European Commission

sesar JOINT UNDERTAKING

EU Drone Days

Launch of the European Drone Strategy 2.0

SESAR U-space Showcase

Brussels, 29-30 November 2022

#EUDroneDays

Project partnership

AIRBUS

AT-One

B4 CONSORTIUM

COOPANS
REAL COOPERATION, REAL RESULTS

DFS Deutsche Flugsicherung

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LEONARDO

NATMIG

NATS

THALES

AURA Objectives

Lay the foundations for the integration of the new entrants in current and future air traffic environment, developing the required concept of operations and validating U-space services information exchanges with ATM systems

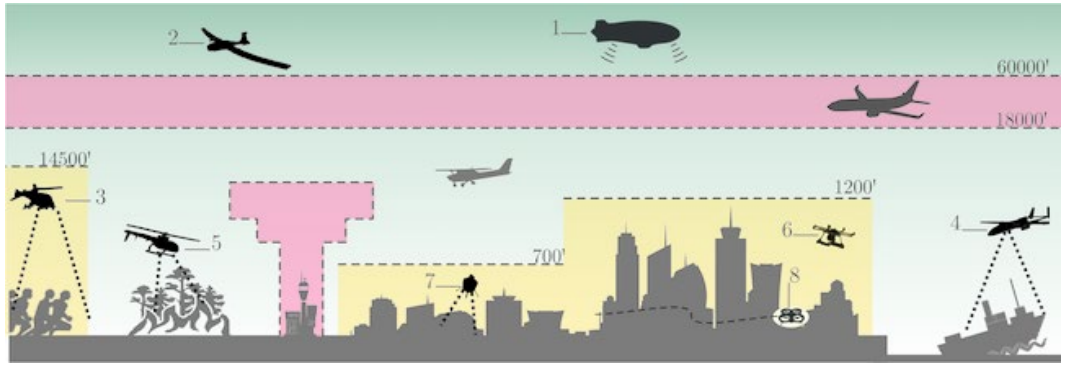
AURA project identifies the requirements for U-space information exchange with ATM through SWIM and validates a set of selected U-space services. It defines a novel Collaborative ATM-U-space Concept of Operations which introduces the dynamic use of airspace to ensure segregation between operations

AURA Solutions

Solution PJ.34-W3-01: Collaborative U-space – ATM Interface

Medium-term concept focused on the data exchange between U-space and ATM systems in terms of information to be shared.

Generation of a set of basic services permitting the information exchange through SWIM as middleware of the ATM - U-space interface.



Solution PJ.34-W3-02: Highly-automated Collaborative U-space – ATM Environment

Medium- to long-term concept for a collaborative ATM-U-space environment.

Facilitates seamless operations of drones and manned aviation in non-segregated airspace.

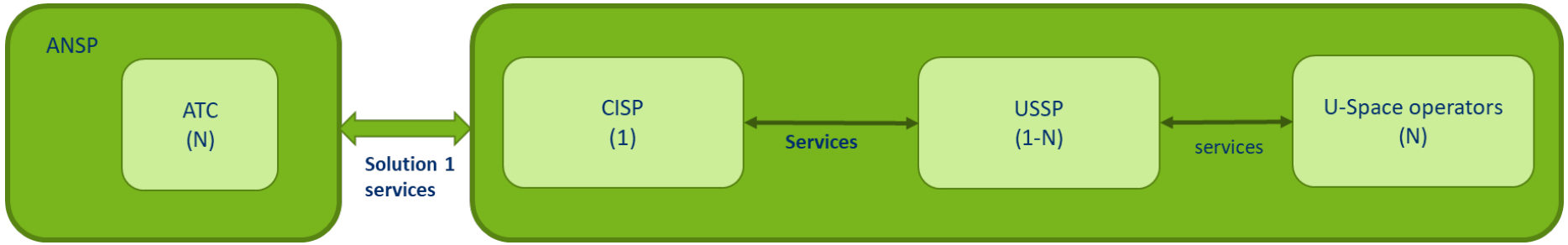
Relies on systems with high automation levels and a fully dynamic airspace management.

Solution 1

Designed 5 services to serve ATM and U-Space data exchange, and also CISP – USSP exchange which compose the main architecture of ATM-U-space interface:

- Operation Plan
- Tracking Information
- Tactical Operation Message
- Traffic Non Conformance Message
- Geofence Information

UAS' areas of operations are assigned dynamically in the moment missions are going to take place. In this way, they are handled dynamically in the tactical phase so that they can be enabled or disabled as needed.

