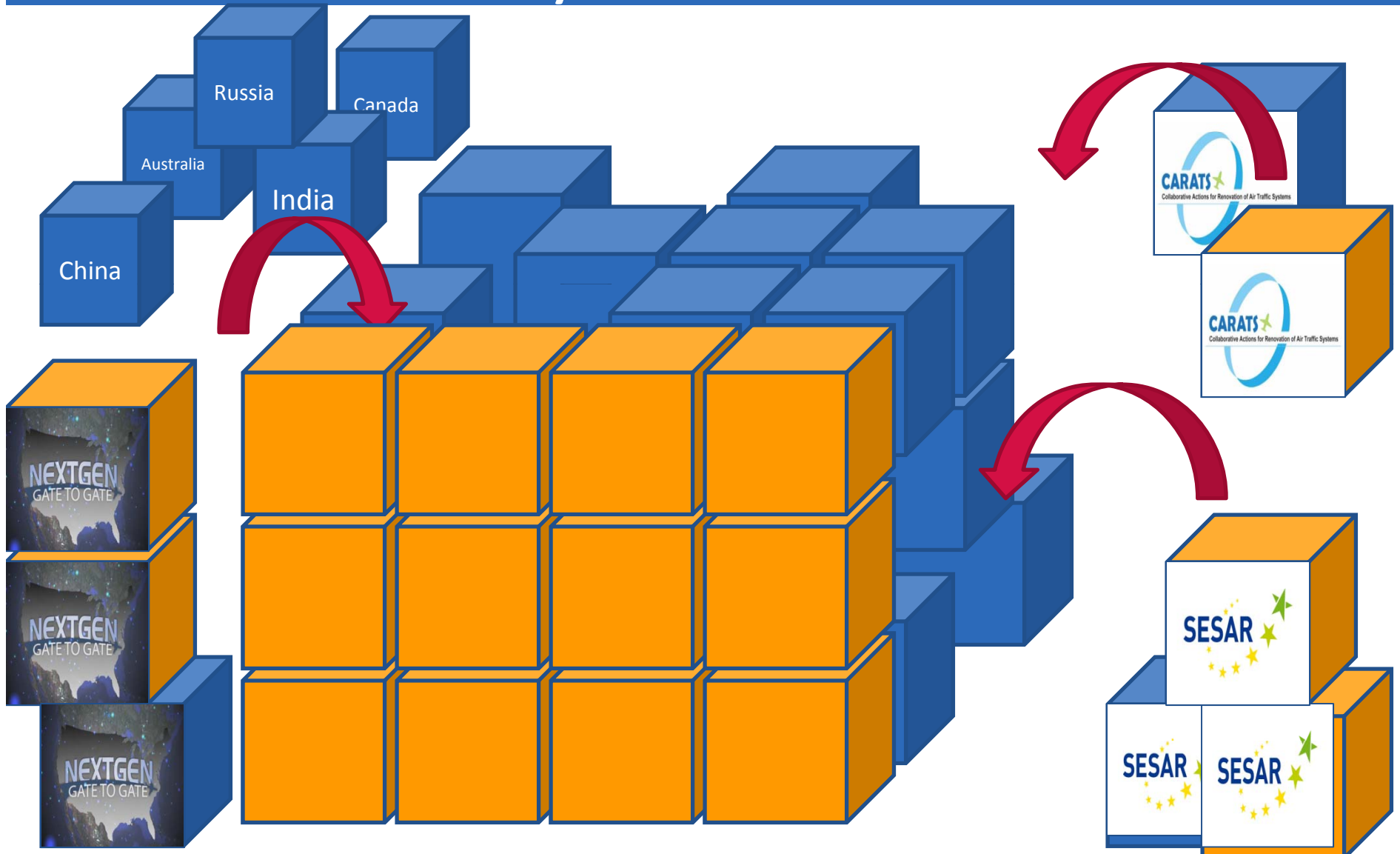
# Aviation System Block Upgrades – Definition

- What is an ‘Aviation System Block Upgrade’ (ASBU)?
  - Intended *Operational Improvement/Metric* to determine success
  - Necessary *Procedures*/Air and Ground
  - Necessary *Technology*/Air and Ground
  - Positive *Business Case* per Upgrade
  - *Regulatory Approval Plan*/Air and Ground
  - *Well understood* by a Global Demonstration Trial
    - All synchronized to allow initial implementation
    - Won’t matter **when or where** implemented

