SESAR: a way forward on airports & airspace modernization

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SESAR Joint Undertaking

Cologne 12/13 November 2019

SESAR JOINT UNDERTAKING

Founding Members

EUROPEAN UNION EUROCONTROL

Presentation overview

- Setting the scene: SESAR
- SESAR results
- SESAR validation process
- Solutions supporting Business Aviation
- Drones activities

Presentation overview

Setting the scene: SESAR

SESAR results

SESAR validation process

Solutions supporting airports

Drones activities

SESAR: a policy-driven project by design

EU Aviation Strategy

Single European Sky
Regulatory Framework

European ATM Master Plan

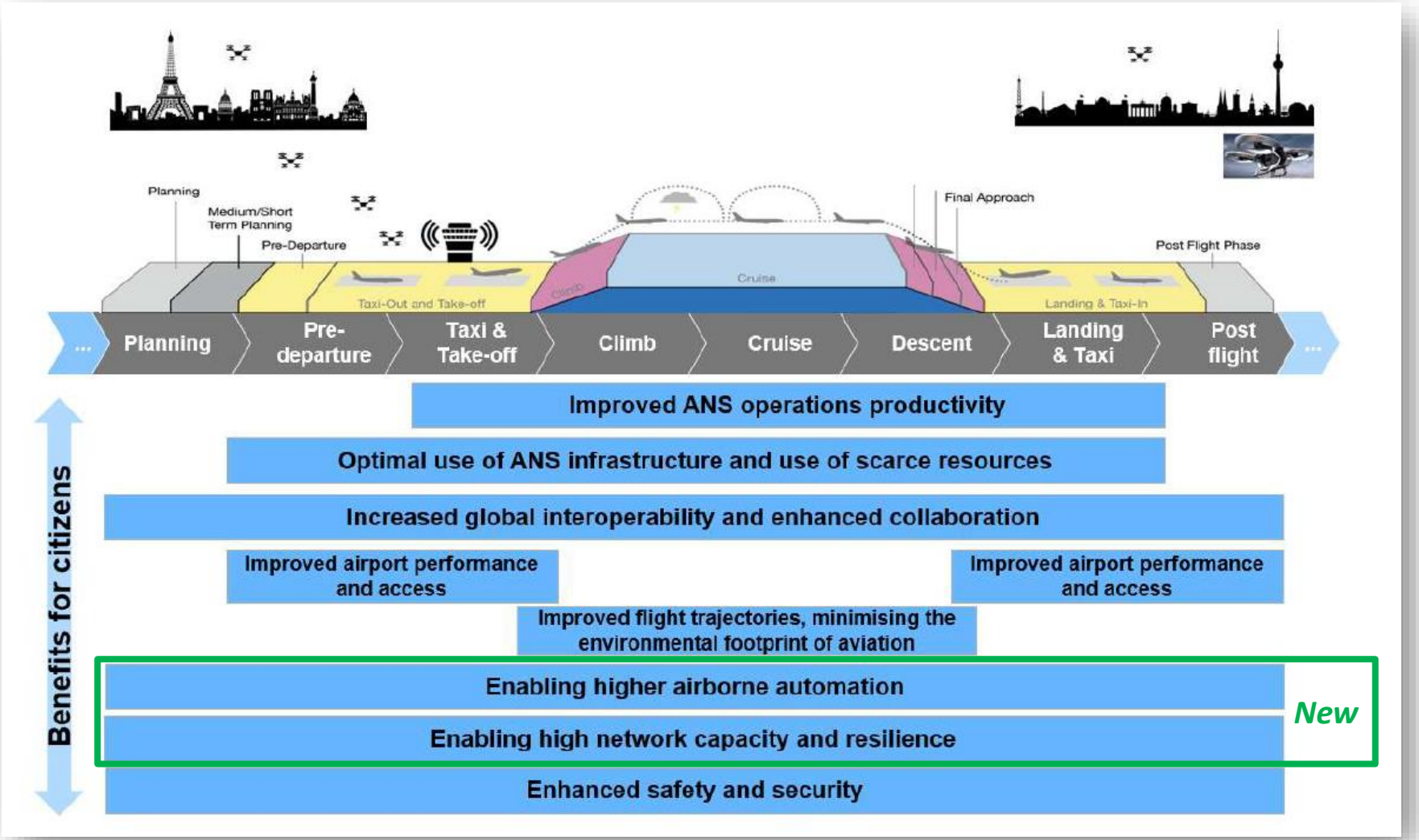
Supervisions & recommendations

EASA
EUROPEAN DEFENCE AGENCY
EUROCONTROL

SESAR Vision [1]

The objective of SESAR is to modernise European ATM by defining, developing and delivering new or improved technologies and procedures (SESAR Solutions).

Sesar vision 2



SESAR Vision : a digital European sky

Today: thousands of connected traditional aircraft

Tomorrow: hundreds of thousands of connected vehicles in the sky

Digital transformation of aviation infrastructure
AUTOMATION + CONNECTIVITY

Supporting increased traffic, air vehicle diversity, safety, security, service continuity

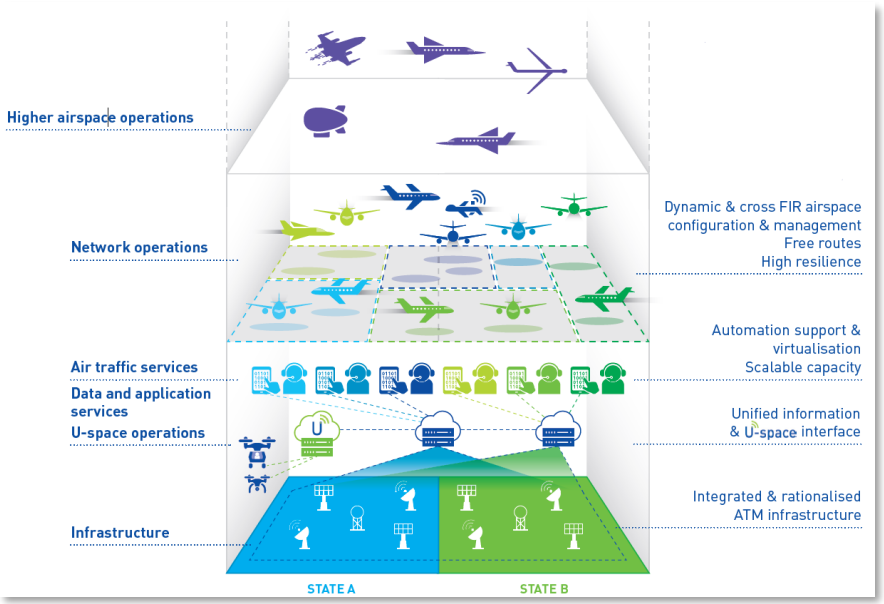
Vision – towards the delivery of a digital European sky

Fully scalable ATC system with strong **air-ground integration**

Relying on a **digital ecosystem**

Elimination of environmental inefficiencies caused by the aviation infrastructure

Ensuring that it offers solutions **that will fully exploit the potential offered by the next generation aircraft** for cleaner and quieter flight



Airspace Architecture Study (AAS)

Airspace modernization short term plan (2020-2025)

Recognising the urgency to act, a Transition Plan is being published to coincide with a high-level conference on the future of the Single European Sky.

The plan sets out three key operational and technical measures. These measures are:

- Launching an airspace re-configuration programme supported by an operational excellence programme to achieve quick wins;
- Ensuring the planned roll-out of SESAR Solutions that support cross-border free route operations, and air-ground and ground-ground connectivity;
- Accelerating market uptake of the next generation SESAR technologies and services in order to overcome the de-fragmentation of Europe's skies through virtualisation and the free flow of data among trusted users across borders.

