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Author(s)	Maggy CARRAZ (Egis) Hervé DREVILLON (Egis)
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RECIPIENTS

Name	Entity
Stephen O'SULLIVAN	European Defence Agency

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1 - INTRODUCTION

1.1 - Document scope and objectives

This Monitoring Report is intended to provide an overview of U-space development from different angles:

- **Governance**, to report on the higher-level, organisational aspects, both at European and local levels. This includes organisations and operators, and the definition of legal, regulatory, operational and financial relationships between them.
- **Regulation**, to cover regulatory activities both at European (Commission and EASA, mostly) and local (CAAs) levels.
- **Operations**, to report on the definition, validation and implementation of concepts of operations, use cases and business models. Initially, outcomes from SESAR work are expected to provide most of the information for this section, but local initiatives will be progressively set up and be included in this section.
- **Technical aspects**, to identify the progress on the technical aspects of U-space implementation, notably in terms of standardisation activities or trends on supporting technology.

The Monitoring Report is updated on a monthly basis over the course of SC2 (i.e., from beginning of 2022 to the end of 2024). It has been structured with an objective to ease identification of changes from one iteration to the next, so that progress in U-space definition and implementation can be tracked easily.

The information presented in the Monitoring Report is limited to publicly available sources: web sites, reports, conferences, events, etc. Through its work, the Egis team may have access to confidential or commercially sensitive information and sharing this information would risk harming our clients.

1.2 - Document structure

This report is composed of 5 main sections:

SECTION 1 – INTRODUCTION is intended to provide a detailed presentation of the report, its objectives and the approach used to develop it.

SECTION 2 – U-SPACE GOVERNANCE contains information on the governance of U-space at European level first and then at local level (including EDA MS, but also States under EASA responsibility).

SECTION 3 – U-SPACE REGULATION presents the progress in the development of regulation covering U-space stakeholders, operations and drones (or eVTOL in the future).

SECTION 4 – U-SPACE OPERATIONS presents activities of interest conducted within trial or demonstration projects, such as validation of use cases, implementation of concepts of operations, etc. that are related to the U-space assessment and the military use cases developed in D1 of SC1.

SECTION 5 – TECHNICAL ASPECTS OF U-SPACE IMPLEMENTATION contains information on the technical and technological aspects of U-space development that can be relevant from a military perspective.

2 - U-SPACE GOVERNANCE

This section provides an overview of the on-going initiatives aiming at defining the governance of U-space across the Member States of EDA, as well as in countries subject to European Commission U-space regulation.

Topics covered in this section typically include:

- Definition of U-space governance structures at European and local level.
- Designation, certification and licensing of USSPs and CISPs.
- Definition of provider charging schemes.

2.1 - Changes tracking matrix

The following table indicates changes to this section compared to the previous iteration of the report.

- An empty cell means no progress or new information is reported for the corresponding country.
- 'New' means an entire section has been added to report on progress in a region or country that did not feature in the previous iteration.
- 'Update' means new content has been added for the corresponding region or country. In the updated sub-section, previous information, if it remains current, is written using blue colour, while new information is using black.

	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24/ Aug 24	Sept 24	Oct 24	Nov 24
ICAO										New		
United Nations			New									
European Commission												
European Parliament												
EASA		New					Update		Update	Update		
Belgium					Update						Update	
Bulgaria												
Estonia												
FAB CE airspace alliance												
Finland								New	Update			
France												
Germany											Update	
Ireland												
Italy											Update	
Lithuania											New	
Netherlands						Update			Update			
Norway												
Poland						Update						
Portugal												
Spain			Update					Update				

	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24/ Aug 24	Sept 24	Oct 24	Nov 24
Slovakia									New			
Sweden			Update									
Switzerland								Update				

2.2 - At global level

2.2.1 - ICAO

ICAO organised its first Advanced Air Mobility (AAM) Symposium from 9 to 12 September, which brought together 1 400 representatives from all types of stakeholders, including ICAO Member States and other local governmental entities (regional, municipal), intergovernmental stakeholders (UN entities), academia and research institutions, aircraft manufacturers, and providers of infrastructure, including airspace and physical infrastructure, as well as associated services, such as air traffic management and supporting capabilities.

The symposium recognised the need to achieve a globally harmonised and interoperable framework for AAM, building on the recent experience from unmanned aircraft systems and exploring opportunities for new traffic management solutions. The symposium adopted a call for action, urging all stakeholders to collaborate on AAM development in the following areas:

- **Understanding AAM**: Engage in comprehensive data collection, research, and solution development to fully grasp and balance AAM's potential and challenges and identify the role of each type of stakeholder involved.
- **Building AAM infrastructure**: Collaboratively work on developing affordable and scalable physical and digital infrastructure to support AAM systems worldwide and explore utilization and enhancement of the current infrastructure.
- **Supporting, governing and regulating AAM**: Cooperate in the establishment of adaptive, flexible and harmonized regulatory frameworks embracing innovation and compatible with current aviation frameworks, including through collaboration among international bodies, national governments, and other relevant entities.

(source: *https://www.icao.int/Meetings/AAM2024/Documents/AAM%202024%20Call%20to%20Action%20(all%20languages)/International%20Call%20to%20Action%20-%20English.pdf*)

2.2.2 - United Nations

The Counter-Terrorism Committee (CTC) of the UN Security Council has adopted the "Abu Dhabi Guiding Principles", which has established a set of guidelines that address the challenges posed by drones for terrorist purposes. Among the statements laid out in this document, principle three includes the recommendation for States to develop and deploy UAS traffic management systems "to assist authorities with identifying which UAS may be operating for terrorist purposes…establishing a licensing and registration scheme that clearly and proportionately defines restrictions that mitigate the risk of UAS use for terrorist purposes, enables appropriate authorities to identify terrorist perpetrators and allows for more effective collection of digital forensics, while developing and implementing such licensing procedures and conditions through a multi-stakeholder approach that is in line with human rights and with protection of privacy and data.

2.3 - At European level

2.3.1 - European Commission

The European Commission provided an update of its on-going Drone Strategy 2.0 study during the Amsterdam Drone Week that notably detailed the foreseen actions after the entry into force of regulation IR 2021/664. The target date for publication is end of 2022 and the study covers 8 thematic areas, of which the following appear relevant in the context of EDA's own study:

- Adequate funding of private and public R&I. This area notably includes European Defence Funds in its scope.
- Civil-military synergies in technology.
- U-space/UTM and ATM integration. The principle of segregating manned traffic from drone traffic established in IR 2021/664 should be considered as an initial step only, and future regulation should work towards the integration of both types of traffic.

On 26 April 2022, the Drone Leaders' Group assisting the European Commission with the Drone Strategy 2.0 study issued a report, notably concluding on the hearings conducted by the Group in February and March 2022. One of these focused on the development of military/civil synergies and technology building blocks. The report endorses the objective to foster the synergies between the civil and defence use of drones and related technologies (i.e., 2nd bullet above) and provides recommendations on how these synergies could be achieved:

- Developing a strategic Drone Technology Roadmap for critical drone technologies and dual-use drone systems.
- Ensuring that the needs of the European drone sector are well covered regarding the availability of critical technologies.
- Coordinating closely with relevant actors and organisations (e.g., ICAO, ITU) to safeguard that the drone sector has sufficient frequencies and protected spectrum available for safe operations.
- Setting up a funding initiative to support SMEs involvement in standardisation activities (including for dual use technologies, as well as effective procedures to develop standards in a faster way.
- Working on the harmonisation of certification requirements for civil and military applications towards those set by EASA so as to facilitate the development of dual-use applications (while considering military specificities and existing certification standards).
- Developing standard scenarios for the specific category of drone operations that could have both civil and military applications.
- Creating a dedicated funding pathway for dual-use technologies by design.
- Setting up a dedicated PPP/Joint Undertaking to support the development of dual-use drones and UAM through a large-scale flagship project (e.g., a civil-military cargo drone).
- Creating a network of the existing Drone dual-use centres of excellence at EU-level, thus facilitating the development of networks of incubators connected to these centres.

(source: EC/DG MOVE - *https://transport.ec.europa.eu/news/drone-leaders-group-supports-preparation-drone-strategy-20-2022-05-02_en*)

The European Drone Strategy 2.0 has been published on 29/11/2022 by the European Commission. This communication sets out the vision of the Commission for a mature and thriving drone eco-system in 2030 in the EU and identifies 19 flagship actions to further build the drone service market and strengthen the drone civil, security and defence industry capabilities and synergies. This document recognises the potential contribution of military drones to the European strategic autonomy and identifies the defence/military dimension as part of the overall European drone ecosystem.

Among the 19 flagship actions, the following ones stand out as particularly relevant for the military, whether in terms of operations, financing or development of capabilities:

- Flagship action 3: The Commission intends to adopt new European standard scenarios[1] for low to medium risk aerial operations, possibly to address needs related to military operations.
- Flagship action 9: The Commission intends to continue to provide funding for R&I on drones and their integration into the airspace under the Horizon Europe programme and the European Defence Fund.
- Flagship action 10: The Commission intends to set up a coordinated series of calls under the existing EU instruments and EIB loans to support a new flagship project on 'drone technologies'. These technologies can correspond to civil, military or dual-use systems.
- Flagship action 11: The Commission will consider possible amendments to the existing financing/funding framework to ensure a consistent approach in support of dual-use research and innovation to improve synergies between civil and defence instruments.
- Flagship action 12: The Commission intends to develop a Strategic Drone Technology Roadmap in order to identify priority areas to boost research and innovation, reduce existing strategic dependencies and avoid the emergence of new ones.
- Flagship action 13: The Commission intends to coordinate with other relevant EU actors a common approach with the aim of providing sufficient radio frequencies spectrum for drone operations.
- Flagship action 14: The Commission intends to set up an EU network on civil-defence drone testing centres to facilitate exchanges between civilian and defence sectors.
- Flagship action 15: The Commission will encourage all relevant actors to further align certification requirements for civil and military applications towards those set by EASA while considering military specificities and existing military certification standards.
- Flagship action 16: The Commission intends to adopt new standard scenarios for civil operations that could facilitate corresponding military use cases.

(source: EC/DG MOVE - *https://transport.ec.europa.eu/news/drone-strategy-creating-large-scale-european-drone-market-2022-11-29_en*)

2.3.2 - European Parliament

The study, '*Unmanned Aircraft Systems (UAS) integration into European airspace and operation over people*', has been published in May 2023 following a request by the European Parliament TRAN committee and is informing an assessment of the Drone Strategy 2.0. It notably provides an overview of good practices around military and civil UAS integration. The seven key findings are as follows:

1. The integration of UAS within airspace will happen in stages. Current operations are in segregated airspace away from manned aircraft. Integration with manned traffic will require improved technical and operational procedures. These are currently being looked at as part of Research & Innovation (R&I) programmes.
2. UAS have similarities and differences with manned aircraft in terms of how they operate. The focus should be on areas in which they differ, such as manoeuvrability, communications, performance and the diversity of their operating environments.
3. Operations over populated areas require a specific focus on ground risk. Integration into airspace over these areas needs to account for dynamic changes in population densities as well as safety, privacy, security, noise and social acceptance concerns.

[1] *Under the European Drone Rules, standard scenarios are a means to accelerate the approval of drone operations by relying on typical, pre-defined operations which level of risk has already been assessed as acceptable. Two such standard scenarios are currently defined.*

4. Good practices have been identified across the areas of user-friendly platforms and information sharing, step-by-step approaches to use cases, engagement with industry and city stakeholders and military and civil synergies.
5. There are a number of lessons that can be learned from Military and Civil cooperation on systems, technologies and processes. However, procurement barriers could be eased to support the adoption of civil technologies beyond R&I.
6. Incentives for industry are an area in which the EU is arguably slightly lagging behind the US and China, where government programmes are seeking to reduce cost and risk for private sector development in the UAS and electric vertical take off and landing aircraft (eVTOL) markets.
7. Drone Strategy 2.0 provides good coverage of the issues currently facing the UAS industry. However, it may underplay some of the difficulty in achieving full integration, which requires further coordination and prioritisation to keep the EU on track to achieve a large-scale drone market in the EU by 2030.

(source: *https://www.unmannedairspace.info/commentary/european-study-supports-drone-strategy-2-0-calls-for-increased-coordination-and-prioritisation/* and *www.transport.ec.europa.eu*)

2.3.3 - EASA

EASA has launched a digital space for the exchange of information on air taxis and drones. This will create transparency and thus reassure citizens that their concerns about the introduction of these services in Europe's cities are being fully addressed. The first version of the Innovative Air Mobility (*IAM*) hub enables cities, regions, national authorities, operators, and manufacturers who have a role in the introduction of these air taxi and drone services to connect. They can then share and obtain reliable information and data.

The project is funded by the European Commission and the European Parliament. It is Flagship Action Number 7 of the European Commission Drone Strategy 2.0 to enable a smart and sustainable EU drones market.

(source: *https://www.easa.europa.eu/en/domains/civil-drones/news*)

The European Union Aviation Safety Agency (EASA) has launched the second release of its digital space for the exchange of information on air taxis and drones with a focus on privacy concerns. The second release contains the following new elements:

- An entire new section **on privacy** and how the drone industry can address citizen concerns around privacy in line with EU regulatory material. EASA is going beyond legislation and provides hands-on guidance in the form of a privacy handbook and checklists for operators.
- An upgrade to the IAM Hub Members Area with new functionalities like the Critical Area Calculator for specific operations risk assessment (SORA) approvals and a pilot test for operational declarations.

(source: *https://www.easa.europa.eu/en/newsroom-and-events/news/easa-launches-second-release-innovative-air-mobility-hub*)

The European Union Aviation Safety Agency has launched the third release of its digital space for the exchange of information on air taxis and drones with a focus on sustainability and geographical information.

The third release of the IAM Hub contains the following new elements:

- An updated version of the list of approved drones for EU operations.
- An entire new section on sustainability of drones and eVTOLs. In order to manage the environmental impact of drones and eVTOLs the Agency developed the initial version of its standard methodology called Environmental Footprint Aviation (EFA) for Delivery Drones which is following the Commission Product Environmental Footprint framework of the European Commission.

- The new geographical information on the IAM Hub allows to view statistical drone operations and population density from the EASA Member States as well as a test case for Geo Zone information from Portugal.
- Guidance material and a new start page about "Getting started", "Flying a drone for fun" and "Flying a drone for work" have been added.

(source: *https://www.easa.europa.eu/en/newsroom-and-events/news/easa-launches-third-release-innovative-air-mobility-hub*)

The European Union Aviation Safety Agency's (EASA) Innovative Air Mobility Hub has launched the public version of its tool to determine the 'critical area' of a drone. The size of the critical area is a key element to determine the ground risk within the SORA risk assessments, which are needed to authorise drone operations in the EU.

UAS operators may use the default value of critical area, proposed in the SORA methodology or they may opt to define a more precise critical area value, to demonstrate a lower ground risk class. The critical area assessment can be complex due to the plethora of the contributing effects and factors. To reduce the burden on UAS operators and foster a harmonised approach towards the calculation of the critical area, EASA developed the Critical Area Assessment Tool (CAAT) to support applicants in the ground risk determination.

The Critical Area Assessment Tool is hosted by the EASA *Innovative Air Mobility (IAM) Hub*, a digital platform that brings together all actors in the European system including cities, regions, national authorities, the EU, operators and manufactures. The primary goal is to facilitate the safe, secure, efficient, and sustainable implementation of IAM practices. It is flagship action number 7 of the *Drones Strategy 2.0*.

(source : *https://www.unmannedairspace.info/latest-news-and-information/easas-iam-hub-launches-public-version-of-the-uas-critical-area-assessment-tool/*)

2.4 - At local level

2.4.1 - Belgium

U-space could offer a solution for regulating UAS in areas with geographical restrictions such as in the vicinity of airports and military activities. Skeyes has been designated as the single CIS provider for the country in a royal decree dated from 27/11/2022, as Belgium has decided to adopt the centralised model for the provision of Common Information. The greatest challenge is considered to be the detection of illegality.

(source: Dutch Government - *https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2021/11/03/u-space-scenarios-governance-en-finance/u-space-scenario-s-governance-finance.PDF)*

Skeyes is collaborating with the Belgian Civil Aviation Authority to prepare the future implementation of U-space airspaces over Belgium. This joint activity will enable elaboration of a framework to designate U-space airspaces after a risk assessment process, and to certify Skeyes as Common Information Service Provider (CISP) and SkeyDrone as U-space airspace Service Provider (USSP). These actions will be needed for the BURDI project aiming to develop a global solution for U-space airspaces implementation in Belgium.

(source: *https://www.unmannedairspace.info/latest-news-and-information/belgian-ansp-and-civil-aviation-authority-collaborate-to-designate-u-space-airspaces/*)

Belgian Air Navigation Service Provider skeyes and Belgian Defence have announced a new platform to support drone and aerial activities due to be launched in the coming weeks. Developed by SkeyDrone, the Drone & Aerial Activities digital platform is expected to accelerate the approval process for special air activities including survey flights, parachutes, fireworks and other activities taking place within controlled airspace. Building upon the success of the Drone Service Application (DSA) implemented in 2021, the Drone & Aerial Activities platform

complements Belgium's lower airspace and traffic management strategy, ensuring the safe integration of both drones and special air activities. Through strategic deconfliction, collisions between unmanned traffic and special activities within controlled airspace will be mitigated, guaranteeing the safety of all airspace users.

Annually, skeyes and Defence receive approximately 1,000 requests for special air activities, managed by a team of four civil and military experts in the Special Activities Coordination Cell. With the introduction of the Drone & Aerial Activities platform, this process will undergo a significant transformation, now featuring streamlined and semi-automated approval processes. The platform is designed to offer a digital workflow, integrated rule engine, automatic altitude conversion, and multi-stakeholder authorization capabilities.

(source: *https://www.unmannedairspace.info/latest-news-and-information/skeydrone-implements-drone-aerial-activities-digital-platform-to-manage-special-air-activities/*)

The Belgian Civil Aviation Authority (BCAA) plans to complete its final audit of the country's Common Information Service Provider (CISP) in its certification process during the first quarter of 2025. Belgian's ANSP skeyes is the designated CISP candidate and the BCAA is currently examining how the issues related to CISP services, such as the business plan and network identification service hosting, will relate to the certification process. Slightly more complex will be the certification process for U-space service providers (USSPs) by BCAA. One candidate is undergoing certification; documents have been received but there are still some questions and assumptions that need to be resolved around the issues identified through the airspace risk assessment.

(source: EASA IAM Implementation Forum, 22 October 2024)

2.4.2 - Bulgaria

Bulgaria has established a Task Force for the coordination mechanism for the deployment of U-space, in line with Article 18 (f) of IR 2021/664. This was followed by the designation of a Coordination Body, in charge of holding public consultations and hearings on the potential deployment of U-space in Bulgaria. This U-space Coordinator has been assigned a rather central role in an updated Civil-Military Cooperation framework. In parallel, a decree on the safe operation of drones in Bulgaria and the supervision of their operators has already been prepared and is to be signed by the Minister of Transport.

(source: EASA workshop: U-space – From the concept to the implementation – 22&23/06/2023)

2.4.3 - Estonia

Estonian Air Navigation Services (EANS) have implemented a UTM suite covering services and applications towards drone operators. Users now have access to up-to-date drone flight information, can register themselves as operators and securely exchange data, monitor airspace conditions, file flight plans, and even apply for take-off clearance.

EANS is on track to be the common information services (CIS) provider in Estonia and the newly implemented, cloud-based UTM suite facilitates a CIS environment for all unmanned aviation stakeholders. Its secure open protocol ensures seamless data exchange between government authorities, entrepreneurs, and drone operators.

The UTM suite is available as a user-friendly and interactive web portal, and soon as a mobile app, consisting of the UTM Operation Manager to enhance airspace safety and efficiency for drone operators and the UTM Airspace Manager application for air traffic controllers (ATCOs) to enhance safety and situational awareness. This ensures that both drone operators and ATCOs have a comprehensive understanding of their operating environment. The coordination of drone flights between the operator and ATCOs was first implemented in Tallinn, due to the proximity of Estonia's largest airport. Developments to implement the same service near regional airports is ongoing, as is adding new features to the software.

(source: *Estonia puts UTM suite into operation, provides secure registration, flight authorisation and geo awareness - Unmanned airspace*)

2.4.4 - FAB CE airspace alliance: Austria, Bosnia & Herzegovina, Croatia, Czech Republic, Hungary, Slovakia and Slovenia

The seven States and air navigation service providers (ANSPs) of the FAB CE airspace alliance are developing a harmonized approach to developing U-space areas in response to the European Union Regulation establishing U-space areas within the EU.

The functional airspace block has set up a UAS traffic management (UTM) Coordination Group (UCG) focused on three main areas:

- developing an understanding on roles and responsibilities for the development of common information services (CIS);
- developing a common FAB CE risk assessment methodology for the implementation of U-space airspace along with associated services; and
- understanding the procedures and technology for separating manned and unmanned aircraft operations.

(source: *https://www.unmannedairspace.info/uncategorized/central-european-ansps-agree-to-harmonise-their-u-space-utm-implementation-programmes/*)

Austro Control, together with Frequentis, has developed a traffic management system for the safe integration of drones into the Austrian airspace. The launch of Austro Control Dronespace aims to make flying drones in Austria safer and simpler. Dronespace is designed to enable digital drone flight planning and flight clearances in real time. Drone pilots will have comprehensive situational awareness of other flights in their vicinity as well as all information relevant to aviation law regarding geo zones and airspace restrictions. With more transparency on planned drone flights and the automated clearance process (a process previously carried out via telephone by the tower), the new system also makes things less complicated for Austro Control's air traffic controllers.

Dronespace in a nutshell:

- Flying drones becomes easier as flight plans can be filed, and flight clearances requested or issued directly in the app;
- Flying becomes safer, because air traffic control and drone pilots will be able to see where other drones are on the move;
- Drone flying becomes easier, because Austro Control Dronespace will be the contact point for all official and operational processes: from registering as a drone operator to personally managing individual drones in the app;
- Drone flying becomes safer because the "Quick Check" function for drone pilots always makes it immediately clear where it is permitted to fly and where it is not.

The new system has been tested intensively with drone operators and the constructive feedback was incorporated into the development process. Drone pilots can use the Dronespace app for all their drone flights and file a flight plan when doing so. With this, their drone flights will always be visible to other drone pilots as well as to air traffic control, enhancing safety. Since 24/10/2023, digital flight plan filing, and approval is possible directly and digitally via dronespace.at.

(source: *www.austrocontrol.at*)

2.4.5 - Finland

The Finnish Transport and Communication Agency (Traficom) has published a report on U-space and Urban Air Mobility (UAM) as a business, which predicts increasing demand over the next 5-10 years. According to the Traficom report, the development and implementation of U-space services will inevitably call for investments, listing the biggest costs as testing and development to meet regulation and interoperability requirements. With

this in mind, the report questions whether there is sufficient demand and ability in Finland to become a U-space service provider nationally, or whether, for example, larger service providers certified by EASA would offer U-space services across Europe in places where there is sufficient need and demand.

(source: *https://www.unmannedairspace.info/uncategorized/finnish-transport-agency-considers-national-u-space-demand-and-potential/*)

Finland's VTT (Technical Research Centre of Finland) has published a tender for the supply of a pre-commercial U-space system. The object of the tender process is to award a single contract to a supplier that can provide the licenses for a precommercial U-space system application and hosting in a cloud environment. VTT aims to purchase 25 simultaneous per-user licenses with an option to purchase perpetual and/or additional licenses in the future. All operators of drones in U-space airspace are required to purchase the following services which must be available anywhere in Finland:

- UAS flight authorisation service,
- Geo-awareness service,
- Network identification service,
- Traffic information service, according to Regulation (EU) 2021/664 on a regulatory framework for U-space,
- Weather information service.

The procurement includes fifteen trackers and there has to be an option to purchase more trackers later if needed. VTT uses drones for research purposes. The services offered in the tender must be compliant with EU Regulation, particularly with the Regulations regarding aviation safety (2023/203), requirements for manned aviation operating in U-space airspace (2021/666), requirements for providers of ATM/ANS and other air traffic management network functions (2021/665), regulatory framework for U-Space (2021/664), EASA's Acceptable Means of Compliance (AMC) and Guidance Material (GM) for 2021/664 and the GDPR 2016/679 (General Data Protection Regulation).

(source: *https://www.hankintailmoitukset.fi/en/public/procedure/8706/enotice/11773/*)

2.4.6 - France

France is still at the beginning of U-space implementation. The "U-space together" project has been set up. A fully integrated airspace management for manned and unmanned traffic is seen as a long-term goal but not possible yet taking into account the current regulations. U-space implementation will likely be limited to parts of controlled airspace such as in the CTR, over urban areas, over specific governmental and industrial complexes and above natural areas. Considering CIS, data from different data sources that are linked in a network will be made available to USSPs. The designation of a single CIS provider will not be necessary. To date, the focus is on recreational UAS, whereas U-space will be used by professional UAS operators. Regarding cost-recovery, it is possible there will only be a charge for technical supervision, not for USSPs. No meteorological provider will be designated.

(source: Dutch Government - *https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2021/11/03/u-space-scenarios-governance-en-finance/u-space-scenario-s-governance-finance.PDF*)

2.4.7 - Germany

German ANSP DFS, together with Deutsche Telekom, founded a joint venture Droniq to offer a commercial UTM system. U-space was trialled in Hamburg by Droniq and supported by the German Federal Ministry for Digital and Transport (BMDV). The project brought number of useful conclusions and recommendations for the U-space services. The first U-space airspaces are planned to be designated in early 2023 by the ministry.

In December 2022, the BMDV has published their U-space concept in a document intended to provide the basis for the establishment of U-spaces and was developed by the Unmanned Aviation Project Group in the

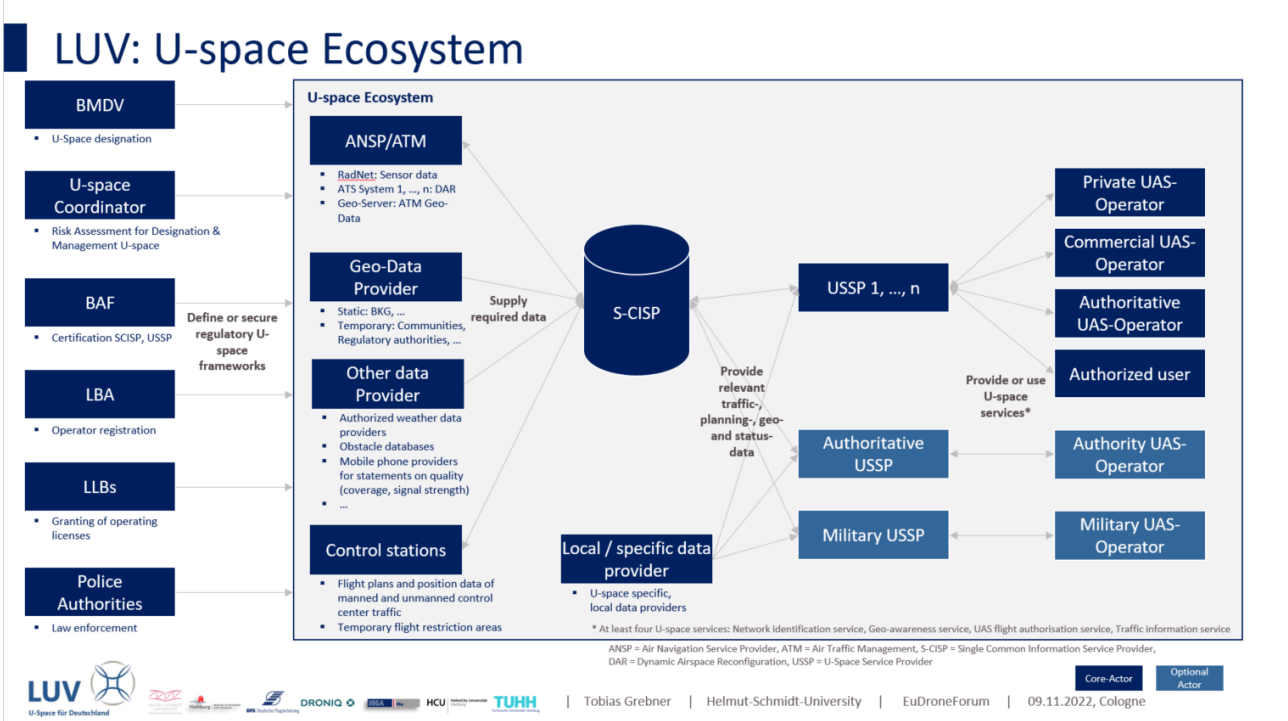
BMDV in a group of experts with the participation of various federal ministries, federal states, authorities, federal companies and the Drone Advisory Board. It serves to define the responsibilities, necessary structures and the procedure for the designation of U-Spaces in accordance with the U-space regulation.

This concept document sets forth a number of principles:

- U-space airspaces will be primarily designated in urban areas, but also to facilitate the safe integration of drone traffic into specific areas (e.g., military airspace, cross-border drone operations).
- U-space airspaces will be defined as sets of hexagonal portions of airspace to enable a smooth reconfiguration of the U-space airspace.
- The BMDV will designate a U-space coordinator in charge of performing safety, security, environmental and privacy assessments in the process of designating U-space airspaces. The approval of the Federal Ministry of Defence is required for the designation of U-spaces if (low altitude) flight routes and airspaces under military responsibility are affected.
- The BMDV will designate a single CISP for all U-space airspaces in Germany.
- Entities in charge of security (e.g., military, police, domestic intelligence services, customs, civil protection, emergency services) are exempt from the obligation to use a USSP in U-Space. If they operate manned or unmanned aircraft in U-space airspace, they should be digitally connected to the Single CISP and transmit the routes and destinations of their aircraft as well as necessary temporary airspace restrictions to the Single CISP as soon as they are known.

(source: *https://www.dipul.de/homepage/en/aktuelle-meldungen/u-space-concept/*)

The following diagram (© LUV project) illustrates the overall U-space architecture foreseen in Germany:



Germany's Federal Ministry for Digital and Transport (BMDV) has published its "Strategy on the establishment of U-spaces in Germany" outlining a plan to create new U-space airspaces in Germany. It includes the definition of U-space and outlines the requirements for both private and public stakeholders involved in the future establishment of these new airspaces. Its purpose is to define the responsibilities, necessary structures and the procedures for the designation of U-spaces in accordance with Implementing Regulation (EU) 2021/664.

The BMDV overview states: "In most cases, U-spaces are established in agglomeration areas because a strong demand for drone operations and high traffic density can be expected there (e.g., Berlin, Hamburg, Frankfurt, Munich and the Ruhr-Düsseldorf-Cologne region). However, there are also arguments for U-spaces where the integration of unmanned aviation into existing traffic structures may be necessary for other reasons (e.g. military airspaces, cross-border UAS operations)."

The BMDV document states that the creation of a U-space airspace is subject to the fulfilment of several criteria by the relevant stakeholders. In particular, the approval of the Federal Ministry of Defence is required for the designation of U-space airspaces that cover (low altitude) air routes and airspaces under military responsibility.

(source: *https://www.unmannedairspace.info/emerging-regulations/urban-area-bvlos-operations-require-continuous-communication-with-central-base-airbornerf/* and *https://www.dipul.de/homepage/en/aktuelle-meldungen/u-space-concept/u-space-concept-en.pdf?cid=1f6*)

HHLA, the Hamburg port authority, through its drone unit HHLA Sky has developed a complex UTM system for the port and city of Hamburg. Based on an open architecture approach to facilitate the integration of new users, this system features real-time approvals, dynamic airspace reconfiguration (around 30 helicopter flights a day transverse the port area) and segmented flight approvals, so drone operators can see when temporary airspace restrictions might impact their flight plans. HHLA Sky plans to provide access to this system to future USSPs, as a component of the broader system required to deliver U-space services.

(source: EASA IAM Implementation Forum, 22 October 2024)

2.4.8 - Ireland

The Irish Aviation Authority (IAA) has published its *State Plan for Aviation Safety* on 16/01/2023. This plan set out two new actions: to work with the Department of Transport and drone industry stakeholders to facilitate the safe integration of drones into the Irish civil aviation system by Q4 2024 and to work with aircraft operators, airport operators and ANSPs to address the risks of drone infringements at aerodromes in accordance with EASA guidance "Drone Incident Management at Aerodromes" by the fourth quarter of 2025.

The following drone actions have been taken or are under development by the IAA:

- Mature draft of National UAS policy framework under review.
- IAA UAS Advisory Council established.
- IAA UAS implementation roadmap established including 7 workstreams:
  - WS-1: Building Operation Capacity
  - WS-2: Ensuring Effective Airspace Design & Usage
  - WS-3: Facilitating Drone Products & Airworthiness
  - WS-4: Enabling Innovation, Research & Development
  - WS-5: Assuring Oversight, Enforcement and Security
  - WS-6: Establish Market Surveillance Authority Role
  - WS-7: Ensuring Safe Integration with Manned Aviation
- IAA drone website established (*https://www.iaa.ie/general-aviation/drones*).
- Pilot training modules provided for UAS pilots (i.e., open and specific category).
- Developing risk-based oversight and enforcement policies in open/specific categories.
- National legislation being drafted to address privacy rights and enforcement powers.
- Implementation of EU regulation concerning USSPs per EU Regulation 2021/664, effective in January 2023.

- Work in progress to address UAS geographical zones and development of the geographical zone electronic dataset.
- Regulatory support provided to industry in developing research projects and drone trials in Ireland.
- Supporting EU development of regulation for certified UAS passenger operations.
- Ongoing digitisation of Drones activities (e.g., applications, training, certificates etc) on IAA digital platform.
- Supporting ongoing development of Counter-UAS plans for airports.
- Monitoring implementation of guidance and recommendations in accordance with EASA Guidance "Drone Incident Management at aerodromes" for aircraft operators, airports and ANSP's.
- Developing drone sector risk register to help identify and mitigate main operational risks.
- Conducting drone related safety promotion campaigns for open category (e.g., pre-Christmas).

