



# Performance-based Navigation (PBN) Symposium

**16–19 October 2012**  
**ICAO Headquarters, Montréal**

[www.icao.int/Meetings/PBN-Symposium](http://www.icao.int/Meetings/PBN-Symposium)

## PBN and the Cockpit Workshop

Flight OPS Forum

Approach Re-Classification  
The Links

Capt. Miguel Marin  
Flt OPS Technical Officer  
OPSP Secretary,  
Wednesday 17 October

# Disclaimer



Work in Progress

- State letter AN 11/1.1-12/40,
- Final Review by the ANC after the recess.

# What is broken ?



- It is a question of perspective...
  - From a NSP and IFPP side, nothing !
  - From an OPSP and AP side many things...
- Precision & Non-Precision approach do not exist in a Performance Based World
- ILS and MLS are not APVs, yet they are Approaches with Vertical Guidance
- APV is defined in Annex 6 but not used



# The Challenge

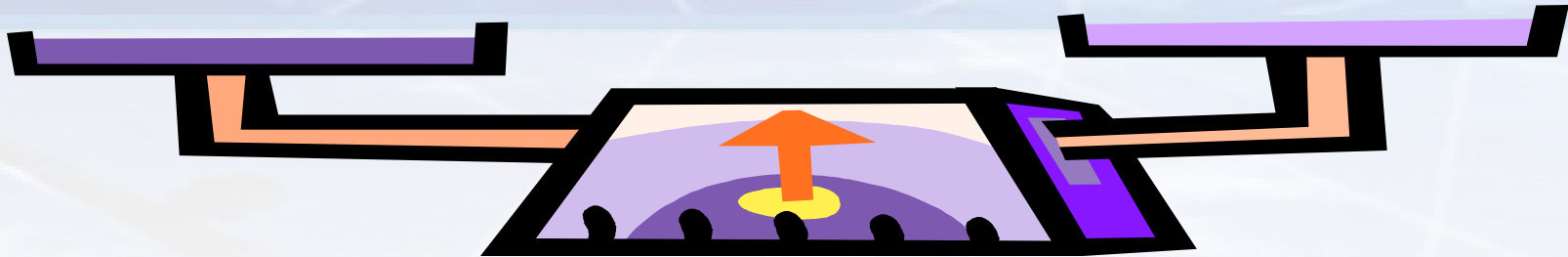


## Conventional

- Non-Precision
- Precision

## PBN

- Performance Based



*Addressing the Future whilst retaining compatibility*



## ICAO PROVISIONS

Instrument Approach  
Runways

Instrument Approach  
Procedures

**Huge Complicated  
Task**

Instrument Approach  
System Performance

Instrument Approach  
Operations



**Annex 14**  
Instrument Approach  
**Runways**

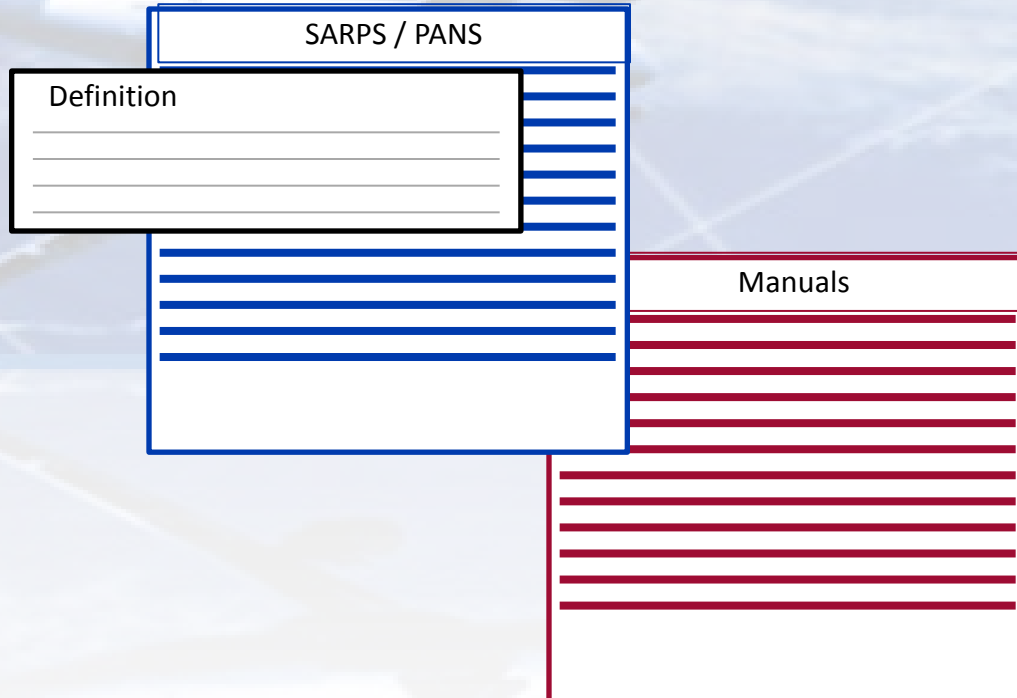
**PANS-OPS vol. II**  
Instrument Approach  
**Procedures**