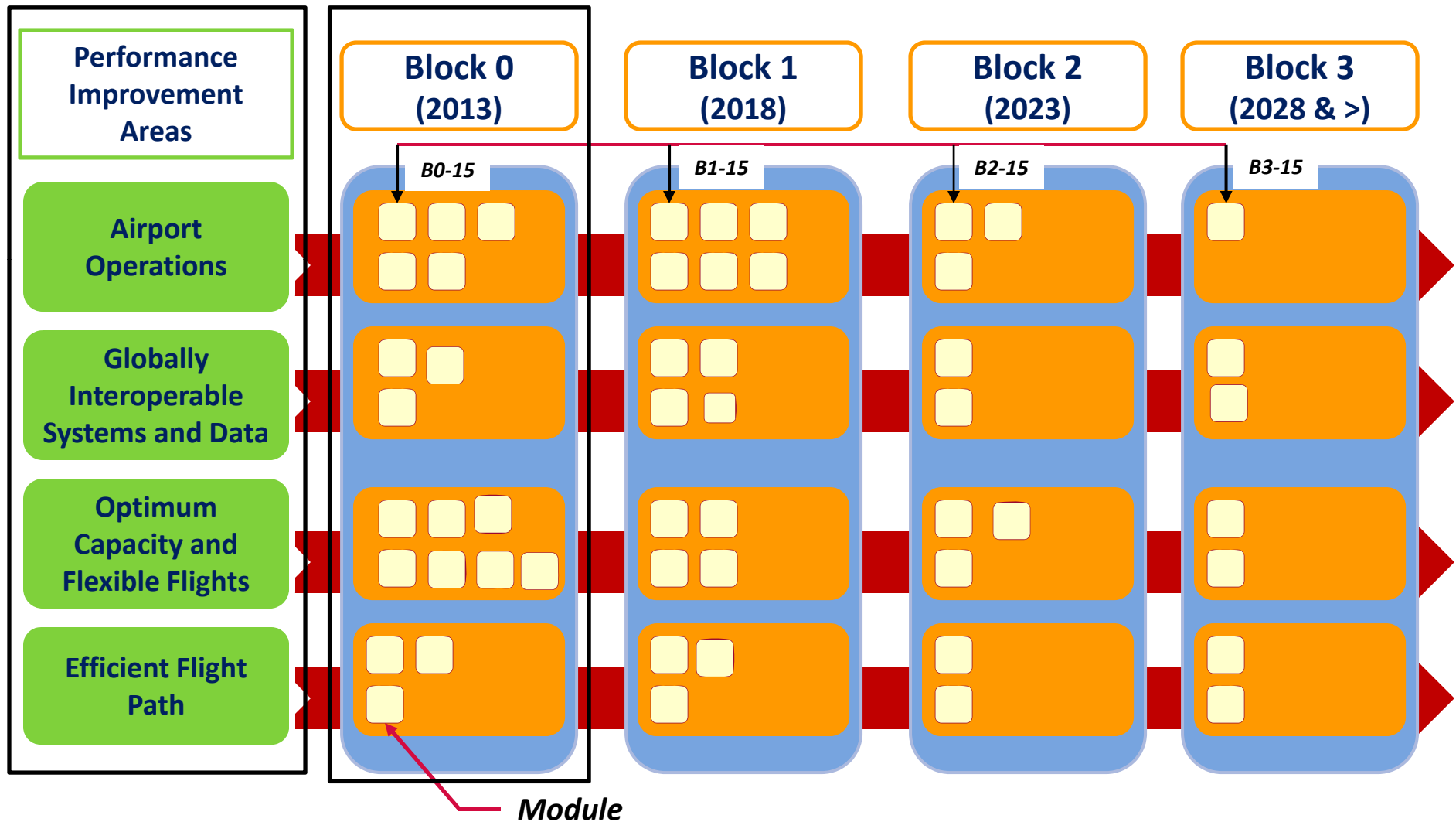
# Performance-based Navigation: An example of ASBU approach



