

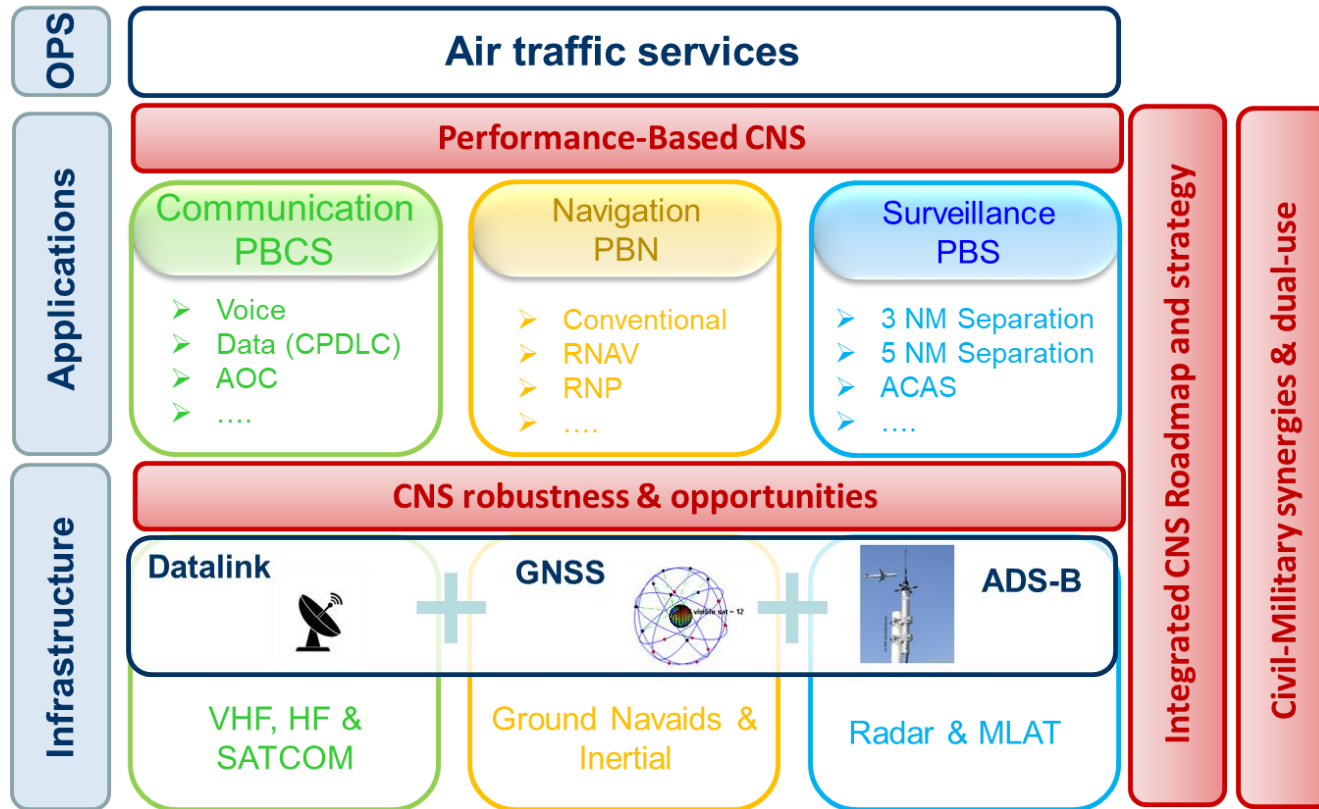


CNS evolution

Emilien Robert, EUROCONTROL
emilien.robert@eurocontrol.int



The integrated CNS concept



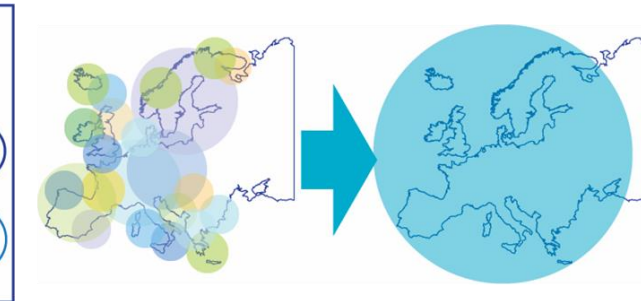
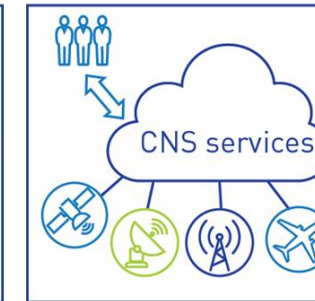
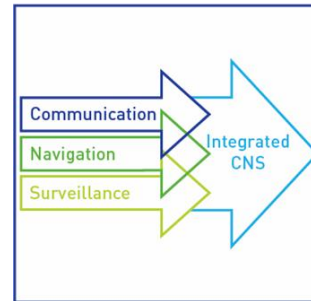
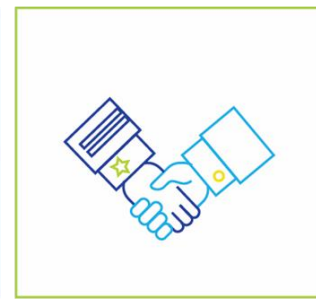
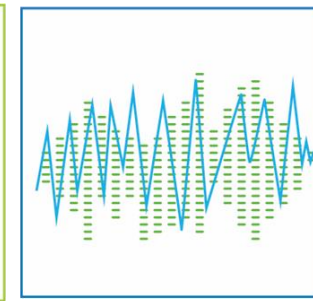
Main deliverable from SESAR PJ14 Wave 1

