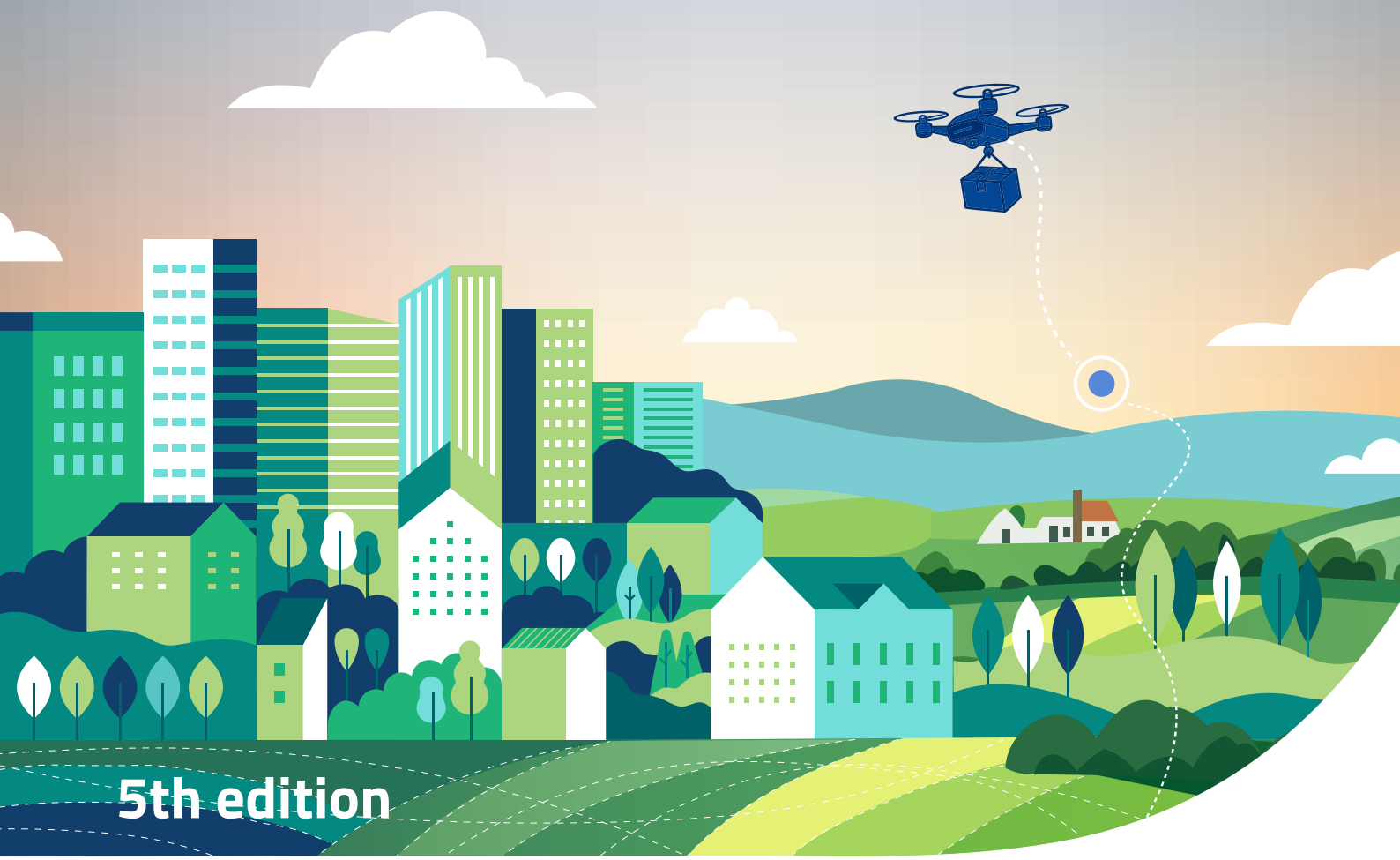
U-space

Concept of Operations (CONOPS)

Extended executive summary



5th edition

CORUS five

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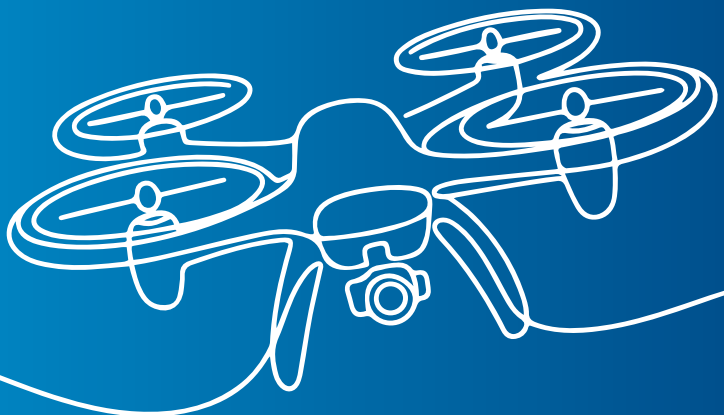
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Introduction

Unmanned aircraft systems (UAS) are fundamentally transforming civil aviation by delivering vital social services – from logistics and infrastructure inspection to emergency response – and establishing the operational foundation for a sustainable economic future in air mobility. As the number and complexity of operations continue to grow, it is increasingly important to ensure that unmanned and manned aircraft can operate safely, securely and efficiently within a common airspace environment.

The European regulatory framework has established the foundations for U-space ([1]), including requirements for UAS operators, U-space airspaces and U-space service providers (USSPs). In parallel, successive SESAR research and innovation activities have expanded the understanding of how U-space can evolve to support increasingly complex operations. Since the first editions of the U-space ConOps were published, both regulation and research have matured significantly. The adoption of the U-space regulatory framework, together with the associated acceptable means of compliance (AMC) and guidance material (GM), has driven the initial U-space implementation across Europe. At the same time, numerous research and deployment projects have generated new operational knowledge and experience.

The CORUS five project has received funding from the SESAR Joint Undertaking (SESAR JU) under the European Union's Horizon Europe Research and Innovation Programme through Grant Agreement No. 101166763 to develop the fifth edition of the Concept of Operations (ConOps) for U-space. This edition aims to bridge the gap between regulatory implementation and research and innovation activities, supporting the progressive integration of unmanned aviation, Innovative Aerial Services (IAS), Innovative Air Mobility (IAM ([2])) and the wider Air Traffic Management (ATM) network within a collaborative, highly digitalised and information-driven aviation ecosystem.

This is an Extended Executive Summary of the CORUS five ConOps. It provides a concise, accessible overview of the main concepts, assumptions, operational principles, and future directions described in the ConOps. While it presents the key messages and findings, it does not aim to reproduce the complete level of detail contained in the original document. Readers seeking further information, detailed explanations or the full rationale behind the concepts presented are encouraged to consult the U-space ConOps 5.0.



([1]) U-space is the European version of UAS Traffic Management (UTM).

([2]) IAM is sometimes called Advanced Air Mobility (AAM).

What is a ConOps?

A ConOps describes how a system is expected to function from an operational perspective. It provides qualitative and quantitative information describing how the system should be used, how its different actors interact, and how it is expected to behave.

The CORUS five ConOps aims to answer a simple question: "**How does U-space work?**". It describes the current U-space framework and explores how it is expected to evolve from the first U-space implementations towards the long-term objective of seamless integration with the ATM network. Building on previous CORUS activities and lessons learned from research projects and early deployments, this edition reflects developments in European regulation, research, standardisation and the latest ATM Master Plan. This update is driven by the growing number and complexity of UAS operations, the emergence of IAM and IAS, and the increasing need for interoperability between U-space and ATM.

As U-space is considered part of air traffic management, this ConOps is organised according to the ICAO Global Air Traffic Management Operational Concept (GATMOC). The GATMOC provides a common framework for analysing how airspace is organised, managed and used. Based on this framework, the CORUS five ConOps examines the evolution of U-space across seven interrelated areas, as shown in the figure below. Demand and capacity balancing, airspace organisation and management, conflict management and traffic synchronisation work together to enable safe and efficient operations.

To describe the concept's evolution, the ConOps is structured around three time horizons. The **Short-term horizon** focuses on implementing and maturing the current U-space regulatory framework. The **Medium-term horizon** explores the operational enhancements required to support higher traffic densities, more complex operations and greater integration with ATM and U-space. The **Long-term horizon** considers the strategic developments needed to achieve a highly automated and fully integrated air traffic management ecosystem where manned and unmanned aviation can safely coexist within a common framework.