(source : *https://www.iaa.ie/news/2023/01/16/irish-state-plan-for-aviation-safety-2023-2025-published*)

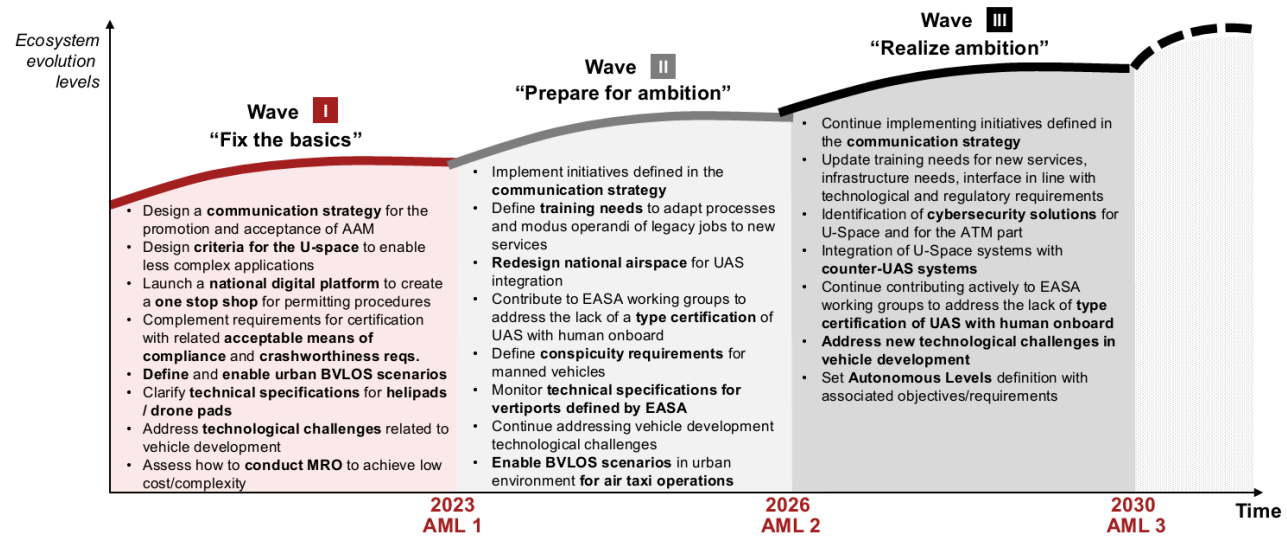
2.4.9 - Italy

Italian CAA, ENAC, has developed an AAM National Strategic Plan (2021-2030) for the development of Advanced Air Mobility in Italy, which clearly identifies U-space as an enabler for future concepts such as AAM, allowing the integration of different airspace users in urban airspace. The strategic plan proposes an AAM framework around six pillars, including:

- Airspace design and implementation, which develops topics of airspace integration, definition of flight zones, restriction of certain flight altitudes, infrastructure requirements, ground risk assessment;
- Vehicle Management, which develops topics of risk classes, pilot licensing, flight over people, operations in BVLOS (Beyond Visual Line of Sight), autonomous flight, response to different weather conditions, maintenance requirements;
- Air Traffic Management, which develops topics of registration and identification, operator certification and licensing, U-Space requirements.

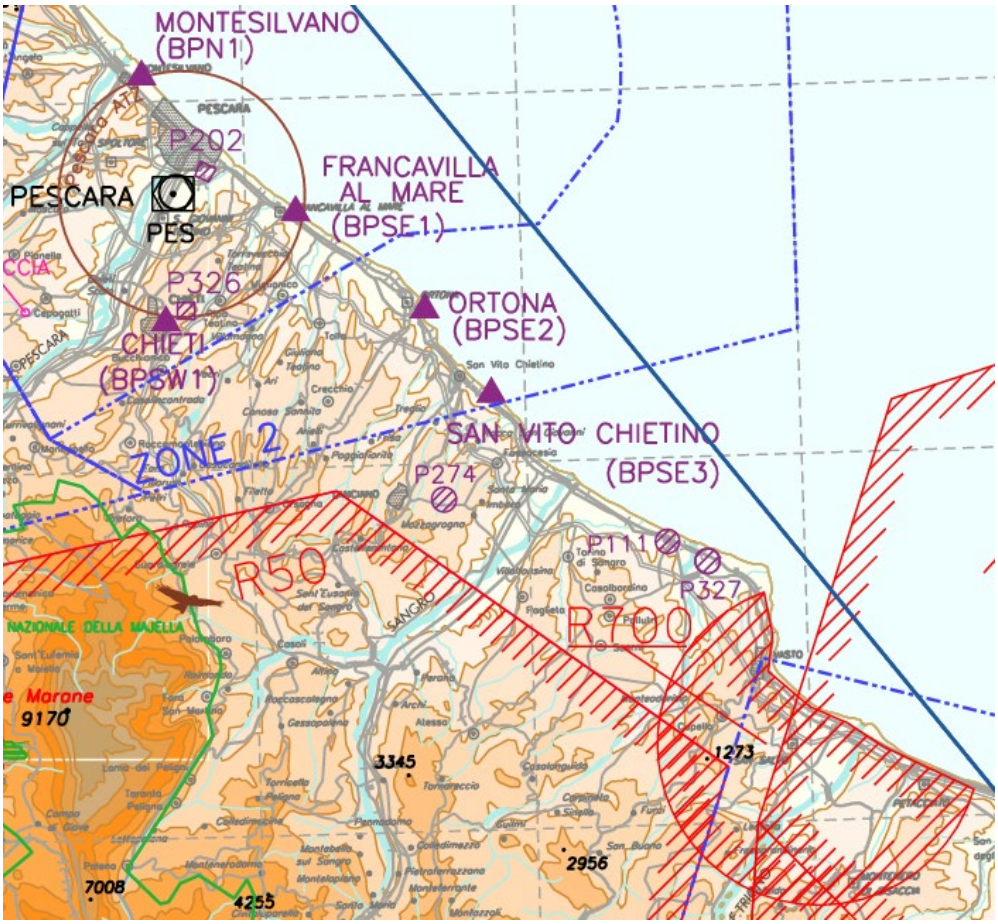
Three maturity levels (called AML, Advanced Air Mobility Maturity Level) have been defined, which will have to be reached at the end of different development waves in order to enable more and more applications in terms of complexity and number. The three waves, covering the periods 2021-2023, 2024-2026 and 2027-2030, will provide for the implementation of the activities identified in an overarching Roadmap with a continuous approach.

Roadmap waves overview



The strategic plan posits that integration of U-Space and ATM requires the definition of standardized SWIM interfaces between U-Space and ATM, but also between other stakeholders such as data service providers, aeronautical data providers and authorities. However, the Military are not explicitly mentioned among these stakeholders and the strategic plan makes no provision to address their specificities.

ENAV has published in October 2024 its first dedicated U-space airspace in a portion of Class G airspace, identified as restricted area LI R700 – San Salvo/U-space in the country's Aeronautical Information Publication (AIP), will become active from 28 November 2024. This U-space airspace is located in the Province of Chieti in the Abruzzo region of the country, covers a height up to 400 ft above ground level, has a radius of 6.5NM and is active from Monday to Friday. The next candidate U-space areas in Italy are centred on Rome, Milan, Venice and Campania. At the same time, ENAV is also undergoing certification as both CISP and USSP



(sources: EASA IAM Implementation Forum, 22 October 2024, Italy AIP)

2.4.10 - Lithuania

Oro Navigacija (ON), a certified European ANSP that provides services to aircraft flying in Lithuanian airspace, has presented its U-space traffic management project to the country's Ministry of Transport and Communications.

Once the system is fully implemented, drone traffic management will be significantly streamlined, and stakeholders will receive information faster. This will reduce risks for residents, institutions, and businesses and ensure smoother operations. Both drone pilots and residents will soon be able to connect to the U-space system via a mobile app, which will offer flight approval, traffic information, and other services.

(source: *https://www.unmannedairspace.info/latest-news-and-information/oro-navigacija-presents-lithuanian-utm-system-ahead-of-implementation/*)

2.4.11 - Netherlands

The Dutch Ministry of Infrastructure and Water Management has commissioned a study on the future governance and financing structure for U-space in the Netherlands. The research gives insights in how other countries (plan to) execute the U-space regulation and how a selection of the Dutch drone sector prefers the regulation to be implemented. The research results in a total of 5 models for the establishment of U-space in the Netherlands, varying from a market driven model to a model focusing on integration within the current ATM model. Finally, the models were rated against several assessment criteria, resulting in a preferred model and advice on how to proceed with implementation of this model.

(source: CANSO news - *https://canso.org/study-on-the-governance-and-finance-structure-for-u-space-in-the-netherlands-successfully-completed*)

(source: Dutch Government - *https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2021/11/03/u-space-scenarios-governance-en-finance/u-space-scenario-s-governance-finance.PDF*)

AirHub Consultancy, in collaboration with partners Ordina and MovingDot, conducted a comprehensive study on behalf of the Dutch Ministry of Infrastructure and Water Management. The study delved into the fundamental U-space architecture, focusing specifically on the architecture of a Single Common Information Service Provider (CISP). The main objective was to create an architectural vision, business-, information- and security architecture for a centralised U-space ecosystem. The Dutch Ministry intends to use this outcome as a foundational framework to establish the CISP in line with European and National standards and regulations, including stakeholder requirements.

When designing the CIS, one can choose between a single national CIS for all U-space airspace or one CIS per U-space airspace. In both scenarios, information can be supplied by a single organisation, i.e. a CISP, or through a distributed system where information is relayed directly from the provider to the users. However, the common information will have to be made available to the relevant and authorised actors at all times on a non-discriminatory basis, ensuring data quality and security. When designating a single CISP, the provider must meet the certification requirements specified by EASA. The initial choice to appoint a single CISP for all U-space airspace was driven by the need for data exchange within U-space and beyond, into (un)controlled airspace. The Ministry of Infrastructure and Water Management opted for a broader use of the CIS, recognising its central role in sharing information within and outside U-space airspace, with the goal of ensuring safe and integrated use of airspace by both unmanned and manned air traffic.

The architectural vision laid the foundation for the development of the CIS architecture. This vision defined the relationships between various stakeholders, both within and outside U-space, and identified the necessary capabilities of the CISP as an organisation. Through stakeholder interviews, the study identified the requirements of different stakeholders, including ANSP, Defence and state operators. The vision also emphasized an extended CISP providing services outside U-space. Alongside the architectural vision, the business and information architecture were created, and a security architecture was developed in parallel, following the 'security by design' approach.

Besides the development of the architecture, an international benchmark has been conducted with interviews with ANSPs and CAAs in other countries (e.g. FOCA, LFV). It became clear during the stakeholder interviews that a centralised architecture (single CIS) is preferable to a distributed model. Important considerations here are that the CIS is seen as a national (critical) infrastructure where a single source of information is required. A public task is also a logical choice, in which the government provides basic needs/information. The quality and reliability of data in combination with (cyber) security is of particular importance in this centralised form to reduce the risk of a 'single point of failure' as much as possible. Partly due to these considerations, EASA member states that have already made their choice to designate the national ANSP as a single CISP.

The study concludes that the single CISP model with the ANSP as the most logical choice is a suitable choice. Furthermore, offering services outside U-space is desirable, especially if these services enable UAS applications, such as BVLOS flights. The study recommends that the Ministry further investigates the phasing of the CISP

towards a national single CISP and explores the types of services that can be provided outside U-space without conflicting with potential commercial (U-space) Service Providers.

(source: *https://airhub.app/usecase/defining-a-uspace-cis-architecture/)*

LVNL is currently looking at their role in the unmanned aviation industry. While today's operations in controlled airspace are limited by capacity and legislation, operations in uncontrolled airspace are beyond the scope of LVNL's services. However, they might play an important role in uncontrolled airspace as well in terms of information management (known as AIP in traditional aviation) and in the near future with U-space. LVNL launched a study to identify the required information that is needed to safely conduct drone operations, how it can be defined as D-AIM, and how this relates to the basic architecture for different types of airspace (uncontrolled, controlled, and U-space).

The outcome of this research shows that Drone AIM (D-AIM) is necessary for safe and efficient unmanned operations. In addition to traditional AIM elements, specific information is needed to be able to safely conduct drone operations, such as population density information and CNS systems. The additional information provided in this assignment as part of the D-AIM is considered independent of the type of airspace where the flight will take place and can be both static or dynamic (real-time). This means that the definition of D-AIM should be considered part of the bigger picture, including but not limited to the implementation of U-space. It therefore also raises the question of what role LVNL will play in the U-space ecosystem. This can vary from being the ATM stakeholder (current role), the CISP, a USSP, or even all three.

It still needs to be made clear which role LVNL will take. During this project, the different roles and corresponding responsibilities have been addressed to give LVNL insight into the possible roles, and it has also visualized the basic architecture for the different types of airspace. In neighboring European countries, choices are being made or have already been made regarding the role of the ANSP. The Swedish ANSP (LFV) has opted for a Single CIS provider principle, just like in Spain where ENAIRE has opted for a centralized model in which ENAIRE will be certified as the CIS provider.

With the results of this project, LVNL has a better understanding of the required information (flows) and the corresponding roles (for LVNL and other stakeholders).

(source: *https://airhub.app/usecase/defining-drone-aeronautical-information-management*)

The area between Katwijk and the port of Rotterdam has been designated by the Netherlands Ministry of Infrastructure and Water Management as a preferred area for BVLOS flights with drones in closed airspace. The designation means that the province of Zuid Holland can start the airspace and flight procedure change process to make the airspace available for BVLOS flights.

The designated area includes the drone test centre Unmanned Valley and the port of Rotterdam, where a U-space prototype is being implemented.

The Zuid Holland province will first undertake the airspace and flight operations change procedure, which sets out the steps to be taken before the national government can determine the change to the airspace. The actual size of the area is determined on the basis of a needs assessment among companies in Unmanned Valley and airspace users. In addition, an airspace safety analysis is taking place.

(source: *https://www.unmannedairspace.info/latest-news-and-information/netherlands-designates-area-for-bvlos-flights-with-drones-in-closed-airspace/*)

Breda has become the first Dutch municipality to receive a permit to conduct BVLOS drone test flights over the Hazeldonk industrial estate on the Belgian border. The permit from the Ministry of Infrastructure and Water Management allows Bredata – part of the municipality of Breda – to test the use of a drone in the event of incidents such as a traffic accident or a fire alarm. Research is also being conducted into whether the drone

can also make a significant contribution on a more structural level. For example, in monitoring road surface wear or detecting litter.

One drone operating from a remote docking station is used by multiple organisations in the tests that Bredata is conducting with a group of partners including regional security, police, road and maintenance organisations, as well as private companies and various departments within the municipality of Breda.

(source: *https://www.dronewatch.nl/2024/06/25/breda-mag-als-eerste-gemeente-bvlos-vluchten-vanuit-dronebox-gaan-uitvoeren/*)

2.4.12 - Norway

Avinor expects to be designated as the single Common Information Service provider in Norway in 2023. To enable growth in the unmanned aviation industry, the new UTM system will need to provide some, or all, Common Information Services outside of U-space airspace as well. Additionally, Avinor envisions to provide USSP services within U-space airspace, and similar services outside of U-space airspace, to further promote growth in the industry.

In anticipation of this new role, Avinor has launched a Request for Information to inform the market of Avinor's forthcoming need of a new UTM system that is compliant with IR 2021/664 for those airspaces where the regulation is applicable, gather relevant information to use in the possible upcoming procurement procedure, to give potential Suppliers an indication of what kind of requirements to expect in the possible upcoming procurement procedure, and assess possibilities for a partnership with the Supplier of a UTM system.

2.4.13 - Poland

Poland makes use of the European COVID Recovery Fund to launch a national UAS programme. A budget of 164M euros has been made available so as to become a leader with regards to UAS in Europe, it is expected that the UAS market will contribute 128B euros to the polish economy within 5 years. Half of the budget is foreseen for PANSA (Polish Air Navigation Services Agency), responsible for the development of the infrastructure enabling UAS in the polish airspace. Within the new ATC (Air Traffic Control) centre, a specialised Drone Technology Parc will be built where, apart from the UAS infrastructure, a monitoring and command centre will be implemented. Furthermore, a low-altitude airspace management coordination centre will protect and guarantee public health and safety.

(source: Dutch Government - *https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2021/11/03/u-space-scenarios-governance-en-finance/u-space-scenario-s-governance-finance.PDF*)

The Polish Air Navigation Services Agency (PANSA) has published a guide to the implementation of U-space regulation to present "possible solutions to emerging problems and help to make the advanced drone ecosystem even better and more efficient," says the head of PANSA's UTM Projects Department, Rafal Paprocki. The guide has been complied by PANSA experts and includes problems and possible solutions. Solving these will help to deliver safe, efficient and secure access to airspace for large numbers of drones.

The guide lists 'must haves' including:

- CISP as a flight plan repository
- CISP as a tracking data repository
- Crossing of the flight plans
- Time of information about airspace restrictions

'Nice-to-have' includes:

- DAR automation
- Modification of flight plan by USSP
- Process of designation of U-space

PANSA has taken a step by step approach to the introduction of U-space, and sets out the following guidance:

U-space is so advanced concept, that must be introduced with caution and maintaining the highest safety standards. In Poland designation of U-space follows development stages:

- Tests in dedicated testing site

- Tests in destination
- Decision of the CAA
- Constant supervision.

(source: *https://www.unmannedairspace.info/emerging-regulations/pansa-publishes-implementation-of-u-space-regulation-guide-based-on-experience/*)

The Polish Air Navigation Services Agency (PANSA) has launched the DroneTower mobile application, which is now the official system for reporting the intention to fly a drone (Check-In) in Poland. The application allows users to check flight conditions in a selected location, enables the operator/pilot of an unmanned aerial system (UAS) to notify the intention to fly (Check-In), conduct non-verbal two-way communication with an air traffic controller in the case of flight in the controlled zone of airports, inform of emergency situations and receive reminders about the expiring Check-In time. The app also provides information about other reported UAS flights in the immediate vicinity.

The new app launched on April 15 and the transitional solution, checkin.pansa.pl, has been withdrawn from operational use and will only be used in emergency situations. DroneTower contains information about both fixed and flexible zones – active and inactive. The DroneTower application is part of the PansaUTM system, therefore it allows operators to access the missions they have created and activate them at the time of Check-In.

In compliance with European and Polish regulations, the latest update includes data about geozones, a new module of the PansaUTM system, which can be used to apply for geographical zones for authorised entities.

The app launch follows the introduction of a new portal called the National Drone Information System, which enables registration for operators and pilots, operational authorisation and provides access to information on the Civil Aviation Office's permits. According to CAO data, there are currently a quarter of a million UAS operators registered in Poland.

(source: *https://www.unmannedairspace.info/latest-news-and-information/poland-launches-official-uas-flight-reporting-app/* and *https://www.unmannedairspace.info/latest-news-and-information/pansa-updates-dronetower-app-to-include-geozones/*)

2.4.14 - Portugal

NAV Portugal, the Portuguese ANSP, are working on defining possible business models around the provision of Common Information and U-space services. NAV Portugal will probably be designated as a single CISP for the whole country.

In parallel, ANAC, the Portuguese CAA, is defining the airspaces that will be designated as U-space airspaces and the government is preparing the law that will implement this new organisational and airspace structure.

2.4.15 - Slovakia

Slovakia has earlier established a Temporary Working Group to draft documents governing the implementation of requirements for U-space and Concept of Operation for UAS in the airspace of Slovakia. The members have been nominated by the Ministry of Transport, Ministry of Defence, Ministry of Interior, Slovak Information Service, National Security Bureau, Office for Personal Data Protection, Authority for Spatial Planning and Construction, University of Žilina and Technical University of Košice.

(source: Resolution U/2023/7 of the Permanent Interdepartmental Commission for Aviation *https://www.mindop.sk/uploads/extfilesnew/doprava/letecka/SMK%20MDPT%20SR%20a%20MO%20SR/03042023/Uznesenie%20U_2023_7.pdf /Slovak language only/*)

2.4.16 - Spain

The Ministry of Transport, Mobility and Urban Agenda has established the National Action Plan for the Deployment of the U-space (PANDU). The document has been developed under the leadership of the Directorate General of Civil Aviation (DGAC) with the co-authorship of the State Aviation Safety Agency (AESA) and ENAIRE, as well as the outstanding collaboration in its development of the Ministry of Defence.

The Plan sets out four objectives, which will be translated into specific action lines and actions along its time horizon:

1. Actions in the area of airspace.
2. Implementation of the national service delivery model.
3. Deployment of U-space and CIS services and enablers for their provision.
4. Establishment of mechanisms for cooperation and collaboration between administrations.

(source: *https://www.seguridadaerea.gob.es/en/noticias/publicado-el-plan-de-acci%C3%B3n-nacional-para-el-despliegue-del-u-space-que-integrar%C3%A1-los*)

Spanish air navigation service provider, ENAIRE, has entrusted Indra in a public tender with the deployment of its U-space system in Spain. The system includes both CISP (Common Information Service Provider) and USSP (U-space Service provider) platforms, enabling a federated architecture since the first operational phases of the project. This U-space system will follow the 'single CIS Provider' architecture from U-space regulation, being ENAIRE a pioneer in Europe with the role of the Common Information Service Provider, becoming not only a national but also an international reference.

(source: ENAIRE news - *https://www.enaire.es/es_ES/2021_08_26/ndp_adjudicacion_u-space*)

ENAIRE has created the GO-DRON operational task force for meeting with stakeholders from the drone sector, where it can propose and analyse improvement initiatives involving the needs of both professional and recreational unmanned aviation users, as these relate to air navigation.

Through this task force, ENAIRE is enabling the debate and analysis of the enhancements put forth to help the sector develop safely and harmoniously, improving the application of the procedures contained in the current laws, and facilitating the debate on upgrades that could be presented to the relevant authorities for their consideration. The goal is to potentially incorporate content from national or European standards to regulate these operations, and thus enable the coordinated deployment and implementation of U-space in Spain.

The members of GO-DRON include Aena (main airport operator), AESA (National Aviation Safety Agency), the Civil Aviation General Directorate, the Interior Ministry's State Secretariat for Security, the Air Force Staff and professional associations representing airspace users.

(source: ENAIRE news - *https://www.enaire.es/en_GB/2021_02_26/ndp_enaire_launches_go-dron_operational_task_force*)

The Spanish General Directorate of Civil Aviation has launched a new portal for the coordination of activity relating to the transport ministry's development of UAS and U-space regulation. Part of Spain's National Action Plan for the Deployment of U-space (PANDU) this portal enables coordination of applicable regulations across all geographical areas. The Portal is publicly accessible and connects administrations, industry and citizens.

The DGCA is also testing their U-space airspace designation process around the city of Benidorm, within the framework of the SESAR U-ELCOME project (cf. also 4.2.2 -), and notably the Airspace Risk Assessment process. The DGCA has defined a set of criteria that will guide the designation of an airspace as a U-space airspace and include safety, security, the environment and protection. If this testing phase is successful, the next step will be to apply this airspace designation process to the other Spanish testing areas where U-ELCOME trials will be conducted.

(sources: https://www.unmannedairspace.info/emerging-regulations/spain-launches-new-web-portal-to-coordinate-regulatory-activity-across-geographical-areas/, European network of U-space stakeholders)

At a recent presentation to the Transport and sustainable mobility commission of the Spanish parliament, the Spanish Minister of Transports has announced that, following the development of the U-space platform in 2023 and the testing of complex drone operations, Spain will certify U-space common information services in 2025. ENAIRE is expected to start a certification process in 2024 that will lead to its formal designation as CISP for the State and the provision of U-space services will begin in 2025.

(source: https://www.infodron.es/texto-diario/mostrar/4697496/oscar-puente-transporte-prestacion-servicios-space-espana-podra-iniciar-2025/)

Spain has published on 04/06/2024 a Royal Decree on UAS regulations which includes major provisions for the implementation of U-space. According to the new decree, ENAIRE is designated, to ensure the effective implementation of U-space, as the sole provider of common information services to provide its services exclusively in all U-space airspaces designated in airspace under Spanish responsibility, for a period of ten years, extendable by agreement of the Ministry of Transport and Sustainable Mobility.

Moreover, the new decree defines some of the operational limitations which will apply to drone operators in U-space areas, or areas defined as UAS geographic zones for reasons of citizen security and the protection of people and property in urban environments.

The new law complements the European Union regulations (Delegated Regulation (EU) 2019/945 and Implementing Regulation (EU) 2019/947) and repeals Royal Decree 1036/207 that regulated the civil use of these aircraft. The new law also complements the legal regime of Implementing Regulation (EU) 2021/664 on a regulatory framework for U-space (U-Space Regulation), in terms of organisation and competences. In this regard, the Interministerial Commission for Defence and Transport (CIDETRA) is responsible for designating airspace as U-space. Likewise, the Ministry of Transport and Sustainable Mobility is the entity responsible for the designation for all airspaces and U-space of Spanish responsibility of the single certified Common Information Service Provider (CISP).

In this context, EASA is the competent authority for deciding on the issue, modification, revocation, suspension or limitation of Common Information Service Provider (CISP) certificates and U-space Service Provider (USSP) certificates and for the supervision of those providers.

(source: https://www.seguridadaerea.gob.es/en/noticias/nueva-actualizacion-normativa-para-impulsar-el-sector-de-los-drones-en-espana)

2.4.17 - Sweden

Swedish ANSP LFV is looking to establish a reliable, robust and efficient UAS/UTM solution for LFV and its associated government authorities, customers and other stakeholders in a cost-efficient manner. The UAS/UTM solution consist of three sub services. To this effect, LFV has launched an open procurement procedure:

- Common Information Services – Common Information Services will be provided by LFV as a single common information service provider on exclusive basis in Sweden.
- U-space Services – The number of potential users of LFVs U-space services is estimated as follows: Sweden's civil aviation authority (CAA), Transportstyrelsen, has a register of approximately 30 000 registered drone operators (as of early 2022). According to surveys performed by the Swedish CAA (2017-2019), the approximate number of persons with access to a drone is around 400 000 to 600 000.
- Other related services – The potential number of users for the "other related services" is difficult to estimate at this stage. Since the development of the European and national legislation will affect the potential number of users of these services. However, some estimation can be made by the following numbers:

- approx. 50 ATS/AFIS units.
- approx. 10 external authorities (e.g., CAA, Military, Police authorities, Environmental authority, etc.);
- 290 cities/municipalities.
- 21 county administrative boards;
- 20 region administrative boards.
- Approx. 200 local, regional and state Rescue services.

The Swedish government has extended LFV's responsibility for drones by including in its remit information and services that support unmanned aviation. The new Regulation (2023:434) requires LFV to provide, within and outside the country, air navigation services for civil and military aviation, common information services for U-space airspace and services for the planning and execution of flights for unmanned aviation. LFV is designated as the exclusive provider of common information services for all U-space airspace in accordance with Article 5(6) of Commission Implementing Regulation (EU) 2021/664 of 22 April 2021.

(source: *https://lfv.se/en/news/news-2023/the-government-gives-lfv-increased-responsibility-for-unmanned-aviation-and-extends-the-director-generals-appointment*)

2.4.18 - Switzerland

Switzerland has adopted a pragmatic, market-driven approach and foresees setting up U-space with the direct involvement of commercial parties. FOCA aims at implementing a first U-space airspace by March 2023. This takes place in the SUSI (Swiss U-Space Implementation) programme, a partnership of FOCA (Federal Office of Civil Aviation) (CAA), skyguide (ANSP) and 30 companies. They run a joint network for shared Discovery & Synchronisation (DSS) for the setup of dynamic flight restrictions. For the surveillance of USSPs, a low-cost solution has been established under the form of an automated system that checks flights online via the open DSS network. This allows the FOCA to react in case of a USSP getting into trouble (e.g., getting hacked).

In order to prepare for the implementation of U-space, FOCA has run a survey of potential USSPs that led to over 40 different entities expressing their interest in providing U-space services in Switzerland. This result led FOCA to investigate how to automate part of the process that will lead to the certification of these USSPs, but also to consider the impacts of such automation on the NSAs of other countries where these USSPs may operate. USSPs would serve as CIS providers and, in the beginning, the government will not charge users in terms of costs. Qualified entities are considered for certification and supervision purposes.

(source: Swiss Federal Office of Civil Aviation, Swiss U-space implementation, SUSI – Swiss U-Space Implementation - *https://susi.swiss/*)

Switzerland will harmonise its legal framework with Europe relating to drones from 1 January 2023 and apply the European regulations relating to U-space. A set of digital and automated functions and processes can therefore be implemented in a defined airspace. U-space aims to integrate the growing traffic of civilian drones by guaranteeing harmonious coexistence with traditional aircraft. Pilots will therefore benefit from a better overview of the traffic situation.

(source: *https://www.unmannedairspace.info/emerging-regulations/Switzerland to adopt EU regulations relating to drones from January 2023 - Unmanned airspace*)

Switzerland is currently preparing the designation of a first U-space airspace around Zurich and is currently performing the required Airspace Risk Assessment, with an objective to complete this step by the end of 2023. Starting from the 2nd half of 2023, the civilian ANSP (skyguide) and the regulator (FOCA) will also be involved in the designation process, respectively on technical aspects, such as the implementation of the Dynamic Airspace Reconfiguration process and performance aspects. The Zurich U-space airspace should become functional at end of 2024 or early 2025.

(source: European network of U-space stakeholders)

Switzerland's Federal Council approved on 14 June 2024 the revised ordinances designed to implement the European U-space regulatory package, which Switzerland adopted on 24 November 2022. The Federal Office of Civil Aviation (FOCA) will now be able to designate specific U-space areas in which certified U-space service providers (USSPs) will provide digital and highly automated services to drone operators. This development ensures that complex drone operations can be managed efficiently, and so creates significant benefits for drone operators.

(source: *https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-101401.html*)

3 - U-SPACE REGULATION

This section provides an overview of the on-going regulatory activities regarding U-space across the Member States of EDA, as well as in countries subject to European Commission U-space regulation. Subjects covered in this section typically include definition of U-space regulation at European and local level, as well as the supporting acceptable means of compliance and guidance material.

3.1 - Changes tracking matrix

The following table indicates changes to this section compared to the previous iteration of the report.

- An empty cell means no progress or new information is reported for the corresponding region or country.
- 'New' means an entire section has been added to report on progress in a region or country that did not feature in the previous iteration.
- 'Update' means new content has been added for the corresponding region or country. In the updated sub-section, previous information, if it remains current, is written using blue colour, while new information is using black.

	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24/ Aug 24	Sept 24	Oct 24	Nov 24
ICAO					Update	Update			Update			
EU			Update	Update			Update			Update		

3.2 - At ICAO level

ICAO has created an Advanced Air Mobility Study Group (AAM SG), in charge of assisting the ICAO Secretariat in developing a holistic vision and framework regarding AAM. This is done in a coordinated manner with other ICAO expert groups, as appropriate, with the aim to support a safe, secure, efficient and environmentally sustainable integration of AAM operations, and to facilitate the development of the AAM ecosystem. The AAM SG was formally kicked-off from 1 to 5 May 2023 and was structured into three Working Groups:

- Vision WG, charged with assessing, from the global perspective, an AAM ecosystem, its components (subsets and enablers), the interaction among said components, as well the interaction with the other airspace users, as well as the conventional aviation system.
- Small UAS & UTM WG, tasked with identifying the elements which could support member States in the development of necessary UTM infrastructure, capturing the progress of implementation of UTM in various States and regions, and facilitating operational and regulatory foundations to implement AAM operations.
- Explore WG, will explore novel enablers for AAM, such as automation and autonomy, new flight rules, digital information and data management and AAM considerations supporting United's Nations SDG's.

(source: *https://www.icao.int/safety/UA/Pages/default.aspx*)

ICAO's Remotely Piloted Aircraft Systems Panel (RPASP) has approved Annex 6 Part IV, establishing key operational rules for safe international RPAS flights. It provides the necessary regulatory provisions to support international RPAS operations in controlled airspace and at controlled aerodromes and is due to become applicable from November 2026.

RPASP developed the Standards and Recommended Practices (SARPs) to guide states in setting their national regulations regarding remotely piloted aircraft systems (RPAS). Approximately 15 ICAO panels and other expert groups took part in the consultation process. Eight rounds of coordination were conducted starting in July 2017 and concluding in September 2021, including a detailed review by the Flight Operations Panel (FLTOPSP).

Additionally, a comprehensive review was conducted by the RPASP and FLTOPSP Secretariat. This effort was completed in October 2019.

The new Annex 6, Part IV August 2022 relating to Operation of Aircraft, Part IV International Operations Remotely Piloted Aircraft Systems was agreed in August 2022, with amendments due by February 2023 to the Air Navigation Council, for consideration by the Air Navigation Commission and the Council.

The new Annex 6, Part IV is one component of the regulatory framework under development by ICAO to integrate RPAS into the existing international air navigation system. The process involves SARPs in all 19 Annexes to the Chicago Convention, procedures for air navigation services (PANS) and related guidance material.

(source: *https://www.unmannedairspace.info/latest-news-and-information/icao-rpas-panel-approves-annex-6-part-iv-setting-rules-for-safe-international-rpas-flights/*)

New aviation Standards and Recommended Practices (SARPs) have been adopted at the International Civil Aviation Organisation (ICAO) to enhance safety and accelerate the transformation of the global air navigation system, including the integration of Remotely Piloted Aircraft Systems (RPAS). The ICAO Council approved amendments to 15 of the 19 Annexes to the Convention on International Civil Aviation and approved a new "Procedure for Air Navigation Services (PANS) on Information Management".

With the Council's adoption of the new Part IV International Operations — Remotely Piloted Aircraft Systems to Annex 6 – Operation of Aircraft, the basic building blocks for a regulatory framework to enable the international operation of RPAS are now in place. Consequently, RPAS operators will be required to hold a specific operator certificate, akin to the traditional air operator certificate.

(source: *https://www.unmannedairspace.info/latest-news-and-information/icao-adopts-new-international-standards-and-practices-for-remotely-piloted-aircraft-systems/*)

Developed by the RPAS Panel on behalf of the Air Navigation Commission and adopted by the ICAO Council, the Annex 6 Part IV became effective in July 2024 and will become applicable from 26 November 2026.

This first edition of Annex 6, Part IV, focuses on safe and standardised international RPAS operations, with additional standards to be developed as the industry evolves. Specifically, the SARPs cover flight operations, performance operating limitations, RPAS instruments, equipment and flight documents, RPAS communication and navigation equipment, RPAS maintenance, remote flight crew, flight operations officers/flight dispatchers, lights to be displayed in the air and on the ground during operations, contents of an operations manual, and flight time and flight duty period limitations.

