

Colombian PBN implementation: El Dorado case

INTERNATIONAL FORUM ON AIRPORT MANAGEMENT IN A GLOBAL GROWTH
SCENARIO

02.03.2017

LUIS GAFARO
BUSINESS DEVELOPMENT DIRECTOR FO AND ATM
AIRBUS GROUP



AN AIRBUS COMPANY

04 Takeaways

03 Bogota New CONOPS

02 Project Overview

01 Introduction



AN AIRBUS COMPANY

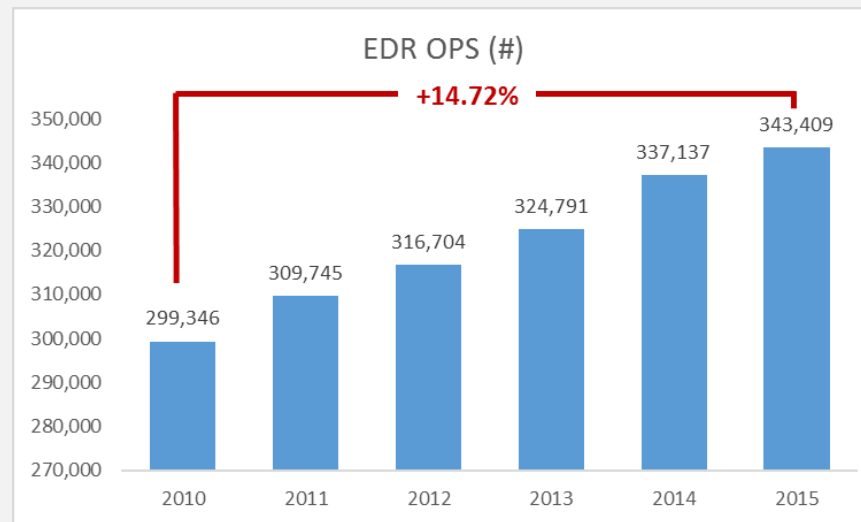
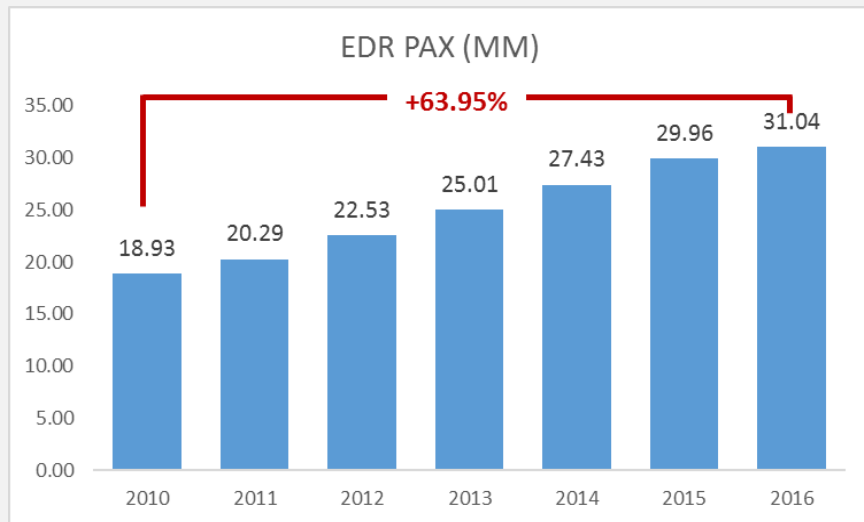
Introduction