- CNS Evolution Roadmap and Strategy
- Performance-Based Integrated CNS
- CNS robustness
- Civil/Military information exchange requirements

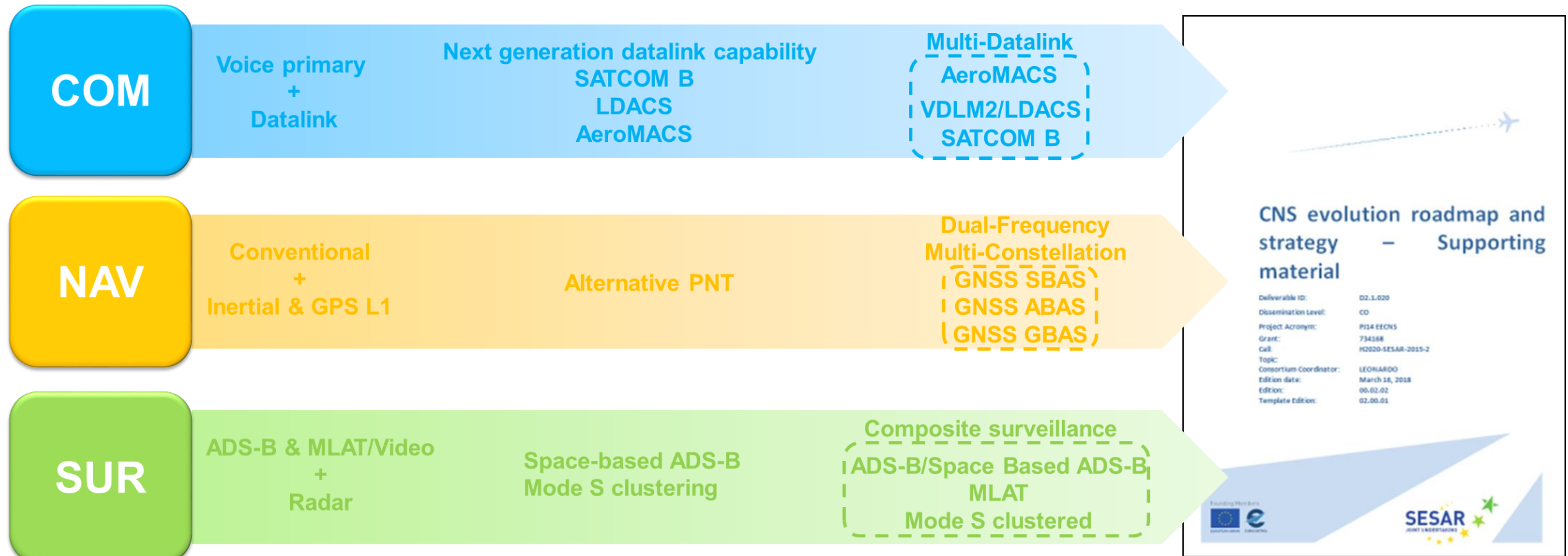
CNS Roadmap & Strategy: top-down approach

