DECEMBER 2021 #02

UAS Bulletin

European Civil Aviation Conference Bulletin on Unmanned Aircraft Systems

FOREWORD

Dear readers,

I am delighted to present the second edition of the ECAC UAS Bulletin. This edition is dedicated to U-space, the system implemented in Europe for unmanned traffic management (UTM).

Following the industry's tremendous development in recent years, the need for a system to support the safe and efficient integration and management of UAS into airspace has become essential. In Europe, this system is called U-space and it is based on establishing U-space airspaces in which a minimum and mandatory set of services will be provided. This edition of the UAS Bulletin will first address the purpose of U-space, and secondly what the UAS traffic management system consists of.

Likewise, for the development and safe deployment of U-space, it is essential to have appropriate regulations that will support this new system and its integration into the air traffic management (ATM) system. In this issue, we will review the new EU U-space regulatory framework adopted in April 2021, as well as the different aspects it regulates.

Another objective is to give visibility to the main U-space initiatives taken by some ECAC Member States. I would like to personally thank these States for sharing this information and for their collaboration on this second edition.

Finally, we will look at the most relevant activities being carried out by the United States for the development and deployment of its own UTM system. ■

Raúl Medina Caballero
DGCA Spain

WHAT IS U-SPACE?

The concept of U-space emerged to support commercial operations with drones, especially those entailing greater complexity and automation. This is the European system being developed to manage drone traffic.

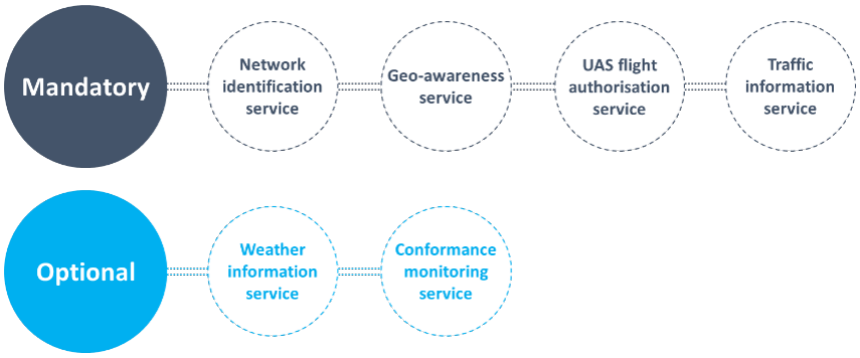
U-space is a set of specific services and procedures designed to ensure safe and efficient access to airspace for a large number of drones, and which are based on high levels of digitalisation and automation.

The purpose of U-space is therefore to achieve automated UAS management and integration, allowing for a large series of operations, many of them even simultaneous, and all of this in harmonious coexistence with the current ATM system.

Implementing this new system requires States first to define and designate U-space airspaces - which will be the volumes of airspace in which the mandatory U-space services will be provided - in order to guarantee safe, efficient and interoperable operations.

Four U-space mandatory services will be established in every U-space airspace:

1. Network Identification Service: provides the identity of UAS operators and the location and trajectory of drones during operations.
2. Geo-Awareness Service: provides information on operational conditions, airspace limitations or existing time restrictions.



WHAT IS U-SPACE?

3. Flight Clearance Service: ensures free-of-conflict operations with other UAS operating in the same volume of airspace.

4. Traffic Information Service: alerts operators of air traffic that may be found near the aircraft.

Additionally, there are two more U-space services that may be established as mandatory for certain U-space airspaces, when so determined by the State after the development of a safety evaluation:

5. Weather Information Service: supports the flight planning and execution phases and enhances the performance of other U-space services.

6. Compliance Monitoring Service: warns of non-compliance with the granted flight clearance and informs operators of any deviation from it.

Furthermore, for the provision of these mandatory services, the deployment of U-space will entail the integration of two new service providers into the system: the common information service provider (CISP) and the U-space service provider (USSP).

The CISP will be in charge of spreading the common information required to enable the operation and provision of U-space services in U-space airspaces wherever it has been designated. The CISP will be a single and reliable source of all common information.

