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OACI



# **Third ICAO/IATA/CANSO Performance-Based Navigation (PBN) Harmonization, Modernization and Implementation Meeting for the North American, Caribbean and South American (NAM/CAR/SAM) Regions**



# Turning Challenges into Opportunities

SFO

JUL 2018

# What's the overall goal?

- PBN implementation?
- Reduce the separation?
- Implement shorter routes?
- Implement ASBU?

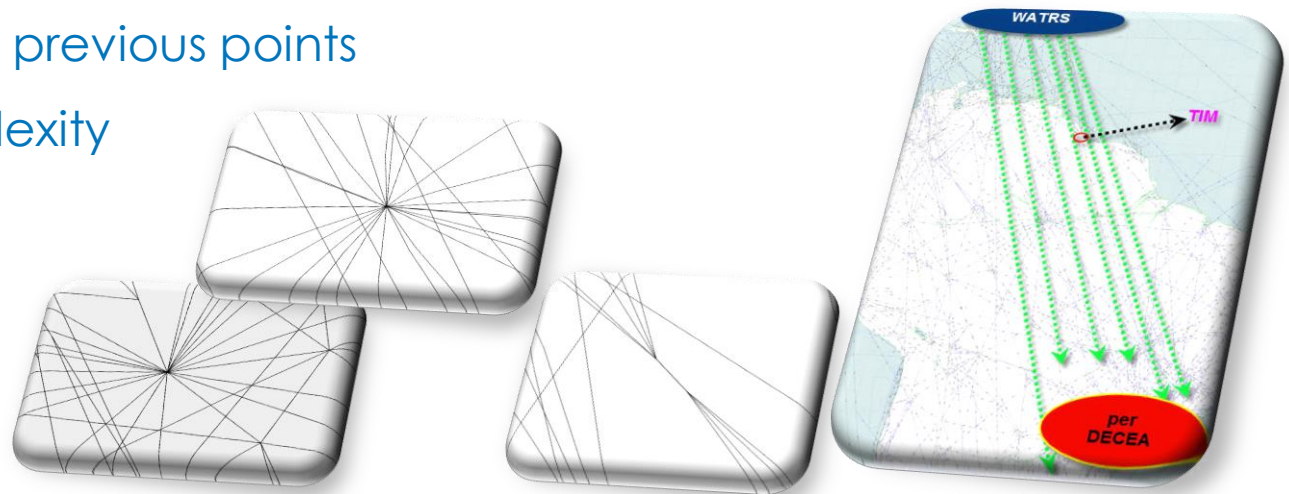


# What's the overall goal?

- Safe operation in and efficient seamless environment

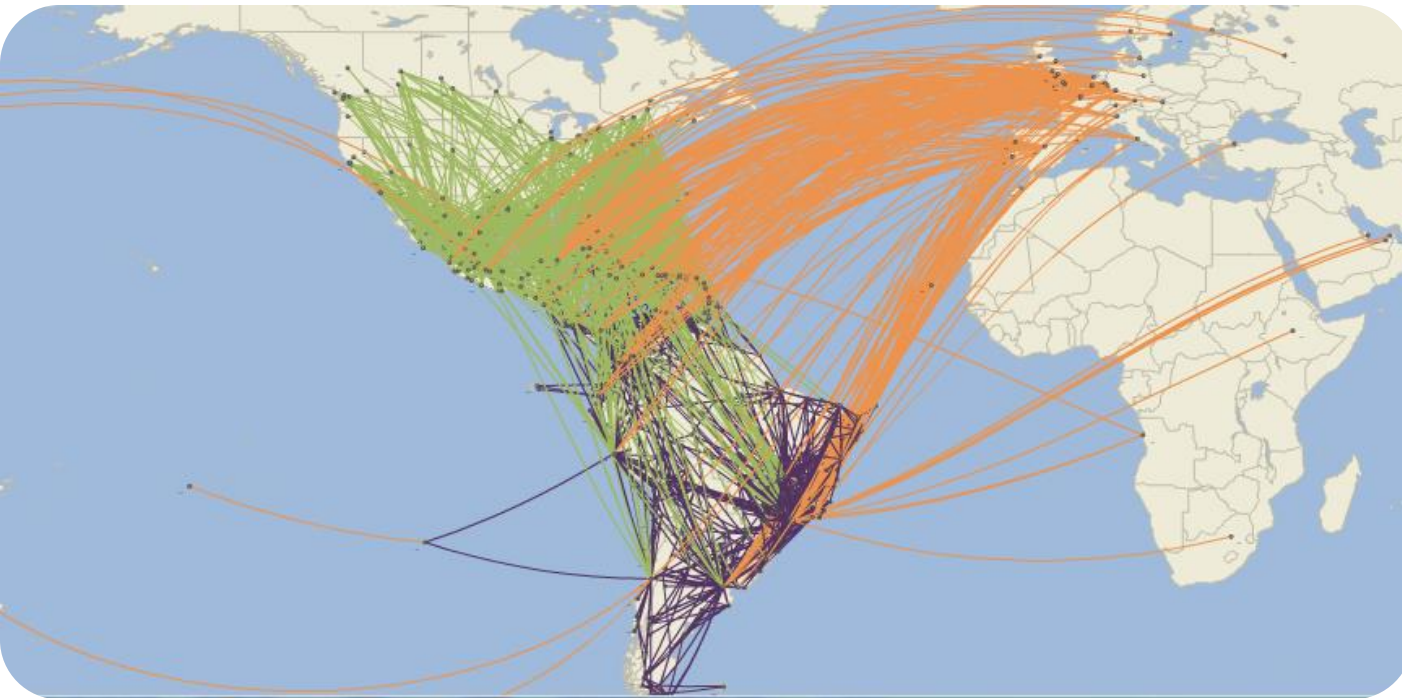
# Options to consider to reduce airspace complexity