(source: *https://www.unmannedairspace.info/latest-news-and-information/icao-issues-annex-on-safe-and-standardised-rpas-operations/*)

3.3 - At European level

This subsection provides an update on regulatory activities carried out in Europe, mainly by EASA. It covers new regulation, the development of acceptable means of compliance (AMC) and guidance material (GM) supporting adopted regulation and updates to existing regulation.

3.3.1 - RMT.0230

EASA has revised the terms of refences of its Rulemaking Task in charge of UAS and UAM (RMT.0230). This latest version expands the scope of the regulatory framework for the operation of unmanned aircraft systems and for urban air mobility in the European Union aviation system.

This new version of the document outlines the latest EASA thinking on how drone operations in the specific and certified categories, and urban air mobility operations will be regulated, including the introduction of new certification specifications for eVTOLs and airspace integration.

(source: EASA *ToR RMT.0230 - Introduction of a regulatory framework for the operation of unmanned aircraft systems and for urban air mobility in the European Union aviation system | EASA (europa.eu)*)

The European Aviation Safety Agency (EASA) has published guidelines for drone operations in the open and specific category. Both industry and Member States may use it as a reference to support application of Regulations (EU) No 2019/945 and No 2019/947.

EASA will continue to collect feedback from the community and, once the material contained in these guidelines is considered sufficiently mature, will apply the rulemaking process, transferring them in AMC and GM that are regularly integrated in the easy access rule on drones.

These guidelines are not legally binding and shall be considered as a working document only, which summarises and disseminates the experience of application of the drone regulatory framework to facilitate of application by the competent authorities, operators.

(source: *https://www.unmannedairspace.info/emerging-regulations/easa-publishes-guidelines-of-uas-operations-in-the-open-and-specific-category/*)

3.3.2 - IR 2021/664

3.3.2.1 - AMC & GM

On 19 December 2022, EASA has published its first set of acceptable means of compliance (AMC) and guidance material (GM) for the U-space regulatory package (IR (EU) 2021/664, (EU) 2021/665 and (EU) 2021/666). This AMC/GM is supported by an Explanatory Note that clarifies that:

- Through this GM, EASA expressly includes military organisations as relevant stakeholders in the U-space as third party. The need for military cooperation is acknowledged to improve safety of both civilian and military flights by sharing relevant data between them.
- EASA suggests limiting the U-space airspace to a 150 m (500 ft) height above the ground. This limitation is deemed desirable to ensure safety of operations, considering the novelty of U-space and the lack of experience with its implementation.
- The AMC/GM envisages the Dynamic Airspace Reconfiguration (DAR) mechanism as a mean to define U-space airspace restrictions to enable military operations. However, the DAR is only applicable in controlled airspace and no similar solution is proposed in uncontrolled airspace.

(source: EASA *AMC and GM to Implementing Regulation (EU) 2021/664 — Issue 1 - Proposed acceptable means of compliance (AMC) and guidance material (GM) to the U-space regulatory package | EASA (europa.eu)*)

EASA also published an amendment (#6) to the AMC and GM to the rules of the air that clarifies the expectations with the requirement SERA.6005(c) of the Rules of the Air, related to communications, SSR transponder and e-conspicuity in U-space airspace. A GM clarifies that coordination between authorities in charge of civil and military aircraft should take place at national level to assess the risk of electronically non-conspicuous military and State aircraft operating in U-space airspace.

(source: EASA *https://www.easa.europa.eu/en/document-library/agency-decisions/ed-decision-2022024r*)

On 26 January 2023 the European Union's U-space regulation IR 2021/664 came into effect. EU Member States will now identify U-space airspace areas where drones will be able to fly increasingly complex operations – beyond visual line of sight, over people, autonomously and at night – supported by air traffic services provided by certified U-space service providers (USSP). USSPs will coordinate drone operations with the air navigation service providers (ANSPs) and operational data exchanges between USSPs, ANSPs and drone operators will be ensured by the Common Information Service Provider (CISP).

(source: *The importance of the European Union's U-space drone regulation - Unmanned airspace*)

On 22 & 23 June 2023, EASA held a U-space workshop titled "From the concept to the implementation", which provided on opportunity to receive clarification from EASA on their vision of U-space, confront it with the early implementation projects currently going on and have some details on the next regulatory steps. The USSP/S-CISP certification process and the outcome of the Member States Task force on the USSP/S-CISP certification harmonisation, was also presented.

Regarding military authorities, they are identified as authorised users of U-space services in the regulation, (for e.g., contributing to the geo-awareness U-space service to inform USSPs of possible airspace restrictions), but are not subject to EASA regulation (unless the Member State has decided to opt-in under the new Basic Regulation for military operations). EASA clarified that the involvement of military authorities in U-space services should be addressed through Member State regulation.

EASA also announced that they will start working on a new issue of the AMC/GM for IR 2021/664 with expert groups beginning 2024, for a publication of the updated AMC/GM in 2025.

(source: *https://www.easa.europa.eu/en/newsroom-and-events/events/u-space-workshop-concept-implementation*)

3.3.2.2 - Easy Access Rules for U-space

The **Easy Access Rules (EAR) for U-space (Regulation (EU) 2021/664)** have been published on the 29th of May. They cover the following regulatory material:

- *Commission Implementing Regulation (EU) 2021/664 (the 'U-space Regulation')*, introducing a regulatory framework for the U-space, an airspace of certain UAS geographical zones, defined for use by unmanned aircraft systems (UAS) operators under specific requirements and on the condition to use certain services;
- *Commission Implementing Regulation (EU) 2023/203*, amending the U-space Regulation as regards requirements for the management of information security risks with a potential impact on aviation safety, applicable from 22 February 2026; and
- *ED Decision 2022/022/R*, introducing the related acceptable means of compliance (AMC) and guidance material (GM) to the U-space Regulation to help in its implementation.

(source: *https://www.easa.europa.eu/en/document-library/easy-access-rules/easy-access-rules-u-space-regulation-eu-2021664*)

3.3.3 - NPA 2022-06

EASA has issued an NPA which puts forward the establishment of a comprehensive regulatory framework to address new operational and mobility concepts that are based on innovative technologies, like unmanned aircraft systems (UAS) and aircraft with vertical take-off and landing (VTOL) capability, and foster and promote their acceptance and adoption by European citizens. Although the scope of this NPA is much wider than the U-space context and is focused on preparing the operations of VTOL aircraft for Urban Air Mobility (UAM), it proposes some requirements to create the conditions for the safe operation of UAS and of manned VTOL-capable aircraft in the U-space airspace.

Notably, the NPA foresees that VTOL-capable aircraft operating in U-space will be under ATC in controlled airspace or will have an e-conspicuity device in uncontrolled airspace to share their position with the USSP(s). The NPA also proposes to conduct air risk assessments for VTOL operations considering four operational environments (combinations of controlled/uncontrolled nature of the considered airspace and availability of U-space services). In U-space airspace, whether in controlled or uncontrolled airspace, the NPA proposes to use the probability of a collision between a VFR helicopter (carried under an AOC) with other airspace users as the maximum acceptable level of air risk for manned VTOL capable aircraft.

(source: EASA *https://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2022-06*)

3.3.1 - NPA 2024-06

EASA has issued an NPA which puts forward a proposal for the establishment of a set of new, as well as the amendment of existing, acceptable means of compliance (AMC) and guidance material (GM) associated with the applicable regulatory framework (Commission Delegated Regulations (EU) 2024/1107 and (EU) 2024/1108, and Commission Implementing Regulations (EU) 2024/1109 and (EU) 2024/1110) for the initial airworthiness requirements for unmanned aircraft systems (UAS) that are subject to certification, and the continuing airworthiness of those certified UAS operated in the 'specific' category. The NPA addresses new operational and mobility concepts that are based on innovative technologies, such as UAS, and fosters and promotes their acceptance and adoption by European citizens.

The specific objectives of the proposed new and amended AMC and GM are to:

- ensure a high and uniform level of safety for UAS subject to certification and operated in the 'specific' category;
- create the conditions for the safe operation of UAS in the U-space airspace;
- promote innovation and development in the field of innovative air mobility (IAM) while establishing an efficient, proportionate, and well-designed regulatory framework which does not unnecessarily hinder the development of the UAS market;
- provide guidance to the competent authorities of the EU Member States for the application of the UAS Regulations;
- support the implementation of the new regulatory framework applicable to UAS;
- help affected stakeholders understand the specificities of the new regulatory framework;
- address the novelties of UAS compared to manned aviation.

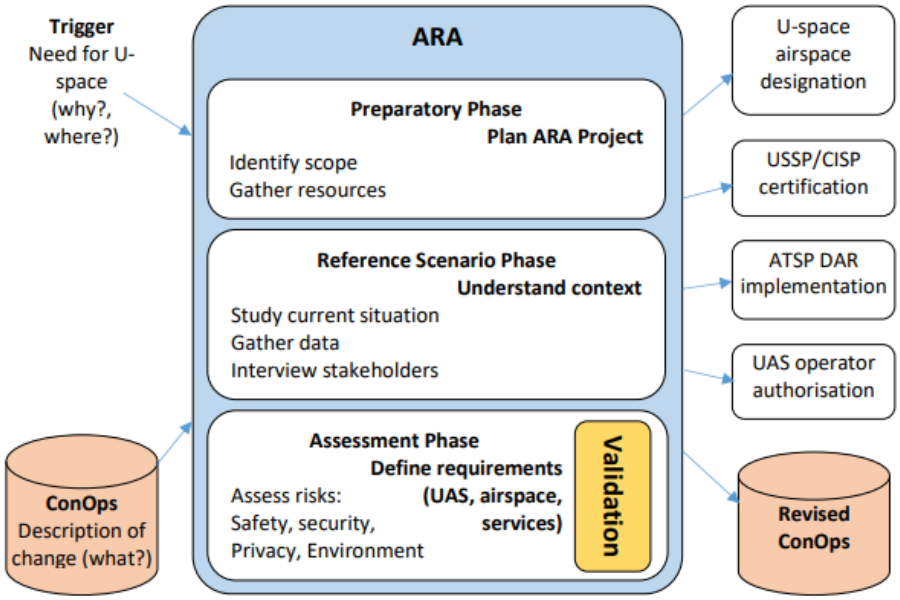
(source: EASA *https://www.easa.europa.eu/en/document-library/notices-of-proposed-amendment/npa-2024-06*)

3.3.2 - Eurocontrol

The EUROCONTROL Innovation Hub's drone programme team has just released its "U-space Airspace Risk Assessment Method and Guidelines - Volume 1" document, providing States with written guidance on how to perform the airspace risk assessments (ARAs) required by Commission Implementing Regulation 2021/664 to support the designation of U-space airspace.

This document is fully aligned with EASA's recently published Acceptable Means of Compliance and Guidance Material (AMC/GM) for Regulation 664 and describes a systematic process for conducting an ARA through its three main phases:

- Preparatory Phase: to define the scope of the assessment and the required resources.
- Reference Scenario Phase: to compile a full picture of the airspace being assessed.
- Assessment Phase: to address safety, security, privacy and environmental hazards, as well as the required risk mitigation measures.



The guidance applies EUROCONTROL's soon-to-be-published Expanded Safety Reference Material (E-SRM) to perform a complete safety assessment of the change, which in this case is the designation of a new U-space airspace.

(source: *https://www.eurocontrol.int/news/written-guidance-published-performing-airspace-risk-assessments*)

The EUROCONTROL Innovation Hub's safety team has released in January 2024 its Expanded Safety Reference Material (E-SRM) which is a safety assessment method expanded to address U-space and safety support assessment.

The E-SRM could be used for the following types of assessment:

- safety/safety support assessment of changes to the functional system, as required by Regulation (EU) 2017/373;
- safety assessment for U-Space Airspace Risk assessment, as required by Regulation (EU) 2021/664;
- safety support assessment of changes to the functional system for U-space services, as required by Regulation (EU) 2021/664;
- Digital European Sky programme (SESAR3) projects;
- EUROCONTROL Generic Safety Cases.

The E-SRM has been reviewed by EASA and a letter has been issued identifying the advantages of the methodology and some limitations associated to the E-SRM like the assessment limited to the pre-industrial and standardisation phase.

This document is the result of several years of work to define a methodology which could be used for several types of application/project (ATM/ANS, U-space) and where the results could be used more easily by "implementers" considering the latest regulations ((EU) 2017/373 for ATM/ANS and (EU) 2021/664 for U-space).

(source: *https://www.eurocontrol.int/publication/expanded-safety-reference-material-e-srm*)

3.4 - At local level

No information to report.

4 - U-SPACE OPERATIONS

This section provides an overview of the on-going operational activities regarding U-space across the Member States of EDA, as well as in countries subject to European Commission U-space regulation. Subjects covered in this section typically include validation of use cases, definition of operational concepts and trials of U-space services.

4.1 - Changes tracking matrix

The following table indicates changes to this section compared to the previous iteration of the report.

- An empty cell means no progress or new information is reported for the corresponding region or country.
- 'New' means an entire section has been added to report on progress in a region or country that did not feature in the previous iteration.
- 'Update' means new content has been added for the corresponding project or country. In the updated sub-section, previous information, if it remains current, is written using blue colour, while new information is using black.

	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 2024	Jun 24	Jul 24/ Aug 24	Sept 24	Oct 24	Nov 24
SESAR	Update (U-ELCOME, SPATIO)	Update (BURDI, U-ELCOME)			Update (U-ELCOME) New (CORUS five, U-Agree, VISORS)	Update (U-ELCOME)	Update (U-ELCOME) New (ENSURE)	Update (BURDI, ENSURE)	Update (U-ELCOME, EUREKA, OperA, SAFIR-Ready)	Update (ENSURE, U-ELCOME)	Update (U-ELCOME)	Update (ENSURE, U-ELCOME)
Other European projects			New	Update			Update					Update (Certiflight) New (EUDAAS)
Belgium		Update		Update		Update			Update		Update	
Estonia												
Finland												
France												
Germany		Update	Update	Update	Update		Update	Update	Update		Update	
Greece												
Ireland							New		Update			
Italy				Update						Update		
Lithuania					New							
Luxembourg											New	
Malta											New	
Monaco												
Netherlands	Update		Update		Update		Update			Update		Update
Romania	New											
Serbia												
Slovakia							New		Update			

	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 2024	Jun 24	Jul 24/ Aug 24	Sept 24	Oct 24	Nov 24
Spain			Update		Update			Update	Update			
Sweden						New						
Switzerland							Update		Update			
UK	Update				Update				Update			Update

4.2 - SESAR projects

4.2.1 - BURDI

BURDI is a 3-year project initiated in June 2022. It aims to demonstrate the feasibility of managing dense and complex unmanned aircraft systems (UAS) operations in controlled, uncontrolled and urban air mobility environments. Multiple domains are considered, such as the delivery of goods, inspections, support to medical as well as security operations. The trials will take place around the Belgian cities of Antwerp, Liège and Brussels close to international airports, an active maritime port and the border with The Netherlands. The project aims to ensure that solutions to be deployed are economically sustainable and socially acceptable and of benefit to the general public. Ultimately, the project aims to become a reference for best practices, standardisation, harmonisation and/or interoperability, fostering operational deployment of U-space airspace across Europe.

The project is delivered by a consortium of 18 partners, including skeyes as ANSP and CISP, SkeyDrone as USSP and Belgian Defence.

As a Digital Sky Demonstrator, BURDI's goal is market uptake by reaching a very high degree of technology maturity, building on the results of several previous SESAR projects, such as *CORUS XUAM*, *SAFIR-Med*, or *DACUS*.

BURDI aims to implement the U-space airspace concept to manage various, dense and complex unmanned air system (UAS) operations in controlled and uncontrolled airspace, as well as in an urban air mobility environment. Safe and secure solutions fitting for real-life operations and to be considered for future implementation in Europe will be developed. Indeed, BURDI aspires to make these solutions a reference to develop best practices, standardisation, harmonisation and/or interoperability requirements that would foster operational deployment of U-space airspace elsewhere in Europe. The second objective focuses on market uptake of these solutions which should also be economically sustainable and socially acceptable/supported so that they will actually benefit all stakeholders, including the general public.

The BURDI project will be implemented around the cities of Antwerp, Liège and Brussels. These locations have been chosen due to the proximity of international airports, an active maritime port and the proximity of the border with the Netherlands. These environments are considered as highly relevant for the development of "UAS operations as a service" in multiple domains like delivery of goods, inspections, support to medical as well as security operations.

(source: *https://www.sesarju.eu/news/belgium-partners-gear-u-space-implementation*)

BURDI partner, Infrabel has received its first BVLOS (Beyond Visual Line of Sight) authorisation for the use of drones in railway applications, marking a step forward in the efficiency, safety and innovation of our rail-specific drone operations. BVLOS authorisation enables Infrabel to implement drone technology for trackside inspections, monitoring and maintenance, without being limited to the operator's line of sight. Achieving BVLOS authorisation is the result of close collaboration with the Belgian Civil Aviation Authorities, rail experts and BURDI partners.

(source: *https://www.unmannedairspace.info/latest-news-and-information/burdi-partner-infrabel-receives-bvlos-authorisation-from-belgian-regulator/*)

The BURDI project developed a specific U-space CONOPS (concept of operations) describing how the different partners intend to implement U-space airspaces in order to be compliant with the ad-hoc regulations, as well as the solutions to clarify or to cover lack of directives in some topics which are not covered or detailed enough in these regulations.

This CONOPS considers State UAS operations, including Military operations, but assumes the State under consideration has opted in to EASA regulation, therefore applying the Basic Regulation to aircraft performing State activities, which would normally be subject to national rules. The CONOPS excludes from its scope U-space airspaces that would be designated inside military controlled airspace.

This document is intended to translate the EU regulations into working methods for all to understand what to expect and how to interact within the framework of the BURDI project. It specifically considers the role of CISP and USSP, as newly created entities ensuring that safety and security levels are met, enabling drone operators to focus on the tasks at hand. The different roles and responsibilities are to be made well clear for the eco-system participants to know how to interact with each other.

(source: *https://www.burdi.eu/conops/*)

Belgian partners of BURDI have provided additional details on how the on-going work in this project is paving the way for the implementation of a first U-space airspace around the Port of Antwerp-Bruges area.

(BVLOS flights are authorised by BCAA over the Port of Antwerp-Bruges area since March 2023 without creating a dedicated reserved airspace, but implementing specific mitigations measures within the existing UAS geographical zone, the "Antwerp Harbour Geozone". BVLOS flights can only be executed after submitting a Specific Operations Risk Assessment (SORA). SkeyDrone's BVLOS Enablement Framework holds the key to reducing the initial Air Risk Category in the Port of Antwerp-Bruges. This framework has been recognized as a "safe to fly" risk-mitigating framework, paving the way for many other drone operators to conduct scalable BVLOS flights in congested airspaces and high-risk environments. The Airspace Risk Assessment (ARA) of the future U-space airspace will be executed on the same mitigating measures.

SkeyDrone provides a traffic information "service" to the drone operator, to detect both manned and unmanned aviation and provide the pilot with collision avoidance and conformance monitoring features, fostering a "pre U-space" environment towards implementation of a full U-space airspace within the framework of the BURDI project.

The development of SkeyDrone's BVLOS framework has been a key contributor to the future development of U-space services within the BURDI project. A lesson learned is that drone operators may need consultancy to be able to fully complete a SORA. Furthermore, it also became clear that in the harbour area, in the context of U-space, the traffic information service should also include the AIS tracks from ships, evolving the service to the so-called 4D situational awareness.

The airspace risk assessment should consider air and ground risks in order to adequately mitigate related identified hazards. This assessment is an operational evaluation of the envisaged drone operations to be conducted in the U-space airspace. Thus, BURDI partners are performing the very first airspace risk assessment related to the expected first U-space airspace designated over the Port of Antwerp-Bruges area. This airspace risk assessment should allow to derive the proper U-space airspace design, USSP performance requirements, required drone capabilities and other constraints required to enable safe operations.

In parallel, under the responsibility of the Competent authority, establishment of a coordination mechanism is ongoing, seeking early consultation and alignment of concerned parties. According to the regulation, a coordination mechanism should address multi-party public, institutional and private stakeholders participation and consultation and shall consider local, regional and national levels in accordance with the national governance model. Consultation could cover multiple domains (e.g. airports, environment, defence, security, airspace users, drone operators, citizens). As it is a new regulation, the format of any coordination mechanism is strongly linked to national structures and practices. In Belgium, the BURDI project is used as a test case, aiming to pilot consultation processes with interested parties and explore schemes for practical multi-level

governance in the BURDI geographical areas. Interested parties should be all the parties that could be affected by the U-space airspace, in some way.

Outcomes of airspace risk assessment and coordination mechanism have to be considered together before initial designation of a U-space airspace.

(source: *https://burdi.eu/burdi-project/*)

4.2.2 - U-ELCOME

U-ELCOME is a 3-year project started in June 2022 that will be performing a series of tests and demonstrations in various operational environments across 15 locations in Spain, Italy and France. Its goal is to further the scalable market uptake of U-space services. The demonstrations will address the interface with the ATM system to ensure safe and fair access to airspace for all airspace users, built around real-life use cases for both business and civil authority use, such as medicine and goods delivery, inspection flights and aerial missions in urban and sub-urban environments in both controlled and uncontrolled airspace.

U-ELCOME uses a scalable U-space architecture enabling information exchange and coordination among U-space Service Providers (USSPs) and the Common Information Service Provider (CISP), as well as between USSPs, CISP and ATM using interoperable standards. This allows for automated drone traffic management and situational awareness among all U-space stakeholders.

U-ELCOME, under the coordination of the Eurocontrol Innovation Hub, has detailed its objectives: develop, test, and demonstrate early U1 and U2 U-space solutions up to TRL8:

- U-space U1 — foundation services: these will identify drones and operators, and inform operators about known restricted areas. With the deployment of U1, more drone operations are enabled, especially in areas where the density of manned traffic is low. The U-space foundation services include e-registration, e-identification and geo-awareness.
- U-space U2 — initial services: the main purpose of these is to support the safe management of "beyond visual line of sight" (BVLOS) operations and a first level of interface and connection with ATM/ATC and manned aviation. With the deployment of U2, the range of operations at low levels will increase, including some operations in controlled airspace. Drone flights will no longer be considered on a case-by-case basis, and some BVLOS operations will become routine. At least the following initial U-space services will be included: tactical geo-fencing, emergency management, strategic deconfliction, weather information, tracking, flight planning management, monitoring, traffic information, drone aeronautical information management, and a procedural interface with ATC.

(source: *SESAR U-ELCOME consortium sets out objectives and demonstrations in Spain, Italy and France - Unmanned airspace*)

U-ELCOME French cluster participants have shown their solutions and services for the first time in the live opening of a long-range corridor in Bretigny-sur-Orge on Thursday 22 June 2023. The long-range drone air corridor to the south of Paris has completed its first Beyond Visual Line of Sight (BVLOS) drone flight. The drone took off from La Base 217 in Brétigny-sur-Orge and flew along the corridor to Le Val-Saint-Germain.

The BVLOS flight was part of *U-ELCOME DSD Project*, led by the Eurocontrol Innovation Hub, and was performed by Thales Aerospace, Parrot and Hub Drone Systematic – with live feed to the Paris Air Show auditorium at Le Bourget along.

Centre d'Excellence Drones Ile de France (CEDIF) – is responsible for the corridor, and aims to accelerate the deployment of U-space by providing a realistic environment for flight trials, equipment development and training, with various types of air and ground risks that will help familiarise end-users with real-life operational challenges and U-space services.

(source : *https://www.unmannedairspace.info/civilmilitary-integration/paris-drone-corridor-commences-with-first-beyond-visual-line-of-sight-flight/*)

U-ELCOME project leaders recently selected Benidorm in Spain as a test environment to help establish the guidelines to achieve safe navigation for drones. Benidorm will provide a coordination centre for the U-ELCOME project, which will be located at the old police checkpoint, a heliport that can be used as a vertiport and the digital services of the town around urban planning and population densities analyses.

The U-ELCOME project is configured as a space for drones to receive services and information with the aim of avoiding conflicts and collisions and flying safely.

(source: *https://www.unmannedairspace.info/latest-news-and-information/sesar-u-elcome-research-project-names-benidorm-as-test-location-for-u1-and-u2-u-space-services/*)

U-ELCOME project commenced first demonstrations to test the deployment of U-space during Airspace Integration Week in Madrid.

U-ELCOME partners INECO, Madrid Local Police and ENAIRE are testing a set of services and procedures which facilitate, in a regulated and coordinated way in Europe, a safe and efficient access to the airspace for a large number of UAS, as well as their coexistence with manned aircraft in certain airspaces. ENAIRE has been designated as the sole provider of common information services (CISP) in Spain, which is necessary for the provision of U-space services.

(source: *https://www.unmannedairspace.info/latest-news-and-information/u-elcome-first-flight-demonstrations-in-madrid-target-daily-bvlos-vlos-by-2026/*)

Three U-space Service Providers (USSPs) tested, as part of the U-ELCOME project, integrated services in the same operation through the ENAIRE U-Hub platform, as an extended part of the Common Information Services (CISP), in the Spanish city of Zaragoza.

U-ELCOME project aims at communication between CISP and USSPs with their respective operators and communication between USSPs. The Zaragoza demonstration has served to successfully validate communications with the stakeholders involved and the security of communications.

In this demo, an emergency use case was presented : during a routine drone flight operation, an emergency may arise and it is the authority itself, National Police, City Council, Fire Department, … that can activate a secure volume within the ENAIRE platform, as CISP (Common Information Service Provider) to be able to enter that scenario, thus allowing to communicate from the platform itself to the operators the situation so that they leave that space free.

(source: *https://www.unmannedairspace.info/latest-news-and-information/u-elcome-drone-project-integrates-multiple-service-providers-in-tests-conducted-in-zaragoza-spain/)*

The U-ELCOME project demonstrations' Italian cluster, led by ENAV, has kickstarted its drone flight campaign with various UAS operators conducting operational missions across Italy, benefitting from d-flight's U-space services.

From 9 to 13 October 2023, missions including emergency response, search and rescue, solar panel inspection and territory surveillance took place in locations like Gorizia, Trieste, Mantua, and Caserta. U-space services, including network identification, geo-awareness, UAS flight authorisation and traffic information, supported operators and pilots. Additional flight activities are planned for the coming months and through 2024 and 2025 until project completion.

(source: *https://www.unmannedairspace.info/latest-news-and-information/italy-demonstrates-drone-missions-and-services-in-multiple-cities-as-part-of-u-elcome-research/*)

The large-scale drone flight demonstration held on 1 December 2023 in Spain – the first of its kind – is a firm step towards U-space implementation and represent a milestone in the field of technology for the management of drone operations. Drone flight trials took place in Benidorm and featured 27 drones operating simultaneously in an urban environment to perform tests & collect data to validate U-space services.

The drones were connected to three USSPs: Airus (developed by NTT DATA and the Technological Institute of Galicia (ITG)), Aslogic, and ENAIRE, Spain's ANSP. The USSPs were interconnected through ENAIRE's U-Hub platform which facilitated the exchange of operational information. The provision of the common information service which, besides housing the repository of the airspace and restricted or prohibited areas data, also facilitates the connectivity with the air traffic control services of conventional aviation and other privileged users such as local administrations, emergencies or law enforcement agencies, is also contained in ENAIRE U-Hub.

The drone operators that were involved represented a multitude of sectors, each with different needs and with the same goal of achieving full integration within U-space, and included members of the State Security Forces and Corps (national and local police forces, Guardia Civil…)

(source: *https://u-elcome.eu/benidorm-drones/*)

The SESAR U-ELCOME research project carried out logistics drone test flights in the surroundings of Cantoblanco Hospital in Madrid, Spain, on 24 February 2024. Over a 30-minute period, project partners completed four demonstration flights.

Initially two test flights were undertaken, followed by two real use cases to demonstrate delivery logistics. The flights were possible due to permission granted by AESA, coordination with Barajas Airport, and collaboration of Hospital Universitario La Paz. The flights were supported by Bluenest by Globalvia is a Spain-based vertiport services company.

The four flights reached a height of 40 meters above the ground and the following sensors were used for the proper development of the tests:

- ADS-B & Transponder > To be seen by ATC
- Sound level meter > To gather noise info for KPI fulfilling during the takeoff at different distances
- Anemometer > To operate the drone safely.

(source: *https://www.unmannedairspace.info/emerging-regulations/corus-five-exploratory-research-selected-to-deliver-fifth-version-of-u-space-conops/*)

From late January 2024 till 21 March, U-ELCOME Italian cluster performed its demonstration campaign successfully. Last 29th January, Techno Sky (UAS Operator) started the monitoring of (ATM) CNS infrastructures with drones supported by U-space services provided by D-flight near Rome. Last 24th February, Rescue Drone Network OdV, external UAS operator acting as Civil protection, executed in Emilia Romagna (north of Italy), Search and Rescue operations supported by u-space services provided by D-flight. On 16th March, Rescue Drone Network OdV, external UAS operator acting as Civil protection, executed in Pulia near Brindisi, Search and Rescue operations supported by U-space services provided by D-flight. Last 20th & 21st March, in Taranto, Top View (UAS operator) performed infrastructure monitoring and airport runway inspection with drones in BVLOS supported by U-space services provided by D-flight.

Last April 3rd and 4th, SEA Milan Airports had hosted, at the Milan Malpensa airport, all the stakeholders involved in the demonstration campaign of the Italian cluster within the European U-ELCOME DSD Project.

The objective of the meetings was to identify take-off and landing areas for flight operations with drone from the Cargo City of Malpensa through inspections with cargo and UAS operators, in order to start the first

demonstration tests. Furthermore, the timing of the main activities planned during 2024 and 2025 aimed at preparing the request for the activation of the sandbox in Milan was defined.

(source: *https://u-elcome.eu/*)

Experts have met in Spain in May 2024 to analyse the challenges encountered during the initial phases of U-space implementation in the U-ELCOME project, which is coordinated by EUROCONTROL and involves 51 European partners.

Nine topics were discussed during this second U-ELCOME workshop that was held at the Polytechnical University of Cataluña, in numerous sessions over the two days, covering crucial issues such as interoperability between operators and USSPs, U-space services, integration with ATM, common information services, communications, local engagement and regulatory challenges, and the utilisation of U-space in emergency and security operations.

The workshop closed with several presentations about other initiatives and how U-space is being implemented in other countries. Alongside the sessions, some industry partners demonstrated their technologies.

The results of the workshop discussions will help form the handbook that the U-ELCOME project is producing in collaboration with external stakeholders. This document aims to capture all the experiences, lessons learned and best practices from first implementers of U-space both within and outside the project, serving as a comprehensive guide for future implementers.

(source: *https://www.unmannedairspace.info/latest-news-and-information/u-welcome-project-workshop-analyses-challenges-of-u-space-implementation/*)

During the night of 8-9 July, the first set of test flights were carried out using drones with vertical take-off and landing capabilities to transport goods from Malpensa's airport Cargo City to Barbarini & Foglia's logistics warehouse.

The aim of the flight trials is to test this innovative transport mode with drones enabled by the U-space services provided by D-flight. The flight trials activities from the Cargo City of Malpensa may contribute to the launch of large-scale drone cargo delivery services in the future, optimising delivery times, reducing CO2 emissions as an alternative to road transport, promoting environmental sustainability and decarbonisation.

(source: *https://www.unmannedairspace.info/uncategorized/first-cargo-drone-flights-take-off-from-milan-malpensa-airport-as-part-of-u-elcome-trials/*)

The ITG Technology Centre, a partner in the U-ELCOME project, has demonstrated the use of an autonomous drone station at the Port of A Coruña, Spain.

The event at the port included practical demonstrations for six use cases, which form part of the list of twenty cases already identified and analysed during previous work in recent months. In one such case, an autonomous drone simulated a routine surveillance operation in which a person who had fallen into the sea was detected and various drone operations associated with their rescue were activated. DroneFinder technology enabled the exact coordinates to be sent so that another drone could launch a float to the person in distress while a maritime drone brought the victim to the dock. There were also demonstrations of crane, perimeter and breakwater inspection, port logistics, non-collaborative drone detection and how ITG technology works to obtain authorisations.

By 2026, the city of Coruña is planning to deploy U-space zones that meet regulatory requirements and install the technology necessary for a large number of drone operators to fly simultaneously.

(source: *https://www.unmannedairspace.info/latest-news-and-information/port-of-a-coruna-hosts-autonomous-drone-station-demonstration-for-u-elcome-project/*)

Techno Sky, from ENAV Group, has conducted a further series of night operations at Milan's Malpensa Airport, Italy for U-ELCOME DSD Project. On the nights of September 17 and 18 2024, drones flew beyond visual line of sight (BVLOS) in the cargo transportation exercise.

The drones covered 8 km between Malpensa's Cargo City and a logistics warehouse, "demonstrating the usefulness of U-space services provided by D-Flight and seamless integration into airport operations thanks to the involvement of the IAM Coordination Center".

This development follows the first set of test flights from Malpensa's airport Cargo City to Barbarini & Foglia's logistics warehouse in July. Further tests are scheduled for later this year.

(source: *https://www.unmannedairspace.info/latest-news-and-information/u-elcome-trials-continue-at-milan-malpensa-with-more-cargo-drone-flights/*)

The U-ELCOME project successfully tested the implementation of U-space on the banks of the River Ebro in Saragossa, Spain on October 24. The test consisted of a mixed search and rescue operation between Saragossa Fire Department and the company Umiles, simulating the search for a person in the selected area of the Ebro River. Two drones flew and coordinated with manned boats in a joint search party. A third drone operated by the company Bluenest flew a defibrillator from the south bank of the river to the north bank. The flight served as a contingency for the other users in the area, making a safe landing and resuming the flight when the traffic volume was at a safe level again.

The operation tested a Dynamic Airspace Reconfiguration (DAR) with the drone operators flying simultaneously. Umiles performed a beyond visual line of sight (BVLOS) flight and Bluenest performed a line-of-sight drug delivery and release flight.