*Accomplished for the most part with simple  
mapping in the definitions*

**Annex 10**  
Instrument Approach  
System **Performance**

**Annex 6**  
Instrument Approach  
**Operations**

# Annex 2, 10, 14 & PANS OPS Compatibility Retained



- No modification to SARPs
- Other initiatives have tagged along

# What is new? –Annex 6



- Clear distinction between
  - **Procedures** versus **Operations**
  - **Procedure**: the procedure is the instrument flight procedure allowing an aircraft to navigate on the final approach down to a given OCH, relying on a given type of Navigation infrastructure
  - **Operation**: is the manner in which an aircraft is conducted to operate on a procedure



The proposal focuses solely on the Operations side based on:

- Minima and
- Flight method



# What is new? –Annex 6



- Operations are to be classified in accordance to the achieved Minima at the end of an approach
  - **Type A**: Instrument approach operation 250' or above
  - **Type B**: Instrument approach operation below 250'
- Flight method is in accordance whether there is vertical guidance or not.
  -  2D (lateral guidance only)
  -  3D (lateral and vertical guidance)

# Addressing the Links

## Navigation System / App Procedures



- **Navigation Systems support for:**
  - **Conventional**
    - 2D or 3D Type “A” or “B” (CAT I, II & III)  
**Approach Operations**
  - **PBN**
    - 2D or 3D Type “A” or “B” (CAT I, II & III)  
**Approach Operations**

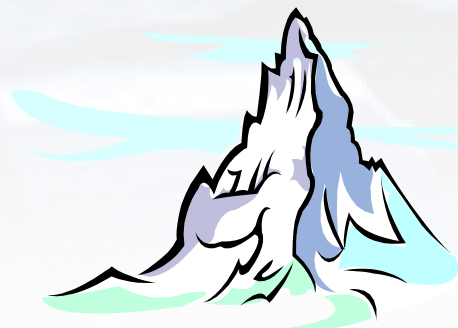


# Addressing the Links

## App Procedures/ App Operations



- **Approach Procedures designed for:**
  - **Conventional**
    - 2D or 3D Type “A” or “B” (CAT I, II & III)  
**Approach Operations**
  - **PBN**
    - 2D or 3D Type “A” or “B” (CAT I, II & III)  
**Approach Operations**



