

International Civil Aviation Organization


ASBU/SIP/Lima/2012-WP/9

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


## H. Sudarshan

Workshop on preparations for ANConf/12 – ASBU methodology  
(Lima, 16-20 April 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



ICAO SIP 2012-ASBU workshops

3

## 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

ICAO SIP 2012-ASBU workshops

4

## 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



ICAO SIP 2012-ASBU workshops

5

## 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)

ICAO SIP 2012-ASBU workshops

6

## 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?

ICAO SIP 2012-ASBU workshops

7

## 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

ICAO SIP 2012-ASBU workshops

8

## 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

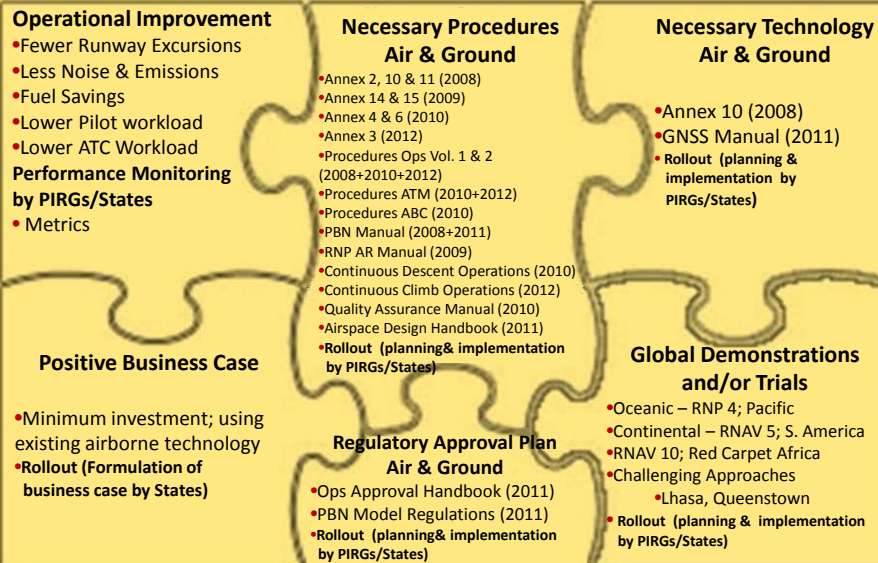


- What is an 'Aviation System Block Upgrade' (ASBU)?
  - Intended *Operational Improvement*/Metric to determine success
  - Necessary *Procedures*/Air and Ground
  - Necessary *Technology*/Air and Ground
  - Positive *Business Case* per Upgrade
  - *Regulatory Approval Plan*/Air and Ground
  - *Well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