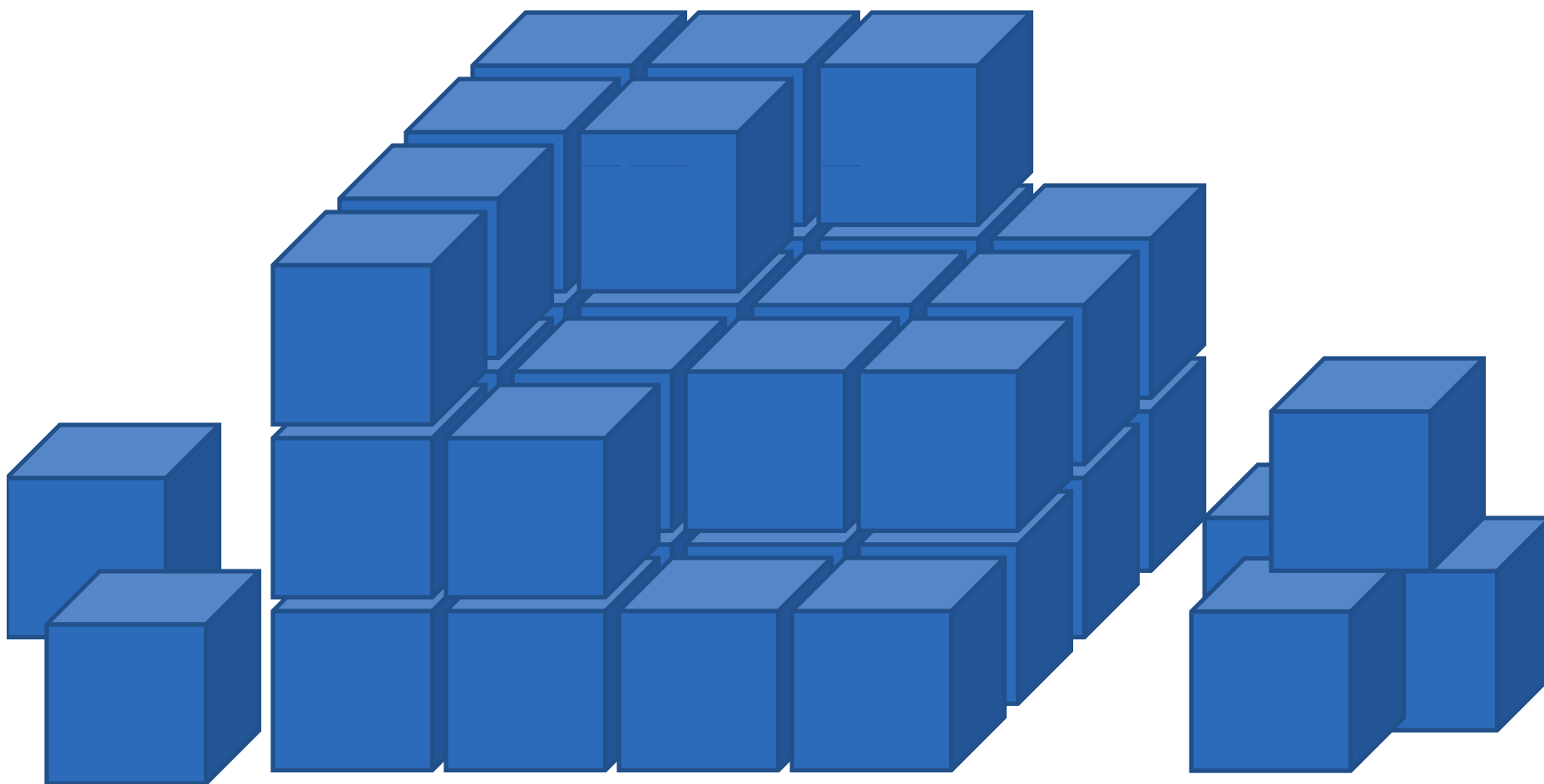
# We Can Benefit From What Is Already Out There...



