



Implementing multi-USSP architecture in U-space: Operational insights from Spain and Italy

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15th SESAR Innovation Days, 2025
Dec. 02nd, 2025

A quadcopter drone is positioned on a paved surface in the foreground. In the background, several large satellite dishes are visible against a dramatic sunset sky with orange and yellow clouds. A red and white striped barrier with a chain is also present. The text "Ensuring routine commercial drone operations in Europe by 2026" is overlaid in white.

Ensuring routine commercial
drone operations in Europe by
2026

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What is U-space?

‘**U-space**’ digital and automated services that enable protected, efficient, and secure access to the same airspace for a large number of drones

Who makes this possible?

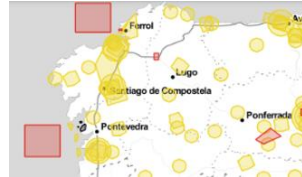
Two new agents:

- **U-space Service Providers (USSP)**

1. network identification service



2. geo-awareness service



3. traffic information service



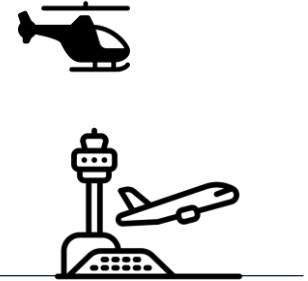
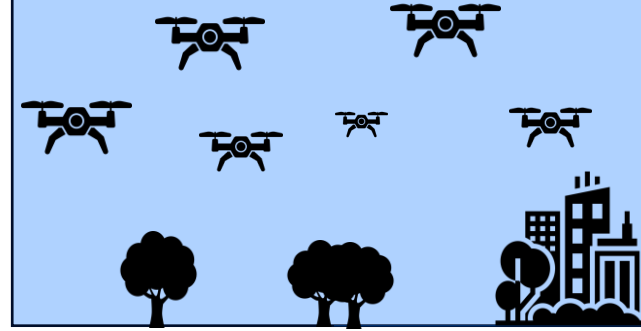
4. UAS flight authorization service



