CISUC
CENTRO DE INFORMÁTICA E SISTEMAS DA UNIVERSIDADE DE COIMBRA

SATERA

Space-based composite Ads-b and multilaTeration systEm validation thRough scalable simulAtions

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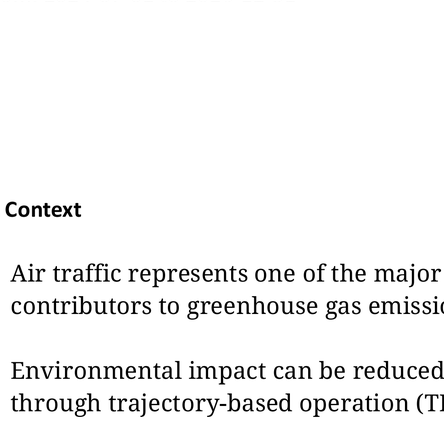
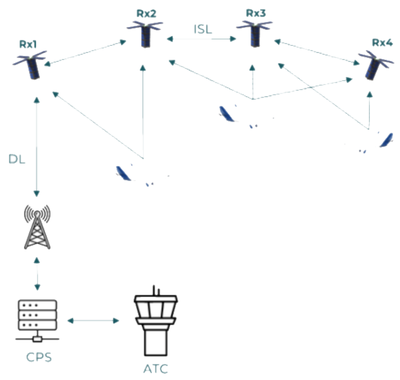
1. Context

- Air traffic represents one of the major contributors to greenhouse gas emissions
- Environmental impact can be reduced through trajectory-based operation (TBO)
- Existing systems for aircraft tracking are ground-based: cannot cover oceanic and uninhabited areas
- Moving to a space-based paradigm will overcome this limitation
- Low-Eart Orbit (LEO) satellite constellation can be used for this purpose
- Leading to better coverage, optimized trajectories, lower consumption and gas emissions



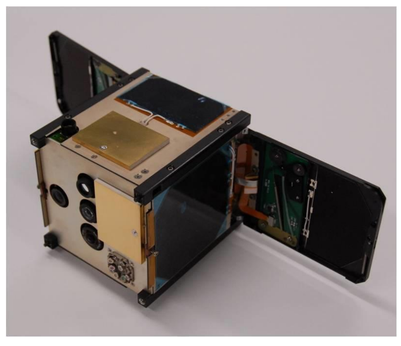
2. Objectives

- Design, develop and proof a space-based enhanced multilateration (E-MLAT) + Automatic Dependent Surveillance-Broadcast (ADS-B) system
- Ensure the system to achieve accurate and trusted tracking
- Develop and validate a communication network architecture that combines space and ground-based stations
- Design and evaluate a position estimation and tracking system for space-based ADS-B systems
- Assemble a simulation of the constellation, network and tracking systems
- Validate the TRL2 maturity concept



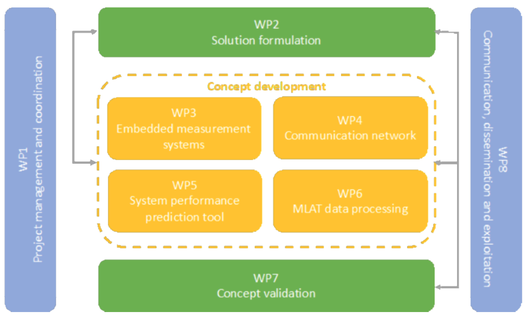
3. Challenges

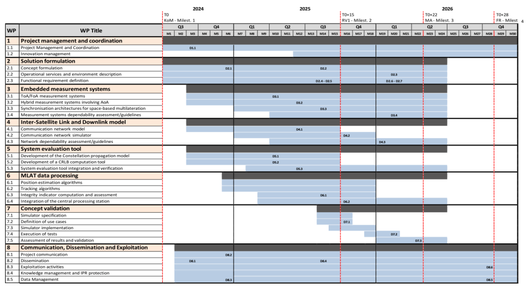
- Ensure high precision position tracking
- Design reliable tracking system capable of withstanding external perturbation
- Combine data from E-MLAT and ADS-B systems
- Tolerate adverse conditions associated to e xtraterrestrial deployments (e.g., cosmic ra diation)



4. Project Structure

- International project composed by 6 partners from 4 different countries
- High-tech research with direct application in the aviation and aerospace field
- 8 Work Packages, from concept formulation to measurement and evaluation
- WP1: Project management and coordination
- WP2: Solution formulation
- WP3: Embedded measurement systems
- WP4: Communication network
- WP5: System performance prediction tool
- WP6: MLAT data processing
- WP7: Concept validation
- WP8: Communication, Dissemination and Exploitation





5. Expected Outcomes

- Environment: The solution will have no impact or a positive impact on aviation environmental footprint
- Capacity: Contribute to the airspace capacity, by eliminating bottlenecks, among others
- Cost-.efficiency: Investment costs should be justified in relation to the obtained dividends
- Safety: The solution will maintain at least the same level of safety as current racking systems
- Security: The solution will maintain at least the same level of security as current tracking systems

6. Wider impacts

- Enhancing European industrial leadership and sovereignty
- Boosting the deployment of space-based ADS-B

Consortium partners

UNIVERSITAT POLITÈCNICA DE VALÈNCIA · UNIVERSIDADE DE COIMBRA · TOR VERGATA UNIVERSITÀ DEGLI STUDI DI ROMA · sesar JOINT UNDERTAKING · ENAIRE · Collins Aerospace An RTX Business · INPE

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