SESAR Vision

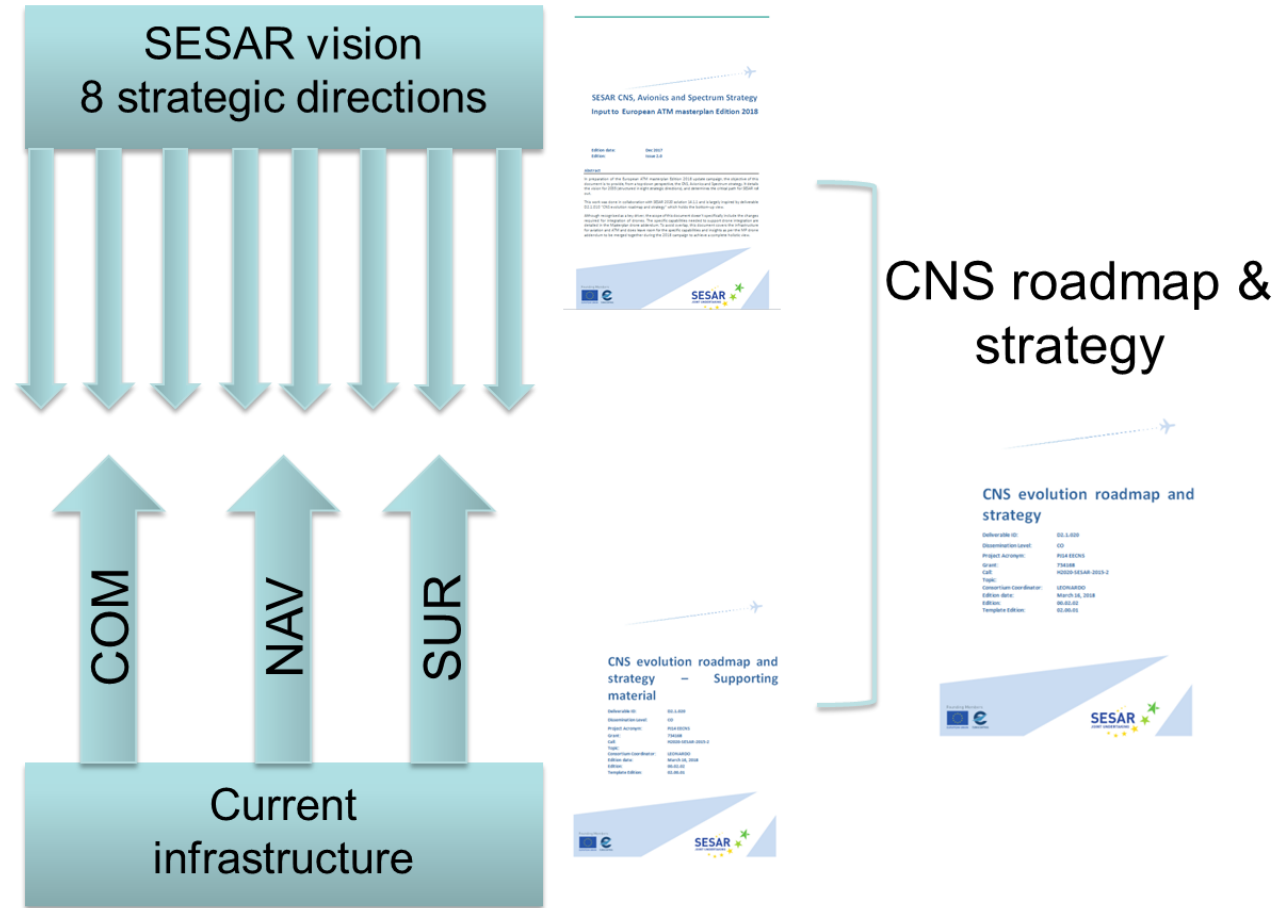
- Increase **digitalisation, connectivity** and **higher automation** levels
- Implement a **safe, secure and resilient infrastructure**
- Move from physical assets management to **CNS services**
- Develop **performance-based** and **integrated CNS concepts**
- **Combine satellite-based airborne and ground-based CNS**
- **Rationalize** infrastructure
- Increase **civil-military synergies** and **dual-use**
- Ensure an **efficient** and long-term availability of suitable **spectrum**