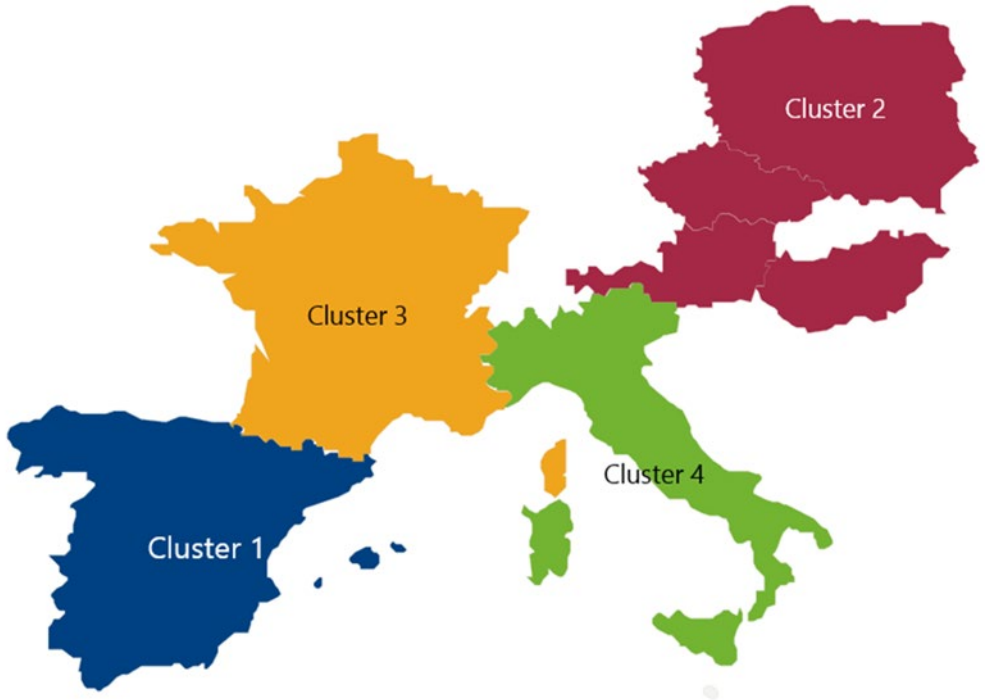


Solution 1 Exercises

Validation activities have been divided in clusters. Each one will be centered on a different geographical area and will focus on different validation exercises, allowing the project to cover the full scope of the problem using a **"divide and conquer"** approach.

Thus, each cluster will be able to tackle with sufficient depth a subset of the **key issues regarding ATM-U-space collaboration and the full set of validations will cover a broad variety of ATC systems and practices across Europe**.

- Cluster 1, led by INDRA and based in Spain
- Cluster 2, led by FRQ (FSP) and based in Austria and Hungary
- Cluster 3, led by DSNA and based in France
- Cluster 4, led by LEONARDO and based in Italy



Solution 1 Exercises

Some of the use cases to be validated respond to scenarios like…

UAS performing navaid calibration being interrupted by a manned aircraft

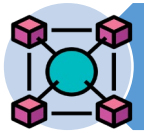
UAS Strategic deconfliction involving ATC

UAS suffers a failure triggering a Non-nominal situation

UAS performing aerial works crossing two countries

Emergency originated by ATM and application of Dynamic Airspace Reservation

Solution 1 Preliminary Results



Increases airspace interoperability and improves the security of operations

Contribute to the creation of new standards

Promote the development and reach the expected economic potential of the drone market

Better situational awareness due to displaying U-space airspace on the radar display

ATCOs are able to perform tasks in a timely and efficiently manner

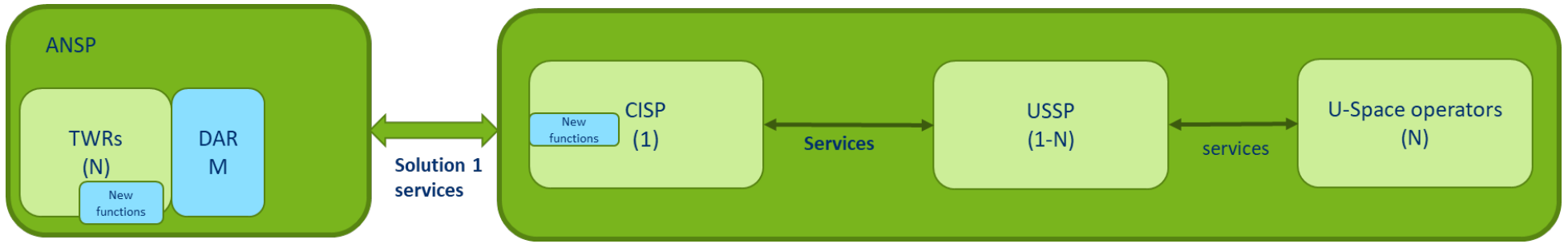
Roles and responsibilities are adequately defined and perceived by the stakeholders involved

Solution 2

Designed solution in **Mid and Long-Term horizon**.