CHAPTER 01

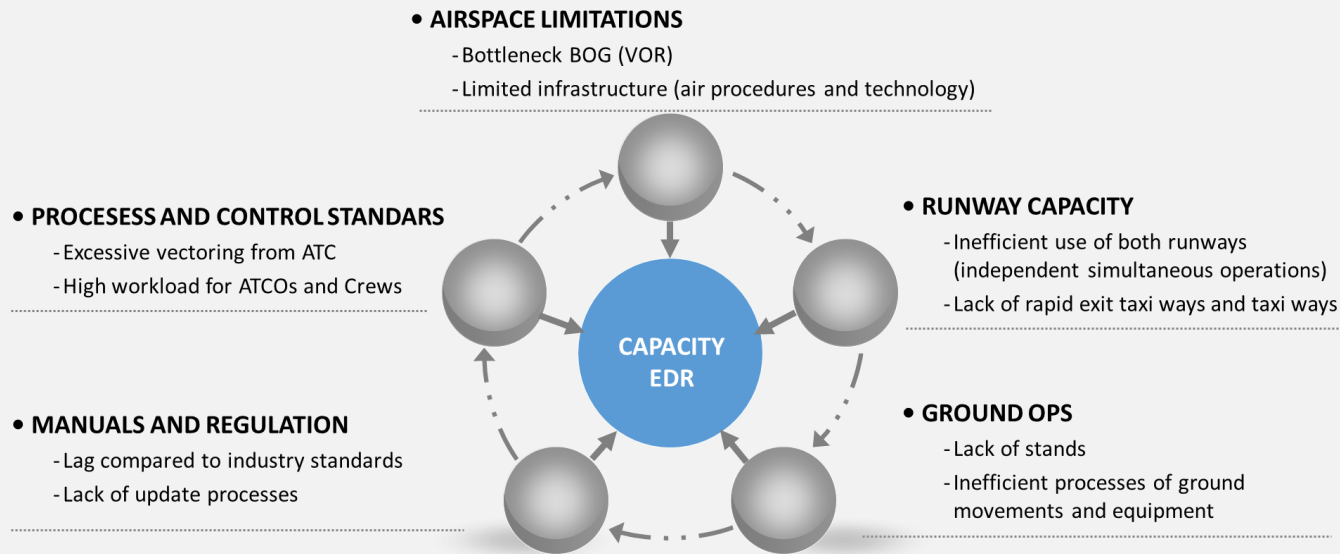


AN AIRBUS COMPANY

In only 6 years PAX increased in Bogota more than 60%

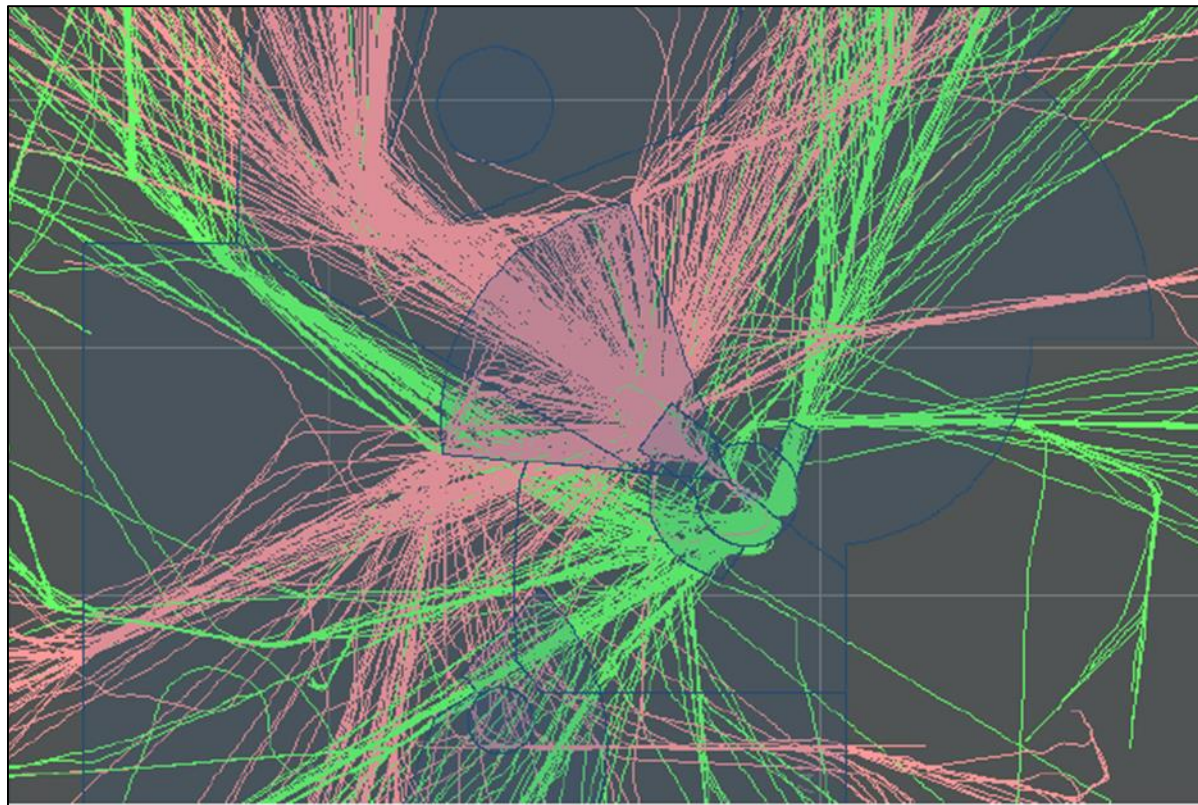


Capacity at EDR airport is constrained by different systemic elements



EDR urgently needed an airspace turnaround

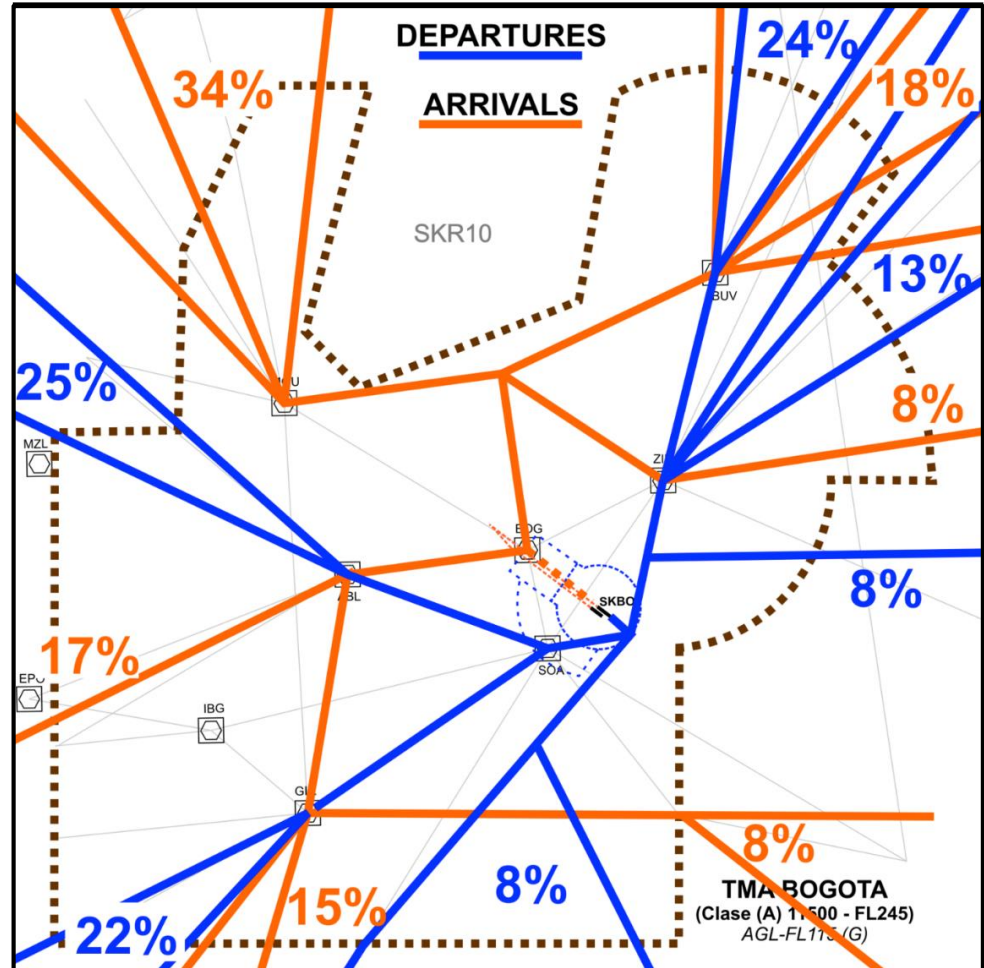
- ATCOs vector ~100% of arriving aircrafts
- Encounter/dispersed flows
- Holding patterns
- Bottleneck at VOR



Bogota's ATCOs constantly outperform their own limits!

