



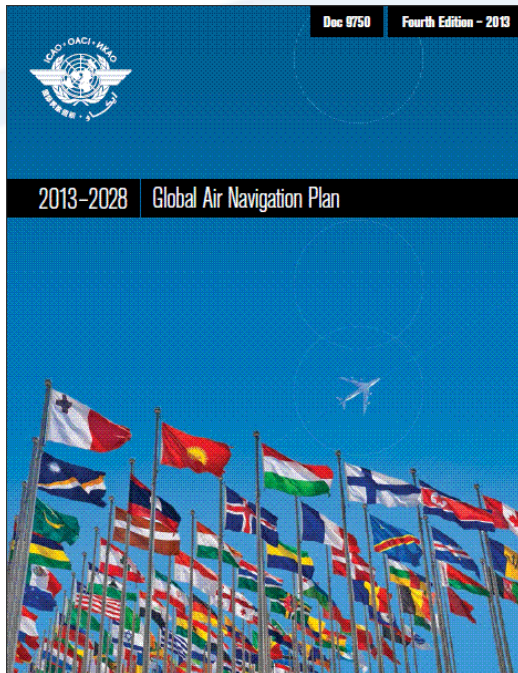
# Global Air Navigation Plan ANC-12 Results and Impacts

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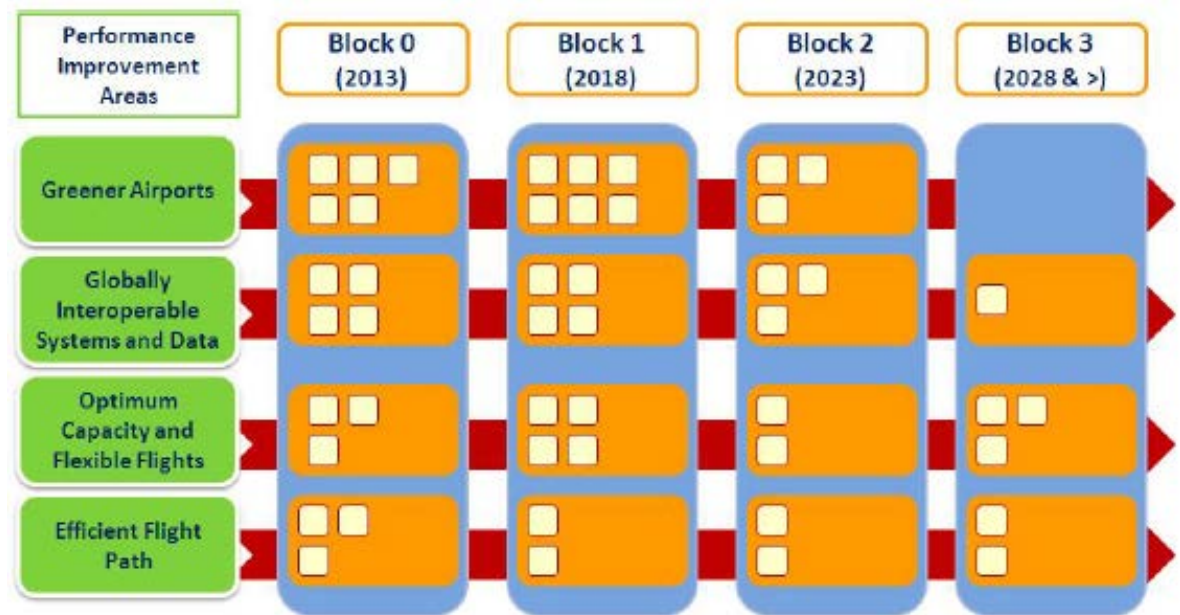
**FAA**

# GANP and ASBUs



- Overarching framework
- Addresses key civil aviation policy principles
- Assists ICAO Regions and States to establish air navigation priorities for the next 15 years
- Assists ICAO Regions and States to prepare their navigation plans

- ASBUs can be tailored to a State's needs and requirements



# ASBUs

## Background

- NextGen and SESAR provide the foundation for ASBUs that can be expanded to other regions around the globe