Operational steps defined are:

- Integration of UAV in controlled airspace through Dynamic Airspace Reconfiguration, with volumes extending vertically from the ground up to a **common static ceiling altitude within VLL**.
- Integration of UAV in controlled airspace through Dynamic Airspace Reconfigurations, that are strategically managed by means of airspace volumes with **vertical and lateral extension**.
- Integration of UAV in controlled airspace through Dynamic Airspace Reconfigurations that are **tactically managed by means of airspace volumes** with vertical and lateral extension.



Solution 2 Exercises

Some of the challenges to be validated in specific use cases and scenarios are…

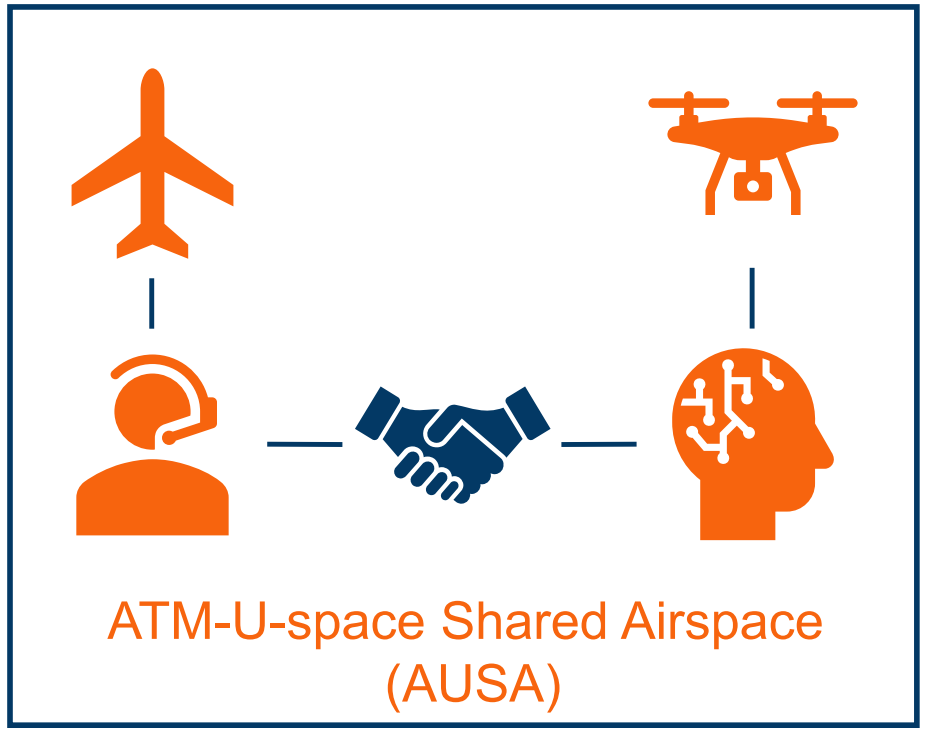
Number of drones exceeding those of manned aviation Ratio 10:1

Most operations are BVLOS and highly autonomous

High levels of automation in the ATM-U-space processes

New ATM role, the Dynamic Airspace Reconfiguration Manager

Methods to manage contingencies and non-nominal cases



Solution 2 exercises

Six exercises addressing some of the challenges with regards to safety and human performance impact.

Human Factors vs. automation in nominal conditions
- Real-Time simulation by ENAIRE

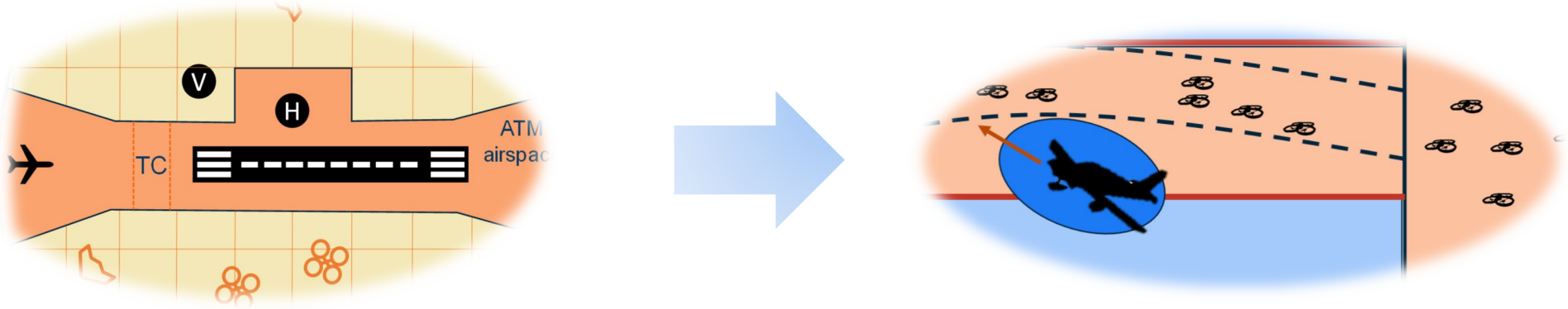
Human Factors and contingencies
- Real-Time simulation by AT-ONE