5. Conformance monitoring service



U-space Airspace



- **Common Information Service Providers (CISP)**

1. UAS Geographical Zones



2. Static & Dynamic Restrictions

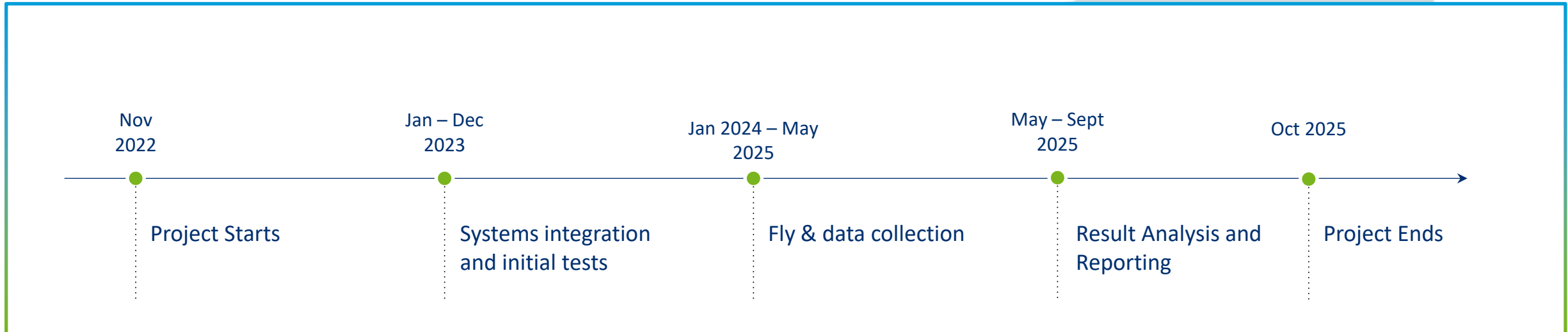


3. Manned tracks in controlled airspace



4. Dynamic Airspace Reconfiguration (DAR)

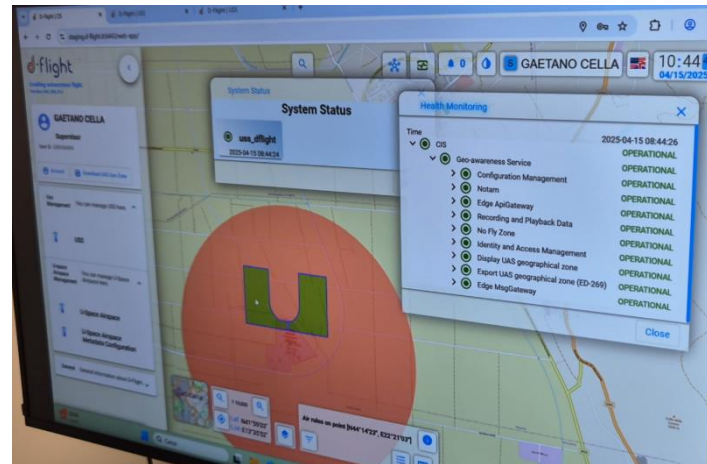
Three countries bridging the gap from research to implementation



U-space services implemented up to TRL 8 maturity