## GANP provides description and information on:

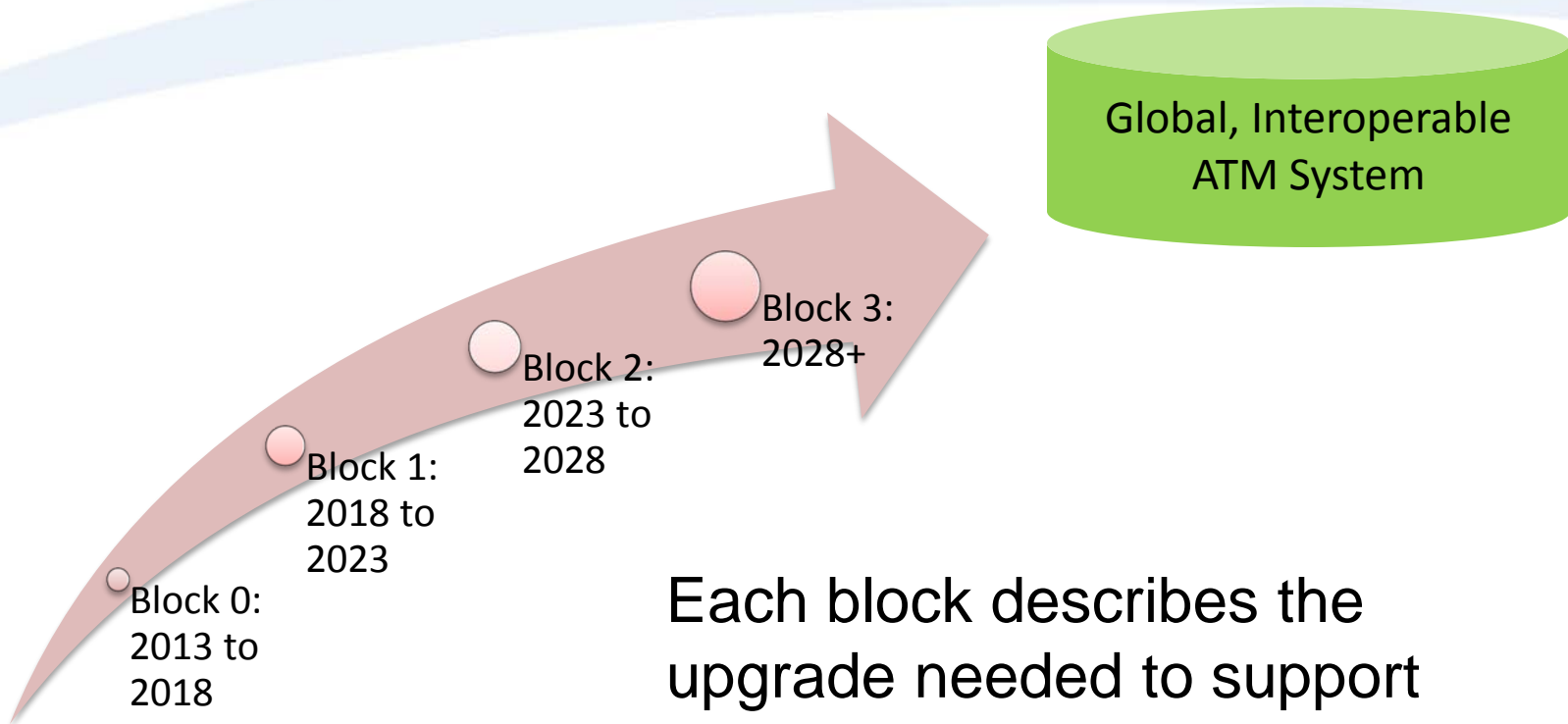
- the ASBU framework;
- the ASBU modules; and
- Its associated technology roadmaps

## ASBUs are designed so that:

- Regions and States can adopt and implement the systems and technologies based on their respective needs; and
- Whichever system is implemented, it will be harmonized and interoperable with rest of the world



# Air Navigation Global Performance Improvement Roadmap



Each block describes the upgrade needed to support the overall effort in each time frame.



