



SES/SESAR Airspace Architecture Study Workshop

Workshop document | 6 July



Founding Members



Welcome

SES/SESAR AIRSPACE ARCHITECTURE STUDY WORKSHOP – Day 2

5-6 July 2018

European Commission, Breydel Building, Avenue d'Auderghem 45, Brussels , Belgium

6 July 2018

Opening session	
9:00 – 9:15	Welcome and reflections from day 1 Michael Standar, Chief Strategy and External Affairs, SESAR JU
Stakeholder perspectives	
9:15 – 9:30	Perspectives from Airspace Users Achim Baumann, Policy Director, A4E
9:30 – 9:45	Perspectives from Airports Luc Laveyne, Senior Adviser Single European Sky, ACI Europe
9:45 – 10:00	The ANSP Perspective Iacopo Prissinotti, Head of the International Strategies Department, ENAV (representing the A6 Alliance)
10:00 – 10:15	Perspectives from Professional Staff Organisations Luis Barbero, President and Chief Executive Officer, Guild of Air Traffic Control Officers (GATCO)
10:15 – 10:30	The Network Manager Perspective Joe Sultana, Director, European Network Manager
10:30 – 10:45	Perspectives from the Military Defence Sector Christophe Vivier, Head of Unit Single European Sky/SESAR, EDA
10:45 – 11:00	Perspectives from the manufacturing industry Vincent De Vroey, Director Civil Aviation at ASD
10:30 – 11:00	Coffee break
11:00 – 12:00	Discussion with the audience Moderated by Michael Standar, Chief Strategy and External Affairs, SESAR JU
12:00 – 12:30	Conclusions and next steps Florian Guillermet, Executive Director, SESAR JU
12:30	END

FOUNDING MEMBERS



#SESAR
@SESAR_JU



- We all share this sense of **urgency** - so what are we waiting for?
- There are **constraints which are inhibiting the performance** of the system – are we clear on which ones?
- From a SESAR perspective, we have one plan & vision under which we all operate: **European ATM Master Plan** coupled with **the ICAO GANP** - so why continue debating the vision?
- **Technology is available** or in the pipeline – can we now move on to talk about services?
- **Airspace configuration** and design can provide solutions for the network – are we ready for it?
- We need to look at **the overall architecture** – can we connect technology, airspace and services? Can we start using modern technology to deliver better and safer services?
- Thank you for **day 1!** - any elephant in the room?

Stakeholder perspectives

A/E AIRLINES
FOR
EUROPE



July 2018

Content expectations

- ✈ Represents more than a simple restructuring exercise
- ✈ Current 'Capacity Crunch' is urging for sustainable strategic changes
- ✈ Takes into account ECA report
 - 📌 Defragmentation
 - 📌 Competitive environment
 - 📌 Foster performance
 - 📌 Timelines for achievement

Expectations of Results

- ✈ **Paradigm shift**
 - 📌 Clean sheet and no limitations
 - 📌 Only addresses challenges to the vision
 - 📌 Change the mode of operations from ATM 'Control' to ATM 'Management'
- ✈ Support a standardised Concept of Operations (ConOps)
- ✈ Clear timelines and milestones
- ✈ Enable growth to provide transportation services to citizens

We believe in

Paradigm Shift

-  **Seamless airspace with business preferred trajectories**
-  **Resilient and dynamic**
-  **No geographic link between service provision and customer (virtualisations, connectivity)**
-  **Overcoming of human limitations (automation, digitalisation, new ConOps)**
-  **Performance based (air, ground and regulation)**

Standardisation

-  **One ConOps**
-  **One qualification for Upper Airspace Controller**
-  **Global Interoperability**

Driving factors

- ✈ **Defined by airspace users**
- ✈ **Demand based**
 - 📌 Passenger
 - 📌 Cargo
- ✈ **Business driven**
 - 📌 Revenue/Cost
 - 📌 Environment
 - 📌 Human resources

Areas

- ✈ **Safety**
- ✈ **Network**
- ✈ **Communication**
- ✈ **Navigation**
- ✈ **Surveillance**

Best value for money

Services

Safety

-  **Separation**
-  **Conflict resolution**

Network

-  **Management services**
-  **Capacity management**
-  **Dynamic re-routing due to disruption**
-  **Collaborative planning process**

CNS

-  **Pan-European governance regulation basic service**
-  **Unbundling of services**
-  **Flexible selection of services**
-  **Performance based**

SES/SESAR

- ✕ Use the results of the study to update pertinent documents (ATM Masterplan, regulation, Common Projects, etc.)
- ✕ Develop an EUIR ConOps
- ✕ Cooperation between operational stakeholders is key

Governance

- ✕ EC continue to lead
- ✕ Member states to play their part
- ✕ Performance scheme(s) to support
- ✕ Binding implementation plan with strong execution monitoring
- ✕ Based on industry wide stakeholder commitment

We have a vision for 2035 but
We need to implement now what is available now
We need to start working on the transition plan now

One Airspace
One Concept
One Qualification



Perspectives from Airports

SES/SESAR AIRSPACE ARCHITECTURE STUDY WORKSHOP

Luc Laveyne, Senior Adviser SES, ACI Europe

6 July 2018, Brussels



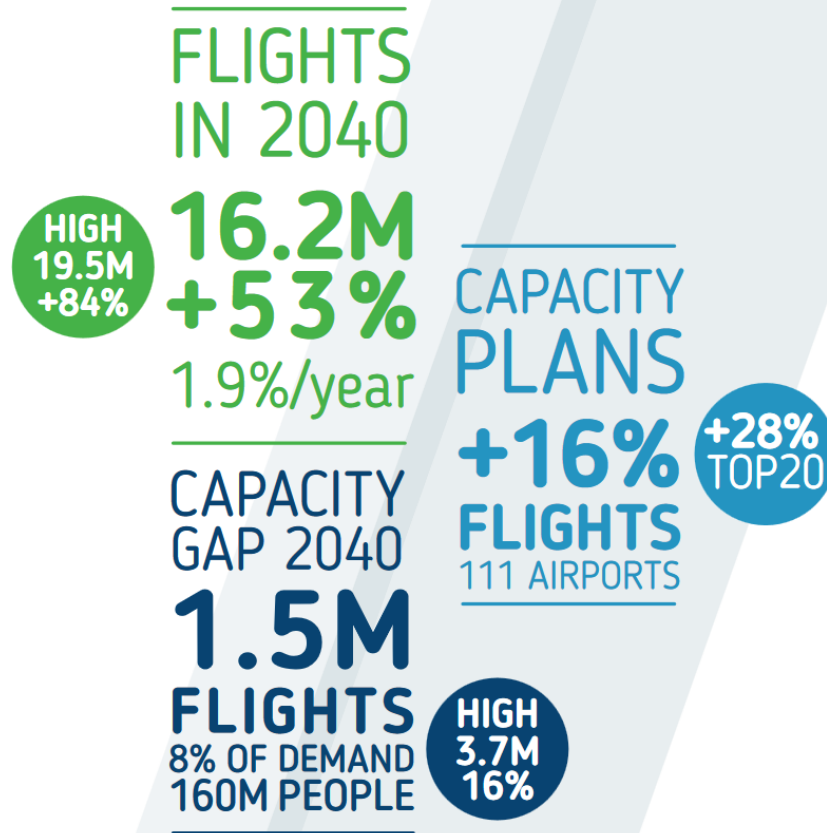


En route

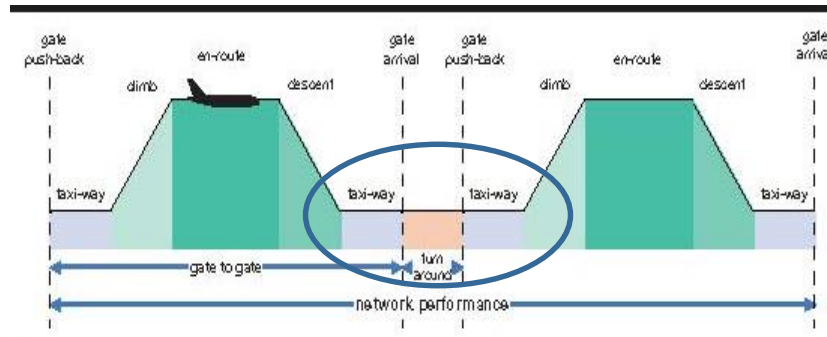
Airport



→ The future ...



→ Capacity, throughput and ATM



Traffic increase requires for airports :

- Permits for new infrastructure
- Better traffic sequencing
- Reduced separation requirements
- Reduced and more predictable ROT.
- Tighter utilization of airport capacity will lead to better predictability and punctuality (as for passengers also for planes : come on time to the airport – not late; not early)
- Make the link between the SESAR work and The Airspace Architecture Study.
- These improvements cater for avoiding European airports to be the bottlenecks and have a policy to match airspace capacity and ground capacity.



*Investment is all about more capacity,
connectivity and quality*



AIRPORT CAPACITY PLANS ARE NOT ENOUGH

Airport capacity expansion plans, even if they can be delivered, are not sufficient. Plans are better focused than they were in 2013, with more capacity expansion where we predict more traffic growth. Even so, by 2030



The political environment.