Over 1,000 flights successfully executed using U-space services



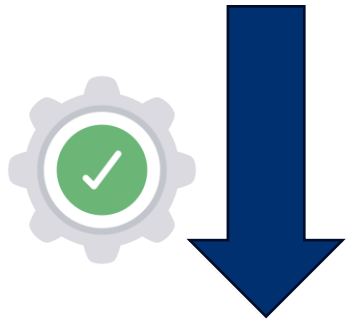
1 Common Information Service Provider (CISP) and 1 U-space Service Provider (USSP) **certified**
And 1 CISP and 1 USSP **in the process of becoming certified**



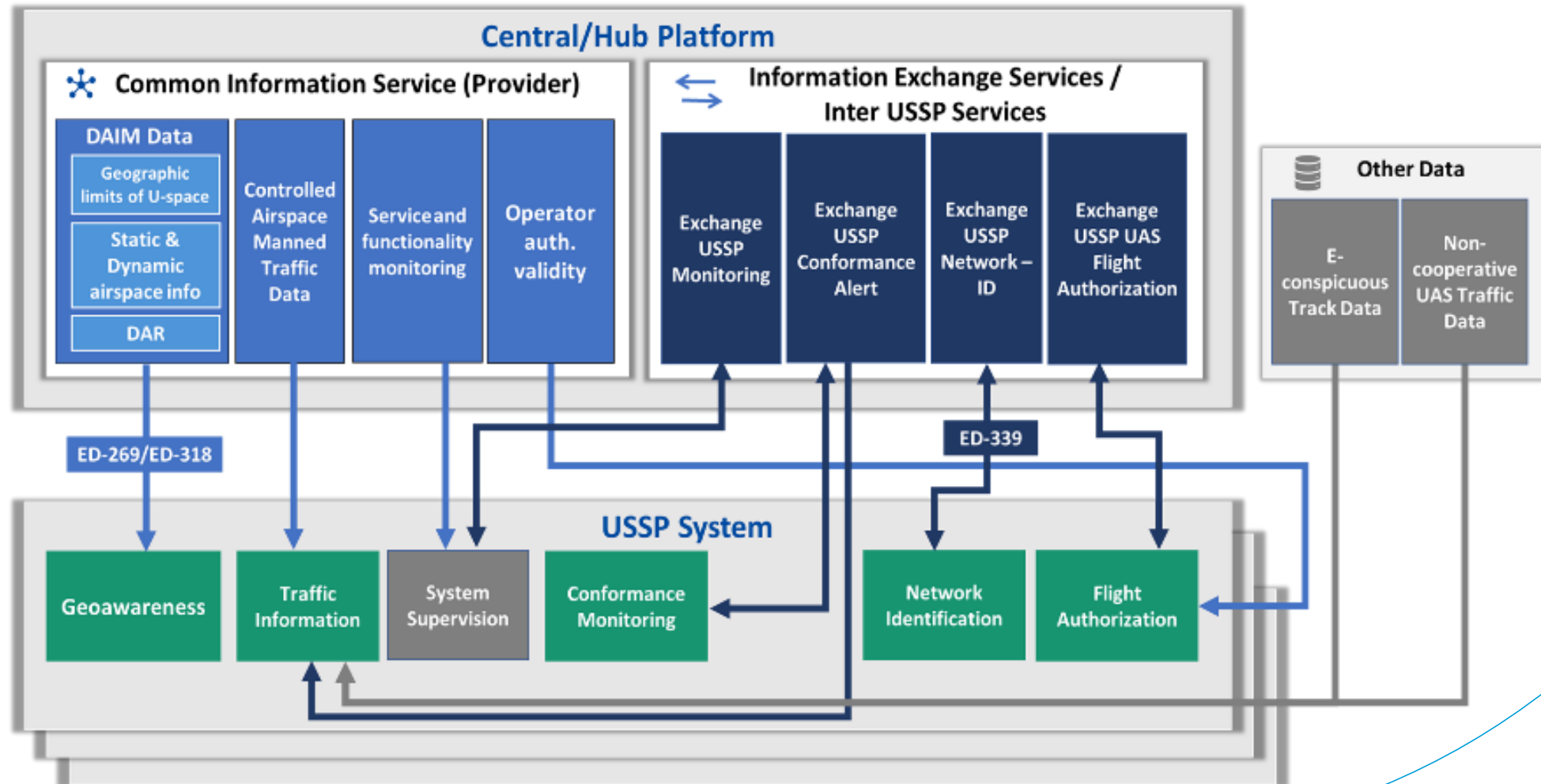
The only **multi-USSP U-space ecosystem with 4 USSPs** communicating indirectly through a centralized platform