Transition Plan

Presentation overview

Setting the scene: SESAR

SESAR results

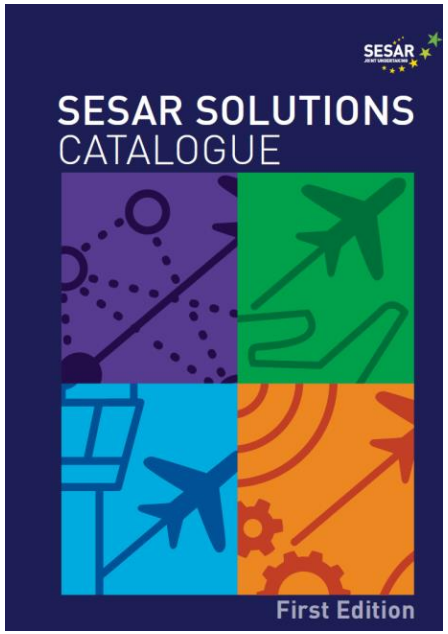
SESAR validation process

Solutions supporting airports

Drones activities

SESAR 1 delivered the first building blocks

63 tech solutions delivered

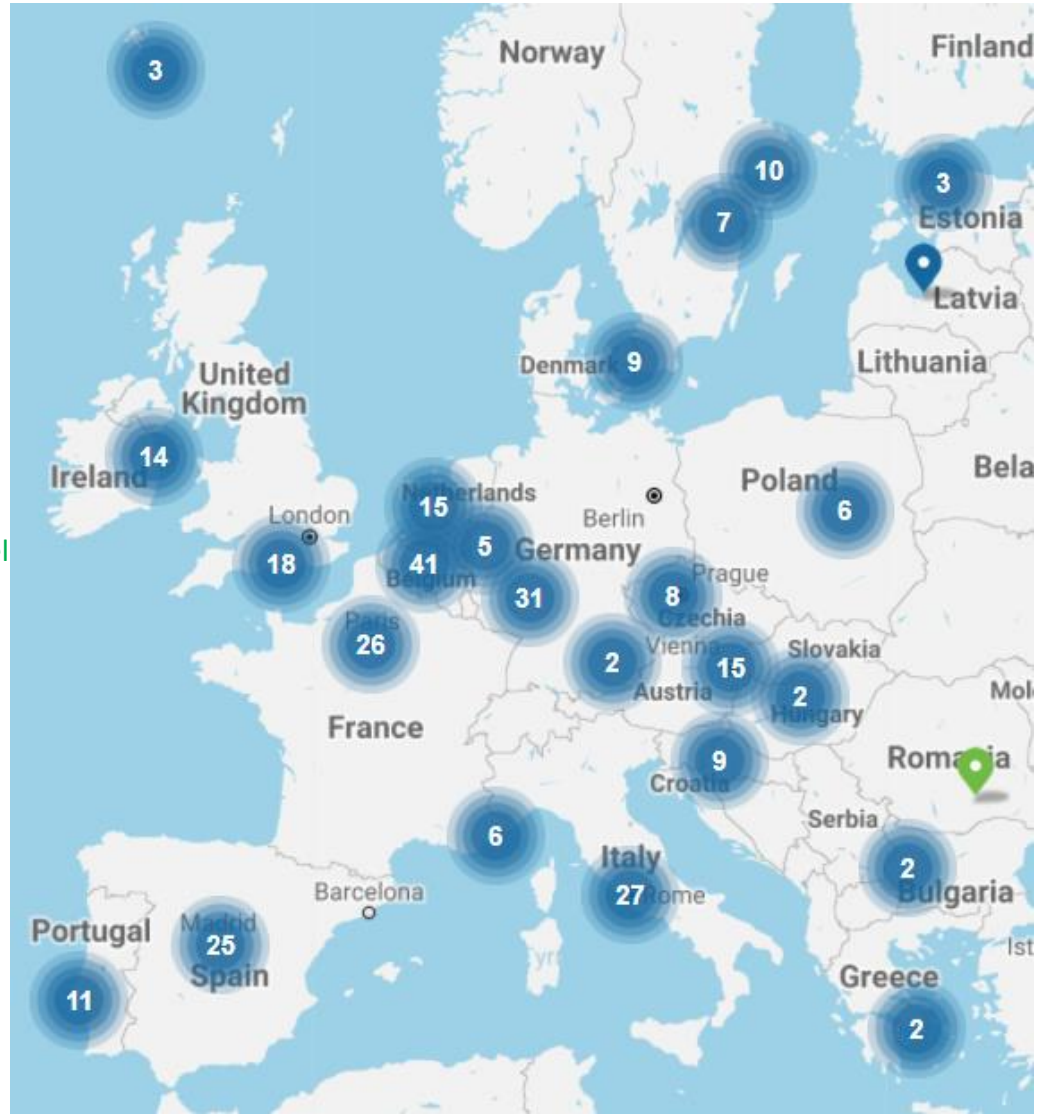


+11% Airport capacity

-39% flight time variance

-5,3% costs

-2,4% fuel per flight



Local & synchronised deployments underway

SESAR 2020: next wave of digital projects delivering additional building blocks

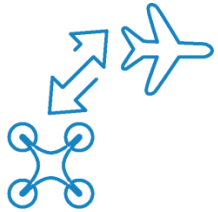
60+ projects underway

Exploratory research, industrial research, demonstrations

Virtual technologies

Mobile, terrestrial & satellite-based communications

Digital & automated tools

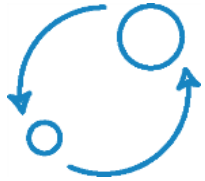


Higher levels of autonomy & connectivity

Video, synthetic & enhanced sensor tech

Big data analytics & open source data usage

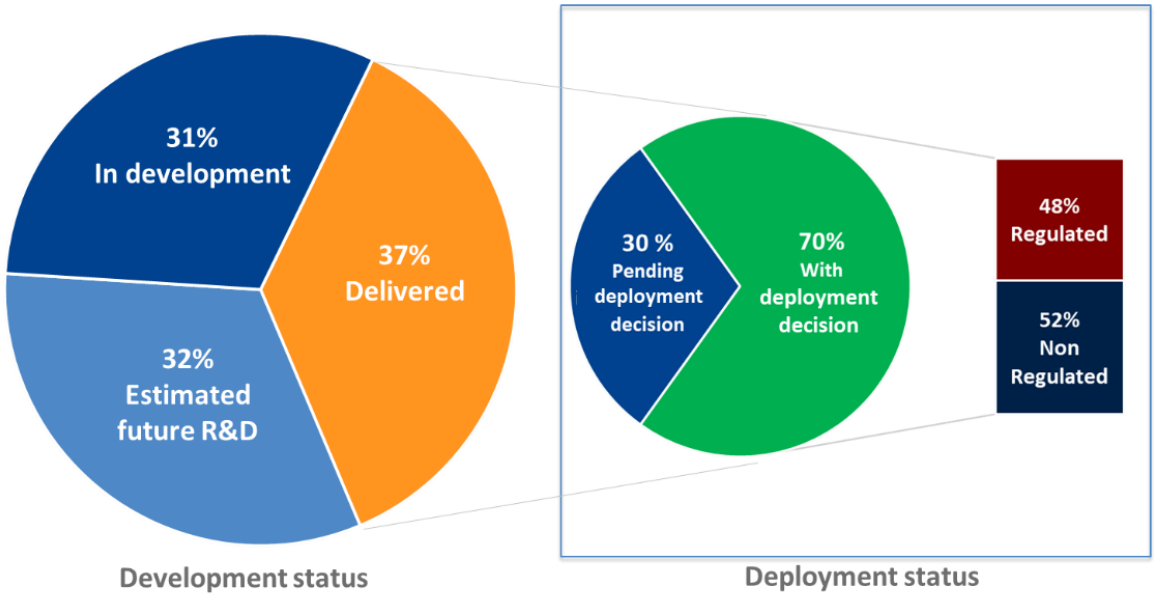
System modularity



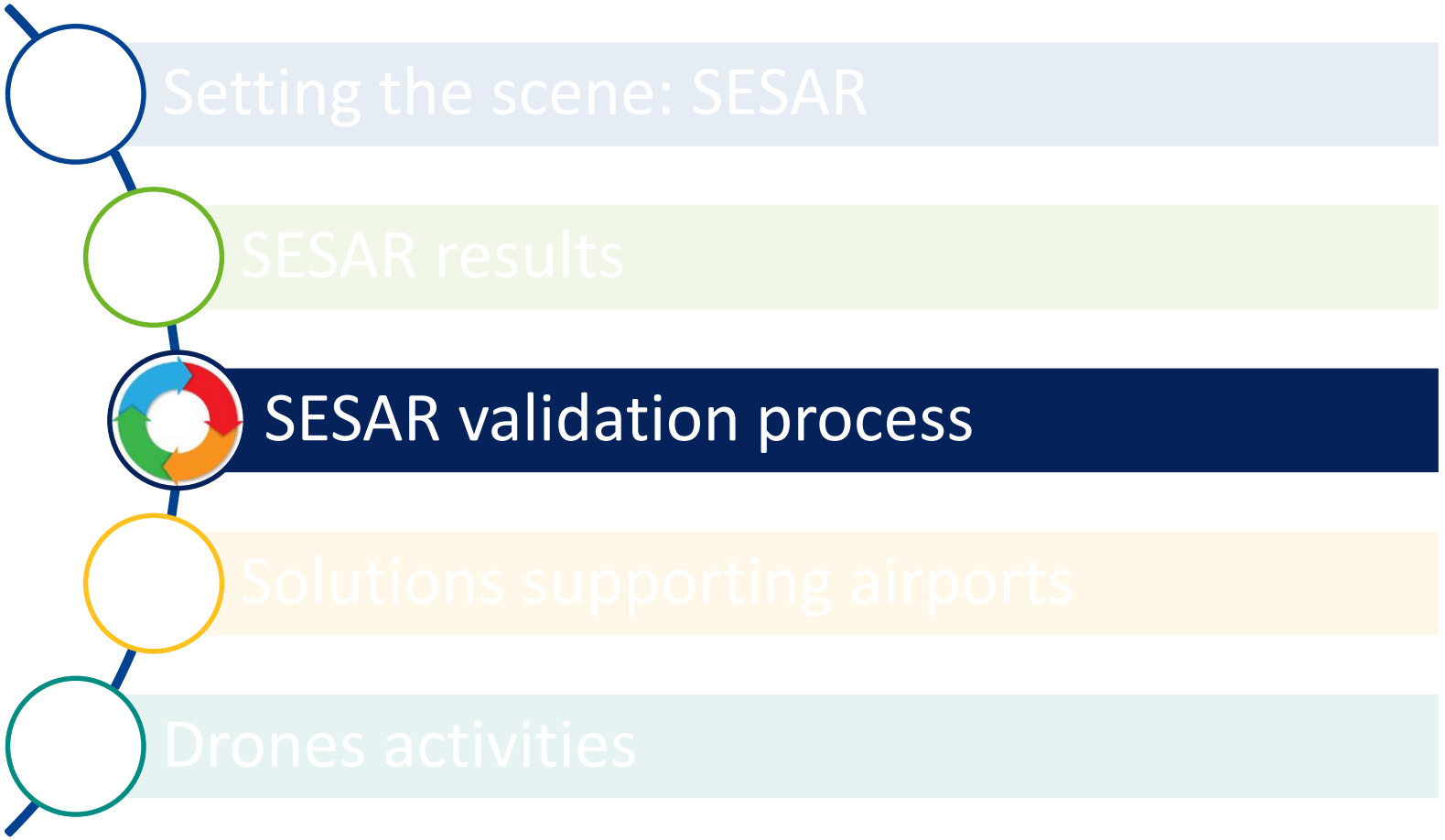
System flexibility

State of implementation

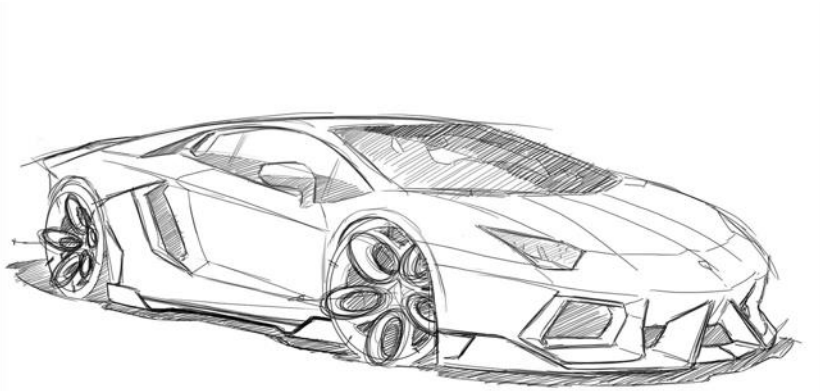
- ✓ SESAR 1 & 2020 delivering solutions foreseen in MP up to Phase C (defragmentation of European skies through virtualsation)
- ✓ 70 % of delivered SESAR solutions are already associated to Master Plan deployment objectives (level 3)
- ✓ Of which 48% are currently covered by the SESAR Deployment Programme



Presentation overview



analogy between this solution and the development of a super car



V1 SCOPE

- **Identification of operational/technical solutions to meet performance targets.**
- **Identification of benefit mechanisms**
- **Scope of potential applicability**
- **Initial cost estimates to justify R&D.**
- **Identification of major research and development issues/needs (R&D needs)**

analogy between this solution and the development of a super car

V2 FEASIBILITY

- Elaboration and development of the operational concept
- Validation in representative operational contexts to establish the concept's actual applicability
- Performance, operability and acceptability of operational aspects are primary concerns
- Operational procedures (nominal / non-nominal conditions) and operational requirements are stable.
- Human and technology integration and phraseology / information exchange requirements are defined

analogy between this solution and the development of a super car

V3 PRE-INDUSTRIAL DEVELOPMENT & INTEGRATION

- **Further develop and refine concepts to prepare their transition from research to an operational environment**
- **Validate that concepts can work coherently together and deliver the required benefits**
- **Establish that they can be integrated into the target ATM system.**
- **V3 requires integration of pre-industrial prototypes in representative system platforms.**