CNS Roadmap & Strategy: bottom-up approach



Combining both approach

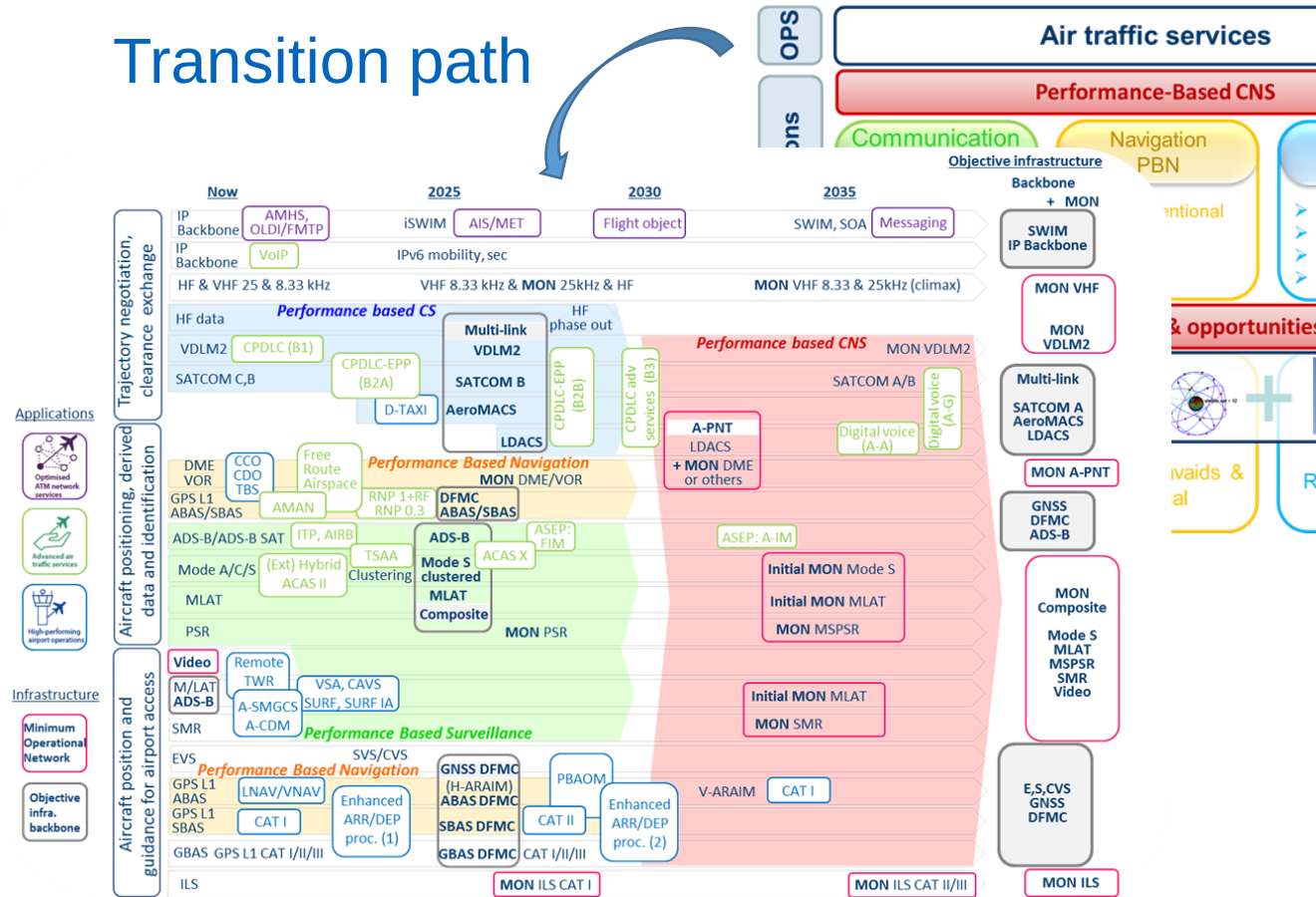


CNS Roadmap development led to:

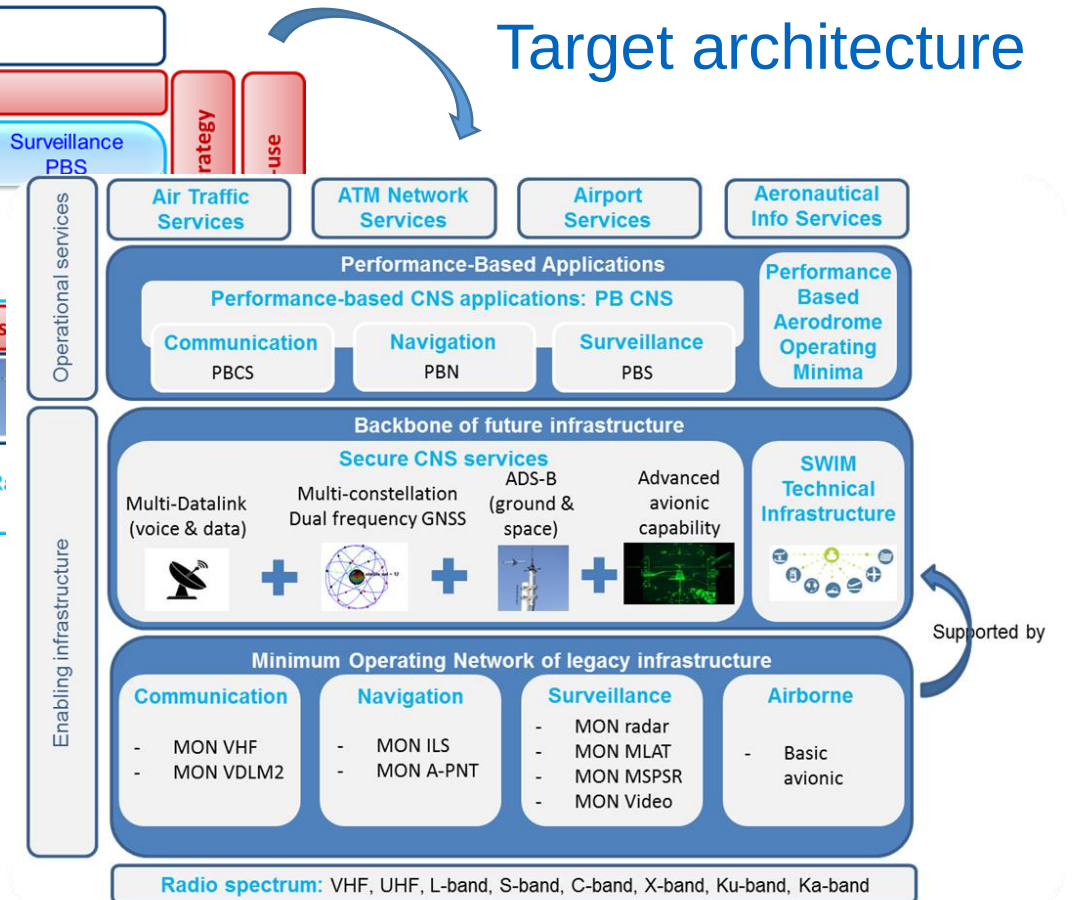
1. Stress the need for an **integrated CNS Concept**
2. Generalization of the **Minimum Operational Network** concept
3. Definition of the **CNS target architecture**
4. Development of a **transition path**
5. Identification of the **CNS rationalisation opportunities**