**FAA**

Next**GEN**

# ANC 12 Outcome - Highlights

- ICAO hosted the 12<sup>th</sup> ICAO Air Navigation Conference (ANC/12) in Nov 2012 at Montreal, Canada
- ANC/12 was attended by 1032 participants from 120 contracting states and 30 observer delegations
- 150 Working Papers and 232 Conference Recommendations were presented
- The primary objective of the ANC/12 was to gain acceptance by States and industry of the Global Air Navigation Plan (GANP) and the Aviation System Block Upgrades (ASBUs)
- ANC/12 objectives has been successfully met

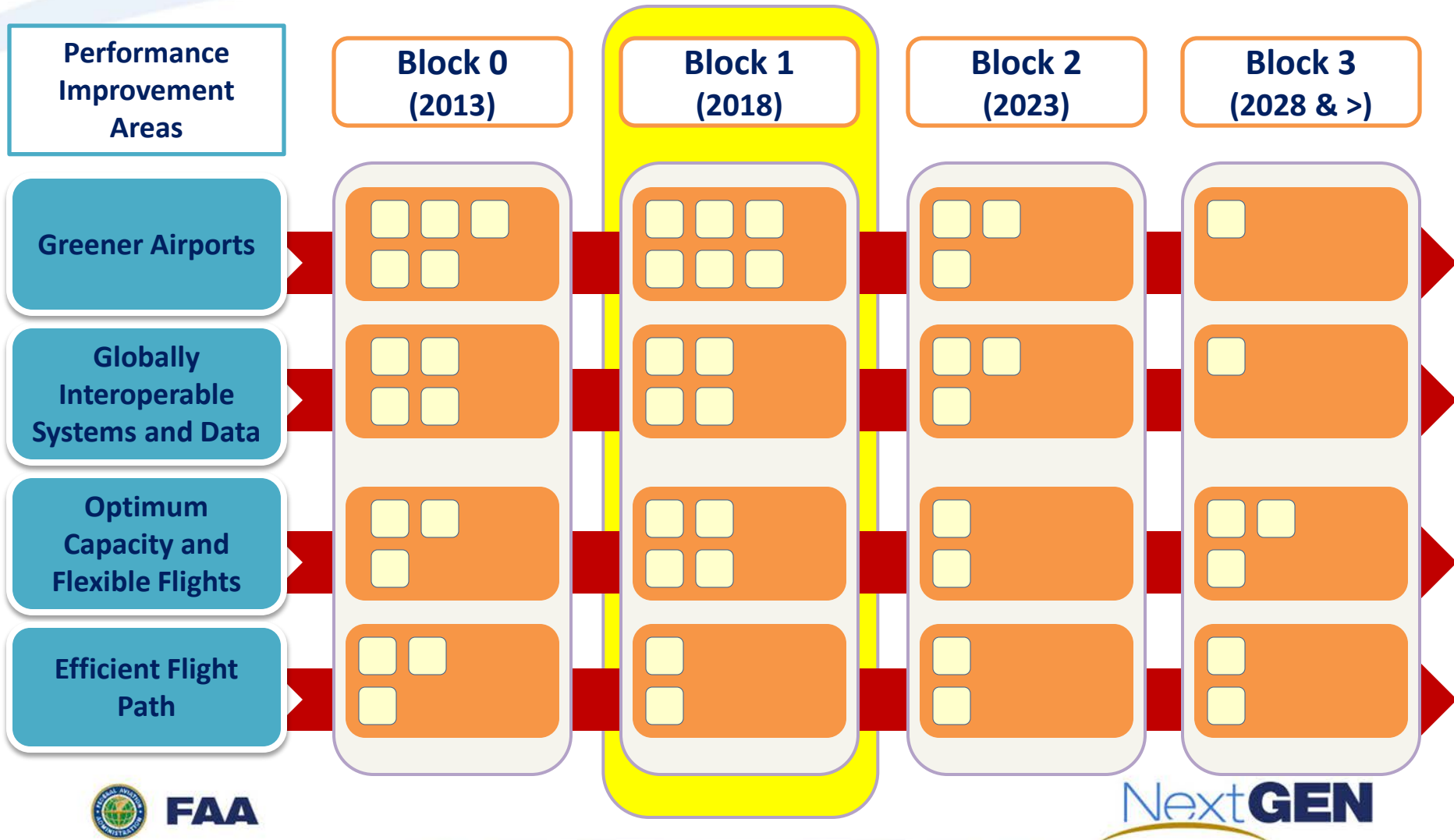
# GANP 2013-2028 Minimum Path

- Obliges State to map their individual or regional programs against the GANP, but provides them with greater certainty of investment
- Requires active collaboration with regional colleagues via the PIRGs in order to coordinate initiatives within applicable regional ANSP
- Provides all required tools for States and Regions to consider as they conduct a comprehensive business case analysis to realize their specific operational improvements