(source: *https://www.unmannedairspace.info/latest-news-and-information/u-elcome-tests-u-space-implementation-in-spain/*)

The Advanced Centre for Aerospace Technologies (CATEC), together with the aeronautical engineering companies AERTEC and Pildo Labs and the University of Seville, have successfully completed a series of tests in a real environment in Seville, within the context of the U-ELCOME Project, aimed at demonstrating the viability of transporting goods, in this case medical cargo, over long distances, through the use of drones.

The trials carried out in Seville have consisted of a test of how drones in a U-space airspace can optimise the delivery of medical cargo in urban, interurban and rural environments by improving the efficiency, safety and sustainability of operations. The key, on this occasion, has been the combination of digital and physical infrastructure capabilities. The feasibility of the concept has been demonstrated and flights will soon be carried out in real scenarios.

The test involved the collection of various medical loads (medications, defibrillator, surgical equipment, etc.) in a hospital area with a drone from the University of Seville , which took them to a nearby runway where a TARSIS drone was waiting for it, which was in charge of quickly transporting the medical load up to several dozen kilometres, where, upon landing, the load was transferred to another small drone, in charge of taking it to its destination point, in an area that is difficult to access. The flights carried were performed in BVLOS and automatically.

These trials have demonstrated the feasibility of carrying out drone operations supported by U-space services. This means that both the U-space services, which include e-registration, e-identification and geo-awareness, flight planning, approval, tracking, dynamic airspace information and information exchange with air traffic management (ATM) systems, have been validated.

(source: *https://u-elcome.eu/u-elcome-project-tests-in-which-catec-participates-have-been-successfully-completed-in-seville/*)

The 18th of November 2024, the U-ELCOME DSD Project reached another milestone during the WP6 Open Day at Milano Malpensa airport. The future of logistics and healthcare with drone operations for cargo and medical deliveries have been presented and discussed through:

- Live Demonstrations: Presenting cutting-edge drone cargo and medical supply deliveries.
- Integration with Airport Operations: Seamless collaboration between drones and existing terminal logistics at one of Europe's busiest hubs.
- Discussions & Insights: Municipality, regional Health Agency, regulatory bodies, and technology providers shared insights on the operational, regulatory, and technological advancements shaping the future of autonomous deliveries.
- Sustainability & Innovation: Emphasis on eco-friendly solutions to reduce carbon footprints while enhancing delivery speed and accessibility.

This event marked a crucial step in further advancing and integrating drone technologies into critical operations, such as medical supply chains.

(source: *https://u-elcome.eu/%f0%9f%8c%9f-u-elcome-digital-sky-demonstrator-wp6-open-day-pioneering-uas-cargo-medical-delivery-at-milano-malpensa-airport-%f0%9f%8c%9f/*)

4.2.3 - ÉALÚ-AER

ÉALÚ-AERA aims to demonstrate U-space architecture operations and the integration with ATM, leveraging drone traffic management technology solutions. These solutions include a UAS platform, a backhaul network, communications and surveillance equipment, and advanced three-dimensional phased array radar. The project builds on previous research and seeks to enable higher automation for future U-space services, beyond those defined in IR (EU) 2021/664. The project will focus on five use cases of urban air mobility, many of them involving BVLOS operations, that capture the operational requirements, vehicle dynamics, and technology demonstrations associated with the projected near-term UAM services market, such as food and product deliveries, emergency response, agriculture uses, and even personal transportation like air taxi services.

The partners involved aim to integrate the U-space system into the Future Mobility Campus Ireland's (FMCI) vertiport operations site and associated facilities.

Between July and September 2023, EALU-AER is executing the first out of four demonstration activities, comprising five different use cases. The use cases fall within the first of four phases of integration of world-class U-Space technology solutions.

The first demonstration is part of the technical activities carried out by EALU-AER. The overall aim of this SESAR 3 project is to demonstrate a U-space infrastructure, backed by industry standards technology and/or solutions with a higher level of integration among various stakeholders, within a U-space ecosystem and increased levels of automation in the various processes in place. Consequently, the project will establish Ireland's first Digital Sky Demonstrator, located at Future Mobility Campus vertiport site, in Shannon, Ireland.

To achieve these goals, EALU-AER focuses on achieving four objectives:

1. **U-space architecture**: developing a technical U-Space integrated infrastructure solution for the implementation of Urban Air Mobility (UAM);
2. **Demos**: demonstrating and validating five use cases;
3. **Public acceptance**: evaluating the public's perception of UAM and defining competency profiles of the future workforce;
4. **Coordination and harmonisation**: ensuring consistency, integration, and consolidation of regulations and standards at a pan-European level.

The first use case mission is a beyond visual line of sight (BVLOS) validation. It aims to demonstrate and explore the automated coordination with the Air Traffic Control (ATC) when planning, approving and conducting drone flights in and/or around Controlled Airspace (CAS). This demonstration facilitates the project's first phase, which focuses on performing a VLOS flight in order to validate U-Space Service Provider (USSP) based platform functionality and securely monitor flights from the operations centre over ARINC Ground Network (AGN). This fosters proving the feasibility, reliability and operational efficiency of transport services

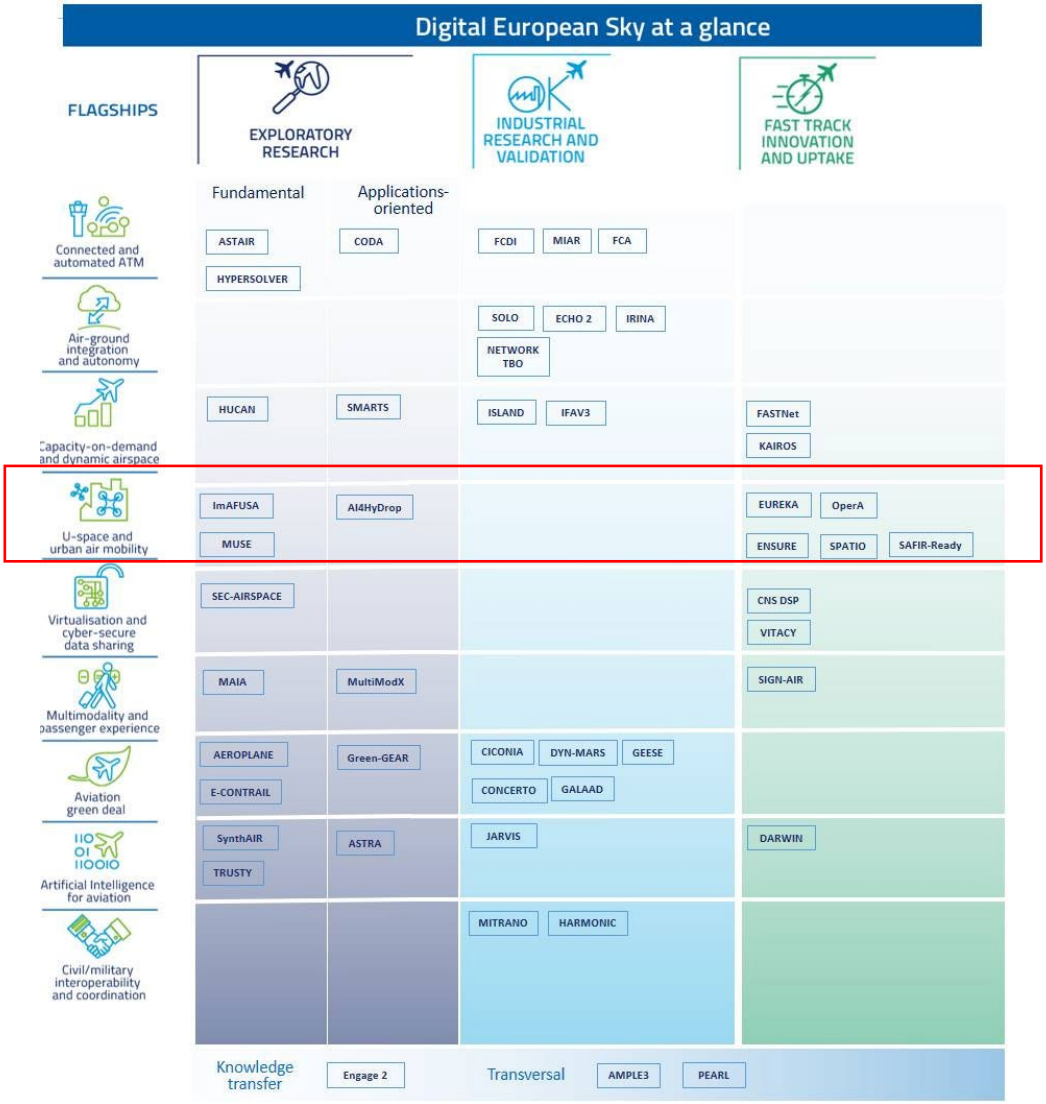
provided by various eVTOL (electric Vertical Takeoff and Landing) aircraft for a variety of use cases and applications, as well as testing and optimising the use of Urban Air Mobility.

(source: *https://www.unmannedairspace.info/latest-news-and-information/sesar-ealu-aer-project-to-establish-irelands-first-digital-sky-demonstrator-in-shannon/* and *www.research.dblue.it*)

4.2.4 - SESAR 3

The SESAR 3 Joint Undertaking has selected 48 research projects within the framework of its ambitious *Digital European Sky* research and innovation programme. The projects address exploratory research, industrial research, and activities to fast-track innovative solutions, all with a view to making air traffic management in Europe smarter and more sustainable. The projects represent a total investment of EUR 350 million by the aviation industry and the European Union through Horizon Europe.

Among these 48 new projects, 8 are about U-space and Urban Air Mobility:



(source: *https://www.sesarju.eu/news/onwards-and-upwards-new-projects-invest-eur-350-million-digital-european-sky*)

4.2.5 - EUREKA

The SESAR3 Digital European Sky EUREKA research project has launched at Fiumicino Airport in Rome. EUREKA aims to accommodate Vertiport operations in the European airspace to enable Urban Air Mobility (UAM). A consortium of 35 members from all over Europe, under the leadership of Eurocontrol, collaborates in the EUREKA project until mid-2026.

At its core, EUREKA is about developing four solutions and integrating them with each other:

- **Vertiport arrival & departure management**
  This solution will enable the management of safe & operationally efficient arrival and departure from the vertiport in different use cases. It will cover different ATM and U-space environments and time horizons. It will also enable the implementation of UAM operations by proposing routes and trajectories around and between vertiports based on best practices and guidelines to achieve UAM accommodation while focusing on the technical specifications and requirements of UAMs vehicles as well as planning elements and methods of application for a common description that will cover operational concepts and requirements.
- **Vertiport collaborative traffic management**
  This solution will develop a Vertiport Management service and a U-space management service that enables the Vertiport Collaborative Traffic Management (VCTM) concept.
- **Disruption and emergency management**
  This solution will enable vertiports & USSPs to manage unexpected situations in the field of security and safety, at nearby vertiports. This is crucial because operations are performed in a "vertiport-on-the-airport" situation. The goal is to validate a new "U3 emergency service for vertiports", as a future new service for U-space.
- **Vertiport network flow, capacity and operational management**
  This solution will enable efficient and safe vertiport operations with a holistic view at the local vertiport network level. Ground and air capacity in a vertiport system are strongly related, the vertiport network can be considered as a new concept of wide-spread mobility infrastructure. The solution will allow managing information regarding the capacity of the different parts of the system (vertiports); external factors that can influence it (vertiport surroundings); tools to communicate with the other stakeholders of the process (eVTOL operators, ATM and UTM service providers).

(source: *https://www.unmannedairspace.info/latest-news-and-information/sesar3-launches-eureka-to-vertiport-infrastructure-development-research-project/*)

Ecole Nationale de l'Aviation Civile (ENAC) host the Real Time Simulations event on July 2024 as part of the EUREKA SESAR3 Fast Track project that aims to make Advanced Air Mobility a reality by paving the way for safe and efficient integration of vertiports.

ENAC with project partners Bluenest by Globalvia, Lilium, Hologarde, DSNA, Boeing Spain and Human Design Group worked on five scenarii with different conditions integrating aircraft, drones and eVTOLs into the airspace with new procedures, tools and guidelines to focus on vertiport disruption and emergency management exercises, ensuring preparedness for unforeseen circumstances.

(source: *https://www.unmannedairspace.info/latest-news-and-information/enac-hosts-simulation-event-to-help-uas-airspace-integration/*)

4.2.6 - OperA

Honeywell participates in OperA, a new research and development project under the SESAR 3 Joint Undertaking partnership and its Digital European Sky program. The project will see the development of innovative solutions focused on advanced levels of automation in all types of airspaces to improve operational efficiency and sustainability through new or improved ways of working.

The OperA consortium aims to enable the safe accommodation of advanced air mobility (AAM) in European Air Traffic Management (ATM) and U-space. It plans to develop and validate several AAM solutions addressing the ecosystem of manned air-taxi and unmanned cargo cross-border operations. Honeywell's contribution will focus on the development of autonomy-enabling technologies, including an energy-efficient approach with a ground control station, high-integrity precision navigation, and detect-and-avoid technology for AAM aircraft. These technologies will play an integral part in the ecosystem of crewed air taxi and unmanned cargo cross-border operations.

(source: *https://www.unmannedairspace.info/latest-news-and-information/paris-2023-honeywell-to-lead-sesar3-digital-sky-opera-research-addressing-aam-and-u-space/*)

Latvian air navigation service providers Latvijas Gaisa Satiksme (LGS) is participating in real-life demonstrations to validate complex Innovative Air Mobility (IAM) operations as part of the SESAR OperA project.

LGS' role is to support the validation of the concept providing the coordination of drone flight in uncontrolled and controlled Latvian airspace. The major challenge will be to synchronize and coordinate the activities with UAS Operator (Pipistrel Aircraft) and neighbouring ANSP (ORO Navigacija), in beyond visual line of sight operations.

According to the preliminary plan, the flight(s) will be organized between two airports (Palanga and Liepaja), so it will be required to "fit" those flights into the regular and irregular air traffic at both airports and provide the necessary support during the flight in uncontrolled airspace. LGS will dedicate the tower air traffic controller for the whole duration of the project and FIS controller for the validation and trial's part.

(source: *SESAR OperA project to demonstrate piloted and unmanned operations in controlled airspace - Unmanned airspace*)

Honeywell and Frequentis have reached a major milestone in advancing the operation of drones in European airspace as part of the SESAR OperA (Operate Anywhere) project consortium with the flight test of a new ground control station for eVTOL aircraft, integrated with the ATM system.

The flight test took place in Amstetten, Austria, in June and leveraged new functionalities of the two-display ground control station that is also operated from Honeywell's Brno research and development facility.

Frequentis provided enhanced U-space services for the flight test, including mission conformance monitoring and tactical conflict detection. Using both simulated and real drones, Honeywell's ground control station also demonstrated the initial implementation of a ground-based detect and avoid solution, a safety tool designed to make drone flights safer and more reliable, especially in uncontrolled airspace.

(source: *https://www.unmannedairspace.info/uncategorized/honeywell-frequentis-trial-evtol-ground-control-station-integrated-with-utm/*)

4.2.7 - SAFIR-Ready

The project aims to develop new U-space advanced services together with a central command and control centre (C2C), as well as an automated ground integration (Drone Cargo Port - DCP) to facilitate automated time-critical drone-based services for medical and non-medical use cases. Specifically, research will focus on a dynamic capacity management system (U3), detect and avoid algorithms (U3) and machine to machine communication and decision making (U4). The project will extend use cases to non-medical critical missions, such as shore to ship for the transport of materials and the inspection of railway and electric grids in case of unforeseen issues with the infrastructure (e.g. tree fallen on high tension cable).

The kick-off meeting of the project assembled 34 partners, promoting collaboration and discussion on the SAFIR-Ready research objectives across four European Union countries. ANRA, as a full partner, will serve as a USSP (U-space Service Provider) and CISP (Common Information Service Provider) for operations in Belgium and Estonia, providing U-space and Common Information Services.

(source : *https://www.unmannedairspace.info/latest-news-and-information/anra-commences-european-safir-ready-project-to-enable-drone-services-including-u3-and-u3-services/* and *https://www.sesarju.eu/projects/SAFIR-ready*)

RigiTech helped the SAFIR-Ready project to develop improvements to the API of the company's networked drone control software RigiCloud. SAFIR-Ready aims to improve emergency medical and critical infrastructure responses through the utilisation of AAM and U-space technologies. The new API allows third-party control systems to receive critical flight data and send commands to RigiTech's Eiger delivery drone system while ensuring full certifications and security.

Working towards this new integration, Eiger drone operators will soon be able to conduct and oversee beyond visual line of sight (BVLOS) operations directly from their software suite, including telemetry and flight path management.

(source: *https://www.unmannedairspace.info/latest-news-and-information/rigitech-and-safir-ready-develop-new-api-for-bvlos-operations/*)

4.2.8 - SPATIO

SPATIO is a three-year SESAR 3 JU project that addresses separation between unmanned air vehicles, in particular, strategic and tactical conflict resolution services and the relationship between separation and capacity in U-space airspace. The SPATIO consortium brings together the unmanned aircraft and aviation industry, air navigation service providers, as well as research institutions.

Keeping aircraft safely separated is one of the core functions of air traffic management (ATM) today. As larger numbers of unmanned aerial systems (UAS) take to the skies, separation management becomes more important to avoid mid-air collisions.

Building upon the work of previous SESAR exploratory and very large-scale demonstration projects such as *DACUS*, *BUBBLES* and *TindAIR*, *SPATIO* short for "U-space Separation Management", will develop and validate in a real operating environment four elements:

- A dynamic capacity management (DCM) service for U-space.
- An advanced strategic conflict resolution (SCR) service for U-space, which considers Fairness among operators and is integrated with the dynamic capacity balancing service.
- A tactical conflict resolution (TCR) service, whose instructions are implemented manually by the remote pilot through an improved Ground Control Station.
- An advanced tactical conflict resolution (TCR) service, whose instructions are implemented autonomously by command instructions to the UAS.

Funded within the framework of Horizon Europe, SPATIO will develop a classification of U-space airspaces according to their separation and capacity management needs. Required services, specificities of the regulatory and standardisation needs, as well as costs and benefits associated with the implementation of U-space services will be detailed. Overall, SPATIO solutions will benefit the safe and secure simultaneous UAS operations in high-risk areas such as airport vicinities, thus facilitating the societal acceptance of these operations in urban environments.

(source: *https://www.sesarju.eu/news/advancing-u-space-separation-management-safer-skies*)

4.2.9 - CORUS five

Like its highly successful predecessors, CORUS and CORUS-XUAM, CORUS five is a pan-European consortium led by Eurocontrol Innovation Hub. It will focus on the challenges of safely integrating Unmanned Aerial Systems (UAS) into the same airspace as traditional aviation, addressing airspace that is not presently covered, e.g. above very low level and in the vicinity of controlled airports, with a particular focus on contingency management, risk quantification and flight rules. CORUS five will deliver the fifth version of the European U-space Concept of Operations.

The 13 project partners represent a range of U-space stakeholders and their suppliers, including ANSPs, drone operators, U-space service providers, future Common Information Service Providers, R&D and industry. The project team will work for 24 months and then spend six additional months communicating and encouraging the exploitation of the work.

(source: *https://www.unmannedairspace.info/emerging-regulations/corus-five-exploratory-research-selected-to-deliver-fifth-version-of-u-space-conops/*)

4.2.10 - U-Agree

The **U-space Air and Ground Risk modEls Enhancement** project aims to develop an integrated risk model linking the operations of unmanned aircraft (UAS) with some negative effects they may have with regard safety, security, privacy and environment. This risk model is intended to support the airspace risk assessments required by U-space European regulation as well as an amendment to SORA methodology so that risk can be quantitatively estimated, enabling digital implementations leading to swifter operational approval processes.

(source: *https://www.sesarju.eu/news/eur-26-million-investment-sesar-ju-unveils-new-projects-smarter-air-traffic-management*)

4.2.11 - VISORS

Real-time simulations (RTS) are widely recognised as a means to support the validation process of systems and procedures up to the highest operational readiness levels and are therefore widely used to support validation campaigns in the SESAR context. With the development of new ATM concepts in recent years and those expected in the near future (e.g. innovative air mobility,) verification and validation processes have become increasingly complex, with increasing demands on the infrastructures for validating these concepts and operational conditions. The **Validation Infrastructure SuppOrting Remote Simulations** project aims at supporting a wide diffusion of interoperability standards among ATM validation platforms. An economic analysis of performing validation processes for ATM/AAM/U-space interoperability concepts and solutions through a multi-site validation architecture will be performed. An experimental demonstration test will be defined and performed to collect data for this analysis.

(source: *https://www.sesarju.eu/news/eur-26-million-investment-sesar-ju-unveils-new-projects-smarter-air-traffic-management*)

4.2.12 - ENSURE

Ensuring an interoperable and effective interface between unmanned and conventional traffic and air traffic control is critical for the delivery of the future Digital European Sky. The ENSURE project aims to refine and

complete the definition of a common interface and services for U-space and ATM. The project will develop a standardised data model, architecture and an operational methodology. The project will also develop a dynamic airspace configuration service to help ATC actors in charge of airspace reconfigurations to maintain traffic segregation and to avoid proximity between manned and unmanned aircraft within the designated U-space airspace.

On 14 May 2024, SESAR ENSURE project partners gathered for some paper gaming on solutions to integrate drone traffic safely and securely into the airspace, ahead of the project's first technical validations later this year.

As the first validations are still months away, the project wanted to simulate an exercise with partners to test and evaluate plans, procedures, and responses in a controlled, discussion-based environment.

The paper game exercise focused on dynamic airspace reconfiguration, one of the solutions under investigation by the project. It brought together a wide range of players: controllers (ENAIRE and LFV), U-space service providers (INDRA, AIRBUS, UNIFLY), drone operators (AEUROCÁMARAS, INECO), CISP (ENAIRE), ATM pilots (INECO and CRIDA) and those analysing and observing the gaming (EUROCONTROL, CRIDA).

The session looked at two different use cases, challenging, and enriching the development of the solution:

- Dynamic airspace reconfiguration in a scenario involving an advertising aircraft that needed space allocated to drones.
- Dynamic airspace reconfiguration in a scenario where an aircraft experiences an emergency failure and needs to navigate through an active U-space corridor. These situations allowed the partners to examine thoroughly the roles involved, responsibilities, and functionalities necessary to handle such emergencies effectively.

From these discussions, numerous valuable insights emerged that will further enrich the project's activities and further validation work.

(source: *https://www.sesarju.eu/projects/ensure*)

During the week of 10th of June 2024, Indra validated a new service of the ATM-U-space Interface: the Emergency Management and Contingency Plan. During this validation information have been exchanged between Indra´s ATM and U-space systems related with emergencies situations a drone can suffer. This allows the ATCO to be alerted when a drone is under an emergency situation, indicating the corresponding alert and displaying the alternative flight plan that the drone is going to follow when this emergency occurs. The ATCO is now aware at all the time about this drone situation and the procedure the drone is going to follow, increasing the situational awareness and the level of safety.

(source: *https://www.sesarju.eu/projects/ensure*)

In July 2024, partners in the ENSURE project, ENAIRE and CRIDA, in collaboration with INECO, conducted a real-time simulation to test the dynamic airspace reconfiguration (DAR) solution.

These tests, focusing on a solution to dynamically adjust U-space airspace within controlled airspace to meet the varying demands of both manned and unmanned traffic. The platform, developed by ENAIRE, was enhanced with cutting-edge functionalities to facilitate the dynamic segregation of manned and unmanned traffic. ENAIRE's controllers rigorously tested the solution in a simulation environment focused at Malaga airport.

These exercises are part of a series of iterative simulations aimed at quickly advancing the solution to higher maturity levels.

(source : *https://sesarju.eu/news/fast-track-dynamic-airspace-reconfiguration-service*)

From November 6 to November 8, 2024, the ENSURE project conducted a series of technology validations which took place at the CRIDA premises in Madrid, concentrating on developing U-space Dynamic Airspace

Reconfiguration (DAR) processes that will improve airspace management, particularly in complex airport environments.

During this three-day session, ENAIRE and its partners used the GAMMASIM tool to simulate various DAR scenarios in Málaga's airport environment, involving two control tower positions and a supervisor. The simulations were designed to refine operational procedures and human performance, enhancing controllers' efficiency in managing dynamic, shared airspace between U-space and ATM.

The tests aimed to consolidate previous learnings, with particular focus on two key use cases:

- **Strategic DAR**: Planned DAR to handle interactions between VFR flights and Advanced Air Mobility (AAM) operations.
- **Tactical DAR**: Unplanned DAR for urgent situations, such as emergency medical helicopters navigating through airspace shared with drones, demonstrating the need for agile response capabilities.

These validations, which included strategic inputs from ENAIRE, INECO, and CRIDA, contributed significantly to progressing ENSURE Solution 2 towards higher maturity levels, supporting a future of more responsive and efficient airspace management.

(source: *https://www.sesarju.eu/news/sesar-partners-advance-dynamic-airspace-reconfiguration-safer-more-efficient-air-mobility*)

4.3 - Other European projects

4.3.1 - Certiflight

Certiflight is a European project which aims to offer a new U-space service for the legal certification of tracks generated by drones and aircraft flights.

The aim of the Certiflight document is to analyse the regulatory aspects related to Certiflight service, regarding the actual EU U-space regulations 2021/664, 2021/665, 2021/666, EU UAS regulations 2019/945, 2019/947 and UAS/U-space standards.

The document includes a general overview of the U-space concept and its related services, provides some guidelines and recommendations for the design of the EGNSS/IoT UTM BOX and the development of Certiflight service, lastly shows the UAS operations category for each of the use cases identified by the project up to finish with an assessment in terms of legal validity of the added value offered by the Certiflight service.

Certiflight has identified 10 use cases to test the Certiflight concept: highly automated drone operations, last mile delivery, airspace infringement/e-conspicuity, agricultural applications, industrial applications, port surveillance, platform interoperability, fisheries, airport runway inspection and traffic accident investigation.

(source: https://*www.certiflight.info*)

The European Union Horizon-funded Certiflight programme has issued more information about its D2.5 "E-Conspicuity and Automated Separation Algorithms" deliverable to assure separation between general aviation traffic and drones.

The proposed U-space services allow UAS to fly in the existing airspace, thus increasing the likelihood of encountering General Aviation aircraft. EU Regulation considers this fact and requires both manned and unmanned aircraft to be electronically conspicuous when operating in U-space. Thus, the concept of e-conspicuity.

However, to lack of coordination and separation rules increases the possibility of mid-air collision. Unlike in controlled airspace for manned aircraft, services in U-space airspace are still in development phase. For instance, there are certified U-space service providers yet. Moreover, a standardised separation distance between aircraft is also still missing at the moment.

In this context, the deliverable D2.5 "E-Conspicuity and Automated Separation Algorithms" analyses, through simulations, the use of bespoke algorithms to solve this problem. The baseline are the Velocity Obstacle-based methods, which are well-established in the domain of robotics, self-separation for manned aviation, and complexity analysis.

(source: *https://certiflight.info/documentation/deliverables/*)

The Certiflight service has entered its validation phase, which is expected to be completed in early 2025. Certiflight completed a test readiness review in April, which confirmed the system's readiness for real-world testing. Now, the validation process will demonstrate the system's capabilities through seven representative scenarios:

- Volume calculation,
- Power line inspection,
- Airspace infringement / e-conspicuity,
- Agriculture applications,
- Airport inspection,
- Monitoring activities,
- Port surveillance.

Each scenario is designed to test specific features of the Certiflight technology, including the devices and methodologies used, as well as the actors and equipment involved. The goal is to ensure that the system delivers the necessary functionality to meet the use cases and needs of all identified stakeholders.

As part of the Port Surveillance scenario, real-time demonstrations will take place in a port area. Drones will be used for environmental monitoring, safety, and security. The results of this scenario are expected to include real-time visualisation of authenticated flight tracking, generation of light and full operation reports, an automated flight log book, recorded UTM flight tracks, and feedback from port stakeholders and authorities.

This scenario will be part of a broader demonstration campaign in Belgium, Italy, and the Czech Republic, demonstrating Certiflight's interoperability with multiple U-space service providers.

(source: *https://www.unmannedairspace.info/latest-news-and-information/uniflys-certiflight-enters-validation-phase/*)

4.3.2 - SONORA project

The second round of flight tests from the Support to Standardisation Actions for EGNOS and Galileo in the U-Space (SONORA) project, recently completed in Benidorm, Spain has shown that Urban environments significantly impact satellite availability and that using multi-constellation (GPS and Galileo) improves both availability and dilution of precision (DOP) in such degraded reception conditions.

Other conclusions of the flight tests included:

- Single vs. Dual Frequency: Switching from single to dual frequency configurations resulted in GPS performance degradation due to satellite availability loss, a situation expected to improve once GPS constellation is fully renewed. For Galileo, an improvement was observed when using dual-frequency measurements (E1+E5). This improvement is expected to further increase in these frequency bands as more GPS satellites transmitting in L5 become available.
- EGNSS Augmentation and Cybersecurity Protection: The Galileo HAS service showcased promising results, reaching decimeter-level accuracy. Moreover, Galileo OSNMA has shown protection against navigation spoofing attacks without a significant impact into other performances.

- Position vs Autopilot errors: Analysing UAS navigation errors, it has been observed that positioning error (NSE) is significantly larger than autopilot error (FTE) for this particular trial. A different usage of vertical references has also been identified, which could be a potential risk for operations if a CAR (Common Altitude Reference) is not used.
- GNSS+IMU Hybridisation: Hybrid solutions were shown to further improve on the accuracy and availability of the GNSS-only solution, which are key to ensure a smooth navigation in urban environment.

Based on further analysis of the test results, the project will provide feedback to the UAS regulatory agencies with the goal of streamlining the authorization processes for these kinds of medium-risk Specific Category operations (SAIL III-IV).

The second round of flight was conducted in an urban environment and aimed to analyze the challenges of drone navigation in such a complex setting. Participants evaluated the capabilities and performance of GNSS-alone and hybrid GNSS solutions, which are navigation systems that combine GNSS technology with other sensors. These include cameras, lidar light detection and ranging technology to measure precise distances and movements in real time, IMUs (Inertial Measurement Units), odometers, and other possible. Such systems are used to improve the accuracy and reliability of navigation in urban and indoor environments, where the GNSS signal may be weak or interrupted.

(source: *https://www.unmannedairspace.info/uncategorized/multi-rather-than-single-constellation-gnss-signals-needed-for-uam-services-latest-eu-research/*)

4.3.3 - EUDAAS

The European Detect and Avoid System (EUDAAS) demonstrator, integrated into Leonardo's Falco Xplorer, has completed its final test flight at Trapani airport, Sicily. The event was attended by military and industry representatives from EUDAAS' five contributing member states.

The flights at Trapani confirmed the effectiveness of the systems developed for the DAA demonstrator. These provide traffic awareness, remain well clear, and collision avoidance capabilities. The systems detect and avoid both cooperative and non-cooperative air traffic, performing necessary manoeuvres to prevent conflicts while reducing the workload for operators.

Leonardo's Falco Xplorer demonstrated how unmanned aircraft can be integrated into conventional air traffic management systems. The company expects the results of this demonstration to have long-term positive implications, enabling unmanned aircraft to serve as reliable assets in support of diverse community and operational needs across Europe.

Building on these achievements, the EUDAAS consortium is moving forward to the follow-up project, EUDAAS2, which will begin on 1 December. The consortium will complete the full suite of DAA functionalities at the highest technology readiness levels, including the definition of European standards in EUROCAE WG-105 as the basis for the future certification of the system.

(source : *https://www.unmannedairspace.info/latest-news-and-information/eudaas-completes-final-test-flight-ahead-of-second-project-phase/*)

4.4 - Local projects

4.4.1 - Belgium

Port of Antwerp has become the first seaport to initiate UTM in a busy and complex port environment. In doing so, they are the **first non-aviation authority to become a fully-fledged geozone manager**. As geozone manager, the port is responsible for managing ground risk related to above-the-ground activity, with respects

to operational and working drones, overall safety and seamless integration of processes required; all of which are intended to ramp up productivity and efficiency of port operations.

(source: *https://www.portofantwerp.com/en/drones-port-area*)

Port of Antwerp-Bruges and its partners Dronematrix, Skeydrone and Proximus were given the green light to launch their drone in a box network D-Hive: operational authorization was given for BVLOS (Beyond Visual Line of Sight) automated drone flights to take place on a daily basis in the Antwerp port area, a first in the world.

The operational authorisation is built around a new BVLOS framework (also known as pre-U-space airspace) built by Skeydrone and approved by BCAA (Belgian Civil Aviation Authority) and EASA (European Union Aviation Safety Agency) as a legitimate and safe framework for BVLOS flights. With the approval of this framework, all is set to fully operationalize the D-Hive network of automated drones in the next months.

(source: https://www.portofantwerpbruges.com/en/news/final-approval-drone-network)

SkeyDrone and SafeSky, developer of the collision-avoidance mobile phone application by the same name, have announced a collaboration agreement to share air traffic information between manned and unmanned aviation. The goal of this collaboration is to improve safety for both types of aircraft in the increasingly congested skies.

Under the agreement, SkeyDrone plans to integrate and validate SafeSky's (manned) traffic data as part of its certification as U-space service provider. Both companies will share real-time traffic information about their aircrafts' positions, flight paths, and schedules. This information exchange will allow both manned and unmanned aircraft to avoid mid-air collisions and other potential safety hazards.

(source: *https://www.safesky.app/en/post/aerial-harmony-between-manned-and-unmanned-aircraft-thanks-to-safesky-and-skeydrone*)

Belgian UTM company SkeyDrone has developed a Traffic Information Service (TIS) available for manned and unmanned aviation. Traffic information is one of the four mandatory services that USSPs must provide to drone operators in U-space and is required to allow BVLOS operations to Detect and Avoid (DAA) possible mid-air collisions with either manned or unmanned aviation.

According to SkeyDrone, the TIS offers traffic information from both manned and unmanned aviation from several reliable sources. In areas where this multi-source traffic data does not guarantee reliable coverage, for example in very low-level (VLL) airspace, a network of meshed ground receivers is added. The information is then fused into one unique air picture offering the most complete and most reliable situational awareness available. This Traffic Information is visualised and enhanced by the SkeyDrone Monitor software. This software features intrusion detection alerting, conformance monitoring alerting, and loss of separation alerting.

