PBCS - CONOPs & Benefits

Presented to: PBCS/GOLD Workshop

Date: September 2017

Dakar, Senegal

New York Center-1940

New York Center-2000

Technology Enables Change: The FAA ATOP System

- **The ATOP system is one of the most advanced air traffic control systems in the world.**

- **Fully operational in New York, Oakland and Anchorage oceanic airspace.**

ATOP Functionality

ATOP Provides:

- Complete 4D Traffic Profiling in Oceanic Airspace

- Conflict Detection for All Oceanic Separation Standards

- Separation Criteria Based on Individual Aircraft Performance and Equipage

- Full Integration of RADAR and non-RADAR Traffic

- Dual Channel Architecture with full redundancy on all processors

- Fully ICAO 2012 compliant system. Supports all ICAO flight plan messages such as FPL, CHG, DEP, CNL, ARR.

AIR TRAFFIC CONTROL WITH ATOP

INMARSAT

GNSS

Satellite based navigation systems

Direct link data communication

Conflict probe

Automatic dependent surveillance

Paperless operations

Modernized system allows reduced horizontal separation standards

ARTCC

Ground-to-ground data link to other centers

ATOP Functionality

ATOP Provides:

- Dynamically Assignable Airspace

- Satellite based Controller Pilot Data Link Communication (CPDLC)

- Satellite based Automatic Dependent Surveillance – Contract (ADS-C)

- Automatic Dependent Surveillance-Broadcast (ADS-B)
- Paperless Environment

- Automatic Weather Dissemination

- Air Traffic Services Inter-facility Data Communications 2.0 (AIDC)

- RADAR Data Processing

- Elimination of voice communication between RADAR and non-RADAR Ocean21 Sectors

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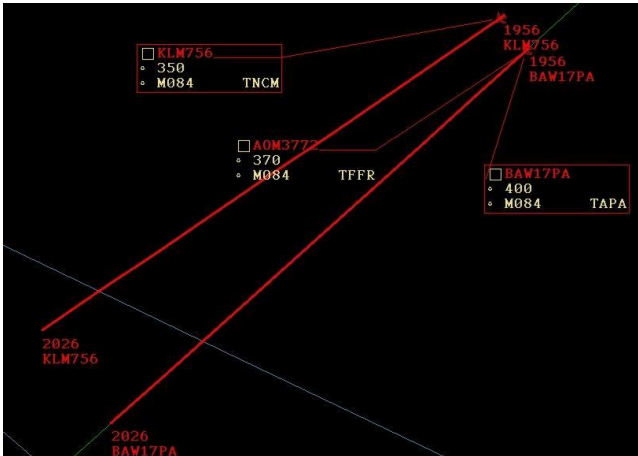
ARTCC

Conflict Prediction and Resolution

Conflict Probe

- ATOP Detects All Conflicts - Controller Resolves Conflicts.
- Aircraft/Aircraft and Aircraft/Airspace.
- Probe Runs Automatically on All Trajectory Updates.
- Applies Appropriate Separation Standard.
- Conflict Probe is 4-dimensional and calculated down to the second.

