

Project Backgrounder

Project: VARIANT - Validation of AiRspace Integration Applications and New Technologies

Overview: VARIANT is a multi-disciplinary validation program focused on safely integrating Innovative Air Mobility (IAM) operations near vertiports into existing Air Traffic Management (ATM) system. The initiative produces validated operational data to inform standards and regulatory frameworks, and demonstrates interoperable solutions for remotely supervised and remotely piloted IAM aircraft operating alongside conventional traffic.

Funding: Funded by the Subdirectorate General for Technological Innovation of the Madrid regional Government under a public solicitation from the regional Ministry of Education.

Timeframe: Jan 2026 - Dec 2028

Partnership: Boeing Airspace Spain, ANZEN Engineering, AI Methods and Qcentroid. Other contributors include Enaire, CRIDA and UC3M and UPM Universities. Sponsorship from SkyGrid and Wisk.

Objectives and research areas:

1. Advance **Ground-based IAM Integration Services**

Vertiport Coordination

- A. *Automated vertiport access services*
- B. *Contingency management solutions*
- C. *Localized weather and surveillance data*

Micro-Weather

- A. *Weather models benchmarking*
- B. *Advanced local sensors (incl. LIDAR)*
- C. *IAM digital weather service*
- D. *Operational impact analysis*

Traffic Surveillance

- A. *Radars and MLAT assessment*
- B. *Ground Based Traffic Surveillance service*
- C. *Traffic information exchange interfaces*

GNSS performance monitoring

- A. *GNSS underperformance impact assessment*
- B. *Spoofing and jamming detection service*

2. Assess **safety and (cyber) security** hazards affecting vertiport operations and associated services.

3. Assess usability of **Artificial Intelligence** and **Quantum Computing** technologies for enabling IAM operations.

4. Validate designs through actual **Physical Sensors** deployment and **High-fidelity Simulation Infrastructure**