



Partnering
for excellence
in global
aviation



World ATM Congress 2017

Operated by CANSO in partnership with ATCA

Advanced flexible use of airspace and free route

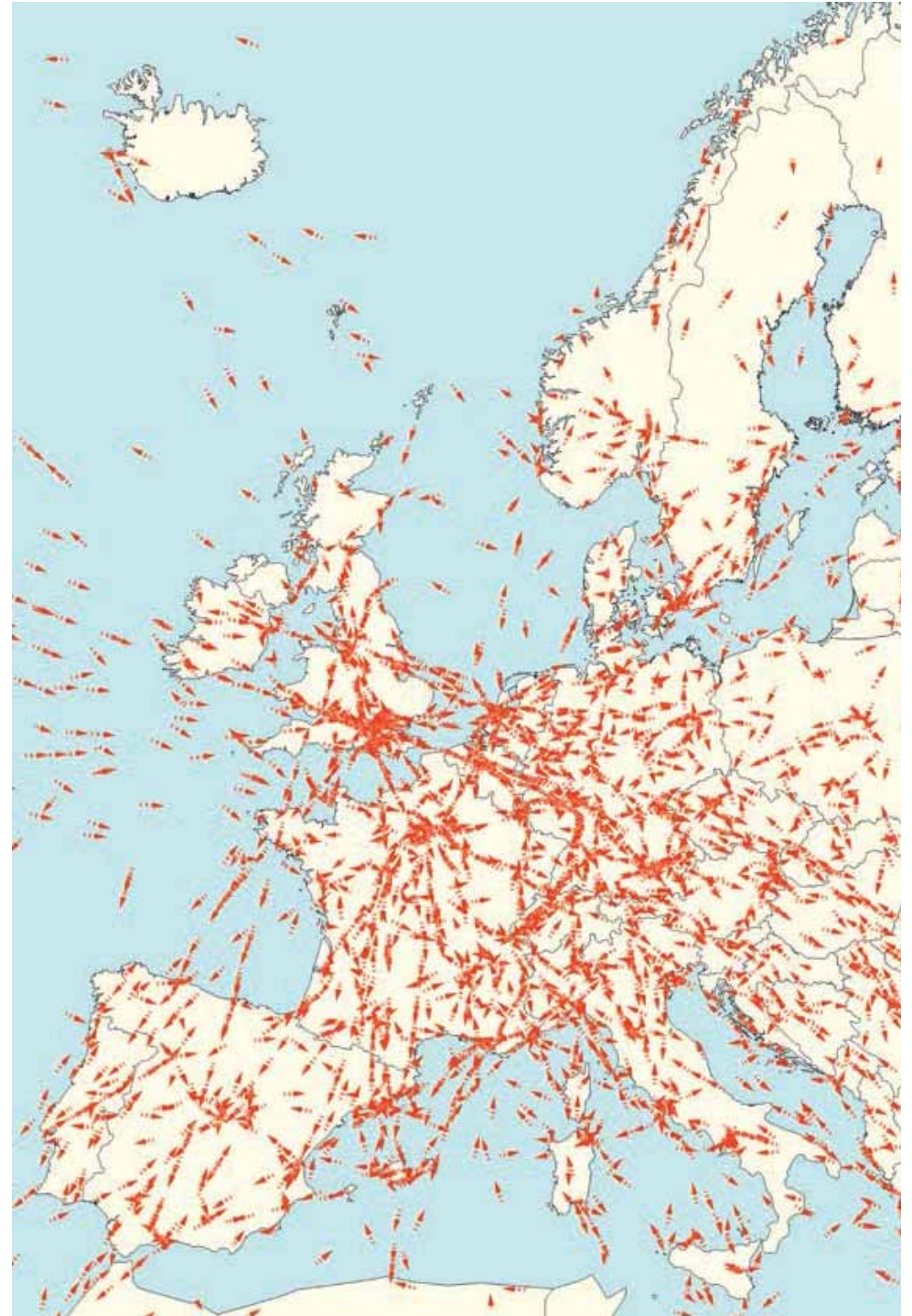
Serge BAGIEU

SESAR JU Programme Management



Agenda

- Moving from innovation to free route operations
- Airspace user perspective
- Military perspective
- Synchronised deployment of free route airspace (FRA) in Europe
- Network Manager perspective towards global European operations