Match airport capacity and airspace capacity



EU Transport Commissioner Violeta Bulc, a vocal proponent of investment in the European air transport sector, commented: "Investment drives development. Through investment, we can continue to be a catalyst for change." For this reason, she

Land Use Building Permit

14884 Old Lodge Dr SE
Burien, WA 98148

IN CONSIDERATION OF The statements and representations made by **SAMPLE**

in application therefore duly filed in this office, which application is hereby made a part hereof, PERMISSION IS HEREBY GRANTED to said **SAMPLE** as owner, to

(Build, erect, install, add to, alter, repair, move, wreck, as the case may be)

(Describe project in detail): front or width in feet, side or length in feet, height in feet, number of stories, square feet, upon that tract of land described as follows: Lot, Block, Plat or Addition, Parcel ID#

size and area specified in said application

This permit is granted upon the express condition that said owner and he/she contractors, agents, workers and employees, shall comply in all respects with the ordinances of the Town of Ten Lake, that it does not cover the use of public property, such as streets, sidewalks, alleys, etc., for which special permits must be secured; and that it does not cover the following:

for which a permit must be secured

Given under the hand of the Planning and Zoning Administrator of Ten Lake Township and attested by its Clerk

Attest: **SAMPLE** Ten Lake Township Clerk

SAMPLE Zoning Administrator or Board Chair

Airlines Urge Caution on Airport Privatization

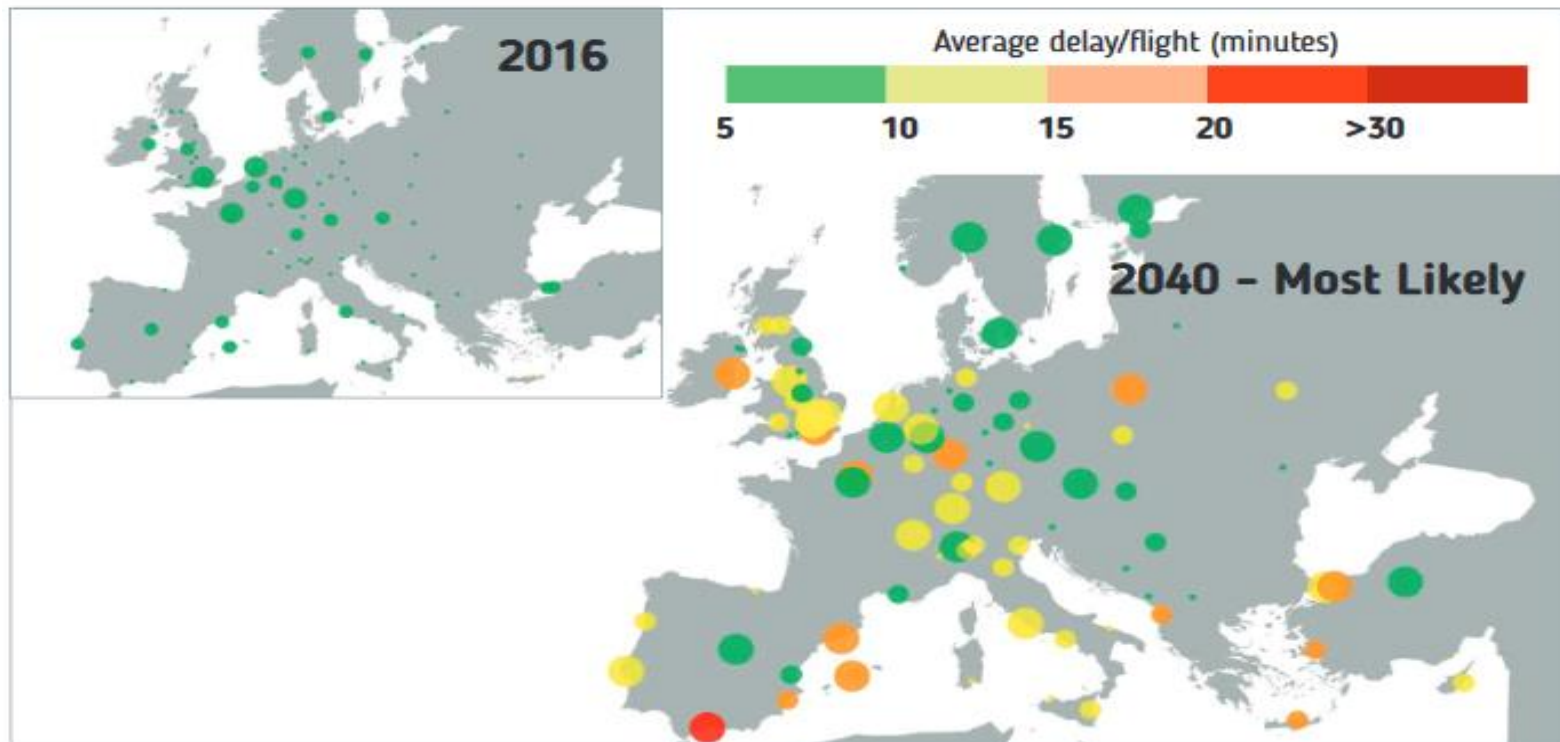
Junio 5, 2018





The business environment

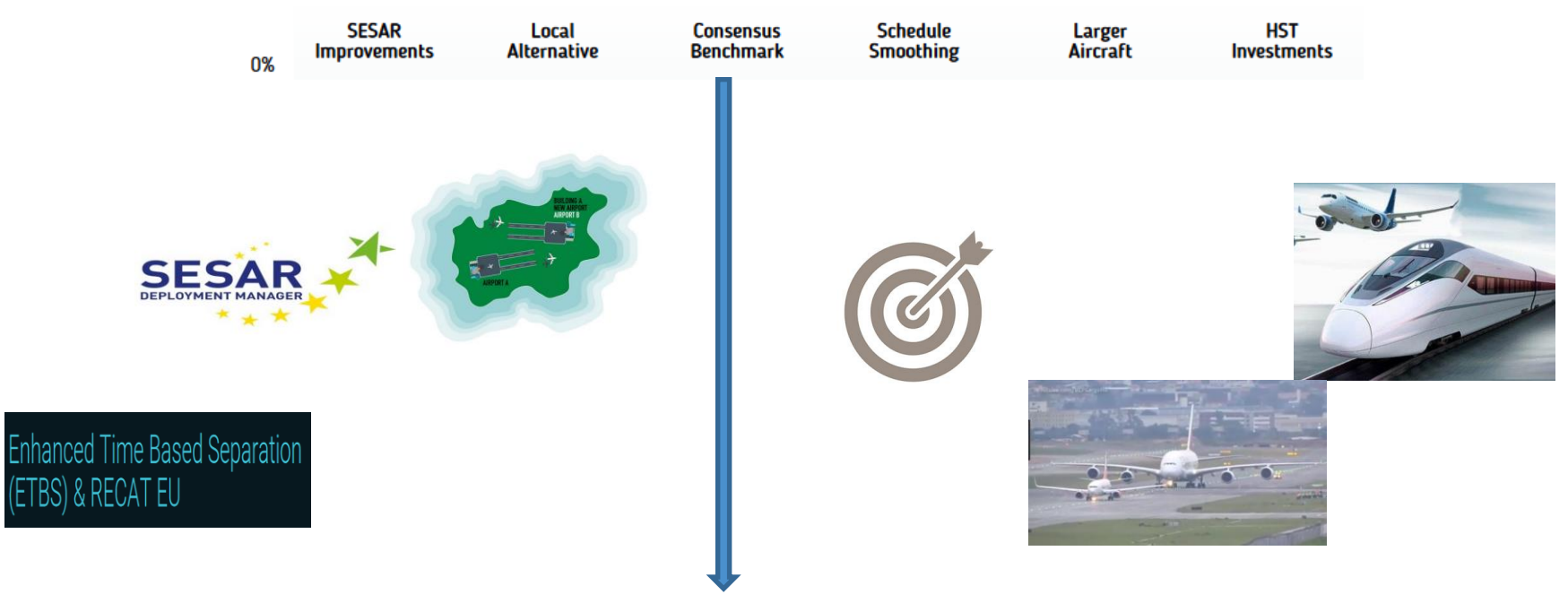
Figure 14 / The congestion challenge means degraded performance at a significant number of airports.





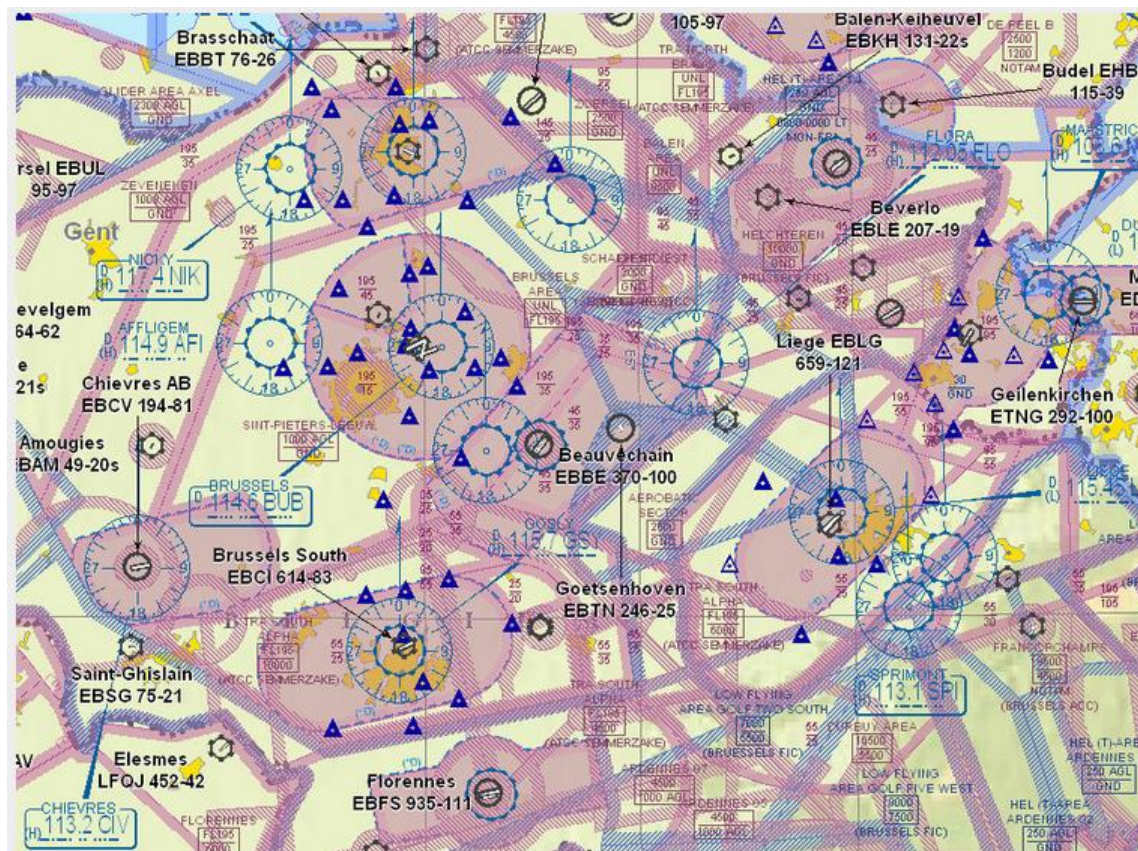
Is it possible to mitigate additional airport infrastructure ?

Figure 16 / Mitigation: What-if? reductions in capacity gap for 2040.



What are airspace designers smoking?





→ (Local) Airspace : a (poorly used) asset for member states to deliver the SES.