# Regional and Global Air Navigation Reporting

- Regional Planning
- Regional Reporting
- Regional Performance
- Global Air Navigation Report

# Block 1





**\* \* \* \***



# FAA Approach to ASBUs

- Support of the GANP and ASBUs at the ICAO 38<sup>th</sup> Assembly in Sep 24 – Oct 4, 2013 in Montreal, Canada
- NextGen is US's Upgrade Plan
- All items are aligned with NextGen and SESAR coordination plans
- ICAO Block timelines are more conservative than FAA
- Just as NextGen is not everything, for everyone, all the time, neither are the blocks

# Realigned Elements of NextGen

## Today's National Airspace System

Inefficient routes & fuel consumption

Ground-based Navigation and Surveillance

Disconnected Information Systems

Cognitive-Based Air Traffic "Control"

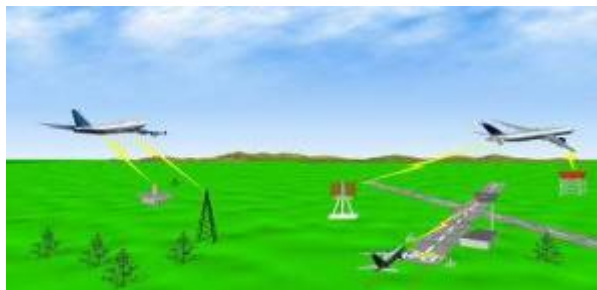
Air Traffic Control Communications By Voice

Fragmented Weather Forecasting

Focus on major airports

Airport Operations Limited By Visibility Conditions

Forensic Safety Systems



## NextGen

Shorter flight paths/ fuel saving procedures; alternative fuels; reduced noise

Satellite-based Navigation and Surveillance

Information More Readily Accessible

Automation, Decision Support Tools

Routine Information Sent Digitally

Forecasts Embedded into Decisions

Focus on metropolitan areas

Operations Continue Into Lower Visibility Conditions

Prognostic Safety Systems



# A consistent thread

- Advanced procedures to save fuel and time
- Navigation to support advanced procedures – APNT
- Information that provides both aircraft and crew capabilities
- TBFM to TSS, from workload to sequencing and spacing – beyond simple cognition
- Datacomm to adjust, communicate, alleviate storage issues
- Work in all weather
- High Volume traffic – Metroplex
- Same pattern – all weather all visibility