Moving from innovation to free route operations

Giancarlo FERRARA

ENAV S.p.A. – VLSD & LTR Coordinator

FREE Solutions Project Manager



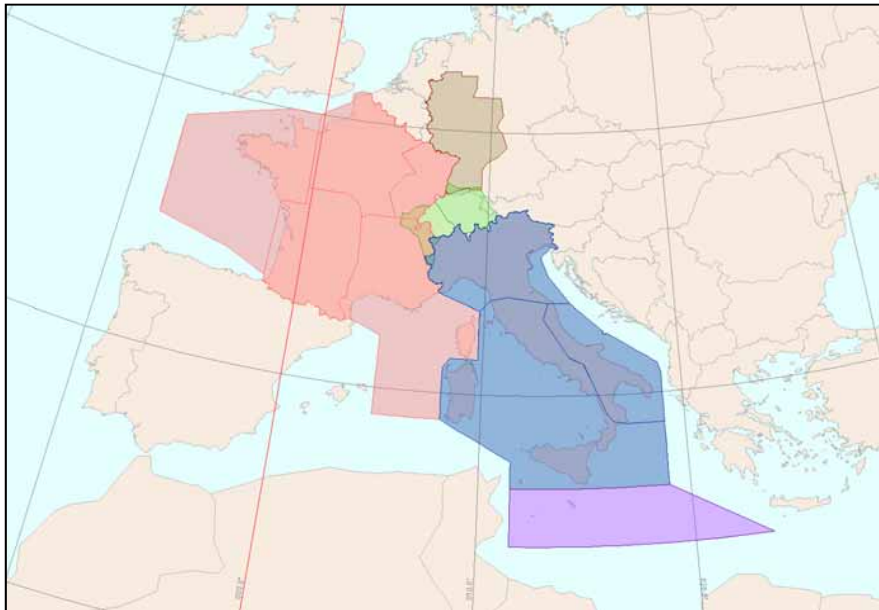
FREE Solutions – project overview



- “Seeing is believing”
- Integrated **cross-border flight trials** involving a wide range of ATM stakeholders
- **>1,000 flights over a wide multi-FAB continental FRA**
- **Direct Routing and Free Routing** operations (in **low and medium density**) are possible in Europe
- FRA operations **reduce flight times, congestion and the impact on the environment**
- FRA operations represent the first step towards the **implementation of Airspace Users’ Preferred Business Trajectories**.

FREE Solutions – partnership

- Led by ENAV S.p.A. and composed by 5 AUs, 5 ANSPs and the Network Manager.



FREE Solutions – stepwise approach

City Pairs operations:

1st set of flight trials focused on a group of City Pair available for FREE Solutions Consortium AUs

Direct Routing operations during weekend:

2nd set dedicated to the defined DRs available for all AUs

Direct Routing and FUA operations:

3rd set focused on DRs crossing active TSA/TRA available for FREE Solution Consortium AUs

Free Routing operations:

A final set of flight trials within a defined Free Routing Area made available to all AUs



FREE Solutions – main live trials

STEP 1: City Pairs live trials (Spring 2015)

STEP 2: DR & FUA live trials (Autumn 2015)



STEP 3: FRA live trials (Winter-Spring 2016)

Benefits

CITY PAIRS

Trial Flights	Length (NM)	Time (min)	Fuel (kg)	CO2 (kg)	NOx (kg)
120	-391	-81	- 3823	-12043	-53kg

Trial Flights	Length (NM)	Time (min)	Fuel (kg)	CO2 (kg)	NOx (kg)
405	-2171	-469	-21367	-67519	-416

DRs WEEKEND

DRs WEEKDAYS

Trial Flights	Length (NM)	Time (min)	Fuel (kg)	CO2 (kg)	NOx (kg)
328	-1596	-251	-5683	-17958	-362

Trial Flights	Length (NM)	Time (min)	Fuel (kg)	CO2 (kg)	NOx (kg)
149	-324	-46	-3701	-11692	-63

FREE ROUTING



FREE Solutions - project achievements

- ✓ showed **how FRA and FUA solutions could actually work**
- ✓ demonstrated the **expected performance improvements** in terms of flight efficiency and environment sustainability
- ✓ proved there is **no negative impact on capacity at both local and network level** deriving from FRA operations
- ✓ no major issues related to the FRA operations performed have been noted but **reduced traffic deviation from route and less level-off**
- ✓ provided a set of recommendations that has already helped to **de-risk the subsequent deployment** initiatives





**Thank you
for your attention**

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AFUA and free routing

Airspace user perspective

Pascal Collès
SESAR Technical Manager
Air France



AU expectations



➤ Wide cross border operations

- No hybrid trajectories
- Homogeneous FRA design
- Seamless planning (Flexible DCT length - no FIR border point management)

➤ File and Fly optimum 3D trajectory providing best flight efficiency

- Reduction of trajectory constraints (RAD's, Flow management, etc.)