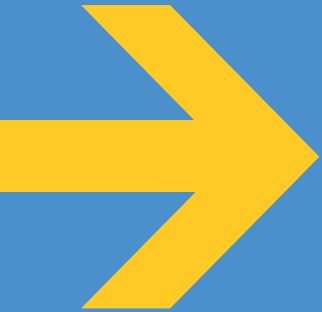
- Airports are in favour of the Seamless European Sky and are fully committed to make their part of the investments to accomplish this.
- However, airspace – more specific the efficient design and use, is crucial to connect the highway (en-route) and the end destination (airport) in a door to door transport policy.
- Review systematically the airspace around airports and adapt the design to make seamless operations possible.
- As in infrastructure investment ATC providers cannot start re-design of airspace without the formal decisions of public authorities.



→ Conclusions

- ACI-Europe supports the ongoing airspace architecture study as a first step to a more comprehensive airspace modernisation to tackle the capacity crunch on the ground;
- ACI-Europe demands an efficient connection between the en-route and the airport in order to enhance on time performance for the passenger and the network.
- ACI-Europe calls on member states
 - To reduce the timeline for permits and decisions to build additional physical capacity .
 - To instruct their ATC providers to start modernisation of local airspace to help overcome the capacity crunch.





THANK YOU

www.aci-europe.org

www.airportcarbonaccreditation.org



a6

SES/SESAR AIRSPACE ARCHITECTURE STUDY WORKSHOP

Brussels, 6th July 2018

Iacopo Prissinotti

Background

Technology and Transport infrastructure in dramatic evolution



Needs and challenges

- Pressure for more capacity and safety
- New customers
- Data availability and Cyber security
- Global and regional political strategy

Disruption

- Digitization, virtualization and automation
- Open architecture
- Satellite based services
- Drones services

Strategic choices to make

- First mover
- Consolidation and industrial partnership
- Public-private cooperation
- International and cross-sector collaboration

TEC & OPS enablers

- The A6 envisions the development and operation of:
 - ⊕ **New Operational Concepts** already envisaged in the ATM Master Plan, maximizing the use of Users' preferences and Airspace system performance
 - ⊕ **Airspace “super-structures”** enabling new Operational Concepts, fully supporting Free Route Airspace
 - ⊕ **Airspace capacity needs** balanced dynamically on the network and regional levels
 - ⊕ **Fully interoperable ground-based systems** supported by large **ATM “data centers”** enabling seamless operations and a high degree of **automation** for managing data flows and carrying out many more of the routine control tasks
 - ⊕ **Flight plans information** (trajectory plans) available in enough detail to all affected service providers in sufficient time
 - ⊕ **Virtualisation and remotization** of systems and services which will support the modernization and consolidation of ATM/CNS infrastructure

Key enablers

- The A6 considers the following aspects as key to ensure success of this initiative:
 - ✦ **Cooperation of all actors** within the operation is required: ANSPs, Airports, Airspace Users, Network Manager, Staff
 - ✦ **Operational resilience** will become increasingly important, appropriate levels of fall back and the ability to transfer operations between actors in the event of serious failures shall be ensured
 - ✦ **Intelligent Regulation** at both national and supra-national levels, greater focus placed on regulation that drives outcomes rather than inputs and:
 - appropriate balance between mandates and incentivise related to equipage of airborne and ground based systems
 - greater development and harmonization of social regulations that will deliver the flexibility required of human resources whilst not compromising safety
 - ✦ **Political support** is crucial and we must propose solutions that are feasible and sufficiently mature for implementation

Additional aspects

- There are two specific aspects to be considered:

- ✚ **EUIR concept**

- shall not be understood as simplistic consolidation of ATSUs in the Upper Airspace
 - rather “an airspace within which the airspace classifications and rules that are applied are harmonized with consistent and widespread application of advanced ATM tools to manage aircraft trajectories both for safety (deconfliction) and efficiency. Flights within this airspace should not be trajectory constrained by national boundaries or ATM service provider and should be highly resilient to perturbations that could occur through technical failures or social/industrial issues. High degrees of cooperation between all actors drive a highly performant network”

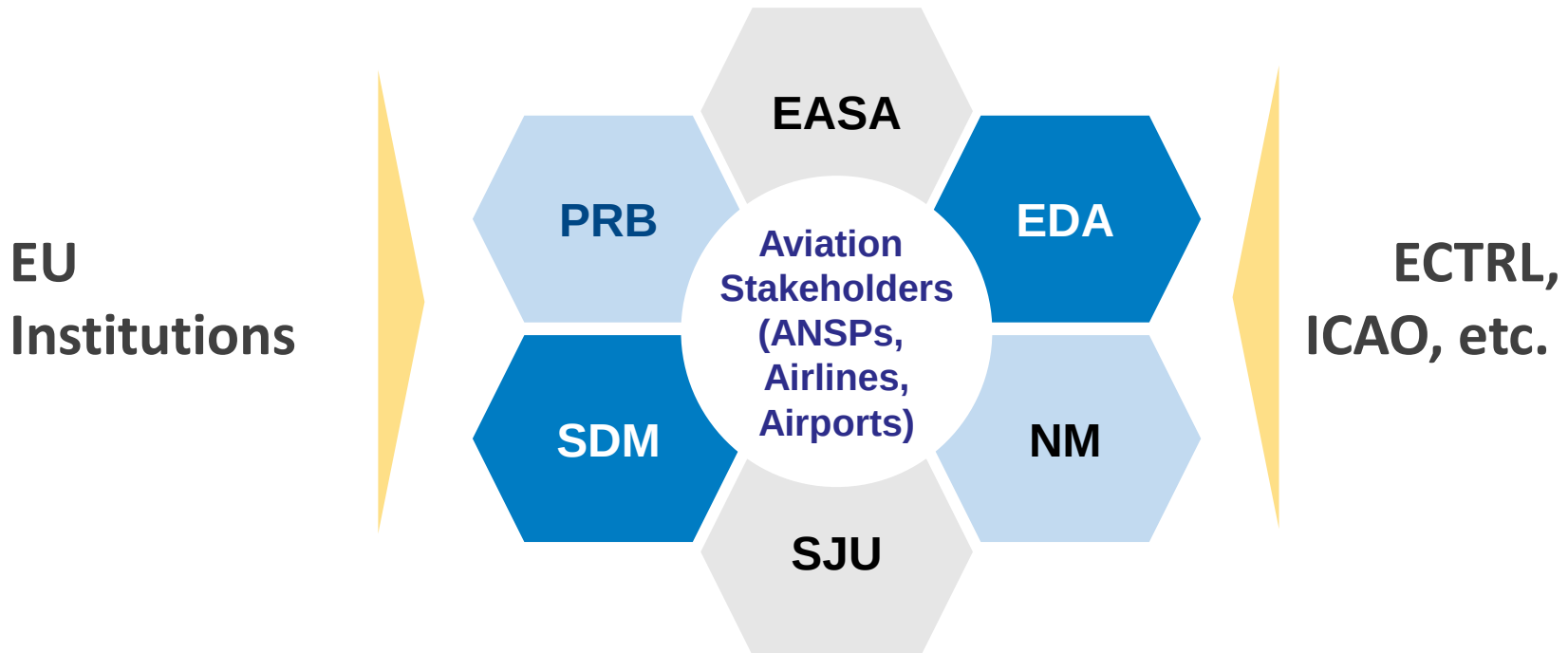
- ✚ **NM role** - NM need full involvement in the process:

- NM is also a service provider
 - NM has a role in the ATFM/ATFCM evolution
 - NM has knowledge and capability to accompany the change to be implemented by the Operational stakeholders
 - ANSPs and Airlines can support the NM by providing further information on capacity and route development plans
 - NM has a role in the harmonisation of the measures and of the technical interventions required in order to achieve the objectives

Boost cooperative environment

SES has already delivered a cultural change and several improvements at institutional and operational/technology level

Cooperative environment



Conclusions

- ANSPs' major objective is to improve the performance of the European ATM network
- We have created an important asset to protect
- Through the SESAR Programme, A6 have identified new operational concepts and technologies that are the fundamental enablers in achieving the SES objectives
- We must continue and boost the industrial strategy
- Involvement and cooperation of all aviation partners is key
- Performance-based regulation and incentivization should be used to foster and support the change
- Political support is key



Perspectives from Professional Staff Organisations

Dr Luis Barbero

President and CEO of GATCO

5-6 July 2018

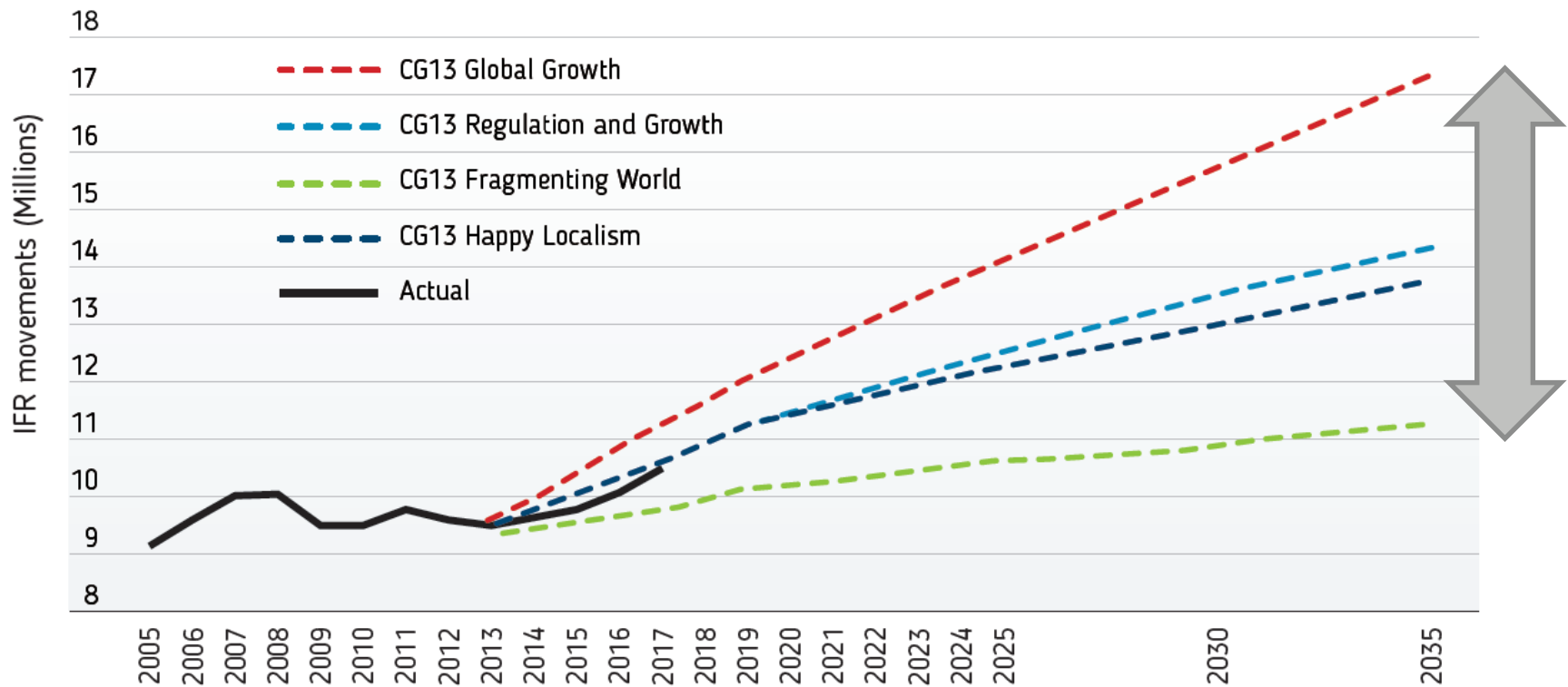
SES/SESAR Airspace Architecture Study Workshop