# Understanding the Relationships



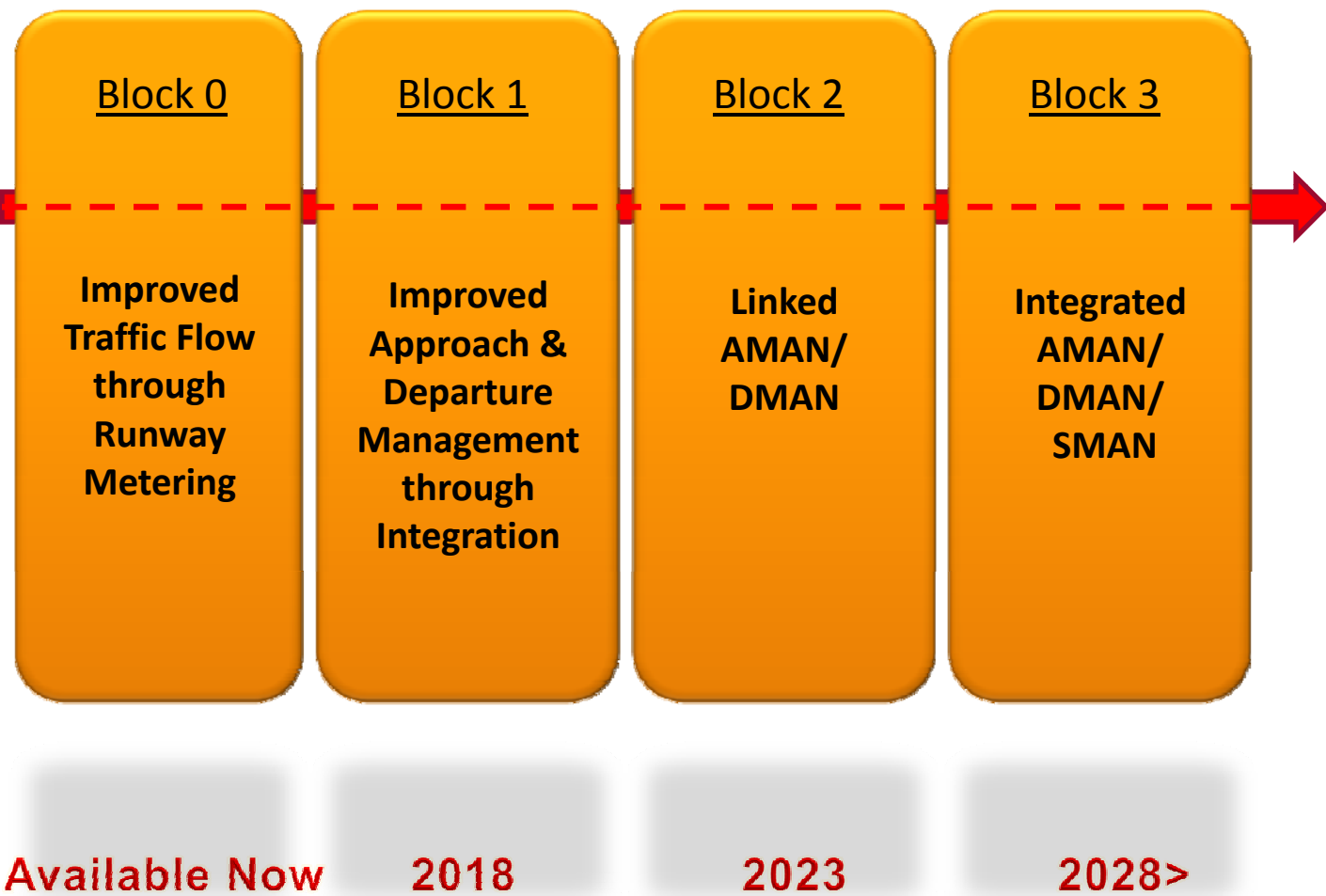
# A Block made Up of Modules is Scalable to Meet Regional or Local Needs



# Threads Between Modules... and Across Blocks



## Airport Operations





# Module sample (1/3)



## Module N° B#-##: TITLE

<b>Summary</b>	Brief description of benefit provided.	
<b>Main Performance Impact</b>	List of affected KPAs	
<b>Operating Environment/Phases of Flight</b>	Single word entries explaining operating environment(s), i.e; airport surface, etc and/or phases of flight, i.e; approach, en-route, etc.	
<b>Applicability Considerations</b>	Specifics on operating environment and/or types of airspace where Module is applicable	
<b>Global Concept Component(s)</b>	Up to three.	
<b>Global Plan Initiatives (GPI)</b>	Up to three	
<b>Pre-Requisites</b>	Modules that must be implemented to support this module.	
<b>Global Readiness Checklist</b>		<b>Status</b> (ready now or estimated date).
	Standards Readiness	
	Avionics Availability	
	Ground System Availability	
	Procedures Available	
	Operations Approvals	

### 1. Narrative

#### 1.1 General

General description of the module with focus on the operational benefit or capability provided, operating environment and applicability.