Transition path and target architecture

Transition path



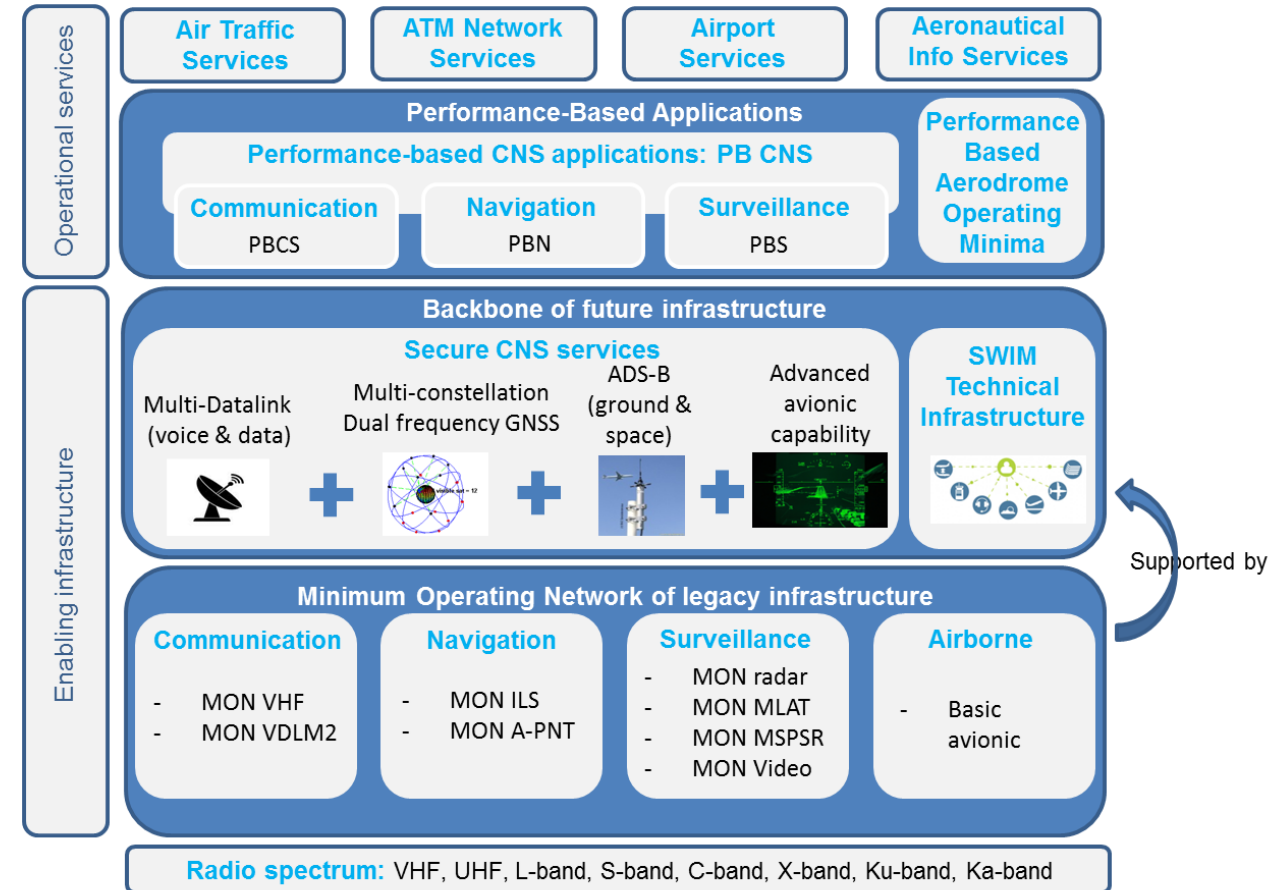
Target architecture



CNS target architecture

CNS Target architecture is composed of 3 layers:

- **Performance-based** application, grouped under a common CNS PB framework
- Backbone of the future infrastructure, in the form