analogy between this solution and the development of a super car

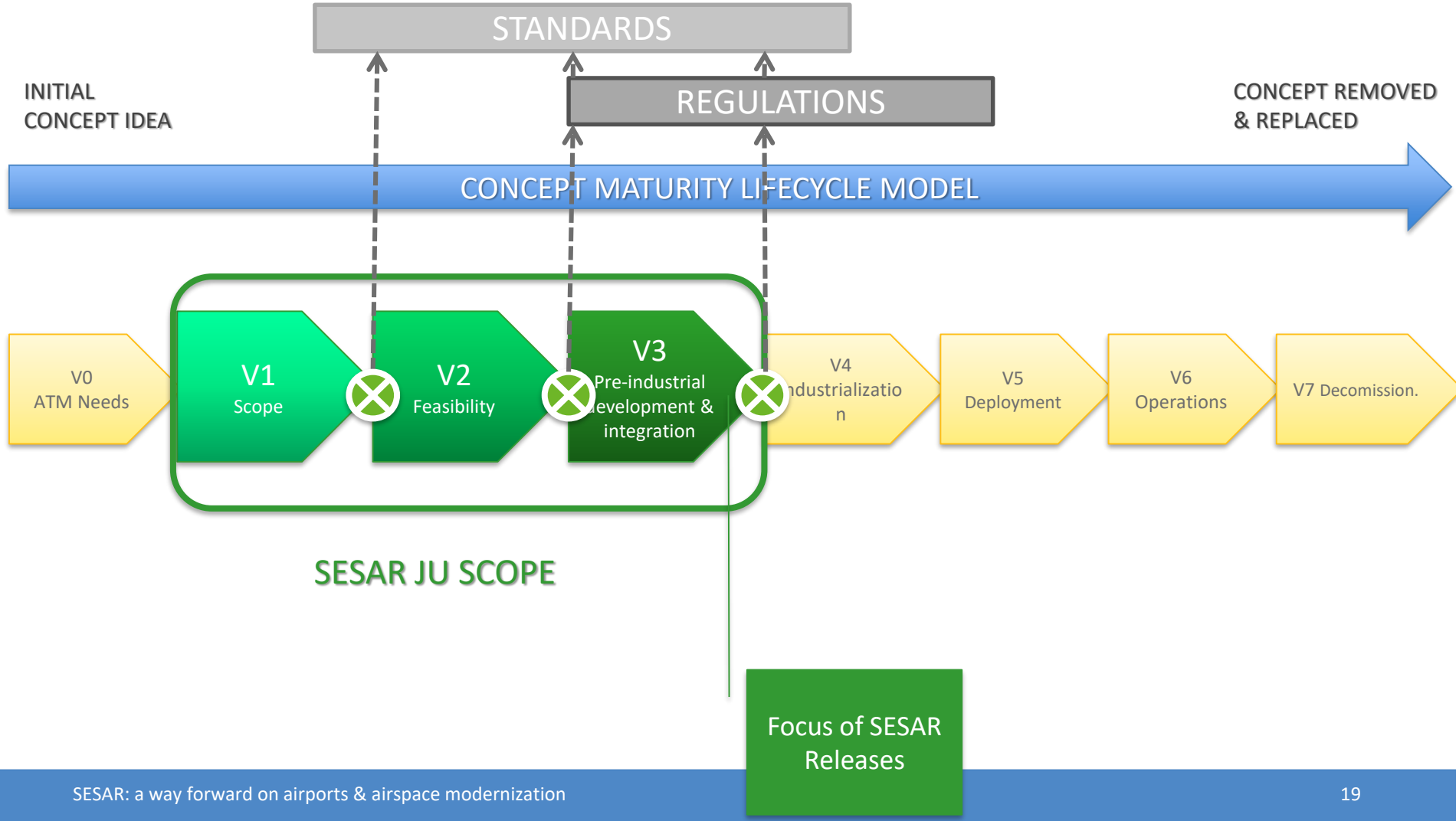
V4 Industrialization

V5 Deployment

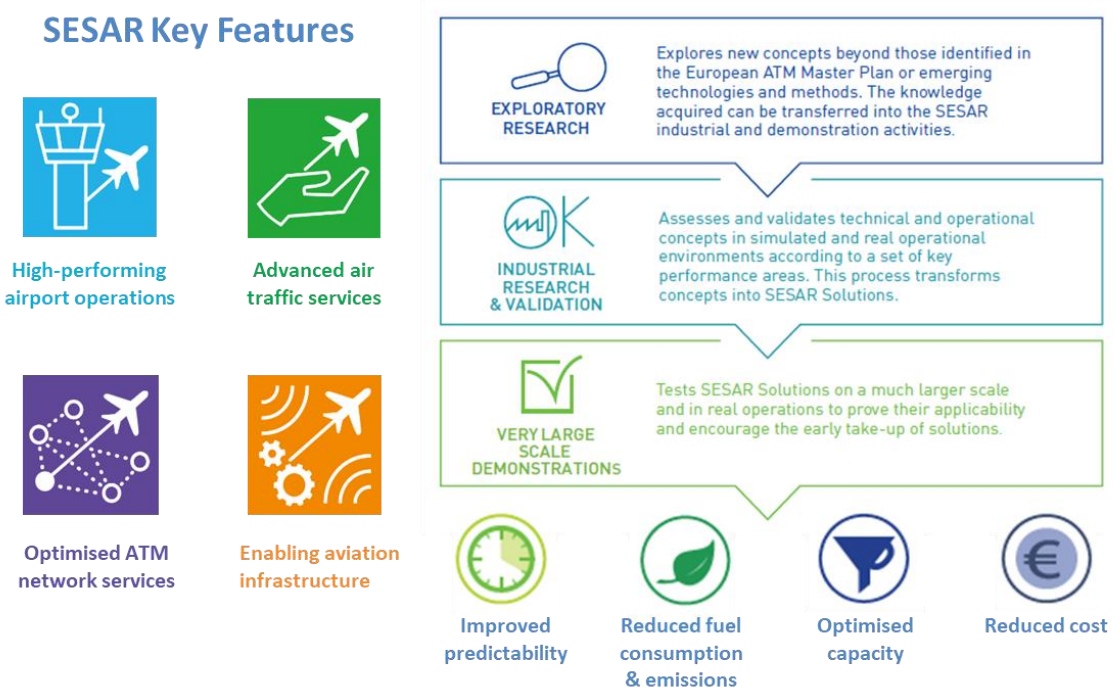
V6 Operations

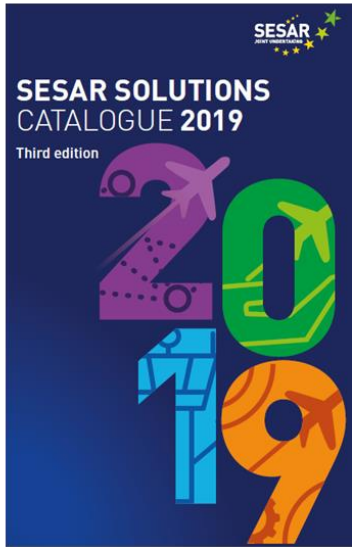
Validation and Standards/Regulations

GATES The maturity assessments establish whether the needs for standardization and regulation are adequately justified and whether material is sufficiently developed and mature to support the standardisation and regulatory process in the next phase



SESAR's performance driven innovation pipeline





Presentation overview

Setting the scene: SESAR

SESAR results

SESAR validation process

Solutions supporting Business Aviation

Drones activities

Example of Business aviation projects

Low Visibility Operations

GNSS Augmentation (GBAS/SBAS)

EFVS

Synthetic Vision

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Accessibility to Small Airports

Performance based Navigation

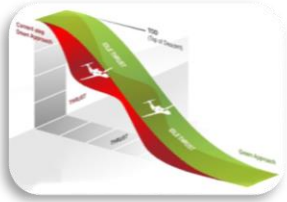
Remote towers

Low cost Surf Management

...

Operational Efficiency

Free Route Airspace



Continuous Climb and Descent

Collaborative Decision Making

...

Low Visibility operations & Accessibility to small Airports

Solution PJ.03a-04 – Enhanced Visual Operations

HONEYWELL, DASSAULT, THALES AVS FRANCE, LEONARDO

PJ03A SUMO SURFACE MANAGEMENT OPERATIONS SESAR JOINT UNDERTAKING

Solution Scope:

The solution refers to enhanced vision systems (EVS) and synthetic vision systems (SVS), alone or in combination, which will enable more efficient taxi, take-off and landing operations in low visibility conditions (LVC).

This is applicable to all platforms as even if main airline platforms have autoland capabilities to facilitate approaches in LVC, they currently have no capability to facilitate taxi in order to maintain airport capacity.

V1 | V2 | V3

Target Release R9

22-11-19

Supporting Solution Exercises and dates:

✓ EXE.03a-04.01	FTS/FT	V3 (HONEYWELL)	01-09-2018 to 26-04-2019	in Brno/Prague/Yuma (US)
✓ EXE.03a-04.02	FT	V3 (THALES/DASSAULT)	01-01-2019 to 07-03-2019	in Treviso (Italy)
✓ EXE.03a-04.03	FT	V3 (THALES/DASSAULT)	01-01-2019 to 07-03-2019	in Paris CDG Airport

FTS – Fast Time Simulation
FT - Flight trial

Intended Benefits:

Improve accessibility to all airports operating in low visibility conditions, without additional ground infrastructure, by providing flight crews with an enhanced vision aid to perform approach, landing and taxi operations.

The vision systems will support safe operations together with increasing the situation awareness of flight crews.

Human performance
Efficiency, Safety, Cost effectiveness, Resilience

Solution PJ.03a-03 – Enhanced navigation and accuracy in low visibility conditions (LVC) on the airport surface

HONEYWELL

PJ03A SUMO SURFACE MANAGEMENT OPERATIONS SESAR JOINT UNDERTAKING

Solution Scope:

The solution aims at developing navigation technology for aircraft operations on an airport surface in low visibility condition.
The solution is considering two technological approaches:

1. Augmented GNSS (SBAS, GBAS, DFMC GNSS)
2. INS hybridization with alternative ways of aiding: odometers, camera.

It aims at providing accurate and available navigation information with high integrity provided by aircraft systems. This represents the key information for integrated surface management and will positively influence surface management as a whole.

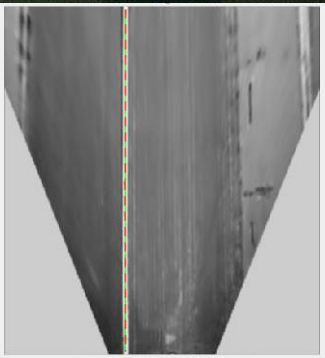
Supporting Solution Exercises and dates:

- ✓ EXE.03a-03.001 DC/LT TRL4 (HONEYWELL) 29-10-2018 to 01-03-2019 in several airports
- • EXE.03a-03.002 RTS TRL4 (HONEYWELL) 03-12-2018 to 15-06-2019 in Brno

TRL2 | TRL4 | TRL6

Target Release R9

08-11-19



Michal Dobes, Honeywell

Intended Benefits:

Sharing of same and more accurate information among all relevant stakeholders will improve the efficiency of surface operations with a direct impact on environmental sustainability.

Fuel Efficiency, Safety, Human Performance, Capacity
Predictability, Environmental sustainability

Solution PJ.03b-06 – Safety support tools for avoiding Runway Excursions

DSNA, AIRBUS, DASSAULT AVIATION, ADP (SEAC2020), LPS SR (B4), PANSA (B4)

SAFE Safer Airports and Flights for Europe — SESAR JOINT UNDERTAKING

V1 | V2 | V3

25-09-17 — 01-11-19

Target Release R7/9

Solution Scope:

The solution provides airport operators and/or pilots with the appropriate alerts where there is a risk of runway excursion (take-off and landing).

The Solution focuses on how the risk of runway excursion can be mitigated by on-board systems (Runway Overrun Awareness and Alerting System, On-board Braking Action Computation System to compute and report Braking Action after landing, Take-Off Monitoring System) and ground based systems (ground sensors to identify the runway contaminant type and depth, weather observations and forecasts, surveillance radar input data to consolidate runway surface condition for all stakeholders) that can help pilots to plan and execute take-off and landing, as well as alert pilots or controllers when runway excursion risk is detected.

The Solution is based on the Global reporting Format implementation (ICAO Amendment 13 to Annex 14) which uses Runway Condition Code (RWYCC) for flight crews to make the right decisions in the preparation and execution of take-off, approach, and landing phases.

Supporting Solution Exercises and dates:

✓	EXE.03b-06-V2-VALP-0001	FT	(DASSAULT)	12-11-2018	to 16-11-2018	in Istres
✓	EXE.03b-06-V2-VALP-0002	FTS/RTS	(PANSA)	06-02-2018	to 31-12-2108	in Warsaw (FTS) / Gdańsk LW (RTS)
✓	EXE.03b-06-V2-VALP-0003	FTS/SM	(LPS SR)	12-02-2018	to 31-12-2018	in Poprad-Tatry
✓	EXE.03b-06-V2-VALP-0004	FTS	(ADP)	01-12-2017	to 31-12-2018	in Paris CDG
✓	WKS-03b.06-V2-VALP-0001 & -0002		(DSNA)	04-04-2018	to 05-04-2018	in Toulouse

Intended Benefits:

The benefits are expected primarily in terms of Safety and Resilience in adverse weather condition.

Safety, Human Performance

Solution PJ.03b-05 – Traffic alerts for pilots for airport operations

AIRBUS, HONEYWELL, DASSAULT AVIATION, EUROCONTROL

SAFE Safer Airports and Flights for Europe — SESAR JOINT UNDERTAKING

V1 | V2 | V3 — Target Release R9

15-11-19

Solution Scope:

The solution refers to enhancing on-board systems in order to detect potential and actual risks of collision with other traffic during runway and taxiway operations. In all cases the flight crew are provided with appropriate alerts.

It covers 2 validated implementations:

- The mainline aircraft implementation addresses runway operations and provides the Flight Crew with aural alerts ('warning' alert level).
- The business aircraft implementation addresses runway and taxiway operations and provides the Flight Crew with visual and aural alerts (indication, caution and warning alert levels).

Supporting Solution Exercises and dates:

✓	EXE.03b-05.01 (Business)	FTS/RTS	V3	(HONEYWELL)	31-10-2017	to 26-10-2018	in Toulouse
✓	EXE.03b-05.02 (Mainline)	FTS/RTS	V3	(AIRBUS)	25-01-2018	to 26-04-2019	in Toulouse
✓	EXE.03b-05.03 (B. & M.)	FT	V3	(AIRBUS)	10-06-2019	to 21-06-2019	in Toulouse

Intended Benefits:

It is a key feature to significantly improve safety on the airport surface

Safety, Human Performance

Solution PJ.03b-03 – Conformance Monitoring Alerts for Pilots

LEONARDO,
THALES AVS FRANCE

SAFE Safer Airports and Flights for Europe

SESAR JOINT UNDERTAKING

Solution Scope:

The solution provides conformance monitoring safety alerts for the flight crew (visual + aural), generated by the on-board system when the system detects a non-compliance with airport configuration (e.g. closed runway, non-compliant taxiway, restricted area) as well as a non-conformance to procedures or clearances.

Even if the main use is mostly intended on airport with size or characteristics that can be complex to crews not familiar with it, all airports are potentially concerned whether they are equipped with ground services (A-SMGCS) or not. Interoperability with on ground safety net tools will be investigated through a workshop.
The on-board airport safety net developed in this Solution is applicable on the whole airport movement area.

Supporting Solution Exercises and dates:

- ✓ EXE.03b-03.01 (Toulouse Blagnac) RTS V2 (THALES AVS) 13-11-2018 to 13-11-2018 in Toulouse
- ✓ EXE.03b-03.02 (Milan Malpensa) RTS V2 (LEONARDO) 22-11-2018 to 22-11-2018 in Turin

V1 | V2 | V3

28-10-19

Target Release R9

Intended Benefits:

The benefits of this Solution are in terms of Safety and Human Performance through the on board availability of an independent detection system that informs the Flight Crew through an alerting presentation (improved with respect to SESAR1):

- The Flight Crew gets an alert when the aircraft is operating at an airport where the ATC is not equipped with such alerting systems;
- Reaction time to any potential risk can be shorter if the Flight Crew receives an alert as well as the ATCO.

Safety, Human performance

Solution PJ.03b-01 – Enhanced airport safety support tools for controllers

DSNA, ANS CR (B4), DFS, DLR (AT-ONE), EUROCONTROL, ENAV, FREQUENTIS, INDRA, LEONARDO, LPS SR (B4), NLR (AT-ONE), PANSA (B4), THALES LAS FRANCE

SAFE Safer Airports and Flights for Europe — SESAR JOINT UNDERTAKING

V1 | V2 | V3 — 01-10-19

Target Release R9

Solution Scope:

The solution detects potential and actual conflicting situations, incursions and non-conformance to procedures or ATC clearances, involving mobiles (and stationary traffic) on runways, taxiways and in the apron/stand/gate area as well as unauthorised/unidentified traffic. Controllers are provided in all cases with the appropriate alerts.