TMA workload needed to be balanced

- Different sectors work balance
- Excessive radio communications
- Job dissatisfaction



Project Overview

CHAPTER 02



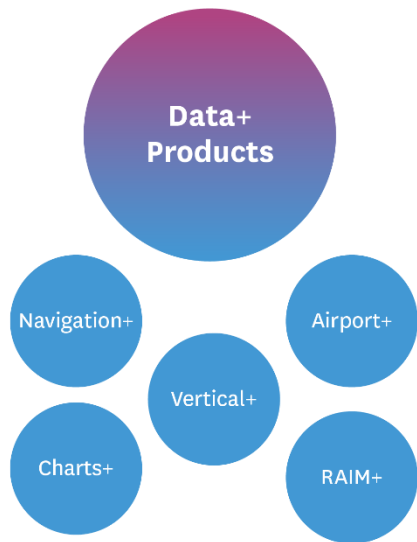
AN AIRBUS COMPANY

NAVBLUE:

The New Airbus Company for Flight Operations and Air Traffic Management



Our offer is divided in three pillars



AIRSPACE by NAVBLUE



The world's number one expert in Performance Based Navigation (PBN)

Airspace by NAVBLUE allows airports to implement Performance Based Navigation (PBN). The benefits to both airports and airlines are numerous, including shorter and more direct routes, reduction of airport and airspace congestion, and improved access to airports in reduced visibility. PBN highly contributes to minimizing the environmental impact of air transport by reducing fuel burn and aircraft CO2 emissions.



YOUROPERATIONS by NAVBLUE

We'll take care of your complex tasks



YourOperations by NAVBLUE delegates all or part of your Flight Operations to NAVBLUE. This allows you to focus on your core business and benefit from our intimate knowledge and experience of the comprehensive NAVBLUE solutions, and their impact on your operations.

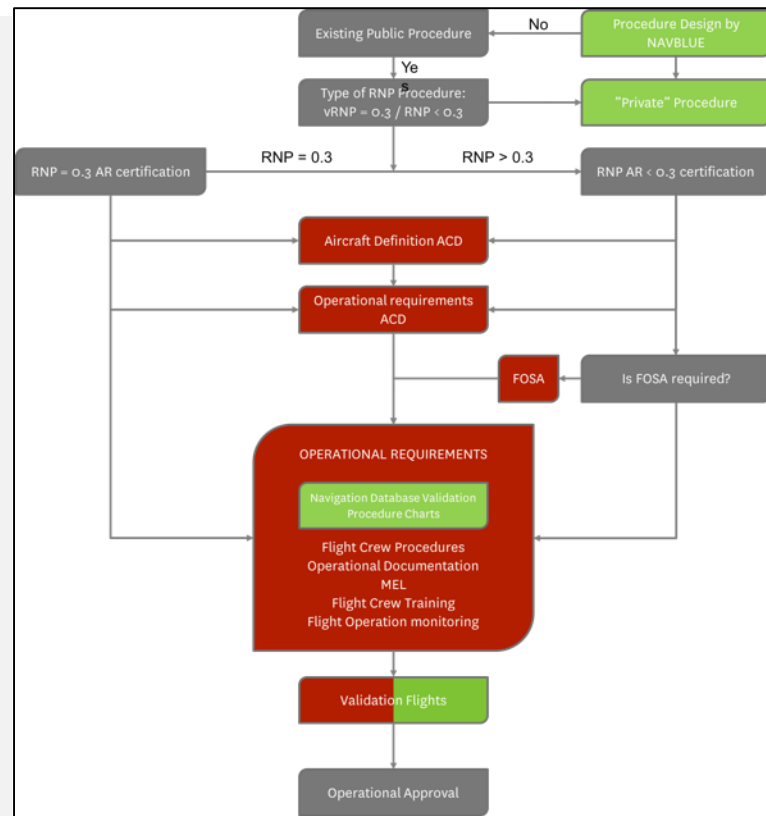
YourOperations by NAVBLUE

- ✓ Your Operational Approval
- ✓ Your Performance Studies
- ✓ Your Flight Data Analysis
- ✓ Your EFB Approval



Operational Approvals

- Aircraft, systems & training expertise supports approval process
- Comprehensive service:
 - Operational documentation
 - NAVDB check
 - RAIM prediction
 - Aircraft qualification demonstration
 - Dispatch and crew training
 - Flight Operational Safety Assessment (FOSA)
- Procedure design & operational approval activities run in parallel



RAIM+

Trust the world's leading
RAIM Data provider



NAVBLUE has built a worldwide reputation amongst air transport operators for its RAIM (Receiver Autonomous Integrity Monitoring) expertise and GNSS coverage prediction accuracy.

Product innovation in RAIM+ takes into account new satellite constellations and will deliver a unique and enhanced user experience by integrating RAIM+ Mapping into flight plan systems.



A Successful Partnership Story

- International Cooperation Agreement signed between IATA and UAEAC
- Project as the result of a assessment made by IATA Consulting
- NAVBLUE as the airspace design provider
- 6 major work packages



Project Objectives

International Cooperation Agreement to Redesign the Airspace & Optimize Airside Capacity at Bogota El Dorado Airport

To position Bogotá El Dorado international airport as one of the most efficient international terminals in Latin America by increasing its capacity and airspace efficiency through:

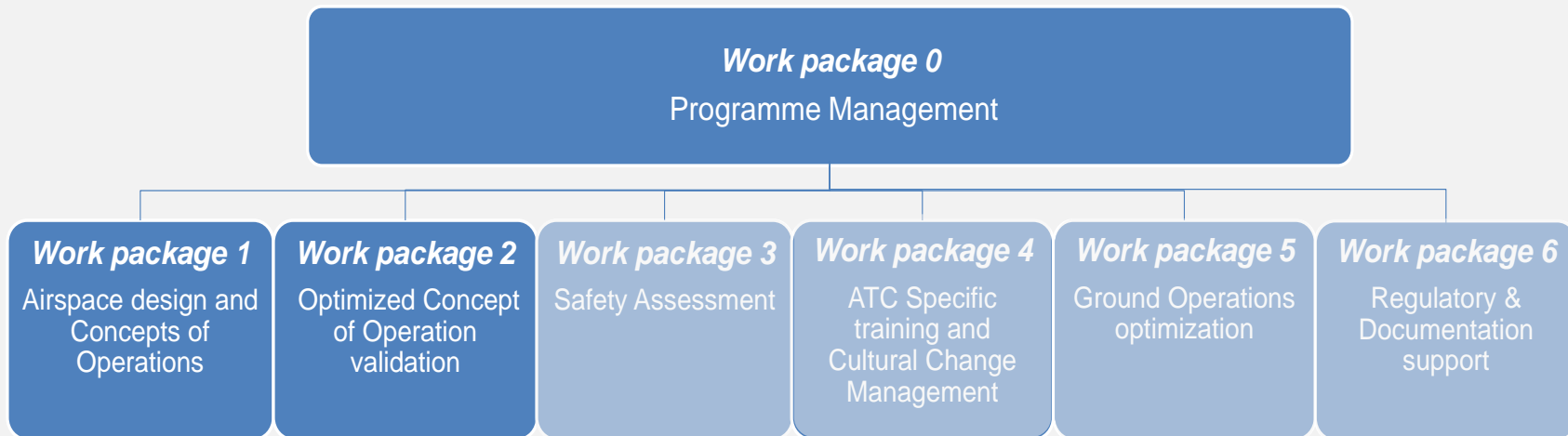
- ✓ Introduction of PBN
- ✓ Reduction of aircraft separation within the TMA
- ✓ Implementation of independent and simultaneous parallel runways operations
- ✓ Improvement of ground operations
- ✓ Update of regulations & operations manuals
- ✓ Enhancement of ATC capability with theoretical & practical (OJT) training

NAVBLUE

AN AIRBUS COMPANY



An holistic approach for a systemic challenge was necessary



Bogota New CONOPS

CHAPTER 03



AN AIRBUS COMPANY

Project Constrains and Considerations

- Location of airport
- Orientation of runways
- Mountains - terrain
- Restricted airspace
- Location of city pairs
- Performance of aircrafts

Information Gathering

- Previous designs
- Local experience and suggestions
- ACC limits
- Scope
- Aircraft flows and operations

Design for improvements at each step

- Trajectory and aircraft separations
- Reduction of crew workload with repeatable and easy to operate trajectories.