U-space architecture description (multi-USSP environment)

Multi-USSP architecture with a single-CISP and indirect USSP communication through a centralised platform



With one single integration, a USSP receive all the U-space information!

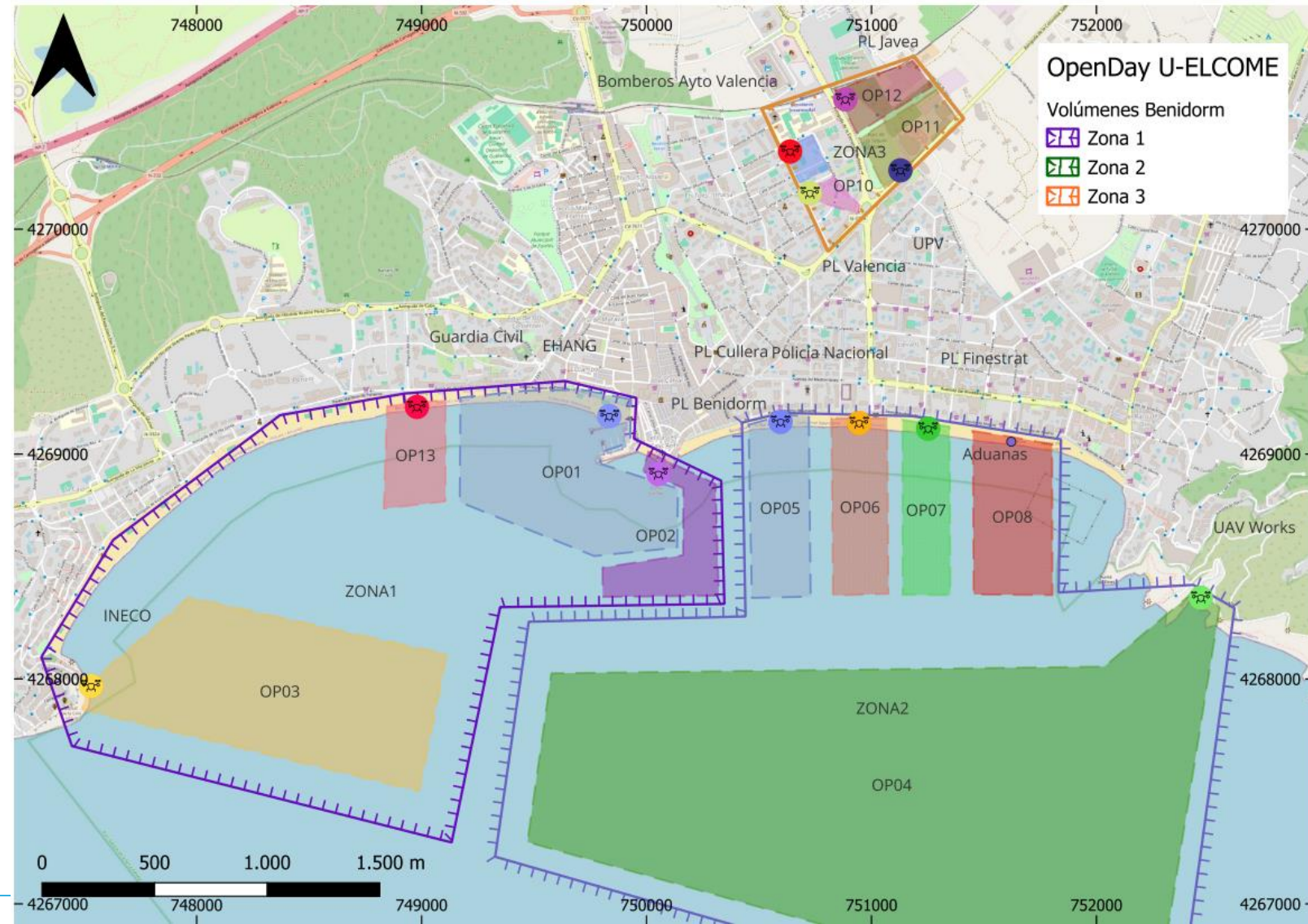




Spanish Cluster multi-USSPs exercise (Benidorm Demo Day 27/02/2025)

Most simultaneous U-space operations

- 14 simultaneous UAS operations supported by U-space services
- 3 different USSP communicating through a ENAIRE centralized platform (indirect communication)
- 1 CISP; manned aviation detected
- Emergencies, surveillance and recreative use cases with UAS in U-space demonstrated

