



**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

*A United Nations Specialized Agency*

# **ICAO's Aviation System Block Upgrades from a Pilot's Perspective**

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IFALPA 68<sup>th</sup> Annual Conference

12-15 April 2013

# Addressing Safety & Traffic Growth



- Air traffic growth expands two-fold once every 15 years
- If we do nothing, we'll have to bear costs
  - Direct costs:
    - congestion
    - delays
    - etc.
  - Indirect costs:
    - increase in accidents
    - negative impact on environment
- Challenge is to ensure that continuous Safety improvement and Air Navigation modernization advance hand-in-hand



# A Strategic Systems Approach



- Number of States undertook modernization of national/regional ANS
- Other States explore possibility of developing upgrades
- Need for globally coordinated strategy
  - for globally interoperable ANS
- ICAO developed strategic systems approach
  - linking progress in safety and AN
- Allows States and stakeholders to realize safe, sustained growth,
  - increasingly efficient and environmentally responsible
- Proposed approach addresses regulatory & user requirements



# A Team Effort





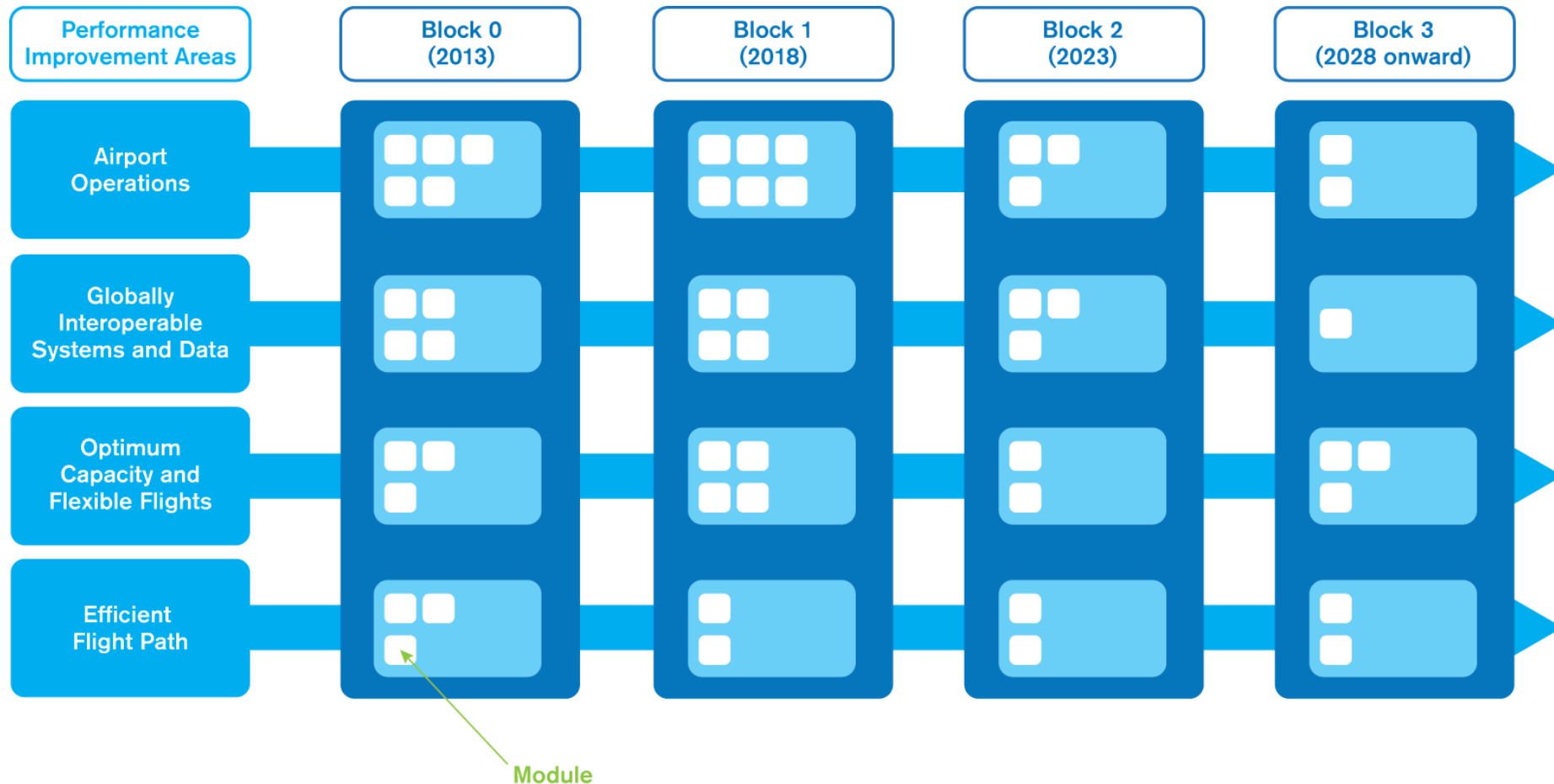
# “Block Upgrades” Strategy



- Systems engineering planning & implementation approach
- Clear goals in operational improvements
- Result of extensive collaboration and consultation
  - safety enhancements
  - harmonization
  - removing barriers
- Not “one size fits all”
  - based on specific traffic densities & operational needs
  - all modules not required in all airspaces