- Analyze and plan what strategies could provide more efficiency:
  - Shorter routes
  - UPRs – random routing
  - Efficient routes - focused on less restrictive routes (e.g. 5NM longitudinal separation supported by an optimum CNS infrastructure)
  - Flexible airspace (e.g. parallel ATS routes between 2 major city pairs or area flows)
  - Or a mix of the previous points
  - Reduce complexity



# NAM-LATAM/CAR flights flows

- City pairs to/from/within LATAM/CAR, NAM, USA
- **Regional Challenge:** to implement “homogenous areas”

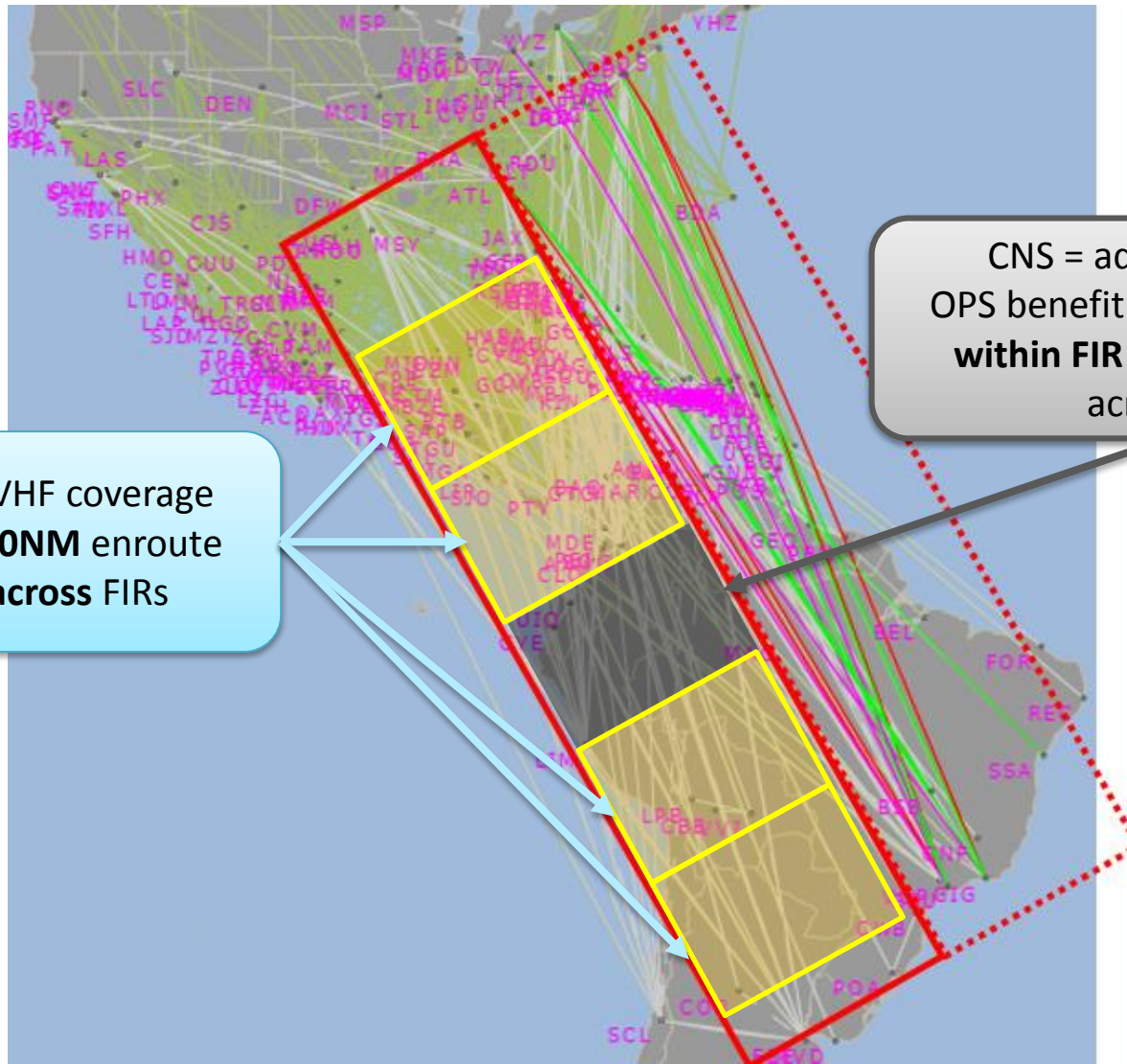


- Working groups could request an specific view to IATA



# TFAs

- Example 1 of “black hole effect” = **less operational benefits** with an expensive CNS implementation



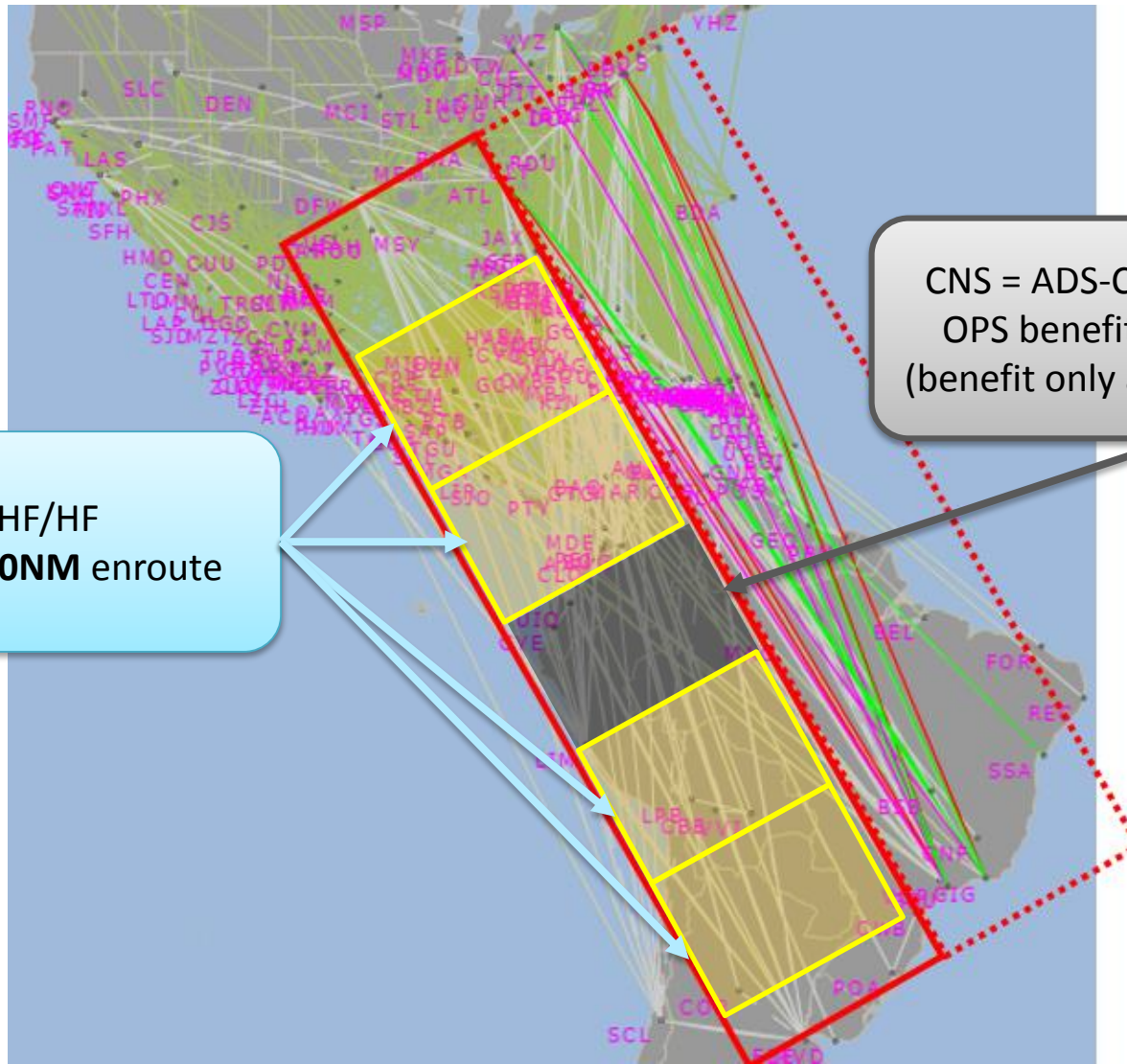
CNS = current VHF coverage  
OPS benefit = **20NM** enroute  
**within and across FIRs**

