



# SESAR 2020 – Wave 1 Solutions



Founding Members



# High-performing airport operations





## Solution PJ.03a-01 – Enhanced Guidance Assistance to Aircraft and Vehicles on the Airport Surface Combined with Routing

ENAV, AIRBUS, ANSCR (B4), DFS, ACG (COOPANS), LEONARDO, MUC / ZRH (SEAC2020), INDRA, DASSAULT AVIATION, DSNA, EUROCONTROL, FREQUENTIS, SINTEF (NATMIG), HC (FSP), NLR (AT-ONE), THALES AVIONICS, THALES AIR SYSTEMS



### Solution Scope:

The solution is intended to **optimize airport resources allocation** with more efficient A-SMGCS Routing and Planning functions aiming also to avoid potential conflicting situations. That will be particularly true during **low visibility conditions**. In such conditions **low-visibility procedures** are in place and Flight Crew are provided with the Airfield Ground Lighting service switching on / off taxiway centreline lights in accordance with the taxi clearances issued by Tower Controllers.

**Smoother and more predictable traffic flows** during low-visibility conditions are further expected to result from the application of Virtual Stop Bars for so-called Dynamic Virtual Block Control. The integration with airport sequencing tools as DMAN is also expected to lead to more predictable surface traffic operations.

The exchange of information between ATC and vehicles/aircraft will be improved with the use of airport data link and other guidance means in all weather conditions. Both pilots and vehicle drivers will be provided with a display (Airport Moving Map) of the airport layout including taxiways, runways, fixed obstacles, status of stop bars and virtual stop bars, the own ship position as well as the taxi clearance as issued by ATC.

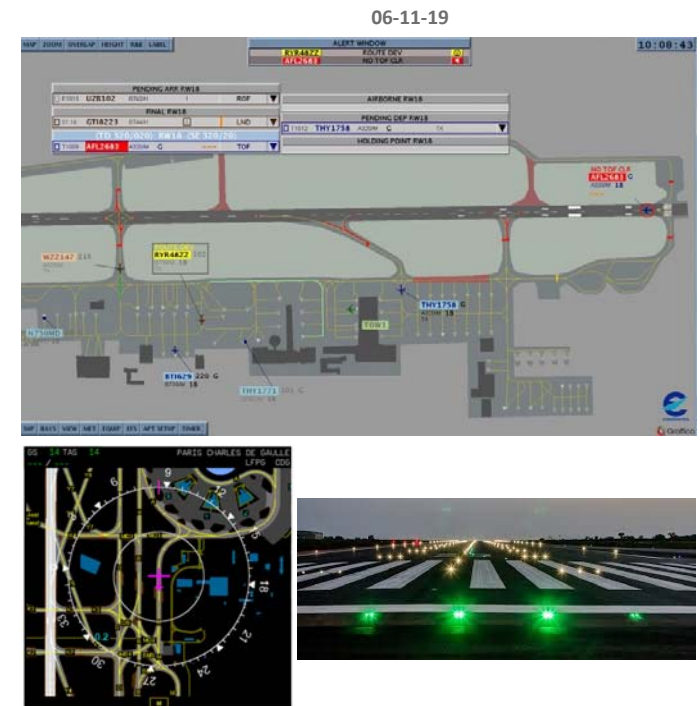
### Supporting Solution Exercises and dates:

|                   |              |     |    |                   |                          |                      |
|-------------------|--------------|-----|----|-------------------|--------------------------|----------------------|
| ✓ EXE.03a-01.010  | (Budapest)   | RTS | V2 | (EUROCONTROL)     | 16-04-2018 to 27-04-2018 | in Brétigny-sur-Orge |
| ✓ EXE.03a-01.020  | (Nice)       | RTS | V2 | (DSNA)            | 16-10-2018 to 29-10-2018 | in Toulouse          |
| ✓ EXE.03a-01.030  | (Milan)      | RTS | V2 | (ENAV)            | 06-06-2018 to 08-06-2018 | in Rome-Ciampino     |
| ✓ EXE.03a-01.040  | (Sofia)      | RTS | V2 | (LEONARDO)        | 15-10-2018 to 26-10-2018 | in Sofia             |
| ✓ EXE.03a-01.050a | (Milan)      | RTS | V2 | (NLR)             | 12-12-2017 to 14-12-2017 | in Amsterdam         |
| ✓ EXE.03a-01.050b | (Milan)      | RTS | V2 | (NLR)             | 14-05-2018 to 18-05-2018 | in Amsterdam & Turin |
| ✓ EXE.03a-01.060  | (Düsseldorf) | RTS | V2 | (DFS)             | 17-09-2018 to 20-09-2018 | in Langen            |
| ✓ EXE.03a-01.070  | (Prague)     | RTS | V2 | (EUROCONTROL)     | 17-10-2018 to 30-10-2018 | in Brétigny-sur-Orge |
| ✓ EXE.03a-01.080  | (Paris CDG)  | RTS | V2 | (THALES AVIONICS) | 11-04-2018 to 13-04-2018 | in Toulouse          |
| ✓ EXE.03a-01.090  | (Nice)       | FTS | V2 | (DSNA)            | 04-06-2018 to 08-06-2018 | in Toulouse          |

### Intended Benefits:

- Improve the predictability of surface ground operations with more accurate taxi times.
- Increase the situational awareness of all relevant airport stakeholders in all weather conditions.
- Limit the effect of adverse weather conditions on nominal capacity and improve efficiency and predictability of surface operations.

**Predictability, Safety, Environmental sustainability, Capacity**  
Human performance, Security, Resilience





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

HONEYWELL



### 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, DFMG 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



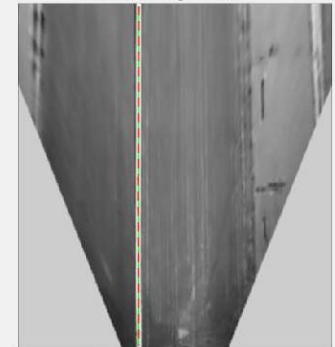
08-11-19



Aircraft distance and angle to line:  
 $d = 2.35 \text{ m}$ ,  $\theta = -0.1 \text{ deg}$



green = straight line  
red = not straight line



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.03a-04 – Enhanced Visual Operations

HONEYWELL, DASSAULT,  
THALES AVIONICS,  
LEONARDO



### 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 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.

### Supporting Solution Exercises and dates:

- EXE.03a-04.01 FT/FTS 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

FT - Flight trial

FTS – Fast Time Simulation



22-11-19



### 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-09 – Surface operations by Remotely Piloted Aircraft Systems (RPAS)

ENAV, ENAIRE, LEONARDO,  
THALES AIR SYSTEMS,  
AIRTEL (NATMIG),  
DLR (AT-ONE)



### Solution Scope:

The solution facilitates the operation of RPAS at airports and their integration into an environment which is dominated by manned aviation. To the maximum extent possible, RPAS will have to comply with the existing rules and regulations. The solution includes the particular requirements of remotely piloted operations, and will describe their specificities with respect to the manned operations, providing operational requirements for technological developments that could mitigate them.

### Supporting Solution Exercises and dates:

|                  |        |                   |                          |                 |
|------------------|--------|-------------------|--------------------------|-----------------|
| ✓ EXE.03a-09.001 | Gaming | V1 (ENAV)         | 11-12-2017 to 15-12-2017 | in Naples       |
| ✓ EXE.03a-09.003 | Gaming | V1 (AT-ONE (DLR)) | 01-10-2017 to 30-11-2017 | in Cologne      |
| • EXE.03a-09.002 | RTS    | V2 (ENAV)         | 13-05-2019 to 16-05-2019 | in Rome         |
| • EXE.03a-09.004 | RTS    | V2 (ENAIRE)       | 01-01-2019 to 29-03-2019 | in Madrid       |
| • EXE.03a-09.005 | RTS    | V2 (AT-ONE (DLR)) | 01-03-2019 to 29-03-2019 | in Braunschweig |



### Intended Benefits:

Improve the access for Remotely Piloted Aircraft Systems (RPAS) in an environment characterized mainly by manned aviation.

**Safety, Human performance, Access and Equity, Interoperability, Security**