➤ No capacity reduction vs ATS route network, especially in high complexity environment

- Develop solutions based on:
 - most advanced airborne CNS capabilities
 - advanced FOC systems
 - advanced ATCO tools



AU acknowledgements



➤ Main achievements performed or in progress:

- FRA in operation at FAB level in **low complexity environment**
 - NEFRA
 - Borealis
- **Extended FPL deployment** ⇔ better predictability for ATM actors
- **NM B2B services** ⇔ **real time** status of airspace linked to AFUA and ASM



AU key messages



➤ Efficient Flight Path:

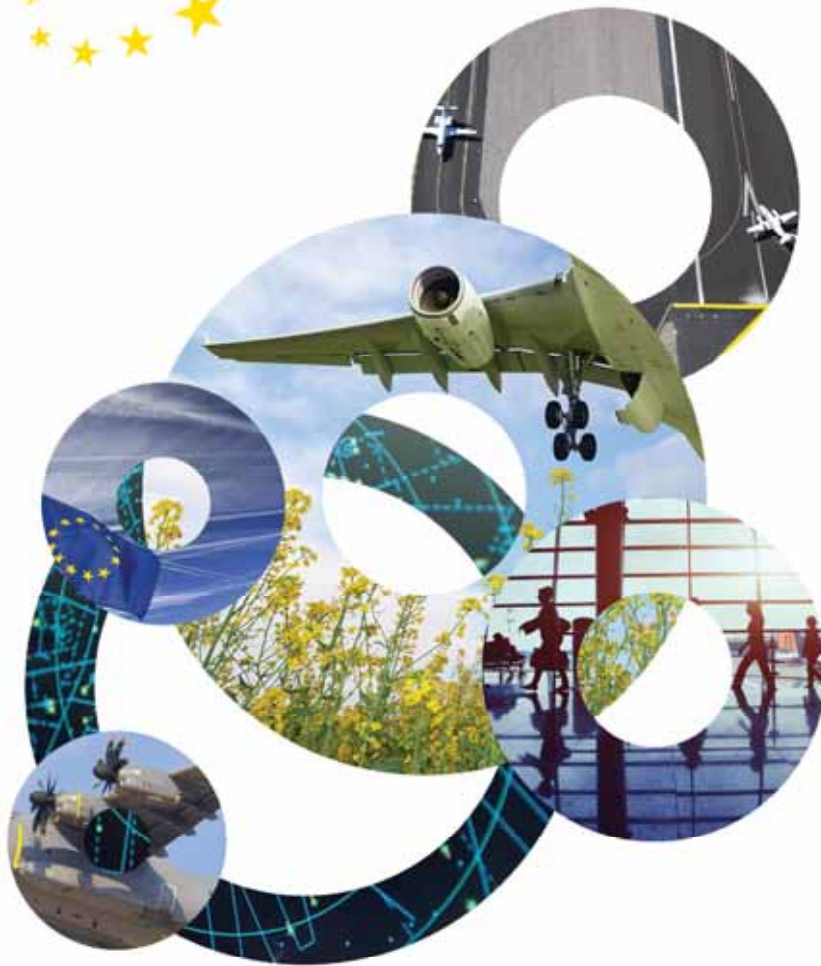
- Flight path built/filed and flown **in accordance with the airline policy in terms of business and cost**
 - At strategic level, fuel/time/overfly cost barycenter
 - At tactical level, weighing of parameters may be adapted to the current situation (delay recovery etc.)

➤ Good example flight efficient airspace:

- North Atlantic OTS publishing regularly optimum routes (tracks), based on **AUs daily preferences**.
- Also continuously improving the performance of the airspace e.g. capacity by deploying CNS enablers = Data Link, Satellite based ADS B, RLat SM etc.

➤ **AUs are ready to invest if evidence of benefits is demonstrated**





Thank you
for your attention

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Military perspective on how it is evolving

Jos Laarhoven

European Defence Agency

Expert Point of view



Role of the military

- ✓ **Airspace User**
- ✓ **Airport Operator**
- ✓ **Air Navigation Service Provider**
 - ✓ **Air Traffic Control**
 - ✓ **Air Defense**
- ✓ **Authority and Regulator**



Flexible use of airspace

- ✓ **Airspace management**
 - ✓ **Manageable airspace**
 - ✓ **Aeronautical information publication**
 - ✓ **Airspace user plan**
 - ✓ **Updated Airspace User plan**