# Overview of Block Upgrades



# Routine Flight From Block 0 Perspective As of 2013



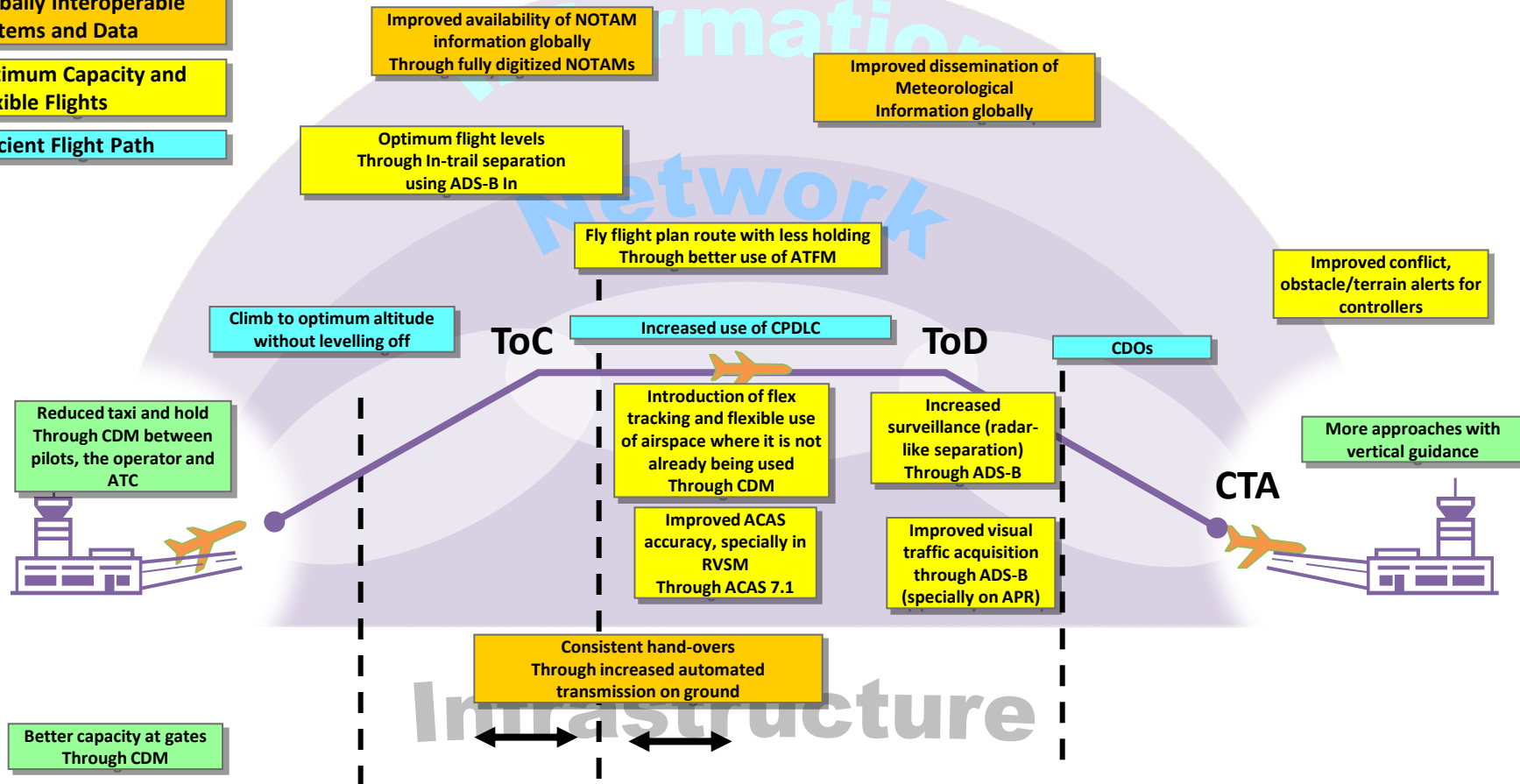
## Performance Improvement Areas

Airport Operations

Globally Interoperable  
Systems and Data

Optimum Capacity and  
Flexible Flights

Efficient Flight Path



# Routine Flight From Block 1 Perspective As of 2018



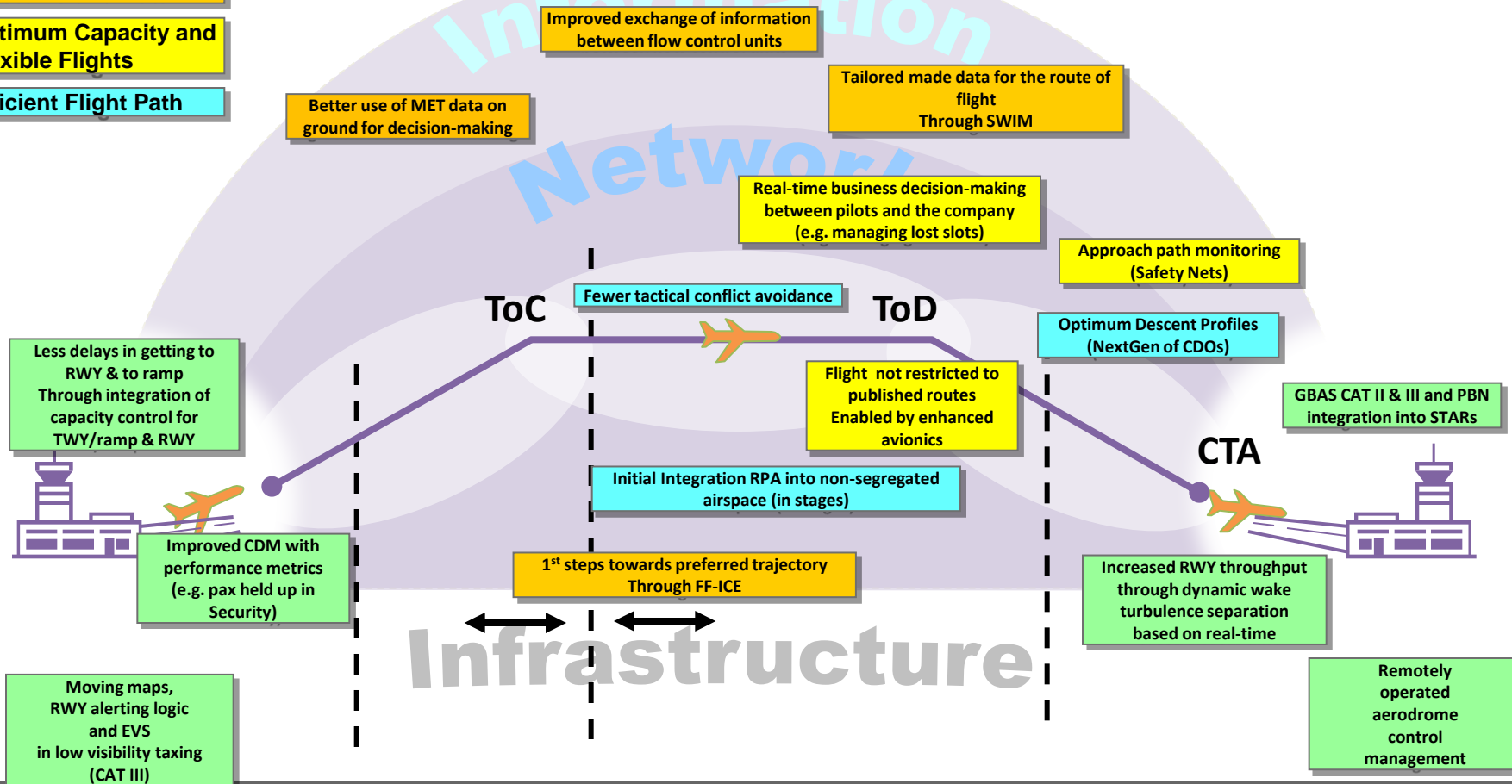
## Performance Improvement Areas

Airport Operations

Globally Interoperable  
Systems and Data

Optimum Capacity and  
Flexible Flights

Efficient Flight Path





# Routine Flight From Block 2 Perspective As of 2023



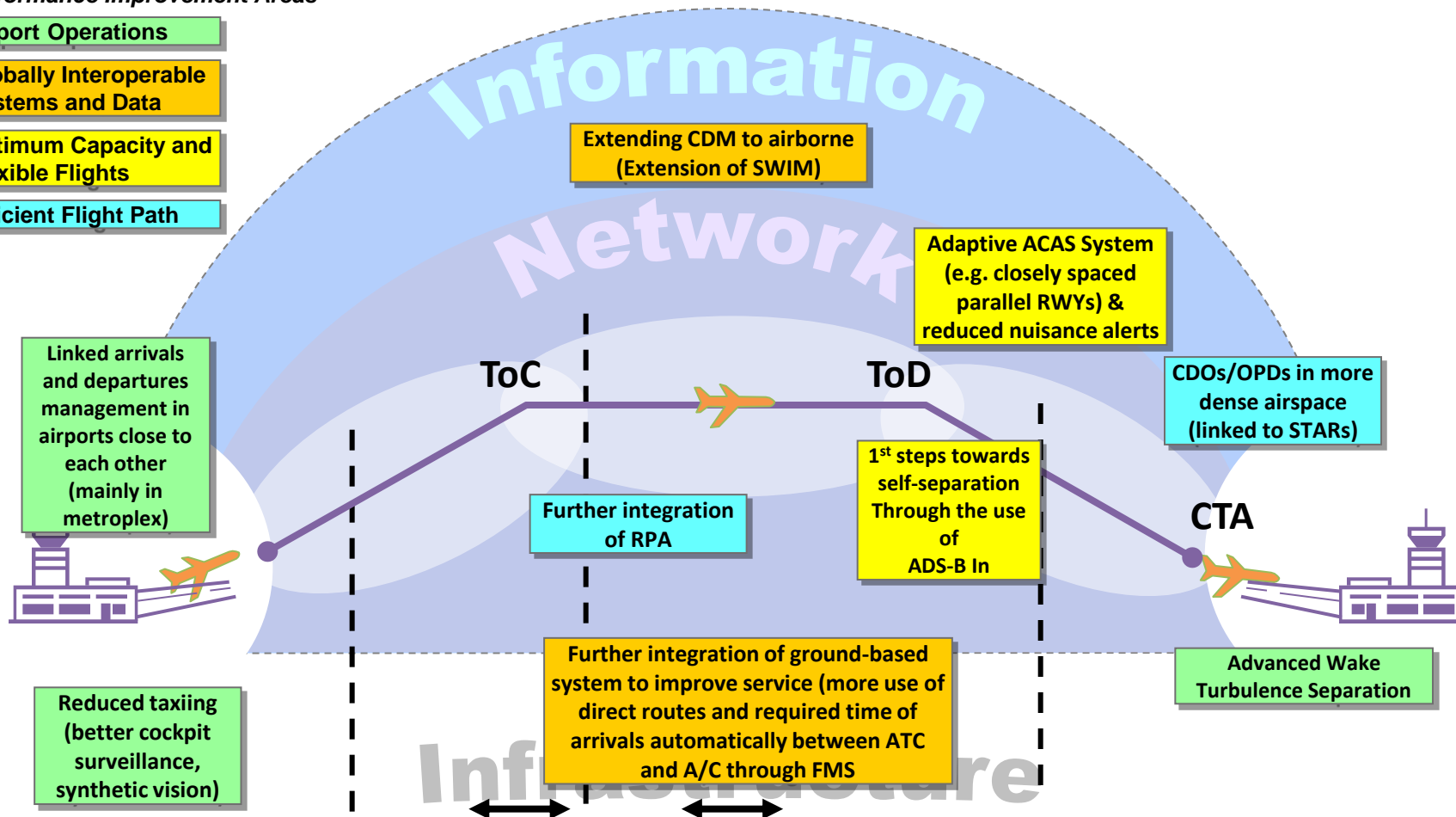