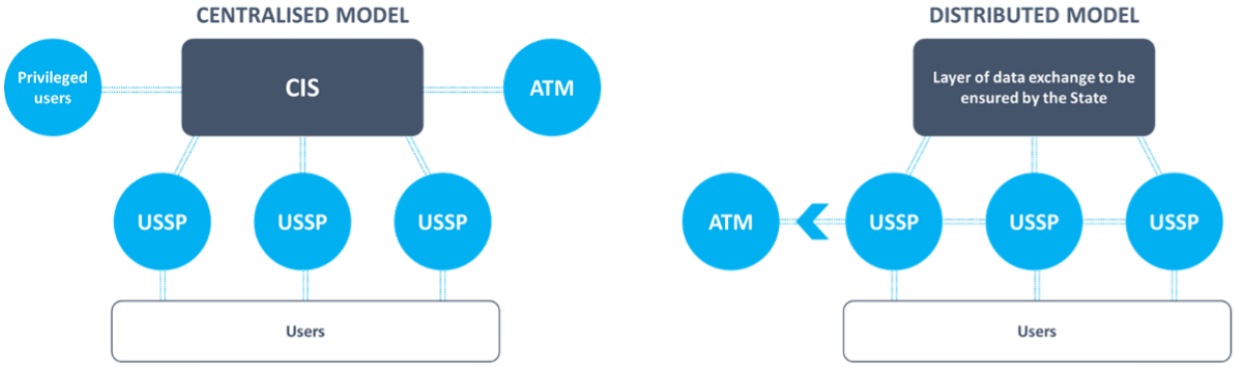
Accordingly, U-space services will be provided by different certified USSPs within these U-space airspaces and during all operational phases. In addition, they will actively coordinate with air traffic service (ATS) providers, with other USSPs and with the CISP for the exchange of information and proper functioning of all operations.

The last aspect to be determined by each State will be the delivery model for these U-space services. The service providing model may be centralised, distributed or mixed.

In the centralised model, a single CISP will be designated in each U-space airspace, which will open the possibility for centralising coordination between USSPs and ATS providers, by acting as a single focal point for information.

The CISP is not considered in the distributed model, and States will be responsible for providing common information to all parties. Coordination between USSPs and ATS providers will be done directly.

There is a third, more flexible solution, which combines both previous models. This would be the mixed service provision model, where there would be U-space airspaces with a designated CISP wherever it is deemed necessary, while in others the distributed model would be chosen. ■



THE NEW EU REGULATORY FRAMEWORK FOR U-SPACE

In order to support the deployment and implementation of U-space, it is essential to have the appropriate regulations in place to adopt the necessary requirements as well as for the safe integration of drones with manned aviation.

With the participation of Member States and following a long process of several meetings and discussions at European level, the U-space regulatory package was approved within the European Union Aviation Safety Agency (EASA) Committee in February 2021.

Subsequently, in April 2021 the European Commission adopted and published the policy package regulating U-space, which is made up of three implementing regulations whose new provisions will be applicable as of 26 January 2023.

This regulatory package consists, on the one hand, of the Commission Implementing Regulation (EU) 2021/664 of 22 April 2021 on a regulatory framework for U-space, which regulates the technical and operational requirements for the U-space system, as summarised in the previous section of this edition.

On the other hand, it was necessary to amend two implementing regulations to complement the regulatory regime on U-space, which was necessary to incorporate requirements and obligations for air navigation service providers and manned aviation in U-space airspaces:

Implementing Regulation (EU) 2021/665 amends Implementing Regulation (EU) 2017/373, establishing common requirements for air traffic management and air navigation service providers to establish the specific coordination

procedures and communication facilities between ATS units, U-space service providers and UAS operators.

Implementing Regulation (EU) 2021/666 amends Regulation (EU) No. 923/2012 (laying down the rules of the air (SERA Regulation)), establishing the common rules for effectively making the presence of manned aircraft operating in U-space airspace electronically conspicuous.

Currently, EASA continues to work on developing acceptable means of compliance (AMCs) and guidance material with which to help implement the U-space regulation package adopted at European level. ■

U-SPACE APPLICATIONS

Among the most anticipated applications for the use of U-space is urban air mobility (UAM), one of the solutions to address the mobility and pollution problems facing large cities.

Urban air mobility will use electric vertical take-off and landing aircraft (called eVTOLs) to transport people (air cabs, sightseeing tours, emergency transport, etc.) as well as smaller drones to deliver parcels or transport medical equipment in urban environments, among others.