11

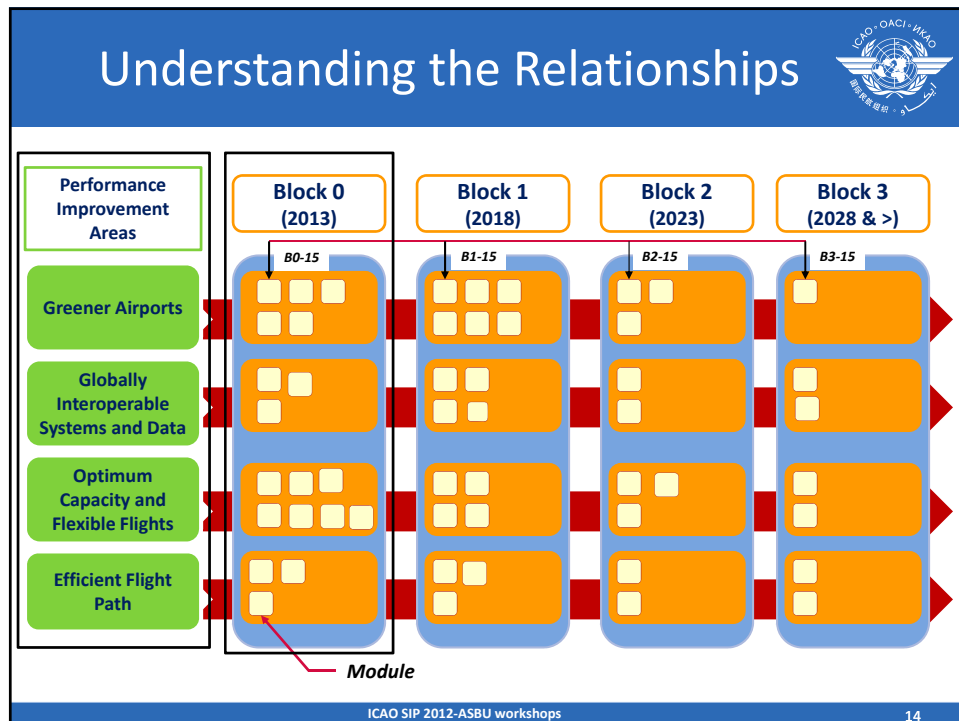
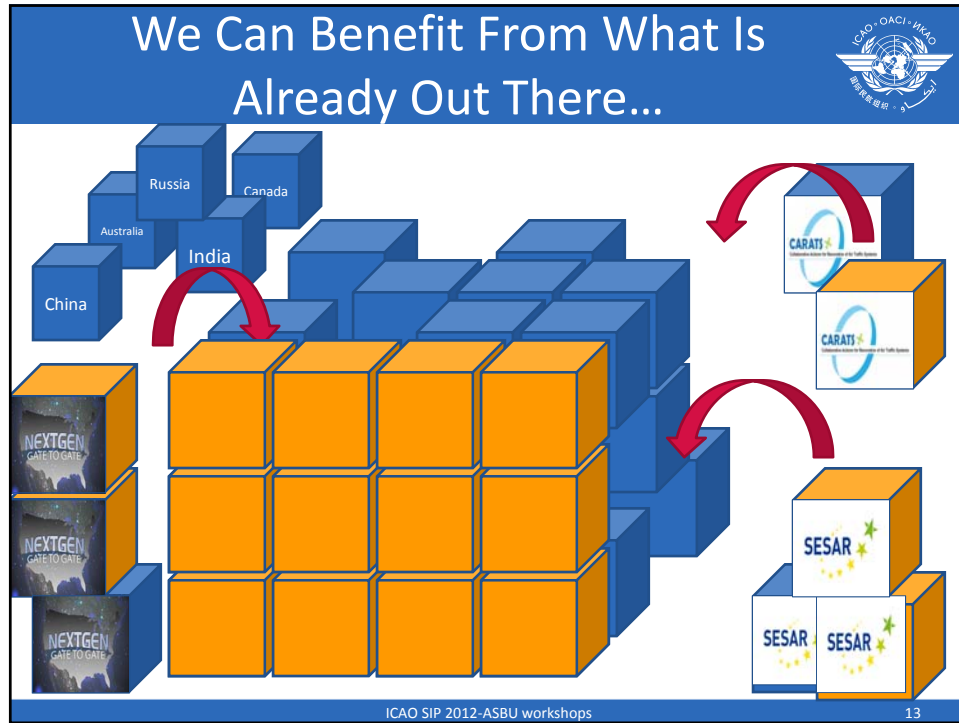
ICAO SIP 2012-ASBU workshops