It consists of the following new functions, made available to the Tower controllers:

1. "Extended Conflicting ATC Clearances (CATC) and Updated Conformance Monitoring Alerts for Controllers (CMAC)"
2. "Taxiway Conflict Detection (TCD)"
3. "Alerting at Airports with no Advanced Surface Movement Guidance and Control Systems
4. (A-SMGCS)"
5. "Time Critical Weather Alerts"

Supporting Solution Exercises and dates:

✓	EXE.03b-01.01 (Nice)	RTS	V2 (DSNA)	01-10-2018	to	11-10-2018	in Toulouse
✓	EXE.03b-01.02 (Prague)	RTS	V2 (EUROCONTROL)	18-10-2018	to	31-10-2018	in Brétigny
✓	EXE.03b-01.03 (Düsseldorf)	RTS	V2 (DFS)	17-09-2018	to	28-09-2018	in Langen
✓	EXE.03b-01.04 (Bratislava)	RTS	V2 (LPS SR)	21-05-2018	to	04-09-2018	in Bratislava
✓	EXE.03b-01.05 (Gdańsk)	RTS	V2 (PANSA)	04-02-2019	to	08-02-2019	in Lisbon
✓	EXE.03b-01.06 (Sofia)	RTS	V2 (LEONARDO)	15-10-2018	to	26-10-2018	in Sofia
✓	EXE.03b-01.07 (Amsterdam)	RTS	V2 (NLR)	25-06-2018	to	16-11-2018	in Amsterdam

Intended Benefits:

The benefits of this SESAR Solution are expected in Safety and in Human Performance (improved Situational Awareness) because these improvements are expected to further reduce the number of airport surface incidents at the main airports with A-SMGCS, to reduce the number of airport surface incidents and the severity of runway incursions at the secondary airports with no A-SMGCS, and to reduce the number of weather related incidents at airports.

Safety, Human performance

Solution PJ.02-06 – Improved access into secondary airports in low visibility conditions

PANSA, ENAV, ENAIRE, DASSAULT AVIATION, HONEYWELL, THALES LAS

PJ02 SESAR EARTH JOINT UNDERTAKING

V1 | V2 | V3

06-03-20

Target Release R9

Solution Scope:

The solution focuses on enhancing availability and accessibility of secondary airports which are currently suffering from limited infrastructure both from the air and ground perspective. The aim is to handle more operations in the Low Visibility Conditions (LVC).

The airborne aspect focuses on the use of GNSS (SBAS/GBAS) or Localiser Performance with Vertical Guidance (LPV 100) equipment and related procedures, as well as on Enhanced Flight Vision System (EFVS) operations.

The ground part will concentrate on the capability of cost-effective surveillance systems (use of the video-detection based on cameras, also as a combination with other surveillance means) for provision of runway status to both the crew and the ATS personnel, targeting the flexibility of ATS.

Supporting Solution Exercises and dates:

•	FTS 2	V2	(ENAIRE)	03-12-2018 to 30-06-2019	in Logroño airport
✓	FTS 3	V2	(ENAV)	01-11-2018 to 31-12-2018	in Pescara airport
✓	RTS 4	V2	(ENAV)	19-09-2018 to 21-09-2018	in Pescara airport
•	RTS 5	V2	(PANSA/THALES LAS)	03-06-2019 to 16-08-2019	in Gdańsk airport
•	FTS 6	V2	(HONEYWELL)	02-07-2018 to 27-06-2019	in multiple Airports

Intended Benefits:

Improve capacity both at the secondary airports and the major ones, where fewer diversions from the secondary airports are expected.

The supporting tools should also allow to improve situational awareness, thus predictability.

Capacity
Predictability, Safety

Solution PJ.05-02 – Remotely Provided Air Traffic Service for Multiple Aerodromes for up to three airports

LFV/COOPANS, ON (B4), ACG, CCL, LFV, DFS, ENAV, INDRA, FREQUENTIS, HC, SAAB, DLR (AT-One), EUROCONTROL, LEONARDO, NLR (AT-One)

REMOTE TOWER SESAR JOINT UNDERTAKING

Solution Scope:

EATMA used – SE-DMF not started

The solution will enable an ATCO to maintain situational awareness and provide Aerodrome Control Service for 2 or 3 aerodromes simultaneously, with the following indicative traffic characteristics:

- 2 airports with 6 simultaneous movements or 3 airports with 4 simultaneous movements;
- 10 to 20 movements (ground and air) per hour in total for all airports.

The solution considers advanced features of the visual reproduction as well as additional voice services being integrated into the Multiple Remote Tower Module (MRTM).

There is a fixed allocation of airports to a set of MRTMs. However, in case of an upcoming ATCO overload, due to e.g. emergency, high traffic volumes or degraded mode, the ATCO can split the aerodromes to a spare MRTM if required.

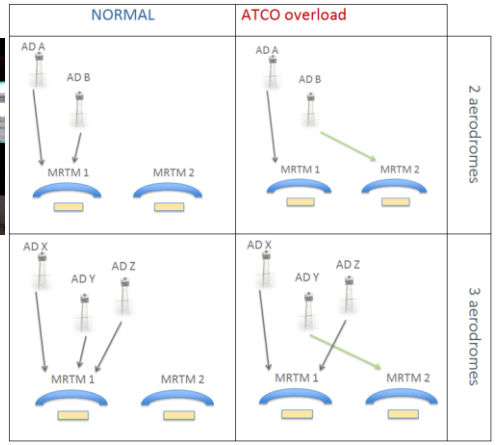
Supporting Solution Exercises and dates:

✓	EXE-05.02-V2-2.1	RTS	(ON (B4))	19-03-2018	to 29-03-2018	in Braunschweig, DLR
✓	EXE-05.02-V2-2.2	RTS	(COOOPANS)	22-01-2018	to 16-03-2018	in Sturup
✓	EXE-05.02-V2-2.3	RTS	(INDRA)	05-02-2018	to 30-03-2018	in Oslo
✓	EXE-05.02-V2-2.4	RTS	(HC)	13-11-2017	to 21-11-2017	in Braunschweig, DLR
•	EXE-05.02-V3-2.1	RTS	(ON (B4))	01-11-2018	to 08-03-2019	in Braunschweig, DLR
•	EXE-05.02-V3-2.2	RTS	(COOPANS)	01-11-2018	to 08-03-2019	in Växjö
•	EXE-05.02-V3-2.3	RTS	(INDRA)	01-11-2018	to 08-03-2019	in Oslo
•	EXE-05.02-V3-2.4	PSM	(HC)	01-11-2018	to 08-03-2019	in Budapest
•	EXE-05.02-V3-2.5	RTS	(ENAV)	01-11-2018	to 08-03-2019	in Milan

V1 | V2 | V3

Target Release R8/9

30-09-18 23-10-19



Intended Benefits:

Compared to the predecessor remote tower solutions of SESAR 1, more significant impacts in cost-efficiency is expected with Multiple Remote Tower, for small and medium sized airports.
Rural, less frequented airports are supported to retain in operations or even to increase the service levels for more hours of operations or even to upgrade non-controlled to controlled airports, what in the end, the passengers will benefit from.

Cost effectiveness, Flexibility, Safety, Human performance

Solution PJ.05-03 – Highly Flexible Allocation of Aerodromes to Multiple Remote Tower Modules

DFS, LFV/COOPANS, ON (B4), ACG, CCL, LFV, ENAV, INDRA, FREQUENTIS, HC, SAAB, EUROCONTROL, DLR (AT-One), LEONARDO, NLR (AT-One)

REMOTE TOWER SESAR JOINT UNDERTAKING

EATMA & SE-DMF not started

V1 | V2 | V3

Target Release R9

30-10-19

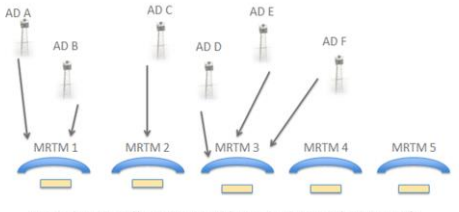
Solution Scope:

The solution will enable the provision of remote tower services to a large number of airports from one Remote Tower Centre (RTC), housing one or several Multiple Remote Tower Modules (MRTM), thanks to complementary approaches:

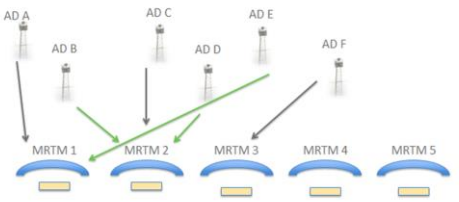
- Advanced automation functionalities are added in each MRTM (e.g. conformance monitoring, task prioritisation) to allow the ATCO to maintain situational awareness and provide Air Traffic Service for up to 3 aerodromes simultaneously, with the following indicative traffic characteristics:
  - 3 airports with 6 to 8 simultaneous movements;
  - 20 to 30 movements (ground and air) per hour in total for all airports combined.
- A RTC supervisor managing flexible and dynamic allocation of airports connected to the different MRTMs over time, in order to balance aerodromes and traffic volumes to each MRTM, with the support of a RTC planning tool.
- An harmonisation of systems and procedures in the MRTMs/RTC making it easier for the ATCOs to hold endorsements for more than 3 airports.

Supporting Solution Exercises and dates:

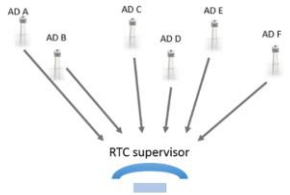
•	EXE-05.03-V2-3.1	RTS	(ON (B4))	01-11-2018	to 08-03-2019	in Vilnius
•	EXE-05.03-V2-3.2	RTS	(COOPANS)	01-11-2018	to 08-03-2019	in Amsterdam and Växjö
•	EXE-05.03-V2-3.3	RTS	(INDRA)	01-11-2018	to 08-03-2019	in Oslo
•	EXE-05.03-V2-3.5	RTS	(DFS)	01-11-2018	to 08-03-2019	in Langen



Aerodrome allocation within an RTC with MRTM´s



Flexible allocation of aerodromes to MRTM´s



RTC Supervisor role with data from all connected airports

Intended Benefits:

Compared to the solution PJ.05-02, still more significant impacts in cost-efficiency, flexibility and service tailored ATS are expected;
Less MRTMs might be provided due to a synergy in the required backup MRTMs.

Cost effectiveness, Flexibility, Safety, Human performance

Solution PJ.05-05 – Advanced Automated MET System

LPS SR (B4)

REMOTE TOWER SESAR JOINT UNDERTAKING

Solution Scope:

EATMA not started – SE-DMF used

The solution defines a system which will significantly enhance the current possibilities of automated weather observation (AUTOMETAR), in conditions where it is difficult or too expensive to implement and staff a conventional manned facility.

The targeted improvements are in monitoring of prevailing visibility and its directional variations especially in inhomogeneous visibility conditions, aeronautically significant weather phenomena, cloud amount in inhomogeneous cloud coverage conditions and aeronautically significant cloud types.
The solution will not target innovative airport equipment only, but also integration of existing standard MET sources.

The Advanced Automated MET System will have two variants that work independently :

- Fully-Automated MET System – the system is collecting meteorological data from a number of sensors and cameras located at one or more remote aerodrome. These data are then processed automatically and presented directly to the Controller, by means of a suitable HMI.
- Semi-Automated MET System – the remote MET Observer receives meteorological data from a number of sensors and cameras that are located at one or more remote aerodromes. The remote MET Observer is responsible for their processing before these are presented at the Controller's HMI.

Supporting Solution Exercises and dates:

- EXE-05.05-TRL4-5.1 RTS (LPS (B4)) 01-08-2018 to 31-10-2018 in Bratislava/Poprad

TRL2 | TRL4 | TRL6

31-07-19

Target Release R9

Visible light

IR light

Intended Benefits:

This improved weather information provided by Automated MET System, once properly integrated (utilizing SWIM standards) within air traffic management decision-making process, will facilitate latest weather situation awareness for airspace users, airports and ANSPs.

This technological solution is independent from the usage of a Remote Tower and can be advantageously used also with conventional Towers.

Safety, Human Performance

Operational Efficiency

Solution PJ.06-01 – Optimized traffic management to enable Free Routing in high and very high complexity environments

DSNA, Météo France, Naviair, ENAIRE, CRIDA, INECO, Nav Portugal, ENAV, BULATSA, TECHNO SKY, ECTL, INDRA, Leonardo, Selex ES Gmbh, Skyguide, Skysoft ATM, Thales LAS, SMATSA, ACG, CCL, LFV

SESAR JOINT UNDERTAKING

V1 V2 V3

Target Release R9

18-11-19

Solution Scope:

The Solution PJ.06-01 provides a description of high complexity cross-border Free Routing environment in upper airspace (at the 2022 timeframe as per PCP AF#3). The scope of the solution focuses on the improvement of Aircraft-to-Aircraft Separation Provision and Air Traffic Flow / Complexity Management (in the frame of Integrated Network Management) to enable Free Routing operations in upper airspace in high complexity cross-border environments (with minimum structural limits to manage airspace and demand complexity).

Supporting Solution Exercises and dates:

- RTS V3 in Toulouse, Roma and Geneva (DSNA, ENAV, Skyguide) : EXE-06-01-01 (25/10/2018 – 29/05/2019)
- RTS V3 in Madrid (ENAIRE,INDRA): EXE-06-01-02 (01/09/2018 – 21/12/2018)

Intended Benefits

Free Routing technical and operational development will provide airspace users with significant opportunities to optimize their flights in line with individual operator business needs and/or military needs and therefore boost greener Air Transport operations.