Datalink Equipage Statistics

ZNY Flights & Equipment Utilization

Legend: No. Flights — % Utilizing Datalink — % RNP4 — % RNP10
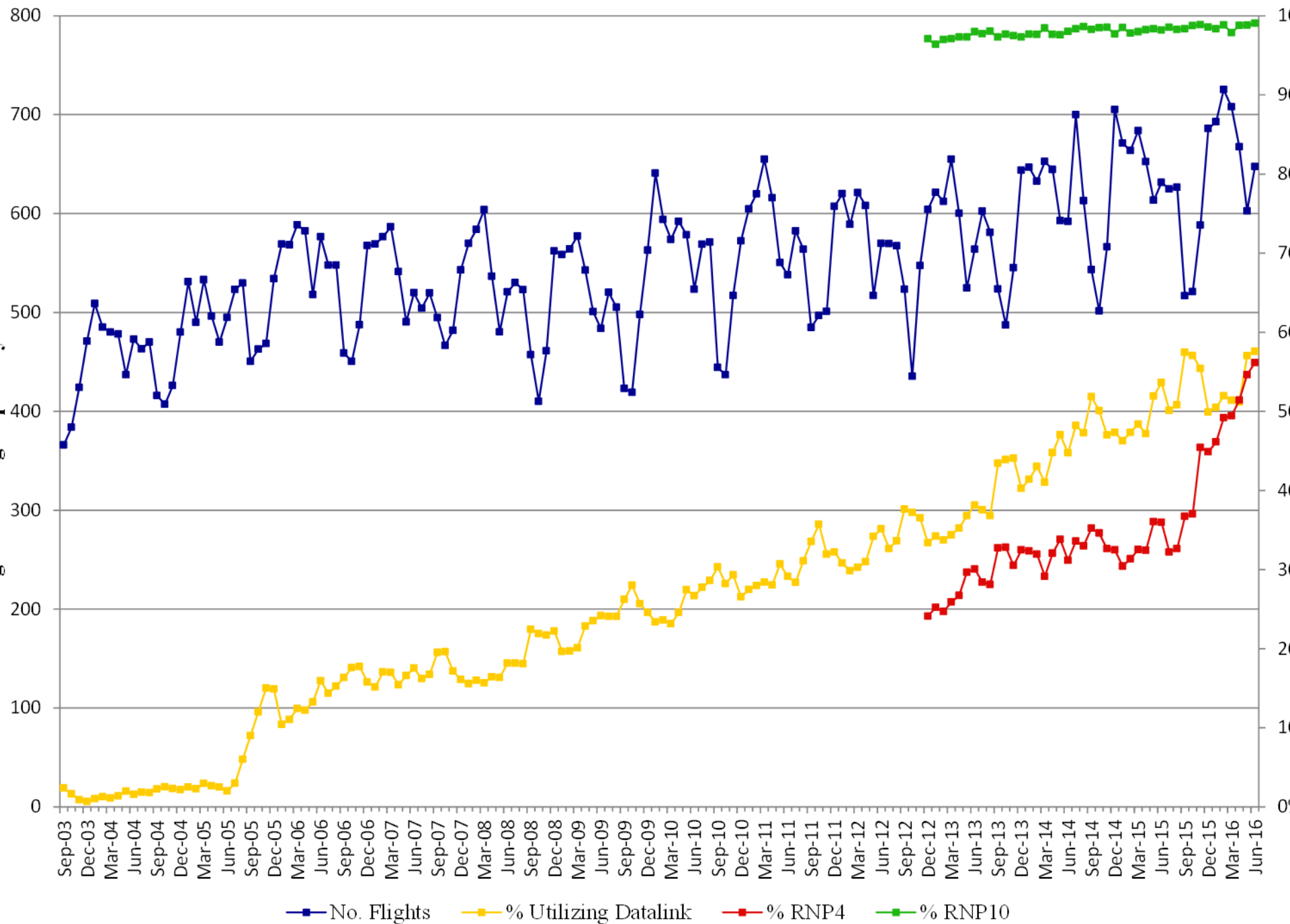
30/30 and D50

- On 10 December 2013, the United States reduced the *__lateral__* spacing between ADS-C and CPDLC connected RNP-4 aircraft operating in the entire New York Oceanic CTA from 50 NM to 30 NM.

- Additionally, the *__longitudinal__* spacing of these same aircraft was reduced from 80 NM to 30 NM.

- The *__longitudinal__* spacing of ADS-C and CPDLC connected RNP-10 aircraft was reduced from 80 NM to 50 NM.

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Example of Application of RNP4 30/30 Separation

Downlink request to climb

Climb results in a conflict

SECTOR QUEUE

| NM | CPD | DAL11 | 04:40:04 |

DL : REQUEST CLIMB TO F370

Process   Route   Print

CLEARANCE

DAL11   42N030W 0239/ 38N040W 0346/ 36N050W 0450/ 34N060W 0555/ LAZEY 0605/ JIMAC 0650/ JAINS 0748/ 0

Urgent   Rpt   Negot   Rspn   Misc   Vert   Route   Speed   X-ing   Conn   Pre-Fmt