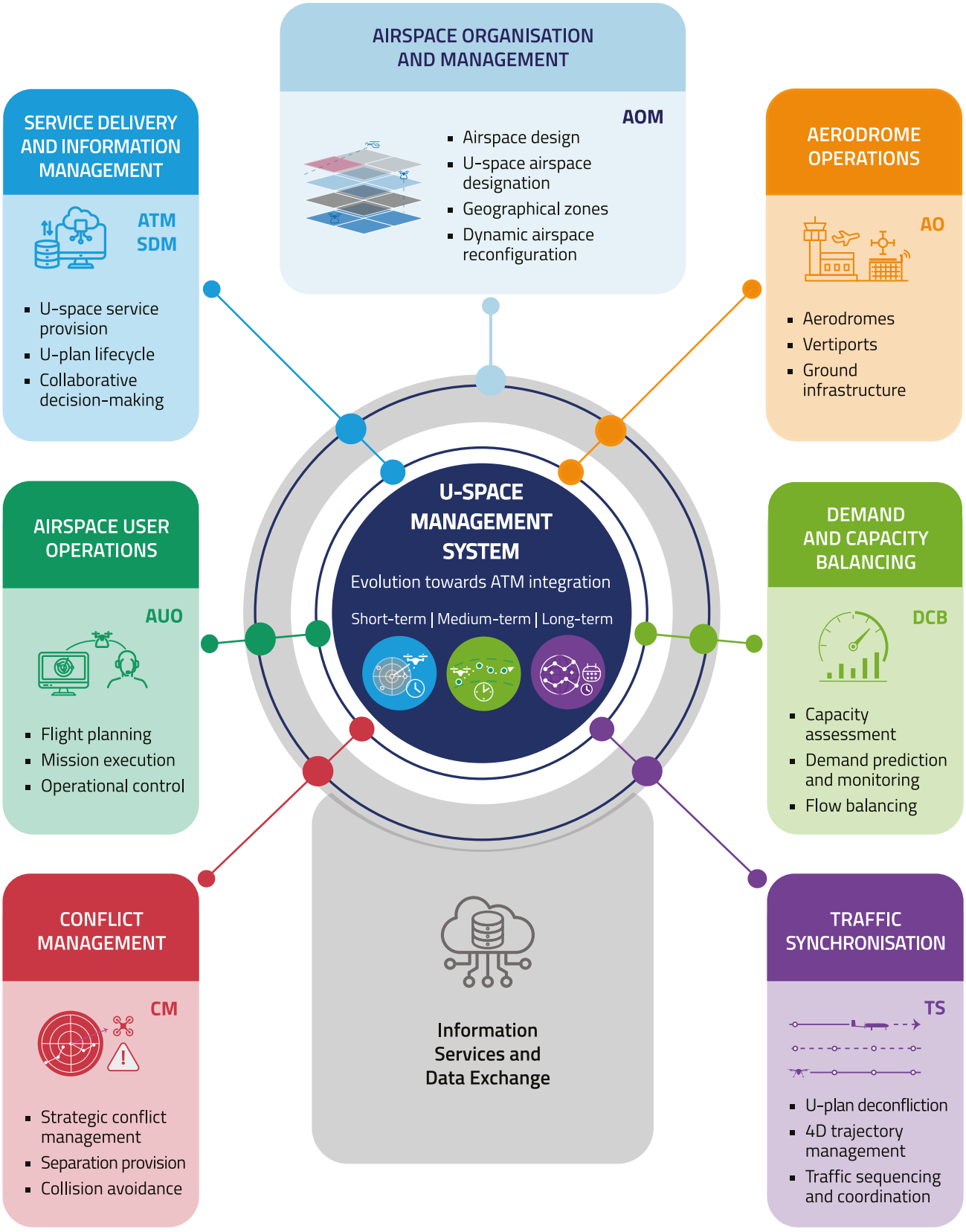
U-space policy and regulatory context

U-space is a framework for managing drone operations safely and efficiently in increasingly busy and complex airspace. It combines designated airspace, digital services and operational procedures to enable unmanned aircraft system (UAS) operations to plan, authorise and conduct flights, while ensuring that drone operations can coexist safely with other airspace users.

Applicable since January 2023 ([3]), the European U-space regulatory framework establishes common requirements for U-space airspace, UAS operators, U-space service providers (USSPs) and the provision of U-space services. It also defines how U-space interacts with air traffic services and manned aviation. Member States are responsible for designating U-space airspace and ensuring that the framework is implemented within their airspace, supported by common EU rules and EASA Acceptable Means of Compliance (AMC) and Guidance Material (GM).

([3]) Commission Implementing Regulations (EU) 2021/664, 2021/665 and 2021/666 of 22 April 2021, establishing the U-space regulatory framework. The framework entered into force in January 2021 and became applicable from 26 January 2023.

FIGURE 1. AREAS OF THE CORUS FIVE U-SPACE CONOPS



U-space ConOps 5.0 in a nutshell

FIGURE 2. CORUS FIVE ROADMAP – SAFE, SCALABLE AND SUSTAINABLE U-SPACE INTEGRATED WITH ATM

	FOCUS	KEY ENABLERS	CORUS FIVE SERVICES IN SCOPE	OPERATIONAL SCOPE	MATURITY OUTLOOK
SHORT TERM IMPLEMENTATION **Establish the foundation and initial services**	▪ Initial U-space services in low complexity environments ▪ Establish digital and regulatory foundations ▪ Procedural coexistence with ATM and aerodromes ▪ Build operational experience	Basic U-space Services Digital Platform U-space Airspace Volumes Initial DAA Information Stakeholder Onboarding	▪ Common Information ▪ Network Identification ▪ Geo-Awareness ▪ UAS Flight Authorization ▪ Traffic Information ▪ Weather Information (optional) ▪ Conformance Monitoring (optional)	▪ VLOS/BVLOS in segregated volumes ▪ Low altitude in urban and regional areas ▪ Vertiport operations (initial) ▪ Limited cross-border operations	Emerging (Foundation)
MEDIUM TERM OPERATIONAL EXPANSION **Scale operations and expand services**	▪ Expand U-space services to more complex environments ▪ Enhance automation and dynamic capacity management ▪ Stronger integration with ATM and network operations ▪ Different U-space classes to enable higher density operations and lower density operations in broader area	Advanced U-space Services Dynamic Capacity Management Smart Segregation Enhanced Connectivity Cross-border Interoperability	▪ Common Information (U-space X, Y, Z) ▪ Network Identification (U-space X, Y, Z) ▪ Geo-Awareness (U-space X optional; U-space Y, Z) ▪ UAS Flight Authorization (U-space Y, Z) ▪ Traffic Information (U-space X, Y, Z) ▪ Weather Information (U-space Y, Z) ▪ Conformance Monitoring (U-space Y, Z) ▪ Separation Service (U-space Z)	▪ Rural operations at scale ▪ Complex urban airspace operations ▪ High density airspace, vertiports and flights above VLL ▪ Cross-border and multi-jurisdiction operations	Developing (Expansion)
LONG TERM FULL INTEGRATION **Fully integrated, automated and intelligent U-space**	▪ Full intregration of U-space with ATM and network management ▪ Highly automated and predictive operations ▪ System-wide interoperability and seamless data exchange ▪ Trusted, resilient and sustainable U-space ecosystem	Full ATM/ U-space Intregration Digital Flight Rules Flight plan and U-plan convergence System-wide Automation Full interoperability of digital services	▪ Full suite of U-space services for unmanned and manned aircraft in lower airspace ▪ Combined common and aeronautical information ▪ Digital management of lower airspace access permissions ▪ Common flight authorisation and plan filing ▪ Sensor fused traffic information, combining network identification with other surveillance ▪ Continuous management of conflict, filling the gap between pre-flight and tactical	▪ High density BVLOS and autonomous operations alongside manned aviation ▪ Integrated airspace (Class X, Y, Z dynamic use) ▪ Innovative Air Mobility (IAM) integration ▪ New, "Digital Flight Rules" dictate operations	Mature (Transformation)

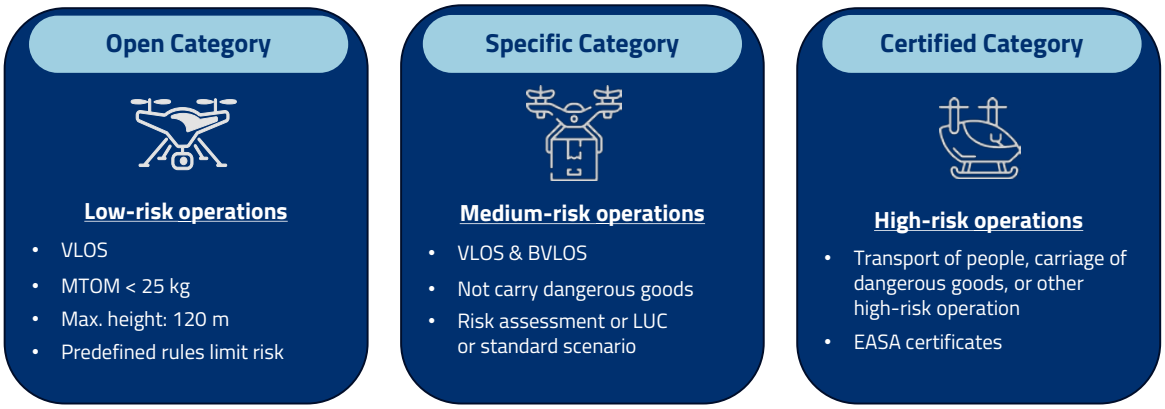
KEY TRIGGERS			
	U1 U2	U3	U4
	U1-U2 - FOUNDATIONAL & INITIAL U-SPACE SERVICES • Regulatory framework available • Basic digital platform and connectivity • Initial operational experience and safety case	**U3 - ADVANCED U-SPACE SERVICES** • Scalable digital infrastructure in place • Automation and data sharing established • Cross-border interoperability achieved	**U4 - FULL U-SPACE SERVICES** • High density and complex operations • Full automation and predictive capability • Integrated network and services performance

UAS operations

UAS and UAS operations are regulated as part of aviation. European regulations classify UAS operations into three categories according to the level of risk they present and the regulatory requirements: **open**, **specific**, and **certified**. The open category covers low-risk operations conducted under predefined limitations and without prior operational authorisation.

The specific category covers operations that require a risk-based assessment and appropriate mitigations, often including Beyond Visual Line of Sight (BVLOS) operations. The certified category applies to the highest-risk operations, such as those involving the transport of people or dangerous goods, and requires certification of the aircraft, operator and, where applicable, the remote pilot.

FIGURE 3. UAS OPERATION CATEGORIES



As UAS operations become more complex, the required level of safety assurance increases. Consequently, most operations expected to benefit from U-space services, particularly BVLOS operations conducted in the specific category, rely on structured risk assessment methodologies and operational mitigations to ensure an acceptable level of safety.

Risk management and mitigation

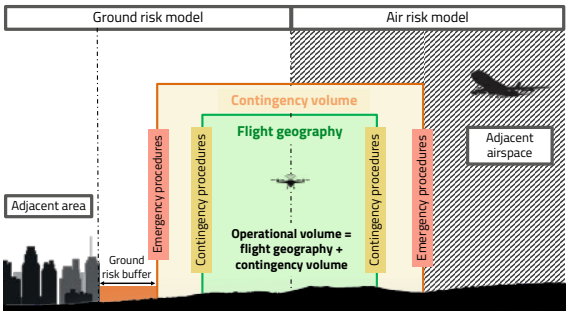
Most operations expected to benefit from U-space are conducted under the **specific category**, particularly BVLOS operations. Unlike Visual Line of Sight (VLOS) operations, BVLOS flights cannot rely solely on direct observation by the remote pilot to maintain awareness of surrounding traffic and hazards. As the operational complexity increases, additional safety measures are required to ensure an acceptable level of risk.