These benefits shall be reached with no negative impact on Safety and Capacity

Fuel Efficiency, Predictability

Solution PJ.06-02 – Management of Performance Based Free Routing in Lower Airspace

B4 (PANSA, ORO NAVIGACIJA , ANS CR, LPS SR), ECTL, INDRA, DSNA, SKYGUIDE, THALES

V1 V2 V3

Target Release R9

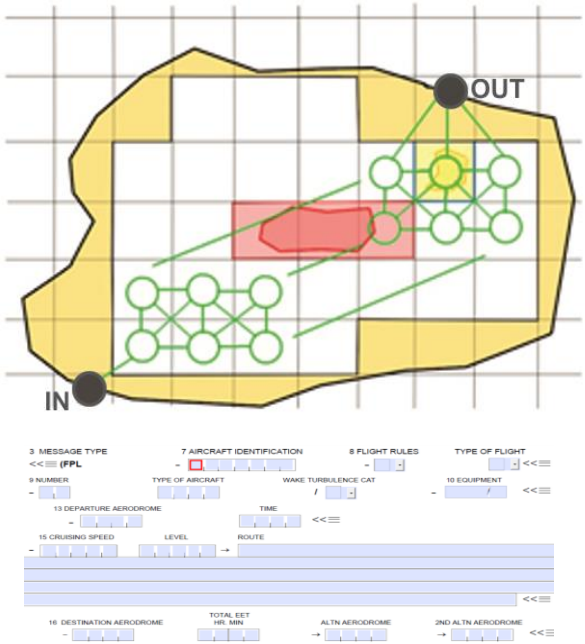
02-05-18 22--11-19

Solution Scope:

The aim of this solution is to research the benefit and impact of expanding the Free Routing concept to the lowest limit possible (below FL310 and up to FL395) while accommodating all Airspace Users concerned.

Supporting Solution Exercises and dates:

- MBS V1 using SAAM, NEST platform (ECTL): EXE-06-02-01 (Q2 to Q4 2017)
- MBS and Delphi method V1 using Rzeszów University test platform (B4): EXE-06-02-02 (Q4 2017)
- Flight Planning algorithm validation V2 using Rzeszów University test platform (B4): continuation of EXE-06-02-02 (Q4 2018-Q1 2019)
- Preliminary RTS V2 using EEC ESCAPE simulation platform (ECTL): EXE-06-02-03 (Q4 2018)
- Preliminary RTS V2 using B4 platform (PANSA): EXE-06-02-04 (Q1 2019)



Intended Benefits

Making available Free Routing Airspace below FL310, will allow Airspace Users to improve time and fuel efficiency in short haul flights and to raise the automation level of flight planning and lessen workload of flight crew.

Predictability, Environment/Fuel Efficiency

Solution PJ.01-03B – Dynamic E-TMA for Advanced Continuous Climb and Descent Operations

AIRBUS, NATS, DSNA, ENAIRE, THALES AIR SYS,
THALES AVIONICS

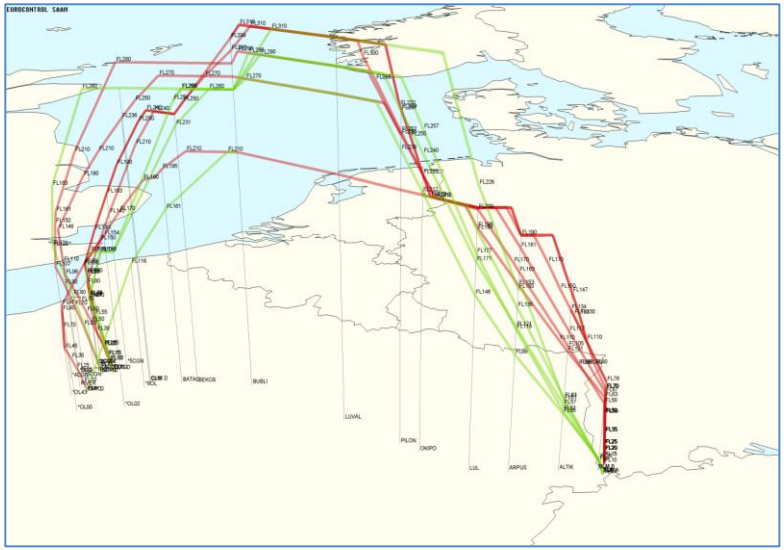
V1 | V2 | V3

Target Release R9

30-09-19

Solution Scope:

The Solution will investigate the facilitation of Continuous Climbs Operations and Continuous Descents Operations through dynamically assigned routes (based on PBN route structures), and/or use of controller assisted tools and airborne systems support to flight crews allowing them to enhance flight efficiency along descent. The Solution will address the improvement of trajectory predictability and the reduction of constraints in aircraft's climb and descent profiles with an anticipated reduction in the environmental impact and an improvement of the real-time tactical decisions or adjustments of CDO or CCO. **The objective is to achieve the best compromises between flight efficiency, workload and capacity, in a Medium to High density environment. Shared information between controllers and crews, including EPP, TTA (Target Time of Arrival**) or CTA will be considered in order to improve the airborne management of the descent, and predictability of aircraft trajectory on the ground side.



Supporting Solution Exercises and dates:

- PJ01.03b V2 (ENAIRE, FTS) 11/2018 to 02/2019
- PJ01.03b V2 (DSNA, RTS) 11/2018 to 12/2018

Intended Benefits:

Improved environmental impact and cost effectiveness through the facilitation of CCO and CDO, cost effectiveness enhanced due to improved management of airspace configuration and staffing, improvement of predictability and human performance through the use of tools and the shared information between controllers and crews, including EPP, TTA or CTA, capacity maintained.

Fuel efficiency, Cost efficiency, Capacity, Predictability, Human Performance

Solution PJ.02-11 – Enhanced Terminal Area for efficient curved operation

ENAV, AVINOR-SEAC2020, ENAIRE, LFV/COOPANS, SICTA, Techno Sky, NAIS, LDO, THALES Avs France, INDRA, INDRA Navia, Swedavia-SEAC2020, EUROCONTROL

PJ02 SESAR EARTH JOINT UNDERTAKING

Solution Scope: **EATMA & SE-DMF Initiated**

The solution provides enhancement for Terminal Area using more efficient curved operation based on GNSS technologies since the beginning of the approach phase and curved RF legs for arrivals and departures as close as possible to the runway.

- Arrivals

  Use of curved RF-legs and geometric vertical navigation in the TMA from the IAF, facilitating continuous descent operations

- Departures

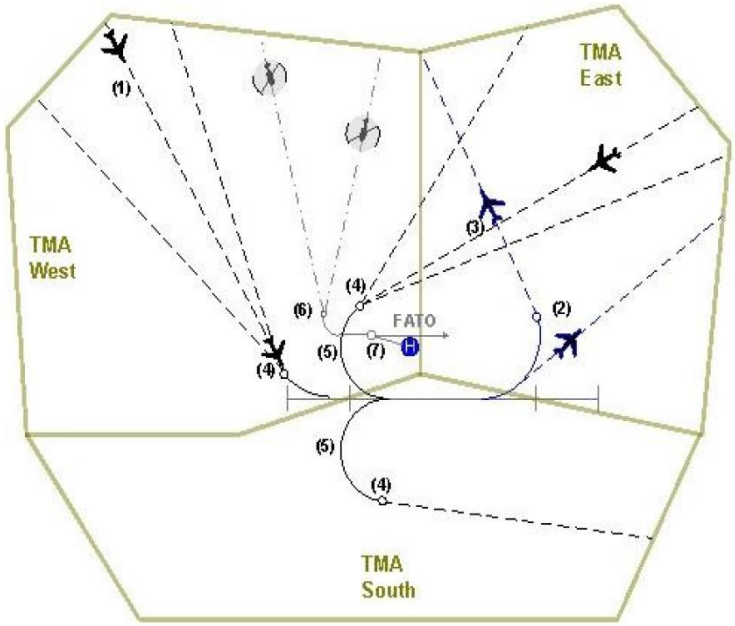
  Use of curved RF-leg(s) as close as possible to the departure RWY compared to today's operation (currently at least 1NM from the Departure end of runway)

Supporting Solution Exercises and dates:

✓	FG(*) 1	V1	(ENAV)	02-01-2017 to 06-03-2019	
✓	RTS 2	V1	(LEONARDO)	06-09-2018 to 07-09-2018	in Turin

(*) FG = Focus Groups, meaning workshops and expert groups.

V1	V2	V3	Target Release
15-10-19			R9



Intended Benefits:

Environmental sustainability and fuel efficiency benefit (fuel consumption and noise abatement) thanks to shorten path and improved continuous descending operations .

Potential capacity benefits (runway throughput) thanks to curved departure operations

Safety and human performance (workload and situational awareness) benefits for arrivals thanks to the use of the same systems since the IAF and the reduced need of a step by step descent

Environmental sustainability, Fuel efficiency, Safety, Human performance

Predictability, Flexibility, Capacity

Solution PJ.02-02 – Enhanced arrival procedures

EUROCONTROL, ENAIRE, AIRBUS, LEONARDO, ENAV, HONEYWELL, THALES LAS, THALES AVS FRANCE

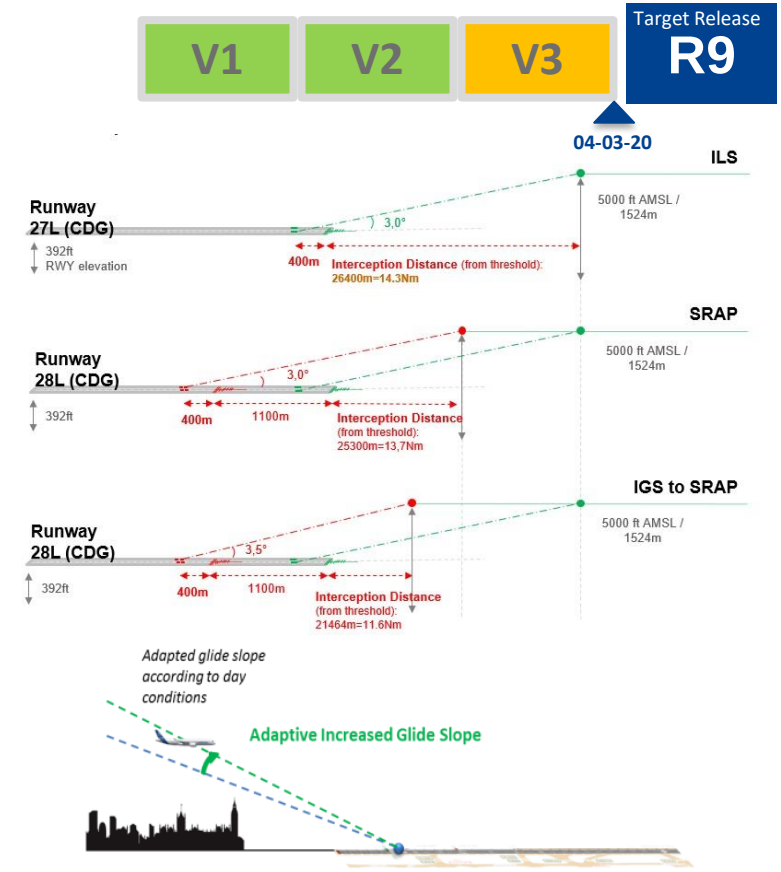
PJ02 SESAR EARTH JOINT UNDERTAKING

Solution Scope: **EATMA & SE-DMF used**

The solution makes use of satellite navigation and augmentation capabilities, such as GBAS and satellite-based augmentation systems (SBAS), to enhance landing performance and to facilitate advanced arrival procedures (Dual Thresholds (DT); using a Second Runway Aiming Point (SRAP); Increased Glide Slope (IGS); Adaptive Increased Glide Slope (A-IGS); Increased Glide Slope to Second Runway Aiming Point (IGS-to-SRAP)).
By doing so, noise is reduced while runway occupancy time (ROT) is optimised.
The solution also reduces the need for separation for wake-vortex avoidance.
The solution will mainly focus on GBAS as this will allow in the future to perform CAT III operations not foreseen to be achievable with SBAS.