#### 1.1.1 Baseline

Capability in place prior to the implementation of this module. This section is appropriate where the module provides an improvement over an existing capability.

#### 1.1.2 Change brought by the module

Additional information on the operational benefit or capability plus any significant change to operations. For complex modules may be decomposed into constituent elements.

#### 1.2 Element 1 (if needed)

#### 1.3 Element 2 (if needed), etc.

# Module sample (2/3)



## 2. Intended Performance Operational Improvement/Metric to determine success

<i>KPAs</i>	Specific improvement provided.

<i>CBA</i>	Illustrative example of Cost-Benefit to be expected. The mechanisms supporting the cost benefit must be clearly stated.

## 3. Necessary Procedures (Air & Ground)

Description of new procedures. Where procedures exist or are under development, references to these must be provided. For procedures to be developed, the requirement must be clearly stated (This is applicable to latter blocks).

## 4. Necessary System Capability

### 4.1 Avionics

Description of required avionics. Where avionics exist or are under development, references to these must be provided. For avionics to be developed, the requirement must be clearly stated (This is applicable to latter blocks).

### 4.2 Ground Systems

Description of required ground systems. Where ground systems exist or are under development, references to these must be provided. For ground systems to be developed, the requirement must be clearly stated (This is applicable to latter blocks).

## 5. Human Performance

### 5.1 Human Factors Considerations

General statements on the impact on operational functions.

### 5.2 Training and Qualification Requirements

Description of required training and qualification requirements. Where they exist or are under development, references to these must be provided. For training and qualification requirements to be developed, the requirement must be clearly stated (This is applicable to latter blocks).

### 5.3 Others

TBD

# Module sample (3/3)



## 6. Regulatory/standardisation needs and Approval Plan (Air and Ground)

Description of required regulatory and standardisation needs and approval plans. Where they exist or are under development, references to these must be provided. For regulatory and standardisation needs to be developed, the requirement must be clearly stated (This is applicable to latter blocks).

## 7. Implementation and Demonstration Activities

### 7.1 *Current Use*

Description and results of current demonstration activities and implementation status, for each known region.

### 7.2 *Planned or Ongoing Activities*

Description of planned demonstration and implementation activities, for each known region.

## 8. Reference Documents

This section shall contain details of all known reference documents both published and in preparation.

### 8.1 *Standards*

ICAO and Industry Standards (ie; MOPS, MASPS, SPRs).

### 8.2 *Procedures*

Documented procedures by States and ANSPs,

### 8.3 *Guidance Material*

ICAO Manuals, Guidance Material and Circulars. Also any similar industry documents

