



WORLD ATM CONGRESS – SJU WALKING TOURS



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March 7, 2018

AUGMENTED APPROACHES TO LAND 2

SESAR VERY LARGE SCALE DEMONSTRATION PROJECT



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Demonstration Project Objectives



Demonstration of benefits of augmented vision and GNSS augmented navigation solutions:

- Improved access
- Reduced environmental impact
- To all types of airport
- For all types of Airspace users

Bridging gap between research and deployment.

Joint Effort of Key Stakeholders

Domain	Consortium Member
Airspace Users	EBAA
	Lufthansa
	Ryanair
Air Navigation Service Providers	DFS
	DSNA
	Skyguide
	Belgocontrol
Airframe Manufacturers	Airbus
	ATR
	Dassault Aviation
Avionics Suppliers	Honeywell
Procedure Design	DLR

Lead by

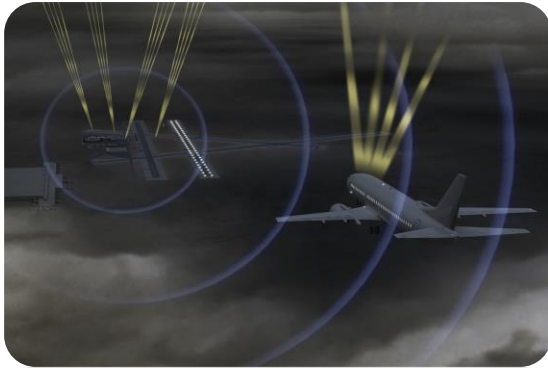
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Supported by Eurocontrol.

Project Execution: Feb 2018 – Jan 2020.

Overview of Technical Work-Packages



WP2: GBAS CAT II
with CAT I airborne and
ground equipment

Led by Honeywell

- Enabling lower decision heights to CAT II minima (DH 100ft);
- Addresses hubs and medium size airports

Airports:

Bremen, Newark

Trials:

Lufthansa, Ryanair

Q2- Q3 2019

> 150 approaches
planned with
mainline revenue
aircraft.

With **Honeywell**
GBAS Ground
station.



WP3: EFVS to Land

Led by Dassault

- Operational credit down to 300 meters RVR in non- CAT II/III airports;
- Addresses medium, small, very small size airports

Airports:

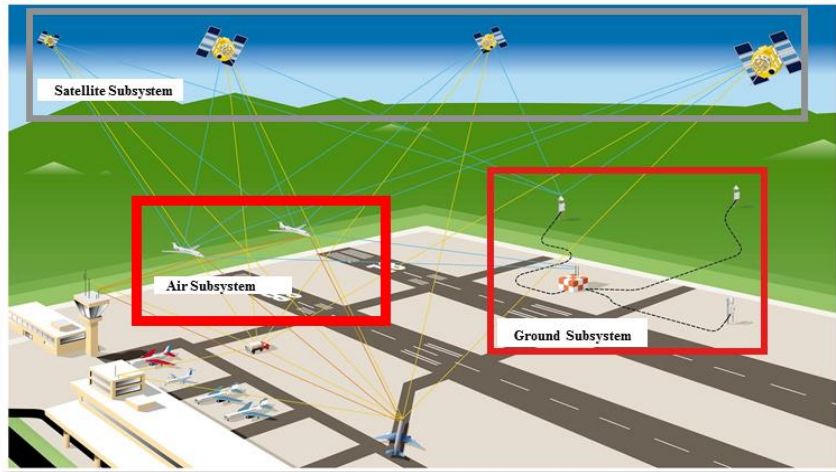
4 medium/small airports in France,
Belgium, Switzerland.

Trials:

Dassault, ATR

Q3 2018 – Q1 2019

GBAS CAT II with CAT I Equipment - Advanced Operations



GBAS Technology: system overview graphics (left), ground subsystem Honeywell GBAS tower (right).

GBAS Ground Station – SLS 4000 Block IIS - FAA fully approved Block IIS (October 2015).

By integrating the GBAS ground station with an SBAS receiver, GBAS can take advantage of SBAS's independent anomalous ionosphere monitoring -> lower protection levels during low iono activity, which then enables CAT 2 operations.

The required integrity is attained at all times.

Procedures:

- RNP to GLS CAT II: prepared by DFS in Bremen.

Approvals:

- Honeywell to get System Design Approval Block IIS ground system from German authority (BAF)"
- Lufthansa and Ryanair to get **operational approval** from their authorities (LBA, IAA).
- Airbus will work towards operational approval for A 320 family.

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GBAS CAT II demonstrations in Europe with GBAS CAT I equipment.

GBAS CAT II with CAT I Equipment - Advanced Operations

More than 150 demonstration flights planned by Lufthansa and Ryanair.

Demonstrations will be performed in real environment, in Bremen, potentially in Newark.

Benefits will be evaluated (incl. ILS vs GLS) and promoted to stakeholders.

Lufthansa will execute demo flights with Boeing 747-8 (Newark) and potentially with Airbus 320 family (Bremen).

Ryanair will execute demo flights with Boeing 737 NG (Bremen).



Lufthansa B747-8 aircraft



Ryanair Boeing 737 NG

EFVS Advanced Operations

- **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)



EFVS Advanced Operations - Demonstrations

- **4 aerodromes operators** from 3 different countries partners of the project
 - *Le Bourget – Antwerp - Payern - Périgueux -*
 - **+ ANSP/ national authorities** in the loop
- Demo flights performed by **3 AIR operators** from **Regional** (ATR) or **Bizav** (Dassault)
- **EC** and **EASA** EFVS team (rulemaking and certification authorities) informed



Falcon 7X/8X



ATR 42/72-600

AAL2 Summary

- **Two SESAR technologies** considered in this project, when combined with GNSS (either LPV or GBAS), will **enable the access to a large diversity of airports in low visibility and/or low ceiling conditions.**
 - GBAS CAT II with CAT I equipment
 - EFVS to Land
- **A very large partnership of aviation stakeholders** has been brought together for this project.
 - Many already involved in the former SESAR Large Scale Demonstration project AAL (Single European Sky Award 2017 winning project for Innovation-Technology).
- **Altogether this VLD project will enjoy the involvement of very relevant stakeholders**, giving the project high credibility of successful execution of the demonstrations, achievable results, good external communication, and collaboration.



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Clear Objectives: Added Value and Bridge towards Deployment

Many thanks to SESAR for enabling the
AAL2 Very Large Scale Demonstrations Project.



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WAC, Madrid – March 2018

THANK YOU

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This project has received funding from the SESAR Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement 783112



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