CNS = add MSSRs (\$\$)  
OPS benefit = **10NM** enroute  
**within FIR only** but **80NM**  
across FIR



# TFAs

- Example 2 of “black hole effect”= operational Benefit – reduced longitudinal separation **only within** FIR



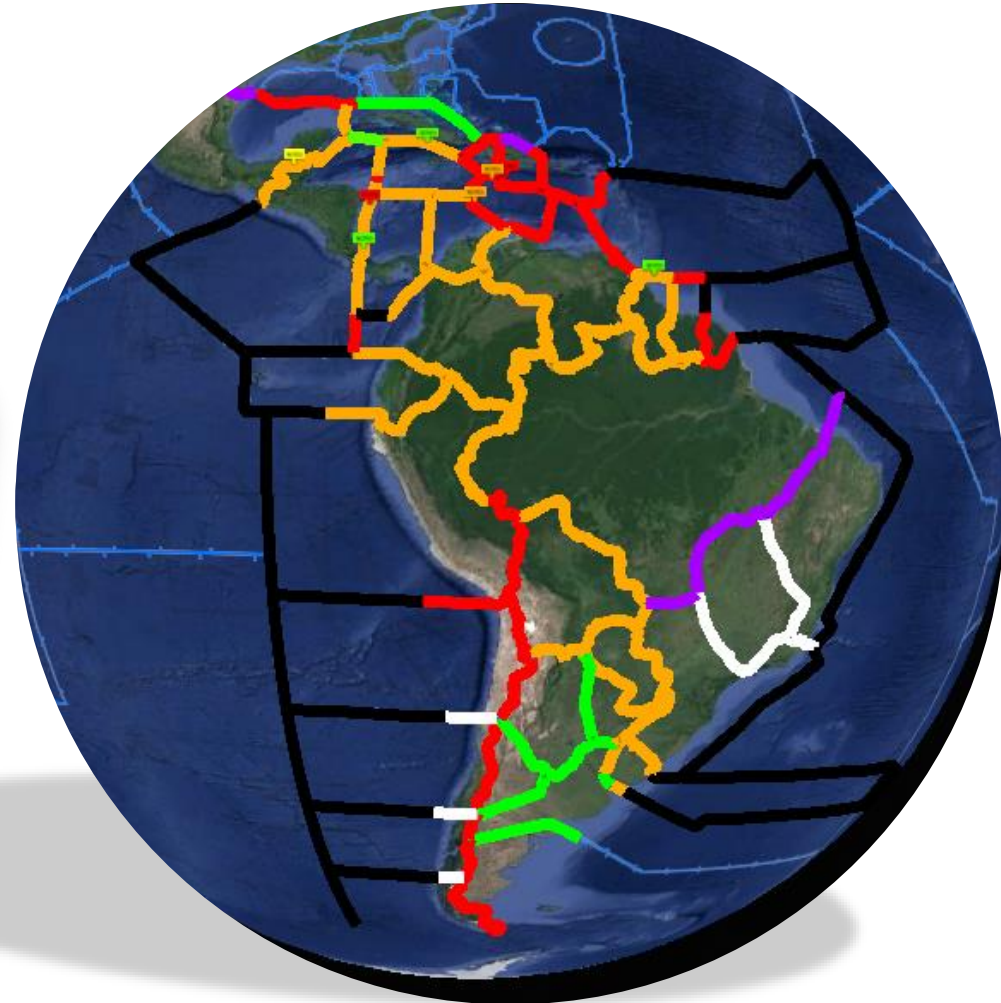
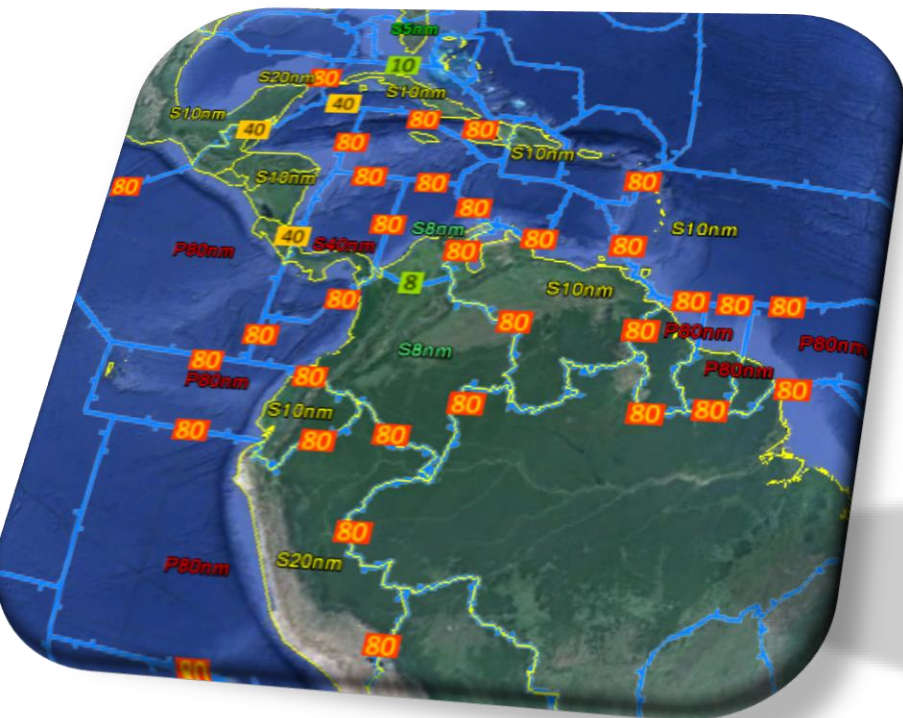
CNS = VHF/HF  
OPS benefit = **80NM** enroute

CNS = ADS-C/CPDLC **MANDATE**  
OPS benefit = **50NM** enroute  
(benefit only achieved within FIR)

# Regional Harmonization that impacts airspace efforts

- PBN implementation
- FPL – AICD
- Different operational standard – regulation (ex item 19)
- CNS (Ex. Diff requirements
  - DO260Bs = using different separation
  - Performance in ATM systems = not compatible;
  - poor Comms, etc.)
- Outdated LOAs
- ATFM (procedures, implementation, capacity analysis, etc.)
- Safety concerns (safety case? Risk matrix? Mitigation?)
- Lack of workforce
- Etc..

# Longitudinal Separation



# Longitudinal Separation - goal

- Proposal: to change procedures from
  - *“longitudinal separation minima based on time”*, to
  - *“longitudinal separation minima based on DME and/or GNSS”*
- Doc.4444 – chapter 5 requirements:
  - DME/GNSS and direct ATC-pilot VHF

5.4.2.3.1 Separation shall be established by maintaining not less than specified distance(s) between aircraft positions as reported by reference to DME in conjunction with other appropriate navigation aids and/or GNSS. This type of separation shall be applied between two aircraft using **DME, or two aircraft using GNSS** or one aircraft using DME and one aircraft using GNSS. **Direct controller-pilot VHF voice communication** shall be maintained while such separation is used.