# Trajectory Operations: Transformation

## Procedural Based Control:

*Control on Where We Think the Aircraft Is*



Landmark Navigation

Radio Beacons

Position Reports

## Surveillance Based Control:

*Control on Where We Know the Aircraft Is*

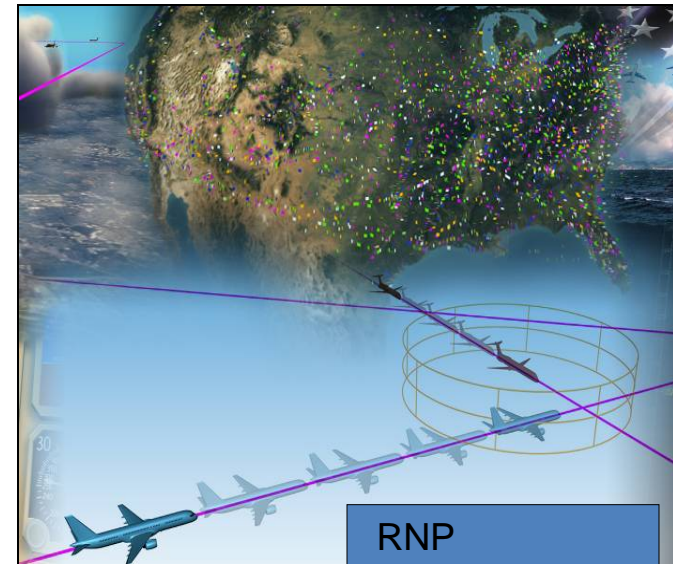


VOR/DME

RADAR

## Trajectory Based Control:

*Control on Where We Know the Aircraft Will Be*



RNP

ADS-B

DataComm



Flow Management Trajectory Management

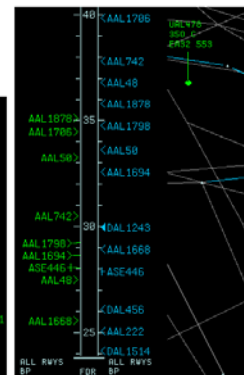
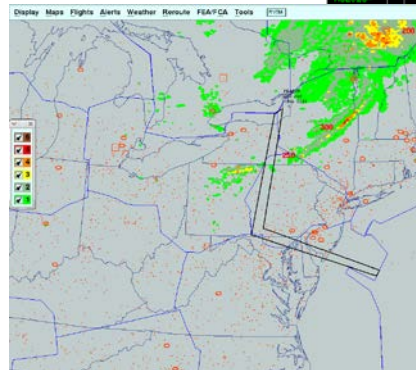
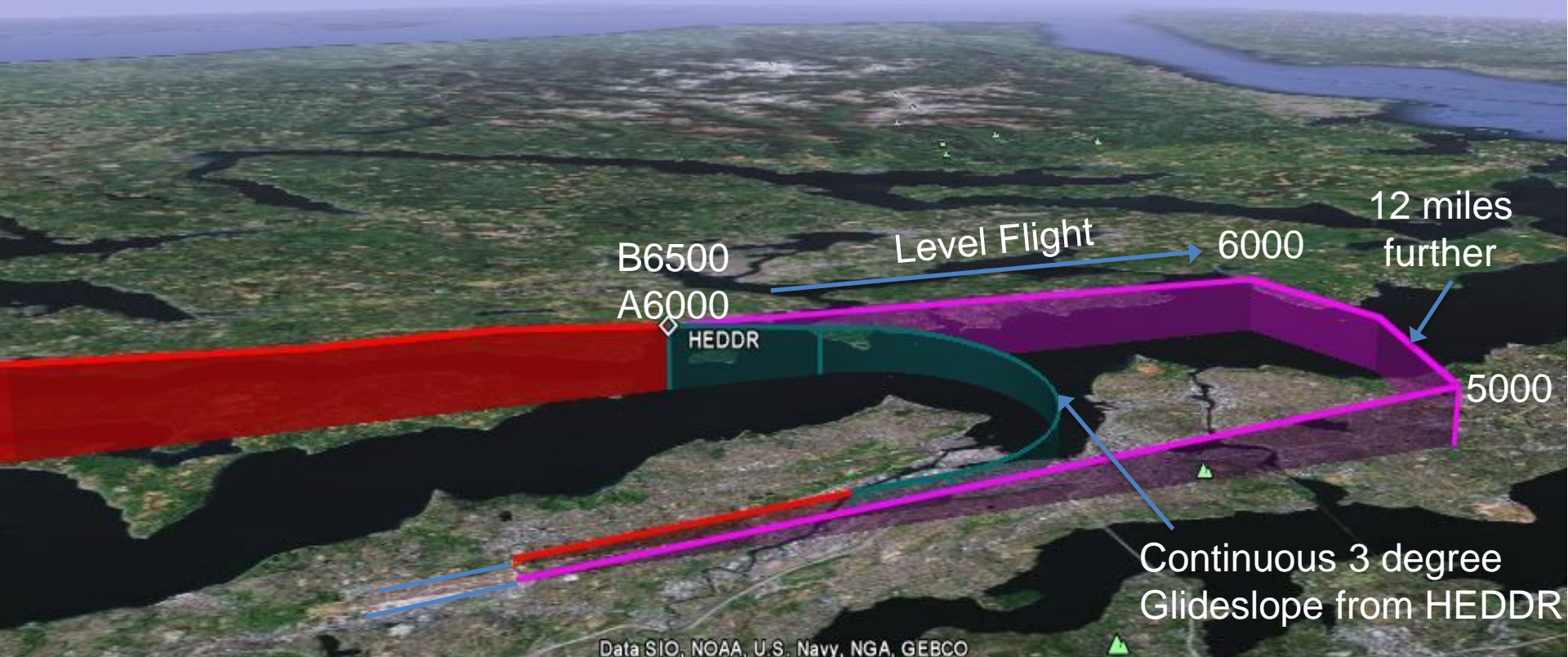


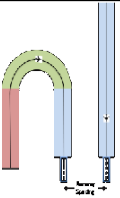
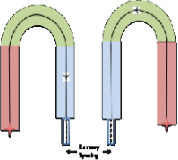
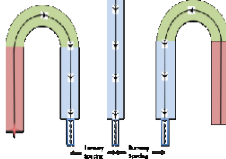
Figure 4 - PGUI Timeline