OAC ✈ Climb ⌖Time @Fix ⌖Time ↘Fix DSCND ⌖Time @Fix ⌖Time ↘Fix EO RTE SPD POS OTA HOLD

20 CLIMB TO AND MAINTAIN (alt) F370   EOS

26 CLIMB TO REACH (alt) F370   BY (time)   EOS

27 CLIMB TO REACH (alt) F370   BY (pos)   EOS

(20) CLIMB TO AND MAINTAIN (alt) F370   INS   DEL

Probing : CLIMB TO AND MAINTAIN F370
[DAL11]: Conflict with 1 aircraft, 0 airspace, IMMINENT

PRB   CAN   TPRB   SND   UNABL   VHF   SAVE   EALT   OVRD   COORD   RCPT   REJ   HLP   CLS

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Aircraft on Display

Conflict details. Note that
time is being used.

CONFLICT REPORT

same direction		REQUIRED 10 minutes (50 nm) 1000 ft
0.0 degrees LOS	**NOW** ACTUAL	6 min 52 sec (0 nm) 0 ft

		PASSING POINT			CONFLICT SEGM	
B764	F320↑				3555N	3350N
*DAL11	F370				05033W	06037W
M080					0453	0559
B763					3544N	3335N
DAL71	F350				05137W	06130W
M080					0453	0559

Draw   Close

30/30 is applied. Note the in-trail time for 60W. Both aircraft are RNP-4.