(source: *https://www.unmannedairspace.info/latest-news-and-information/skeydrone-introduces-traffic-information-system-to-increase-airspace-situational-awareness/*)

The first implementation worldwide of regular, multiple BVLOS drone flights at scale in a complex industrial environment has taken place at Antwerp port. The Antwerp port area is more than 120km², an area that will now be covered by the D-Hive network of six autonomous drones.

The drones will offer a unique perspective from the air and enable the port authorities to manage, inspect and supervise a large area, quickly and effectively. The port will use the drones for a range of functions including berth management, monitoring, infrastructure inspections, oil spill and floating waste detection, and to support security partners during incidents. The 18 daily BVLOS drone flights will be remotely controlled from a Command and Control Centre in the heart of the port.

Unlike VLOS flights, these will take place out of the pilot's sight. Port of Antwerp-Bruges is working with partners DroneMatrix, SkeyDrone and Proximus for the D-Hive network. Two months ago, the partners were

given the green light to launch the drone network. This operational permit was built around a new BVLOS framework (known as pre-U-space airspace), built by Skeydrone and approved by the Belgian Civil Aviation Authority (BCAA) and the European Union Aviation Safety Agency (EASA), as an appropriate and safe framework for BVLOS drone flights.

(source: *https://www.unmannedairspace.info/uncategorized/antwerp-port-reports-world-first-in-multiple-autonomous-bvlos-drone-flights-under-5g-u-space-control/*)

Skeydrone plans to continue its commitment to playing a facilitating role in the further development of the West Flanders drone ecosystem, and is poised to undertake several upcoming projects:

- **Develop Innovative Offshore Logistic (DIOL)**, which aims to develop offshore logistics solutions to support the transition from fossil fuels to renewable energy sources in the North Sea. SkeyDrone, along with VIVES, the port of Ostend, and other European project partners, will develop drone-based offshore solutions. SkeyDrone contributions include implementing U-space drone corridors between land and offshore renewable energy platforms and managing offshore drone traffic as a U-space service provider, in coordination with skeyes, responsible for ensuring the safety of manned air traffic.
- **Medical DROne Supplies (MEDROS)** project, led by VIVES and co-funded by the Flemish agency VLAIO. This project aims to establish a roadmap for point-to-point drone transport and create a logistics setup for the efficient and timely transportation of high-value, time-critical goods in the medical sector. SkeyDrone is providing consultancy services to VIVES, including the development of a Specific Operational Risk Assessment (SORA) for BVLOS operations, as well as (pre) U-space services and a Traffic Information service.
- **European Maritime Safety Agency (EMSA)** project: SkeyDrone aims to become a strategic partner of EMSA by offering operational services for BVLOS drone flights, facilitating coordination with Air Navigation Service Provider skeyes, and catering to the needs of maritime civil and military stakeholders.

(source: *https://www.unmannedairspace.info/uncategorized/west-flanders-drone-ecosystem-expands-with-skydrone-support/*)

After an extensive Specific Operational Risk Assessment (SORA) process, the Belgian Civil Aviation Authority (BCAA) has given ADLC the authorization to perform true Beyond Visual Line of Sight (BVLOS) flights (including at night) without observers in the Port of Antwerp-Bruges over a stretch of 12,5 km to deliver goods with a weight of up to 15 kg.

ADLC's operations are compliant with the European U-space regulation. As such they can ensure safe flights through integration of manned and unmanned air traffic. Based on this authorization from the BCAA, ADLC is setting up a drone delivery network via which it will be able to offer ultra-fast drone-based delivery services to the users of the Port of Antwerp-Bruges and should be fully operational in Q2 2024. The network stretches from the north of the Port to the south and part of the route runs through controlled airspace.

(source: *https://www.unmannedairspace.info/latest-news-and-information/adlc-receives-bcaa-approval-to-fly-bvlos-drone-flights-without-observers-in-antwerp-bruges-port/*)

Unifly and SkeyDrone have announced a significant upgrade to the Port of Antwerp-Bruges' (PoAB) UAS Traffic Management (UTM), DronePortal. This upgrade enhances the efficiency of drone operations in the complex Port of Antwerp's airspace and supports the expanded use of drone technology. Additionally, the upgraded services are now extended to include the Port of Bruges. This development is a crucial step in advancing the PoAB airspace towards U-space readiness. Operational in the Antwerp Port area since mid-March 2021 and having processed over 5,000 flight authorizations, the PoAB DronePortal upgrade plays a pivotal role in the evolving U-space landscape. The latest improvements include optimized automated approvals, enhanced integration support with drone operations, and User Interface (UI)/User Experience (UX) enhancements, all based on the most recent Unifly product version.

The Port of Antwerp-Bruges is expected to become the first official U-space airspace in Europe, marking a significant milestone in unmanned aerial operations. The Port of Antwerp-Bruges has become a hub for drone activities, hosting the highest volume of drone flights in Belgium. Beyond the D-Hive project that facilitates scalable Beyond Visual Line of Sight (BVLOS) drone flights, numerous drone operators fly within the same airspace for various purposes, further solidifying the port's status as a key player in the drone ecosystem.

(source: *https://unifly.aero/news/unifly-s-nextgen-utm-system-upgrades-the-antwerp-bruges-port-area-together-with-skeydrone*)

SkeyDrone has announced that it operated a fully automated drone flight at DronePort in Sint-Truiden in Belgium with the drone being out of the pilot's line of sight. The objective of this flight, on April 10 2024, was to conduct a remote perimeter inspection from the SkeyDrone operations centre in Steenokkerzeel. The test was a collaboration between Brussels Airport, Airport Intelligence, SkeyDrone, and DronePort, organised as part of the 'U-space in Practice' event in light of Belgium's presidency of the European Union.

The use case involved an automated perimeter inspection at the active airport premises at DronePort, using a 'drone in a box' (DiaB) platform to conduct a beyond visual line of sight (BVLOS) flight. In this case, the drone's camera was operated approximately 60 km away, at SkeyDrone in Steenokkerzeel. The flight was supported by a range of digital services established by DronePort in collaboration with SkeyDrone, allowing the airport to remain fully operational. This included detection of all air traffic near the airport – both drones and crewed aircraft – and the use of a flight management system.

(source: *https://www.unmannedairspace.info/latest-news-and-information/skeydrone-operates-automated-drone-flight-for-perimeter-inspection/*)

A drone has successfully completed a 4-km test flight in Belgium between Residential Care Centre De Zon in Bellegem, and General Hospital Groeninge in Kortrijk. The flight, conducted beyond the visual line of sight (BVLOS) of the pilot, is part of the TETRA project Medical Drone Supplies (MEDROS), led by VIVES University of Applied Sciences.

The drone's route included the geo-zone of Kortrijk-Wevelgem Airport, where strict safety regulations apply to drones. The test marked the first time that a drone has flown beyond the pilot's line of sight in this geo-zone without the need to interrupt other air traffic. The drone was operated fully automatically throughout the flight, with real-time remote monitoring from flight operations control room.

The flight was closely monitored by a team of experts, and the collected data will be analysed to formulate further recommendations.

(source: *https://www.unmannedairspace.info/latest-news-and-information/bvlos-drone-flight-connects-residential-care-centre-and-general-hospital-in-belgium/*)

On 6 October, as part of Open Company Day 2024, skeyes and Skeydrone have provided a demonstration on obtaining flight authorisations for drones, detecting illegal flights, and discussing potential intervention measures against such flights.

Seyes and SkeyDrone provided a picture of the capabilities of their systems for police services. Police units utilise the airspace under their specific status as a state aircraft operator. Traditionally, this use of airspace was limited to police helicopters, but in recent years, drones have also become more and more important for both federal and local police forces. These drones are deployed in essential operations such as emergency response, surveillance, investigations, and maintaining public order. The use of drones requires additional operational agreements with the different control units of skeyes, especially when drones are operated beyond visual line of sight (BVLOS). Additionally, local police play a crucial role in monitoring compliance with drone regulations by private users, such as during public events and festivals. For this purpose, an increasing number of police zones are using SkeyDrone's drone detection system. This system, based on a growing network of detection antennas, provides real-time monitoring of drone activities in and around major cities.

(source: https://www.unmannedairspace.info/latest-news-and-information/skeyes-and-skeydrone-organise-drone-management-and-detection-demonstration-for-police/)

4.4.2 - Denmark

Scandinavian Drone Solutions (SDS) has received approval to operate beyond virtual line-of-sight (BVLOS) flights outside restricted areas in Denmark. SDS flies unmanned aerial systems (UAS) for research projects, inspections and special assignments such as using a spraying drone. The company can provide thermographic imaging as well as video and still images.

Denmark's Transport Ministry prepares an update its national drone strategy. The new strategy is expected to be finalised in mid-2024.

(source: https://www.unmannedairspace.info/latest-news-and-information/scandinavian-drone-solutions-approved-for-bvlos-flights-in-denmark/)

4.4.3 - Estonia

UTM company ANRA Technologies, in partnership with the Tartu Science Park Foundation (TSP), supports the development of a U-space Sandbox in Tartu, Estonia. The Estonia Transport Administration, with funding from the Estonian Business and Innovation Agency, sponsors this project named CACTUS "Competent Authority Coordinating Testing in U-space Sandbox" to implement the European U-space regulation. ANRA will lead the creation of the sandbox for broad-based development and deployment of unmanned aviation technologies, including the safe testing of automated aviation systems.

For the CACTUS project ANRA will provide the foundational infrastructure to enable the interaction of the various U-space services, exchange data with stakeholders in the ecosystem throughout automation software and data interfaces to enable integration between the competent and local authorities, air navigation service providers, UAS service providers, common information service providers, supplemental data service providers (surveillance, weather, etc.) and operators.

(source: https://www.unmannedairspace.info/latest-news-and-information/anra-to-provide-u-space-infrastructure-for-estonias-cactus-sandbox-trials/)

4.4.4 - Finland

The Technical Research Centre of Finland (VTT) has been investigating solutions for beyond visual line of sight (BVLOS) operations for a long time. The centre has now conducted tests alongside Fintraffic, the Finnish entity responsible for controlling and managing traffic on the land, in the air and at sea, on challenging test flights. The flights were carried out between 7 and 8 September 2023 in Oulu, within controlled airspace, where the air traffic controller managed both drones and traditional aircraft. A drone corridor had been defined in the airspace where the U-space system was used for testing traffic control in the lower airspace.

The first demanding specific category flight was made from Oulu Airport to Hailuoto town hall and back. Flight was done by using a RigiTech Eiger drone. This 35-kilometre journey lasted 25 minutes. The Eiger can carry a 3-kilogram payload, with the cellular network serving as the radio link. The air traffic controller also acted as a U-space operator. The subsequent flight was made from Oulu's city centre, from Sonnisaari to Hailuoto and back. The flight plans were prepared and launched and the flights were monitored using U-space tools.

(source: https://www.unmannedairspace.info/latest-news-and-information/finnish-drone-corridor-opens-with-bvlos-flights-within-oulu-controlled-airspace/)

4.4.5 - France

The French civil aviation authority has issued flight authorisations to a drone operator to perform regular Beyond Visual Line Of Sight (BVLOS) flights between two sites located 17.6 km apart in the East of France. The project involved communication between many stakeholders, including French CAA, DSNA (French ANSP), the UTM service provider, the drone operator, local ATC services and local authorities at the two sites of operation.

Swiss drone manufacturer Rigitech has launched a regular BVLOS (Beyond-Visual-Line-of-Sight) route linking Bourgoin-Jallieu to Tignieu-Jameyzieu, East of Lyons. RigiTech has begun daily flights between two laboratories located 26km apart in only 15 minutes, reducing delivery time by 50% (this route usually takes 30 minutes by car), using its long-range drone, that can carry a payload of up to 3 kg, and medical boxes with up to 150 pre-conditioned blood vials.

(source: *https://www.unmannedairspace.info/latest-news-and-information/rigitech-launches-daily-beyond-visual-line-of-sight-medical-deliveries-in-france/*)

Drone operator Deliverone collaborated with Rigitech to complete Beyond Visual Line of Sight (BVLOS) drone operations in northern France. Utilising the Rigitech's Eiger platform, the partners aim to establish an efficient and secure network for transporting critical medical supplies between clinics and hospitals during nighttime aeronautic hours. Rigitech provides detailed route planning, smart navigation, integrated Detect and Avoid systems, and contingency measures.

Delivrone recently began flying two routes from Valenciennes to Maubeuge, connecting a local clinic and the Maubeuge Central Hospital to Valenciennes, traversing a distance of 39 km in approximately 25 minutes.

(source: *https://www.unmannedairspace.info/latest-news-and-information/deliverone-and-rigitech-complete-night-bvlos-routes-in-northern-france/*)

4.4.6 - Germany

The Free State of Bavaria and the Federal Republic of Germany are supporting a new initiative called Air Mobility Initiative, carried out by a partnership of German entities organised around Airbus, and looking into three main streams: electric vertical take-off and landing (eVTOL) aircraft, unmanned traffic management (UTM) services, airport & city integration including vertiports.

The UTM stream is concerned with the safe and efficient flight of the vehicles on their route in and outside cities. The central element for testing is the establishment and operation of a U-Space airspace for testing purposes, with Droniq acting as USSP. The U-Space forms the basis for enabling safe and efficient interaction between manned and unmanned air traffic, particularly in urban regions.

The Air Mobility Initiative U-Space (AMIUS) project (part of the Air Mobility Initiative (AMI)) establishes the first integrated Bavarian U-Space as its overarching goal. AMIUS investigates how a U-space based on digital services can integrate today's air traffic, including its processes and technologies, with future deployment scenarios of Unmanned Aircraft Systems (UAS) and eVTOLs (electric Vertical Take-Off and Landing aircraft) in a common airspace.

For this purpose, the necessary air traffic management functions for safe, integrated and efficient operation are provided and demonstrated by the U-space services – including network identification service, geo-awareness, UAS flight permit service and traffic information service – defined by EASA.

In order to guarantee the safe and efficient integrated operation of UAS, eVTOLs and general aviation in the future, new traffic concepts are required. The existing airspace management must be supplemented by an integrated UTM and thus expanded by the dimension of the previously uncontrolled airspace.

The AMIUS project also investigates how the data flow between the airspace users involved and the storage of relevant data can be secured against unauthorized external interference by various measures.

The project started in January 2022 and is due to end in December 2024.

(source: *https://www.unmannedairspace.info/latest-news-and-information/germanys-amius-project-to-demonstrate-u-space-services-defined-by-easa-in-bavaria/*)

16 aviation-related organisations came together as partners in the mFUND project SkyTRACKplus, partly funded by the Federal Ministry of Digital and Transport and officially launched at Mönchengladbach Airport in April 2023.

This project will be completed in 2024 and aims to launch a series of drone flights in manned and unmanned airspace areas between Mönchengladbach and Paderborn airports with a stopover in rural areas. The first steps will be to define the operational concept for simultaneous flight operations of manned and unmanned air traffic, define the flight procedures and undertake ATC controller training. As part of its safety assessment work DFS Aviation Services is identifying threats and possible implications, developing safety measures to mitigate risks and ensuring the work is approved by the National Supervisory Authority.

Droniq is supporting the project with its UTM traffic management system to provide a combined live air situation picture from manned and unmanned aerial vehicles and working with DFS Aviation Services on the operational concept, including risk analysis (SORA and ConOps) and the procedures for air traffic control clearance.

(source: *https://www.unmannedairspace.info/latest-news-and-information/skytrackplus-programme-plans-drone-flights-in-unsegregated-airspace-between-monchengladbach-and-paderborn/*)

German UTM service provider Droniq reports successful drone deliveries of laboratory samples beyond visual line of sight (BVLOS) between the central laboratory of Labor Berlin and individual clinics in Charité and Vivantes.

To realise drone operations for medical purposes in urban areas, Droniq worked together with Senatsverwaltung für Umwelt, Mobilität, Verbraucher-und Klimaschutz, Polizei Berlin, Berlin Feuerwehr, Bundespolizei, Flugbereitschaft Bundeswehr, DRF Luftrettung, ADAC Luftrettung, and Matternet on the integration of routine drone flights into daily flight operations in Berlin.

Test flights began in November 2022 to enable samples to be transported by drone from several Charité and Vivantes clinic locations to the central laboratory of Labor Berlin at the Charité Campus Virchow-Klinik in order to process them there as quickly as possible (for STAT samples for example, the turnaround time in the lab is under 30 minutes).

(source: *https://www.unmannedairspace.info/latest-news-and-information/droniq-supports-bvlos-medical-flights-between-medical-clinics-in-urban-settings/*)

Germany has launched the "U-Space Reallabor Nord-Westdeutschland & Deutsche Bucht" (U-Space NW) project involving a number of local partners. Based on U-space concepts, it aims to create an integrative airspace that will successively establish airspace structures for manned and unmanned aviation. The project will also define interfaces between civil and military applications in the air as well as maritime activities in the German Bight.

Operational tools planned to be used in the project include:

- A web-based application to display aircraft movements in defined areas and altitudes. It displays the positions of drones equipped with an LTE transponder or a remote ID emitter, as well as the relevant manned aircraft in the vicinity.
- A dedicated tool to support authorities and organisations in large-scale monitoring of manned and unmanned air traffic.
- A display of surrounding air traffic in real-time and alerts in case of a risk of collision.

Taking into account all relevant airspace users, the goal is to simplify and automate drone operations in coordination to ultimately increase safety.

(source: *https://www.unmannedairspace.info/latest-news-and-information/germany-launches-north-west-u-space-project-to-integrate-manned-and-unmanned-users/*)

The Luftfahrt-Bundesamt (LBA), Germany's Federal Aviation Office, has approved the operations of the Matternet M2 drone delivery platform beyond the visual line of sight (BVLOS) in the heart of Berlin. This represents one of Berlin's first BVLOS drone delivery network.

Labor Berlin, Europe's largest hospital laboratory, provides diagnostics for 30 hospitals with more than 24,000 beds, including Charité, the largest university hospital in Europe and Vivantes, the largest municipal hospital group in Berlin. Labor Berlin handles more than 6 million lab samples per year from satellite laboratories across Berlin in its central lab. The drone delivery network aims to connect Labor Berlin's central lab to affiliated hospitals for ultra-fast delivery of critical samples in the densely populated city. When fully operational, the network will serve millions of patients a year. Operations will formally begin early 2024 following clearance on federal state level.

(source: *https://www.unmannedairspace.info/aam-uam-route-and-programme-news/german-regulator-authorises-matternet-bvlos-medical-drone-deliveries-in-berlin/*)

The Air Mobility Initiative U-Space (AMIUS) project is part of the Air Mobility Initiative (AMI), which is funded by the Free State of Bavaria and the Federal Republic of Germany and initiates a number of research projects. AMIUS is investigating how a U-space based on digital services can integrate today's air traffic, including its processes and technologies, with future deployment scenarios of Unmanned Aircraft Systems (UAS) and eVTOLs (electric Vertical Take-Off and Landing aircraft) in a common airspace. The project will conduct flight test campaign at the U-space test facilities in Manching later this year.

(source: *https://www.unmannedairspace.info/latest-news-and-information/amius-u-space-project-plans-test-flights-at-manching-test-facilities-later-this-year/*)

After two years of joint developments, the German Federal Aviation Office granted Koerschulte Group an operating license to conduct regular flight operations following Specific Assurance and Integrity Levels (SAIL) III approval, enabling them to operate automatically in public spaces. On February 21, 2024, the first BVLOS automated drone took off from Lüdenscheid, Germany. The drone is controlled and monitored by an Integrated Control Center (ICC) provided by HHLA Sky, a core element that makes drone service scalable. The ICC allows one remote pilot to manage and control up to 12 drones at a time, with more than 100 drones in the air simultaneously in total.

Koerschulte Group plans to add five additional drone delivery routes in the next few months in Lüdenscheid. Up to 80 parcels per day will be flown to local customers by the automated drones and the project partners are planning to introduce further routes in Germany and Europe.

(source: *https://www.unmannedairspace.info/aam-uam-route-and-programme-news/last-mile-drone-delivery-in-germany-benefits-from-bvlos-authorisation-by-the-regulator/*)

Germany's DLR Institute of Flight Guidance has developed a Blueprint titled "U-space Flight Rules" (UFR). This framework of new flight rules aims to establish standardized rules for all airspace users within U-spaces, seamlessly integrating UAS alongside traditional crewed aircraft.

This ConOps proposes UFR to follow a stepwise implementation depending on the level of automation that each U-space will provide. Based on the advancements of the four different U-space levels, increased automation of aircraft capabilities as well as increased digital information exchange and connectivity of U-space services will lead to more automated procedures in ATM systems and U-spaces. In U-space airspaces, this ConOps suggests airspace users to fly under three different operational blocks X1 to X3. For each UFR operational block, a range of U-space services will be mandatory for airspace users to fulfil the technical and operational requirements of each U-space. Additionally, UFR operational block X0 is intended to apply exclusively for UAS operations that cannot conform to VFR or IFR in airspace segments which have not been declared as U-space yet. This implies that all UAS operations will follow UFR principles, regardless of whether they operate in U-space airspace or not. In summary, UFR are envisioned to apply to all airspace users within U-space airspaces and – depend on U-space services and aircraft automation capabilities, – complement

existing flight rules, – ensure fair and common airspace access, – provide operational flexibility, – increase safe and efficient air traffic procedures, – enable increasingly automated air traffic procedures while providing common flight information surveillance, cooperative traffic interaction, and collaborative performance-based separation.

(source: *https://www.unmannedairspace.info/emerging-regulations/dlr-publishes-initial-concept-of-operations-for-all-airspace-users-within-u-space/*)

The BLU-Space project is developing a system for the management of unmanned drone traffic in Germany. Its purpose is to integrate air traffic data with data from various sources and platforms for the first time under real conditions to develop holistic blueprints. This is expected to make a significant contribution to safe and economical air mobility. The BLU-Space project is being funded with a total of EUR2.36 million by the Federal Ministry of Digital and Transport as part of the mFUND innovation initiative. The BLU-Space consortium brings together various municipal authorities and companies, business partners and air traffic control. Together, they are planning to create a European test *airspace* for a complete drone traffic management system in Hamburg, known as a U-space airspace. The city offers optimal conditions to achieve this goal. Its complex infrastructure, which consists of densely populated urban areas, large port and industrial areas as well as inner-city airports, is ideal for developing future-proof solutions for Germany.

U-space airspaces are the digital foundation of a completely new form of mobility and a prerequisite for scaling the use of drones, which can fly automatically and beyond visual line of sight, remotely operated by pilots in a control center. To achieve this, the position of aircraft will be shared between all relevant systems, which is ensured uniformly and securely in a U-space. One of the core objectives of BLU-Space, which will be completed by mid-2026, is to digitally integrate all relevant authorities, emergency service centers and transport companies with the U-space.

(source: *https://www.unmannedairspace.info/uncategorized/blu-space-consortium-unites-partners-in-hamburgs-urban-drone-traffic-management-project/*)

Leichtwerk AG and its partners have performed a beyond visual line of sight (BVLOS) validation flight at the National Test Centre for Uncrewed Aircraft Systems at the German Aerospace Center (DLR) in Cochstedt. The flight operation of a HAPS (High Altitude Pseudo Satellites) system was simulated with a scaled demonstrator.

During the flight, the drone was safely operated by the Leichtwerk ground control centre system from Braunschweig, 100km away.

The flight was part of the OBeLiSk project which is funded by the Federal Aeronautical Research Programme. The aim of the project is to develop and validate an operational concept for the safe and efficient airspace integration of drones. This includes flight plan processes and route optimisations that take into account weather influences in all phases from planning to execution, precisely and in line with the requirements of the respective flight system.

(source: *https://www.unmannedairspace.info/latest-news-and-information/leichtwerk-performs-bvlos-validation-flight-for-the-obelisk-project/*)

Opened on June 14 by the Hamburg Port Authority, Hamburg Police and Hamburg Aviation, dronePORT Hamburg is a ground infrastructure facility focusing on UAS and mobile sensor technology. In the future, a wide variety of missions will be initiated and monitored from the dronePORT, with potential for both public and private-sector use.

HHLA Sky, a subsidiary of Hamburger Hafen und Logistik AG (HHLA), provides drones for inspecting the Port of Hamburg and shipping lanes as well as the technology required for automated drone control and management of the drone fleet: the Integrated Control Centre. The software makes BVLOS flights possible and drone operations scalable, while offering additional cybersecurity and safety capabilities.

The Integrated Control Centre enables BVLOS drone flights over long distances for various applications, such as infrastructure inspection. An operator in the control centre monitors the flights and can intervene at any

time. The system enables one operator to monitor several drone flights at the same time. It is designed to handle more than 100 BVLOS-automated drone flights simultaneously.

(source: *https://www.unmannedairspace.info/latest-news-and-information/hamburg-opens-droneport-with-hhla-sky-control-centre/*)

Urban Ray has secured SAIL II ((Specific Assurance and Integrity Level – low risk) operational approval from the German Federal Aviation Office to conduct beyond visual line of sight (BVLOS) flights for its delivery drones on three designated routes near Cologne, North Rhine-Westphalia.

This approval allows Urban Ray to test its flying couriers over extended distances and in more complex environments. By operating BVLOS, the company can gather data and experience under real-world conditions. The BVLOS flights will also allow the company to fully test the interaction of its drones with its ground station. Urban Ray aims to provide parcel deliveries, starting with the healthcare sector, using aerial robotics and lockers.

(source: *https://www.unmannedairspace.info/latest-news-and-information/urban-ray-granted-approval-for-bvlos-flights-near-cologne/*)

Security specialist Securitas has received approval from the national civil aviation authority for fully automated drone operations and BVLOS flights in Germany. Securitas Air Control flights will offer critical infrastructure protection.

The drones are equipped with a variety of sensors, including high-resolution cameras, thermal imaging cameras and laser rangefinders. These technologies are designed to enable the drones to detect people, vehicles and other objects such as licence plates even in difficult conditions such as poor visibility or total darkness. They can also communicate with people via integrated loudspeaker systems using live offender speech and provide visibility in dark areas using headlights. Flight operations are monitored by an operator regardless of location. For example, a flight over Hamburg may be monitored by an operator in Munich.

(source: *https://www.unmannedairspace.info/latest-news-and-information/germany-grants-bvlos-approval-to-securitas-for-critical-infrastructure-protection-by-drone/*)

Globe UAV has announced that its ZERC fixed-wing VTOL drone has received approval from the German Federal Aviation Office for BVLOS flights over urban areas. This authorisation adds to the company's approval for BVLOS flights over inhabited areas with its MultiCopter drone, which was given in 2022.

The approval meets the European Union's SAIL III (medium risk) for drone operations. SAIL III indicates a medium risk level, where specific measures are required to ensure safety. The company has listed medical transports, monitoring of wildfire areas, and corridor inspections as potential BVLOS applications with ZERC.

(source: *https://www.unmannedairspace.info/latest-news-and-information/germany-approves-globe-uavs-zerc-drone-for-bvlos-flights-over-urban-areas/*)

HHLA Sky has established a test airspace in Hamburg and is conducting field trials for the BLU-Space project. This 'Blueprint for U-space' project, funded by Germany's Federal Ministry for Digital and Transport, aims to automatically manage drone traffic in complex environments.

During the first test day, HHLA Sky and the Hamburg Port Authority (HPA) evaluated the technical interfaces between the drone operator and the USSP's systems. The roles and procedures of these stakeholders were also put in practice and initial findings were gained. Upcoming test days are planned, which will integrate additional U-space stakeholder systems and test additional interfaces.

(source : *https://www.unmannedairspace.info/latest-news-and-information/blu-space-project-field-trials-commence-in-hamburg/*)

4.4.7 - Greece

Drone operator RigiTech has launched its Eiger drone system in Greece in collaboration with 5 Greek industry players. On 8 September, RigiTech's Eiger drone carried out the first test operations, managed remotely from Kos and Pserimos. The Eiger performed an 8-minute flight connecting points over the ocean that are 12 km apart. As safety remains a top priority in all BVLOS operations, all project partners were working closely with Greek aviation authorities to ensure strict compliance with safety regulations and air traffic management.

The partnership between these Greek industry players applies drone technology to applications such as logistics and emergency services. The project's primary objective is to validate the feasibility and efficiency of BVLOS drone delivery, addressing the challenges posed by Greece's island geography.

4.4.8 - Ireland

Dublin City has launched its Drone and Urban Air Mobility Strategy 2024 – 2029, an initiative aiming to transform how the city uses drone technology to enhance public services. Dublin City Council (DCC) Smart City programme led the development of the Drone Strategy to support the Council in future-proofing how new and emerging technologies are applied.

Drones are utilised across a range of city services helping to increase service efficiencies, reduce costs, and streamline operations. Areas where drones are used within DCC include mapping, dangerous building inspections, or emergency response. They are also being used to access to hard-to-reach areas for surveys and environmental monitoring, providing better oversight and management of urban spaces.

Dublin City Council will soon establish a new dedicated Drone Unit. This will centralise drone operations and support internal departments to accelerate the adoption of this technology. This unit will build on existing capabilities and resources and maximise efficiencies across the Council. The unit will also play a role in supporting innovation in the drone industry by helping develop new services that benefit citizens and communities as the commercial sector grows.

The development of the Drone and Urban Air Mobility Strategy for Dublin City Council has been led through the Smart City programme which supports the council in future-proofing how new and emerging technologies are applied. By fostering a vibrant drone technology ecosystem, Dublin has the potential to attract new businesses and drive economic growth, positioning itself as a leader in this emerging sector.

This strategy was developed through extensive consultation with internal and external stakeholders, ensuring that it aligns with Dublin's unique needs and leverages the latest advancements in drone technology. The strategy also supports compliance with evolving European Union regulations and emphasizes public trust, safety, and privacy.

(source : *https://www.unmannedairspace.info/emerging-regulations/dublin-city-launches-its-drone-and-urban-air-mobility-strategy-2024-2029/*)

Wing and Apian have partnered with Blackrock Health and St. Vincent's Private Hospital in Dublin along with healthcare technology company, Medtronic to launch a drone delivery trial demonstrating the benefits drones could offer in healthcare logistics.

Over the next few months, Wing and Apian will deploy drone delivery to carry medical supplies and devices to hospitals. Wing's lightweight electric drones, which are being used in this programme, will fly direct routes at speeds up to approximately 100 km per hour, avoiding the traffic congestion on Dublin's roads.

The initiative will start with up to 100 weekly flights. The partners have cooperated to implement the relevant safety mechanisms and are working closely with the Irish Aviation Authority to ensure these operations adhere to its operational standards.

(source: *https://www.unmannedairspace.info/latest-news-and-information/irelands-first-ongoing-medical-delivery-service-by-drone-to-launch-in-dublin/*)

4.4.9 - Italy

Italy's Lazio region has signed a memorandum of understanding with ENAC, the Civil Aviation Authority, to work together over the next three years to study the regulatory environment, both aeronautical and urban, operational and technical, and the analysis of usable routes and suitable infrastructures to carry out air mobility services in the Lazio region. The initiative, which will start in 2023, is part of a larger Advanced Air Mobility project and will take place in the Fiumicino sandbox, where stakeholders (CAA, ANSPS, airport operator, industry, etc.) can test new operational concepts and accelerate the technological, regulatory and procedural maturation process while supporting the regulatory evolution.

(source: *https://www.unmannedairspace.info/latest-news-and-information/italys-lazio-region-works-with-regulator-to-develop-drone-transport-infrastructure/*)

Drone services company STRADAai is collaborating with airborne communications company Dimetor to expand market services in Italy. STRADAai offers a drone data network and a patent pending enterprise drone planning platform as a growing U-space Service Provider (USSP). Once the system strategy is established, the two organizations will offer BVLOS solutions to the drone market in Italy through the development and launch of a new integrated software that will function as a unified solution. The service will be offered to relevant authorities, telecommunications organisations, drone operators and digital infrastructure service providers for drones. Stakeholders of the partnership could be local representatives and actors directly involved in the drone ecosystem in Italy. The system will feature end-to-end data encryption to support use cases such as industrial inspections, precision agriculture, delivery, law enforcement, security and surveillance, and emergency response.

(source: *https://www.unmannedairspace.info/latest-news-and-information/dimetor-and-stradaai-partner-to-develop-u-space-services-for-drone-operators-in-italy/*)

Italy's national civil aviation authority Enac has issued the first Light UAS Operator Certificate (LUC) to an Italian operator. The company, FlyingBasket, is a start-up that is also the first national UAS operator to have carried out cross-border operations in Europe.

(source: *https://www.unmannedairspace.info/latest-news-and-information/enac-issues-first-light-uas-certificate-luc-for-italian-operator-flyingbasket/*)

A pilot drone delivery project is underway between Naples and Procida in Italy. The service is managed by the Italian national postal service, Poste Italiane in collaboration with Leonardo and FlyingBasket. Italian regulator ENAC granted the operational authorisation.

The project is testing a daily freight transport system with drones capable of carrying loads of up to 40 kilograms. Drones supplied and remotely piloted by FlyingBasket take off from Bagnoli and land with their load on the island of Procida. All operations are managed from a control station, beyond visual line of sight (BVLOS). The take-off and landing areas have been provided by UrbanV.

The initiative is part of the National Center for Sustainable Mobility (MOST) research and innovation programme in which Poste Italiane and Leonardo participate. It is funded by the Ministry of University and Research with investment from the National Recovery and Resilience Plan. The pilot is scheduled to continue until the end of September with the possibility of extending. This first phase focuses on testing flight operations and the communication and control infrastructures required to activate the freight transport system.

(source: *https://www.unmannedairspace.info/latest-news-and-information/drone-delivery-trial-underway-in-italy/*)

4.4.10 - Lithuania

Oro Navigacija, the air navigation service provider (ANSP) of Lithuania, is extending its UTM solution with a digital, automated, risk assessment tool to speed up the classification of the risk posed by a drone flight in the specific category of operations and for the identification of mitigations and of the safety objectives.

The digital application provides unique automated risk analysis support for drone operators. It is designed to create Specific Operations Risk Assessment (SORA) according to the guidelines defined by JARUS and European Union Aviation Safety Agency (EASA), cutting operator process time by up to 75 per cent.

The service, called wingman, will be provided as a web and mobile friendly application to be integrated into the future Lithuania UTM system, once deployed and operational. It follows the strategy to create a complete drone environment as a 'one stop shop' for value added drone related services.

