



FROM INNOVATION TO SOLUTION

# PBN and SESAR

David Bowen  
Acting Chief ATM

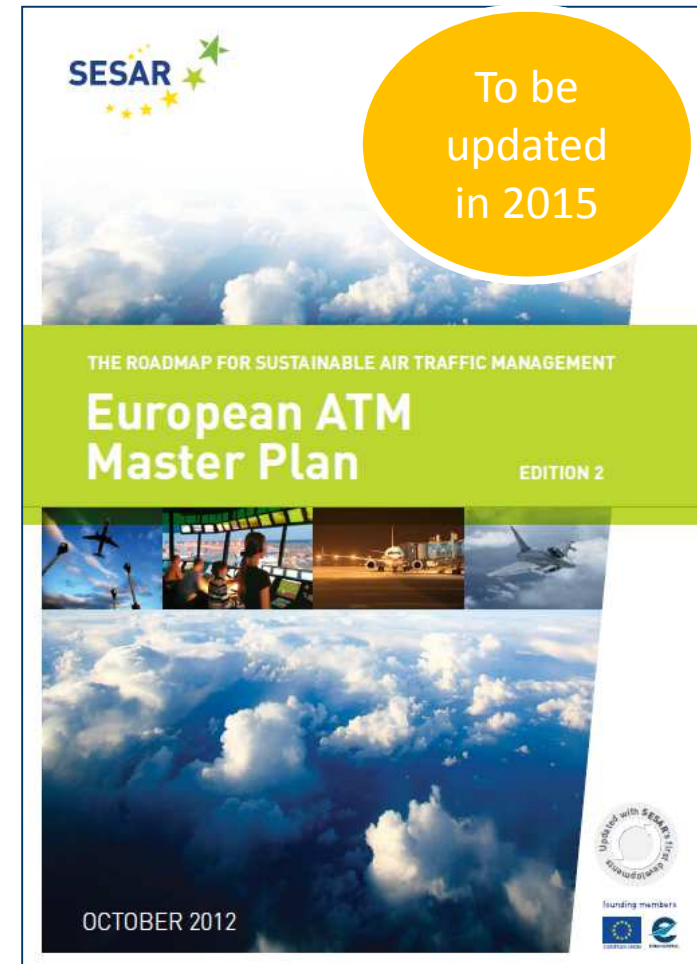


founding members



# PBN is a priority for Europe

- The most recent update of the ATM Master Plan, **approved in 2012**, identifies PBN as an "Essential Operational Change" that needs to be implemented to lead to the full deployment of the SESAR concept of operations
- A key contributor to **performance**:
  - Safety (low visibility operations, access to small/medium size airport with terrain issues etc...)
  - Environment (optimized fuel burn during climb/descent, noise reductions)
  - Capacity (reduced separations)
  - Infrastructure rationalization (ground-based vs satellite based)

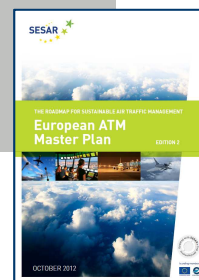


# Ensuring the deployment of SESAR R&D results

## PLANNING VIEW

### ATM Master Plan

Outlines the **essential** operational and technological changes as well as standardisation and regulatory activities



## BUSINESS VIEW

### PCP

Cover a first package of **essential** changes identified in the MP with the sufficient maturity and justification to be deployed at European level



*Implementing Regulation  
published June 2014*



# 6 PACKAGES IDENTIFIED FOR NEAR TERM IMPLEMENTATION

*Key functional improvements addressing critical network performance deficiencies*

1. Extended AMAN and PBN in high density TMAs
2. Airport Integration and Throughput Functionalities
3. Flexible Airspace Management and Free Route
4. Network Collaborative Management

*Building the infrastructure of the future*

5. iSWIM: ground-ground integration and aeronautical data management & sharing
6. Initial Trajectory Information Sharing: air-ground integration towards i4D

# PBN as part of the PCP

## AF1: EXTENDED ARRIVAL MANAGEMENT AND PERFORMANCE BASED NAVIGATION IN THE HIGH DENSITY TERMINAL MANOEUVRING AREAS

### Enhanced Terminal Airspace using RNP-Based Operations

- Enhanced Terminal Airspace using RNP-Based Operations
  - RNP 1 SIDs, STARs and transitions (with the use of the Radius to Fix (RF) attachment)
  - RNP APCH (Lateral Navigation/Vertical Navigation (LNAV/VNAV) and Localiser Performance with Vertical guidance (LPV) minima)



Deployment targeted within the terminal airspace of the 25 busiest airports in Europe by 1 January 2024



# Validation work in SESAR

- A number of projects in SESAR 1 have worked on and validated aspects of PBN

## SESAR 1 validations

- RNP APCH with Radius-to-fix turns onto a short final
- RNP1 to RNP APCH transition
- RNP to GLS transition
- Real Time Simulation on RNP reversion
- Use of tactical parallel offsets (TPO) for separation
- Reduced RNP route separation
- Assessment of PBN infrastructure and Fleet assessment



SESAR Solutions in Release 4 and Release 5  
include these elements

# SESAR 2020 – Future Work

- SESAR 2020 Programme scope still under definition

## SESAR 2020 Target Concept of Operations

- Dynamic route structure, based on PBN:
  - Terminal Airspace makes use of Advanced RNP capability with an optimised TMA route structure.
- Precision trajectory requiring RNP capability
  - Separation Management in the TMA using RBTs with 2D RNP Specifications
- Navigation roadmap focused on RNP capabilities



The future SESAR CONOPS relies on PBN as a critical enabler for advanced operations



# Conclusion

- Performance Based Navigation and the associated specifications, applications and infrastructure is critical to delivering SESAR benefits.
- Initial deployment of SESAR solutions in the PCP relies on PBN principles through RNP specifications
- Regulation is needed to support this initial implementation
- Further PBN and A-RNP elements will follow in the SESAR 2020 solutions.
- Regulation should enable smooth adoption of these applications to deliver the benefits.