Professional Staff Organisations

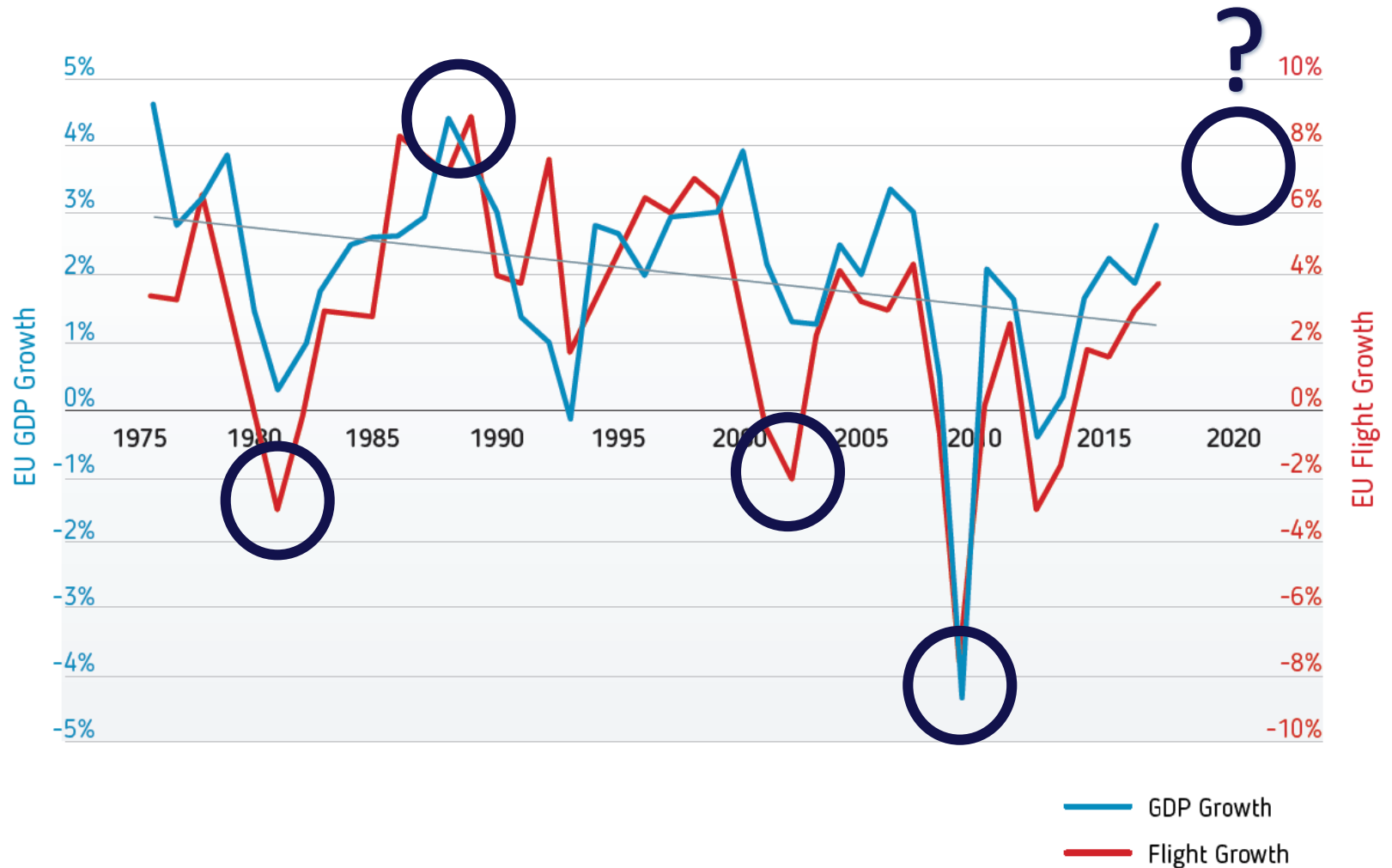
- International Federation of Air Traffic Controllers' Associations
- International Federation of Air Traffic Safety Electronics Associations
- Air Traffic Controllers European Unions Coordination
- European Transport Workers' Federation
- European Cockpit Association



Forecast Fixation



Disruptive Events



Single European Sky Forecast

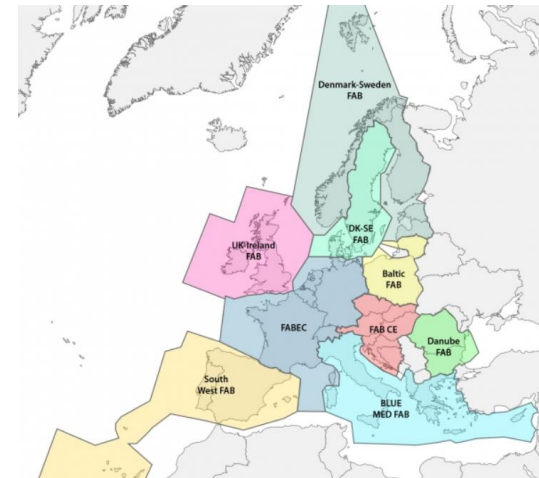
2001



2012

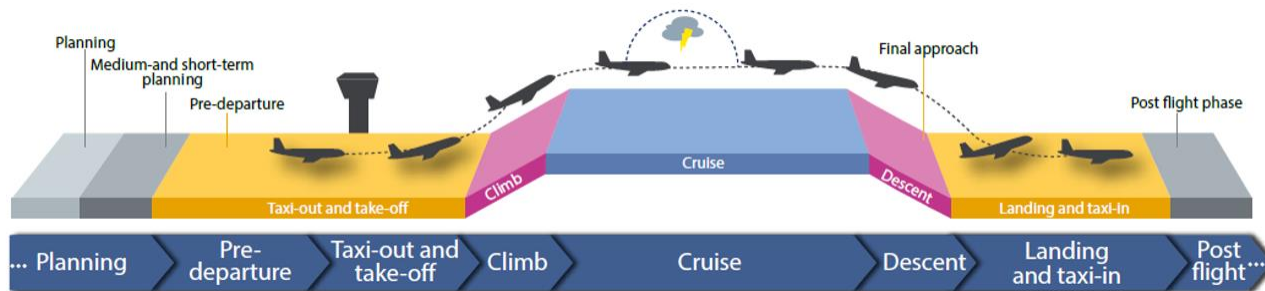


2035

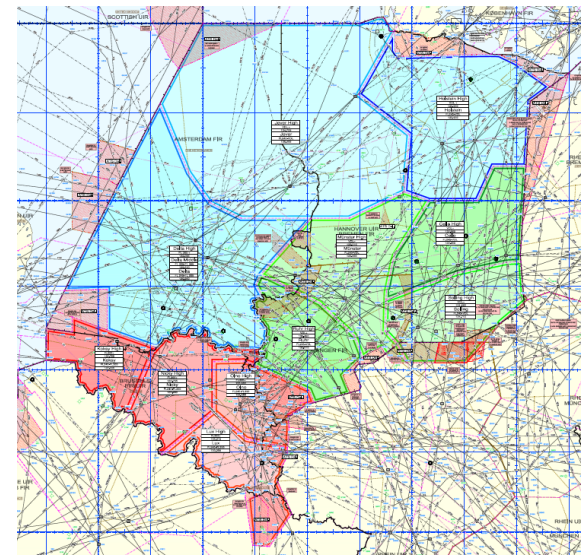


SES/SESAR Airspace Architecture

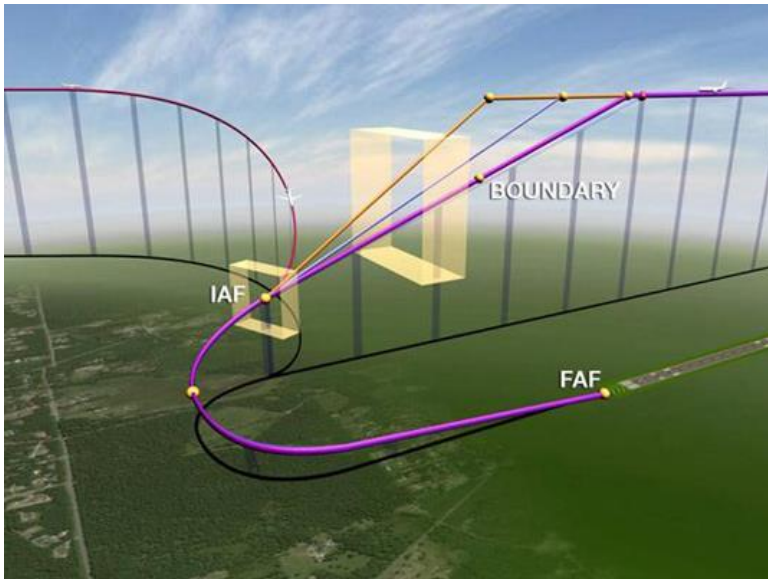
- Airspace architecture study cannot introduce vertical fragmentation – Gate to Gate approach.