# Summary of ASBU Approach

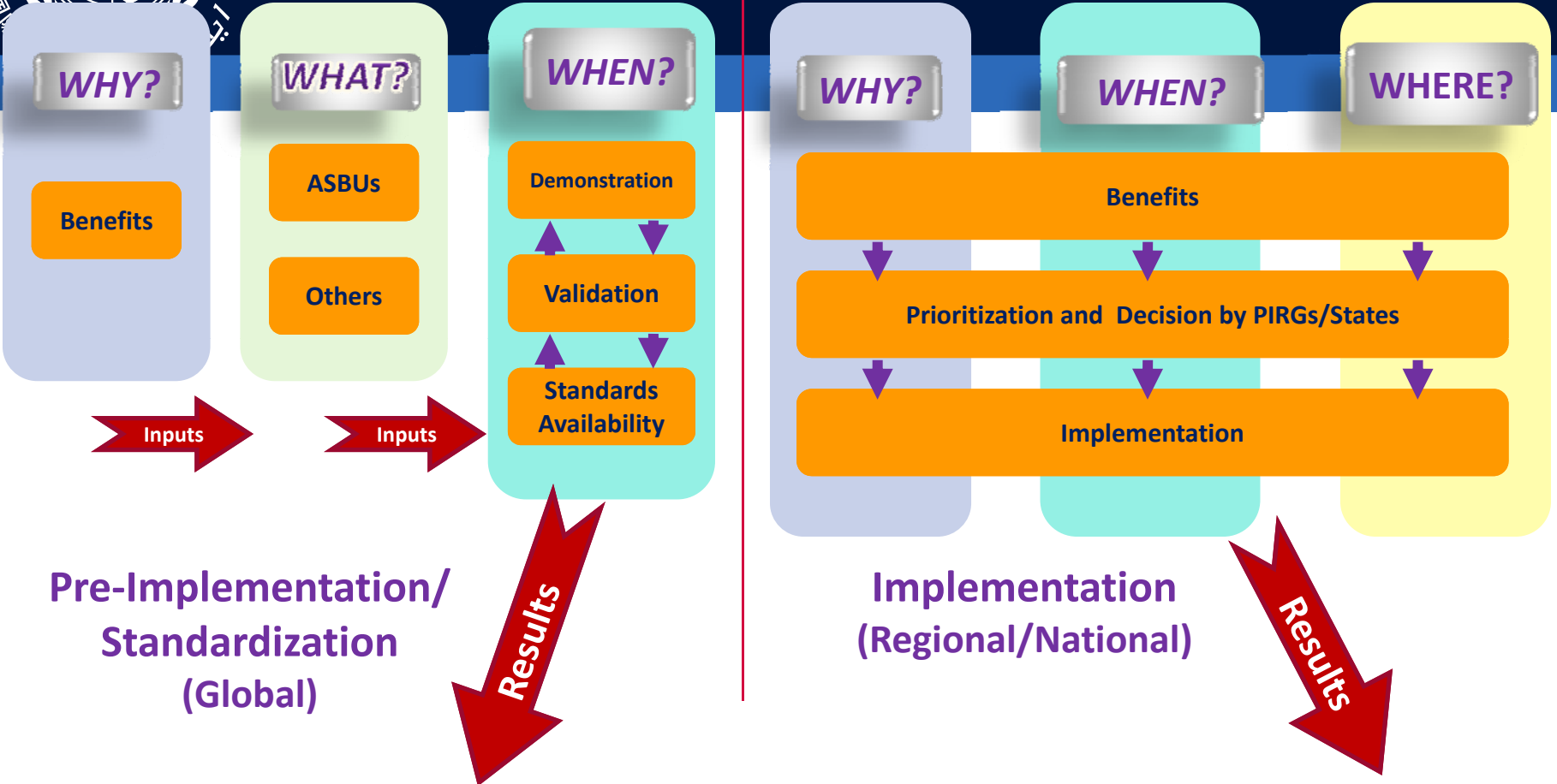


- **Addresses ANSP, aircraft and regularity requirements**
- **Identified 4 improvement areas**
- **Implementation through Block Upgrades ( 0,1,2, and 3) each comprising a number of modules**
- **Each module is explained in a standardized 4-5 pages template**
  - provide a series of measurable, operational performance improvements
  - Organized into flexible & scalable building blocks
  - Could be introduced as needed
  - all modules are **not** required in all airspaces

