SATERA

Space-based composite **A**DS-B and multila**T**eration syst**E**m validation th**R**ough scalable simul**A**tions

MORE INFO

www.satera-sesar.eu

www.youtube.com/@SATERA-SESAR

www.linkedin.com/company/satera-sesar

https://x.com/SATERA_SESAR

Exploratory Research

July 2024-December 2026

SATERA proposes a space-based aeronautical surveillance system that utilizes small satellites in low Earth orbit to enhance air traffic safety and security in remote regions, such as oceanic routes

MAIN AIMS

SATERA will design and validate a GNSS-independent air traffic control (ATC) surveillance system, establishing integrity parameters for space-based ADS-B data to improve air traffic safety and security.

SATERA aims to be a key enabler in optimizing air operations, particularly for long-haul flights over oceanic and uninhabited areas, by reducing greenhouse gas emissions, increasing airspace capacity, and enhancing safety and security.

SATERA aspires to strengthen European airspace sovereignty by promoting the provision of critical air traffic management (ATM) services through European companies. This initiative will enhance Europe's industrial leadership in ATC by leveraging satellite technology and accelerating the deployment of space-based ADS-B systems across the continent.

ABSTRACT

Automatic Dependent Surveillance-Broadcast (ADS-B) is a surveillance technology in which airborne equipment automatically broadcasts aircraft location to ground stations.

ADS-B is one of the pillars of state-of-the-art Air Traffic Control (ATC) systems and today it is considered as the future air traffic surveillance system.

The extension of ADS-B system to cover oceanic and uninhabited areas using spaceborne receivers from Low Earth Orbit (LEO) constellations will enable safer and greener long-haul air operations.

Unfortunately, it has some drawbacks related to the use of Global Navigation Satellite Systems (GNSS) data and the use of open protocols, and usually a secondary independent surveillance system is needed.

Conventional ground-based independent surveillance systems such as primary or secondary radars are rarely available over oceanic and uninhabited areas.

For this reason:

SATERA aims to formulate and validate the concept of a space-based ADS-B signals multilateration (MLAT) system leveraging a constellation of LEO satellites.

SATERA will combine time-of-arrival (ToA), angle-of-arrival (AoA) and frequency-of-arrival (FoA) measurements, to localize the aircraft from the Space and to check the ADS-B positional data with these new ones.

SATERA will develop architectures for the receiving systems onboard the satellite, explore telecommunication solutions for the inter satellite link (ISL) network and develop robust MLAT positioning algorithms. Moreover, SATERA will be designed to avoid common GNSS failure points.

This project receives funding from the SESAR 3 Joint Undertaking under grant agreement N° 101164313 under European Union's Horizon Europe research and innovation programme.
Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or SESAR 3 JU. Neither the European Union nor the granting authority can be held responsible for them.