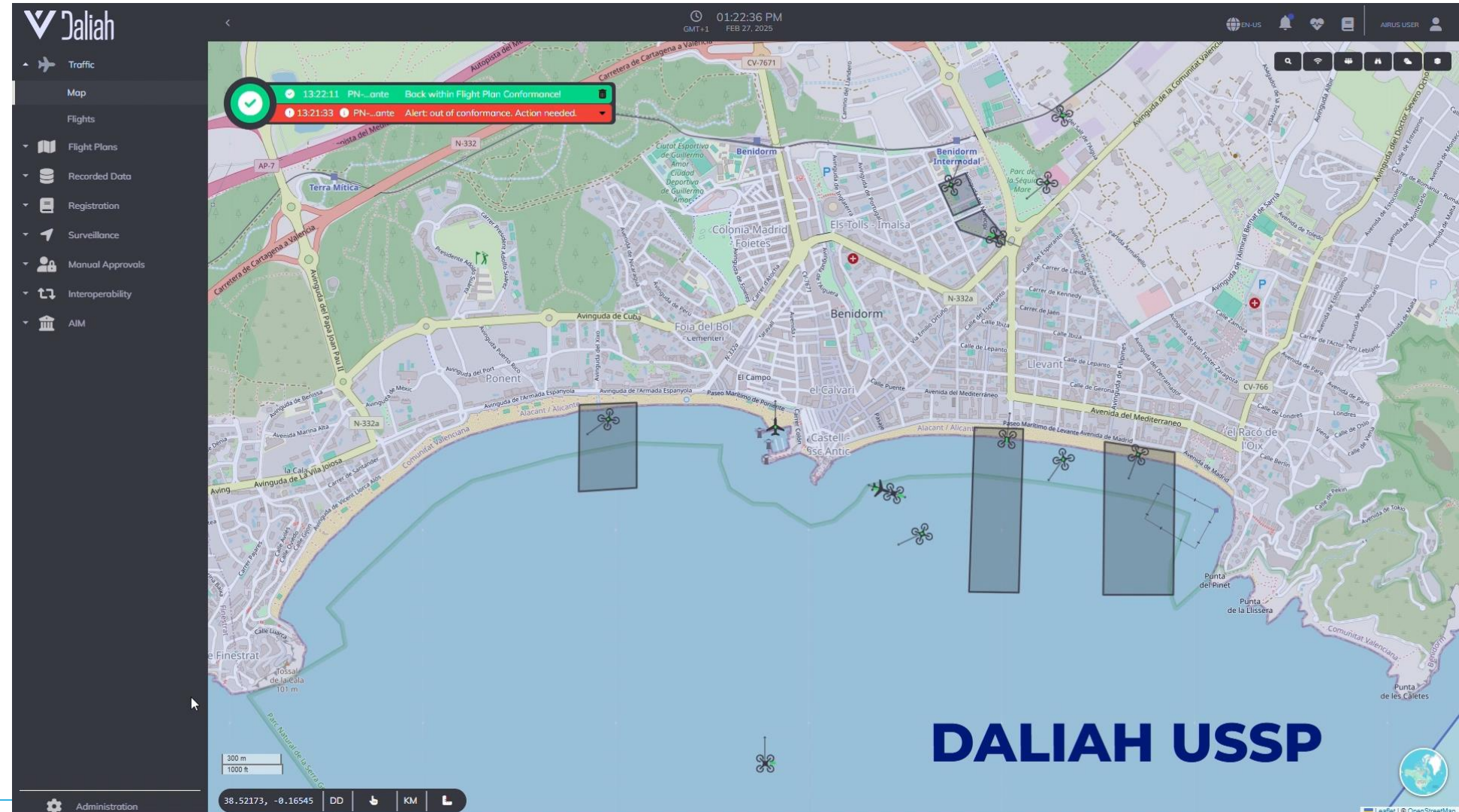




Spanish Cluster - multi-USSPs exercise (Benidorm Demo Day 27/02/2025)

**Real time
communication
between USSP**

**Possibility of
supervision of the
centralized info by
an Authority/ATCO**



Harmonization Task

- 1 CISP
- 2 USSP (SPA+ITA)
- 2 U-space
- DAR procedure
- Manned aviation detected

Validation Results & Outcomes

KPA	Results		
	<i>Performance Indicator</i>	<i>Spain</i>	<i>Italy</i>
Capacity	Maximum number of authorized U-plans	27	5
	Maximum number of active U-plans	14	5
Access & Equity	Maximum number of UAS operators per U-space airspace	13	2
	Authorisation approval rate	92.6%	100%
	Negotiation percentage (authorized U-plans withdrawn)	24.7%	0%
Safety	NRID reception ratio	93.6%	96.0%
	Percentage of flight time in non-conformance alarm	12.5%	3.4%
	Percentage of flight time in geozone violation alarm	5.4%	N.A
	Resolved non-conformance alarms	88.2%	100%
	Resolved geozone violation alarms	66.3%	N.A
Interoperability	USSP data exchange rate between U-space actors (Response time between USSP and UAS operators)	0.817 s	0.817 s
	Number of USSPs operating simultaneously	4	2
Human Performance	Situational Awareness	8.52/10	7/10
	Workload	3.35/10	3.8/10
	Adequacy of the human-machine interface	7.93/10	7.2/10

Future Challenges

Cybersecurity: As the number of connected systems, data exchanges, and external interfaces increases, it will require more robust authentication, encryption, and resilience against malicious attacks

Scalability: Complex U-space systems will demand optimized coordination mechanisms, dynamic load balancing, and more advanced data-sharing strategies to maintain low latency and reliability (SPATIO or RAXUS Projects)

Definition of standard operating procedures for non-nominal situations: for handling unexpected events such as communication failures, GNSS degradation, or emergency landings in a simple manner for UAS operators, regardless of the MS in which they operate

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Thank you!