Below, ECAC Member States share information with readers on the initiatives and measures they have taken on U-space, and the progress made. ■

MAIN INITIATIVES BY ECAC MEMBER STATES

CROATIA

The current level and distribution of UAS operations in Croatia is not enough to require the establishment of U-space airspaces.

However, the Croatian ATC service is conducting an experiment in an airport's controlled airspace, which is highly susceptible to qualify as a U-space airspace.

GERMANY

Germany intends to integrate UAS into existing airspace structures through U-space airspaces. It wants to become one of the leading markets in the UAS economy with high safety standards. Its goal is to bring automated and interconnected aviation into practice while simultaneously protecting private data and the environment.

With its new legislation, which puts Implementing Regulation (EU) 2019/947 on the rules and procedures for the operation of UAS into effect, Germany has based the establishment of geographical zones on previous national legislation containing areas where the operation of UAS was subject to limitations. While UAS operations in these areas were generally forbidden or required a special permit, they are now generally allowed when the operator meets the requirements related to that zone and submits the necessary application.

Currently, Germany is in the process of establishing a U-space laboratory to identify possible obstacles and challenges. In this context, it seems to be difficult to establish the necessary actor constellations. For Germany, there must be one CIS in each U-space to ensure that all USSPs receive similar high-quality data (a single source of truth). This means that a CIS may provide its services in different U-spaces, but there should only be one CIS in each U-space.

Their most important considerations are safety issues related to the integration of UAS into already existing airspaces, especially in emergency scenarios that may require dynamic reconfigurations or very fast reaction by USSPs and pilots.

German authorities are collaborating worldwide with the relevant international and European organisations and associations. At the national level, they are working very closely with the relevant administrations of federal States, the drone industry and research institutions on the establishment of the U-space Reallabor.

LATVIA

The development and implementation of the U-space concept in Latvia is still at a very early stage. Latvia participated in the meetings held to discuss drone issues and has supported EASA in developing the guidance material for geographical areas based on the results of the Riga Controlled Traffic Region (CTR) airspace assessment and its established "RPAS NoFLY" zones.

The work carried out by the Latvian CAA and EUROCONTROL to assess the Riga airspace was the first step towards drone integration in the country's CTR. Its results may help define the requirements for U-space services.

After publishing the U-space regulatory framework, changes in the regulatory authority's monitoring procedures will be required. Additionally, Implementing Regulations (EU) 2021/664 and 2021/665 set requirements for the certification of USSPs, for which they will need to establish appropriate mechanisms.

No U-space airspaces have been defined in Latvia's airspace at present, and no U-space services are being provided. Similarly, the country is still discussing the service provision model with all involved parties.

Currently, it has an online map of its airspace where you can observe airspace restrictions, view drone flight rules in certain areas and check the regions where drone flight is not allowed.

SPAIN

Implementing U-space requires the development of a national policy and strategy that considers issues such as security, economic growth or territorial policy. Spain is therefore working on developing a U-space deployment plan to establish the basis for its implementation.

As for the service provision model, Spain has always advocated a centralised solution, at least during the initial stages of U-space deployment.

AESA, Spain's national supervision authority, actively contributed to developing the U-space regulation at European level. Likewise, it is currently contributing to the development of this regulation's acceptable means of compliance/guidance material through several EASA working groups, including WP10 CISP in charge of developing the regulation framework for common information service providers.

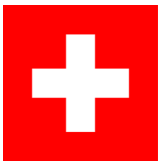
AESA's participation in the following is also worth highlighting: the AURA initiative, focused on the interface between U-space and ATM; the DOMUS project, which provided drone traffic management in emergency situations and urban scenarios; and Vodafone's 5G project in the city of Benidorm, as well as its participation in national working groups to promote the new regulatory framework.

ENAIRE, the leading Spanish air navigation service provider, is working on the development and deployment of tools for the safe integration of drones in airspace: ENAIRE Drones in 2018 and ENAIRE PLANEA in 2020, to improve the provision of aviation information and the management of requests for drone operations.

ENAIRE has also contributed to developing the U-space regulation and has collaborated in SESAR projects such as AURA and DOMUS, which it led in 2019, as well as UAM projects such as AMULED, CORSUS-XUAM or Uspace4UAM.