(source: *https://www.unmannedairspace.info/latest-news-and-information/airspace-world-faster-drone-flight-approvals-with-frequentis-automated-tool-in-lithuania/*)

4.4.11 - Luxembourg

Drone operators from Luxembourg Air Rescue and Luxembourg Air Ambulance have successfully carried out the first beyond visual line of sight (BVLOS) flights for Project Griffin. During these flights, the Project Griffin drone safely travelled the route between the Hôpitaux Robert Schuman at Kirchberg and the Laboratoires Reunis in Junglinster and back – the same route that will be used to transport medical samples in the future. The drone flights were carried out under realistic conditions, but without transporting a medical sample.

(source: *https://www.unmannedairspace.info/latest-news-and-information/first-bvlos-flights-for-project-griffin-in-luxembourg/*)

4.4.12 - Malta

SKY ThinkTank and SKY Mobility (Malta) Ltd, both based in Gozo, have obtained operational authorisation for uncrewed flight tests from Malta's Civil Aviation Directorate. The authorisation enables the commercial launch of Malta's first drone delivery service, Flying ZERO, following two years of development and assessments. A proof-of-concept demonstration was held in Ta´Qali in 2023 to show potential of remotely piloted drone deliveries. The Flying ZERO fleet is designed for beyond visual line of sight (BVLOS) operations within the European Union Aviation Safety Authority (EASA) specific category.

Flying ZERO will enable the fast and secure transport of critical medical supplies, such as blood samples, between healthcare facilities. The company has already partnered with St. James Hospital as its first customer. The service will also cater for retailers and online merchants, offering last-mile deliveries for small parcels, documents, and other goods. For maritime operations, Flying ZERO will deliver essential items like bunker samples and medications to ships at sea.

(sourc:e: *https://www.unmannedairspace.info/latest-news-and-information/authorisation-given-for-maltas-first-drone-delivery-service/*)

4.4.13 - Monaco

A collaboration between drone services company Kookiejar, drone operator MC CLIC and Superyacht Supplies plans to deliver premium goods from mainland Monaco to the yacht Coral Ocean on 30 September to demonstrate drone delivery services. The project is supported by the Aviation Civile and the Monaco's Maritime Authority as a first step towards introducing U-space to Monaco. The flight will be watched by stakeholders, government authorities, industry and technology interests.

(source: *https://www.unmannedairspace.info/latest-news-and-information/monaco-plans-drone-delivery-between-mainland-and-superyacht-to-demonstrate-u-space-services/*)

4.4.14 - Netherlands

Since mid-2022, the Port of Rotterdam Authority has started a 2-year pilot project on regulations and traffic control in the so-called 'very low-level airspace' to ensure that increased drone traffic over the Rotterdam port area is coordinated properly. It is the first time a pilot of this kind takes place in the Netherlands.

The project will offer the Port of Rotterdam Authority the opportunity to assess what is needed to organise safe airspace and to build up a knowledge of U-space. It will help to decide whether they would like to have a role in low altitude airspace in the future and what that role should be. The project is a collaborative partnership between the authorities, the municipality of Rotterdam, stakeholders, knowledge institutes such as the NLR and industry, and will help advance the many drone applications in the port from a neutral position.

(source: *https://www.portofrotterdam.com/sites/default/files/2022-03/drone-port-of-rotterdam-uspace-airspace-prototype-en.pdf*)

To prepare the airspace for new uses of drones, the Port of Rotterdam Authority is setting up a prototype U-space airspace. To test in practice how they should organise the airspace over the port and keep it safe, the Port Authority has entered into a partnership agreement with UTM system supplier Airwayz. These services are used by drone operators and include flight permission and deconfliction services.

The protocols, procedures, agreements and risk profiles with respect to airspace are drawn up by the Port of Rotterdam Authority as the port manager and by the government as the legislator. This makes the Port Authority the first body in the Netherlands to organise its own airspace to ensure smooth and safe drone traffic.

The prototype will take two years and will start in December 2022. The prototype is intended to identify the practical implications of controlling the lower airspace and to gain insight into what the role of the Port Authority in all of this might look like. In addition, it should reveal prerequisites of keeping drone airspace safe, the opportunities for drone operators in the port, and the impact of drone traffic control on the organisation.

(source: *https://www.portofrotterdam.com/en/news-and-press-releases/digitisation-of-airspace-for-the-use-of-drones*)

A collaboration between LVNL (Air Traffic Control the Netherlands), ANWB and KPN aims to establish a 'digital corridor' to enable medical drone flights between two hospitals in Zwolle and Meppel. The digital corridor makes it possible for drones to fly in the same airspace as manned aircraft. In the coming year, the parties will gain experience in deploying unmanned aircraft in the airspace. With this knowledge, drones can be used on a larger scale in the future, for example to get urgent transport of blood, medicines and other medical goods to their destination faster and cheaper.

The first flights are planned for the first half of 2023. Later this year, flights will also be carried out in other places, for example in the vicinity of Rotterdam. This will provide experience in busier airspace, due to the proximity of Rotterdam-The Hague Airport. By testing drone flights in two different types of airspace, experience is gained in both circumstances.

(source: *https://www.unmannedairspace.info/latest-news-and-information/lvnl-anwb-altitude-angel-and-kpn-establish-digital-corridor-for-medical-delivery-in-the-netherlands/*)

Since the start of 2023, Rotterdam Port has been developing a pre-operational UAS traffic management (UTM) system prototype and has slowly been adding services so that a fully functioning operational system is now ready to manage drone operations from over 40 operators flying drones in the port.

The key motivation to develop the system has been to improve safety at the port; since its inception the port has also become aware of the relatively large number of drone operators working and where they are operating. This information has proved particularly valuable for police, port security and customs agencies. It

is not just the number of drone operations which has proved surprising but the different types of flight profiles; the port authority acknowledges that not all drones flying at the port will need UTM services.

There is a long way still to go before the system can be officially certified as U-space management system, ready to handle multiple autonomous drone operations to the regulatory requirements laid down by the European Aviation Safety Agency. The hardware and U-space service provider (USSP) functions are entirely integrated and there is no plan yet for who the USSP might be – and when such a role will be certified by the national aviation safety regulator. There is only one BVLOS operation in the port monitored by the system, currently limited to 2km operations, though with plans to expand in the future.

(source: *https://www.unmannedairspace.info/uncategorized/25139/*)

A consortium of Dutch and UK companies demonstrated how a Common Information Service (CIS) can support and enable commercial drone across the Netherlands. providing a gateway to delivering a secure, performant, and reliable interface between the ANSP and all U-space stakeholders, such as USSPs, authorities, national registration, public safety, and defence. The comprehensive CIS demonstration involves a UM platform platform fusing LVNL's ATM radar data (ASTERIX Categories 21, 48 and 62) with surveillance sources including drone detection systems, UAS RemoteID and ADS-B, to create a consolidated and comprehensive lower-airspace traffic picture.

For the showcase, the consortium has created a common, open, and interoperable interface for USSPs to receive static and dynamic geo-awareness data from LVNL and share flights with other U-space stakeholders. It also acts as an 'authorisation broker' which routes UAS plans to LVNL's GoDrone system for approval to operate in controlled airspace and updates the USSP in real-time with the authorisation.

Drone services company Airwayz reports successful demonstration of the integration of its dynamic UTM/USSP system at the port of Rotterdam. During the demonstration, drones delivered goods to ships. Unmanned aircraft systems offer a multitude of services at ports, with shore-to-ship deliveries by drones revolutionizing the work of boatmen. This advancement streamlines operations and potentially unlocks new services, such as drone deliveries to ships at anchorage. The integration of drones in this ecosystem enables boatmen to transition from conventional ship-based deliveries to drone deliveries, enhancing sustainability, efficiency, and cost-effectiveness in daily port operations, says the press release.

Multiple drone operators and operating systems performed tasks throughout the demonstration, seamlessly connected and managed by the air traffic management system, using U-space services. Airwayz UTM/USSP also integrates with AIS information, adding a safety layer by providing vessel data to Air Traffic Management. This integration is designed to enhance aviation safety and operational efficiency by fostering a harmonious environment where drones and aircraft can coexist. Operating under the CTR, the initiative of the Port of Rotterdam Authority provides an example for other large European cities with airports nearby.

Since the inception of its U-Space, the Port of Rotterdam Authority has completed a series of drone operation demonstrations at the ports, including managing No Fly Zones and fly-away situations, coordinating simultaneous drone requests with one priority flight, flying over vessels and executing ghost operations in addition to today's drone delivery display.

(source: *https://www.unmannedairspace.info/uncategorized/airwayz-demonstrates-integration-of-utm-ussp-at-the-port-of-rotterdam/*)

Altitude Angel has announced that Twente Airport in the Netherlands, in collaboration with drone innovation cluster Space53, is to deploy its Approval Services platform. The platform enables drone operators, and in the future eVTOL pilots, to submit flight requests and pay for operations within Twente Airport's airspace digitally.

Twente Airport is the first airport in the Netherlands to adopt the technology. It operates as a test centre for both crewed and uncrewed flight operations and has recently hosted, together with Space53, exercises conducted by The Royal Netherlands Airforce, national police force, and Twente Fire and Rescue service.

(source: *https://www.unmannedairspace.info/latest-news-and-information/twente-airport-to-deploy-altitude-angels-approval-services-platform/*)

DroneQ Robotics, in collaboration with Den Helder Airport, the air traffic control of Maritime Air Base De Kooy and METIP, held four drone test flights from Den Helder Airport, Netherlands on September 13. The purpose of these beyond visual line of sight (BVLOS) test flights was to test procedures that could enable the future dual (manned/unmanned) use of Den Helder Airport.

During these first flights, procedures with Den Helder Airport and the air traffic control of De Kooy Maritime Air Base were tested, but the transport of cargo was also tested. In this case, medications."

Permission was requested for each flight to allow the uncrewed systems to fly in between regular air traffic. The test was a success and that the flight preparations, procedures and coordination issues provided valuable information for subsequent test flights.

(source: *https://www.unmannedairspace.info/latest-news-and-information/bvlos-test-flights-explore-potential-dual-use-of-den-helder-airport/*)

The Port of Rottterdam has announced a three-year extension to its U-space airspace pilot project. This initiative represents a commitment to advancing safe, secure, and scalable drone operations in one of Europe's largest and most complex ports". The Port of Rottterdam is working to implement drone regulations in collaboration with EASA, Eurocontrol, the SESAR Joint Undertaking and several sectors active in the Port's context.

The U-space airspace prototype in Rotterdam is designed to establish a comprehensive framework for managing drone traffic in low-altitude airspace. This involves UTM systems that monitor and control drone operations, ensuring safe integration with other port activities and manned aviation. The prototype addresses key challenges such as defining airspace roles, setting technical requirements, and balancing safety with opportunities for drone services. This project is also creating a model for collaborative governance by involving stakeholders from authorities, municipalities, and industry.

(source: *https://www.unmannedairspace.info/latest-news-and-information/rotterdam-port-extends-u-space-airport-pilot-for-another-three-years/*)

4.4.15 - Romania

Romanian private medical services company MedLife has partnered with the Australian company Skyy Network, to introduce drone delivery services to routinely transport biological samples over medium and long distances.

Deliveries will be carried out from four localities – In Bihor County (Aleșd, Beiuș, Marghita, Salonta) to Oradea, and Arad; in the future, MedLife plans to expand the project nationwide. With a 120 km length, the route between Oradea and Arad is among the longest drone flight route for medical samples in Europe.

The MedLife project has received the approval of the Romanian Civil Aeronautical Authority (RoCAA), as well as the Public Health Directorate in Bihor and Arad County and that of the Ministry of National Defence.

After almost three months of tests and preparations, the first flights with real samples from patients have already been carried out. The average duration of a transport load flight time is around 19-28 minutes each way, respectively less than one hour between Oradea and Arad. The drone cruises at a speed of approximately 122 km/h. This represents a time saving of more than 50% compared to land transport, at the same time adding greater efficiency in collection and delivery by the autonomy offered by the system. As a result, MedLife manages to offer its patients quicker results, by cutting the response time from 24h to same day, for 76% of the laboratory tests.

(source: *https://www.unmannedairspace.info/aam-uam-route-and-programme-news/medlife-and-skyy-network-partner-to-introduce-romanias-first-medical-delivery-network/*)

4.4.16 - Serbia

The initial results of an urban drone flight trial over Belgrade as part of an EIT Urban Mobility project to test UTM and airspace architecture concepts has shown that large safety corridors are not always need for urban drone flights

In October, the first demonstration flight by the project Urban Air Traffic Management DEVelOpment & DEMOnstration partners was carried out in Belgrade city. The main goal of the demonstration was to confirm the capabilities for delivering medical products between hospitals in the urban area of the city.

During the demo flight, the drone was in communication with the UATM centre, to follow the planned route, flight corridor, and similar data in real-time by the UATM centre. The Faculty of Transport and Traffic Engineering of Belgrade University provided the file with a route based on a digital elevation map of the city no-fly zones and safety corridors which was extracted to FIXAR mission planner software xGroundControl. The algorithm calculated and created the optimal mission route. The demonstration flight took place at the University of Belgrade – Faculty of Transport and Road Technology with a planned take-off and landing in the city area and a flight route mostly over an uninhabited area

As a result, it was concluded that, based on the maximum deviation of 0.7 m and horizontal deviation at turning angles of 4.7 m. large safety corridors are not necessary for flight operations with the FIXAR 007 (a fully autonomous, VTOL (vertical take-off and landing) fixed-wing drone) and it was proven suitable for deliveries and operations within urban areas.

The mentioned characteristics of the flight route were such that risks and possible negative impacts on the safety of air traffic, as well as on the life and health of people and their property on the ground were minimal. Medical delivery in an urban area using the UATM system being developed within EIT Urban Mobility can be executed quickly and safely supporting a fast supply of urgently needed life-saving drugs, medical equipment, blood, vaccines and even human organs.

(source: *https://www.unmannedairspace.info/uncategorized/large-safety-corridors-for-urban-drone-flights-not-always-needed-belgrade-eit-trial/*)

4.4.17 - Slovakia

SD, a.s. (Skupina VSE Holding – Východoslovenská energetika Holding a.s.) has conducted the first fully autonomous beyond visual line of sight (BVLOS) flight in Slovakia for the purpose of inspecting power lines, with the support of technological partners ZEPHYR UAS and the R-SYS subsidiary of ERA.

The drone took off from the Lemesany site and was controlled from the VSD dispatch centre in Košice. Real-time flight supervision was performed using the authority console from the IXO UTM (Mam Dron) system, provided by R-SYS. The drone was equipped with a modified LTE remote identification module from Dronetag, which works in conjunction with the IXO UTM (Mam Dron) system.

The flight covered a distance of nine kilometers, and lasted approximately 25 minutes, during which time the drone automatically captured and recorded parts of the power line according to predefined parameters.

The flight was made possible due to the operational permit granted to VSD, a.s. by the Transport Authority in Slovakia for performing inspection flights using this method.

(source: *https://www.unmannedairspace.info/latest-news-and-information/autonomous-bvlos-flight-inspects-power-lines-in-slovakia/*)

The Armed Forces Academy of General Milan Rastislav Štefánik (AFA GMRS) successfully completed the scientific research study titled "Integration of Unmanned Aerial Systems of the Slovak Armed Forces into the Slovak Airspace" at the end of 2023. (source: *SK_MoD_4154_dodatok-c-semod-el-66_3-108_2020.pdf (Slovak*

Only)). The document also featured a section dedicated to addressing the methods of detecting, tracking, and identifying both cooperative and non-cooperative aerial targets. Practical-based research featured a dynamic demonstration of an integrated ATM/UTM system during the event "Ensuring UAS Operators Training in the Environment of the Armed Forces of the Slovak Republic" (source: *R-SYS demonstrated the capabilities of an integrated ATM/UTM system for the needs of the armed forces | Air Traffic Systems*).

Additionally, AFA GMRS is notably engaged in the sector through its participation in the scientific research project titled "Design and Implementation of a Complex Educational and Training Workplace for Operators of Unmanned Aerial Systems in classes BUQ I – IV." (source: *SK MoD 4154 dodatok-c-semod-el-66 3-108 2020.pdf (Slovak only)*). The objective is to develop a complete hardware and software solution tailored to the requirements of the Slovak Armed Forces.

Since 2018, AFA GMRS has been offering highly specialized courses for Unmanned Aerial System operators in BUQ levels I – II. The Simulation Center, a key component of AFA GMRS, stands as the sole certified entity by the MoD of the Slovak Republic to conduct this specific training.

The technological partners of the Mám Dron association, companies R-SYS and Dronetag , in cooperation with the Simulation Centre of AFA GMRS , carried out a dynamic demonstration of the integrated ATM/UTM system at the end of 2023 during the event, ensuring the training of drone operators in the OS SR environment.

The IXO MIL system from R-SYS provided situational awareness in the area of the training polygon and provided various types of dynamic and static data, including geographic zones, no-fly zones and information on target objects. At the same time, the system enabled the exercisers to be notified and non-verbal communication between the exercise leader and the exercisers via a chat tool. This solution is the functional equivalent of a UTM system, which meets the requirements given by the EU regulation for U-space.

Positional information and tracking of drones that flew in the area of the training polygon were carried out by two methods – DirectID directly via Bluetooth/WiFi (Direct remote identification) and RemoteID via LTE networks (Network identification). The transfer of positional data from the drones was ensured by Dronetag modules, fully integrated into the UTM solution of IXO MIL. This originally civilian UTM solution has been modified for use in various types and components of the armed forces or law enforcement agencies, allowing to display the positions of non-cooperative targets using various types of survey sensors and also to communicate with C-UAS solutions through standard protocols.

The result of this experimental cooperation of the military and civil sectors was a successful demonstration of current technological possibilities in the field of ATM/UTM integration and display of drone location information in real time. The possibility of tracking and monitoring various drones in real time through a web and mobile application based on the principle of the functional equivalent of the UTM system and access to special software providing relevant data on aircraft was also presented.

This demonstration showed how modified UTM systems can safely and effectively manage drone operations even in a demanding military environment, especially in a period when the pressure to integrate and ensure the joint functioning of military and civilian manned and unmanned operations in common airspace, especially in ground and very low altitudes will exert increasing pressure not only on the implementation of rules for UTM/U-space, but also on the automation and mutual integration of new and existing solutions into a reliable and economically efficient technological ecosystem.

(source: *https://www.unmannedairspace.info/latest-news-and-information/slovakian-trials-of-military-integrated-atm-utm-system-include-remote-and-network-id-components/*)

4.4.18 - Spain

The first test flight results of the Support to Standardisation Actions for EGNOS and Galileo in the U-Space (SONORA) programme – to incorporate European Global Navigation Satellite System (EGNSS) services into its standards and regulations and foster the implementation of EGNSS-based solutions in U-Space – has suggested that Europe's Galileo GNSS will be more accurate than the US' GPS for tracking drone flights.

The test flight took place on November 8 and 9, 2022 at the Tactical Center of the Air Traffic Laboratory for Advanced Unmanned Systems (ATLAS), in Beas de Segura in the Spanish province of Jaén. The objective of the trial was to collect and analyse GNSS data from different equipment and technologies to support the development and verification of standards, as well as evaluating new EGNSS services such as GAL HAS and OS-NMA, in a non-degraded environment. Several real-life UAS missions, such as highway surveillance, vehicle pursuit, and intrusion detection, were planned and executed.

During the first day of the trial there was a solar storm that led to obtaining a degraded GPS single frequency performance. However, when in combination with EGNOS, even in single frequency the ionospheric error was corrected and position errors were reduced considerably, resulting in the best observed performance among all tested configurations. Regarding the comparison between Galileo and GPS and the single and double frequency solutions (SF and DF, respectively), it has been observed that under similar geometry conditions in terms of satellite distribution and availability, the accuracy provided by Galileo is better than GPS's. Also, Galileo's accuracy improves significantly with DF compared to SF, reaching errors almost as low as those obtained with SBAS (EGNOS).

Two flight trial campaigns have been foreseen to achieve SONORA's objectives. The second one will take place in the coastal city of Benidorm and is scheduled for autumn of 2023. It will include the performance of a similar study, but this time in a more challenging urban environment and including the use of GNSS receivers hybridized with other technologies such as IMUs. The main objective of this experimentation will be to gather relevant data on EGNSS services for the support of the development of Innovative Air Mobility applications, such as Urban Air Mobility.

(source: *https://www.gmv.com/en-es/communication/news/succesful-flight-tests-performed-sonora-project*)

EHang rand the Advanced Center for Aerospace Technologies (CATEC) have completed the BAUD project in Spain. Framed under the Invest in Spain program of ICEX Trade and Investment, and sponsored by the Spanish Ministry of Industry, Trade and Tourism, the BAUD project aimed at enhancing the operational safety and efficiency of drones for aerial logistic missions, as well as enabling their integration in U-space. EHang and CATEC developed an autonomous airborne beacon, which provides more precise and comprehensive drone positioning by using Global Navigation Satellite Systems, EGNOS (European Geostationary Navigation Overlay Service) and Galileo, along with providing the UAS status, remote electronic identification and other tactical information with U-Space systems. This type of beacon will contribute to the safe operation of drones in European airspace, through their intelligent integration with U-space systems.

(source: *https://www.unmannedairspace.info/latest-news-and-information/ehang-and-catec-report-successful-completion-of-icexs-baud-project-in-spain/*)

Telefónica has developed a use case in Spain for package delivery based on 5G-connected drone air traffic control. The main objective of the project, for which C-V2X (connected car) and RTK technologies for precise location are applied, is to evaluate how the 5G network can facilitate the development and implementation of services with drones in urban environments.

The demonstration consists of the flight of several drones that communicate with each other and with different urban elements connected with the aim of making a correct delivery of a package in a mobile collection point finding in its path another drone or a notice of a restricted area zone:

- Traffic coordination between two drones: one drone intercepts the passage of another drone, detecting a risk of collision. One of the drones stops, giving way to the other drone, thus avoiding the collision and then each drone continues on its own route.
- Restricted area warning: a beacon connected on the ground marks a restricted area and constantly reports its location. The drone on its trajectory, upon entering that zone, detects that it is a restricted area, leaves that area and proceeds to go around it, continuing its route.
- Package delivery at a mobile delivery point: the mobile collection point is equipped with the beacon connected in such a way that it periodically sends its position and so the drone goes to that point and makes a precise landing.

All this, accompanied by an air control platform that geolocates in real time all the drones and beacons connected and displays the information of all the actors and the communication messages that are exchanged.

(source : *https://www.unmannedairspace.info/latest-news-and-information/telefonica-demonstrates-5g-communication-between-drones-and-smart-cities/*)

Madrid city council has established a commission to study the future regulation of drone traffic. With the creation of this commission under the Municipal Sustainable Mobility Ordinance (OMS), Madrid will be the first Spanish city to have a framework that regulates its air mobility. The commission will collaborate with the competent administrations for the development and implementation of the 'U-space' and the development of this type of mobility in the city of Madrid for its integration in a safe and environmentally sustainable way.

(source: *https://www.unmannedairspace.info/latest-news-and-information/madrid-city-to-form-a-drone-and-uam-regulation-commission/*)

The POCTEFA 2021-2027 programme is funding cross-border cooperation projects designed and managed by entities from both sides of the Pyrenees (France, Andorra, and Spain). The Niu.link project has obtained nearly EUR2 million and comprises a consortium formed by Airports of Catalonia, PildoLab, Pirineos Drone, University of Lleida, Open University of Catalonia, University of Barcelona, Innov'ATM and Instadrone.

The goal of this consortium is to achieve these two cross-border corridors (between hospitals or primary care centers in the territory and clinical laboratories) to make transports more sustainable and agile for people living in mountain territories. An experimental vertiport will also be executed in Lleida-Alguaire to study transport between corridors and will be replicated in different formats depending on the territory where the vertiport is located.

(source: *https://www.unmannedairspace.info/aam-uam-route-and-programme-news/nui-link-consortium-plan-cross-border-medical-deliveries-on-both-sides-of-the-pyrenees/*

China's eVTOL manufacturer EHang has announced the completion of a series of flights by its EH216-S electric Vertical Take Off and Landing (eVTOL) aircraft supported by European Geostationary Navigation Overlay Service (EGNOS), Europe's Satellite-Based Augmentation System (SBAS). The flights were conducted at EHang´s UAM Center in Europe, inside Lleida–Alguaire International Airport (LEDA) in Spain, in the frame of European Union Agency for the Space Programme´s ("EUSPA") SAMVA project.

The SBAS Adoption in Multicopter VTOL Aircraft (SAMVA) project, focuses on the implementation of EGNOS satellite-based operations on eVTOLs, to enhance Advanced Air Mobility services and U-space airspace integration. EGNOS allows more accurate positioning and provides an additional layer of safety for the flights of EH216-S pilotless eVTOL in Europe.

(source: *https://www.unmannedairspace.info/urban-air-mobility/ehang-completes-flight-trials-of-european-gnss-egnos-airspace-integration-procedures/*)

ENAIRE, has announced a partnership agreement covering new projects related to drones, air mobility and satellites with the Council of Universities, Science, Innovation and Culture of the Government of the Canary

Islands, through the Canary Islands Agency for Research, Innovation and the Information Society (ACIISI), and the Council of Fuerteventura, through the Parque Tecnológico de Fuerteventura S.A. (PTFSA).

Specific areas to be addressed by the partnership include airspace integration of uncrewed aerial systems such as drones and High-Altitude Pseudo-Satellite Platforms (HAPS); and the development of the operational concepts of U-space and AM for future implementation and deployment nationwide, including the Canary Islands.

The agreement enables collaboration in the development and potential implementation of flight procedures based on the concept of performance-based navigation (PBN) to improve accessibility of drones to new vertiports. The partnership will identify and promote strategic alliances between the different Spanish actors and agents involved in the deployment of U-space services and AAM, including the execution of joint research and development projects, creation of consortia, and training activities.

(source: *https://www.unmannedairspace.info/latest-news-and-information/new-enaire-partnership-will-develop-u-space-and-uam-projects/*)

4.4.19 - Sweden

Testbed Air Mobility is adapting Landvetter Airport in Sweden to enable unmanned air traffic such as drone deliveries and eVTOL traffic. The team announced that it is working to harmonise unmanned flights with the current air traffic management (ATM) system without impairing the operational requirements of conventional air operations.

Testbed Air Mobility is a EUR10M three-year project between Saab, LFV Group, ACR Aviation Capacity Resources, Swedavia AB, Ericsson, Linköping University and RISE Research Institutes of Sweden.

The project will establish an open test bed for research, development as well as test and demo for autonomous flight and is based on the previous project Tb Autonom Flygplats. It will also create infrastructure for the integration of ATM and U-space by developing a new functionality for the ATM system. The unmanned systems will use 5G technology for identification and positioning.

(source: *https://www.unmannedairspace.info/latest-news-and-information/testbed-air-mobility-begins-adapting-landvetter-airport-for-uncrewed-air-traffic/*)

The Swedish Sea Rescue Society has submitted a SORA 2.5 application to the Swedish Transport Authority for authorisation of coastal beyond visual line of sight (BVLOS) drone operations without segregated airspace.

SORA 2.5 introduces a quantitative ground risk assessment methodology. A new risk table has been introduced which draws on population density maps, considering the fluctuations that occur at different times of the year and day.

The Swedish Sea Rescue Society has previously been granted Pre-Defined Risk Assessment Area (PDRA-G02) BVLOS authorisation that requires a Temporarily Segregated Area.

(source: *https://www.unmannedairspace.info/latest-news-and-information/swedish-sea-rescue-society-submits-sora-2-5-application-for-bvlos-drone-operations/*)

4.4.20 - Switzerland

Following the steps of the first short-range deliveries carried out by La Poste, Swiss drone manufacturer Rigitech reports one of the first long-range Beyond Visual Line of Sight (BVLOS) drone delivery routes in Switzerland, successfully flying over Lake Geneva to a laboratory in Coppet and back. Both RigiTech's proprietary software, RigiCloud, and Eiger drone hardware is compliant with BVLOS SORA regulations, says the Rigitech press release.

The flight involved coordination with Skyguide and Geneva Airport to establish an effective communications channel and to obtain clearance before flights. This milestone was several months in the making, as RigiTech gathered the approval and collaboration from Geneva Police, the Cologny Municipality, the Office conatolan de l'agriculture et de la nature (OCAN), and Swiss Federal Office of Civil Aviation (FOCA).

Avoiding high population density on the ground, this challenging route designed over the lake required consideration of necessary protections for local fauna, as well as vigilant attention to ongoing boat traffic on the water. RigiTech's team proved successful in coordinating the planned flights with information from the Compagnie General de Navigation (CGN), before executing this route to connect Geneva and Coppet.

(source: *https://www.unmannedairspace.info/latest-news-and-information/rigitech-local-agencies-complete-long-range-bvlos-medical-flight-between-swiss-cantons/*)

Skyguide's U-Space team has signed a contract with the Cantonal Police of Vaud to digitalise drone flight authorisations. The agreement inaugurates Skyguide's Authority Approval Service within the Swiss Drone Portal, enabling the digital management of drone flight authorisations.

Drone pilots and operators will file their activities through Skyguide's Swiss U-Space application, and the authorities will review and manage the flight authorisation requests via Skyguide's Special Flight Office tool.

Hosted in the public cloud, this Software as a Service (SaaS) will be implemented across the entire Canton of Vaud. The roll-out will increase the Cantonal Police of Vaud's capabilities, with upcoming cantonal legislation updates and will support local authorities including aerodromes, prison facilities, wildlife protection departments, and police forces.

(source: *https://www.unmannedairspace.info/latest-news-and-information/skyguide-to-digitalise-drone-flight-authorisations-for-vaud-police/*)

Swisscom Broadcast has selected Nokia to deploy a nationwide Drones-as-a-Service network across Switzerland. 300 Nokia Drone-in-a-Box units are planned for deployment to enable emergency response, perimeter protection and infrastructure inspection. The deployment is expected to be available in all areas of Switzerland. Nokia and Swisscom are cooperating with the relevant authorities to ensure all operations comply with regulatory frameworks, especially from spectrum and aviation safety standpoints.

The units incorporate the drone, a docking station, a ground control station, a payload with video and thermal cameras, related software, and service components. The system is also designed to support interfaces and APIs for third-party integrations, such as traffic monitoring systems, video management software, dispatch solutions, and industrial inspection and process monitoring systems. Nokia will use its MXIE platform to support BVLOS autonomous operation.

Public safety agencies in Switzerland will be able to tap into the nationwide drone network by requesting a flight, similar to a ride-sharing service, from Swisscom Broadcast. The service also includes compliance, data collection and analysis of the collected data.

The drones can also be used to inspect tall or hard-to-reach infrastructure, which removes the need for workers to climb or walk around hazardous areas. As Nokia Drone Networks are an integral part of the Nokia MXIE platform architecture, additional applications can be offered to industrial customers in Switzerland with Edge computing needs, such as creating 3D maps or detecting assets.

(source: *https://www.unmannedairspace.info/latest-news-and-information/nokia-and-swisscom-broadcast-to-deploy-national-drones-as-a-service-network/*)

US-based drone delivery operator Matternet has been granted a Light UAS Operator Certificate (LUC) by the Swiss Federal Office of Civil Aviation (FOCA). This marks the first LUC issued by the Swiss FOCA for higher-risk SAIL III operations, including beyond visual line of sight (BVLOS) drone flights over populated areas.

The LUC enables Matternet to self-authorise new operations within Switzerland and the Federal State of Berlin, while also accelerating the approval process for similar operations throughout the European Union. Matternet received BVLOS authorisation for operations over cities in Switzerland in 2017. The company also holds Type and Production Certifications from the US Federal Aviation Administration (FAA), along with BVLOS operational approvals from both the FAA and FOCA, as well as cross-border approvals from Germany's CAA.

(source: *https://www.unmannedairspace.info/latest-news-and-information/matternet-receives-light-uas-operator-certificate-for-advanced-drone-operations-in-switzerland/*)

4.4.21 - United Kingdom

Tower and approach ATC services provider Air Navigation Solutions (ANSL) has announced that it has joined Skyports Drone Services in the UK Civil Aviation Authority's (CAA) Sandbox, which provides companies with a space in which to test innovative airspace solutions. They have partnered to develop plans to create the UK's first low-level Transponder Mandatory Zone (TMZ) in the West of Scotland. The project aims to facilitate safe and efficient equitable access for all airspace users, including both manned and unmanned aircraft.

ANSL and Skyports Drone Services are working with the Innovation team from the CAA to create an operational safety case for Beyond Visual Line of Sight (BVLOS) operations. This will enable the two companies to develop their plans and intentions for the TMZ operation and explore regulatory views and feasibility of the proposal, before formally submitting them for approval. A key segment of ANSL and Skyports' development work involves actively engaging stakeholders to seek ongoing feedback.

BLUEPRINT UK's project aims to develop the UK's first drone zone, using transponders to ensure drones and aircraft stay safely separated from one another. The project consortium expects a drone zone to be established around every major town and city in the UK by 2027, with corridors linking drone zones to create a network that can enable medical deliveries, infrastructure monitoring and last mile deliveries.

At the heart of the UTM system under evaluation is an integrated UTM/ATM network with Neuron developing the framework. This includes an ANRA UTM data processing system, two UTM service providers – Collins and DroneCloud – an air navigation service provider – Cranfield Airport – supported by a network of ADS-B sensors. The common information system comprises a discovery and synchronisation service, e-identification, geo-awareness, traffic information and ATM permissions.

Cranfield University and Southampton University are also building a non-cooperative detect and avoid capability into the BLUEPRINT network, using an AI-based algorithm which also includes wind-field estimates.

The two- year project, which concludes in 2024, will create an open-source blueprint for how to solve the BVLOS drone problem, and allow anyone to use it to create their own drone zone within their local area.

(source: *https://www.unmannedairspace.info/latest-news-and-information/uks-project-blueprint-advances-utm-atm-integrated-network-testing/*)

The London Heliport has deployed the Approved Services platform supplied by Unified Traffic Management (UTM) company Altitude Angel. The platform is designed to allow drone operators, and in the future eVTOL pilots, the ability to request and pay for operations within the heliport's airspace digitally.