Same climb now results in no conflict because distance, and not time, is being used.
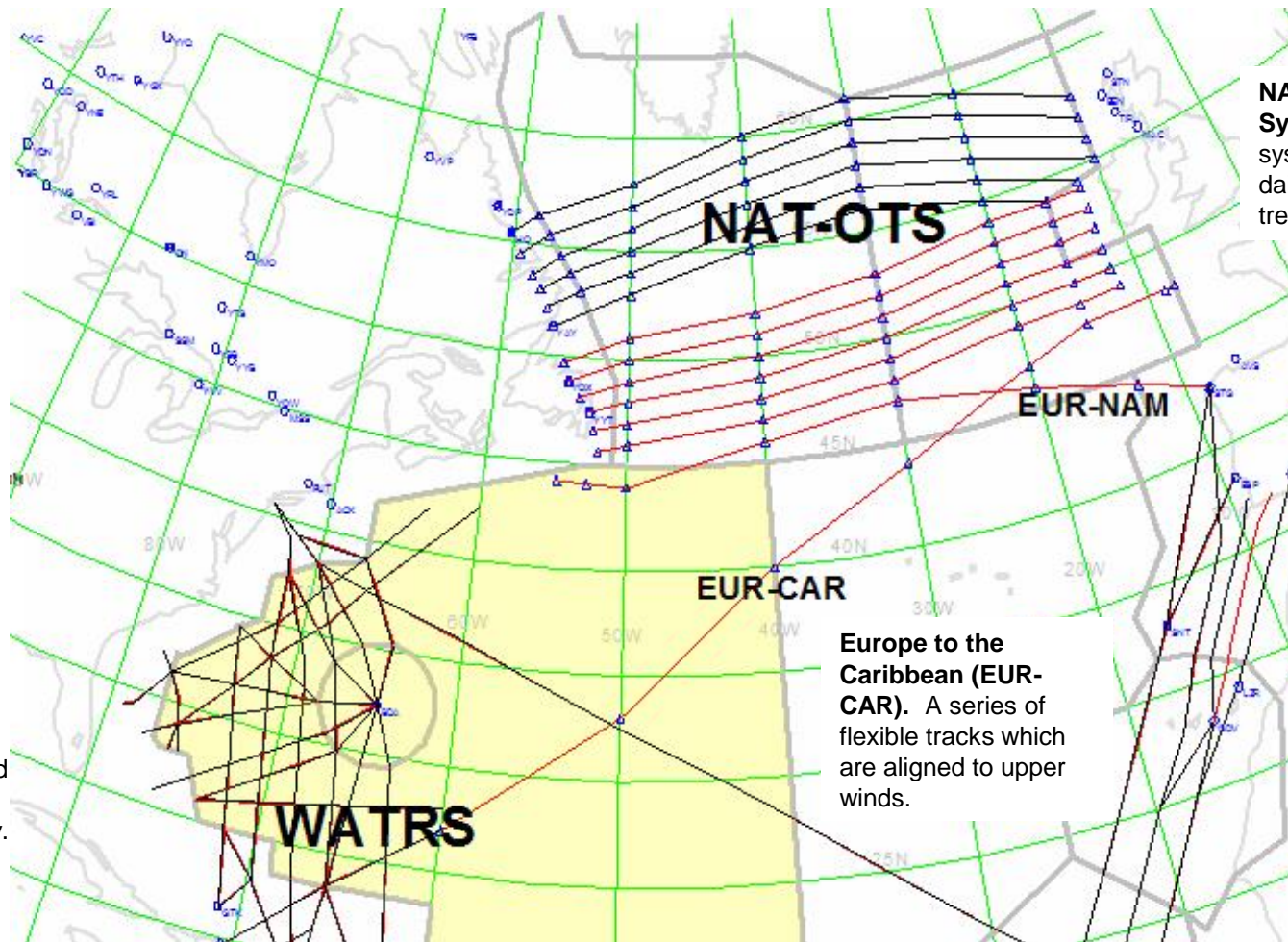
Federal Aviation Administration
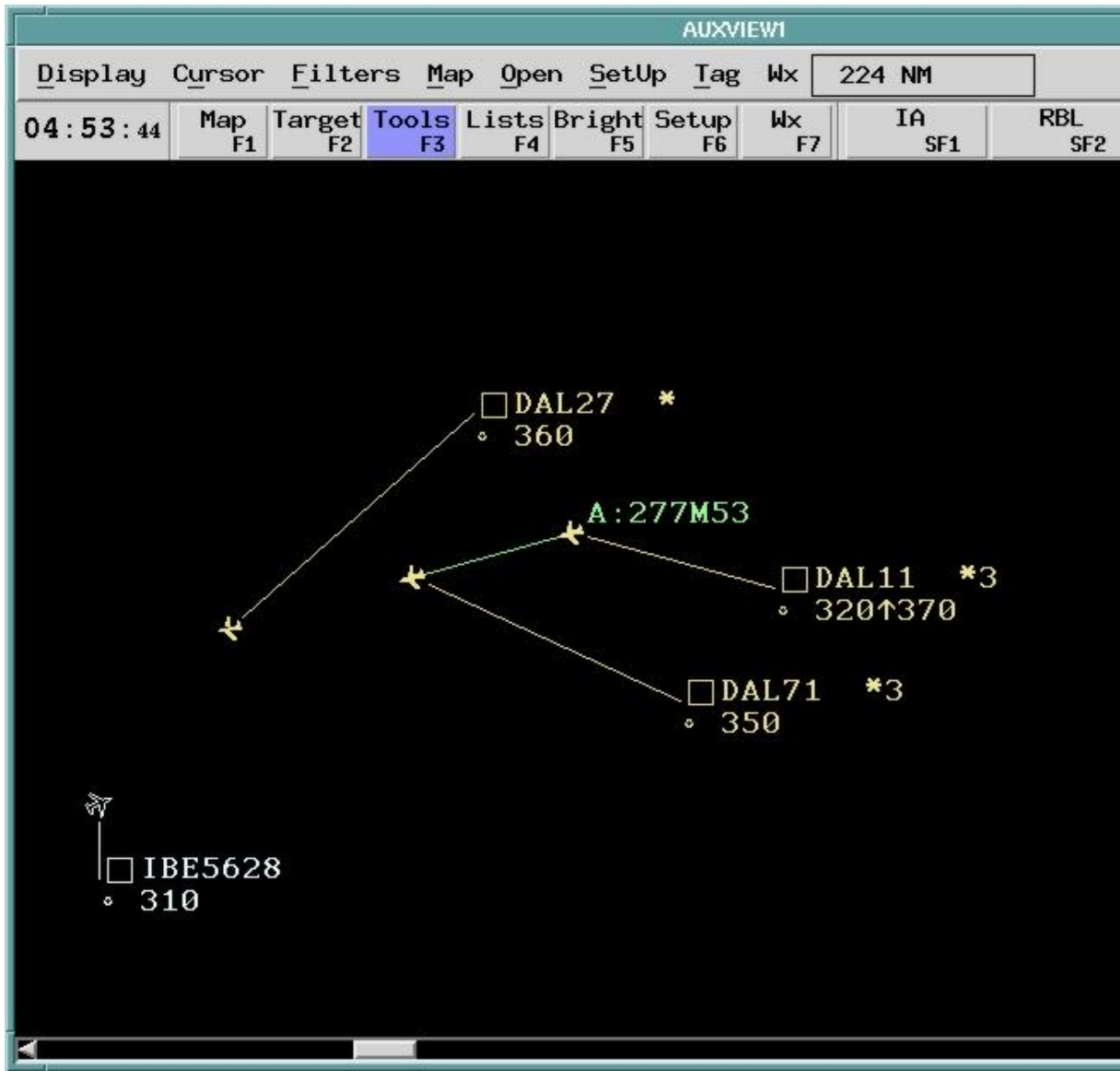
Aircraft are 53 nm in trail.
Climb is good.