of **secure CNS services**: multi-datalink, DFMC GNSS, ADS-B, advance airborne capability
- Supported by **Minimum Operating Network** of the legacy infrastructure



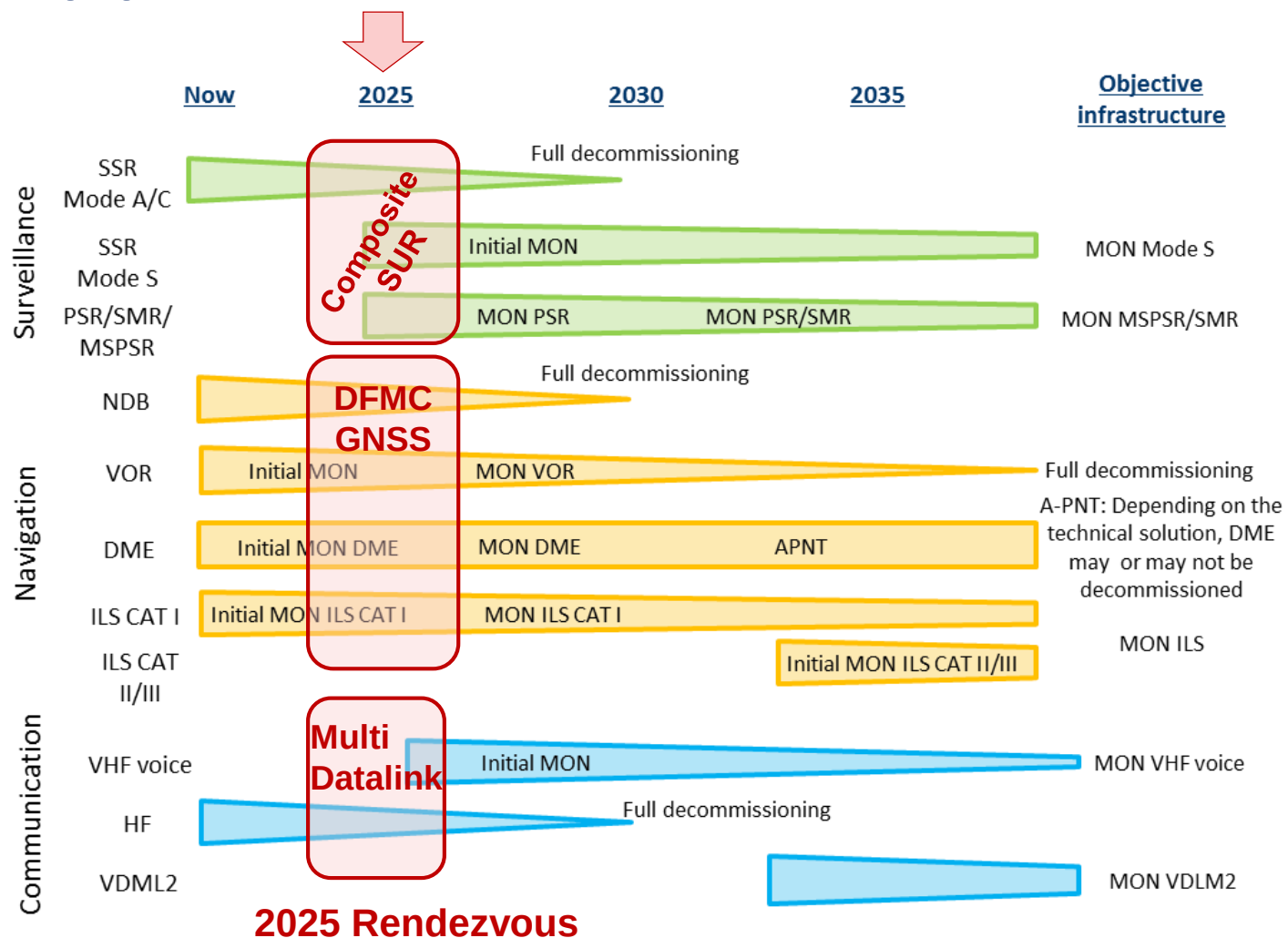
- 2025 “rendez vous”:
 - **Multi-datalink**
 - **Composite surveillance**
 - **DFMC GNSS**
- **Performance Based CNS**