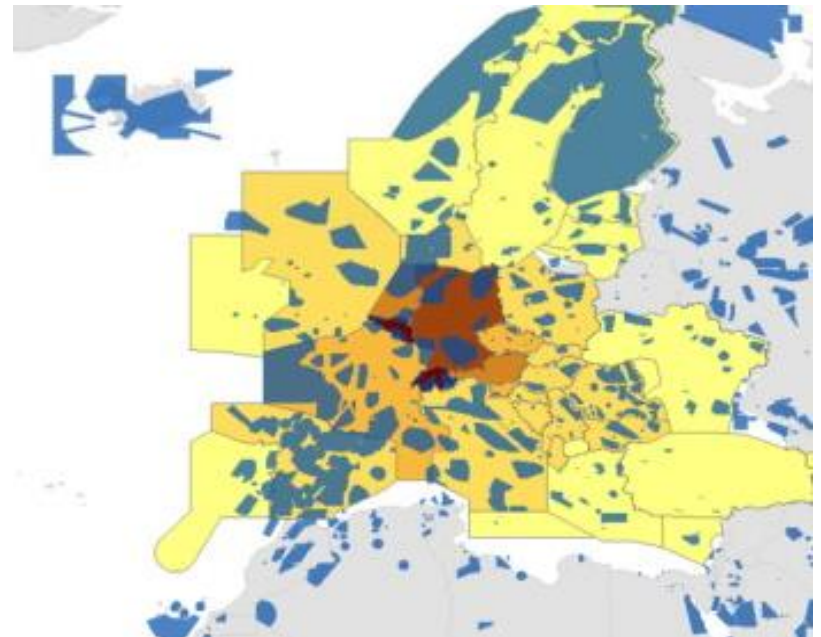
- Areas of responsibility of service providers might not necessarily align with state boundaries.



SES/SESAR Airspace Architecture

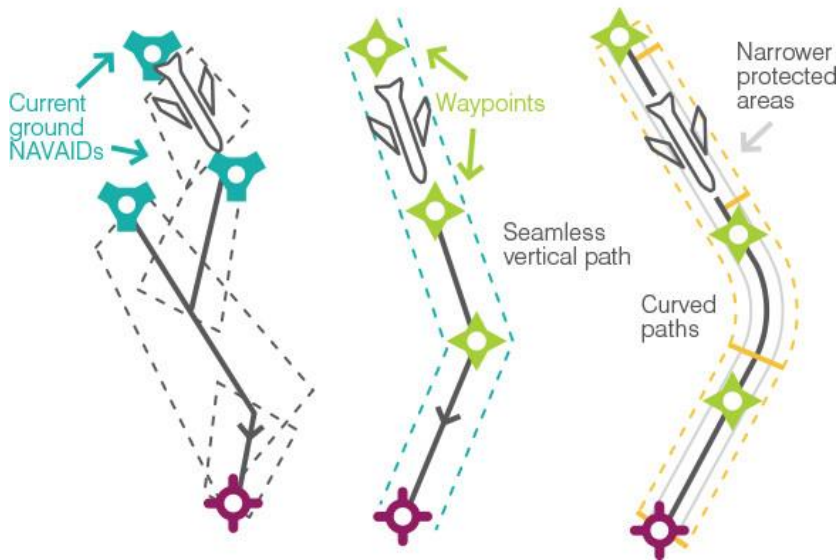


- Airspace architecture must be Trajectory-Based (i4D) to address capacity, flexibility and volatility issues.



- The resulting architecture should apply to both civil and military users with – collaborative decision making.

SES/SESAR Airspace Architecture



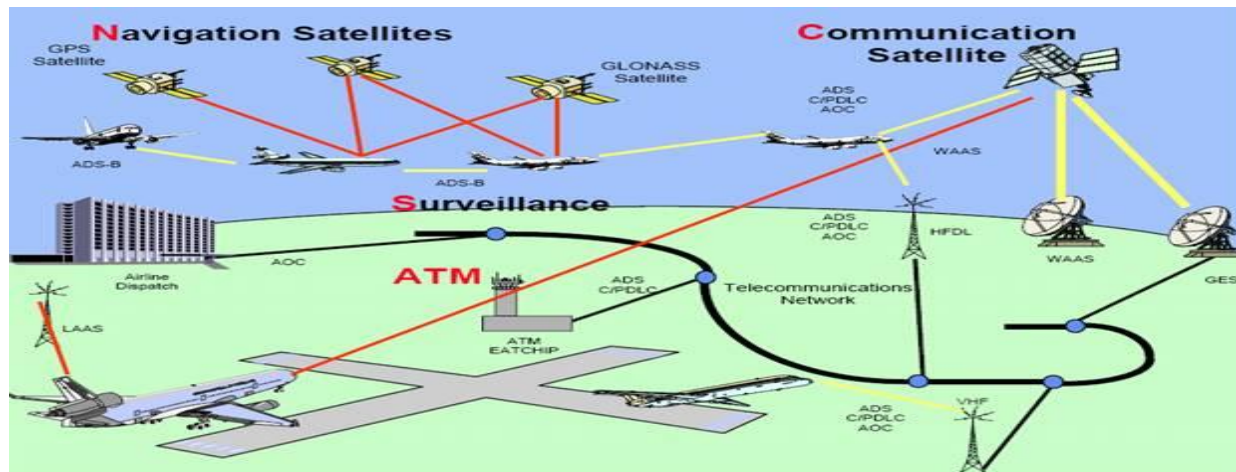
- Cost reduction should not be a priority, optimising and standardising airspace and procedures should.

- ATCO licensing and rostering will likely be based on airspace knowledge and MOPs until new technologies allow that to change.



SES/SESAR Airspace Architecture

- CNS systems should not be centralised but distributed and cooperative – cybersecurity and resilience.



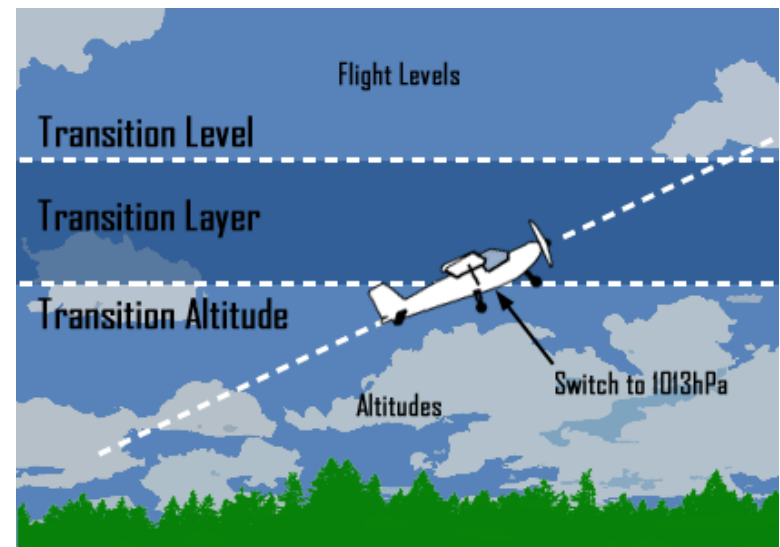
- Step by step approach to the implementation of new technologies and better integration and certification of systems.

Where to Start?



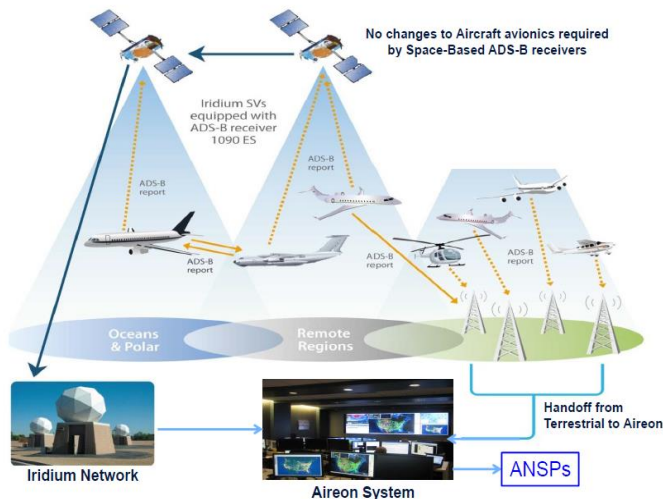
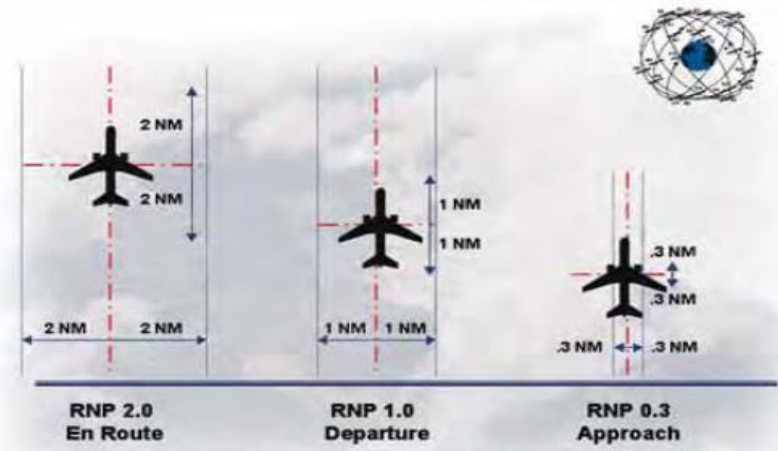
- Reduce complexity of airspace from 7 ICAO classes to 3.

- Reduce complexity by introducing an EU-wide Transition Level – 18,000ft.



Where to Start?