For operations in the specific category, the UAS operator must establish compliance through one of three pathways: submitting an operational declaration under a published Standard Scenario (STS), obtaining an operational authorisation via a streamlined Predefined Risk Assessment (PDRA), or conducting a Specific Operations Risk Assessment (SORA). SORA provides a structured methodology for identifying operational hazards and determining the mitigations necessary to achieve an appropriate level of safety. The objective is not to eliminate all risks, but to reduce them to a level considered acceptable for the intended operation.

A key challenge in BVLOS operations is managing air risks. The operator must demonstrate that the unmanned aircraft will remain within the expected operational volume and that adequate measures exist to address deviations from the planned trajectory. To support this assessment, SORA introduces concepts such as the **operational**

volume, within which the flight is expected to remain, and the **contingency volume**, which provides additional protected airspace for managing abnormal situations. Parameters such as navigation accuracy, flight technical error, path definition error, and deviation thresholds help determine the dimensions of these volumes and the level of protection required around the operation.

FIGURE 4. SORA SEMANTIC MODEL



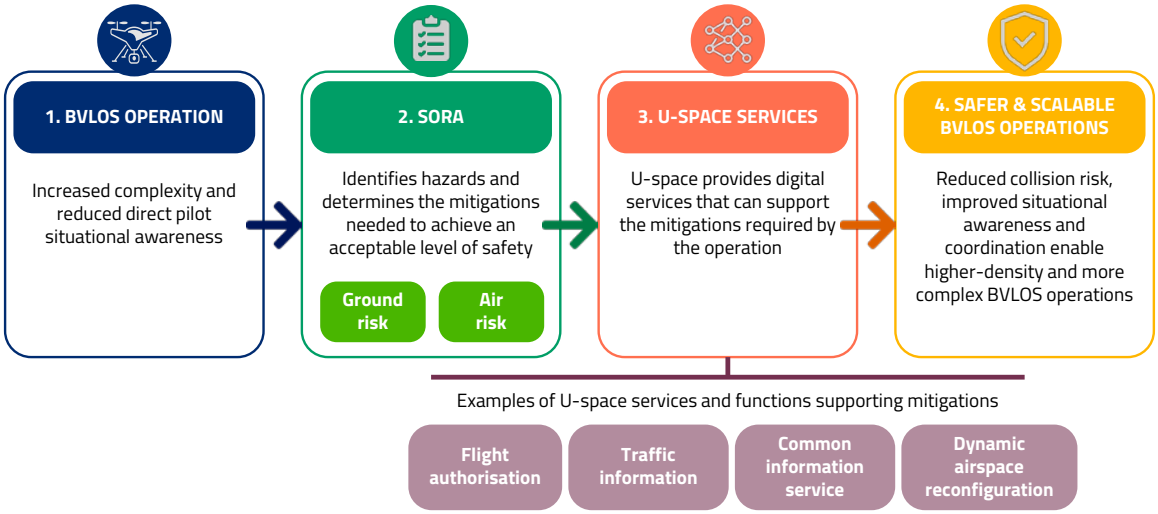
Source: JARUS

U-space contributes to this safety framework by providing information and services that support many of the mitigations identified through SORA.

Depending on the operational context, U-space may assist operators through flight authorisation, traffic information, airspace constraint information, tracking, strategic conflict management and information sharing between relevant stakeholders. These services improve situational awareness, facilitate coordination between airspace users and reduce the likelihood of conflicts between aircraft.

From a SORA perspective, U-space can be viewed as supporting operational mitigations. Rather than replacing the risk assessment, U-space provides capabilities that may help satisfy safety objectives identified during the assessment process. In practical terms, U-space enables operators to conduct increasingly complex BVLOS operations while maintaining an equivalent or improved level of safety. As traffic densities increase and operations become more diverse, the role of U-space becomes increasingly important in supporting the safe scaling of unmanned aviation.

FIGURE 5. HOW U-SPACE SUPPORTS RISK MITIGATION IN THE SORA PROCESS FOR BVLOS OPERATIONS



U-space does not replace SORA. It provides services that can support the Air risk mitigations identified through the SORA process, enabling safe, efficient and scalable BVLOS operations.

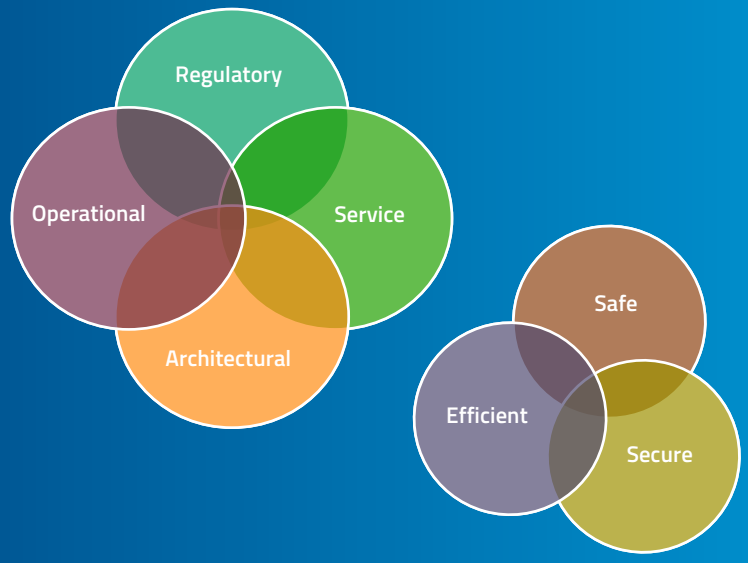
In the longer term, the evolution of U-space described in the CORUS five ConOps seeks to strengthen this relationship between risk assessment and operational services. Enhanced traffic management capabilities, improved information exchange and higher levels of automation are expected to provide additional means of managing operational risks and supporting the future integration of unmanned aviation, IAS, IAM and conventional ATM within a common airspace environment.



U-space

U-space is a regulatory, operational, service and architectural framework designed to enable the safe, efficient and secure integration of UAS and IAM into the airspace.

It is characterised by novel services, and digitalisation and automation functions.



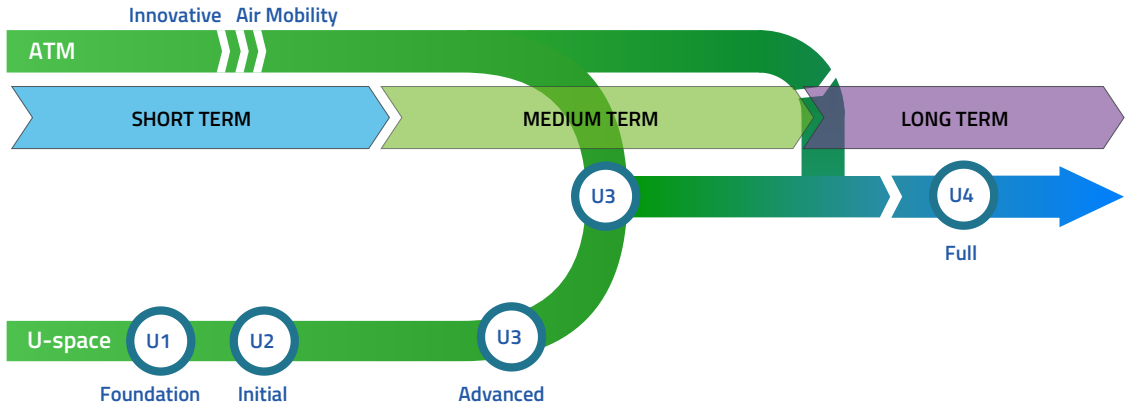
U-space is the European framework designed to enable the safe, secure and efficient integration of UAS and, in the future, IAM operations into the airspace. It combines regulatory provisions, operational procedures, digital services and information exchange mechanisms to support increasing numbers of UAS operations while maintaining an acceptable level of safety. Characterised by a high degree of digitalisation and automation, U-space provides the foundation for managing unmanned aviation as it becomes an integral part of the broader aviation ecosystem.

U-space is not a specific technology, organisation or type of airspace. Rather, it is an operational and service framework that allows multiple stakeholders to coordinate and exchange information. These stakeholders include UAS operators, remote pilots, USSPs, Common Information Service Providers (CISPs), Air Navigation Service Providers (ANSPs), Civil Aviation Authorities (CAAs), aerodrome and vertiport operators, and other airspace users. Through this ecosystem, U-space supports safe access to airspace, situational awareness, coordination between users and the progressive scaling of operations.

At its core, U-space seeks to enable operations that would otherwise be difficult or impossible to perform safely, particularly BVLOS operations and future IAM services. It achieves this through digital services that provide information, coordination, flight authorisation, traffic awareness and other operational capabilities needed to support increasing traffic volumes and operational complexity.



FIGURE 6. ATM AND U-SPACE EVOLUTION OVER THE TIME HORIZONS



U-space has not been conceived as a static concept. The initial implementation focuses on enabling the first large-scale UAS operations through a set of digital services and regulatory provisions. As traffic densities increase and operational demands evolve, additional capabilities become necessary to support higher levels of automation, more complex BVLOS operations, the development of IAS and the emergence of IAM services. Ultimately, the long-term vision is the seamless integration of unmanned aviation within the broader ATM framework.

U-space levels (U1-U4) described in earlier versions of the U-space ConOps provide a useful shorthand for describing the progressive maturity of the concept, from initial regulatory implementation and digital services towards advanced operations and full integration with ATM. In this Executive Summary, however, the evolution is explained mainly through three time horizons: short-term, medium-term, and long-term. These horizons avoid treating U1 to U4 as fixed phases and instead focus on the operational, regulatory and technological triggers needed to move from first U-space deployment towards seamless ATM integration.

The **short-term horizon** focuses on supporting the implementation and maturation of the current U-space regulatory framework.

The **medium-term horizon** addresses the additional capabilities required to support higher-capacity operations, stronger ATM integration and the emergence of IAS and IAM operations (as vertical capable aircraft - VCA).

The **long-term horizon** explores the strategic developments necessary to achieve seamless integration of unmanned aviation within the wider ICAO aviation framework.

The table below summarises the objectives of each horizon and the corresponding role of this ConOps.