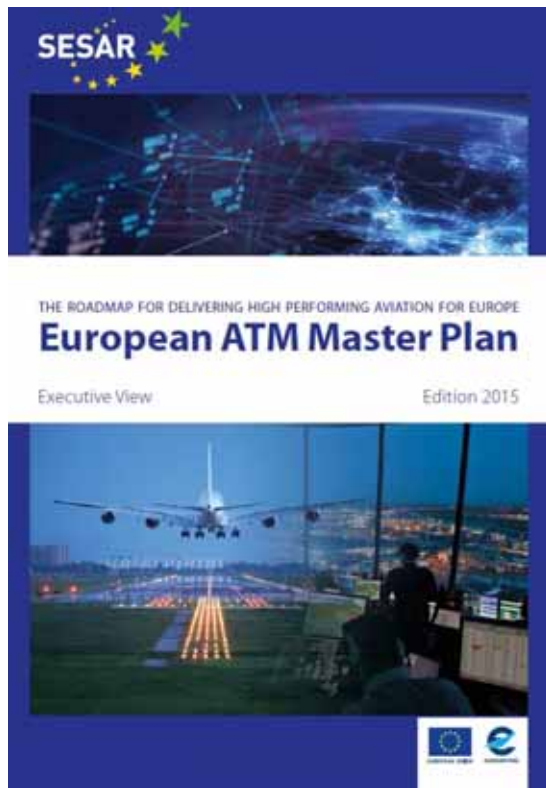


Innovation

- ✓ **Military priorities**
- ✓ **Recuperate costs**
- ✓ **Planning cycles**
- ✓ **Benefits**



Summary



- ✓ **Military are part of the system**
- ✓ **Airspace management**
 - ✓ **Available airspace**
 - ✓ **Use of released airspace**
- ✓ **Cooperation and involvement**
- ✓ **Call 2015 and 2016**





Thank you
for your attention

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Synchronised deployment of Free Route Airspace in Europe

Ramón Raposo

Synchronisation & Coordination

SESAR Deployment Manager



The Pilot Common Project

- June 2014:
Regulation (EU) 716/2014
establishing the "**Pilot
Common Project**" (PCP)
- **Common Projects:**
essential **ATM**
functionalities (AFs) in the
ATM Master Plan which
are **ready for deployment**



ATM FUNCTIONALITIES (AFs)

AF1

Extended Arrival Management
and PBN in the High Density TMA

AF2

Airport Integration and
Throughput

AF3

**Flexible Airspace Management
and Free Route**

AF4

Network Collaborative
Management

AF5

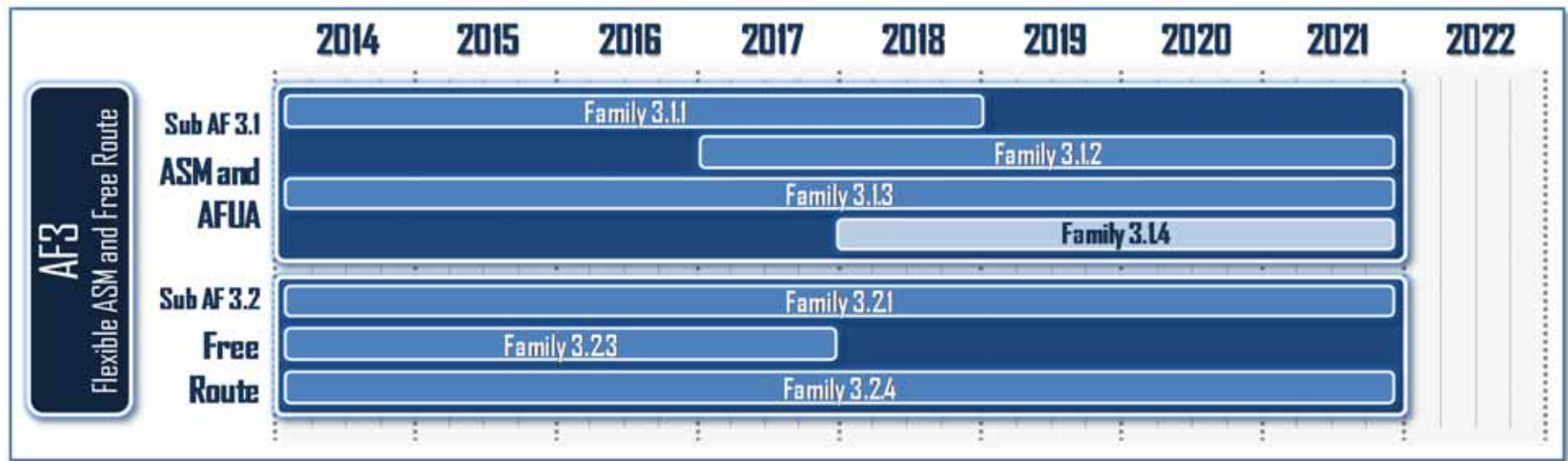
Initial System Wide Information
Management

AF6

Initial Trajectory Information
Sharing

ATM Functionality 3 (AF3) structure

Flexible Airspace Management and Free Route	
Sub AF 3.1: Airspace Management and Advanced Flexible Use of Airspace	Sub AF 3.2: Free Route



Implementation objectives in AF3

- **Flexible Airspace Management and Free Route** shall be provided and operated in the airspace for which the Member States are responsible **at and above flight level 310 in the ICAO EUR region**
- **Network Manager, Air Navigation Service Providers and Airspace Users** shall operate:
 - DCT as from 1 January 2018
 - FRA as from 1 January 2022