Drone flight plan definition in AUSA airspace
- Real-Time simulation by INDRA

Adaptative U-space-ATM traffic information exchange
Real-Time simulation by AIRBUS

Dynamic Airspace Reconfiguration through planning phases
- Fast-Time simulation by AIRBUS

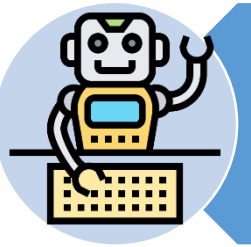
U-space resilience to minimize disruptions
- Fast-time simulation and Workshops by SINTEF/LFV



Solution 2 Preliminary Results

ATCo situation awareness of manned aircraft was maintained despite the number of drones in AUSA

DAR manager as an independent ATM actor, due to ATCo difficulties to manage pre-tactical and tactical tasks



Need to improve trust on automation to ensure safe separation between manned and unmanned through dynamic airspace reconfigurations

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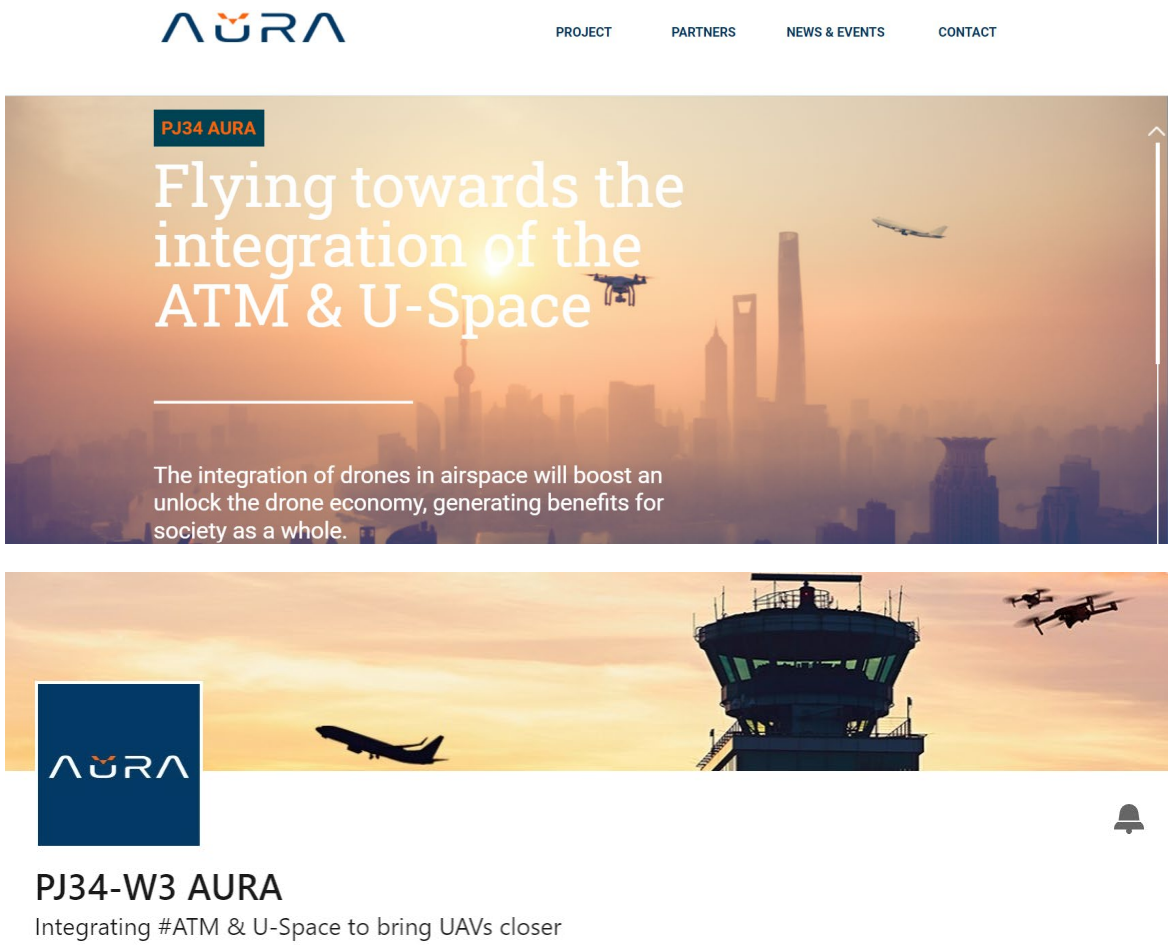

Thank you for your attention!