Horizon	Trigger	Objective of U-space	Objective of this ConOps
Short term U1, U2	Adoption of current U-space regulatory framework	Enable first implementation of U-space	Bridge the gap between SESAR activities and EU regulations. Support AMC/GM update.
Medium term U3	Update of U-space regulatory framework	Satisfy emerging needs including high-capacity U-space, IAS and IAM operations. Improve integration with ATM framework	Guide U-space research and innovation activities. Feed an eventual update of the U-space regulatory framework.
Long term U4	Provision of digital services integrating UAS into the ICAO framework, including airspace classes, flight rules and air traffic services	Seamless integration with ATM framework	Highlight strategic actions needed to achieve integration with ATM.

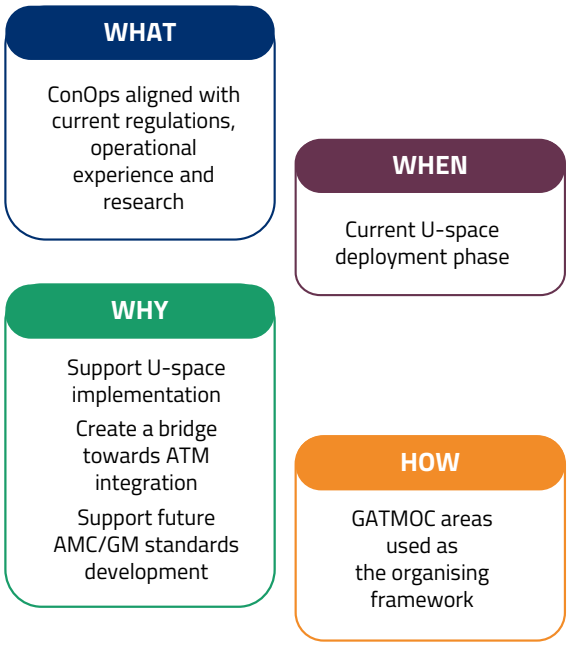


U-space in the short-term horizon

The short-term horizon (STH) describes the first implementation stage of U-space under the current European regulatory framework, reflecting the requirements of Regulations (EU) 2019/947 and 2021/664. Its primary objective is to support the deployment of U-space across Europe while establishing the foundations for future integration between U-space and ATM.

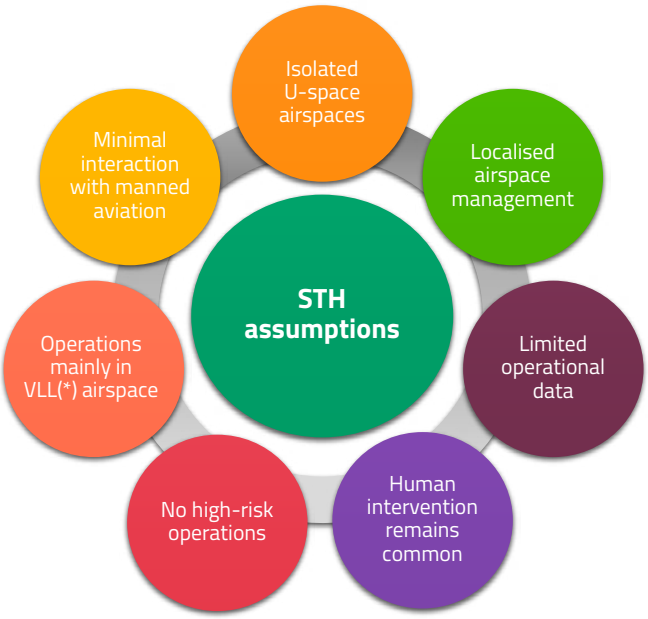
Unlike previous editions of the U-space ConOps, the STH takes the existing regulatory framework as its starting point. Rather than defining a future concept and deriving regulations from it, CORUS five begins with the U-space regulations currently being implemented and explores how U-space operates today through the lens of the ATM functions defined in GATMOC. In doing so, it bridges the SESAR research and innovation framework and operational reality. A secondary objective of the STH is to support the ongoing evolution of the U-space framework through future updates of AMC/GM and supporting standards.

FIGURE 7. SHORT-TERM HORIZON IN SUMMARY



The STH assumes that U-space is still in the early stages of deployment and operational maturity. Consequently, the concept focuses on localised operations, limited interaction with manned aviation and a significant degree of human involvement in decision-making and operational management, as the remote pilot is responsible for maintaining separation from other aircraft. In the STH, U-space reduces air risk, and the flight authorisation service deconflicts U-plans ([4]) before the flight. Furthermore, Dynamic Airspace Reconfiguration (DAR) protects manned aviation.

FIGURE 8. SHORT-TERM HORIZON ASSUMPTIONS



(*) Very Low Level is the airspace below the minimum heights applicable to VFR flights as defined in SERA.5005(f), and the primary layer for U-space deployment in the short-term.

([4]) U-plan is the name for a flight plan in U-space airspace.

U-space services

The STH is based on a common information layer shared by all actors participating in U-space. Common Information Services (CIS) provide the authoritative information required to support safe and interoperable operations, including airspace restrictions, operational conditions and relevant traffic information.

Building on CIS, USSPs provide a bundle of operational services that enable the planning, authorisation and execution of UAS operations.

Service	Short term
Common information	Mandatory
Network identification	Mandatory
Geo-awareness	Mandatory
UAS flight authorisation	Mandatory
Traffic information	Mandatory
Weather information	Optional
Conformance monitoring	Optional

Airspace organisation and management

In the near term, U-space is implemented through the designation of **U-space airspaces.** These airspaces are generally established within the VLL environment, reducing interactions with conventional aviation while enabling UAS operations to be managed through digital services.

Key principles

- U-space airspaces are designated by Member States following an Airspace Risk Assessment (ARA).
- A single class of U-space airspace is envisaged, supported by the services defined in Regulation (EU) 2021/664.
- U-space airspaces are primarily designed for free-route operations, with strategic deconfliction provided through the flight authorisation process rather than through predefined route structures.
- UAS geographical zones may be used to introduce local operational constraints such as altitude limits, speed restrictions, equipment requirements or prohibited areas.
- Multiple certified USSPs may provide services within the same U-space airspace.

Access to U-space airspace

U-space airspaces remain a form of restricted airspace where specific entry conditions apply:

Airspace user	Access condition
UAS operators	Submit a U-plan, receive services from a USSP and comply with applicable requirements. The U-plan is the mechanism through which access is requested, evaluated and authorised.
Manned aircraft (not under ATC)	Must be electronically conspicuous to the U-space ecosystem.
Manned aircraft (under ATC)	ATC applies DAR to segregate UAS from manned aviation.



Airspace management is based on designated U-space airspaces, strategic deconfliction through the U-plan, and temporary segregation of controlled manned traffic through DAR.

Aerodrome operations

In the short-term horizon, aerodrome operations remain largely independent of the U-space environment. U-space airspaces are expected to be designated far enough from controlled aerodromes, so dedicated U-space services for aerodrome-U-space integration are not yet required.

Key principles

- U-space airspaces are generally separated from controlled airspace around aerodromes.
- Most UAS operations can be conducted without dedicated aerodrome infrastructure.
- Operations close to aerodromes continue to rely on local procedures and coordination mechanisms.
- Early interactions between U-space and aerodromes may emerge, but large-scale integration is not yet expected.

UAS operations near aerodromes remain governed through:

- UAS geographical zones and associated restrictions, including dynamic restrictions such as DAR.
- Local aerodrome procedures.
- Flight authorisation, which informs operators of applicable restrictions and permissions.



Separation between U-space and controlled aerodromes remains the primary mechanism for ensuring safe operations.

Demand and capacity balancing

Demand and Capacity Balancing (DCB) focuses on managing traffic within individual U-space airspaces rather than across a wider network of interconnected U-space areas. Capacity is established during U-space airspace designation through the Airspace Risk Assessment (ARA) and is continuously monitored against current and expected demand.



Demand and Capacity Balancing is primarily achieved through Flight Authorisation, ensuring that traffic volumes remain within the safe operating capacity of each U-space airspace.

Key principles

- Capacity limits are defined as part of the U-space airspace designation process.
- Authorities may review the ARA if traffic demand increases and additional capacity is required.
- The Flight Authorisation Service (FAS) ensures that authorised traffic remains within the available capacity.
- U-plan requests may be rejected when demand exceeds the capacity allocated to the U-space airspace.
- Temporary airspace restrictions may reduce the effective capacity available to operators.

Traffic synchronisation

In the short-term horizon, traffic synchronisation is achieved through the **strategic deconfliction of U-plans**, ensuring that UAS flights remain separated in both space and time before departure. Each U-plan is represented as a **4D trajectory** describing the intended flight route, along with the associated spatial and temporal uncertainties.



Traffic synchronisation relies on 4D strategic deconfliction of U-plans before flight, ensuring that conflicts are prevented rather than resolved during flight.

Key principles

- U-plans are assessed by the FAS before being accepted.
- Strategic deconfliction considers both position and time dimensions.
- Deviation thresholds are added to the planned trajectory to account for operational uncertainties.
- Only conflict-free U-plans can be accepted.
- Accepted U-plans remain subject to continuous monitoring and may need updating if airspace conditions change.

Prioritisation and conflict resolution

- Conflicts are managed using a First-Come, First-Served (FCFS) principle.
- Certain special operations may receive higher priority.
- When a conflict exists:
  - the U-plan may be rejected;
  - an alternative solution may be proposed.
- Delaying the operation is expected to be the most common conflict resolution method.

Airspace user operations

In the short-term horizon, the primary users of U-space airspaces are expected to be **BVLOS operations conducted in the specific category**, supported by the services and mitigations provided by the U-space framework. Open category operations may also take place within U-space airspaces, while certified category operations are generally not foreseen during this initial stage of deployment.

Key principles

- UAS operators must comply with both the UAS and U-space EU regulatory framework and the requirements applicable to the specific U-space airspace.
- Access to U-space requires:
  - submission of a U-plan;
  - the receipt of services from a certified USSP;
  - compliance with any applicable operational, performance and capability requirements.
- Additional restrictions may be imposed through UAS Geographical Zones.
- Special operations (e.g. police, customs or military) may be subject to specific national rules and priorities.
- U-space services are provided only to UAS operators; manned aviation does not receive U-space services.
- Network ID ensures all concerned users have situational awareness.

The U-plan is the foundation of flight operations within U-space. Each operation is described through a 4D trajectory containing the intended route and timing of the flight. UAS operators are generally free to fly user-preferred trajectories, provided these do not conflict with airspace restrictions or previously accepted operations.