Finalised projects in AF3

ITALY

#004AF3: Traffic Flow
Restriction (TFR) –
LIDO planning system

Alitalia

#005AF3: Free Flight -
Direct Optimization

Alitalia



BELGIUM

#015AF3: LARA

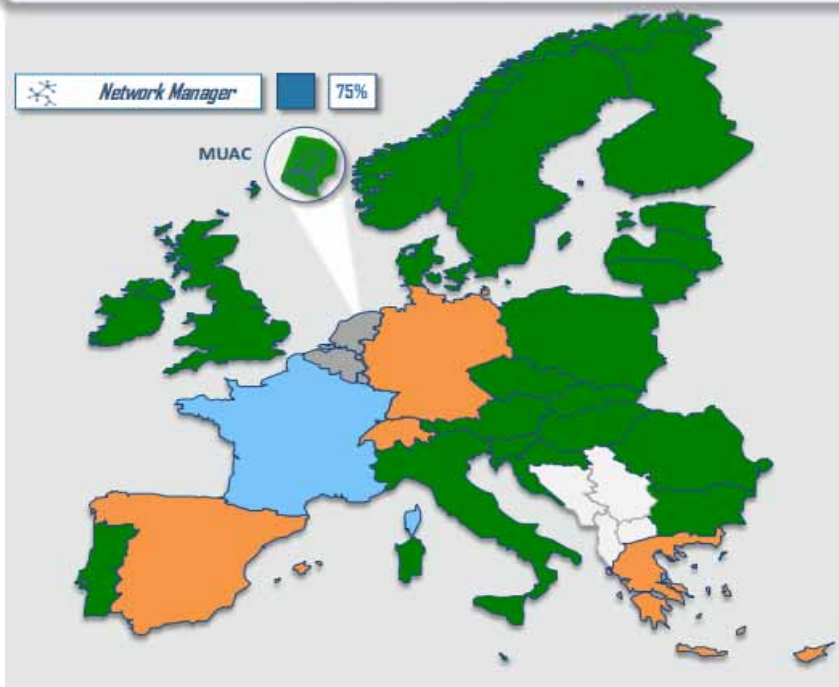
integration in Belgocontrol
CANAC 2

CROATIA

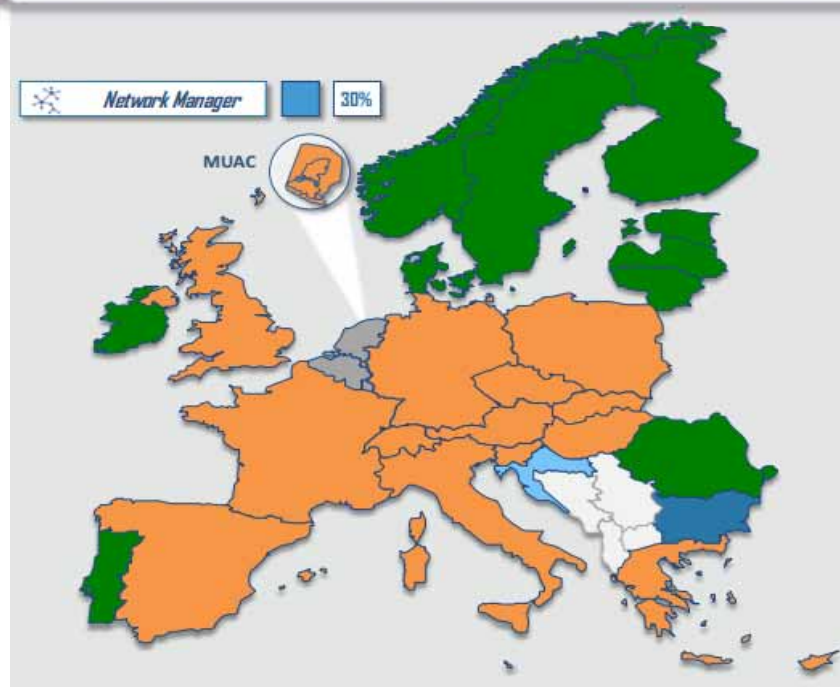
2015_050_AF3:
Simulation and
Implementation
of SEAFRA H24

AF3 monitoring view of Families 3.2.3 and 3.2.4

3.2.3 – Implement Published Direct Routings (DCTs)



3.2.4 – Implement Free Route Airspace



0% 1-25% 26-50% 51-75% 76-99% 100% - Operational Deployment Achieved No information Not applicable

