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# VARIOUS TYPES OF SAFETY NETS SUPPORTING EVEN SAFER AIRPORT OPERATIONS FOR PILOTS, VEHICLE DRIVERS AND TOWER CONTROLLERS

Delivering innovative ground-based and airborne alerting SESAR Solutions for high-performance airport operations.



AIRBUS

Honeywell



LEONARDO



THALES



# SESAR SOLUTIONS SUPPORTING

## 1 RunWay Status Lights (RWSL)

The ATC system is fed by consolidated airport surveillance data to autonomously detect when the runway is unsafe due to other traffic. Thus, dedicated in-pavement lights (Take-off Hold Lights) are automatically illuminated in front of aligned aircraft to indicate a pilot is in an unsafe situation. Likewise, on runway entrance taxiways, Runway Entrance Lights are automatically switched on to prevent pilots and vehicle drivers from entering or crossing the runway when a take-off or landing is detected.

## 2 Conformance Monitoring Alerts and detection of Conflicting ATC Clearances (CMAC-CATC)

Based on airport surveillance data, local airport procedures and electronic stripping integrating ATC clearances, the ATC system alerts the Tower Controller when traffic doesn't comply with procedure or ATC instruction during take-off, landing and surface operations. Moreover, the ATC system alerts the Tower Controller when it detects conflicting runway clearances.

## 3 Enhanced Situational Awareness and Airport Safety Nets for vehicle drivers (AVDR)

Airside vehicle drivers operating on the maneuvering area, are provided with a moving map displaying airport layout, vehicle ownership position and surrounding traffic as received from the airport surveillance system. Additionally, the vehicle on-board equipment raises visual and audio alerts to the driver in case of area infringement or detected conflicting traffic. Alerts are generated by the on-board system or by a centralized server fed by A-SMGCS surveillance data with an uplink to the vehicle.



4 No suitable taxiway!

5 Runway too short!

4 Traffic on runway!

1 THL

3 Traffic Traffic Traffic!

1 REL

6 No pushback clearance!

6 Route deviation!

On-board safety nets  
for pilots and vehicle drivers

USE

# EVEN SAFER AIRPORT OPERATIONS



## 4 Traffic Alerts for Pilots in Airport Operations (SURF ITA +)

Based on ADS-B receptions, the on-board system detects conflicting aircraft during take-off, landing and surface operations to alert the pilot.

## 5 Enhanced Airport Safety Support Tools for Controllers (new CMAC-CATC)

Based on airport surveillance data and electronic environment integrating ATC clearances and local procedures, the ATC system detects more conflicting situations during take-off, landing and surface operations to alert the controller.

## 6 Conformance Monitoring Alerts for Pilots (CMAP)

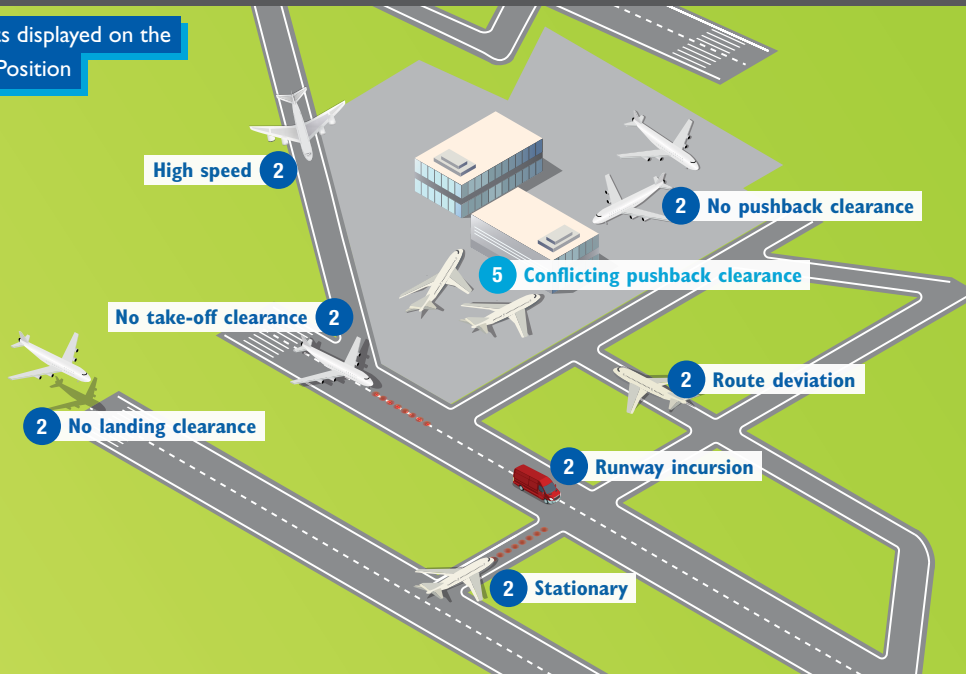
Based on aircraft ownership position, local airport procedures and given ATC clearances, the on-board system detects non conformances to airport procedures or to delivered ATC clearances during surface operations. Major benefits are in low visibility conditions.