## Performance-based Navigation: An example of ASBU approach

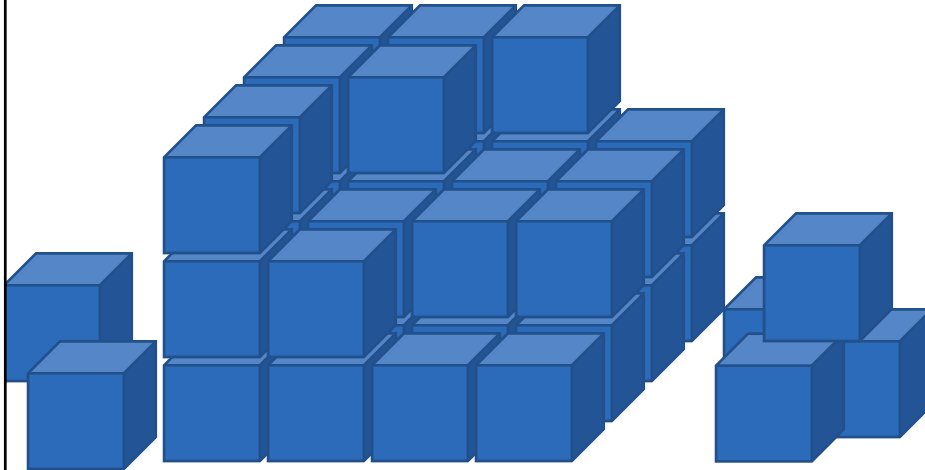


ICAO SIP 2012-ASBU workshops

12



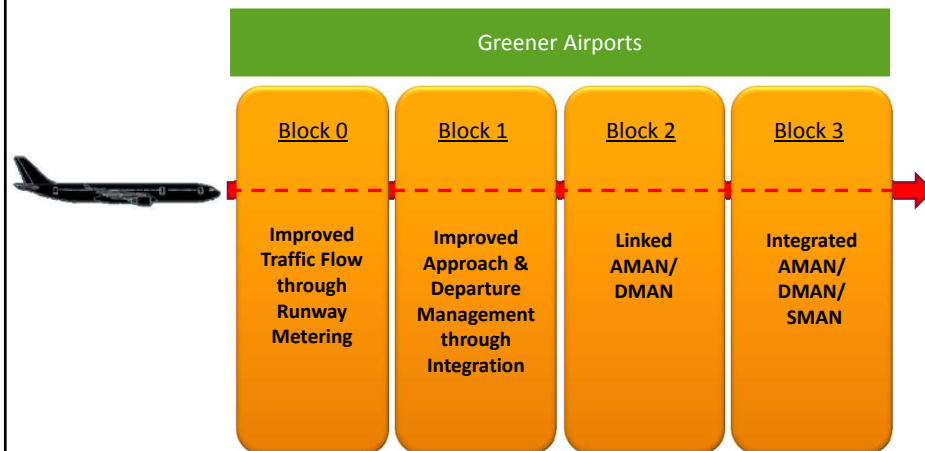
## A Block made Up of Modules is Scalable to Meet Regional or Local Needs



ICAO SIP 2012-ASBU workshops

15

## Threads Between Modules... and Across Blocks



Available Now

2018

2023

2028&gt;

ICAO SIP 2012-ASBU workshops

16



## 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

KPAs	Specific improvement provided.