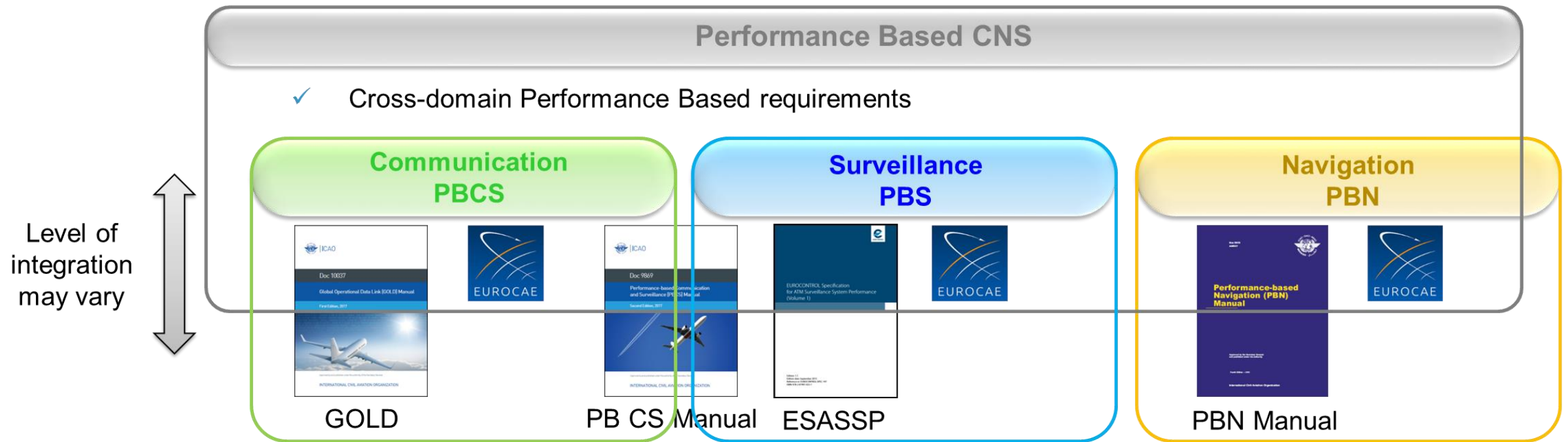
CNS Rationalisation opportunities

Enablers for rationalisation is the same 2025 “rendez vous”:

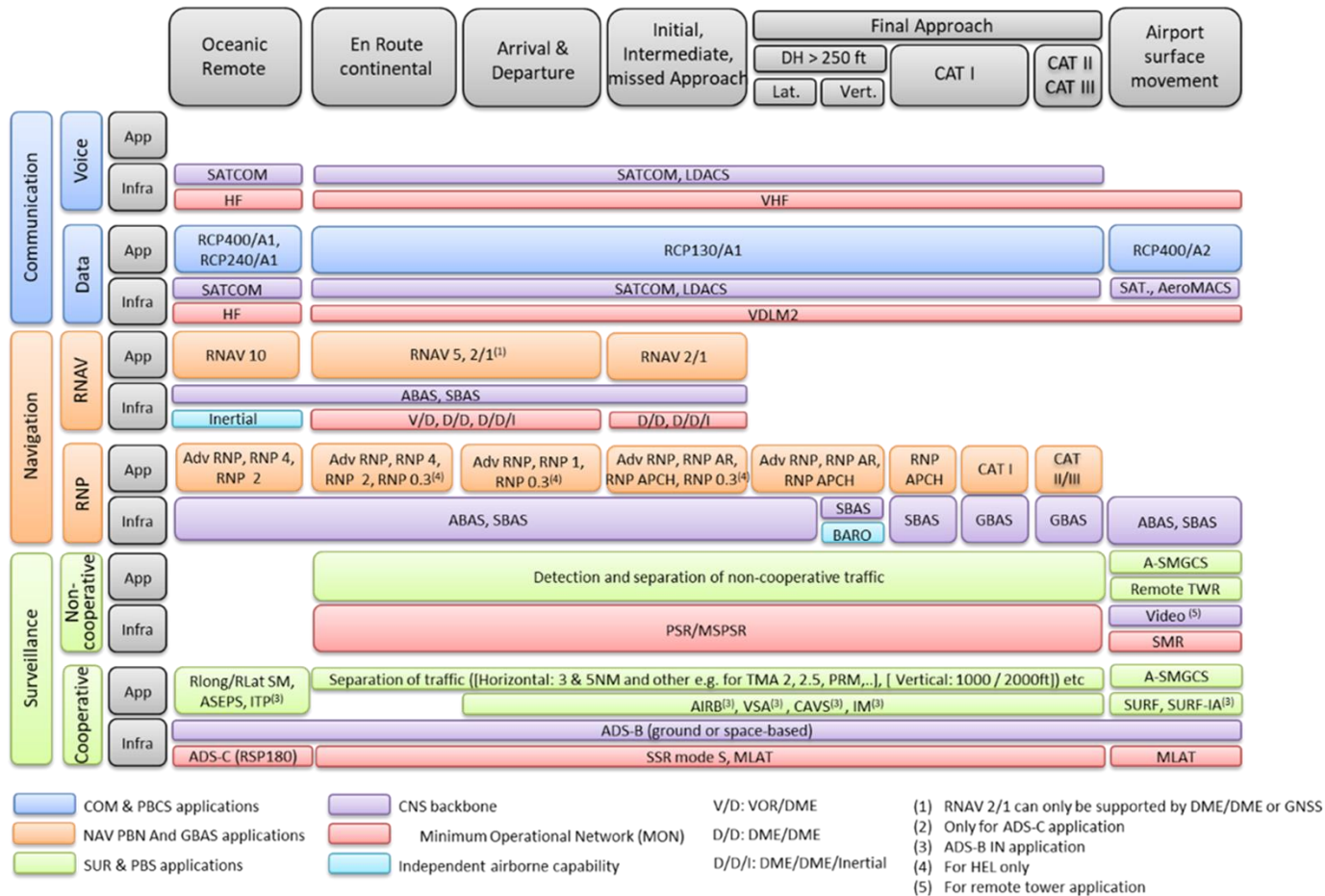
- Multi-datalink
- Composite surveillance
- DFMC GNSS