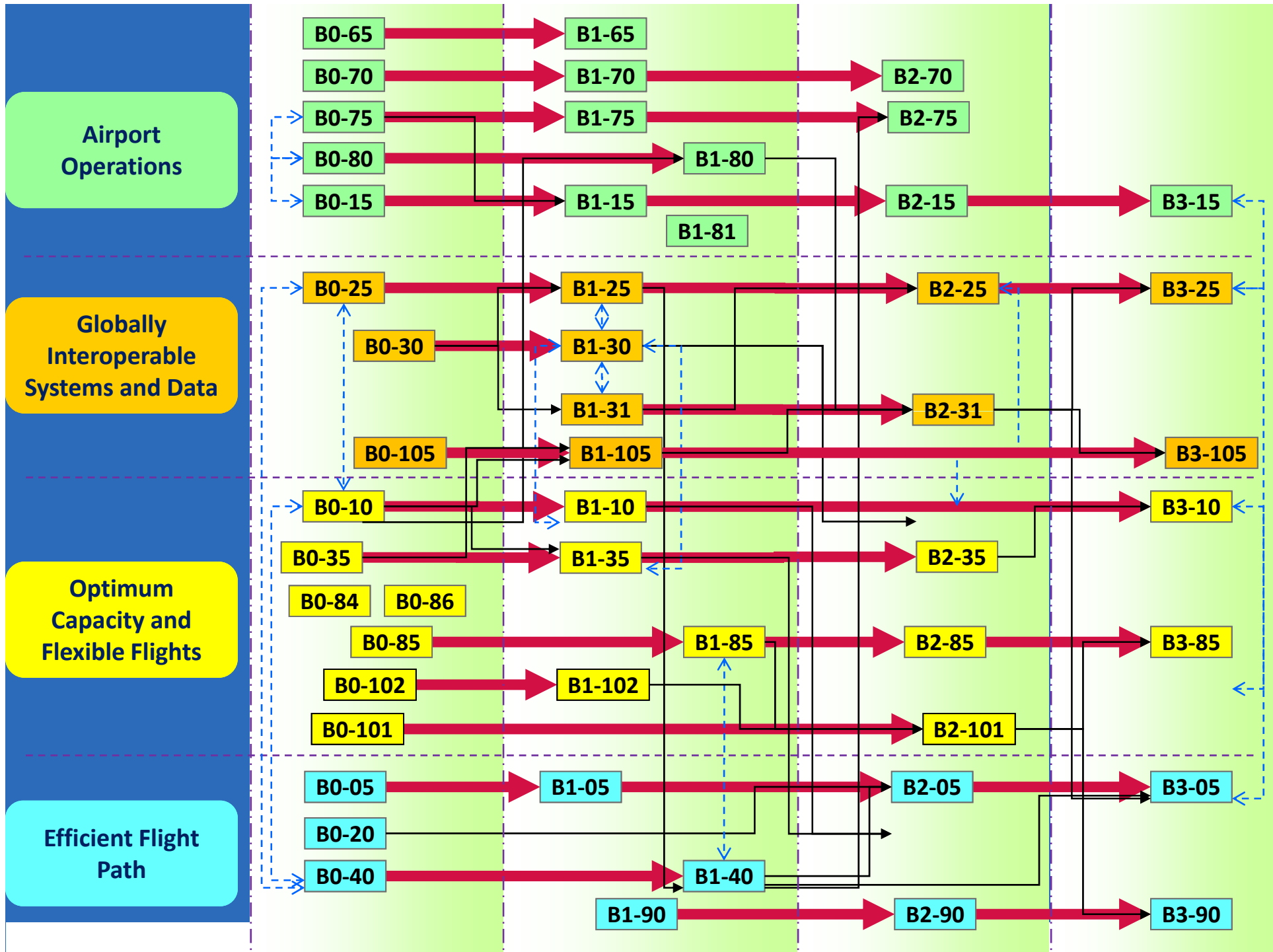




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# ASBU Implementation Timeline



# Mitigating the Risks



- Deployment of block upgrades was chosen to resolve many identified risks
- Timing and sizing of the block upgrades are in response to need for
  - Mature standards
  - Integrated air and ground solutions
  - Establishment of positive business cases for level of equipage and infrastructure costs
- Block “0” optimizes current onboard equipage and provides baseline
  - Gap analysis underway for any missing elements impeding implementation
- Capabilities lacking specific maturity in content or described benefit are purposefully placed in later block upgrades
- Block upgrades respond to issue of non-homogeneous deployment across regions
  - Block components are intended to interoperate seamlessly independent of how they are implemented in neighboring States
  - Ensures procedures, training, policy, and other “infrastructure” are consistent
    - For safe transition to more capable airspace

# Step 3

## Global Rollout & Feedback



- Held Global Air Navigation Industry Symposium (GANIS) in September 2011
    - Facilitated over 500 participants from Industry, States and International Organizations to gain insight
    - Ultimately commit to the initiative
    - Platform established to enable continuous feedback
- <http://www2.icao.int/en/GANIS/Pages/Documentation.aspx>



# Step 3

## Global Rollout & Preparation for AN-Conf/12



ASBU International Briefings -2012	
Cairo	30 January
Moscow	20 March
Kampala	27 March
Lima	15 May
Mexico City	23 May
Dominican Republic	10 July

ASBU Workshops -2012	
Mexico City	27February-02 March
Lima	16-20 April
Bangkok	14-18 May
Nadi (Sponsored by Fiji)	21-25 May
Paris	4-6 July
Dakar	16-20 July
Nairobi	13-17 August
Cairo	30 Sep-04 October

# Step 4

## International Agreement at AN-Conf/12



- Montréal, 19-30 November 2012
- Opportunity to formalize future of infrastructure through ASBUs
- More assistance to States for all ASBU Block 0 Modules
  - Implementation kits for all ASBU Modules will be delivered
- Agreement of ASBU Block 1 upgrades
  - Level of certainty for all stakeholders
  - Encourage more efficient implementation
- Strategies for longer-term requirements – ASBU Blocks 2 and 3
- Approval of GANP
  - Operational capabilities to manage ATM system requirements



# ICAO

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