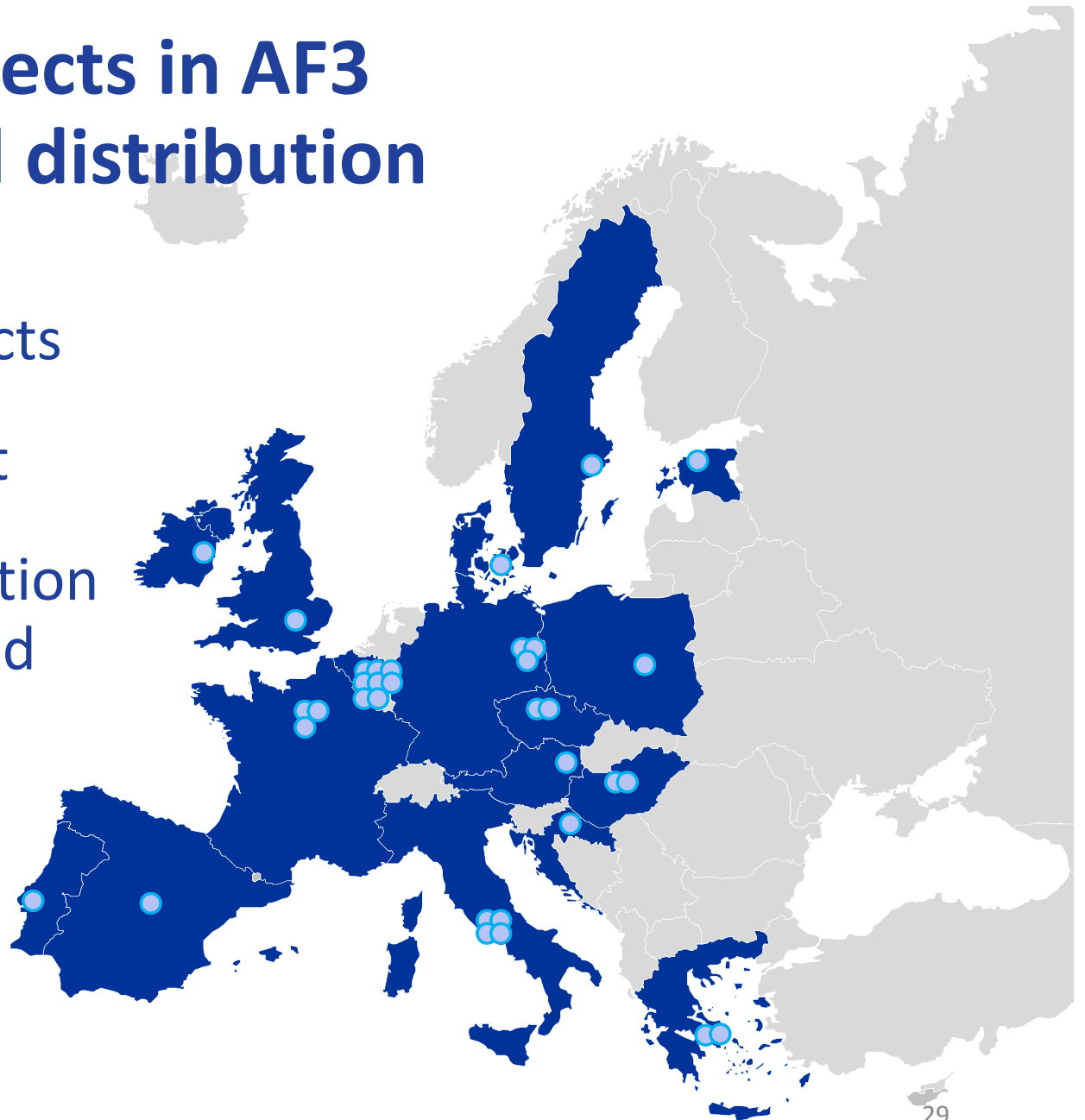


Overall Implementation Status

Ongoing projects in AF3

Geographical distribution

- 32 ongoing projects
- 2 projects to start
- New implementation initiatives expected