U-space supports the operation through digital services and Flight Authorisation, while responsibility for flight execution and operational control remains with the UAS operator.

Operational control remains with the UAS operator throughout the flight.

- **Operators are responsible for initiating, conducting and terminating the operation.**
- **Flights must be conducted in accordance with the authorised U-plan.**
- **U-plan amendments may be required when conditions change.**
- **USSPs may propose modifications to accepted U-plans, but operational responsibility remains with the operator.**



Conflict management

Conflict management follows a **layered approach** in which most collision risk is mitigated before flight. Strategic conflict management acts as the primary safety layer, while tactical separation provision serves as a backup when unexpected situations occur. UAS operators must monitor and avoid collisions. In the short term, dedicated collision-avoidance tools and/or services are optional, supplementary safety nets rather than a core function of the U-space framework.

Key principles

- Strategic conflict management is the primary means of reducing collision risk between unmanned traffic.
- Conflict prevention is achieved through:
  - U-space airspace design and DAR applied by ATC;
  - capacity management through Flight Authorisation;
  - strategic deconfliction of U-plans.
- Tactical separation is performed by the UAS operator, supported by Traffic Information Service (TIS).
- UAS operators remain responsible for detecting and resolving conflicts during flight.
- Collision avoidance systems may be used, but they are not required and operate independently from U-space services.

When strategic measures are insufficient or unexpected situations occur:

- Traffic information services provide information on nearby conspicuous traffic.
- The UAS operator detects potential conflicts and determines the appropriate action.
- Trajectory changes should remain within the authorised 4D volume whenever possible.
- If conformance cannot be maintained, the U-plan must be amended and strategically deconflicted again.



Conflict management is based on preventing conflicts before flight, with the UAS operator responsible for managing residual risks during flight.

Service delivery management

In the short-term horizon, service delivery management focuses on the **U-plan**, which describes the operator's intent and establishes the basis for providing U-space services.

U-space services are provided only to flights for which a Flight Authorisation has been issued, and the available services evolve according to the U-plan status throughout the U-plan lifecycle.

Key principles

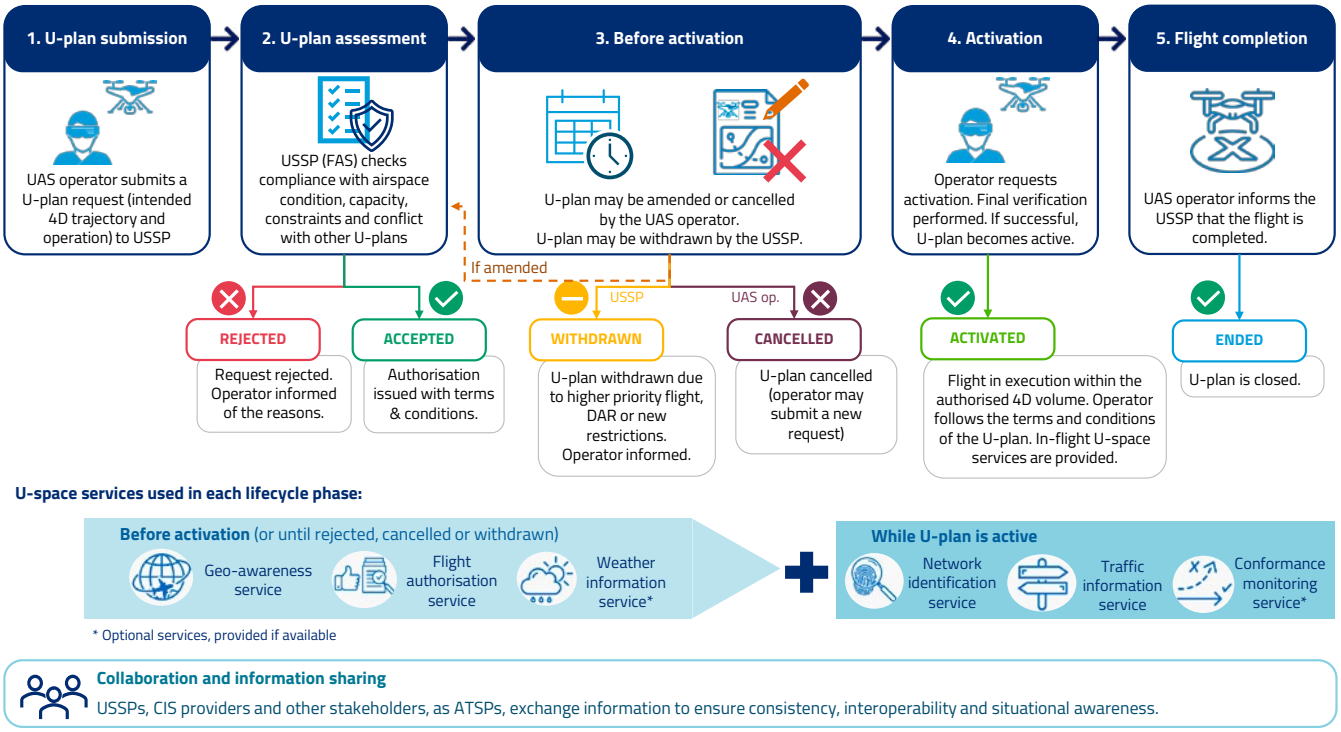
- The provision of U-space services begins with the U-plan submission.
- The flight authorisation service verifies that the operation complies with all applicable conditions before acceptance.
- Predictability is achieved through the operator's commitment to follow the authorised U-plan.
- U-plans may be amended, cancelled or withdrawn when operational conditions change.
- Multiple USSPs may operate in the same U-space airspace and must share information to ensure safe and interoperable service provision.



The U-plan is the central element of U-space service delivery, linking authorisation, information sharing and operational support throughout the lifecycle of the flight.

The U-plan lifecycle and U-space services provision

FIGURE 9. U-PLAN LIFECYCLE

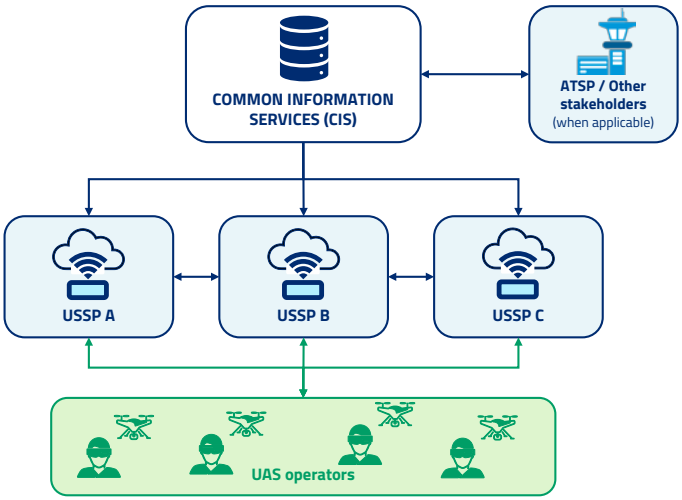


Information services and data exchange

Information services provide the common information layer on which all U-space services depend. CIS ensure all stakeholders operate using a shared, up-to-date operational picture. At the same time, continuous information exchange between USSPs enables Flight Authorisation, Network Identification, Traffic Information, and Conformance Monitoring services. Secure, interoperable and bidirectional information exchange is therefore fundamental to safe and efficient U-space operations.

Safe U-space operations rely on all stakeholders sharing the same operational picture.

FIGURE 10. CIS AND DATA EXCHANGE IN THE STH





U-space in the medium-term horizon

The medium-term horizon (MTH) describes the next major evolution of the U-space concept, corresponding to the objectives defined in the European ATM Master Plan up to approximately 2035([5]). Building on the operational experience gained during the short-term horizon, the MTH introduces another regulated service, new operational concepts and automation capabilities to support a significantly larger number of operations, more diverse aircraft types and stronger integration with the wider ATM ecosystem.

The objective of U-space in the MTH is to overcome the limitations identified in the STH by improving traffic scalability, supporting new forms of air mobility, increasing automation and enabling closer interaction between U-space and ATM stakeholders. The MTH therefore represents an intermediate step between the initial deployment of U-space and the long-term vision of seamless ATM integration.

The start of the MTH is marked not by a specific date, but by the entry into force of a future regulatory framework that expands or updates the current U-space Regulation (EU) 2021/664 and introduces new capabilities, users and services.

The MTH assumes a significantly more mature U-space ecosystem. By this stage, U-space services are fully implemented, and Europe has accumulated operational experience. Service providers, operators and authorities are expected to be familiar with the framework, while standards and supporting guidance material are widely available.

Evolution of U-space services

The MTH does not introduce a completely new set of services. Instead, it builds on the existing regulatory framework by enhancing current services and introducing a single new regulated service: the Separation Service.

FIGURE 11. MEDIUM-TERM HORIZON IN SUMMARY

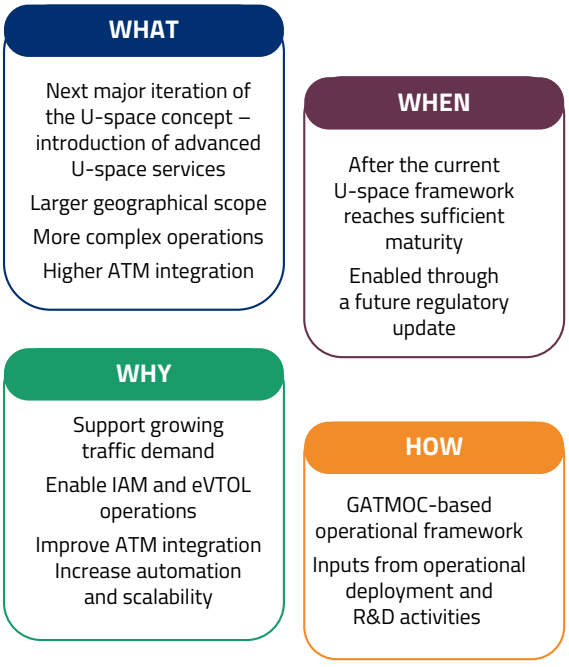
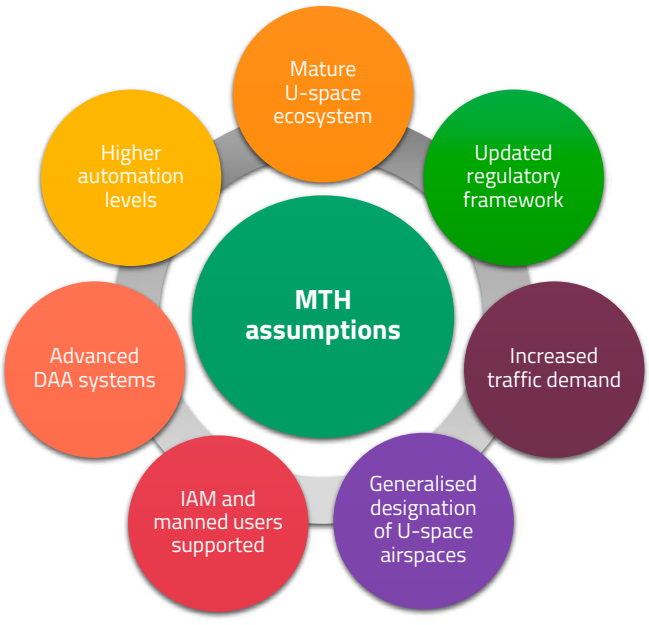


FIGURE 12. MEDIUM-TERM HORIZON ASSUMPTIONS



([5]) Note that this ConOps refrains from providing implementation times for the medium- and long-term horizon.

