

U-Space Implementation Challenges

EUROCONTROL's perspective

Presented at: UAV Integration in Air Traffic, Nivelles, Belgium

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Objectives of presentation

- **1. Overview of EUROCONTOL**
- **2.** Key challenges to implement U-Space?
- 3. What is EUROCONTOL doing to address these challenges?







Overview of EUROCONTROL







THE EUROPEAN AIR TRAFFIC MANAGEMENT SYSTEM





Geographic area (million km2)

Number of civil ANSPs



Number of air traffic controllers



Total staff



68

Flight hours controlled (million) Number of en-route facilities



Number of terminal facilities/approach control

525

Airports with (normally) >10 flights a day

Pre-pandemic figures

EUROCONTROL'S CENTRAL ROLE FOR EUROPEAN AVIATION



Innovation Hub

Maastricht Air Navigation Service provider ATC billing service – over €8 billion p.a. until 2019 (€3.4 billion in 2020 due to the pandemic crisis)

Civil-Military coordination

Pan-European expert support including on data and sustainability Aviation Learning Centre





EUROCONTROL

41 Member States + 2 Comprehensive Agreement States

EUROCONTROL OFFICE LOCATIONS



BELGIUM Brussels (HQ, Network Manager & CRCO)



NETHERLANDS Maastricht (Maastricht UAC)



FRANCE Brétigny-sur-Orge (Innovation Hub)



LUXEMBOURG Luxembourg (ECTL Aviation Learning Centre) Institute)

"The designations employed and the presentation of the material on maps in this presentation do not imply the expression of any opinion whatsoever on the part of EUROCONTROL concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or bound



EUROCONTROL HISTORY



41 Member States & the European Union

2 'Comprehensive Agreement' States: Morocco & Israel EUROCONTROL

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Key challenges to implement U-Space





Key challenges to implement U-Space







EUROCONTROL's Contribution

to address the challenges





Research & Innovation



- Co-founder of SESAR Joint Undertaking
- In kind contribution to Research and Innovation
- Key research projects:

SESAR U-space projects

<u>CORUS-XUAM</u> (Concept of Operations for euRopean U-space Services – eXtension for Urban Air Mobility) – <u>Project Leader</u>

<u>U-ELCOME</u> (Digital Sky Demonstrator) – Project Leader

<u>BUBBLES</u> (BUilding Basic BLocks for a U-Space SEparation Management Service)

DACUS (Demand and Capacity Optimisation in U-space)

<u>ICARUS</u> (Integrated Common Altitude Reference system for U– space)

INVIRCAT (IFR RPAS Control in Airports and TMA)

<u>URCLerED</u> (Unified Integrated Remain Well Clear Concept in Airspace D-G Class)

AURA (ATM U-Space Interface)



Horizon 2020 U-space related Research projects

<u>5D-AeroSafe</u> (5 services of Drones for increased Airports and waterways Safety and security)

<u>LABYRINTH</u> (Unmanned Traffic Management 4d Path Planning Technologies for Drones)

<u>Drone4Safety</u> (Inspection Drones for Ensuring Safety in Transport Infrastructures)

Consolidation of U-space CONOPS with SJU



EUROCONTROL, in coordination with SJU, is leading the transversal coordination of 17 SESAR projects related to U-space/UAM (European Uspace ConOps Coordination Cell) with the aim to:

- Focus the discussion on specific ConOps issues and accelerate R&D on U-space
- Fertilize information sharing among U-space related projects ensuring consistency of project outcomes
- Discuss proposed changes to the ConOps & foundation package information
- Support the projects in their contribution to accelerate a consistent deployment of Uspace/UAM services at a European level



Support to Regulations Development





- a. U-space Regulation Package (2021/664, 665, 666)
- b. Drone regulation (2019/947) and (2019/945)
- c. Ongoing development of Acceptable Means of Compliance and Guidance Material for U-space Regulation :

WP1: Airspace Risk Assessment

WP5: U-space Flight Authorization

WP7: Electronic Conspicuity

WP9: Coordination with local authorities

- d. USSP Certification TF WP1-3
- e. Mitigate potential risks from unauthorised drones
- f. Promote guidance material



- Member of the ICAO RPAS
 Panel and co-rapporteur of the
 RPASP WG 2 C2 Link, a datalink
 which is critical for ATS and ATC
 data/voice
- b. Member of the ICAO UAS Advisory Group
- c. Participation to the WG6 ATM

Support to Standards Development







- a. Counter UAS (C-UAS)
- b. ED-286 OSED for C-UAS in controlled airspace
- c. ED-xxx Interoperability Requirements for C-UAS systems
- d. ED-xxx System Performance Requirements for noncooperative UAS detection systems

Provide domain expertise in developing a document on "Unauthorized UA incursions at the airport"

Support to States



- Assistance with airspace risk assessments
 - ARA required by Regulation 2021/664

- Additional requests from other states to assist with airspace risk assessments
- Provide technical guidance to implement U-space regulation:



U-space Airspace





Airspace Risk Assessment process





Airspace risk assessment outputs



UAS capabilities and performance requirements

- Minimal navigation and weather capabilities
- Communication with U-space actors
- Facilitate BVLOS operations

U-space services, and their performance requirements

- Optional services
- Basis for USSP certification
 - Harmonised
 approach

The applicable operational conditions and airspace constraints

- Airspace structures
- Dynamic airspace reconfiguration

• Ensure a proper airspace integration

Israel Airspace Risk Assessment





- Complex > Busy, Extremely Heterogenic
 - Intense Civil-Military interface
- Relatively large number of Prohibited/Restricted/Danger Areas
- 15000 UAS deliveries as part of "National drone initiative"
- Multiple USSPs in the same U-space
 - Relevance of Discovery and synchronization service
- High level of social acceptance
- Importance of mitigation measures
 - 3xGPS
 - Parachute
 - Avoidance of populated areas
 - Crossing roads at right angles

U-space capacity and Verify ser

efficiency assessments

Support USSP certification

U-space Service Providers

- Develop & test services
- Prepare for certification
- Verify services meet regulatory requirements

UTM Researchers

- Conduct exploratory & industrial research
- Support in answering
 existing research questions
- Testing new concepts

Drivers for EUROCONTROL UTM simulation capability

- Support to deployment to safely enable drone operations
- Test and validation of UTM services as the roll out of U-Space progresses
- Support to research and innovation projects



Airspace Risk

Assessment

CAAs





Transition from U-space Demonstration to Deployment



Commission **SESAR Joint** EUROCONTROL Undertaking European **Aviation Safety** Agency

OBJECTIVES

Building on state-of-the-art deployment of BVLOS operations

Stimulate creation of regulations and standards

Accelerate lead time to market

Promote economies of scale

De-risk implementations

Reduce red tape

DELIVERABLES

- U-space status monitoring
- Share lessons learned
- U-space project inventory
- Open discussion forum

FOL

EUROCONTROL

Inventory of U-space Centres in Europe

- AIRlabs Austria (Austria)
- ID2MOVE (Belgium)
- Dolna Mitropoliya (Bulgaria)
- UAS Denmark Test Center (Denmark)
- Urban Air Mobility Oulu (Finland)
- Sopra Steria U-space Digital Platform (France)
- ENAC Laboratory (France)
- Francazal Multimodality testbed (France)
- Drones Paris Region (France)
- CEEMASAS PROCEMA (France)
- National Experimental Test Center for UAS (Germany)
- Verkehrslandeplatz Cottbus/Neuhausen (Germany)
- U-Space Demonstrator Hamburg (Germany)
- U-Space Integration Centre (Germany)
- AIRBUS Drone Centre (Germany)

- U-Flyte (Ireland)
- Dora Lab (Italy)
- Grottaglie/Bari Test Bed (Italy)
- Balozi Flight zone (Latvia)
- U-space Moldova (Moldova)
- CEDD (Poland)
- AV Living Lab BTC City Ljubljana (Slovenia)

European Commission

- HERA DRONE HUB (Spain)
- Rozas (Spain)
- Technical University of Valencia (Spain)
- Naitec /Aerodromo Lumbier (Spain)
- ATLAS Flight Center (Spain)
- BCN Drone Center (Spain)
- La Nave (Spain)

- Center of Excellence for Air Mobility Sweden (Sweden)
- UAV test bed Västervik (Sweden)
- Dutch Drone Centre Aviolanda (The Netherlands)
- DroneCentre (The Netherlands)
- Thames Valley Arrow Drone Zone (United Kingdom)
- Westcott 5G Step-out Centre (United Kingdom)
- Aberporth Ranges (United Kingdom)
- Cranfield NBEC (United Kingdom)
- Felthorpe Airfield (United Kingdom)
- Oxfordshire (United Kingdom)
- U-Space-UA Test Center (Ukraine)





Integration of new entrants in European ATM network operations (iNEO Project)

- Above FL600 and below 1000ft
- Network planning, Operational procedures
- Contingency management
- Civil-Mil cooperation in ATM
- Impact analysis on network nodes e.g. airports
- System requirements



EU Drone Strategy 2.0 by the European Commission (DG Move)

... for a smart and sustainable unmanned aircraft eco-system in Europe

- Sets out a High-Level vision and objectives for the development of civil and defence drone platforms and services
- EUROCONTROL provided a high-level steer (via Drone Leaders Group) to the development of the EU Drone Strategy 2.0 → DLG Report published on 26th Apr 22
- Next Step: Release of EU Drone Strategy 2.0 on 29th Nov 22 by DG Move



EUROPEAN COMMISSION

Report of the Drone Leaders' Group

in support of the preparation of 'A Drone Strategy 2.0 for a Smart and Sustainable Unmanned Aircraft Eco-System in Europe'

26 April 2022

The information and views set out in this report are those of the Drone Leaders' Group and do not necessarily reflect the official opinion of the Commission.







What might the future look like in urban environment?









Europe's gateway to investment support