Supporting Solution Exercises and dates:

✓	RTS 1	(Paris CDG)	V3	(EUROCONTROL)	23-10-2017 to 27-10-2017	in Brétigny-sur-Orge
✓	RTS 2	(Paris CDG)	V3	(EUROCONTROL)	16-05-2018 to 18-05-2018	in Brétigny-sur-Orge
✓	RTS 3	(Paris CDG)	V3	(EUROCONTROL)	03-12-2018 to 07-12-2018	in Brétigny-sur-Orge
✓	RTS 4	(Paris CDG)	V3	(EUROCONTROL)	01-04-2019 to 05-04-2019	in Brétigny-sur-Orge
•	RTS 5	(Munich)	V3	(EUROCONTROL)	14-06-2019 to 30-08-2019	in Frankfurt
✓	FTS 6	(Milan Malpensa)	V3	(ENAV)	01-11-2018 to 31-01-2019	in Rome
•	RTS 7	(Milan Malpensa)	V3	(ENAV)	21-10-2019 to 25-10-2019	in Brétigny-sur-Orge
✓	FTS 8	(Madrid Barajas)	V3	(ENAIRE)	15-01-2018 to 29-06-2018	in Madrid Barajas
✓	FTS 9	(Barcelona El Prat)	V3	(ENAIRE)	17-09-2018 to 18-01-2019	in Barcelona El Prat
✓	RTS 10		V3	(AIRBUS)	11-06-2018 to 31-07-2018	in Toulouse
✓	RTS 11		V3	(AIRBUS)	15-10-2018 to 31-01-2019	in Toulouse
✓	FTS 12		V3	(AIRBUS)	15-10-2018 to 30-10-2018	in Toulouse
✓	FTS 13		V3	(EUROCONTROL)	01-10-2018 to 15-11-2018	in Brétigny-sur-Orge
•	RTS/LT 14		V3	(AIRBUS)	15-05-2019 to 15-10-2019	in Toulouse



Intended Benefits:

Advanced arrival procedures should enable mitigation of noise (Environmental Sustainability) and allow for reduced wake separation and consequently runway throughput increase (Capacity and Efficiency).

Capacity, Efficiency, Environmental sustainability
Cost effectiveness

Solution PJ.04-01 – Enhanced Collaborative Airport Performance Planning and Monitoring

ENAIRE, ADP, SNBV, SWED, MUC, AVINOR, LPS SR (B4), LHR, LDO, NLR (AT-ONE), DLR (AT-ONE), EUROCONTROL, THALES AIRSYS, PANSA (B4), CCL/COOPANS, ACG/COOPANS, SINTEF, ATOS (FSP)

V1 | V2 | V3

05-12-18 16-09-19

Target Release R8/9

Solution Scope:

EATMA & SE-DMF used

The solution extends the airport performance monitoring process to the airport landside and ground access processes that may have an impact on the airside and ATM operations in both planning and execution timeframes. It mainly cope with normal situations.

It specially considers the additional inclusion of the baggage process, of potential improvements to the passenger process monitoring notably in the area of reduced mobility passengers, and of the area of turnaround process monitoring with specifically the notion of automated milestone generation in an Airport Collaborative Decision Making (A-CDM) context.

It includes the development of rationalised dashboard(s) fed with all landside and airside key performance indicators and covering total airport management processes, and the provision of tools supporting post-operations analysis.

Supporting Solution Exercises and dates:

✓	PJ04-01.v2.01	RTS	(ENAIRE)	02-10-2017	to 27-10-2017	in Palma de Mallorca
✓	PJ04-01.v2.02	RTS	(ENAIRE)	23-10-2017	to 28-10-2017	in Alicante-Elche
✓	PJ04-01.v2.03	RTS	(ENAIRE)	15-02-2018	to 23-02-2018	in Madrid
✓	PJ04-01.v2.04	RTS	(THALES AIR SYS)	28-05-2018	to 26-06-2018	in Lyon
✓	PJ04-01.v2.05	RTS	(THALES AIR SYS)	28-05-2018	to 26-06-2018	in Lyon
✓	PJ04-01.v2.06	RTS	(LPS SR (B4))	10-01-2018	to 18-01-2018	in Bratislava
•	PJ04-01.v3.01	LT	(THALES AIR SYS)	28-01-2019	to 06-03-2019	in Lyon
•	PJ04-01.v3.02	LT	(ENAIRE)	29-04-2019	to 01-07-2019	in Palma de Mallorca
•	PJ04-01.v3.03	SM	(ENAIRE)	28-01-2019	to 28-03-2019	in Barcelona

Intended Benefits:

Provide high levels of predictability to the airport operational community and to the network, through an holistic process monitoring at the forefront and a full integration into the overall ATM network.
Generate both local performance benefits and improved network predictability thanks to a concept scalable to the specific needs of smaller or regional airports.

Predictability,
Flexibility, Efficiency, Capacity, Punctuality, Safety, Environmental sustainability, Security, Human performance

Solution PJ.04-02 – Enhanced Collaborative Airport Performance Management

DLR (AT-ONE), ADP, SNBV, SWED, MUC, AVINOR, HAL, ENAIRE, NLR (AT-ONE), LDO, LPS SR (B4), CCL/COOPANS, PANSA, ATOS (FSP), THALES AIRSYS, SINTEF, EUROCONTROL

EATMA used – SE-DMF initiated

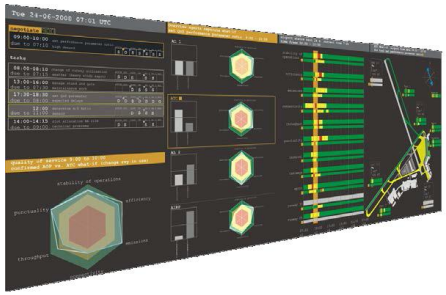
V1 | V2 | V3

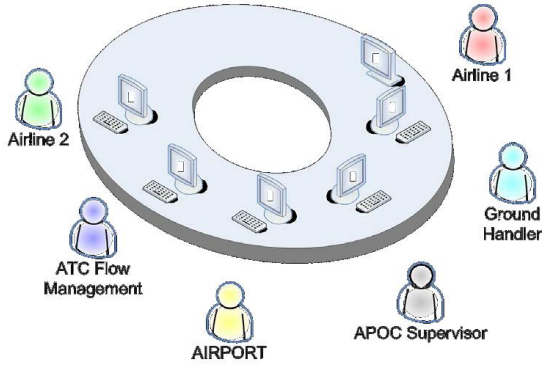
Target Release **R7/9**

23-01-18 — 01-11-19

Solution Scope:

The solution addresses the full integration of the AOP into the NOP, moving towards a total airport DCB process, especially in degraded situations. This involves, among other things, a proactive assessment of the total airport capacity available, including terminal, stand, manoeuvring area, taxiway and runway capacities, and taking into account the prevailing and/or forecast weather and other operational conditions. It is facilitated by access to real-time information captured in the form of performance dashboards and by 'what-if' decision support tools.





Supporting Solution Exercises and dates:

✓	PJ04-02.v1.01		EW	(CRIDA (ENAIRE))	19-04-2017 to 04-09-2017	
✓	PJ04-02.v1.02		EW	(LEONARDO)	19-04-2017 to 04-09-2017	
✓	PJ04-02.v1.03		EW	(EUROCONTROL)	19-04-2017 to 04-09-2017	
✓	PJ04-02.v1.04		EW	(DLR (AT-ONE))	19-04-2017 to 04-09-2017	
✓	PJ04-02.v1.05		EW	(EUROCONTROL)	19-04-2017 to 04-09-2017	
✓	PJ04-02.v1.06		EW	(EUROCONTROL)	19-04-2017 to 04-09-2017	
•	PJ04-02.v2.01	(Group 1)	SM	(EUROCONTROL)	in (March *TBC*) 2019	in Paris CDG
•	PJ04-02.v2.02	(Group 1)	RTS	(EUROCONTROL (PJ.07))	05-11-2018 to 05-12-2018	in Brétigny-sur-Orge
•	PJ04-02.v2.03	(Group 1)	FTS,RTS	(ATOS (FSP))	01-02-2019 to 19-04-2019	in Paris CDG or ORL
•	PJ04-02.v2.04	(Group 1)	RTS	(DLR(AT-ONE))	28-01-2019 to 01-02-2019	in Braunshweig
•	PJ04-02.v2.05	(Group 1)	RTS	(EUROCONTROL)	11-02-2019 to 22-02-2019	in Madrid Barajas
•	PJ04-02.v2.06	(Group 3)	RTS	(LPS SR (B4))	14-01-2019 to 04-02-2019	in Bratislava
•	PJ04-02.v2.07	(Group 2)	RTS	(THALES AIR SYS)	03-01-2019 to 22-01-2019	in Lyon
•	PJ04-02.v2.08	(Group 2)	RTS	(THALES AIR SYS)	03-01-2019 to 22-01-2019	in Lyon
•	PJ04-02.v2.09	(Group 1)	RTS	(DLR (AT-ONE))	28-01-2019 to 01-02-2019	in Braunschweig

Group 1: 39 Airports, European & International Hub or Primary Node at 90%, with a traffic of 110.000 to 490.000 mvts per year (representing 54% of the traffic)
Group 2: 41 Airports, Secondary Node at 86%, with a traffic of 40.000 to 135.000 mvts per year (representing 18% of the traffic)
Group 3: 162 Airports, Secondary Node or Regional Airports, with a traffic of 1.000 to 70.000 mvts per year (representing 21% of the traffic)

Intended Benefits:

Provide high levels of predictability to the airport operational community and to the network, through an holistic process monitoring at the forefront and a full integration into the overall ATM network.
Generate both local performance benefits and improved network predictability thanks to a concept scalable to the specific needs of smaller or regional airports.

Predictability,
Flexibility, Efficiency, Capacity, Punctuality, Safety, Environmental sustainability, Security, Human performance

Solution PJ.11-A1 – Enhanced Airborne Collision Avoidance for Commercial Air Transport normal operations - ACAS Xa

DSNA, EUROCONTROL, Honeywell SAS, DASSAULT, AIRBUS

Updated 17-Jun

PJ11 CAPITO SESAR JOINT UNDERTAKING

V1 V2 V3 Target Release R9

12-12-19

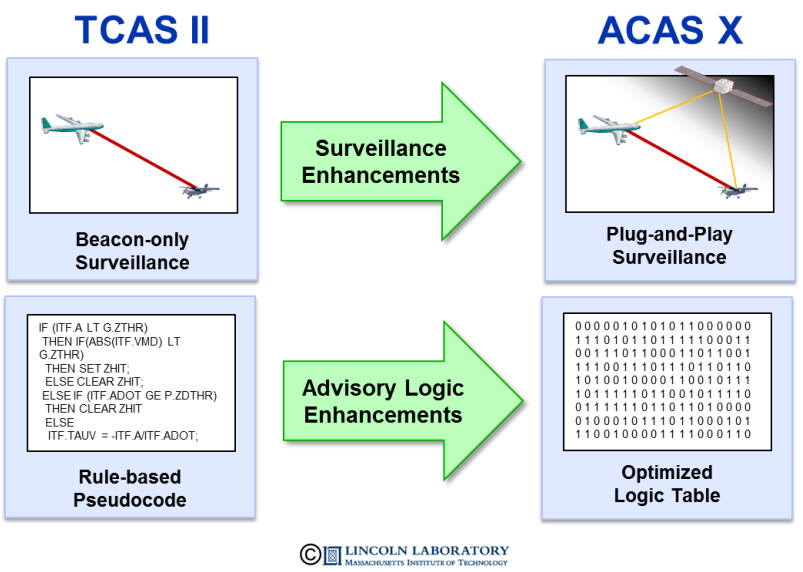
Solution Scope:

The Solution refers to the use of ACAS Xa, an airborne collision avoidance system which takes advantage of optimized resolution advisories and of additional surveillance data, without changing the cockpit interface (i.e. same alerts and presentation in the current TCAS).

Supporting Solution Exercises and dates:

- PJ11-A1-EXE01 V3 (Honeywell, FTS) 08-2017 to 04-2018
- PJ11-A1-EXE02 V3 (DSNA, FTS) 01-2017 to 01-2018
- PJ11-A1-EXE03 V3 (Honeywell, RTS) Cancelled
- PJ11-A1-EXE04 V3 (DSNA, FTS) 04-2017 to 10-2018
- PJ11-A1-EXE05 V3 (ECTL, FTS) 10-2018 to 02-2019
- PJ11-A1-EXE05+(*) V3 (ECTL, FTS) 05- to 10-2019

(*) EXE05 complementary activities



Intended Benefits:

Enhanced Safety, less disruption of aircraft trajectories/Reduction of unnecessary disruption of normal flight by ACAS, enhanced compatibility with ATC practices.