CONOPS Design Process

2015

2016

Data
Survey

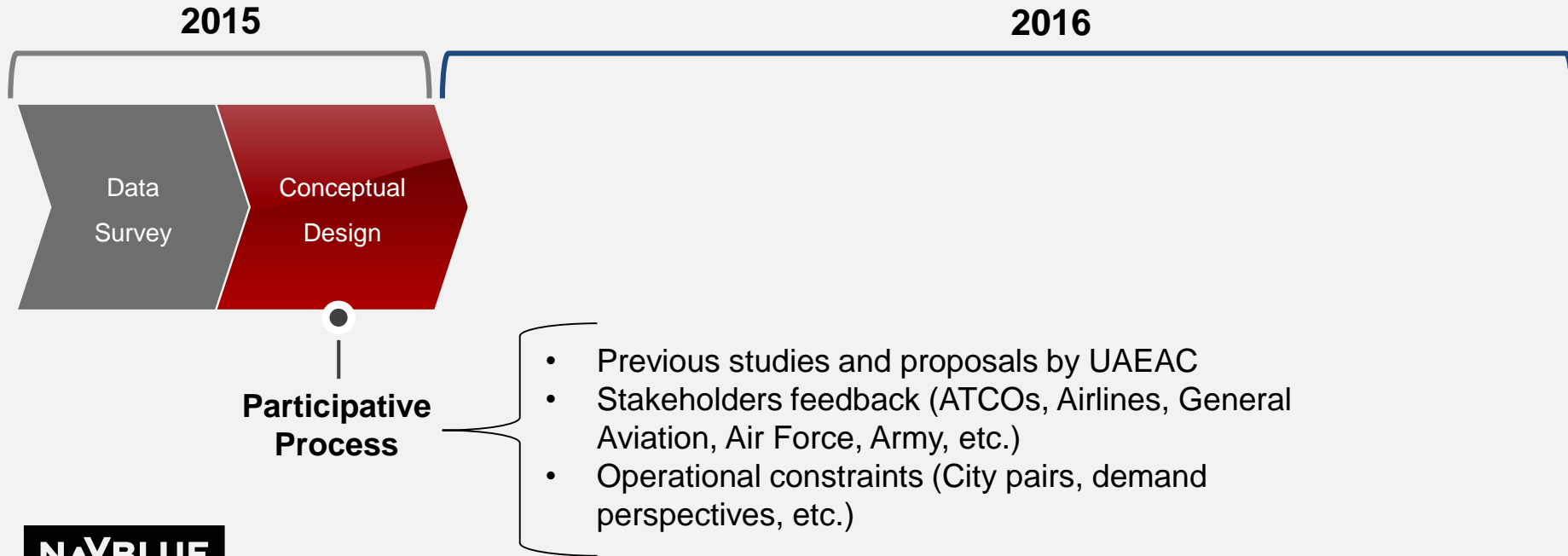
Obstacle Data
Survey
around EDR

NAVBLUE

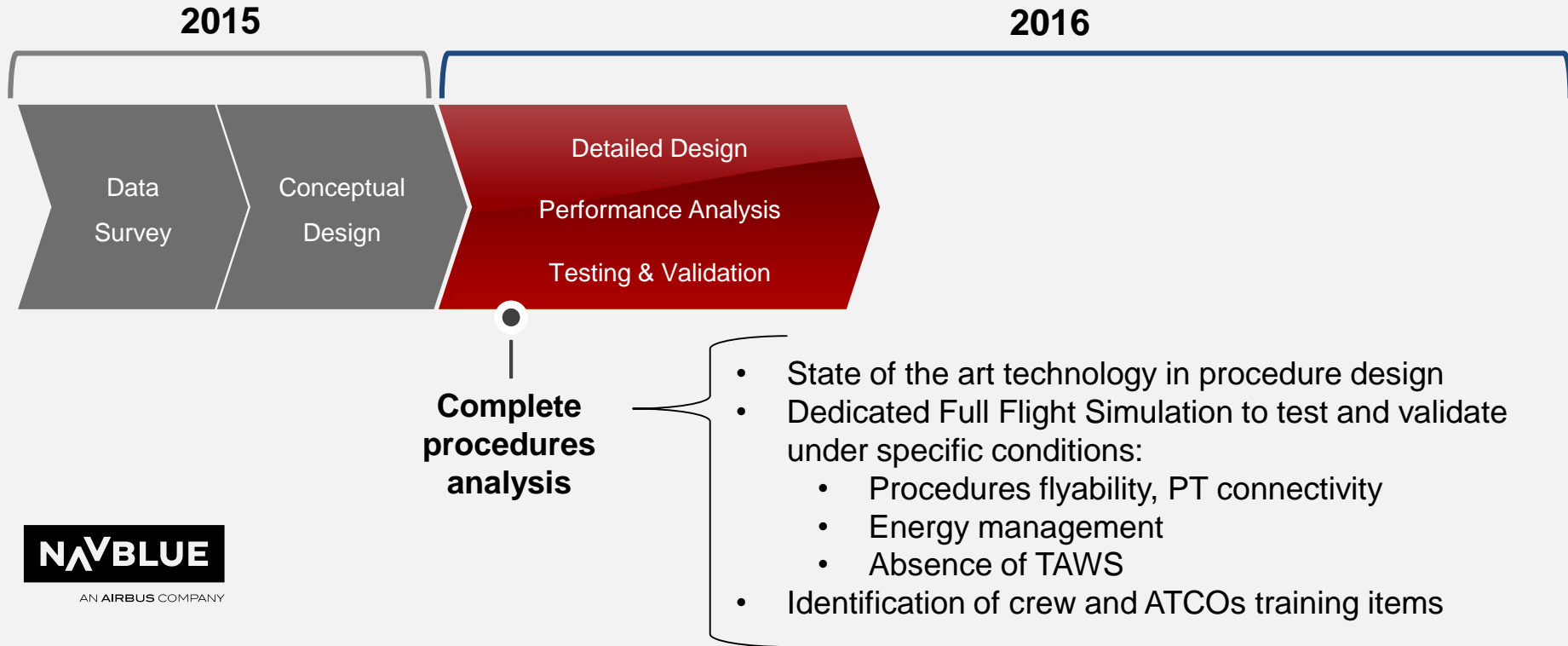
AN AIRBUS COMPANY

- Safety pre-requisite
- New buildings, antennas, threes, etc.
- Minima constrains
- Best practices transfer to UAEAC