ATC

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A/C

“evolving sophistication”

1903

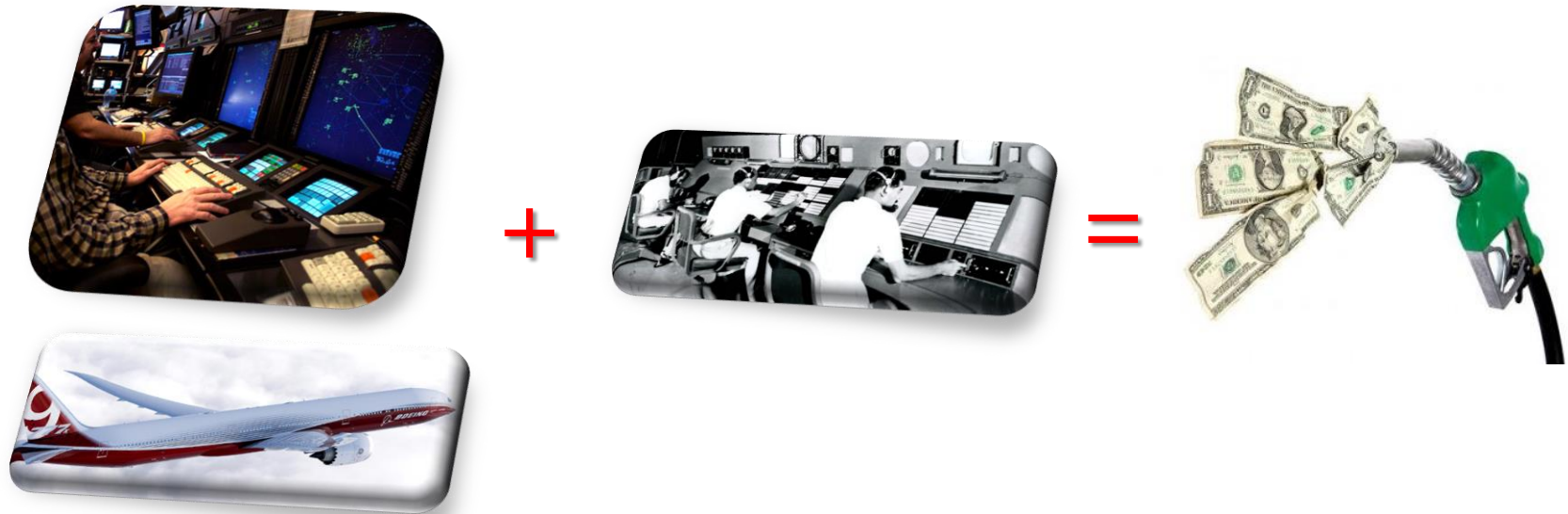


today

ATC

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Aircrafts



New technologies + old techniques

# CNS support

ICAO  
Doc.9082



# Longitudinal Separation (Concepts Homologation)

- Doc.9426 Part II; Section 2, Chapter I; 1.2.1.3
- If the same SUR/COM performance is achieved in “continental airspace” and over “oceanic” areas, the same separation should be applied.

1.2.1.3 The determination of longitudinal separation minima is based on the quality of information available to ATC.

II-2-1-2

Air Traffic Services

1.1.7 In any case, the determination of the prescribed separation minima is a complex process which needs to take account of numerous factors, many of which are outside the scope and competence of ATC. Frequently it will be left to the individual controller to determine, based on sound judgement, what separation is adequate for a specific situation. However, once separation minima are established by the competent authority, it is incumbent upon ATC to ensure that the established minima are not infringed upon.

1.1.8 Because of the many variable factors involved in the determination of separation minima, it could be imagined that each State, and in some cases even each ATC unit, would apply its own separation minima, peculiar to its particular situation. This would, however, not only disrupt any effort to organize an orderly flow of air traffic between adjacent ATC units, but would also create considerable confusion amongst pilots exposed to such varying standards. It was for this reason that, from the early days of ICAO, it was agreed that separation minima should be established internationally and that such minima should only be changed through international agreement. The

1.2.1.2 The ATC system is premised on the responsibility for navigation is vested within air. The ATC system does not normally assume responsibility for the navigation of aircraft except in certain instances when the air traffic controller is in a position to obtain information on a more accurate basis than is available aboard the aircraft. With the increased use of ground radar by ATC, there has been a noticeable trend towards a situation where controllers are required to assume some navigation responsibilities. In such cases, the navigation instructions (vectors) required to maintain the proper flight path are determined and issued by ATC personnel.