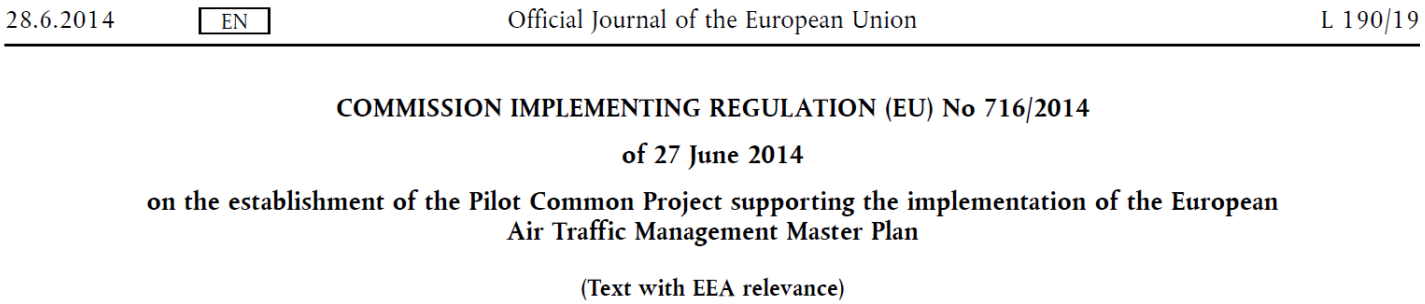
Safety, Human Performance

Very large Scale Demonstrations VLD

Integrated Airport Operations VLD Objectives

Bridge the gap between industrial research and industrialisation and deployment

- Show that mature **SESAR 1 airport solutions related to the PCP ATM Functionality 2** can be integrated in an environment as close as possible to real operations
- Demonstrate benefits 'in real life'
- Demonstrate scalability of the solutions
- Support stakeholder buy-in
- Prepare future standardisation and regulation



28.6.2014 EN Official Journal of the European Union L 190/19

COMMISSION IMPLEMENTING REGULATION (EU) No 716/2014

of 27 June 2014

on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan

(Text with EEA relevance)

Integrated Airport Operations VLD
Project partners & test sites

DLR

dgac DSNA

SINTEF

Honeywell

indra

AIRBUS

Air Navigation Services of the Czech Republic

Hamburg

Nice

PCP

Budapest

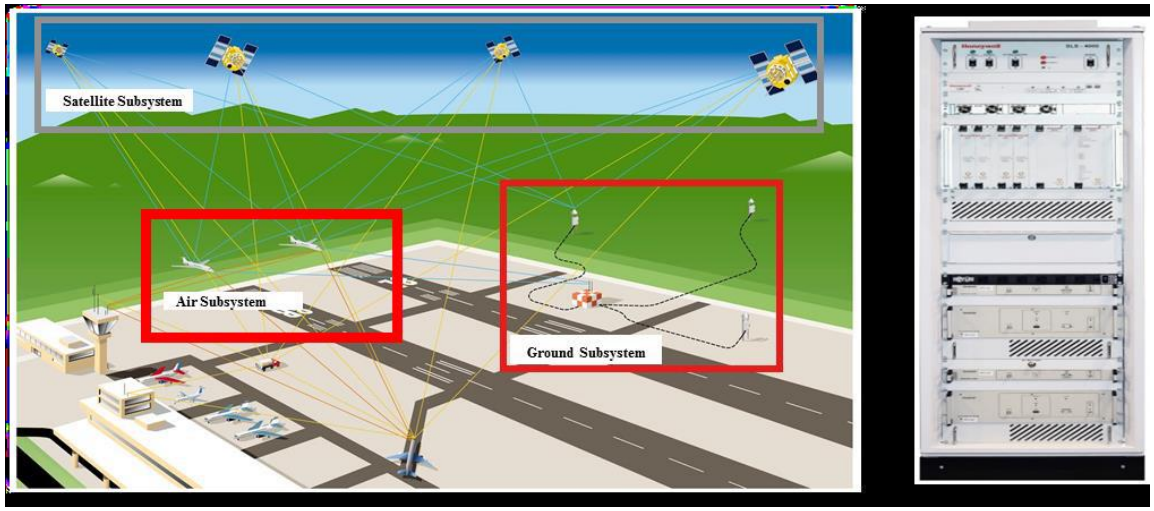
Onboard traffic alerts

Integrated Airport Operations

- Automated Assistance to Controller for Surface Movement Planning and Routing
- Pre-Departure Sequencing supported by Route Planning
- Airport Safety Nets for controllers: conformance monitoring alerts and detection of conflicting ATC clearance

#53	• Reduced waiting time at the runway holding point • Increased accuracy of taxi time-out predication and hence take-off time predictability • Provision of a more stable pre-departure sequence
#22	• Improved predictability • Enhanced safety • Increased capacity • Improved taxi times resulting in reduced fuel burn
#02	• Increased situational awareness • Improved safety in airport operations

AAL2-WP2: GBAS CAT II Advanced Operations



Project will demonstrate GBAS (GroundBasedAugmentationSystem) CATII operation with CATI airborne and ground equipment, enabling lower decision heights down to CATII minima (DH100ft).

•By integrating the GBAS CATI ground station with an SBAS receiver (EGNOS capable receiver in Europe), GBAS can take advantage of SBAS's independent anomalous ionosphere monitoring.

•Enables real time iono monitoring rather than conservative error bounding, increasing availability and enabling advanced operations.

•GBAS brings on the other hand an improved performance (accuracy) due to local augmentation and provides reduced alert limit. This makes the two systems complementary.

AAL2-WP3: EFVS Advanced Operation

Preparation of pioneer aerodromes to accommodate EFVS to land operation in Low Visibility conditions (2018) … *using results of AAL1 & draft of EASA AWO Regulation*

- Demo **Flights in real operational environment** at these aerodromes (2019)
- Additional **Flights in Low vis to collect data** and to support studies
- + Studies to support the pre-deployment
- **Weather** impact analysis
- **Performance** prediction analysis
- Non instrument runway **lowering Minima** analysis(Switzerland)

Presentation overview

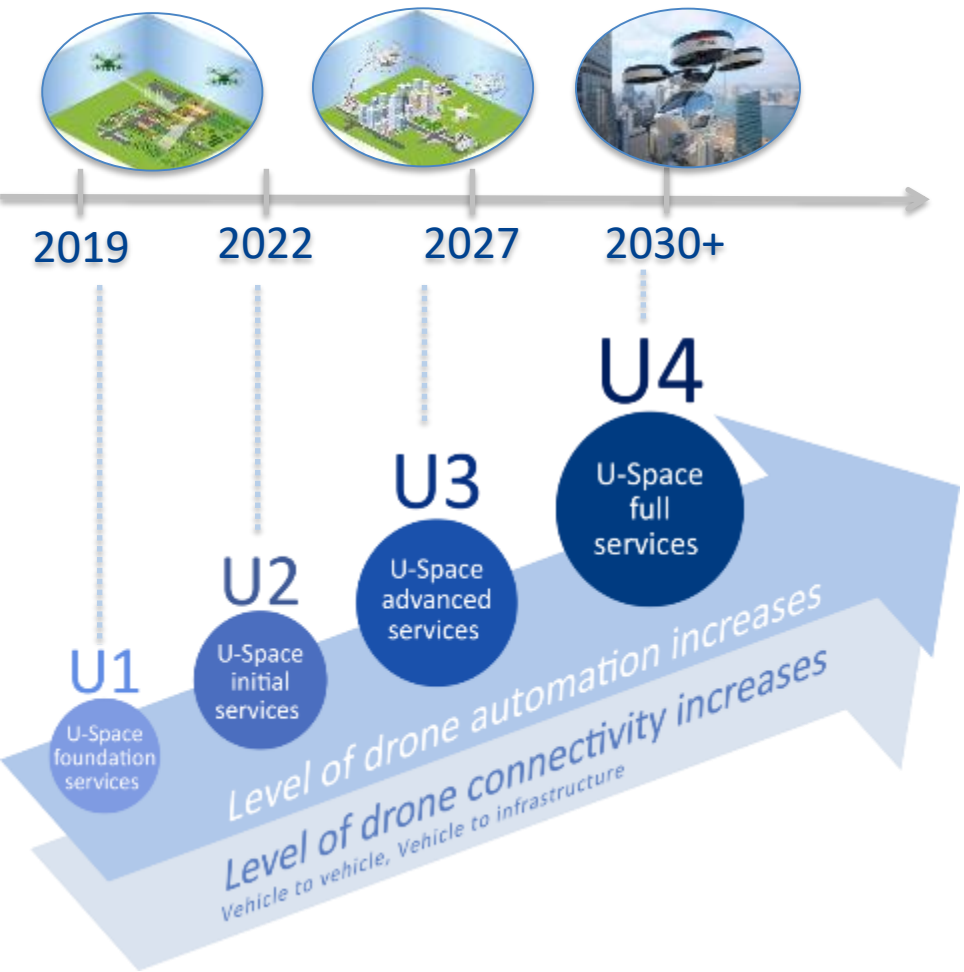
Setting the scene: SESAR

SESAR results

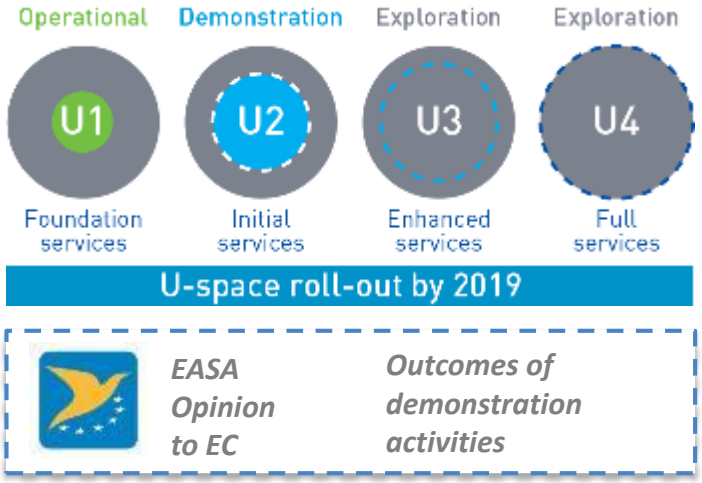
SESAR validation process

Solutions supporting airports

Drones activities



U-space in 2019



U1 Foundation
- e-registration
- e-identification
- geofencing

U2 Initial
- planning & approval
- tracking
- airspace dynamic information
- procedural interface with ATC

U3 Enhanced
- capacity management
- assistance for conflict detection

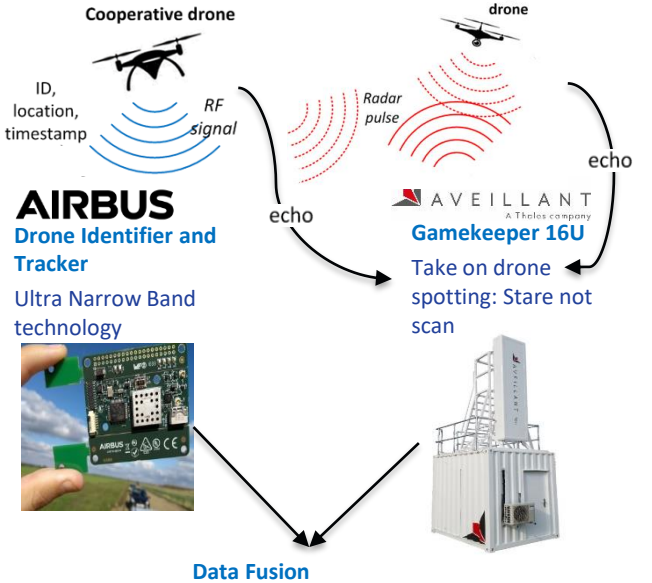
U4 Full
- integrated interfaces with manned aviation
- additional new services

CLASS

CLear Air Situation for uaS

U2 U3 **Ground based technology**

Drone
ENAC's technology



With more words…

CLASS has developed a set of scenarios and KPIs to cover different situations where cooperative, non-cooperative surveillance, and identification can provide useful services for drone operations.

CLASS then defined a surveillance system comprising of the Airbus Drone Identifier and Tracker onboard, the UAS variant of Aveillant's Holographic Radar called Gamekeeper, integrated with data fusion (with support from NTNU) into a the real time situation display provided by Unifly.

Using the defined system KPIs and scenarios, CLASS performed a series of live trials in October 2018. this trial has shown the feasibility of the technologies providing a integrated surveillance and tracking system.

The project has

- Developed functional & technical requirements for U-space Tracking, Monitoring, Tactical Deconfliction services & capabilities.
- Included these services in the frame of the U-space CONOPS
- Concluded that sensitive airspaces require safety oriented tracker:
  - Drones have to be equipped with a dedicated tracker (lightweight, affordable) whose performances are close to aeronautical standards
  - High performance radars are required to detect any intruder, including non-equipped drone.

Live trials campaign in October 2018

CORUS

Concept of Operations for EuRopean UTM Systems

U2 **U3** **U4** **Concept of Operations**

With more words…

CORUS main objective is to develop a reference concept of operation for U-space. The project activity was based on 3 workshops with a wide base of stakeholders, allowing CORUS to build, refine and validate its U-space concept of operations.

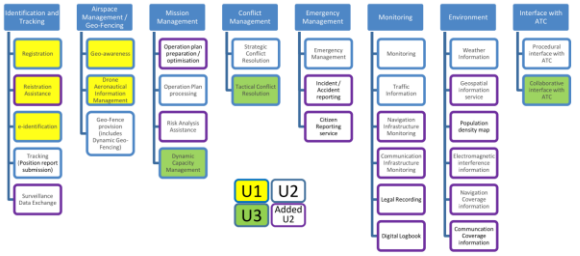
The Edition 3 of the CONOPS has been released to the community for review in September 2019. This work lays the foundations for the description of U-space services and capabilities, includes descriptions of new airspace classification of three different types of airspace volume, named X, Y and Z.

The number and nature of the U-space services differ in the three volumes and as a result the density and complexity of the operations that can occur differs in each. The intention is that the airspace will be divided into X, Y and Z in function of the air risk, ground risk, the traffic demand and other factors, and thus the cost and complexity of providing and using U-space services will be proportionate to the need that they be used. The CONOPS elaborates the U-space services and proposes how they be used in combination to achieve safety, public acceptance and efficient operation.