# Why a Single Track Through the Bay in All Weather Conditions is Critical to Success



ATC issues and pilots fly the same track every time, predictable and stabilized  
STAR connects to all approaches, continues the 3 degree glideslope, no level-offs or

# NAS-wide Established on RNP Plan

		Future	Future	SEA	Future	ATL	ATL	ATL	Future
Airports with Potential Applicability		<b>SOIA</b>	<b>0.308</b>	<b>Dependent 2500-4300 1.5 NM Diagonal Separation</b>	<b>Dependent 4300-9000 2 NM Diagonal Separation</b>	<b>Independent Requires NTZ</b>	<b>Independent FMA/PRM</b>	<b>Widely Spaced Parallels w/o Mon</b>	<b>Widely Spaced Parallels w/o Mon</b>
		BOS, PHI, SFO	BOS, CLE, PHI, SEA, STL	24 AIRPORTS: AUG, CMH, DAL, DAY, DFW, FLL, GSO, HSV, IAH, ICT, IND, JFK, LIT, MCI, MSP, OKC, ORD, PHX, PDX, RDU, SEA, SDF, STL, TUL	15 AIRPORTS: ATL, BNA, CVG, DEN, DFW, DTW, IAH, LAX, MEM, MIA, ORD, PIT, RND, SLC, TPA	15 AIRPORTS: ATL, BNA, CVG, DEN, DFW, DTW, IAH, LAX, MEM, MIA, ORD, PIT, RND, SLC, TPA	ATL, IAH, ORD	7 AIRPORTS: ATL, CLT, DEN, DFW, IAD, MCO, ORD	DEN
		<b>SOIA</b>	<b>0.308</b>	<b>2500' - 4300'</b>	<b>4300' - 9000'</b>	<b>Dual 4300' - 9000'</b>	<b>Triple 5000'+</b>	<b>9000'+</b>	<b>High Alt 9200'+</b>
	Right	Future TBD	Future TBD	TBD SEA	Future TBD	TBD ATL	N/A	TBD ATL	Future TBD
	Left	Future TBD	Future TBD	TBD SEA	Future TBD	TBD ATL	N/A	TBD ATL	Future TBD
	Right	Future TBD	Future TBD	TBD SEA	Future TBD	TBD ATL	N/A	TBD ATL	Future TBD
	Left	Future TBD	Future TBD	TBD SEA	Future TBD	TBD ATL	N/A	TBD ATL	Future TBD
	Right	N/A	N/A	N/A	N/A	N/A	TBD ATL	N/A	N/A
	Ctr	N/A	N/A	N/A	N/A	N/A	TBD ATL	N/A	N/A
	Left	N/A	N/A	N/A	N/A	N/A	TBD ATL	N/A	N/A

NOTE: Quads to be considered where applicable

# Challenges to Global Harmonization

- It is critical that future ATM technologies be compatible and interoperable (Standards)
- Integration of new technologies, systems, procedures and concepts into domestic airspace (Mixing new with old)
- Regional collaboration to coordinate modernization technologies and time lines (Cross boundary and multilateral harmonization)
- Service Provider and Operator investment required to realize full benefits (Infrastructure and avionics)
- ICAO, CANSO and others must continue leadership role in promoting cross-regional harmonization (ICAO Block Upgrades)



# Opportunities in Global Harmonization

- If the GANP is successful – future ATM technologies will be compatible and interoperable. So
  - Learn the new “language” since there are and will be regional opportunities
  - The regional planning groups are very important
- There are opportunities to re-architect – information is a key thrust for the GANP, do not depend on old sources of data to “derive” information
- For US participants remember that almost everything is a boundary.



# NextGen/EU Harmonization

Memorandum of Cooperation (MoC) between U.S./FAA and EU/SESAR for mutual cooperation in civil aviation R&D (Mar 2011)

- Annex 1: NextGen-SESAR cooperation for global interoperability (Mar 2011)
  1. Transversal Activities
  2. Information Management
  3. Trajectory Management
  4. CNS and Airborne Interoperability
  5. Collaboration Projects
- (NEW) Annex 2: Collaboration on Air Traffic Management Performance Measurement (Feb 2013)
  - ✦ Develop common definitions and data to support ATM performance measurement
  - ✦ Establish a standard methodology for assessing operational performance