## 7 Safety Support Tools for Avoiding Runway Excursions (STARe)

On any airport where adverse weather conditions frequently justify this solution, Pilots, Airport Operators and Tower Controllers are provided with indications related to the runway contamination status and braking efficiency. These indications can be consolidated based on multiple input data, including on-board systems. The pilot and tower controller can also be alerted when an arriving aircraft follows a non-nominal trajectory with a risk of runway excursion.

## CASES

Alerts displayed on the Controller Working Position



Flight safety is aviation's top priority. Far from being a constraint, it is a factor of development. Supporting even safer airport operations, the SESAR programme works on several complementary Solutions: safety barriers to mitigate the risks of runway incursion, runway excursion and more generally the risk of incident and accident involving aircraft in the airport environment.



	SESAR Solution	End-user			Input Data	Operations			Operating environment	Time scale
		Pilot	Vehicle Driver	Tower Controller		Runway	Taxiways	Apron		
<b>SESAR 1</b>	RunWay Status Lights <b>(RWSL)</b>	✓	✓		- Advanced –Surface - Movement Guidance - Control System (A-SMGCS) - Surveillance	✓			A-SMGCS airport	Implemented at Paris-CDG airport in 2016 Candidate for Common Project 2 (CP 2)
	Conformance Monitoring Alerts and detection of Conflicting ATC Clearances <b>(CMAC-CATC)</b>			✓	- A-SMGCS Surveillance - Electronic stripping - Airport procedures	✓	✓	✓		Pilot Common Project (PCP)
	Enhanced Situational Awareness and Airport Safety Nets for vehicle drivers <b>(AVDR)</b>		✓		A-SMGCS Surveillance	✓	✓			Candidate for Common Project 2 (CP 2)
<b>SESAR 2020</b> (Industrial Research: project SAFE)	Enhanced airport safety support tools for controllers <b>(new CMAC-CATC)</b>			✓	- A-SMGCS surveillance or ADS-B, Video surveillance - Electronic stripping - Airport procedures	✓	✓	✓	Small / Medium / Major airports	2018 & 2019: 7 Real Time Simulations (RTS) in several airport environments
	Conformance Monitoring Alerts for Pilots <b>(CMAP)</b>	✓			- Given ATC Clearances - Airport procedures - Airport Moving Map	✓	✓	✓		2018: 2 RTS for regional and business flights.
	Traffic Alerts for Pilots in Airport Operations <b>(SURF ITA +)</b>	✓			- Automatic Dependent Surveillance-Broadcast (ADS-B)	✓	✓			2018 & 2019: 1 Fast Time Simulation, 2 RTS and 1 flight trial for business and commercial flights.
	Safety Support Tools for Avoiding Runway Excursions <b>(STARe)</b>	✓		✓	- Aircraft sensors - Runway Sensors - Airep (Air report) - Weather data - Surveillance data	✓				2018: Fast Time Simulations, validation workshops and flight trials

**The SESAR programme**, the technological pillar of the construction of the Single European Sky, has as its objective the modernisation of the air traffic management (ATM) system. Established in 2007 as a public-private partnership, the SESAR Joint Undertaking (SESAR JU) pools the knowledge and resources of the aviation community. The SESAR solutions are ready to be deployed and will improve ATM performance in Europe. SESAR 1 was the initial development phase (2009-2016). SESAR 2020 is the second phase, extended until 2014. All SESAR projects benefit from an European cofunding.

### SESAR 2020 Project



This project has received funding from the SESAR Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement 734139.