**Federal Aviation
Administration**

Atlantic Operations

4 distinct traffic flows affect US Atlantic oceanic operations, controlled from New York Center:

NAT Organized Track System (OTS). A track system generated twice daily based on wind trends.

Europe to North America (EUR-NAM). Random track system which can become more complex due crossing traffic.

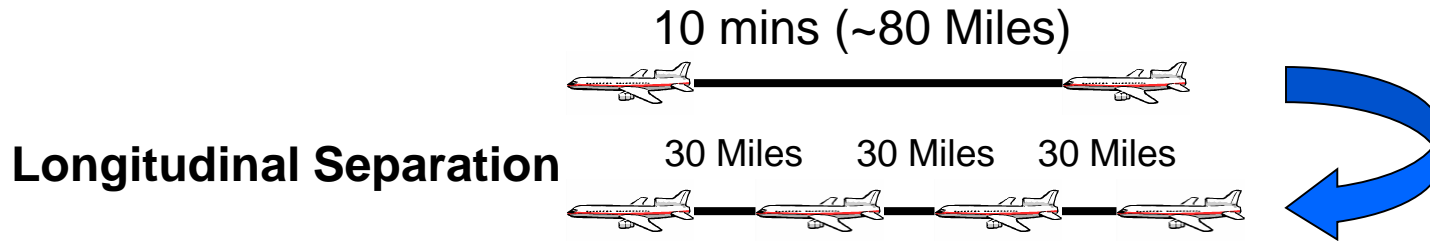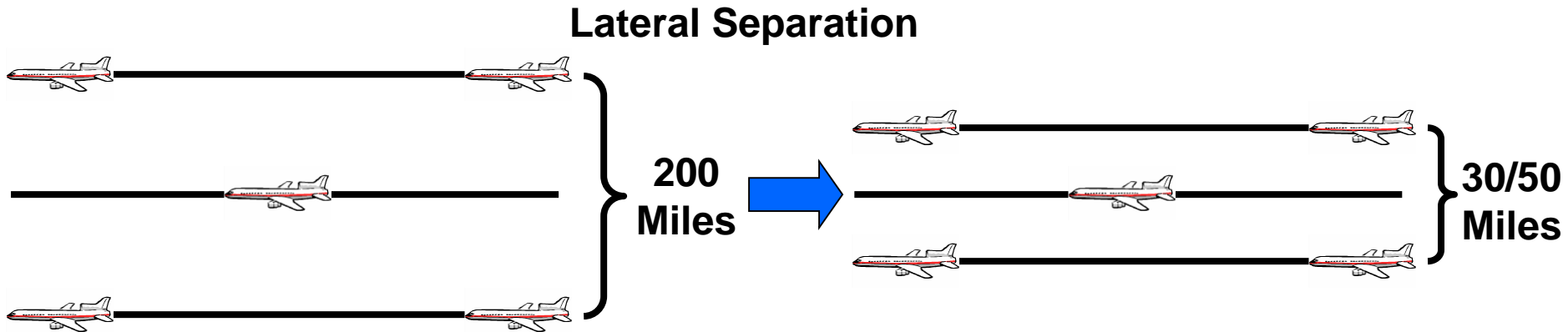**Europe to the Caribbean (EUR-CAR).** A series of flexible tracks which are aligned to upper winds.