# Addressing the Links

## App Operations / Instrument Runways

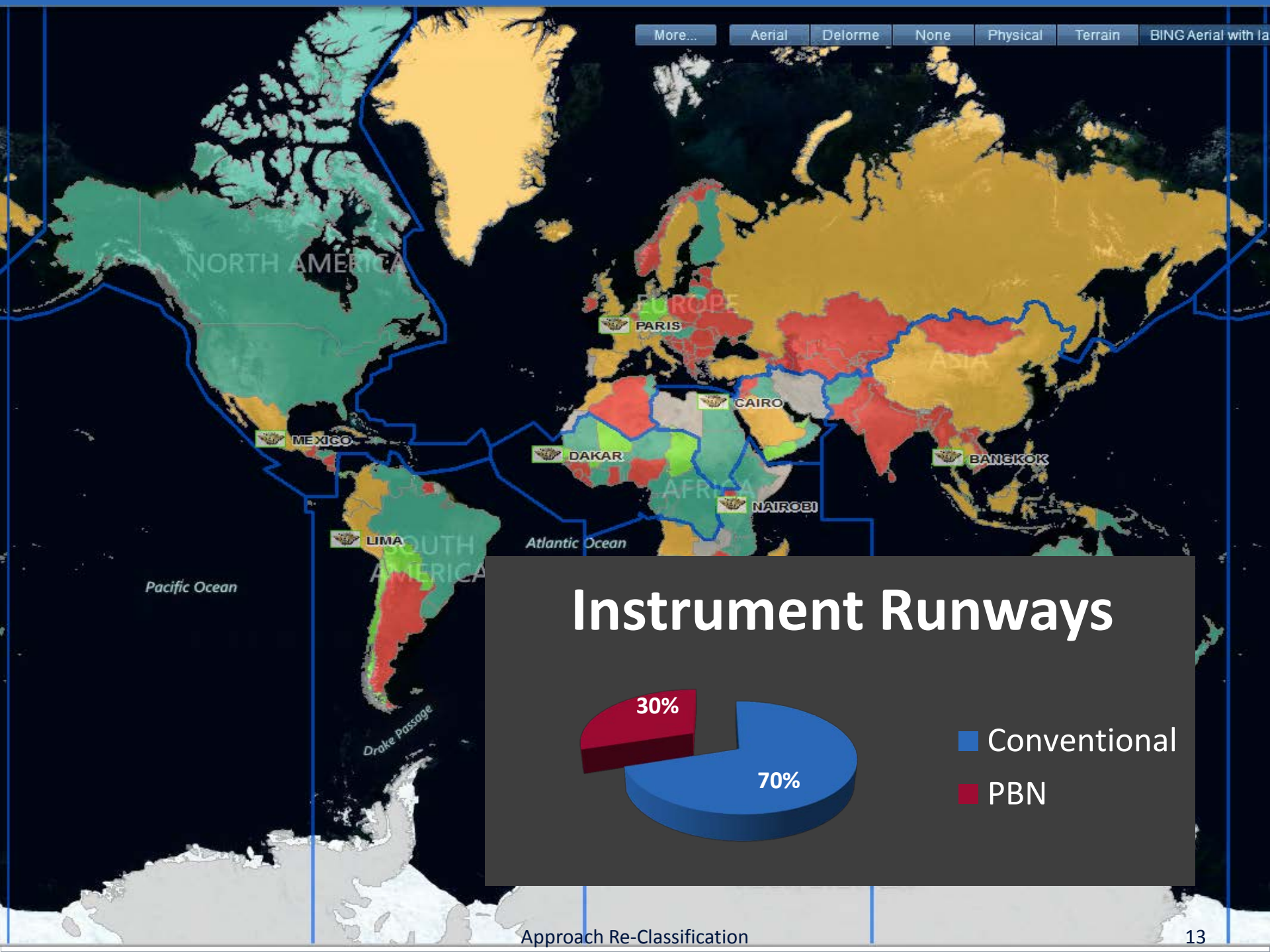


- **Minimum Runway Visual Aids requirements based on approach minima:**
  - Type “**A**” Operations – Non Precision APP RWY
  - Type “**B**” Operations – Precision APP RWY (CAT I, II & III)



Point from which visual references are required





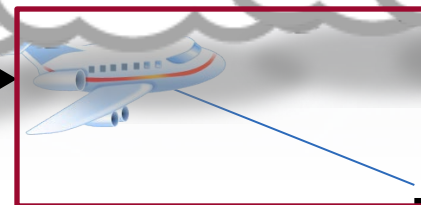


# The next Operational Frontier



- **Operational Credits for:**
  - **HUD - Head up Display**
  - **EVS - Enhanced Vision Systems**
  - **SVS - Synthetic Vision Systems**
  - **CVS - Combined Vision Systems**

Point from which **natural** visual references  
are required



# Summary Proposal

## Baseline – Block 0



### New Approach Classification

Domain	Document	Aspect				
Approach Operations	Annex 6	Classification	Type A		Type B	
			(>= 250')		CAT I (>= 200')	CAT II (>= 100')
		Method	2D	3D		
		Minima	MDA/H	DA/H*		



- Transitions to Performance Based Operations
  - Operations based on minima and flight methods
  - Runway Visual Aids derived by
    - Minima
    - Regardless of system or procedure
- Boost implementation of Assembly Resolution A-37/11
  - De-couples the airborne and ground requirements
  - Expands realm of possibilities at aerodromes
  - Enhances safety in a cost effective manner





- Clarifies Terms and Definitions
  - Simplifies Approach Operation Categorization
- Addresses all ICAO Provisions
- Accommodates for future development
- Retains Compatibility with Documentation
  - Least modifications for States who have begun PBN implementation



THANK YOU

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