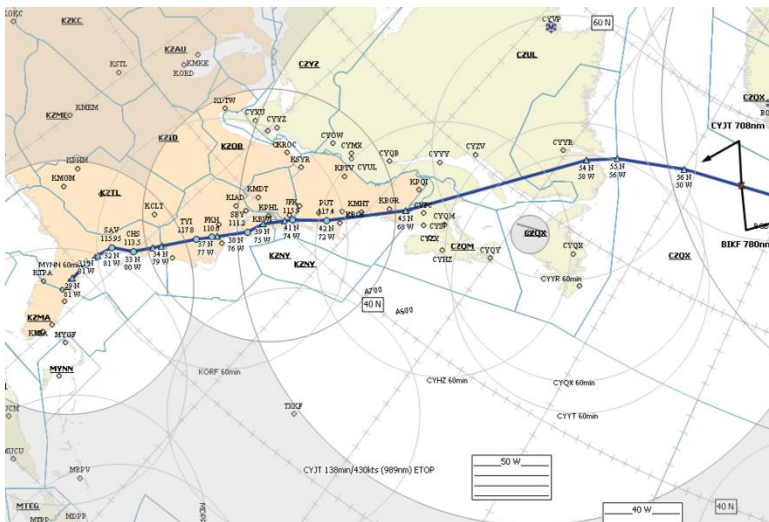
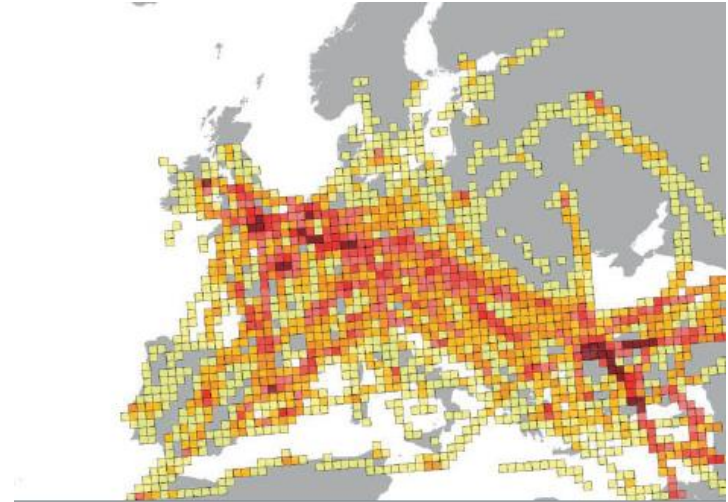
- Use the already highly technologically capable aircraft to revisit separation standards – radar separation routes.



- Introduce advanced communication and surveillance systems – sectorless control.

Where to Start?

- Deregulate the ANSPs' pricing mechanism – flexible rates for congested and uncongested sectors.



- Improve predictability of traffic flows and reduce volatility – flight plan accuracy.

Thank you!





Network Manager
nominated by
the European Commission

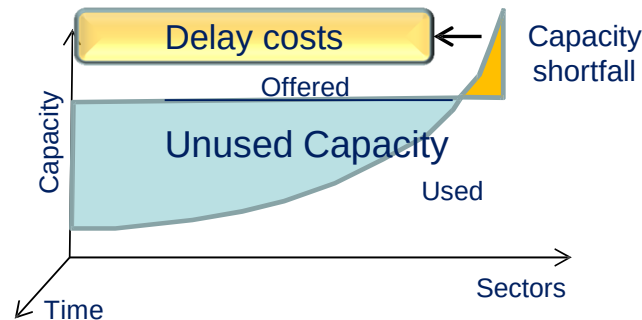


Airspace Architecture Workshop

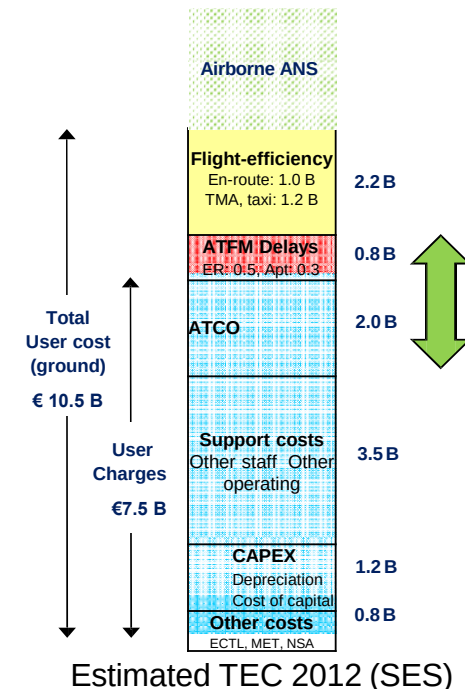
Network Manager Perspective

Mr Joe Sultana
Director Network Management
6 July 2018

Matching demand and operational performance benefits

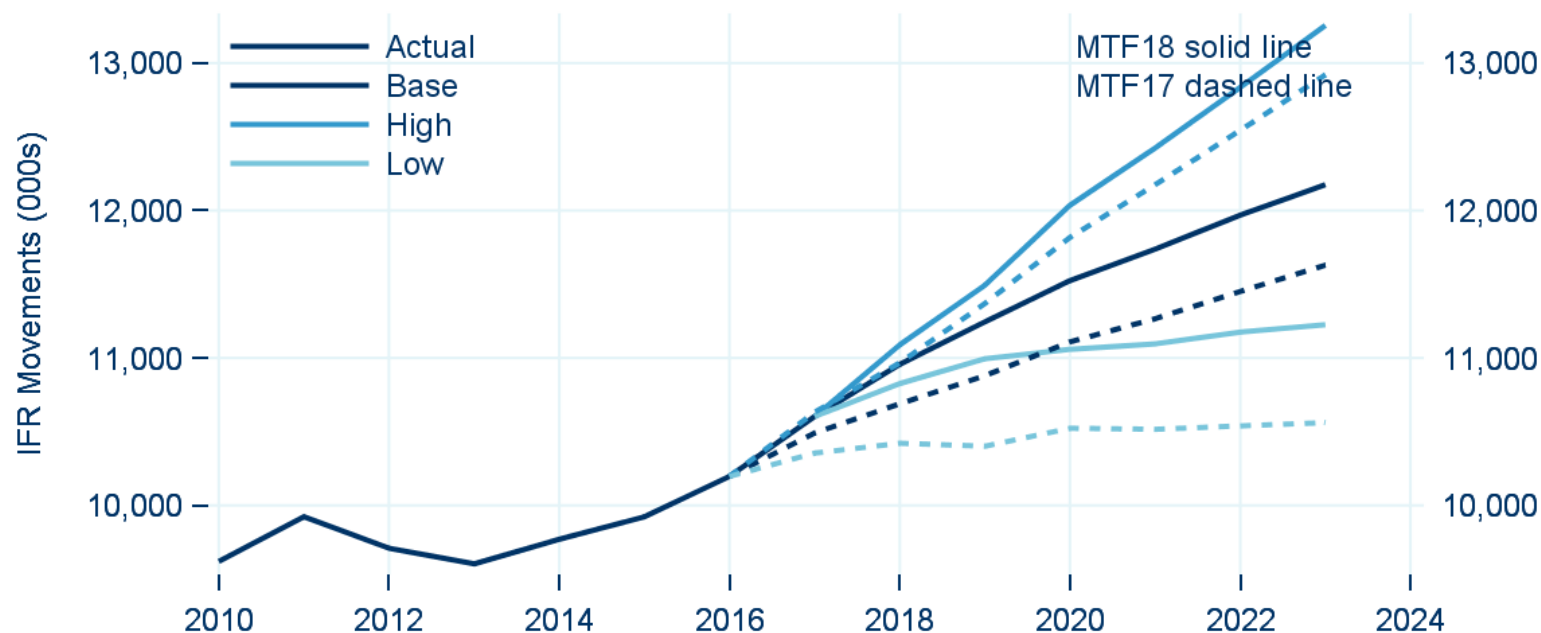


- Often rigid ATC capacity: Both shortfall and surplus
- Better matching ATC capacity with demand
 - Gains on both capacity costs and delays
 - Addressing traffic variability
- More flexible en-route capacity
 - Address ATC workload
 - Optimum airspace structures
 - Delegation of ATS, Virtual centres
 - Innovation, e.g. Flight-centric ATC
- Flight efficiency and environmental benefits
 - Pan-European cross-border Free Route Airspace