From 14 August, the Approved Platform allows drone operators to submit flight plans which take place in part wholly or in part within The London Heliport's FRZ quickly and securely, as well as facilitating any charges the heliport has in place when a flight is approved.

Prior to the introduction of Approval Services, Altitude Angel has been providing The London Heliport with a combined view of the airspace in the vicinity of its FRZ (flight restriction zone), enabling the heliport to digitally approve or decline operations from drone companies and drone operators, using Altitude Angel's proven digital authorisation and flight management technology.

(source: *https://www.unmannedairspace.info/latest-news-and-information/london-heliport-deploys-altitude-angel-approved-platform-to-support-unmanned-operations/*)

Six projects have been chosen for trials under a UK Civil Aviation Authority scheme that will help make beyond visual line of sight (BVLOS) drone flights an everyday reality. Among those included are schemes that involve medical drone deliveries, energy infrastructure, and 'sky highways'.

The UK Civil Aviation Authority invited organisations to bid to participate in an innovation sandbox earlier this year to validate and test their concepts, supporting the development of BVLOS capabilities. Projects involved include Apian London Health Bridge; Cranfield Airport and Project BLUEPRINT; Droneprep Open Skies Cornwall; HexCam; Skyports Project TRAject; and Snowdonia Aerospace Centre Project Dragons Eye. Innovation sandboxes help organisations prepare for regulatory approval, and helps the regulator develop policies that better meet the needs of the industry in the future. Sandboxes are controlled environments where organisations can test their innovative technologies against the existing regulatory framework, helping applicants maximise the readiness of their innovation, and also help the UK Civil Aviation Authority develop better, more efficient ways to develop new regulations.

These new trials will help develop plans for how drones can be safely integrated with other airspace users, as part of the regulator's wider Airspace Modernisation Strategy. The trials will consider a new policy concept that focuses on a specific type of airspace structure called a temporary reserved area (TRA) to enable the trialling of systems and approaches to safely enable drones to operate within the same airspace as other aircraft. Prior to the new concept, drone operators wanting to fly BVLOS typically had to apply for a temporary danger area (TDA), which would effectively close a section of airspace for most other users for up to 90 days.

(source: *https://www.unmannedairspace.info/latest-news-and-information/uk-caa-selects-six-projects-to-demonstrate-beyond-visual-line-of-sight-drone-flights/*)

Project BLUEPRINT was one of the winning consortium projects of the UK Research & Innovation Future Flight Challenge Phase 3 to take part in the Civil Aviation Authority (CAA) Temporary Reserved Area (TRA) Regulatory Sandbox, coordinated by the CAA's Innovation Advisory Service. Project members work closely with the subject matter experts within the CAA to progress towards the objectives of successfully trialling integrated BVLOS (Beyond Visual Line Of Sight) drone operations within UK airspace.

The BLUEPRINT team is led by Neuron Innovations, and includes Ebeni, Cranfield Airport, Cranfield University, University of Southampton, DroneCloud, ANRA Technologies, Sky-Drones, Distributed Avionics and Future Aerial Innovations.

The aims of the Sandbox are to:

- Demonstrate and validate specific technologies, airspace management procedures, and flight operation procedures needed to enable the safe, efficient, and managed integration of BVLOS drone operations and crewed aircraft.
- Enable the CAA to validate the use of the airspace policy concept with real-world use cases to evidence how it supports and enables the accommodation phase of integrated operations within a Temporary Reserved Area (i.e., accommodation phase).
- Through the TRA, enable participants to scale beyond segregation towards integration of BVLOS drone flights with crewed aircraft (i.e., integration phase).

ANRA's Project BLUEPRINT focus is effective Air Traffic Management (ATM), UAS Traffic Management (UTM) and digital communication systems. ANRA's approach is to build an interconnected ecosystem of technologies connected in an open and standardized way. This will be developed for both controlled and uncontrolled airspace and the interface between them, using the airspace around Cranfield Airport as a testbed. ANRA will develop an Air Traffic Control user application to meet the strategic and tactical information requirements to support drone operations.

(source: *www.anratechnologies.com*)

UK Air navigation service provider has completed flight simulations at NATS' head office in Hampshire to demonstrate how drones could be seamlessly integrated alongside other air traffic at a busy airport. This

included drone operators filing flight plans, flying in and out of the airport and being safely deconflicted with other aircraft.

The work forms part of project CAELUS, a UKRI industry collaboration of 16 partners including AGS Airports, University of Strathclyde, NATS and NHS Scotland, aiming to use drones to transport essential medical supplies throughout Scotland.

The project's *first test flight occurred at Glasgow Airport last year*, with a drone flying to the nearby NHS Golden Jubilee hospital. The concept development and simulation work NATS has led on is essential to understanding how that one-off flight could be safely scaled up to include dozens of drones flying 'Beyond Visual Line of Sight' and delivering medicines and blood tests to patients across Scotland and potentially beyond.

The airspace integration was overseen by a new Airspace Manager function using new technology developed by NATS. As part of this proposed 'concept of operations,' direct voice communication between a drone operator and air traffic control would only be required by exception – including the kind of emergency scenario demonstrated during the simulations.

ANRA Technologies has been supporting project CAELUS since 2020, providing digital technologies that enable drone deliveries scale safely and efficiently. During the simulations, ANRA supported UTM and ATM data exchanges that built on the ASTM F3548 and overlaid with ATM processes to allow drone operations in controlled airspaces and in UAS Geozones.

(source: *https://www.unmannedairspace.info/latest-news-and-information/uk-caelus-project-simulates-drone-flights-to-prepare-for-routine-medical-deliveries/*)

A new consortium, led by Skyports has launched to explore how 5G services can support the deployment of drone operations in rural areas. Funded by the UK Space Agency, the Connectivity for Remote Orkney Future Transport (CROFT) project will explore how space technologies can be leveraged to establish 5G-enabled drone deliveries for remote island communities in Orkney, Scotland.

The focus of the 22-month-long project is the development of Sky5, a 5G-enabled drone service. This solution will allow for the low-latency, high-density communication and coverage that is required by drones. The project will also define the functional and performance requirements needed to develop scalable, 5G-supported drone deliveries in harsh, rural environments.

(source: *https://www.unmannedairspace.info/latest-news-and-information/fi-2024-new-consortium-to-explore-how-5g-can-support-drone-operations-in-rural-areas/*)

Altitude Angel is to expand its existing EC (electronic conspicuity) sensor network to cover the majority of the United Kingdom by the end of the year, establishing foundations needed for BVLOS drone flights in 2025. The network is currently used on the SKYWAY drone superhighway in southern and central England, and the nationwide expansion comes as the UK Civil Aviation Authority pursues a policy of rolling out Transponder Mandatory Zones (TMZ).

Intended for low-altitude and low-latency reception across England, Scotland and Wales, the EC sensor network is designed to support the safe integration of automated drones into the airspace. It will provide coverage of low-altitude ADS-B (on 1090MHz and 978MHz), FLARM, Mode-S, and drone RemoteID, providing real-time surveillance of aviation broadcast signals.

Subsequently, Altitude Angel will be able to layer the additional capabilities of its Arrow technology, specifically those sensors which can detect non-EC aircraft, to the towers to enable full automated BVLOS in 2025. This would mean any low-flying aircraft which are present (whether in a TMZ or otherwise) and not transponding, would still be detected by the network.

Data from the sensor network is designed for utilisation by new airspace users – such as drones and eVTOLs – but could also benefit traditional aviation audiences, at airports or by air navigation service providers. With data available in traditional formats, such as ASTERIX, as well as more modern formats for newer technology stacks, the network is highly versatile.

Altitude Angel is making the data from the EC sensor network available, for free, to nationally recognised research organisations and individuals on a limited basis for non-commercial, private use.

(source: *https://www.unmannedairspace.info/latest-news-and-information/altitude-angel-to-expand-ec-sensor-network-across-england-scotland-and-wales/*)

London Oxford Airport and Blenheim Palace have a new way to approve uncrewed flights that require approval from both the airport and palace. Both sites were facing challenges handling a growing number of drone flights, with last-minute requests and incomplete risk assessments taking time away from other work. Drone operators sent their requests by phone or email, and each request would contain different levels of detail. A drone operator then requested to fly over the portion of the Blenheim Palace estate that sat beneath London Oxford Airport's Flight Restriction Zone. This meant that the airport, palace, and drone operator would have to conduct a three-way conversation to ensure everyone had the information they needed and everyone knew whether the flight could go ahead or not.

Altitude Angel was contracted to implement its GuardianUTM airspace management platform at the airport first. With every request coming through the same system and in the same format, London Oxford Airport had standardised information and consistency. Air Traffic Control could see all the day's drone flights in one place and in one format.

Then a bespoke link was built into GuardianUTM for requests that require approval from both the airport and palace. If a drone operator submits a flight request that requires approval from both London Oxford Airport and Blenheim Palace, both airport and palace get the request along with the information they need. For example, Blenheim Palace requires evidence of public liability insurance whereas the airport does not, so each gets the documentation they need.

In addition, all parties can see who has approved the request. The drone operator receives clear confirmation if their flight has been approved, and payment is only taken on joint approval. Should either the airport or palace need to withdraw approval, the drone operator receives notification and a full refund. The three parties continue to work together to make changes and implement new features.

(source: *https://www.unmannedairspace.info/uncategorized/altitude-angel-links-london-oxford-airport-and-blenheim-palace-drone-flight-management/*)

Urgent blood samples are now being transported in London between National Health Service (NHS) hospitals by autonomous drones, in an on-demand medical delivery service which aims to improve patient care by speeding up testing turnaround times and pave the way for autonomous drone delivery services at scale in the UK.

The six-month operation is regulated by the Civil Aviation Authority (CAA), which has granted the airspace approval, and is one of several CAA sponsored "TRA sandbox trials" underway in the UK, which it hopes will lead to scalable BVLOS operations throughout the UK by 2027.

For the current six-month trial the CAA has granted approval for a Temporary Reserved Area (TRA), a few miles long and several hundred yards wide above a very busy urban area, for the drones to make up to 10 deliveries a day. The autonomous drone chooses its own route within this area, based on weather and other factors. The drone operators have worked with air navigation service provider NATS to ensure operations can take place without interfering with other low level air traffic in the area, such as emergency helicopter operations.

The trial, in agreement with the CAA, is to collect data to show that the operation can be safely operated without the need for a TRA. Part of the sandbox application is to prove it is not needed to segregate traffic.

(source: *https://www.unmannedairspace.info/uncategorized/new-uk-inter-hospital-drone-service-could-pave-the-way-for-developing-autonomous-operations-at-scale/*)

5 - TECHNICAL ASPECTS OF U-SPACE IMPLEMENTATION

This section provides an overview of the on-going technical activities associated with U-space implementation. Subjects covered in this section typically include standardisation, adoption of specific technologies for U-space needs such as e-conspicuity, data exchange formats, communication solutions, etc.

5.1 - Changes tracking matrix

The following table indicates changes to this section compared to the previous iteration of the report.

- An empty cell means no progress or new information is reported for the corresponding region or country;
- 'New' means an entire section has been added to report on progress in a region or country that did not feature in the previous iteration;
- 'Update' means new content has been added for the corresponding working group or activity. In the updated sub-section, previous information, if it remains current, is written using blue colour, while new information is using black.

	Nov-23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 23/ Aug 23	Sept 24	Oct 24	Nov 24
ACJA												
AME									New			
ANSI												
ASTM			Update	Update								
EASA								Update			Update	
EUSCG												
EUROCAE	Update			Update						Update		Update
GUTMA				New	Update					Update		
ISO/TC 20/SC 16												
JARUS				Update	Update		Update	Update				
skeydrone										New		
UK CAA												

5.2 - ACJA

The GSMA, a global organisation unifying the mobile ecosystem, and GUTMA (Global Unmanned Traffic Management Association) have set up the Aerial Connectivity Joint Activity (ACJA) initiative to build communication and cooperation between the aviation and mobile industries. The main aim of the ACJA is to promote the exchange between the aviation and cellular communities, and to synchronise contributions between the existing Standard Development Organisations (SDOs) of each community, in order to avoid incompatibilities between them.

In order to support BVLOS operations at scale, there is a need to be able to characterise the performances of the cellular link in different situations, including different geographical environment and also the nature of the drone operations (e.g. linear inspection, package delivery, etc.). Hence there is a need to perform several tests and collate the appropriate information.

ACJA members have been working together to establish a Reference Method that provides objective information about feasible technical capabilities to authorities, depending on the considered environment, and standardization bodies for defining safety-related cellular link performance standards and technical-operational requirements and recommendations. Drone developers, operators, and regulators may also benefit from having a reference method for assessing the performance of a particular drone type's cellular C2 link across varying operational environments throughout the lifespan of the drone system.

(source: *https://www.unmannedairspace.info/emerging-regulations/aerial-connectivity-joint-activity-group-releases-reference-methods-for-cellular-link-performance/*)

5.3 - AME

The Alliance for New Mobility Europe (AME) has created a new Working Group on standardisation coordination to streamline processes and foster collaboration to speed the implementation of U-space ecosystems in Europe.

Many EU member states have yet to fully implement the U-space regulations, leading to significant challenges and inconsistencies on which AME WG is working:

- Time for Approval: The approval process for drone operations in U-space can be lengthy and complex.
- Standardisation: There is a lack of standardised procedures across different countries, causing confusion and inefficiency.
- Access to U-space Airspace: Obtaining access to U-space airspace remains difficult in many regions, limiting the potential of drone technology.

(source: *https://www.unmannedairspace.info/emerging-regulations/alliance-for-new-mobilty-europe-sets-up-new-working-group-to-streamline-u-space-processes/*)

5.4 - ANSI

ANSI, the American National Standards Institute, has updated its living report on the identified gaps in drone standards development compared to the Standardization Roadmap Systems v2.0 issued in June 2020. Their analysis notably covers such areas as airworthiness, flight operations, personnel training & qualifications, certifications, etc.

In this Gaps Progress Report, U-space is only mentioned in the work carried out by EUROCAE WG-105 (see also 5.5 - below) to take account of the U-space services laid out by regulation (EU) 2021/664.

(source: *https://www.ansi.org/news/standards-news/all-news/2022/06/6-14-22-gaps-progress-report-available-ansi-uassc-standardization-roadmap-for-uas*)

5.5 - ASTM

The International standards agency ASTM Committee on Unmanned Aircraft Systems has developed a mapping of relevant ASTM standards to the U-space regulation through its UAS Traffic Management (UTM) Working Group. The work is endorsed and promoted by the Global Unmanned Traffic Management (UTM) Association (GUTMA).

In more detail, its UAS Traffic Management (UTM) Working Group has undertaken the detailed mapping between the F3411-22a (an update to F3411-19) and F3548-21 ASTM standards and the relevant requirements in the U-space Regulation and the associated Acceptable Means of Compliance and Guidance Material.

The ASTM mapping demonstrates that the relevant standards meet U-space Service Provision (USSP) interoperability requirements for the network identification, UAS flight authorisation, and conformance monitoring services.

(source: *https://www.unmannedairspace.info/emerging-regulations/astm-completes-detailed-mapping-of-standards-against-u-space-regulation/*)

International standards body ASTM International has established F3623-23 Standard Specification for Surveillance Supplementary Data Service Provider (SDSP). SDSPs support drone operators by supplying air traffic surveillance, weather, terrain, obstacle clearance and other data specific to the area of operation, particularly for the challenges at the under-400 feet airspace common to autonomous operations.

To date, various sensors such as radar, Lidar, optical, transponder Modes A, C, or S and ADS-B, have lacked a common platform to collect and disseminate surveillance data. Drone operators must establish individual, point-to-point connections to different sensor providers, which is cumbersome and costly. They then receive track data regarding an intruder from different sources and must validate each track.

This specification defines minimum performance requirements for Surveillance supplemental data service providers (SDSPs) and associated equipment and services. This specification also defines requirements on users of the Surveillance SDSP's services. Surveillance SDSPs may provide aircraft track information to Detect and Avoid (DAA) systems and situational awareness tools to enable BVLOS UAS operations and support VLOS operations.

(source: *https://www.unmannedairspace.info/latest-news-and-information/astm-sets-requirements-for-data-dissemination-with-new-f3623-23-standard-for-service-providers/*

International standards body ASTM F38 committee has published the Standard Specification for Performance for Weather Information Reports, Data Interfaces, and Weather Information Providers (WIPs) framework.

This performance standard addresses the criteria for weather information reports, analyses, and services delivered by a Weather Information Provider to support extensible traffic management systems, Unmanned Aircraft Systems, and Vertical Takeoff and Landing (VTOL) systems operating within the range of the surface to 5000 feet above ground level (AGL).

One objective of this specification is to standardize and align across Civil Aviation Authorities (CAAs) globally, promoting consistency in subject matter compatibility with standards established by other Standards Development Organizations (SDOs).

This specification provides an initial version to provide guidance to commercial aviation operations including, but not limited to, UAS and VTOL users, for weather measurements and analyses. Research and development activities will continue to inform and lead to modifications to this specification.

(source: *https://www.unmannedairspace.info/emerging-regulations/astm-publishes-performance-standard-f3673-23-for-weather-data-interfaces/*)

5.6 - EASA

EASA has launched a project to work on the interoperability of electronic conspicuity systems for general aviation, having noted the diversity of the available systems, which are not always interoperable with each other, and the lack of harmonised technical standards addressing the performances of such systems. In addition, the requirements set for electronic conspicuity of manned aircraft for U-space operations (SERA 6005 (c)) will enter into force in 2023 and will impact on the possible choices for GA pilots regarding the installation of such systems.

Among the main objectives of the projects, EASA wants to:

- Identify the different levels of interoperability that may be achieved, e.g. interfacing using ground systems, with CNS/ATM and U-space systems;
- Develop a series of case studies (minimum two) to assess the proposed interoperability requirements while considering the currently deployed electronic conspicuity solutions for General Aviation, including for U-space operations;

- Organise a series of workshops with a group of stakeholders, including GA associations, solution developers, National Aviation Authorities (NAA), Air Navigation Service Providers (ANSP) and U-space service providers (USSP), to obtain their feedback on the proposed interoperability requirements.

EASA has clarified, in a September webinar, how the e-conspicuity requirements defined in the U-space regulation could be implemented. The EASA AMC/GM SERA.6005(c) proposed regulatory requirement aims to be affordable and provide minimum necessary real-time position information so that U-space service providers (USSPs) can safely separate airspace users. It aims to use existing and open standards wherever possible, operate within the ITU regulated spectrum, achieve pan-European applicability, and suit urban and low-level airspace. EASA's vision extends beyond Europe's single compliant technology, ADS-B, to overcome some of these requirements. For example, ADS-Light (ADS-L) offers a Europe-wide coordinated spectrum already in use, with several manufacturers preparing to support this service in non-aviation spectrum (SRD-860).

In the longer term, EASA proposes ADS-L using mobile telephony. Researching smartphones versus dedicated devices, EASA favours affordable smartphones with an application to make aircraft conspicuous in U-space airspace when it is the only application running. This is dependent upon a coordinated decision by the Electronic Communications Committee of the European Conference of Postal and Telecommunications.

EASA has published on 25/01/2023 the initial technical specification of Automatic Dependent Surveillance – Light (ADS-L) transmission using the SRD860 frequency band (ADS-L 4 SRD-860) for aircraft to become electronically conspicuous to U-space Service Providers.

The technical specification is intended to be a complete and accurate description of ADS-L, including physical layer, timing details, data semantics, byte packaging and so forth. It does not cover other aspects of a practical system for electronic conspicuity, such as: User interface, configuration, error handling, software upgrades and so forth. It is open to any interested party for implementation.

(source: *EASA publishes ADS-L technical specification for SRD860 frequency band to support e-Conspicuity in U-space - Unmanned airspace* - *ADS-L 4 SRD860 Issue 1 (europa.eu)*)

EASA is sponsoring the SHEPHERD two-year research initiative to evaluate the technical content of existing UAS standards and to determine whether they are adequate to meet the safety objective of the provisions of the EU regulatory framework for UAS operations.

SHEPHERD consortium members are currently working on the assessment of initial standards which will be finalised by February 2023. In March 2023, these results are then set to undergo review from EASA's experts and external advisors. Subsequently, in April 2024 the results are due to be released for public viewing. Following that milestone completion, efforts will shift towards evaluating a second suite of standards.

Comprised of 9 consortium partners, project SHEPHERD is seeking to build on the work achieved by AW-Drones and further analyse the standards listed in the European UAS Standards Coordination Group (EUSCG) UAS Rolling Development Plan. The previously conducted assessment looked at various factors including maturity, coverage, compliance costs & environmental impacts; however SHEPHERD will delve deeper into technical content for evaluating if these standards align with safety regulations.

(source: EASA – *https://www.easa.europa.eu/en/research-projects/shepherd-uas-standards*)

The European Union Aviation Safety Agency (EASA) has published its Research Agenda 2024.

This provides a list of research topics proposed jointly by the Agency's experts and its Member States' Advisory Body Research Group (in consultation with its other Advisory Bodies as well as the European Commission) in the fields of aviation safety, security, environment, health, and innovation. It serves as a common input towards future European Research Programmes, such as Horizon Europe.

Several topics concern UAS and U-space: especially the proposal aims to study how e-conspicuity solutions, based on mobile technology or others, could be used by UAS operating in BVLOS outside U-space airspace to enable a safe and efficient detect and avoid capability.

(source: EASA - *https://www.easa.europa.eu/en/document-library/general-publications/aviation-authorities-research-agenda-2024*)

The European Union Aviation Safety Agency (EASA) and Eurocontrol plan to identify a single electronic conspicuity system for drones and eVTOLs flying at low level for recommendation to the International Telecommunications Union meeting in 2027.

ADS-B and ADS-L are the two main candidate technologies under consideration. The system would be mandatory for operations within U-space but not outside.

The technology will need to be simple to ensure operability and affordability for end-users and comprise a single language, providing a direct radio air-air link for pilot awareness, air-ground transmission within U-space and a second link for other purposes.

Work will start in 2025 to compare the strengths and weaknesses of the candidate systems, with a consolidated "one link" proposal, including transitional arrangements, ready for 2026.

(source: *https://www.unmannedairspace.info/latest-news-and-information/easa-eurocontrol-to-identify-single-eu-e-conspicuity-system-for-drones-and-evtols-by-2027/*)

5.7 - EUSCG

The EUSCG is a joint coordination and advisory group established to coordinate the UAS-related standardisation activities across Europe, essentially stemming from the EU regulations and EASA rulemaking initiatives. The main deliverable of the EUSCG is the European UAS Standardisation Rolling Development Plan.

It brings together all relevant regulatory and standardisation activities and their status, and is updated regularly in order to maintain visibility and awareness of the progress. It provides a method for the identification and discussion of overlaps, and as a basis for feedback to contributing organisations, to improve overall coordination of standards developments. The process also identifies the technical input from other sources into the standards plan through the interfaces of the EUSCG with the international level.

The last update of the RDP has been issued in April 2022 (*https://euscg.eu/media/1264/euscg-157_version-70-rdp_april-2022.pdf*).

5.8 - EUROCAE

Within EUROCAE, WG-105 is tasked to develop standards and guidance documents that will allow the safe operation of UAS in all types of airspace, at all times and for all types of operations. This group is further organised in six Focus Teams working in a specific area, including SG-3 which deals with UTM and is in charge of developing the following documents (with their target dates for publication according to the last agreed Terms of Reference for the group):

- ER-xxx Report on Network Remote Identification exchange protocol between USSPs - Status: Draft - Publication target date: 01/04/2024
- ED-318 Technical Specification for Geographical Zones and U-Space data provision and exchange - Status: Open Consultation
- ED-yyy Minimum Operational Performance Standards for Network Identification Service of UAV in UTM U Space - Status: Draft - Publication target date: 31/12/2022
- ED-yyy Minimum Operational Performance Standard for Traffic Information Situation Dissemination Exchange - Status: Draft - Publication target date: 31/03/2024
- ED-yyy MOPS for Flight Planning and Authorisation Service for Global awareness in UTM U Space - Status: Draft - Publication target date: 29/03/2024
- ED-yyy Minimum Operational Performance Standard for U Space Geo Awareness Service - Status: Draft - Publication target date: 31/03/2023

- ED-xxx Technical standard on the interface between the UAS operator and the Network Identification Service - Status: Draft - Publication target date: 02/06/2025
- ER-xxx Report on U-Space scenarios and use cases - Status: Draft - Publication target date: 01/04/2024
- ED-270 Minimum Operational Performance Specification for UAS geo-caging - Status: Published - publication date: 23/06/2020
- ED-282 Minimum Operational Performance Standard for UAS E-Reporting - Status: Published - publication date: 19/01/2022
- ED-269 Minimum Operational Performance Standard for UAS Geo-Fencing - Status: Published - publication date: 02/06/2020

In June 2023, WG-105 SG-3 launched the public consultation of the draft 'Technical Specification for Geographical Zones and U-Space data provision and exchange' that covers all aspects related to Data Provision and Exchange (i.e., data scope, quality requirements, data format and model, exchange of data through information service) in support of regulations (EU) 2019/947 and (EU) 2021/664.

Among other WG-105 subgroups, it is worth noting that SG-1 (Detect And Avoid) aims to issue a European Industry Position Report on RTCA SC-147 ACAS sXu (collision avoidance system for small unmanned aircraft) by the end of 2023.

In November 2023, EUROCAE published its 2024 Technical Work Programme, which identifies the need for cooperation between several Working Groups on subjects related to UTM or U-space:

- Higher Airspace Operations: it may be possible to adapt existing or emerging ATM concepts to support such operations, for example trajectory-based operations or advanced flexible use of airspace, or it may need an entirely new model such as U-Space / UTM.
- Advanced Air Mobility: this domain covers related topics, like UAS Traffic Management (UTM or U-space in Europe) and ground infrastructure, that are necessary for global integration of drones (among others) in the operational environment. Working Group WG-105 is active in the very broad field of Unmanned Aircraft Systems. The six sub-groups are developing standards covering standardisation activities from technical design issues all the way to operational requirements of UTM.
- Artificial Intelligence: The objectives of WG-114 Artificial Intelligence (AI) are to establish industrial best practices for the development and the certification of AI embedded into aerial vehicle and ground equipment, providing standards for qualification of aeronautical systems embedding AI in Airborne (manned and unmanned) and Ground (ATM / CNS / U-Space / UTM).

(source: *https://www.eurocae.net/news/posts/2023/november/the-release-of-the-technical-work-programme-twp-for-2024-is-now-official/*)

Standards agency EUROCAE working group WG-105 Unmanned Aircraft Systems (UAS) has published a new standard, ED-318 technical specification for geographical zones and U-space data provision and exchange. ED-318 standard provides recommended requirements for the processing of data, aiming to assist data providers and users in meeting their responsibilities.

The Technical Specification for Geographical Zones and U-Space data provision and exchange will cover all aspects related to Data Provision and Exchange (i.e. data scope, quality requirements, data format and model, exchange of data through information service) in support of regulations (EU) 2019/947 and (EU) 2021/664.

(source: *https://www.unmannedairspace.info/latest-news-and-information/eurocae-publishes-ed-328-standard-for-geo-awareness-technical-specifications/*)

EUROCAE's WG-105 working group has published a report of technical recommendations for alternative exchange mechanisms (under EUROCAE reference ER-031) that could be submitted to EASA, while addressing potential interoperability issues with USSPs implementing the ASTM F3411-22a, the protocol specifying the performance requirements for remote identification (Remote ID) of UAS.

The report documents the outcome of a technical investigation of the current status of the services expected to be provided in a U-space airspace, although many can be envisaged in any airspace, even if not dedicated to unmanned traffic. The report also provide a technical justification on the need and convenience of creating an Interface Control Document (ICD) defining a set of interface for the exchange of messages with information provided by the Network Information Service, which could be used with either a distributed or centralised architecture solution for U-space systems.

(sources: *https://www.unmannedairspace.info/uncategorized/eurocae-proposes-new-remote-u-space-id-standards-to-fill-in-astm-f3411-gaps/* and EUROCAE document ED-031)

EUROCAE has published ED-271A – Minimum Aviation System Performance Standards (MASPS) For Detect And Avoid Traffic For Remotely Piloted Aircraft Systems In Airspace Classes A-G Under IFR.

This document functions as a MASPS for the DAA system for RPAS operating in the certified category in class A to G airspaces under IFR. This standard specifies a proportionate risk-based standard for DAA against conflicting traffic which will support a performance-based regulation for non-segregated RPAS operation.

Revision A supersedes ED-271 'MASPS for Detect And Avoid [Traffic] for Remotely Piloted Aircraft Systems in Airspace Classes A-C under IFR' (May 2022), which has been updated to expand from operations in airspace classes A-C to cover all airspace classes A-G. Main changes are:

- Updated alerting and guidance requirements for RWC,
- Assumed RP behaviour based on RWC alerting and guidance,
- Performance requirements for RWC,
- Harmonization with established ICAO Risk Ratios and Loss of Well Clear ratios.

(source: *https://eshop.eurocae.net/eurocae-documents-and-reports/ed-271a/#*)

EUROCAE has also announced the publication of ER-032 "European Industry Position Report on RTCA SC-147 ACAS sXu". ACAS (Aircraft Collision Avoidance System) sXu is an aviation system designed to provide detect and avoid (DAA) capability for drones operating beyond visual line of sight (BVLOS).

This new report is the result of thorough analysis and provides a detailed assessment of the feasibility of implementing the ACAS sXu system in the European Union, including its compatibility with U-space airspace. Contributors to the publication include members of the working group on Unmanned Aircraft Systems (WG-105) Sub-Group 1 DAA.
(source: *https://www.unmannedairspace.info/latest-news-and-information/eurocae-publishes-industry-position-report-on-acas-sxu-standard/*)

5.9 - GUTMA

The Global UTM Association GUTMA has launched a task force on Mobile Network Services for drone operators. This endeavour will aim at understanding mobile network (MN) capabilities for VLL (Very Low Level) aerial users and services that drone operators need today and in the future by creating a bridge (service scope) between MNO/MN and drone operators.

To summarise, the Task Force will have the following objectives:

- **Objective 1:** Identify and discuss drone operators' communication/data exchange needs regarding scalable and profitable drone services and define them with different priorities in the perspective of time (when they are needed) and value (what they are provided).
- **Objective 2:** Identify and discuss the current and future cellular network services that are and might be relevant to drone operations and define them with the priorities in the perspective of time (when they might be enabled) and value (at what costs they might be in service).

- **Objective 3:** Create a cross-function/value matrix between Objective 1 and Objective 2 to identify the most valuable drone operators' needs and associated Cellular services that help to foster Cellular for the drone market.

The Task Force is set to run for three months, from March to June, with a first weekly and later bi-weekly meeting cadence.

(source: *https://www.unmannedairspace.info/latest-news-and-information/gutma-launches-task-force-on-mobile-network-services-for-drone-operators/&*)

The GUTMA Safety Task Force has released the U-space Service Provider (USSP) Safety Support Assessment document. Its goal is to support the initial discussion on the safety support assessment to be performed by a USSP applying for certification to a competent authority in the framework of the Commission Implementing Regulation (EU) 2021/664 on a Regulatory Framework for the U-space. It targets specifically Article 15(1)(e) (Conditions for obtaining a certificate) and two related AMCs: AMC1 Article 15(1) Conditions for obtaining a certificate Safety Support Assessment and AMC6 Article 15(1)(e), Management System — Safety Assessment (Of the Applicant's System).

The initiative aims to standardize the process by which USSPs engage with authorities regarding the scope of their safety assessments. This document represents a collaborative effort within the industry to ensure consistency and clarity in safety protocols across various jurisdictions.

The document does not tackle questions related to the risks of establishing a U-space airspace. Those are the responsibility of Member States that choose to designate such airspaces. The responsibility of the USSP is limited to managing the safety impact of its own services.

(source: *https://drive.google.com/file/d/18CsaA4f3uEgqi4MqzcyTEZFRjXpAwU4g/view https://www.unmannedairspace.info/latest-news-and-information/gutma-safety-task-force-releases-ussp-safety-support-assessment-document/*)

A new report from the Global UTM Association (GUTMA) underscores the importance of increasing mobile network utilisation by drone operators.

The GUTMA Task Force on Mobile Network Services for Drone Operators report is a step towards advancing the use of mobile networks in drone operations, addressing the evolving needs of drone operators and identifying ways to align these with the capabilities of Mobile Network Operators (MNOs).

The objectives of the report are:

1. **Identifying Communication Needs:** Drone operators' data exchange and communication requirements are crucial for scalable and profitable services. The report discusses these needs in terms of timing and value to the operations.
2. **Exploring Mobile Network Services:** It examines the current and future mobile network services that support drone operations and outlines their development priorities.
3. **Cross-Function/Value Matrix:** The report provides a matrix to match drone operators' most valuable requirements with mobile network services, promoting greater integration of mobile networks in the drone ecosystem.

The report's findings are:

- **Drone Operators' Needs:** Reliable, robust air and ground connectivity are essential for command and control (C2), real-time data streaming, and adherence to regulatory frameworks like UTM and NetRID.
- **Challenges in Mobile Network Services:** Mobile networks, traditionally designed for ground-based users, present challenges for aerial operations, including signal interference and coverage limitations. However, advancements such as **5G** offer significant improvements in throughput, latency, and connectivity.

- **Strategic Alignment:** Greater collaboration between MNOs and drone operators is needed. The report proposes a cross-function/value matrix to ensure both industries work together to meet operational needs and promote innovation.

This report underscores the importance of **increasing mobile network utilization** by drone operators and fosters cross-industry collaboration to address key challenges. By leveraging new technologies and bridging gaps between the drone and telecom sectors, the **scalability, safety, and profitability** of drone services can be enhanced.

(source: *https://gutma.org/gutma-mobile-network-services-for-drone-operators-report/*)

5.10 - ISO/TC 20/SC 16

This technical committee is in charge of standardisation in the field of unmanned aircraft systems (UAS) including, but not limited to, classification, design, manufacture, operation (including maintenance) and safety management of UAS operations.

In April 2022, this TC has published the results of a survey on UTM which indicates aggregated data from survey respondents (ISO/TR 23629-1:2020, UAS traffic management (UTM) — Part 1: Survey results on UTM), and is developing three additional documents:

- ISO/WD 23629-5, UAS traffic management (UTM) — Part 5: UTM functional structure.
- ISO/CD 23629-7, UAS traffic management (UTM) — Part 7: Data model for spatial data.
- ISO/WD 23629-12, UAS traffic management (UTM) — Part 12: Requirements for UTM services and service providers.