Performance Based CNS



Performance Based CNS



➤ Applications are identified by

- COM & PBCS
- NAV PBN & GBAS
- SUR & PBS

➤ Infrastructure is identified by:

- CNS backbone
- MON
- Independent airborne capability

W2 CNS Evolution Roadmap & Strategy

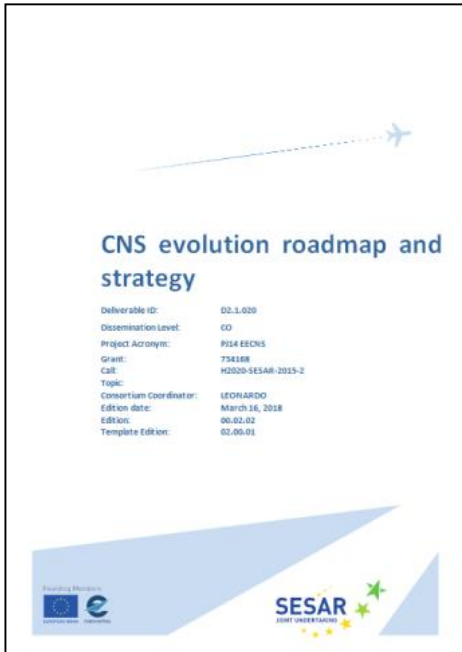
2016-2019



2020



2020 - 2022



- Better support the development of **CNS services**
- Update the **spectrum** consideration
- Update the **UAS** consideration
- Develop a **cyber-security** section using both a top-down and bottom-up approach
- Improve the **airborne** aspect
- Global update

Summary - Take-home messages

Performance Based CNS:

- Individual C, N, S concept
- A future common framework

Secure CNS services:

ATM Data Service Providers

CNS rationalisation:

Minimum Operating Network of the legacy infrastructure

2025 “rendez vous”:

- Multi-datalink
- Composite surveillance
- DFMC GNSS

Performance-Based Applications

Performance-based CNS applications: PB CNS

Communication

PBCS

Navigation

PBN

Surveillance

PBS

Performance Based
Aerodrome
Operating
Minima

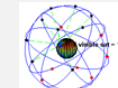
Backbone of future infrastructure

Secure CNS services

Multi-Datalink
(voice & data)



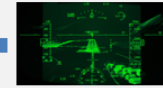
Multi-constellation
Dual frequency GNSS



ADS-B
(ground & space)



Advanced
avionic
capability



SWIM
Technical
Infrastructure



Minimum Operating Network of legacy infrastructure

Communication

- MON VHF
- MON VDLM2

Navigation

- MON ILS
- MON A-PNT

Surveillance

- MON radar
- MON MLAT
- MON MSPSR
- MON Video

Airborne

- Basic
avionic