Constantly evolving traffic demand

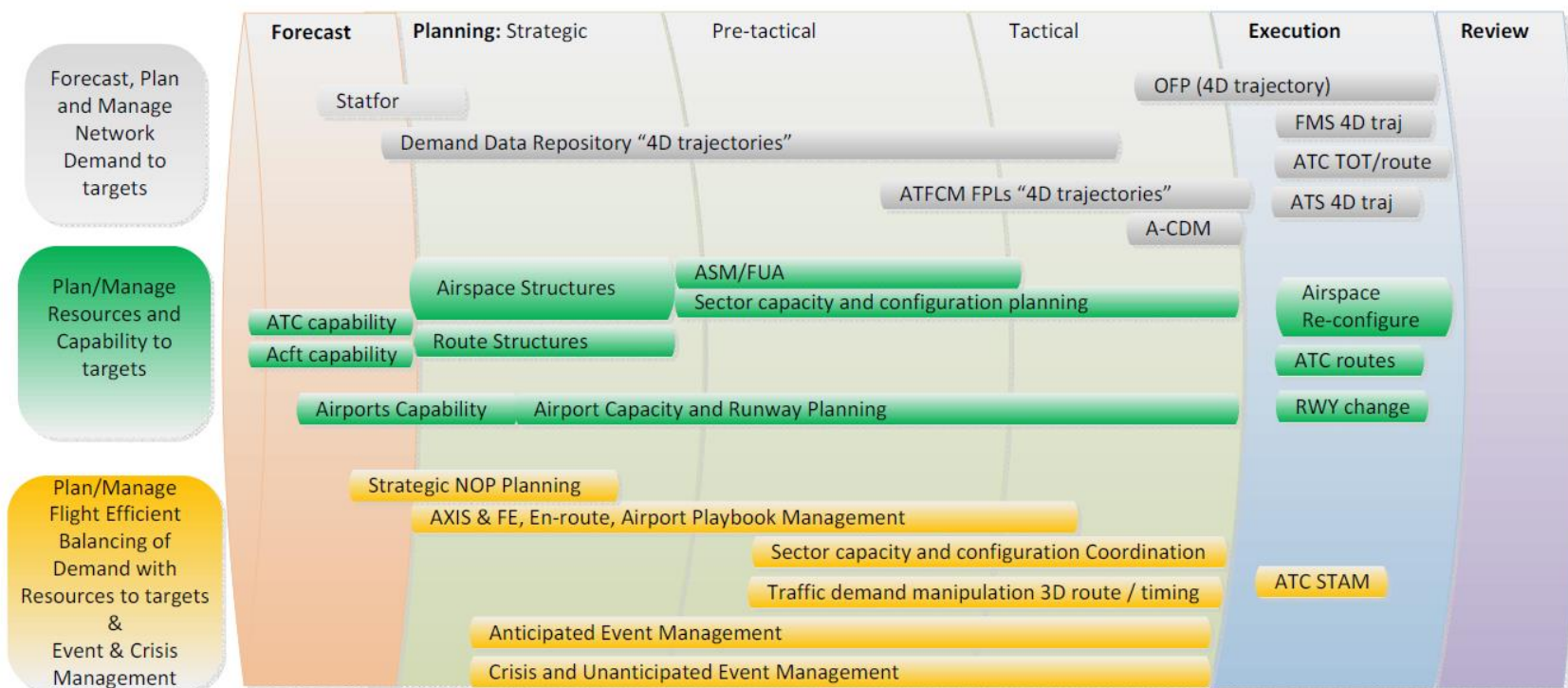
ECAC - Grand Total



©EUROCONTROL 2018 www.eurocontrol.int/STATFOR

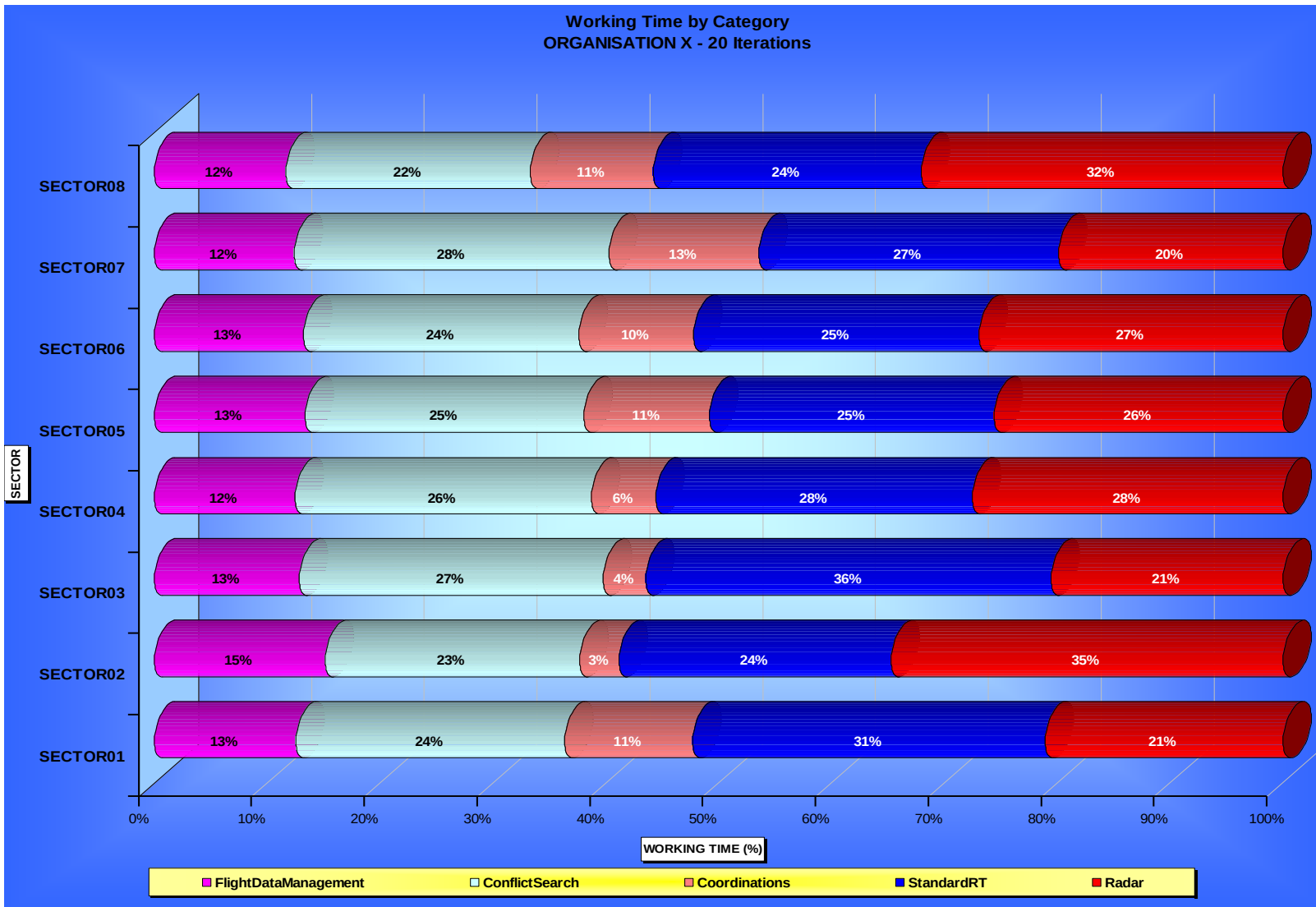
**A European ATM network
responding to variation in traffic changes**

An integrated 4D Trajectory Management

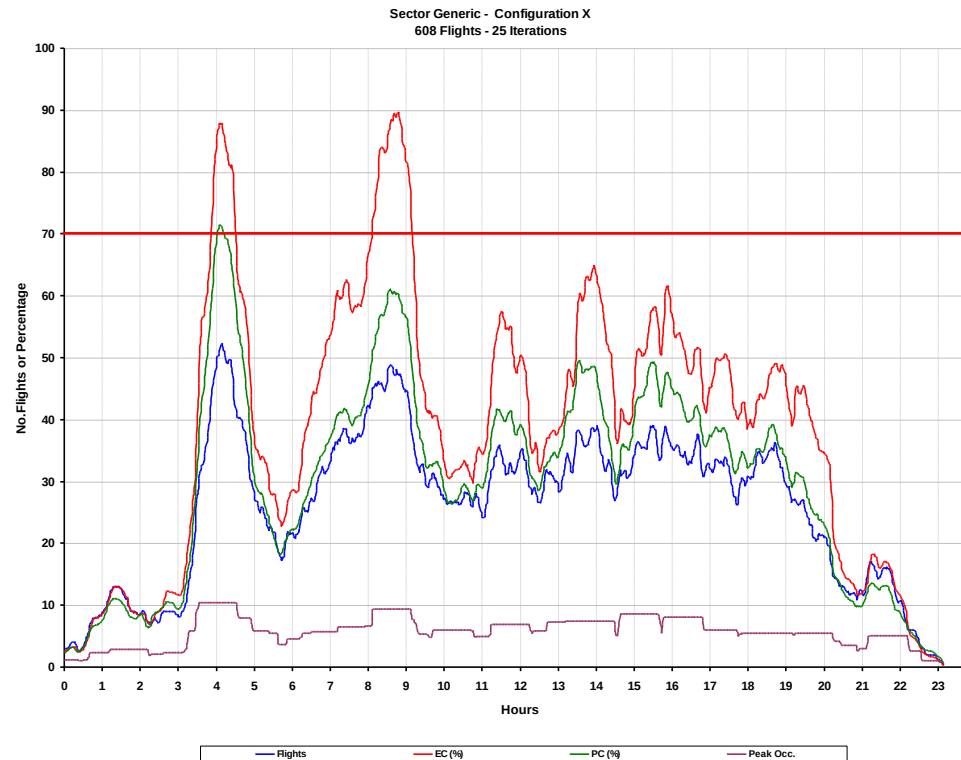


- **Network-wide Iterative 4D Trajectory Management Process**
- **Network-wide Iterative Planning and Management of Resources**
- **Network Management CDM Role from Planning Into Operations**

Structurally Addressing Causes of ATC Workload Based on current operational CAPAN approach



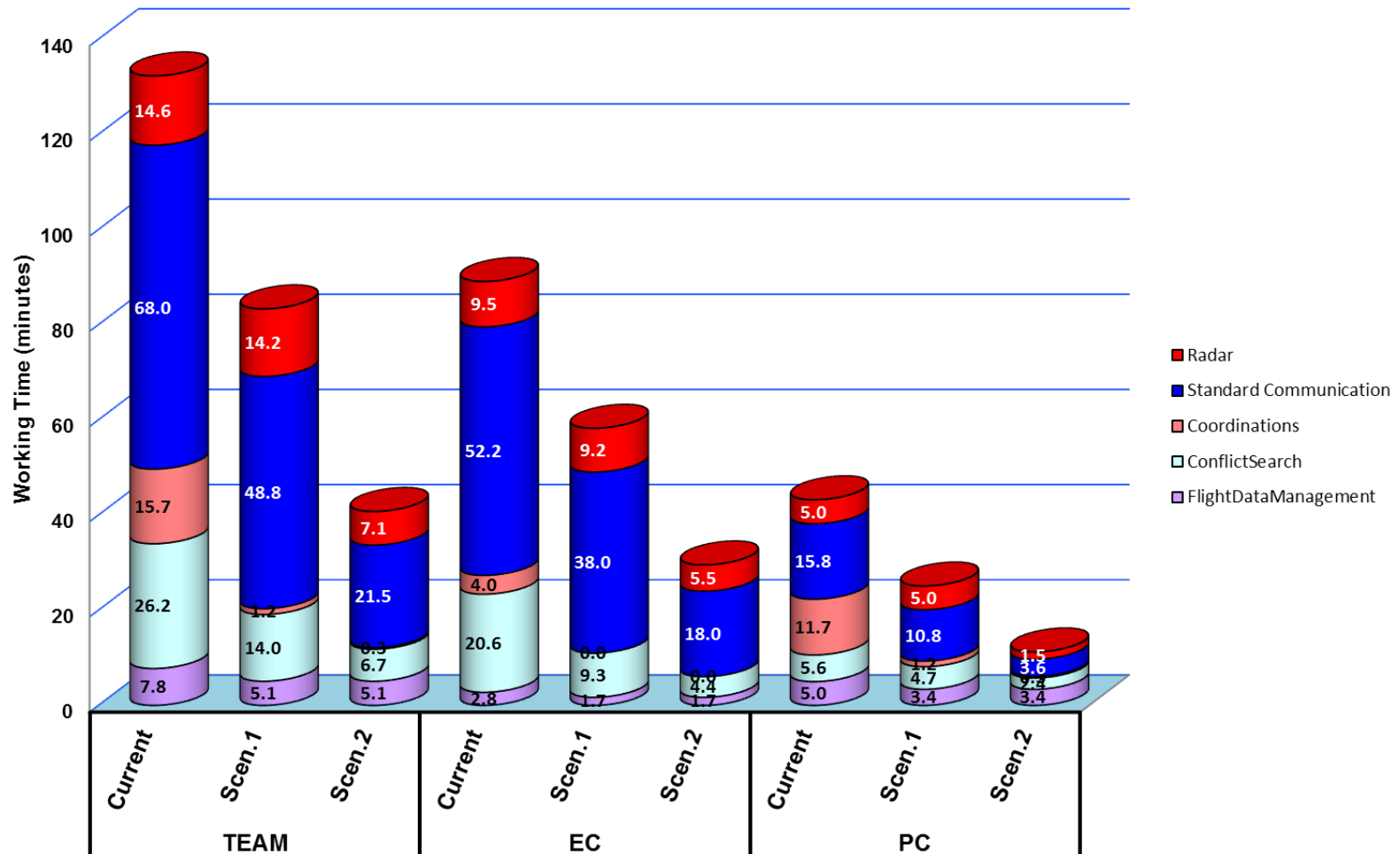
Structurally Addressing Causes of ATC Workload