In the STH, the UAS operator remains responsible for tactical separation. In the MTH, this model evolves through the introduction of the Separation Service, which transfers separation provision from individual operators to the USSP.

Service	Medium term
Common information	✔ Mandatory - ENHANCED
Network identification	✔ Mandatory
Geo-awareness	✔ Mandatory
UAS flight authorisation	✔ Mandatory - ENHANCED
Traffic information	✔ Mandatory - ENHANCED
Weather information	? Optional - Under review
Conformance monitoring	✔ Mandatory
Separation service	✔ Mandatory in Z - NEW

A fundamental change in responsibilities

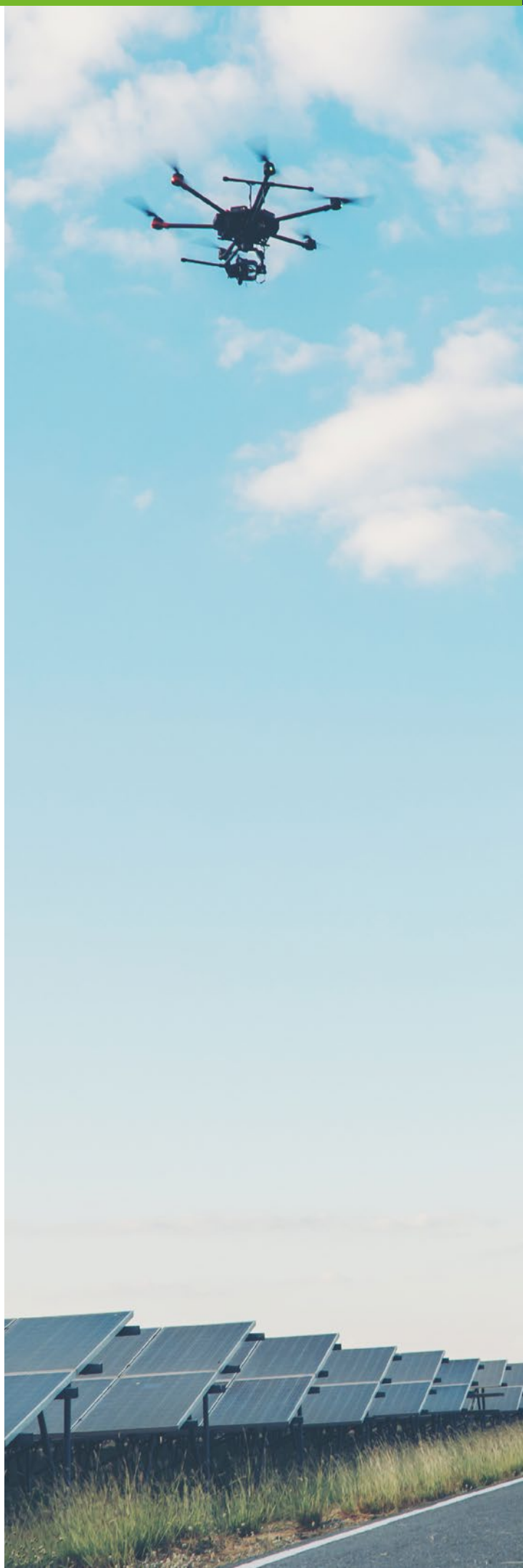
In U-space Z ([6]), the new separation service combines:

- **Tactical conflict detection**

  Predicting potential conflicts using traffic information, trajectory intent and other operational data.

- **Tactical conflict resolution**

  Generating resolution proposals to maintain safe separation between aircraft.



([6]) The different U-space classes are introduced in airspace organisation and management section of the medium-term horizon.

Evolution of existing U-space services

FIGURE 13. EVOLUTION OF U-SPACE SERVICES IN THE MTH

UAS flight authorisation

Evolution towards FF-ICE trajectories.

Fairer allocation mechanisms than FCFS.

Digital permissions and token-based airspace access.

Improved demand forecasting.

Weather information

Finer-grained weather forecasting – "microweather".

Weather information as a supplementary information.

Common information

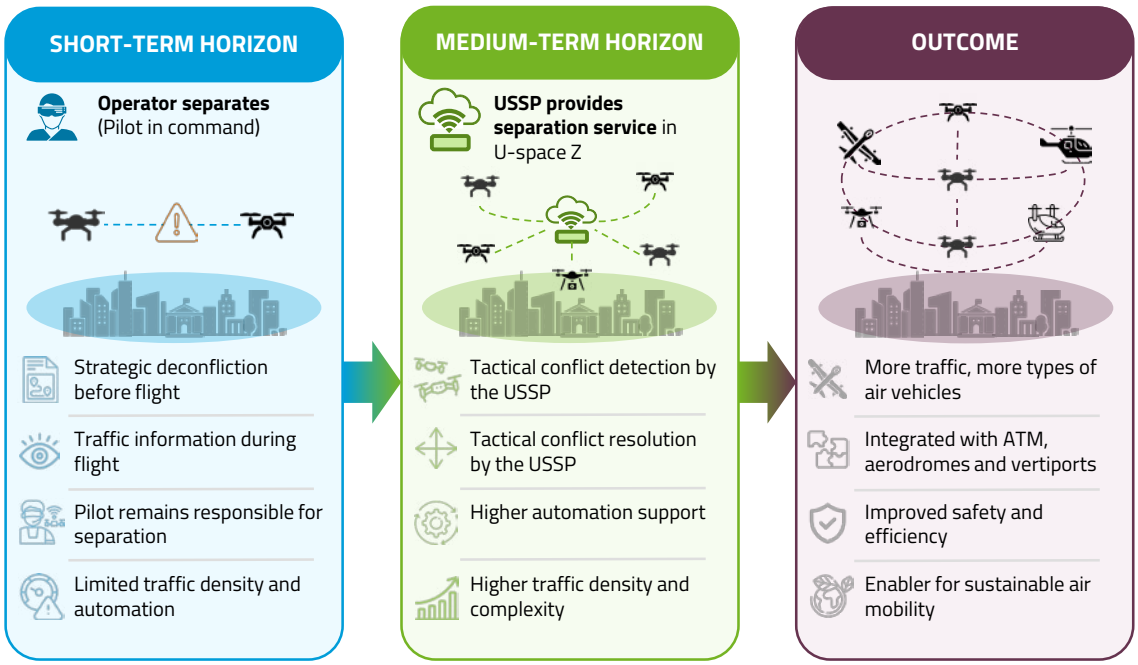
Adds vertiport availability information.

Adds separation management information.

Traffic information

Evolves from simple observations to tracking and multi-sensor fusion.

FIGURE 14. GOAL OF THE MEDIUM-TERM EVOLUTION OF U-SPACE





Airspace organisation and management

In the MTH, U-space expands beyond the limited deployment of the STH and becomes a more widely available airspace environment that supports a broader range of operations, aircraft types, and traffic densities. U-space airspaces may extend beyond VLL, support operations closer to aerodromes and vertiports, and facilitate more widespread BVLOS operations.

Key principles

- U-space expands to support higher-performance operations, including electric vertical take-off and landing (eVTOL) and VCA traffic.
- U-space airspaces become increasingly available across the VLL environment.
- Airspace management becomes more dynamic and more integrated with ATM.
- Different U-space environments are created based on the services provided and the required performance.

Dynamic and integrated airspace management

- Airspace management remains based on ARA but becomes more dynamic and more integrated with ATM.
- Airspace access is based on the combination of airspace class and performance category.
- Dynamic airspace reconfiguration evolves towards more advanced concepts such as ATM U-space Shared Airspace (AUSA).
- UAS geographical zones continue to support security, safety, and environmental requirements.
- Traffic management increasingly considers operations crossing multiple adjacent U-space airspaces.

In the MTH, U-space airspaces are categorised according to:

U-SPACE CLASS (X, Y, Z)

U-space class	Main characteristics
X	Low-risk environments with low traffic demand and limited service provision.
Y	Strategic deconfliction & Traffic Information, similar to the STH.
Z	Separation service provided by the U-space ecosystem.

PERFORMANCE CATEGORY (I, II, III)

Performance categories define the capabilities required to operate within a given airspace, such as navigation performance (how much room each flight needs, how quickly it can turn, etc), aircraft capabilities (e.g. collision avoidance) and levels of automation.

Combining service levels (X-Y-Z) and performance categories (I-II-III) creates different categories of U-space airspace adapted to different operational needs.

The number of performance categories might be more than 3. Some of the combinations of U-space class and performance may never be used. Most likely the performance will rise with the traffic density, as will the U-space class.

Aerodrome operations

In the MTH, vertiports become an integral part of the U-space ecosystem, supporting both IAM and higher-density UAS operations. U-space is no longer limited to airspace away from aerodromes, and interaction between U-space, vertiports, and airports is expected to increase.



The MTH introduces vertiports as a new operational node within U-space, requiring coordinated management of infrastructure, airspace and traffic flows.