**Thank you
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TBC

Razvan



Next challenges SESAR 2020 project

Florence Serdot-Omer

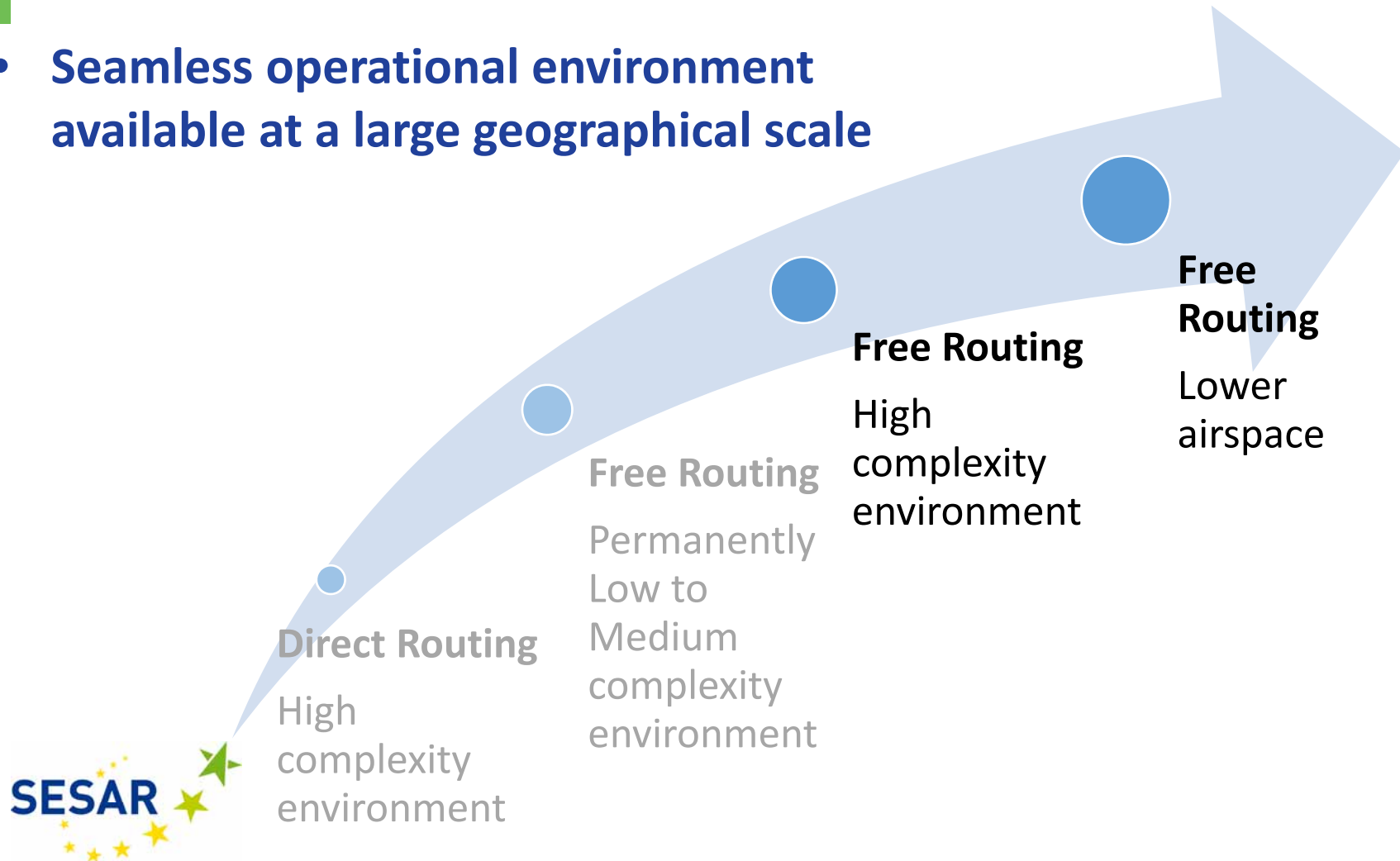
Free Route Project Manager

DSNA-DTI



SESAR 2020 FREE ROUTE R&D scope

- Seamless operational environment available at a large geographical scale



SESAR 2020 FREE ROUTE project objectives

- To complete research supporting delivery of PCP AF#3 (Free Route) by addressing Free routing in high complexity environments
- To research the benefit and impact of expanding the Free Routing concept to the lowest limit possible while accommodating all Airspace Users concerned