At present, it is working on developing a U-space platform to enable the fast implementation in Spain of the new regulatory package by following a centralised architecture, based on a single CIS provider.

SWITZERLAND



U-space has been a Swiss Federal Office of Civil Aviation (FOCA) dedicated programme since 2018. When it comes to U-space implementation, FOCA coordinates the Swiss U-space Implementation partnership (SUSI). With the AVISTRAT-CH initiative that aims to modernise and digitise airspace and aviation infrastructure, the implementation of U-space has become a part of the national aviation strategy.

The main challenge faced by FOCA so far has been to get the different stakeholders involved in the ecosystem to share a common vision and technical framework. However, this challenge has been identified, addressed and solved as part of SUSI.

In September 2019, FOCA - through SUSI - decided to test two remote identification (RID) solutions (network-based or broadcast-based). Based on the test results and the U-space regulation, FOCA worked on the implementation of the NET-RID service. Following the deployment of the network identification service by the end of 2020, Switzerland plans to start testing and implementing the UAS flight authorisation service in September 2021.

FOCA will use the distributed approach to common information services (CIS). A distributed CIS setting provides maximum flexibility and is cost-efficient. Furthermore, the possibility of allowing private companies (certified USSPs) to become CIS providers in case of dynamic data restrictions by local authorities is also envisaged.

Switzerland is ready for the provision of geographical zones. Federal data are currently provided on an interactive map. Furthermore, Switzerland will be ready to add regional and local restrictions by the end of 2021 and plans to allow USSPs to manage dynamic restrictions at local and regional level.

FOCA collaborates with several CAAs worldwide on UAS issues. It also actively participates in standard-developing organisations and rulemaking working groups. It also fosters collaboration with Swiss research institutions.

EUROCONTROL'S drone and U-space activities: a snapshot

EUROCONTROL continues to contribute in multiple phases to developing an eco-system of drones and U-space by working with its Member States, European and international partners as well as the wider stakeholder community.

In 2021, the CORUS-XUAM project that EUROCONTROL manages has made great progress in updating the concept of operations for U-space by adding aspects related to urban air mobility (UAM). The next phase will be activated in the coming year with six live demonstrations that will take place across seven countries. We have also made successful contributions to nine other SESAR 2020 and Horizon 2020-sponsored U-space-related research and innovation projects.

The new "*Centre d'Excellence Drones Île de France (CEDIF)*" operations room that we manage together with Thales and Systematic was inaugurated in Brétigny, France on 1 December 2021. The centre will be using a 40km drone corridor over cities, rail and road infrastructure south of Paris, which will be managed from the new operational room at the EUROCONTROL Innovation Hub, based in Brétigny.

We have responded to high demand to provide technical and operational support to States in assessing their airspace in preparation for the implementation of U-space. In addition, we have provided U-space-related webinars to Member States and a three-day training course on RPAS, delivered via the EUROCONTROL Aviation Learning Centre.

We support EASA in a number of activities, including drafting acceptable means of compliance and guidance material for U-space regulation, conducting safety risk/impact assessment for certified category drone operations, developing drones flight rules, supporting the EASA UAM Task Force, and occurrence reporting for drone pilots and others.

In partnership with European Commission DG MOVE, EASA and SESAR Joint Undertaking, EUROCONTROL was authorised by the European Commission to extend the scope of support it offers to the U-space stakeholders via the newly re-launched European Network of U-space Stakeholders on 30 November 2021. In the new mandate provided, we will support the U-space stakeholders to transition from demonstration to deployment by sharing lessons learnt.

We provide support in drafting ICAO UTM Framework addition and in preparing for the ICAO Drone Enable Symposium 2022. EUROCONTROL experts also contribute to the development of ICAO SARPs, procedures and guidance material for RPAS as part of the work of the ICAO RPAS Panel.

EUROCONTROL contributes to developing the Counter UAS standards in the EUROCAE WG 115. We will coordinate the development of the Safety Performance Requirement document.

Finally, we are providing our technical and operational expertise to the creation of Drone Strategy 2.0, led by the European Commission. In 2022, we will be facilitating discussions on drones and U-space in a number of panels at the Amsterdam Drone Week, where EASA will hold its high-level meeting.