Key principles

- Vertiports introduce a new operational environment for eVTOL and VCA operations.
- Vertiport availability becomes operationally important and is shared through the Vertiport Information Service (VIS).
- Flight planning increasingly requires coordination between:
  - departure vertiport availability;
  - strategic deconfliction of the flight;
  - arrival vertiport availability.
- Dedicated Vertiport Traffic Zones (VTZ) may be established to support sequencing and local traffic management.
- Airspace around airports becomes more dynamic through mechanisms such as smart segregation and shared ATM/U-space management.

Demand and capacity balancing

DCB evolves from a simple capacity protection mechanism into a proactive process that anticipates demand, identifies potential hotspots and applies measures to prevent congestion before it occurs. The objective is to support higher traffic densities and operations with different performance requirements, while maintaining acceptable safety, environmental and operational performance levels.

Key principles

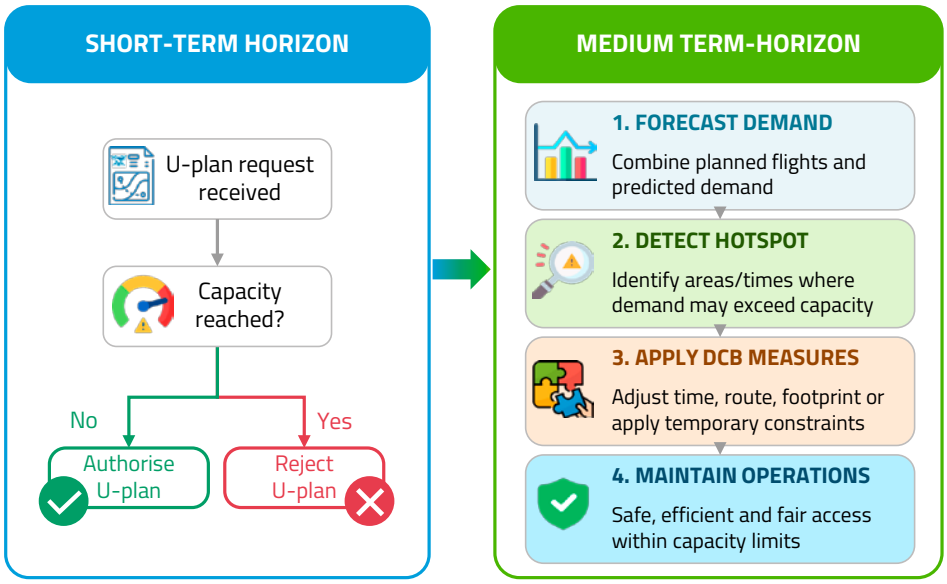
- Capacity management becomes increasingly driven by known demand and traffic forecasts.
- Pre-tactical and tactical DCB require information sharing and coordinated decision-making among multiple USSPs.
- Hotspots are identified before capacity limits could be reached or exceeded.
- DCB prepares U-plans so that traffic synchronisation can subsequently find safe and efficient solutions. It does not itself resolve strategic conflicts.
- Fairer approaches progressively replace the limitations of the FCFS principle.

Typical DCB measures

- **Adjusting flight timing.**
- **Modifying the planned trajectory.**
- **Reducing the operational footprint of a flight.**
- **Applying temporary constraints to all flights within a defined area.**

DCB phase	Main characteristics
Strategic	Review capacity assumptions through ARA updates and anticipate known events that may affect demand or capacity and apply temporary restrictions when required.
Pre-tactical and tactical	Use actual U-plans and traffic forecast to regulate demand. These phases operate as a continuum and are coordinated collectively by USSPs.

FIGURE 15. DCB FROM STH TO MTH



Traffic synchronisation

Traffic synchronisation evolves from simple strategic deconfliction towards a more dynamic and efficient use of airspace. Rather than resolving conflicts when a U-plan is submitted, Traffic synchronisation increasingly benefits from reduced uncertainty as more accurate information becomes available closer to flight execution.

Key principles

- Strategic conflicts are assessed using a risk-based approach rather than a simple overlap/no-overlap criterion.
- U-plans progressively evolve from protected 4D volumes towards more trajectory-centric representations.
- Traffic synchronisation allows a limited level of overlap between planned trajectories provided the residual risk remains acceptable.
- In-flight U-plan updates reduce uncertainty and allow more accurate conflict prediction and resolution.
- Collaborative decision-making considers multiple flights simultaneously rather than treating each operation independently.

From individual flights to system optimisation

In the MTH, Traffic synchronisation increasingly applies batch processing, allowing multiple flights to be optimised together while considering objectives such as capacity, efficiency and environmental constraints.

Fairness and flexibility

The MTH introduces mechanisms that reduce the limitations of first-come, first-served allocation. Concepts such as **Reasonable Time To Act (RTTA)** delay the final synchronisation decision until sufficient operational information is available, improving both fairness and overall system performance.

Traffic synchronisation balances flexibility, efficiency and fairness by progressively reducing uncertainty and applying collaborative optimisation across multiple operations.

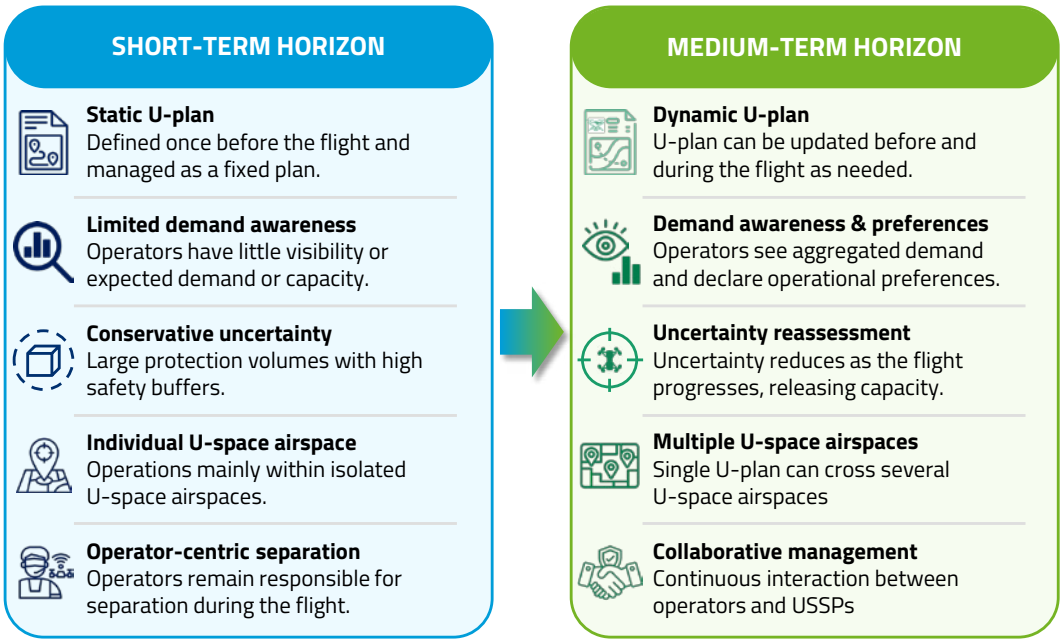
Airspace user operations

In the MTH, airspace user operations become more flexible, collaborative and efficient. Mission planning evolves from the largely static approach of the STH towards continuous interaction between operators and USSPs, allowing U-plans to reflect operational preferences and adapt to changing conditions before and during flight.

Key principles

- **Demand awareness:** Before submitting a U-plan, operators receive aggregated and anonymised information on expected airspace demand, occupancy and congestion.
- **Include user preferences:** U-plans describe both the intended 4D trajectory and the flexibility available for changes to timing, route, altitude or speed.
- **Continuous U-plan feedback:** Operators can monitor the status of accepted U-plans, identify changes from the original request and receive indications of possible future adjustments.
- **Trajectory-based U-plans:** The intended 4D trajectory progressively becomes the primary representation of the operation, supporting advanced deconfliction and convergence with TBO (Trajectory-based operations) and FF-ICE (Flight and Flow Information for a Collaborative Environment).
- **Dynamic uncertainty management:** Uncertainty is reassessed as the flight progresses, releasing capacity and avoiding unnecessary U-plan amendments for small, manageable deviations.
- **More diverse users:** U-space accommodates VCA operations and may provide limited services to manned aviation users. Aircraft must meet the applicable equipage and performance requirements.
- **Cross-airspace operations:** A single U-plan should support a complete flight across multiple U-space airspaces, even if service provision changes or is temporarily suspended.

FIGURE 16. AIRSPACE USER OPERATIONS FROM STH TO MTH



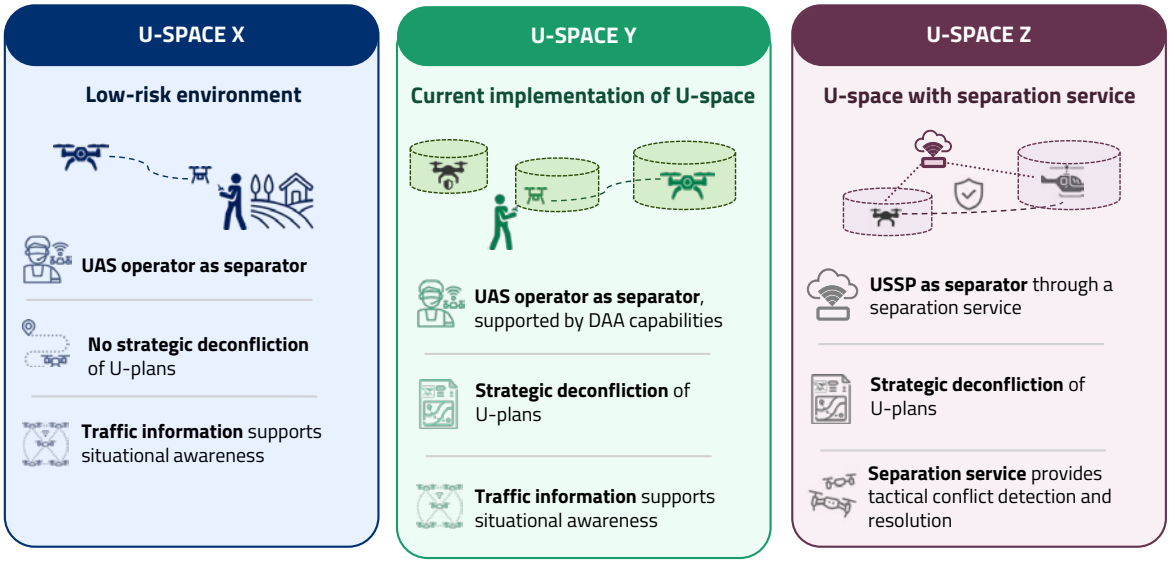
Conflict management

Conflict management is a layered approach to safe flight. The layers are strategic, tactical and finally collision avoidance (e.g. TCAS). In the MTH, conflict management must accommodate higher traffic densities and aircraft with different performance characteristics, including UAS, VCA and some manned aircraft. The conflict mitigation strategy scales with the risk and characteristics of each U-space airspace, combining improved strategic deconfliction with stronger tactical mitigations.

