



# VOICE

Reduced separations and improved efficiency based on Vhf cOmmuniCations over leo satEllites

## Satellite-based VHF communications

Seamless oceanic operations for airlines using satellite-based VHF communications, without any modification to current VHF on-board equipment.

Plans are underway by SESAR 3 Joint Undertaking members and partners to demonstrate the feasibility of using low-orbit satellites to provide VHF (Very-High Frequency) voice and data communications to manage aircraft in oceanic regions of the world. The project aims to show how space-based VHF communications in combination with surveillance technologies can help optimise air traffic while reducing the carbon footprint and maintaining safety levels.

This is where the SESAR 3 JU large-scale demonstration, VOICE ("Reduced separations and improved efficiency based on Vhf cOmmuniCations over leo satEllites), comes in. Over the next year, the partners will demonstrate how Air Traffic Management (ATM) can benefit from low earth orbit satellites – a category of satellites which is low

cost and requires the lowest amount of energy for placement, while providing high quality of service.

The provision of satellite-based VHF voice and data communications between aircraft and controllers, in addition to space-based ADS-B surveillance, could possibly lead to a reduction in the current separation minima between aircraft in oceanic airspace, whilst optimising air traffic, increasing airspace capacity and reducing CO2 emissions without compromising safety.

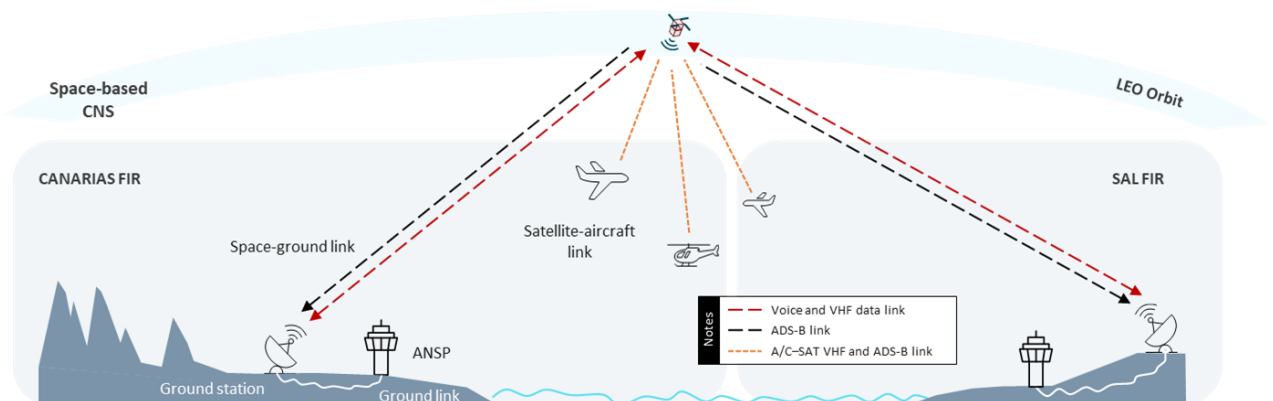
This innovative project is being jointly conducted by the consortium members:

- Indra, Spanish leading global technology and consulting company;
- Enaire, the Spanish air navigation and aeronautical information provider;

- Eurocontrol, supporting European aviation;
- Gomspace A/S and Gomspace Luxembourg, manufacturers and suppliers of satellite-based solutions.

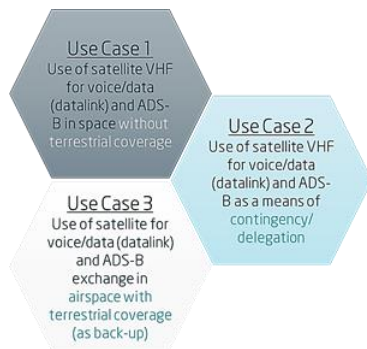
**VOICE will contribute to the following key principles, in line with European ATM Master Plan 2020:**

- Defragmentation of service provision
- Interoperability
- Sharing of infrastructure
- Increase Safety
- Increase Capacity
- Scalability
- Robustness

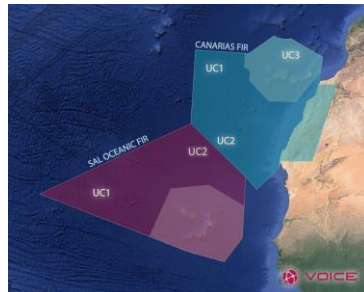


In order to demonstrate this new concept, VOICE project will perform some cross-border operations between adjacent Flight Information Region (FIR) belonging to different countries, with air traffic services provided by different Air Navigation Service Providers (ANSP). Demonstration will cover operations in CANARIAS FIR and SAL FIR with air traffic controllers communicating in real time with aircraft at distances bigger than 800NM.

Demonstration exercises will use these satellite-based Communication and Surveillance technologies as support of the feasibility of the Air Traffic Management Data Service Provider (ADSP) concept by permitting controllers sited far away of the airspace where a flight is flying to provide VHF communication services. The following Use Cases will be studied within the demonstration activities:



The main goal of these exercises is to demonstrate the advantages of having satellite-based VHF voice and data communications



between pilots and controllers in oceanic airspace. The presence of these technologies could lead to an increase in safety as well as an increase in capacity in these oceanic regions. Besides, it will be demonstrated the ability to have contingency measures in case of loss of communications with the controller of a specific area, this measure being the transfer of traffic to a collateral air traffic controller.

The project partners are hopeful that the demonstrations will not only show the feasibility of using low-orbit satellites in these three scenarios but that their findings will be used by standardisation bodies working on satellite-based VHF.

Work with entities is a key aspect for VOICE project as they will use the project results and work on satellite-based VHF concept to provide their conclusions as inputs for the World Radiocommunication Conference by end November 2023 (WRC23), where the frequency allocation, technical regulations and operational procedures will be discussed.

Summarising, VOICE project will demonstrate the viability of providing satellite-based VHF Communication services (voice and data) in areas where the current ground infrastructure is not available due to geographical constraints.



**The demonstration will confirm potential benefits in the following key performance areas:**

- Safety
- Capacity
- Operational efficiency
- Cost efficiency
- Environment

Also, it will demonstrate that a more efficient ATM service is feasible, blurring the border between oceanic/remote and continental areas and allowing a new revolutionary global operational framework.

The satellite-based infrastructure used by VOICE project is interoperable with current aircraft equipment and it can be deployed in a short period of time, providing seamless and full transparency in cockpit operations with no need to take the fleet out of service for upgrades and without the need of pilot training.

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 <p><b>Safety</b></p> <p>The improvement of surveillance through provision of high-quality data and communication will increase ATC and flight crew's perception of safety.</p>	 <p><b>Capacity</b></p> <p>Thanks to the better VHF communications between controller and pilot, the minimum spacing between tracks can be reduced, which increases the capacity in oceanic and remote areas.</p>	 <p><b>Operational efficiency</b></p> <p>Other advantage of better communications in those airspaces will be that flight routes will be optimised and new airways could be designed. This redesign will enable aircrafts to fly at optimum altitudes, which will improve fuel efficiency.</p>	 <p><b>Cost efficiency</b></p> <p>Reducing separation minima will enable more flights, reducing the need of infrastructure investment and maintenance costs. Besides that, the option to choose better routes will decrease flying time and/or fuel, which will reduce cost of tickets.</p>	 <p><b>Environment</b></p> <p>Using better routes will reduce the average CO2 emissions per flight.</p>
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