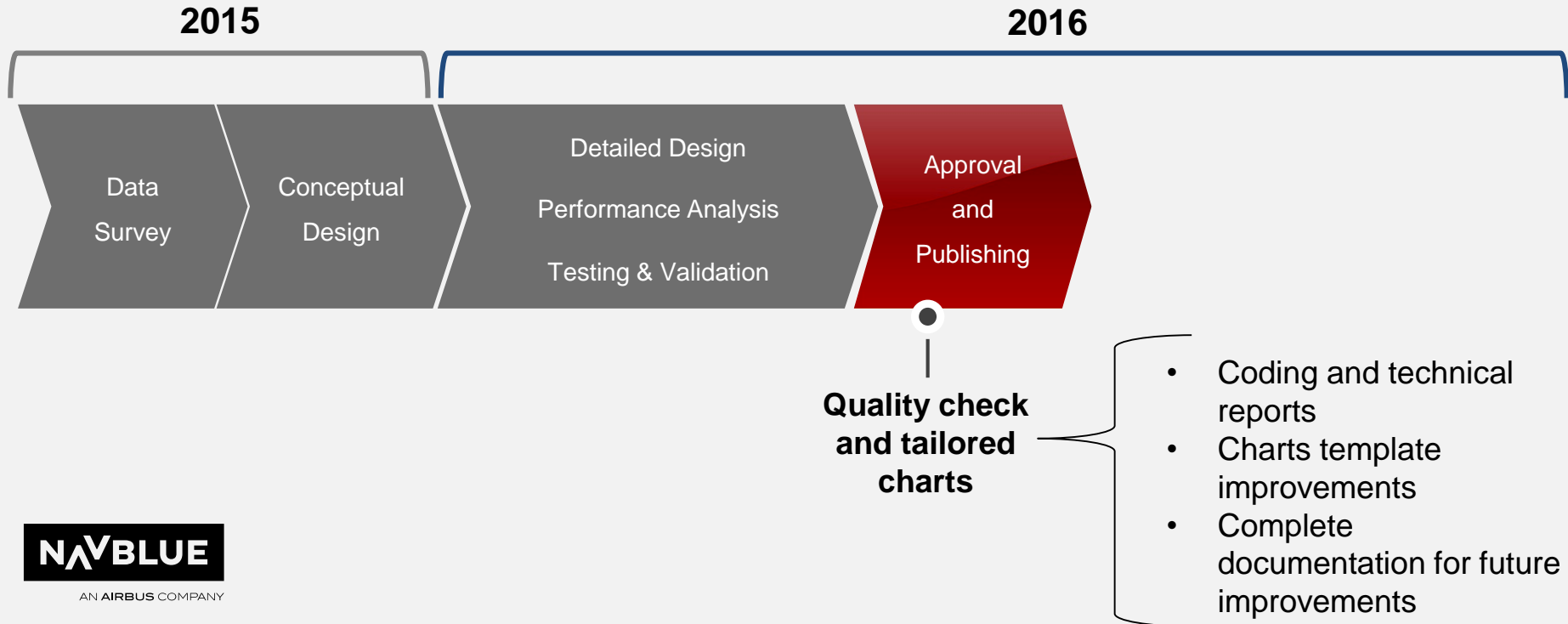
CONOPS Design Process



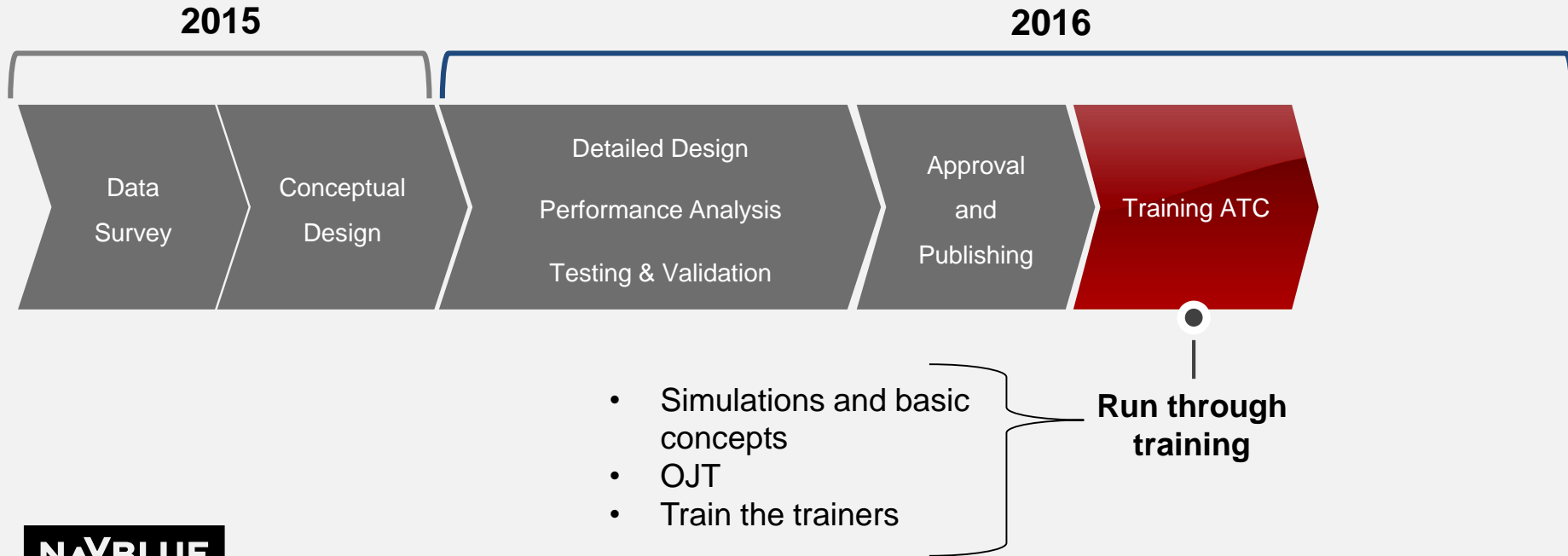
CONOPS Design Process



CONOPS Design Process



CONOPS Design Process



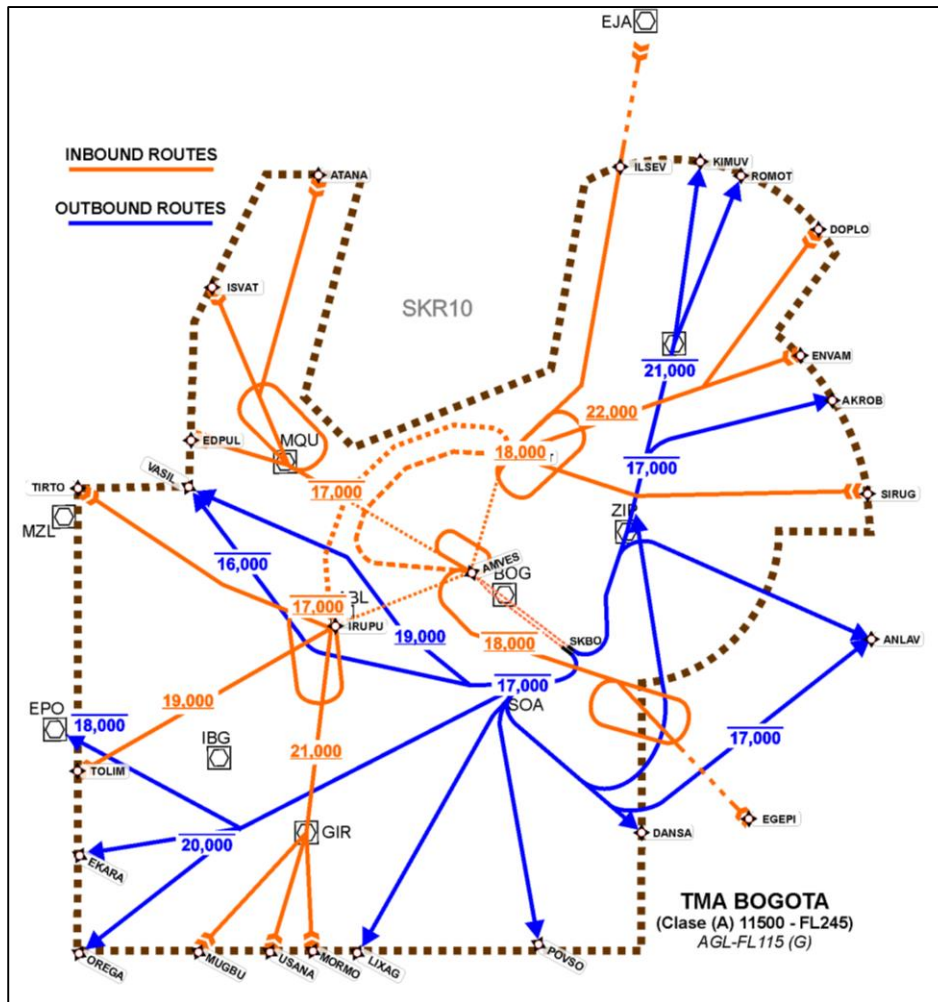