Western Atlantic Route System (WATRS). A fixed set of tracks with high traffic density.

Reduced Lateral and Longitudinal Separation Standards

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PBCS & Impact to FAA

- **Operators currently eligible for and using performance-based separation minima (****50 long, 30 long, 30 lat****) in FAA oceanic airspace will require a State issued approval with RCP240 and RSP180 minimums.**

- **Operators will indicate approval status via flight plan:**
  - P2 in field 10
  - SUR/RSP180 in field 18

- **ATOP will determine eligibility of performance-based separation based on detection of these 2 codes.**

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30/30/D50 Graphical Depiction

Lateral Separation

200 Miles ➡ **30/50 Miles**

10 mins (~80 Miles)

Longitudinal Separation

30 Miles   30 Miles   30 Miles
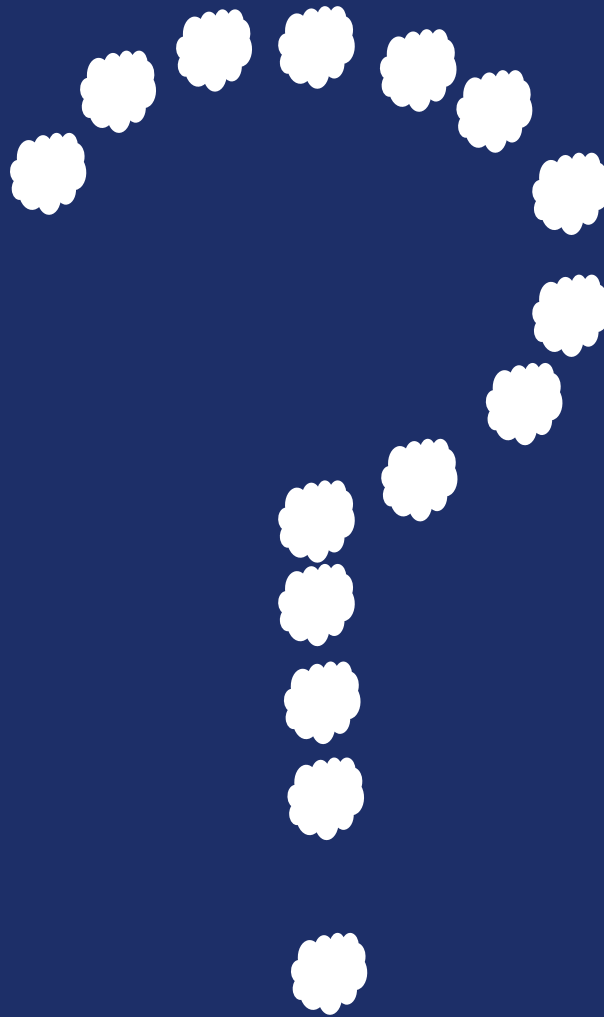
ATOP Improved Efficiencies Using 30/30/D50

- We are now able to accommodate more altitude changes, WX deviations, and route requests.

- 30/30 and D50 more easily allows us to move aircraft to altitudes required by other ANSPs because of traffic in their airspace.

- This has resulted in greater efficiency for both the provider and the user.

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The Bottom Line

- **Best Equipped means Best Served**
  - RNP4 &10 and FANS-1/A aircraft receive better routes, altitudes, flexibility to deviate.
- **Greater Controller Flexibility**
  - More planes are able fly their preferred routes.
- **Greater Capacity**
  - Manual tasks have been automated.
  - Allows controller to handle more aircraft with less effort
- Response times to aircraft requests have dropped dramatically. Average response time before ATOPs was 9 minutes. Current response time is less than 2 minutes.

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PANS-ATM 4444

- **2.1.1 States shall ensure that the level of air traffic services (ATS) and communications, navigation and surveillance, as well as the ATS procedures applicable to the airspace or aerodrome concerned, are appropriate and adequate for maintaining an acceptable level of safety in the provision of ATS.**

Federal Aviation Administration

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