CBA	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

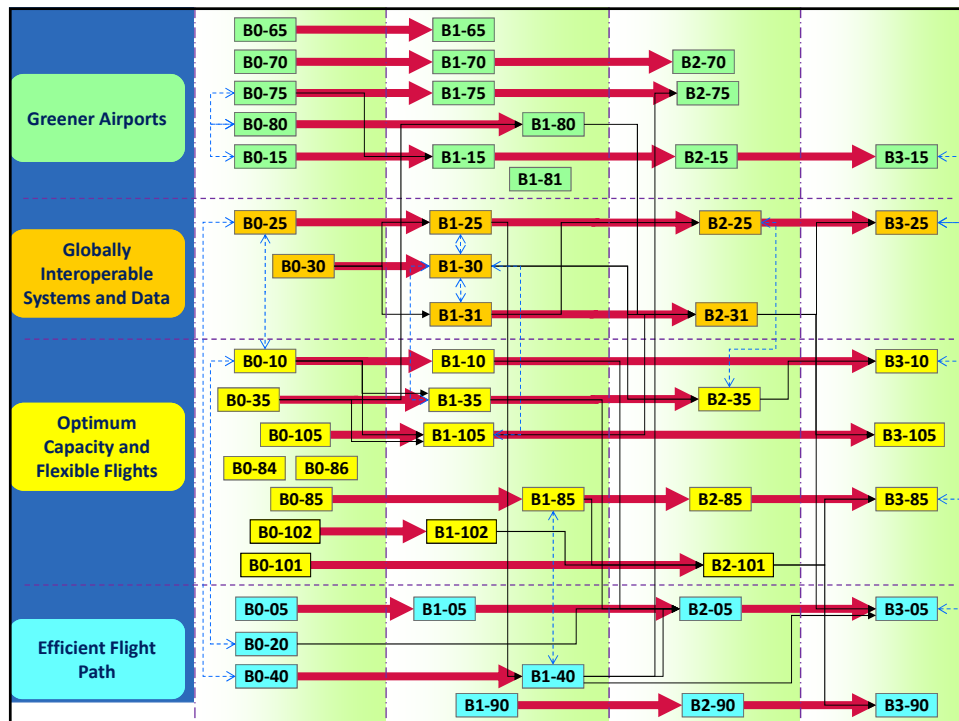
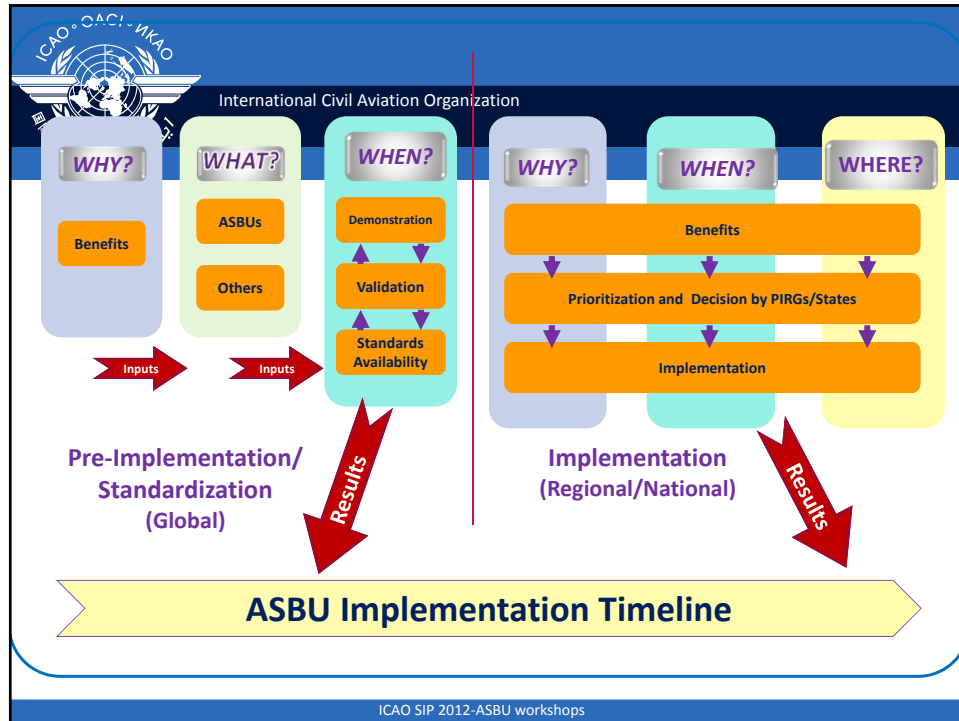
ICAO Manuals, Guidance Material and Circulars. Also any similar industry documents

## 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 airspace





## 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

ICAO SIP 2012-ASBU workshops

23

## 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>

ICAO SIP 2012-ASBU workshops

24

## Step 3

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



ASBU International Briefings -2012		ASBU SIP Workshops -2012	
Cairo	30 January	Mexico City	27 February-02 March
Moscow	20 March	Lima	16-20 April
Kampala	27 March	Bangkok	14-18 May
Lima	14 May	Nadi (Sponsored by Fiji for Pacific States)	21-25 May 2012
Mexico City	23 May	Kiev	2-6 July
Dominican Republic	10 July	Dakar	16-20 July
		Nairobi	13-17 August
		Cairo	30 Sep-04 October

ICAO SIP 2012-ASBU workshops

25

## Step 4

### International Agreement at AN-Conf/12



- Montréal, 19-30 November 2012
- Opportunity to formalize future of infrastructure & equipage
- Strategies for longer-term requirements
- Agreement of first series of block upgrades
  - Level of certainty for all stakeholders
  - Encourage more efficient implementation
- Approval of GANP
  - Operational capabilities to manage ATM system requirements



ICAO SIP 2012-ASBU workshops

26