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UNITED STATES

Like Europe, the United States requires a system to manage drone traffic: the UTM system, which is independent but complementary to the existing ATM system. Drones will be integrated with air traffic operating in low altitude airspace without interfering with their operations.

The UTM research carried out by the United States was divided into four stages called TCLs (Technical Capability Levels), with increasing complexity and specific technical objectives:

- TCL1 (2015): drones in agriculture, fire-fighting and infrastructure monitoring, and technologies such as flight scheduling or geofencing.
- TCL2 (2016): drones in sparsely populated areas and technologies to adjust flight zones or to clear airspaces in case of emergency.
- TCL3 (2018): technologies to ensure separation between drones (detection and avoidance) and ensuring that drones stay in their designated flight zones.
- TCL4 (2019): integration of drones in urban areas and weather forecast, communication and drone technical capabilities technologies.

A transition research team was created to coordinate all activities that are part of the UTM initiative, and a UTM Research Plan was developed to document the objectives and outline the future development of UTM. In addition, the LAANC (Low Altitude Authorization and Notification Capability) enabled the requesting and approving authorisation process for drone operations.

Faced with the increase in drone operations, the United States' infrastructure to manage this expansion within the airspace was limited. In response, the UTM Pilot Program has been established to define an initial set of capabilities to support UTM operations, assess technologies and research results, and outline the next steps towards UTM deployment.

A NEW ECAC FOCAL POINT FOR UAS

The ECAC Triennial Session was held on 12 July 2021. A new Coordinating Committee was elected and the ECAC Focal Points were appointed. This is why, after four years as Focal Point for UAS, I will pass on the baton to my colleague, Elisabeth Landrichter, Director General for Civi Aviation and Deputy Director General for Transport in Austria, who will be responsible for this portfolio from now on. My most sincere congratulations, Elisabeth!

Throughout these years as Focal Point for UAS, I have had the privilege of occupying a position from which it has been possible to promote very interesting ECAC initiatives in the UAS field, and to collaborate with other countries and organisations to promote the evolution of this sector.

Among the promoted initiatives is the publication of this online UAS Bulletin. As you know, it was created to spread information on the strategic aspects of the UAS sector, and the main initiatives being developed in ECAC Member States as well as internationally, promoting cooperation and the sharing of experiences between countries. This is an initiative that I am sure Elisabeth will continue to carry out with great success.

Last of all, I would like to thank my team from the Directorate General of Civil Aviation of Spain, Marina Estal and Andrés López, as well as Mara Keller, responsible for UAS matters in the ECAC Secretariat, for their enthusiasm, hard work and coordination on all the actions that have been developed and implemented in the field of UAS during this period.

Dear Elisabeth, welcome and good luck in your new position!

Best regards,

Raúl Medina Caballero
DGCA Spain

It was a great pleasure to take over from Raúl Medina Caballero as the ECAC Focal Point for Unmanned Aircraft Systems and I would like to thank Raúl and his team for their commitment in this area. They have done an excellent job in keeping Member States informed of developments in the drone sector and facilitating the exchange of information, which I personally consider as one of the most important tasks in my new function.

The drone industry is a fast growing one and it is challenging to stay on track with legislation, projects and initiatives. One of our main activities will therefore be to continue disseminating information on current topics in the UAS field, via the website and in particular via the UAS Bulletin successfully launched by Raúl.

We will also focus on promoting cooperation in the field of UAS - within the EU and also with third countries. Furthermore, we plan to organise a virtual meeting to support the members in sharing their experiences and discussing best practices.

My thanks again to Raúl for the warm welcome, and to the ECAC Secretariat for the introduction. I am truly looking forward to the cooperation with ECAC Member States and international partners in this field and to continuing all the interesting initiatives in the drone sector already started by my predecessor, Raúl.

Elisabeth Landrichter
ECAC Focal Point for Unmanned Aircraft Systems
DGCA Austria

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Our mission is the promotion of the continued development of a safe, efficient and sustainable European air transport system

ECAC Secretariat
3 bis, villa Emile Bergerat
F-92522 Neuilly-sur-Seine
France

Tel: +33 1 46 41 85 96

www.ecac-ceac.org
communications@ecac-ceac.org

@ECACceac LinkedIn