5.11 - JARUS

The Joint Authorities for Rulemaking on Unmanned Systems (JARUS) has published a predefined risk assessment (PDRA) for BVLOS operations in uncontrolled airspace, with a low probability of encounter with manned aircraft. The document was developed with the support of the EASA and EU aviation authorities.

The PDRA was developed considering the increasing demand for UAS operations in Beyond Visual Line of Sight (BVLOS), in nonsegregated airspace, without using airspace observers, with greater range and larger UAs compared to the operations currently covered by national regulations, and before U-space/UTM services supporting air traffic separation become widely available. The PDRA is based upon SORA version 2.0 and any future changes to this version of SORA may lead to changes of the provision in this PDRA.

Therefore, this PDRA is intended to provide a means to facilitate the operational authorisation of such operations while still considering limitations that ensure a low intrinsic risk of the operations, including those identified in previous PDRAs for BVLOS operations:

- UA with maximum characteristic dimensions up to 3 m and typical kinetic energy up to 34 kJ.
- UA operated over sparsely populated areas.
- UA operated at a maximum height of flight geography of 110m.
- BVLOS within the range of a direct C2 Link, which limits the area covered and also constitutes a conservative limitation considering the limited experience with communication networks (e.g., mobile networks);
- In uncontrolled airspace with a low probability of encounter with manned aircraft and in which at least 50% of manned aircraft are detectable by the UAS operator.

(source : *jarus_pdra-05_edition_1.0_1.pdf (jarus-rpas.org)*)

From April 17 to 21, 2023, JARUS held a plenary meeting during which the Safety and Risk Management working group provided details on the recent external consultation of the SORA 2.5 document package. 1 400

comments were received and are being resolved by the WG. The plans for the next update, SORA 3.0, were also detailed and it should focus on a revised air risk section and annexes of the document package.

(source : *http://jarus-rpas.org/sites/jarus-rpas.org/files/jarus_rome_plenary_news_release__0.pdf*)

On 27 February 2024, JARUS has launched a public consultation on the new Annex H for the forthcoming SORA 2.5 package. This Annex extends the SORA with requirements for external service providers in the context of supporting Specific Category (JARUS Cat B) drone operations. It delineates how responsibilities may be divided between the drone operator and the Safety Service Provider. Safety Services considered in this version of the Annex include:

- Ground Risk Operations (GRC) Planning Safety Service, to support intrinsic GRC identification and strategic ground risk mitigations,
- Air Risk Operational (ARC) Volumes Safety Service, to support ARC identification and strategic mitigation for the operational volume,
- Tactical Conflict Detection and Alerting Safety Service, which may be used during flight operations to help operators detect manned aircraft, and may be incorporated as part of Tactical Mitigation Performance Requirements compliance.

(source: *http://jarus-rpas.org/document/sora-2-5-annex-h-uas-safety-services-considerations/*)

JARUS has published a new document aimed at regulating operations of multiple simultaneous unmanned flight operations : "JARUS CS-UAS, Annex B – Management of Multiple Simultaneous UA Flight Operations (MSO)".

The Annex B is intended to be used for Multiple Simultaneous Flight Operation where:

- The purpose of the flights is that the involved UAs operate relative to each other.
- The purpose of the flights is that the involved UAs operate independent of each other.
- It is assumed that MSO requires automation as it is not possible for humans:
- To have sufficient Management over each individual UA participating in this operation.
- To ensure safe operation for all participants in the operational environment without the support of systems performing automated and/or autonomous functions.

(source: *https://www.unmannedairspace.info/latest-news-and-information/new-jarus-document-cs-uas-annex-b-supports-multiple-simultaneous-unmanned-operations/*)

Early reports from today's JARUS official May plenary session say voting members have approved the publication of JARUS SORA 2.5.

SORA 2.5 is a significant improvement, including:

- major modifications to enable a better usability by improving wording and document organisation, corrections of exaggerations and inaccuracies in certain use cases (updated Main Body, Annexes B, E, I);
- new Annex A: Guidelines to write an Operator Manual for the Specific Category and guidelines on presenting a safety case to the authority;
- new Annex F: Includes a supporting quantitative ground risk model;
- formal update of Cyber Annex to Annex E (no content change).

(source: *https://www.unmannedairspace.info/emerging-regulations/jarus-meeting-gives-green-light-to-sora-2-5/*)

The Joint Authorities for Rulemaking on Unmanned Systems (JARUS) published the SORA 2.5, agreed at the Plenary in Kazakhstan on May 13, 2024. The SORA 2.5 can be downloaded on the JARUS webpage.

(source: *http://jarus-rpas.org/publications/*)

5.12 - SkeyDrone

SkeyDrone has announced several updates to its SkeyDrone Hub, the central cloud platform for all SkeyDrone applications.

Key updates include a vessel service that visualises ship traffic from the Port of Antwerp in the SkeyDrone Monitor. This helps local operators avoid flying drones over ships, which is required for accessing the port's Geozone EBR54.

For customers using their own human-machine interface, there is a new Traffic Information Service application programming interface (API), providing real-time traffic data for both crewed and uncrewed vehicles, including cooperative and non-cooperative drones.

Managing data sources has been simplified with the new Data Feed Management feature, available in Drone Analytics and Drone Radar. Users can identify sensor locations through clearer naming conventions and track any changes in sensor access with the added history feature.

SkeyDrone has also updated the sensor coverage view in Drone Radar, providing customers with a more detailed map of the areas covered by the company's drone detection network, tailored to their access.

In addition, the Hub's Telemetry API has been reinforced for better stability and performance.

(sources: *https://www.unmannedairspace.info/latest-news-and-information/skeydrone-hub-update-includes-new-traffic-information-api-and-data-feed-manager/* and *https://hub.skeydrone.aero*)

5.13 - UK Civil Aviation Authority

As part of the management of risk in UK airspace, the UK CAA has identified Electronic Conspicuity ("EC") as a beneficial element of the long-term risk mitigation strategy. The EC deployment programme aims to enable greater integration of all classes of aircraft. The use of interoperable EC is considered as a critical technology capability needed to realise the full benefits of the Airspace Modernisation Strategy (AMS).

The use of EC in the UK has so far been limited to mitigate the risk of air-to-air mid-air collisions for the wider General Aviation community where Instrument Flight Rules operations are required to be electronically conspicuous in controlled airspace through the use of ADS-B. The UK CAA in now looking to develop minimum technical standards to cover EC and associated surveillance in the UK for both Air to Air and Air to Ground.

6 - ANNEXES

6.1 - EASA Member States

- Austria
- Belgium
- Bulgaria
- Croatia
- Cyprus
- Czechia
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Iceland
- Ireland
- Italy
- Latvia
- Liechtenstein
- Lithuania
- Luxembourg
- Malta
- Netherlands
- Norway
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia
- Spain
- Sweden
- Switzerland

6.2 - EDA Member States

- Austria
- Belgium
- Bulgaria
- Croatia
- Cyprus
- Czechia
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Ireland
- Italy
- Latvia
- Lithuania
- Luxembourg
- Malta
- Netherlands
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia
- Spain
- Sweden

6.3 - Completed SESAR projects

6.3.1 - ICARUS

Currently there is no common altitude reference in manned vs unmanned aviation, or between different drone manufacturers. ICARUS project proposes an innovative solution to the challenge of the **Common Altitude Reference inside VLL airspaces** with the definition of a new U3 U-space service and its validation in a real operational environment. In manned aviation, the methods of determining the altitude of an aircraft are based on pressure altitude difference measurements (e.g., QFE, QNH and FL) referred to a common datum.

The intended users of ICARUS service are remote pilots competent to fly in BVLOS in the specific category of UAS operations and ultralight GA pilots potentially sharing the same VLL airspace.

In April 2022, ICARUS started a validation campaign based on representative situations of concurrent (drone/manned aircraft) flight operations where a Common Altitude reference (CAR) service is needed. The project focuses this campaign on 3 services:

- The automatic translation of barometric height to altitude.
- The alerting of drones and manned aircraft on the current vertical distance from the ground, using a common geodetic reference system.
- The provision of an accurate real-time 3D model of ground obstacles during the execution of the flight.

In July 2022, ICARUS completed its work by publishing its Final Report (*https://www.u-spaceicarus.eu/icarus-final-report/*). As its main results, ICARUS introduces GNSS-based altitude and provides a two-way height-transformation that can be provided as a service to manned and unmanned aircraft in a given airspace. The ICARUS project has shown the feasibility of a Common Altitude Reference for UAS based on WGS-84 that provides safe and reliable vertical UAS.

However, the concept is still at an early stage of maturity (i.e., TRL 2) and significant work remains to be conducted before operational use (i.e. TRL 9) can be envisaged: development of documentation, certification of the service, and proven highly scalable data models and algorithms.

(source: *https://www.sesarju.eu/projects/icarus*)

6.3.2 - GOF 2.0

GOF2.0 is a project aiming to safely, securely, and sustainably demonstrate the operational validity of serving combined UAS, eVTOL and manned operations in a unified, dense urban airspace using current ATM and U-space services and systems.

The demonstrations focus on validation of the GOF 2.0 architecture for highly automated real-time separation assurance in dense air space including precision weather and telecom networks for air-ground communication and significantly contributing to understanding how the **safe integration of UAM and other commercial drone operations into ATM airspace** without degrading safety, security or disrupting current airspace operations can be implemented.

The first wave of trials of GOF 2.0 were conducted in September 2021 in Estonia, with more trials planned in Finland, Poland, and Austria. The flight trials aimed to demonstrate the safe, secure, and sustainable integration of unmanned aerial vehicle and air taxi operations in urban airspace. In June 2022, GOF2.0 trialled cross border operations between Helsinki (Finland) and Tallinn (Estonia) with drones and manned aircraft served by U-space services.

In September 2022, under the initiative of the Estonian Air Navigation Services, trial flights once again took place in Viimsi as part of the GOF2.0 project with drones of different sizes and purposes. The flights were used to test systems and technical solutions developed for the management of unmanned air traffic in urban environments and for supporting drone flight in controlled and uncontrolled airspace.

In October 2022, the GOF 2.0 project conducted new trial within in Poland. Several drone and eVTOL operators have shown the ability to operate simultaneously using deconfliction in space and time. GOF 2.0 have used standardized Information Exchange Services built on SWIM principles to provide interoperable, open and secure connections for U-space services and information between ATM, CISP, USSP and UAS operators.

A series of tests also took place in Austria, at St. Georgen am Ybbsfeld Airport – not far from Amstetten, Lower Austria. In this trial, among other things, automated parcel delivery at low-altitude and its safe interaction with air taxi flights and conventional air traffic were extensively tested as an example of a realistic use case. The project demanded the integration of various stakeholders' systems and needs, leading to better understanding of how to achieve this in accordance with U-space regulations. Two USSPs operated in the same area at the same time, connected to one CISP.

The SESAR GOF research project has published in December 2022 a white paper entitled *Validation of integrated multi-stakeholder architecture* following two waves of very large demonstrations addressing integrated urban airspace. The white paper explained a blueprint architecture with Information exchange services based on SWIM Standards for all the flight trials of the GOF2.0 project. It also gives an overview about the GOF2.0 demonstration approach including the reference test scenarios, the deconfliction methods and the success criteria used for evaluation and summarizes the key findings for all the flight trials.

Furthermore, multiple IAM (Innovative Air Mobility) stakeholders have been interviewed within the scope of this deliverable and based on their feedback, the business models and strategies employed in different business segments of the IAM industry have been presented. Finally, the strategies for exploiting the GOF2.0 technologies and learnings have been listed.

GOF2.0 demonstrated a unified air operation traffic management with high levels of automation serving both manned and unmanned aircraft in a safe, interconnected, distributed, interoperable, efficient, scalable and environmentally optimized manner. Highly automated separation assurance in dense airspace – specifically in areas where urban mobility and aerodrome traffic is expected – is becoming a critical capability to efficiently manage a unified airspace. Integrated trajectory management service based on flight plan information and real-time surveillance combined with a digitally connected environment provide the basic safety net for all aviators.

(source: *https://gof2.eu/project/*)

6.3.3 - AURA

The global objective of AURA is to 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. In order to achieve this objective, all relevant stakeholders (drone operators, U-space service providers, data services providers, ATM providers and authorities) are included during the project development and throughout its lifetime.

AURA project identifies the requirements for U-space information exchange with ATM through SWIM and validates a set of selected U-space services, developing the service definition for the SWIM candidate services. Secondly, it defines a novel Collaborative ATM-U-space ConOps for drones in a fully collaborative environment with ATM that go beyond the existing concepts developed for a U-space and validates these new concepts. A key concept within AURA is that flight plans are authorised by default. However, manual authorization of flight plans is required for very high-risk environments, such as airports and their surrounding areas.

In September 2022, AURA conducted a validation exercise at Lille airport (France), which aimed at showcasing the maturity of a SWIM-enabled interface between ATM and U-space. Live drone flights were performed in the vicinity and monitored both in the U-space system and in the control tower. During the exercise, different scenarios were tested to validate different U-space services (e.g.: network identification, Geo Awareness, Flight Authorisation, Non Conformance Monitoring). The underlying network architecture and systems have collated strategic and tactical U-space information with live manned traffic, and have validated data exchanges through SWIM.

In addition, AURA research consortium has performed a second series of simulations focused on the collaborative management of drones near controlled airports. The research looked at controller workflow, performance and mental impact with the aim of identifying additional support tools and operating rules. The simulations investigated how tower controllers would be able to cope with the large increase in drone flights expected in urban areas while keeping manned aircraft safe. The results serve as a reference for further development of automated support tools for controlling airspace in collaboration with U-space. During the exercises, participants were less affected by drone activity than anticipated. When workload was low, some drones were allowed to cross the runway to shorten their flight distance. These preliminary conclusions will now be verified in a more in-depth analysis.

In October 2022, AURA project completed a validation exercise in Spain to demonstrate three different use cases for dynamic U-space services. The partners have conducted a number of simulations before proceeding with validation exercises for the following use cases:

- Validation of the complete process for requesting both authorization and activation from the USSP side. All status addressing drone operations (revocation, rejection, approval and activation) could be successfully validated at this stage.
- Emergency situation while a drone mission is taking place. In this case, a Dynamic Reconfiguration had to be declared so to make the UAS leave immediately the area of operation. The result was to observe the appropriate alerts appeared for both ATM and U-space sides, and how the drone then implemented the appropriate contingency manoeuvre in order to be able to ensure the safety of both operations involved in the scenario. In this last scenario, partners had the opportunity to see how the UAS involved deviated from its intended trajectory and automatically a conformance alert raised.

The different trials conducted by the AURA project validated how manned and unmanned operations could coexist in controlled airspace, thanks to the extensive use of dynamic airspace reconfiguration. The proposed solution allows keeping safe segregation between drones managed by U-space and manned aircraft controlled by air traffic management.

The project results serve as input to regulators such as EASA, and to standardisation bodies working actively in U-space. A collaborative ATM U-space environment increases airspace interoperability and improves the security of operations, while new standards enable development and realisation of the economic potential of the drone market, according to project partners.

It is also worth noting that some project partners have defined a field for military flight plan in the SWIM-based interface between USSPs and the ANSP.

(source: *https://www.sesarju.eu/projects/aura*)

The results of the EXE 5 trials (conducted by DLR and NLR) of the AURA project have been presented in December 2022. The project defined the ATM U-space Shared Airspace (AUSA), which must be seen as generic airspace that can be delegated to contain both ATC controlled and U-space controlled airspace volumes.

The simulations focused on U-space contingencies that could have an impact on those parts of the AUSA controlled by ATC. For the experiment, the role of a manager for Dynamic Airspace Re-configuration (DAR) processes was introduced. The DAR Manager received contingency requests from U-space and negotiated them with both the tower and approach controller in order to find the most appropriate solution for airspace changes.

Experimentations have led to define some recommendations and requirements and the concept has been clarified with a need to define a required minimum separation between U-space and manned aircraft and a real added value of the DAR Manager to increase the ATCO Situation Awareness during emergencies.

(sources : *AURA | Assessing the Impact of UAS Contingencies on ATC Operations in ATM-U-space Shared Airspace - YouTube* and *Playback (nlr.nl)*)

In April 2023, the SESAR 3 JU AURA industrial research project brought together stakeholders in Madrid to present two solutions delivered thanks to the work of the demonstration consortium:

- The first solution, a collaborative U-space ATM interface, aims to enable the exchange of information between U-space web and ATM through harmonised SWIM (system-wide information management) for avoiding airspace fragmentation and allow the safe operation of drones into controlled and uncontrolled airspace.
- The second solution addressed the development of a highly-automated collaborative U-space - ATM environment. This solution focuses a medium-to-long-term concept for a collaborative ATM-U-space environment, which facilitates seamless operations of drones and manned aviation in controlled

airspace. The results of each exercise were presented. Afterwards, an engaging debate took place focusing on the Dynamic Airspace Reconfiguration concept.

In June 2023 the SESAR AURA industrial research project – aimed at enabling seamless operations between U-space and ATM – has published further results following results released in May 2023.

(source: *https://www.sesarju.eu/news/aura-presents-its-u-space-solutions*)

6.3.4 - SAFIR-MED

SAFIR-Med represents all value chain actors and stakeholder as either project partner (ATC, USPs, operators, UAS manufacturers, cities) or formal associate partner (major customers, technology and service providers) at a representative international level. Technologies of all partners are leveraged to make use of the maximum number of U-space services towards the highest possible operational safety level, including advanced detect and avoid U-space service.

The demonstrations took place in the cities of Antwerp (BE), Aachen (DE) and Heerlen (NL), leveraging the MAHHL trans-border region. On 7 April 2022, SAFIR-MED completed a first series of flight trials at the DronePort BVLOS test-facility in Sint-Truiden, Belgium, intended to de-risk future demonstrations that will take place in August and September 22. The event showcased the various medical use cases, including the transport of human tissue, biological lab samples and medicine, automated external defibrillator and patients with the use of unmanned air vehicles. These scenarios link to Use Case 7 from EDA's U-space study D1 report, with defibrillator-carrying drones and eVTOLs used as air ambulance performing emergency missions in both controlled and uncontrolled airspace (as well as urban airspace). On 21 June 2022, SAFIR-MED performed a first BVLOS flight over populated area, under the new EASA UAS regulations. The flight authorisation received for this test makes possible further flights over the MAHHL-Cities (Maastricht, Aachen, Hasselt, Heerlen, Liège).

(source: *https://www.safir-med.eu/*)

SAFIR-Med and EULE project partners successfully demonstrated a beyond visual line of sight (BVLOS) flight from the Zuyderland medical centre in Heerlen, the Netherlands, to Uniklinik RWTH Aachen in Germany on 22 April 2023. The FlyXdrive TW-Neo unmanned aerial system (UAS) covered the distance between the two hospitals, about 14.5 km, in about 15 minutes.

The flight demonstrates how safe and flexible integration of advanced U-space services can be used, especially to enable fast and reliable transport services for urgently needed medical goods. Beside technical preparations, the main challenge was to overcome differences in legislation in Germany and the Netherlands for BVLOS flights.

(source: *https://www.unmannedairspace.info/latest-news-and-information/safir-med-completes-bvlos-cross-border-flight-carrying-medical-goods/*)

SESAR SAFIR-Med project has concluded 28 months' research, including BVLOS demonstration flights above populated area, and activation of the article 13 transferring operational authorisations obtained in the operator country to other EU member states.

Among recent demonstrations, the project successfully concluded the integration of multiple simultaneous unmanned aircraft missions during demonstrations in Antwerp, Belgium, and the MAHHL region (German, Dutch, Belgian cross border region around the cities of Maastricht, Aachen, Hasselt, Heerlen, Liège). The project, backed by SESAR Joint Undertaking and EASA, sought to showcase U-space services.

The project consortium decided to use new European drone law as soon as it was implemented end of December 2020 and immediately started the authorization request process. With demonstration flights scheduled throughout 2022, the project team worked to secure necessary permissions from regulatory bodies in Belgium, Germany, and the Netherlands.

SAFIR-MED carried out a two-pronged approach to de-risking, focusing on both operational and U-space aspects. This involved extensive training, hardware-in-the-loop flights, and practicing simultaneous control of multiple drones. In March 2022, full hardware-in-the-loop operational de-risking flights were carried-out at DronePort, Belgium to test the coordination of multiple drones in the air simultaneously.

SAFIR-MED highlighted the importance of minimizing human involvement, automating flight authorization processes, and reducing the learning curve for crews. As the project showcased, seamless integration and collaboration between manned and unmanned aviation is key to the future development of the drone sector.

The project exposed the need for further development of U-space regulations, standards, and interoperability. The successful exchange of information between different U-space actors using the Helicus C2C system, the Unifly UTM system powering SkeyDrone and Droniq, Involi and Droniq live traffic, demonstrates the potential for a more integrated ecosystem.

(source: *https://www.unmannedairspace.info/latest-news-and-information/safir-med-research-summarised-in-april-2023-newsletter-detailing-bvlos-flights-and-conclusions/*)

The SAFIR-Med project is now ended and the research in this area will be continued as part of the EULE project, where the next flights to transport eye corneas for a medical study are in preparation.

6.3.5 - CORUS-XUAM

CORUS-XUAM is a 24-month project that demonstrates how U-space services and solutions could support integrated Urban Air Mobility (UAM) flight operations, allowing eVTOLs/UAS and other airspace users (unmanned and manned) to operate safely, securely, sustainably and efficiently in a controlled and fully integrated airspace, without undue impact on operations currently managed by ATM. The project builds on the CORUS U-space ConOps, extended by the addition of UAM expertise.

The activities have started with the update of the U-space ConOps, addressing the **integration of UAM/UAS operations into the airspace, also identifying new U3/U4 services**. The project has conducted its first flight tests in February 2022 in France, testing all elements of airspace integration of drone traffic including UTM aspects such as tracking, monitoring, flight altitude checking and no-fly zone detection. These were followed in March 2022 by additional trials in Spain, demonstrating delivery flights (last-mile goods delivery by drones).

The Italian demonstration of the CORUS-XUAM project took place on June 7-8-9, 2022 in the Grottaglie-Manduria area. The focus of these trials was on coordination between ATM and U-Space for the management of special operations such as emergency operations (e.g., ambulance flight), which takes off from a controlled airspace (airport) and needs to operate within U-Space. The trials confirmed that the current state of technological and operational maturity of the systems for the coordination and interoperability of the national airspace management system and U-Space is already adequate to operate emergency drone transportation services in peri-urban and urban areas.

At the end of September, CORUS-XUAM completed a week of flight trials testing the interaction between UTM and conventional ATM systems at Pontoise airfield in France. The successful flight tests at Pontoise airfield were conducted with an RPAS, a crewed electric aircraft and a remotely piloted eVTOL prototype. The crewed aircraft used the conventional ATM tower and system while the RPAS and the eVTOL used the UTM system. The following three use cases were tested:

- The unexpected occupancy of a FATO and aircraft diversion due to priority landing of another aircraft – crewed aircraft and eVTOL.
- The diversion of a flight path due to the closure of an airport or vertiport – RPAS.
- The diversion of a flight path with two aircraft flying the same path – RPAS and eVTOL.

The project activities continue with the preparation of other trials campaigns in Belgium and Germany (November 2022).

In November 2022, Volocopter's VoloDrone was used to fly two research scenarios at DLR's National Experimental Test Centre for Unmanned Aircraft Systems at Magdeburg-Cochstedt Airport. The flight tests in Cochstedt simulated with this drone an air taxi scenario for the connection between the city centre and the major airports within the metropolitan regions of London and Frankfurt/Main. It focused on the digital communication interface for ATM/UTM, including contingency management in the event of unforeseen conflict scenarios, and potential routing and air traffic management solutions. In the scenarios, the flight request, flight planning and flight execution from take-off to landing were remotely piloted/automated.

The flight tests focused particularly on the testing of deconfliction manoeuvres and procedures. Exemplary here are prioritized Emergency Medical Services (EMS) aircraft that are given priority: this was clearly demonstrated in the flight tests with an ADAC EMS helicopter in the 'Frankfurt scenario', where the VoloDrone automatically adjusted its flight path to avoid the EMS helicopter. In the 'London scenario', the research teams tested how reducing the speed of the VoloDrone could be used to maintain separation with commercial air traffic, or to give more time to carry out ground operations at the destination vertiport in preparation for arrival.

A new edition 3.1 of the U-space Concept of Operations has been published by the CORUS-XUAM project team. This new version is extending the edition 3 of the ConOps delivered in October 2019, and it is open for comments. Based on feedback, CORUS-XUAM will publish the final deliverable in early 2023.

As in the previous editions, the ConOps looks far into the future, but now has a simplified structure, aligned with the existing U-space regulation, and includes material related to Urban Air Mobility, in particular vertiports and eVTOL passenger-carrying operations. In an effort to align with the U-space regulation, the list of U-space services proposed in the previous edition has been reworked and traced to existing regulation.

The following table provides a coverage of the various U-space services (using CORUS edition 3 ConOps, and not IR 2022/664, taxonomy) investigated across the above-mentioned trials:

U2 services			
01. Geo-fence provision (incl. dynamic geofencing)	02. Emergency management	03. Strategic Deconfliction	04. Weather information
05. Tracking and position reporting	06. Operation plan/Preparation optimisation	07. Monitoring	08. Traffic Information
09. Drone Aeronautical Information Management	10. Procedural Interface with ATC	11. Surveillance data exchange	12. Operation plan processing
13. Risk Analysis assistance	14.Accident/Incident reporting	15. Navigation Infrastructure Monitoring	16.Communication Infrastructure Monitoring
17. Digital logbook	18. Legal recording	19. Geospatial information service	20. Population density map
21.Electromagnetic interference information	22. Navigation coverage information	23.Communication coverage information	24.Citizen Reporting Service
U3 services			
01. Tactical Conflict Resolution	02. Collaborative Interface with AYC	03. Dynamic capacity Management	

The SESAR CORUS-XUAM Very Large Demonstration (VLD) project is organising the Final Workshop 29-30 March, hosted by Distretto Tecnologico Aerospaziale (DTA) to present the outcomes of six live trials conducted in various European countries and the consolidated U-space ConOps developed jointly with all relevant

SESAR2020 U-space related projects and in close coordination with the SESAR 3 JU U-space ConOps Coordination Cell.

(source: *https://corus-xuam.eu/*)

The CORUS-XUAM solutions presented during final workshop in Bari in March 2023 were tested in European states to show how the development of connected solutions and enabling technologies can support useful services for the community in urban and airport areas within the next 5-10 years. They included experiments conducted in Belgium, Germany and the UK, Italy, Spain, Sweden, and France and examined specific risk conditions related to the presence of anthropogenic activity in urban areas, and shared airspace with manned aviation, with the search for solutions that guarantee absolute safety.

Key research areas have been highlighted as U-space moves from concept to implementation phase:

- CNS infrastructure and tracking capabilities, such as ADS-B lite, to provide an operational framework;
- A catalogue of possible technologies, showing maturity and applications;
- Transversal view of the airspace structure;
- Business and economic aspects;
- Harmonisation and interoperability issues.

UAM research will now continue over the next two years as part of the new SESAR Digital Sky Demonstrators officially launched at the end of 2022.

(source: *https://www.unmannedairspace.info/uncategorized/we-confirmed-u-space-processes-are-sufficient-for-our-need-corus-xuam-final-workshop/*)

The SESAR 3 JU's *CORUS-XUAM* project has published he fourth and latest edition of the U-space Concept of Operations (ConOps) expanding the scope to urban air mobility (UAM).

The ConOps extends the previous edition from 2019 and looks into the future with the goal to serve as a reference manual for delivering U-space, Europe's enabling framework for the safe and secure integration of unmanned aerial systems, or drones, into the airspace.

Specifically, this latest edition of the ConOps:

- addresses urban air mobility needs, in particular processes at vertiports, airspace structure and flight rules, and eVTOL passenger-carrying operations;
- is aligned with EU U-space regulations*1*;
- includes inputs coming from other SESAR research and innovation projects.

The ConOps aims to reach a consensus on what U-space means operationally. The document provides the terminology and a general model of the overall system of U-space, which consists of the seven services, matching what is captured in EU U-space regulations.

(source : *https://www.unmannedairspace.info/emerging-regulations/sesar-3-ju-publishes-fourth-edition-of-u-space-concept-of-operations-to-address-air-mobility-needs/*)

6.3.6 - AMU-LED

The AMU-LED aims at first defining, and then testing in live conditions, UAM operations in a U-space eco-system for coordinated flights of several types of UAVs in different scenarios, use cases and applications (e.g. air taxis, emergency services, delivery of goods, surveys, etc.) for surveillance, logistics and mobility using air vehicles.

In September 2021, AMU-LED performed a number of demonstration flights around the following Use Cases, corresponding to nominal and non-nominal situations involving drones and manned aircraft:

- **Medicalised and manned helicopter intervention**: Coordinated flight of unmanned drones with the arrival of the medicalised and manned helicopter of the emergency medical service (no ATC involved).
- **U-space conflict management coordinated with ATC:** Flight scenario in which a simulated air taxi service has a problem, deviates from its flight plan and ATC must instruct manned aircraft away from the air taxi.
- **Manned helicopter in U-space airspace:** Presence of manned aircraft in U-space airspace, coordinated by ATC to prioritise flights and provide separation between them.
- **Manned helicopter in U-space airspace:** Manned emergency medical helicopter unexpectedly enters the drone flight zone. U-space management coordinated with ATC.
- **Manned Aircraft Emergency and U-Space Disablement:** A flight scenario where a manned aircraft emergency requires ATC to assume control and temporarily disable U-space services.

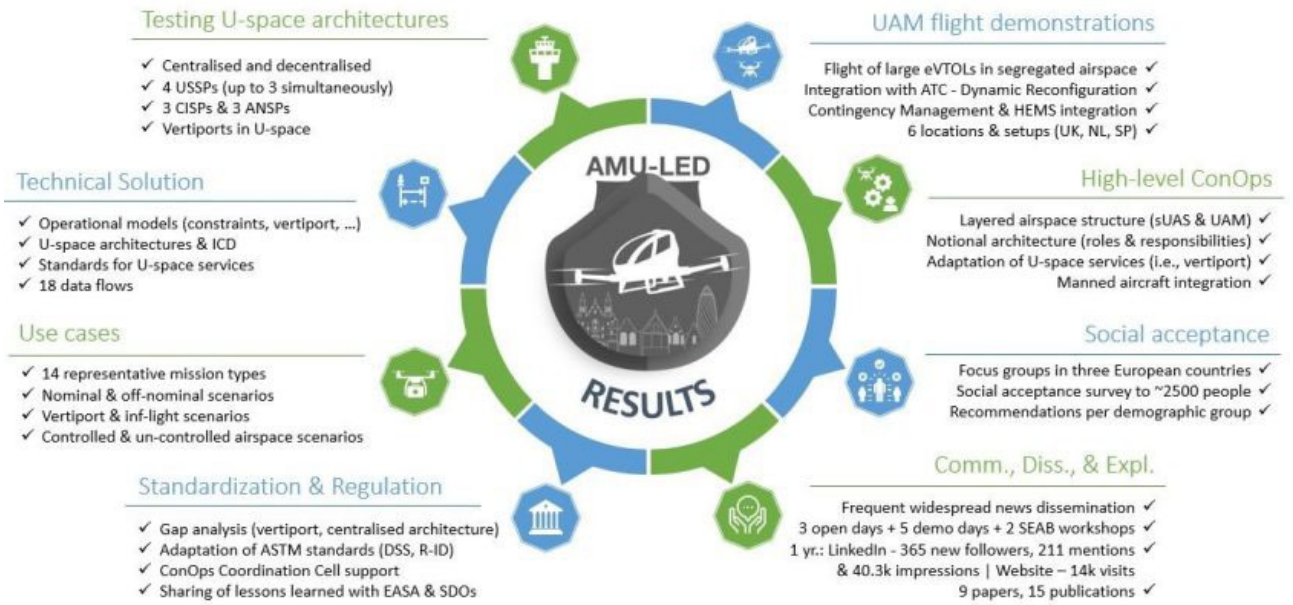
(source: *http://amuledproject.eu/invite-for-amu-led-open-day-in-santiago-de-compostela-spain/*)

AMU-LED has carried out six demonstrations, taking place throughout the summer of 2022, in Cranfield (UK), Amsterdam (NL), Enschede (NL), Rotterdam (NL), and Santiago de Compostela (SP):

- In June 2022 the demonstrations started with the feasibility case in Cranfield, proving the readiness of the AMU-LED solution, technologies, and systems. These tests were led by Cranfield University, and took place at Cranfield Airport.
- In August 2022 the project tested the desirability of its solution in Amsterdam and Enschede, focusing on public acceptance and social impact. In Amsterdam, the tests were led by the Royal Netherlands Aerospace Centre (NLR) and took place in the heart of the city, at the Marineterrein, whereas in Enschede Space 53 was in charge of them, taking place between the Space53 location at Technology Base and Twente Airport, and the city of Enschede.
- In August 2022 in Rotterdam, the economic viability of UAM was also demonstrated. This test was being coordinated by AirHub and took place in the port area of the city.
- Finally, the city of Santiago de Compostela hosted the last demonstration of AMU-LED, where all the previous aspects – feasibility, viability and desirability – came together in a big final exhibition, coordinated by the technology centre ITG.

The research work included two flight trials: the flight of an EHang EH216 in October 2022 monitored by the U-space AIRUS platform, developed by NTT DATA and ITG. During the tests, the air taxi performed four flight missions combining simulated light drone traffic, which enabled the demonstration of the AIRUS system's ability to react in real time to different contingencies, such as deviations from the flight plan, runway obstacles and restricted areas in the air.

The second eVTOL flight was by a Concept Integrity from UMILES Next, equipped with TECNALIA technology, tested in November 2022. The AIRUS platform provided the 'Common Information Services' during the flight, and together with ANRA Technologies Software that also provided the USSP services.



(source: *https://www.unmannedairspace.info/uncategorized/amu-led-completes-research-into-urban-utm-conops-and-airspace-integration/*)