- **Eliminate airspace structure constraints – Seamless airspace design**
 - **Harmonised ATM system support – Automate key ATCO tasks**
 - **Harmonised Operational Procedures**
 - **Stepped gradual coordinated operational implementation**
- **Supported by opportunities provided by seamless Free Route Airspace operations**
 - **Supported by the SESAR 2020 Vision Technology**

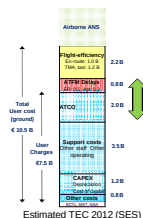
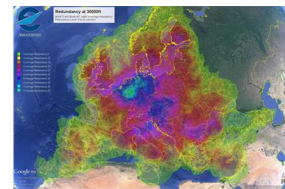
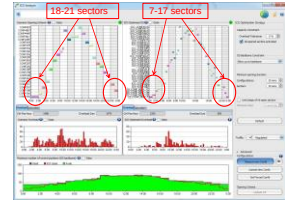
Time to process 100 flights by workload category – Traffic 2030 High

Average Working Time to process 100 Flights



Addressing other Structural Inefficiencies

- **Seamless sectorisation and opening schemes through ATS delegations when required**
- **CSN infrastructure consolidation**
- **Interoperable ATM infrastructure**
- **Effective, flexible AIS**
- **Network-orientated approach to Performance Scheme**



Summary



- **Focus on delivery of 4D preferred trajectories**
 - **From planning into operations**
- **Addressing ATCO workload**
 - **Effective, impartial airspace design**
 - **Operational and technical harmonisation**
 - **Focused research delivering automation of ATC tasks**
- **Efficient and interoperable CNS/ATM Infrastructure**
- **Focused research, targeted deployment, effective regulation and oversight, efficient impartial network design, operations and systems**



AIRSPACE ARCHITECTURE STUDY WORKSHOP



Perspectives from the Military Defence Sector

EDA SES Military Aviation Board



MILITARY ARE



In a shared Airspace

Military Aviation Strategy in the context of SES

- Fundamental principles
 - Safety
 - Civil-military cooperation
 - Military-military cooperation
- Strategic objectives
 - Security and defence
 - Access to airspace and use of air navigation services
 - Confidentiality and cybersecurity
 - Interoperability



Focus on Access to airspace needs

- **effective and safe access to airspace** in order to train for, and conduct, security and defence missions in peacetime, crisis and conflict.
- military manned and unmanned missions **flexibly**, on a **24/7 basis**, with no time or space restrictions, in **all types of airspace**.
- **optimal routing**, transit from, and into, military operating areas, navigate at medium and long range, perform **cross-border operations**, occasionally with little or very short-notice.

Military vision of the future en-route airspace architecture in 2035.

- Military Aviation able to provide and further improve **effective security and defence** in Europe.
- Security and defence dimension **incorporated from the outset**.
- Facilitate a better **mobility** of Air forces within and beyond the EU.
- Cater for necessary military **training needs**.
- Allow a reliable and resilient **recognised air picture**.
- Military missions may be performed **without pre-warning/planning**.

Military key additional gamechangers

- Integration of new generations of Air capabilities into the Airspace:
 - 5th and 6th generation of fighters and weapon systems.
 - RPAS.
- **Need of larger blocks of airspace.**
- Better mobility of forces leads also to seamless **cross borders operations.**

Military “no-go”

- Adverse impact on military training, operations and national and collective defence and security capabilities.



Conditions to make a New Airspace Architecture a reality

- Civil-military **enhanced/Proactive collaboration** through a military involvement upfront in ATM/CNS regulatory and technological developments as well as in the “Decision Process”.
- Sharing **best practices** and addressing **challenges** related to **digitalization, security, flexible use of airspace, RPAS integration and U-Space**.
- Reinforce the development of **civil-military synergies** from **R&D** to **deployment of interoperable systems**.
- End-State would be an “**integrated aviation system**” catering with Civil **and** Military needs in a balanced way (see bullet 1)



Thank you
for your
attention

© Airbus Military 2012



© A. Jeuland/Armée de l'air

« Together for a
stronger Europe »



THE MANUFACTURERS PERSPECTIVE

SES/SESAR AIRSPACE ARCHITECTURE STUDY WORKSHOP

5-6 JULY 2018

ASD's views on the Airspace Architecture

→ Technology is ready to help: existing & mature SESAR technologies can support advanced airspace configurations and new ATM Services Provision models.

- Virtual Centres
- Interoperability
- IP Voice communication Systems
- Flow Centric Operation
- Air Ground Data link
- etc.



→ Technology alone cannot solve the problem:

-higher level of automation can be achieved by digitalisation, big data, machine learning...etc.

But these higher levels of automation have to be framed by an operational model.

→ ASD members invest in SESAR because technology will help overcome the capacity crunch



The future of the Single European Sky

ASD calls for an ambitious step-change in the way we manage the capacity, efficiency, safety and security of our skies:

-capacity crunch

- global competition
- environmental impact
- shift of the human role
- completely new players stepping in
- customers expectations for seamless journeys
- hundreds of thousands of new air vehicles
- urban air mobility
- super/hypersonic travel
- subspace

→ A change is not an option anymore

- Defragmentation is key
- Digitalisation can help overcome many issues
- Airlines/ANSPs/Airports should be incentivized to be early movers on technology





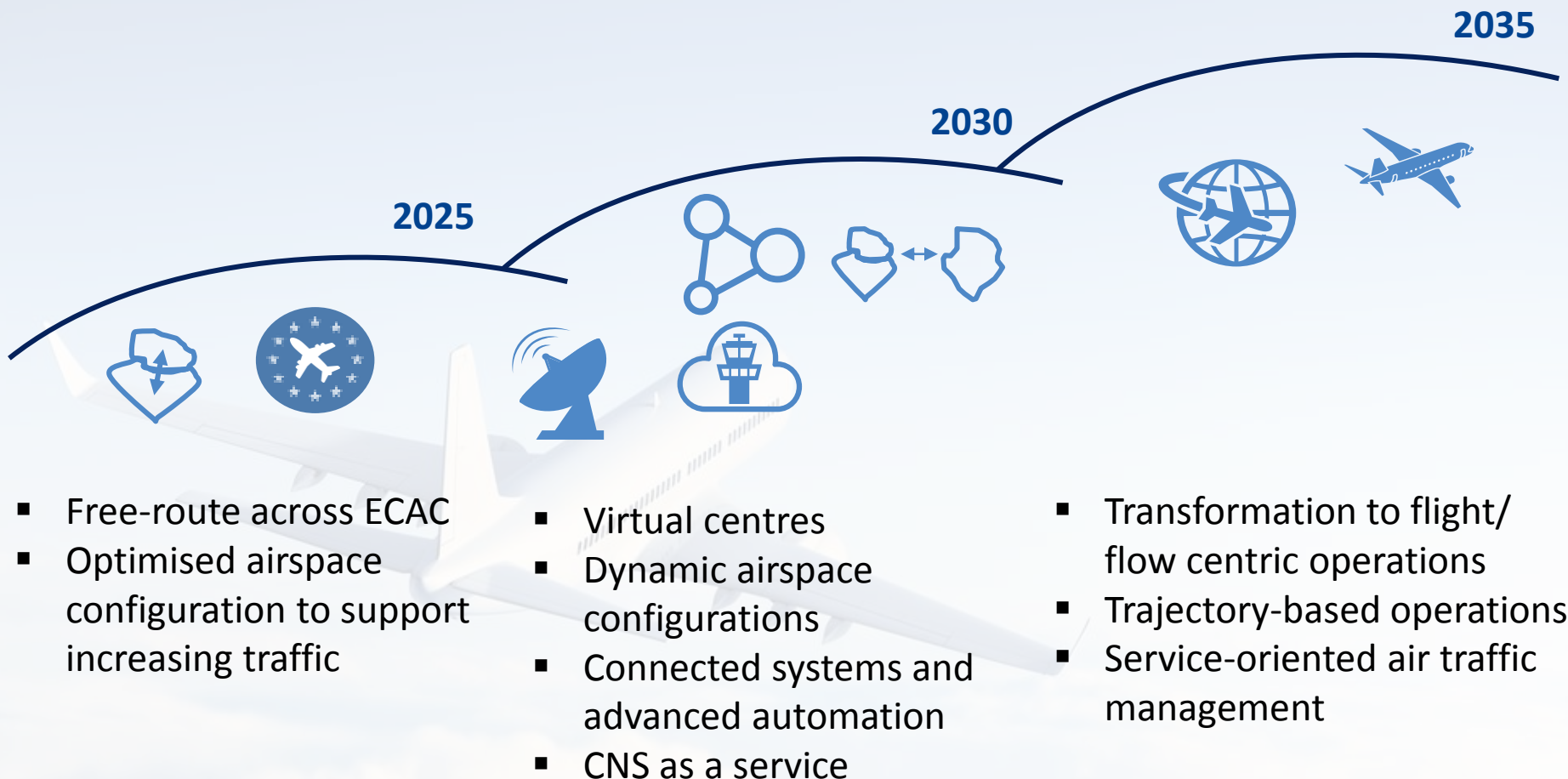
A350-900

Q&A
Any
questions?

Day 2 – Wrap up

Florian Guillermet

Executive Director, SESAR JU



Next steps: based on your input we will...



Couple solutions with **airspace design and service-delivery options** for the future European airspace



Measure the **impact** through simulations, factoring in known deployments and roadmaps from the Master Plan



Prepare recommendations for a set of **possible implementation/transition options** and identify conditions for success



Continue to **collaborate with you**, building on your positive engagement and ensuring that your feedback is taken into account



Thank you very much...



Founding Members



EUROPEAN UNION



EUROCONTROL