CONOPS Design Process



EDR CONOPS

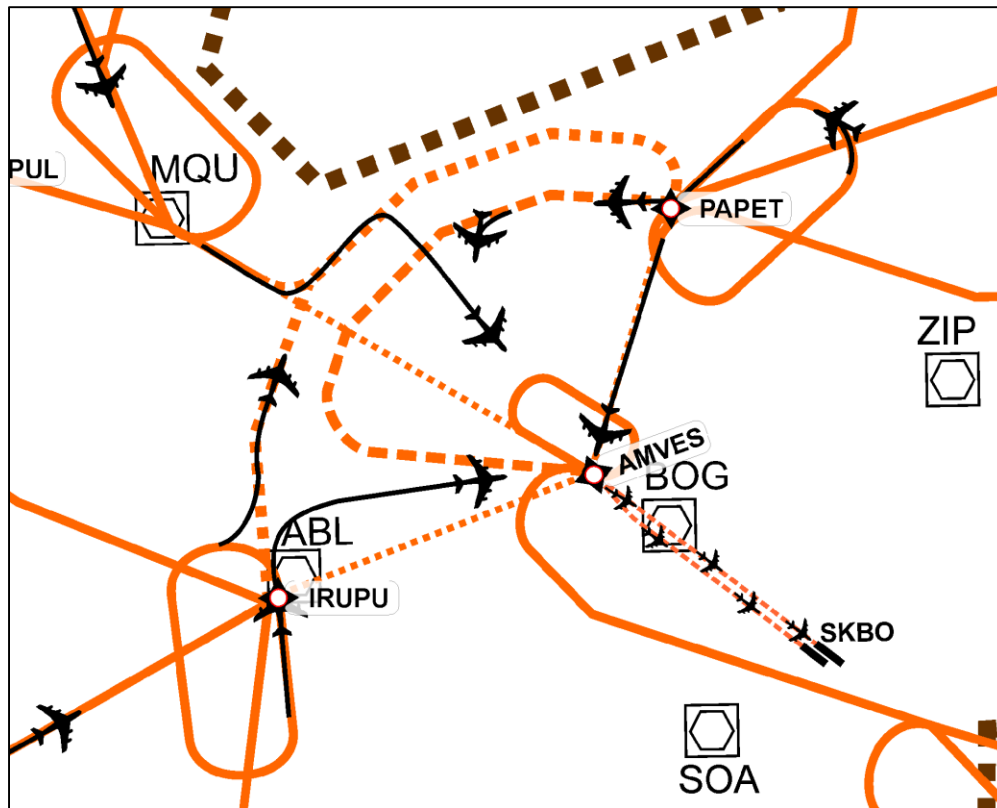
Runway 13

- Altitude separation
- Reduced ATCO/ crew workload
- Reduced ATCO intervention
- Improved safety