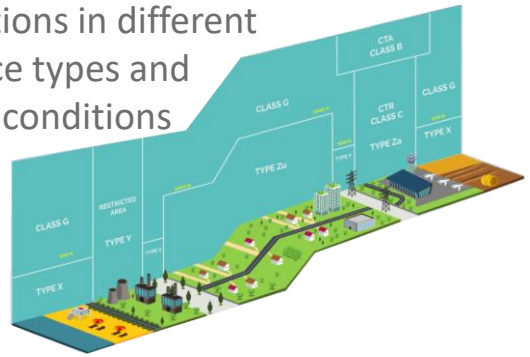
The U-space CONOPS (https://www.sesarju.eu/node/3411) contains:

- Definition of U-space airspace rules and procedures
  - Volumes
  - Operational Practice including Rules of the Air and Flight Rules
  - Spacing & Conflict Resolution
- Definition U-space services and High Level Architecture
- An examination of non-aviation aspects, identifying key issues for society
- Safety Assessment methodology within U-space

U-space services

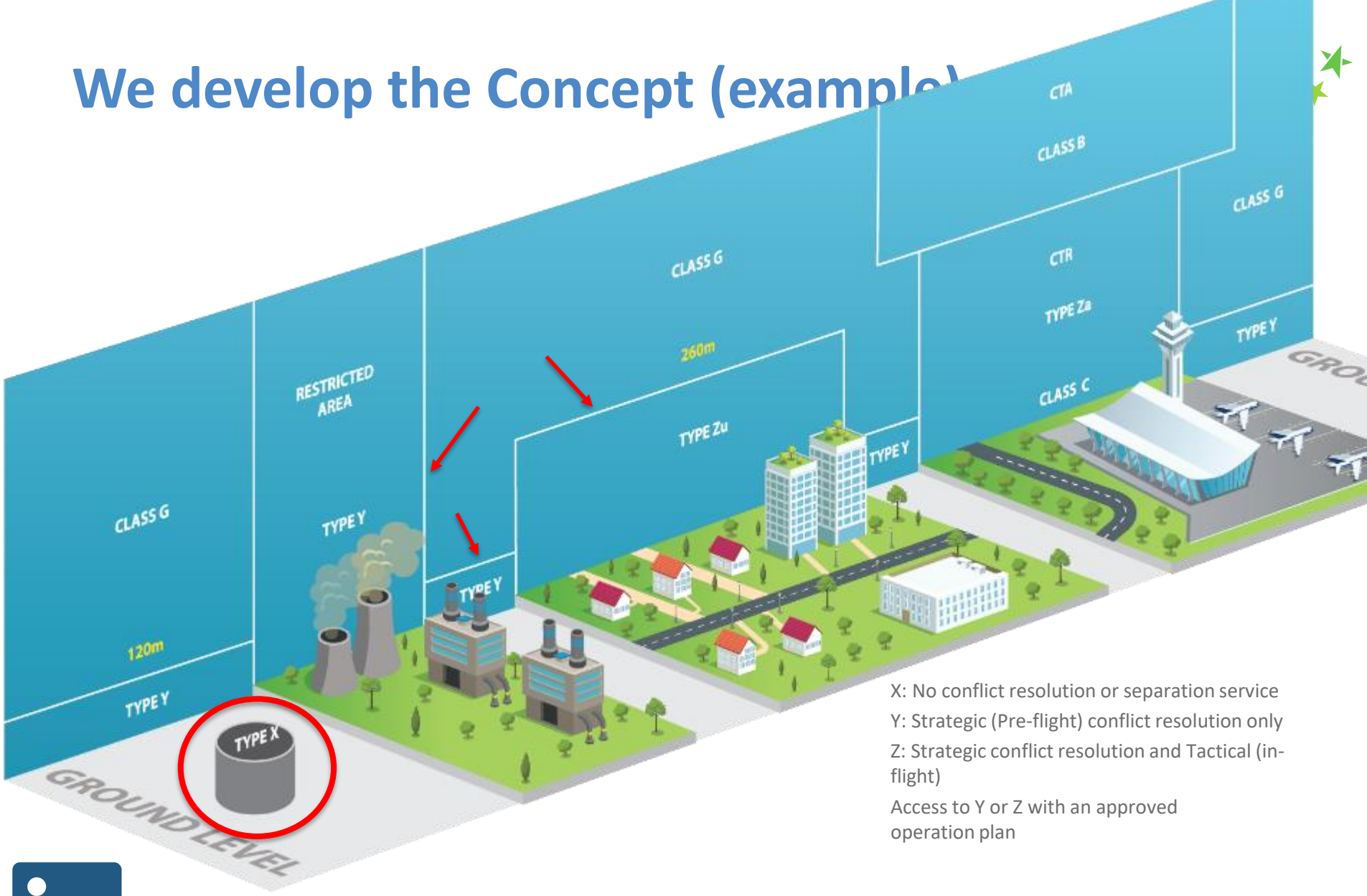


Operations in different airspace types and access conditions



CORUS workshop

We develop the Concept (example)



X: No conflict resolution or separation service

Y: Strategic (Pre-flight) conflict resolution only

Z: Strategic conflict resolution and Tactical (in-flight)

Access to Y or Z with an approved operation plan

https://www.linkedin.com/company/u-space-corus/

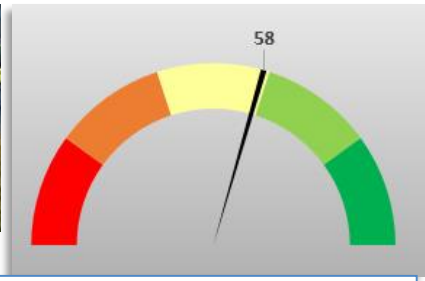
PODIUM

Proving Operations of Drones with Initial UTM

PODIUM U-SPACE TAKES OFF

SESAR JOINT UNDERTAKING

U1 U2 U3 **Demonstrator**



With more words…

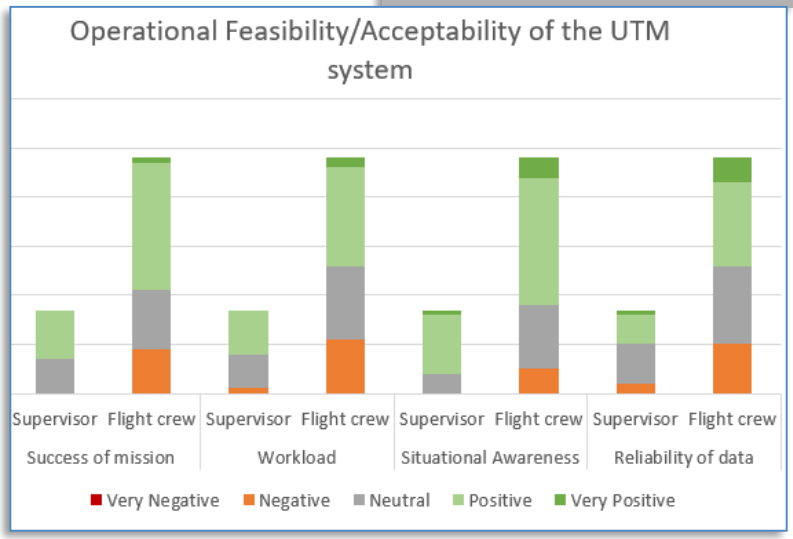
PODIUM has performed 18 operational scenarios for VLOS and BVLOS flights, involving 73 actual flights and 138 flight authorization workflows. The flights were performed in the period May to June 2019.

The first main conclusions of the projects are:

- Concerning the U1 services addressed (e-registration and e-identification), drone operators, air traffic controllers and supervisors confirm the operational acceptability/feasibility and potential benefits of the implemented U-space solution, albeit with a number of remarks.
- Concerning U2 services addressed, the air traffic controllers and supervisors confirm the operational acceptability/feasibility and potential benefits of the implemented U-space solution for the flight preparation phase, albeit with a number of remarks
- A number of drone operators and pilots, however, did not confirm the operational acceptability of the implemented U-space solution for the flight execution phase (corresponding to U2), in particular with regards to situational awareness aspects.

Amongst other recommendations listed in the demonstration report, the project recommends to ensure U-space systems interact seamlessly and automatically with national systems for pilot and drone registrations, permission requests, etc.

The Project Dissemination event will be at EUROCONTROL Brussels on the 17th of October 2019.



- 18 operational scenarios performed at 5 sites/ 5 local visitors days
- 41 questionnaire responses, 5+ facilitated de-briefings, expert observations
- Working draft overall demo report / Consortium review 18-19 September
- 3 new videos on SJU site

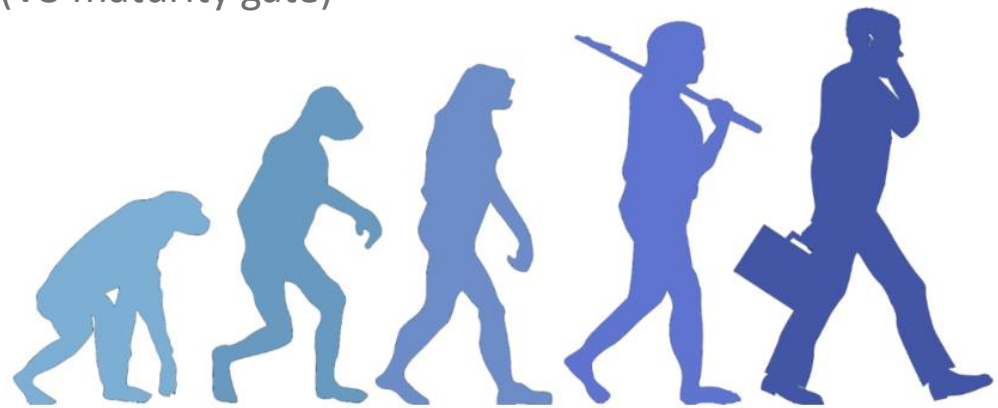
Is there a life after a SESAR validation?

Yes! This validation is only one step toward the SESAR solution delivery!

- Analyse and report on the exercise results
- Consolidate these results with those of the other V3 exercises in the solution
- Update, at solution level, of
    - The operational concept description
    - operational, performance, safety and interoperability requirements
    - Human performance and safety assessments
    - Technical specifications
    - Cost benefit analysis
- Assess the maturity of the solution (V3 maturity gate)

And then?

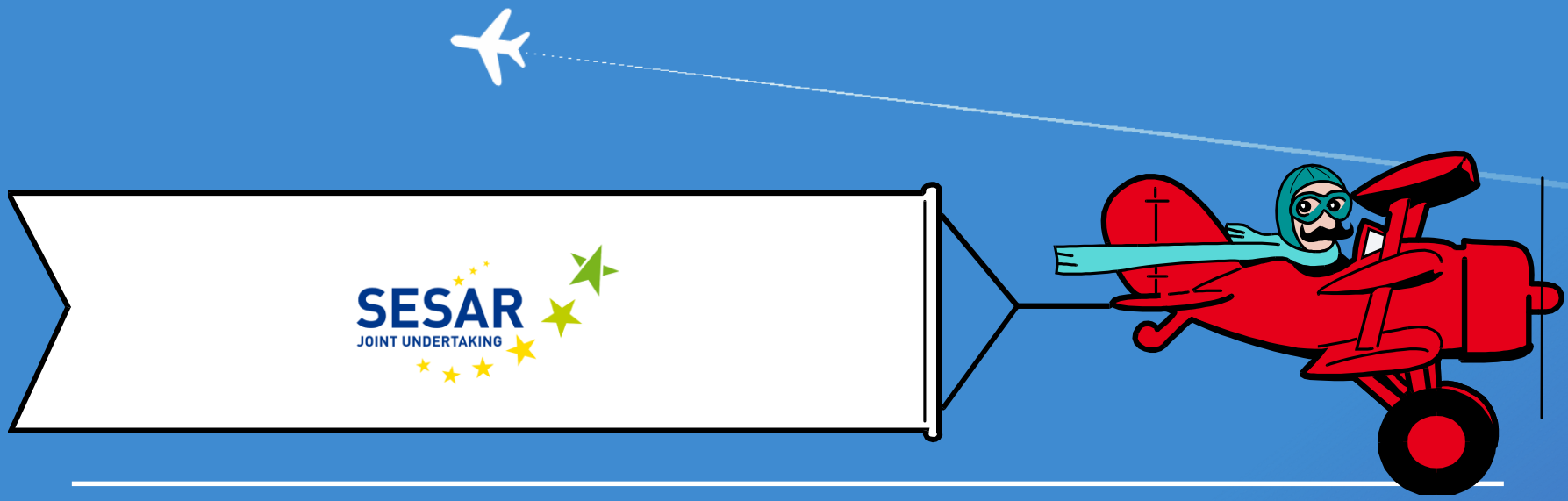
- Standardise? Regulate? Certify?
- Industrialise
- Deploy!



To take away

- SESAR 1 has delivered a first batch of solutions for ATM modernisation
- SESAR 2020 Solutions move further European ATM towards digitalisation
- New disruptive technologies will continue to emerge
- We shall continue to consider them in the ATM

We have to remain relevant !



Thank you very much for your attention!

SESAR
JOINT UNDERTAKING

Founding Members
EUROPEAN UNION EUROCONTROL