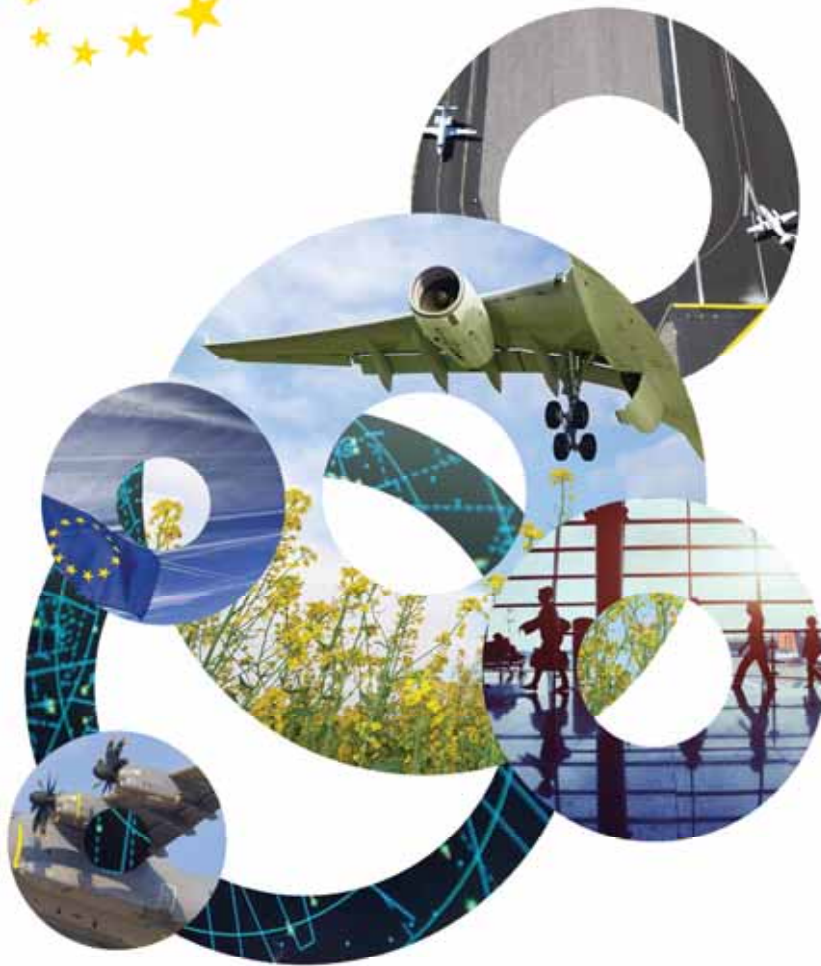
SESAR 2020 FREE ROUTE

The partners



and their linked third parties





**Thank you
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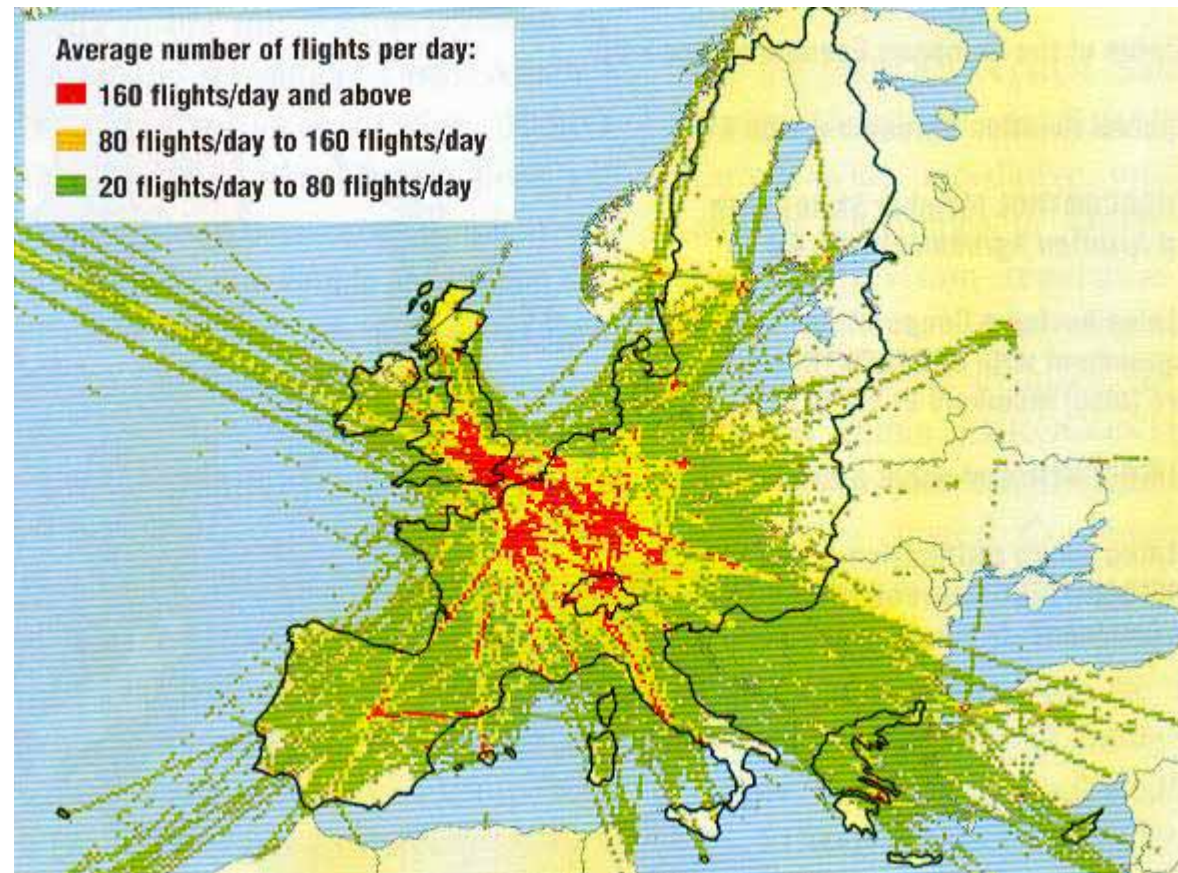
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Wrap up







**Thank you
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