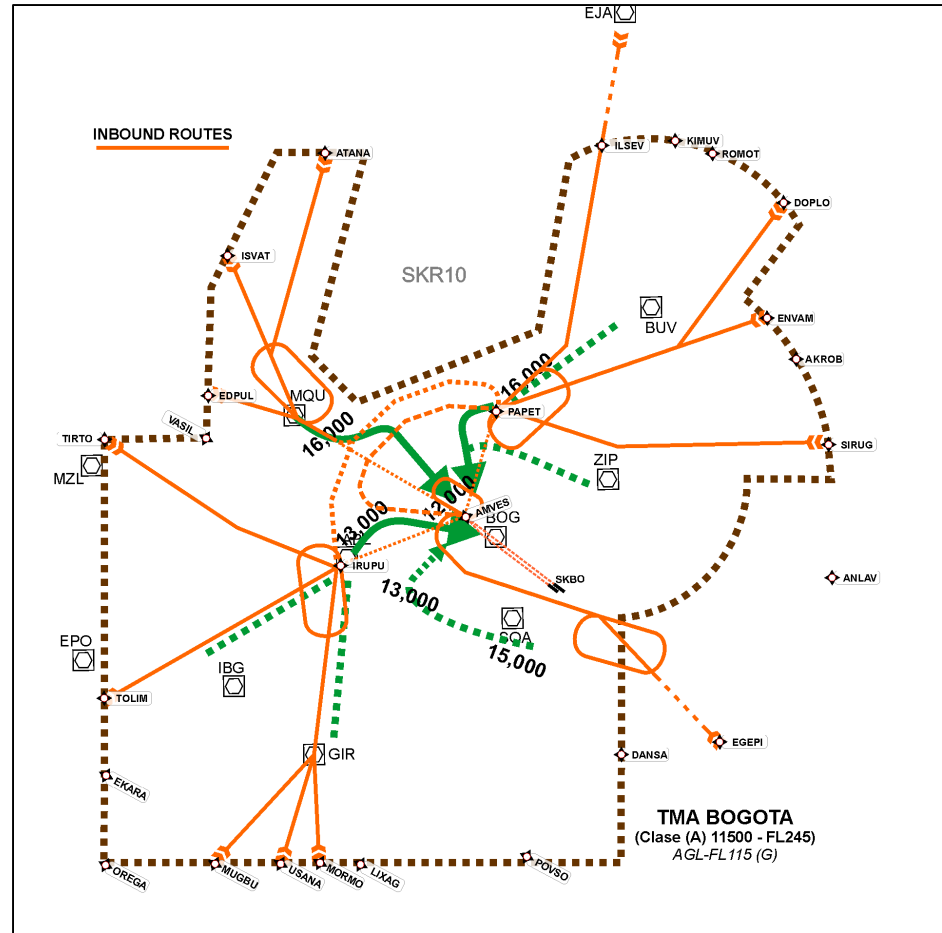
Point of Merge System

- All aircraft sent direct AMVES



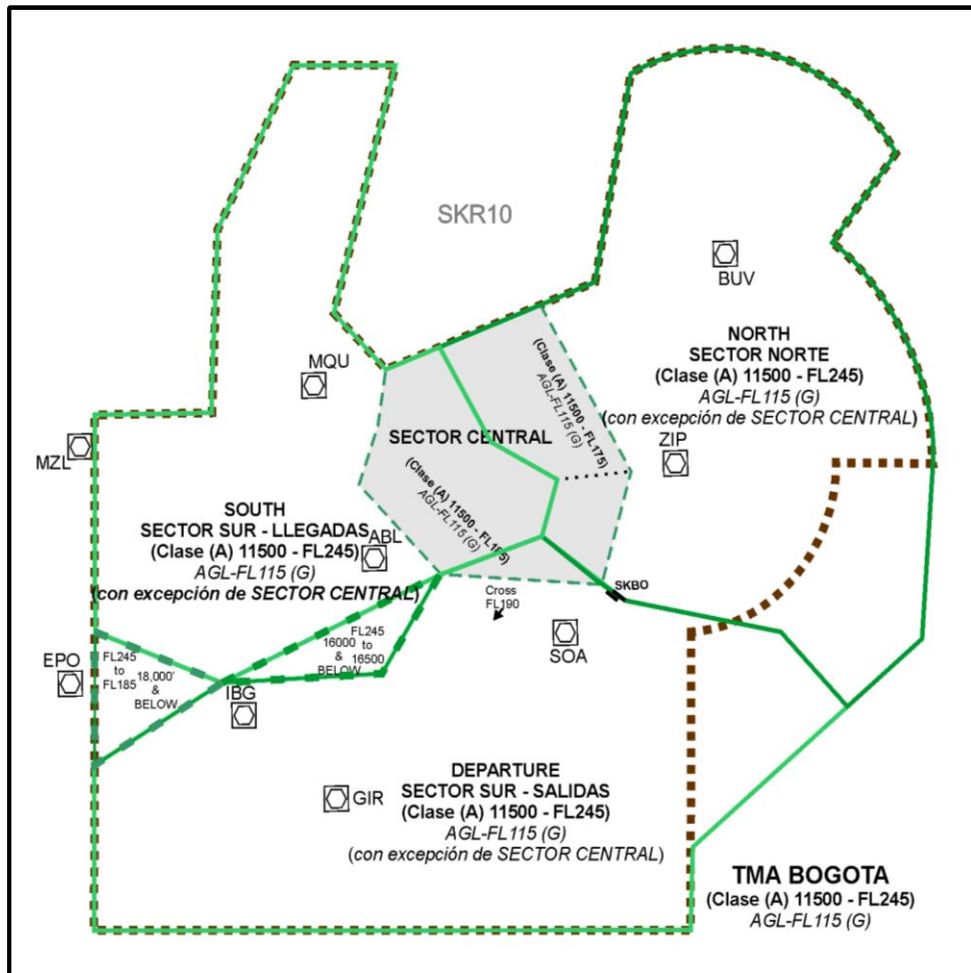
Non/RNAV1 Slow Traffic

- Conventional procedures
- Vectoring techniques



New TMA sectors

- Reduced span of control
- Fewer conflicts to manage
- Reduced ATCO workload
- Reduced ATCO intervention



VIDEOS

- VIDEO 1 / BASELINE OPERATION
- VIDEO 2 / RNW 13
- VIDEO 3 / RNW 31



Key results

- Increase in airspace potential capacity:
 - RNW13:
 - RNW31:
- Reduction in ATCOs workload (60% less communications per aircraft)
- Flexibilization of restricted military airspace
- Expected financial efficiencies for up to US100M/year



Takeaways

CHAPTER 04



AN AIRBUS COMPANY

Takeaways

- ✓ Final ATC training in progress, expected roll out mid 2017
- ✓ Successful public-private collaboration
- ✓ How to manage the lack of resources in the ANSPs
- ✓ Successful knowledge transfer process (both ways)
- ✓ Fast track project

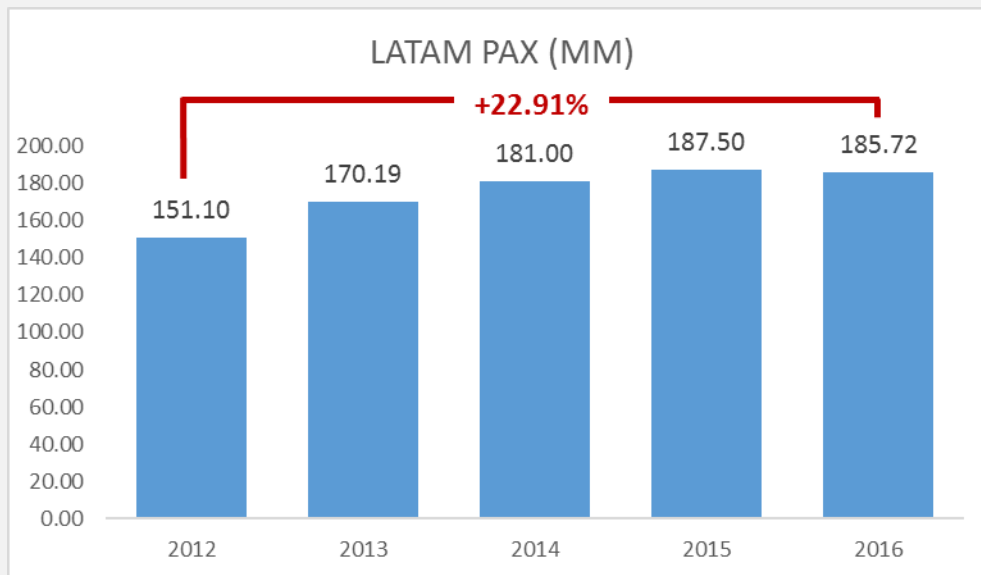


Takeaways

- ✓ PBN Colombian Airspace roadmap under discussion
- ✓ Medellin TMA redesign project ready to be launch
- ✓ Upper airspace project to be developed by UAEAC



Takeaways



Contact

—
LUIS GÁFARO
luis.gafaro@navblue.aero
Mob: +57 3165260474



AN AIRBUS COMPANY

© AIRBUS S.A.S. ALL RIGHTS RESERVED. CONFIDENTIAL AND PROPRIETARY DOCUMENT. THIS DOCUMENT AND ALL INFORMATION CONTAINED HEREIN IS THE SOLE PROPERTY OF AIRBUS. NO INTELLECTUAL PROPERTY RIGHTS ARE GRANTED BY THE DELIVERY OF THIS DOCUMENT OR THE DISCLOSURE OF ITS CONTENT. THIS DOCUMENT SHALL NOT BE REPRODUCED OR DISCLOSED TO A THIRD PARTY WITHOUT THE EXPRESS WRITTEN CONSENT OF AIRBUS S.A.S. THIS DOCUMENT AND ITS CONTENT SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SUPPLIED. THE STATEMENTS MADE HEREIN DO NOT CONSTITUTE AN OFFER. THEY ARE BASED ON THE MENTIONED ASSUMPTIONS AND ARE EXPRESSED IN GOOD FAITH. WHERE THE SUPPORTING GROUNDS FOR THESE STATEMENTS ARE NOT SHOWN, AIRBUS S.A.S. WILL BE PLEASED TO EXPLAIN THE BASIS THEREOF. AIRBUS, ITS LOGO, A300, A310, A318, A319, A320, A321, A330, A340, A350, A380, A400M ARE REGISTERED TRADEMARKS.