1.2.1.3 The determination of longitudinal separation minima is based on the quality of information available to ATC. The determination of lateral separation should be based primarily on the accuracy with which pilots can adhere to an assigned track. In many cases lateral separation minima are stated in terms of the width of the airspace to be protected along a given route or airway. Such minima must be made known to all ATC personnel concerned.

- Where?
- SAM
- Black sea airspace
- Bangkok Oceanic area
- APAC airspace have 2 type of airspace (based on infrastructure)
  - = surveillance
  - = procedural



# ATFM best practices

- Harmonized ATFM procedures
  - AIP, LOAs with other FIRs
  - not by ATCs
- Communication (ITOP, CADENA, Direct)
- Post OPS
- Discuss and analyze all the options in DCM with stakeholders (Airlines, other FIRs, Airports, etc.)



# FPL initiative: Progress

Letters = to procedures used or accepted to use by ANSPs

■ P ■ A ■ IDA ■ FIDA ■ ID-IA

How it was before RCG FPL initiative



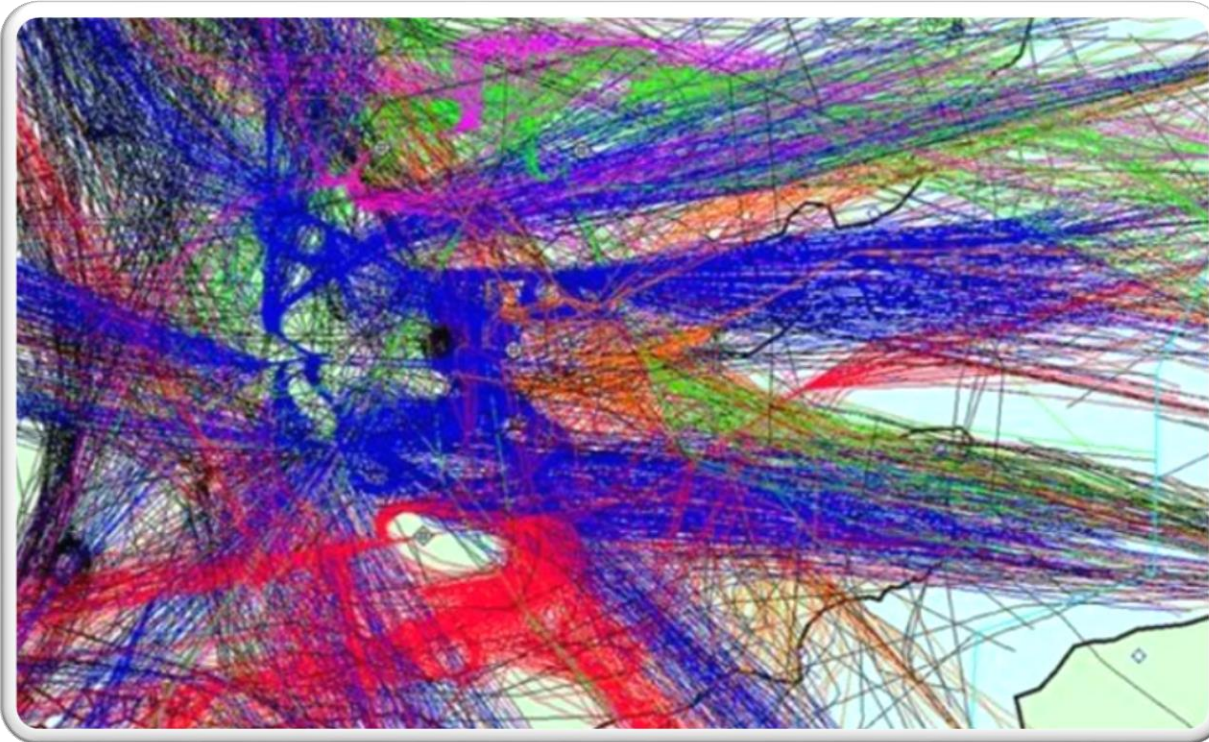
How it is today with current procedures



States that have committed to change to blue/green



# Efficiency of the system is the clue



## How?

- Predictability
- Collaborative Decision Making (CMD) between stakeholders
- Measure the ATM system and improve what is necessary according to the expected demand



THANK YOU

QUESTIONS?