## Performance Improvement Areas

Airport Operations

Globally Interoperable  
Systems and Data

Optimum Capacity and  
Flexible Flights

Efficient Flight Path



# Routine Flight From Block 3 Perspective As of 2028



## Performance Improvement Areas

Airport Operations

Globally Interoperable  
Systems and Data

Optimum Capacity and  
Flexible Flights

Efficient Flight Path

Enhanced operational decisions through integrated  
meteorological information  
(strategic vs. tactical)

Traffic Complexity Management (e.g. Olympic  
Games, World Cup, volcanic ash eruption)

Full 4D TBO (optimum trajectories via FMS & with  
conflict management systems on ground)

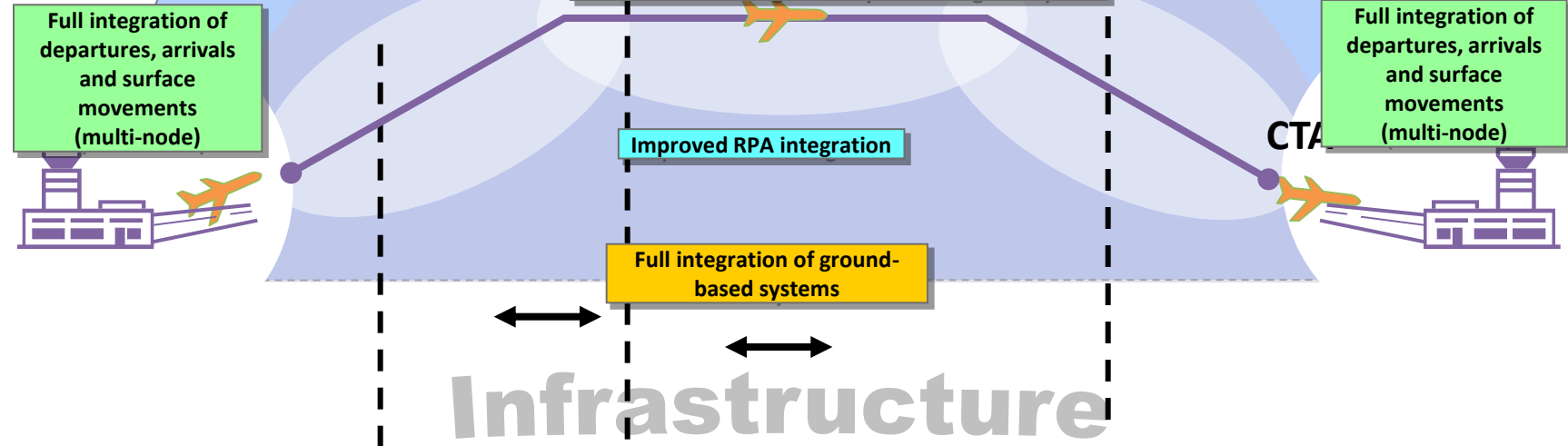
Improved RPA integration

Full integration of ground-  
based systems

Full integration of  
departures, arrivals  
and surface  
movements  
(multi-node)

Full integration of  
departures, arrivals  
and surface  
movements  
(multi-node)

Infrastructure



# Conclusion



- Block Upgrades strategy is systems engineering planning & implementation approach
- Clear operational improvements
- Planning for the next 20 years
- Implemented based on needs
- Modules address phases of flight
- Strategy is part of GANP





North American  
Central American  
and Caribbean  
(NACC) Office  
Mexico City

South American  
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Lima

ICAO  
Headquarters  
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Central African  
(WACAF) Office  
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North Atlantic  
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Middle East  
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Eastern and  
Southern African  
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Asia and Pacific  
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**Thank You**