Key principles

- **Improved strategic deconfliction:** More accurate, trajectory-based U-plans and advanced conflict-detection methods support higher traffic densities.
- **Additional strategic measures:** Airspace structures, advanced DCB and in-flight traffic synchronisation help limit interactions and address potential conflicts early.
- **Stronger tactical mitigations:** Depending on the U-space class, separation is performed either by the UAS operator or by USSPs through the separation service.
- **Advanced DAA:** Automated remain well clear functions (which may be supplied from the ground) support operators, while collision avoidance may provide an independent safety net.
- **Enhanced surveillance:** Tracking replaces reliance on reported positions, enabling conflict prediction based on an estimate of current position and motion.
- **Common rules:** Right-of-way or equivalent separation rules are needed to ensure that USSPs and DAA systems determine consistent and interoperable solutions.

FIGURE 17. CONFLICT MANAGEMENT IN THE MTH PER U-SPACE CLASS



Service delivery management

Service delivery management evolves from the management of individual operations towards the coordination of a more complex ecosystem involving multiple USSPs, U-space airspace categories and new participants, including VCA and some manned aircraft. Its purpose is to make this distributed environment operate as a single coherent system from the airspace user's perspective.

Key principles

- **Federated service delivery:** USSPs participating in the same U-space environment share a minimum common data set, including U-plan status, separation-relevant intent and conformance state.
- **Collaborative decision-making:** Each USSP retains decision authority over the flights it has authorised, while coordinating conflicts and separation with the USSPs managing the other operations involved.

Service delivery management coordinates decisions across multiple service providers and stakeholders, while maintaining clear responsibilities for decision-making and execution.

- **Integration of vertiport information:** Vertiport location, operational status and capacity constraints become relevant inputs to airspace decisions.
- **Traceable responsibilities:** The USSP issuing a resolution manoeuvre is accountable for the safety of that instruction, while the operator remains accountable for its execution.
- **Operator as the default interface:** Instructions are normally delivered to the operator, who remains responsible for execution. Direct delivery to the aircraft is an emerging option for specific use cases, such as automated resolution manoeuvres in U-space Z, subject to clarification of liability and certification implications.



Information services and data exchange

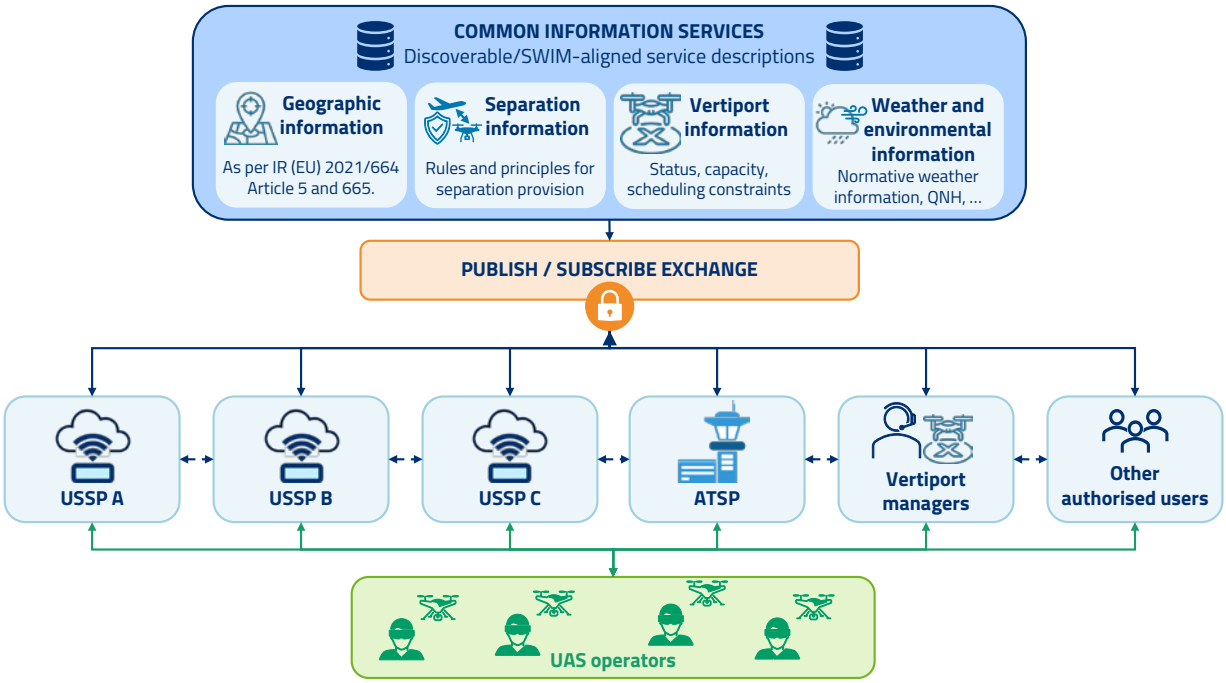
CIS evolves from a largely undifferentiated pool of data into a family of individually described and discoverable information services, aligned with the system-wide information management (SWIM) architecture used in the wider ATM environment. Authorised users can discover and subscribe to the information they need, reducing reliance on bespoke interfaces between individual stakeholders.

This model supports a growing ecosystem of USSPs, CISPs, ATSPs and vertiport managers. Through a publish/subscribe approach, information providers publish each update once and authorised users receive the relevant information without requiring a separate connection for every counterpart.

The main component of Common Information is geographic information: where U-space is active, and what is required to fly there. Additionally, there are elements such as which service providers are certified, information about traffic known to ATC, vertiport information, as well as normative weather and environmental information such as QNH and other reference information.

A common U-space or UTM data model is required to exchange these new information domains through standardised rather than proprietary formats. Information security must also support end-to-end protection, verifiable digital permissions and interoperability with the wider ATM information environment.

FIGURE 18. CIS AND DATA EXCHANGE IN THE MTH





U-space in the long-term horizon

The long-term horizon (LTH) describes the strategic evolution towards an interoperable and increasingly integrated U-space and ATM environment. The distinction between both frameworks progressively dissolves as common digital services support a much wider range of manned and unmanned aircraft operating in shared airspace.

In this time horizon, manned aircraft become regular users of U-space airspace rather than occasional visitors. Advanced U-space services, appropriate aircraft equipage, and harmonised operational rules can reduce some operational restrictions and forms of segregation applied in earlier horizons. UAS and VCA operations may routinely access controlled airspace and aerodromes, while digital services increasingly become common to U-space and ATM.

The LTH does not present a fully mature concept in which every aspect has already been resolved. It combines elements with clear evolutionary directions with fundamental questions that require further research, standardisation, regulation, and operational validation.

The LTH assumes that the U-space and ATM frameworks have reached a level of maturity that enables manned and unmanned traffic to share airspace supported by interoperable digital services. Operations are increasingly managed through negotiated 4D trajectories, information sharing and collaborative decision-making, with automation supporting functions that would be difficult to scale through human intervention alone.

FIGURE 19. LONG-TERM HORIZON IN SUMMARY

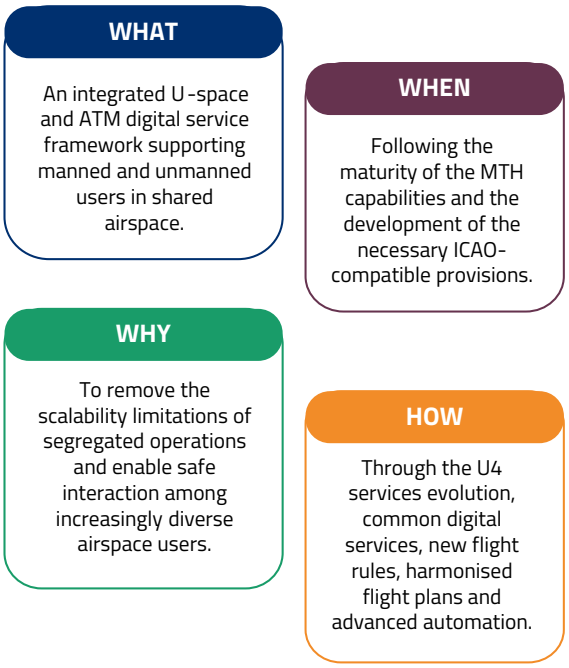


FIGURE 20. LONG-TERM HORIZON ASSUMPTIONS



Towards an integrated U-space and ATM environment

The LTH vision is built around several closely related developments:

- **Shared airspace:** U-space based on permanent segregation does not provide a scalable long-term solution. Airspace organisation instead becomes adaptable and service-oriented, allowing different aircraft types to coexist under harmonised digital flight rules.
- **Common digital services:** U-space and ATM increasingly use the same machine-readable information, trajectory-management and collaborative decision-making capabilities.
- **Flight plan convergence:** The U-plan evolves into a high-precision 4D trajectory and must remain consistent with the ICAO flight plan, enabling flights to transition between operational environments without loss of information.
- **Continuous intent sharing:** Aircraft and ground systems continuously exchange trajectory intent and navigational performance. Traffic synchronisation and conflict management consequently become increasingly continuous and interconnected.
- **Advanced automation:** Human roles evolve towards supervision and exception management, while automated systems manage routine airspace configuration, capacity, trajectory coordination and separation.
- **Integrated operations:** Aerodromes and vertiports become part of a coordinated network, with automated systems supporting facility availability, scheduling, capacity balancing and traffic flows.

FIGURE 21. EVOLUTION OF THE INTEGRATION OF U-SPACE & ATM

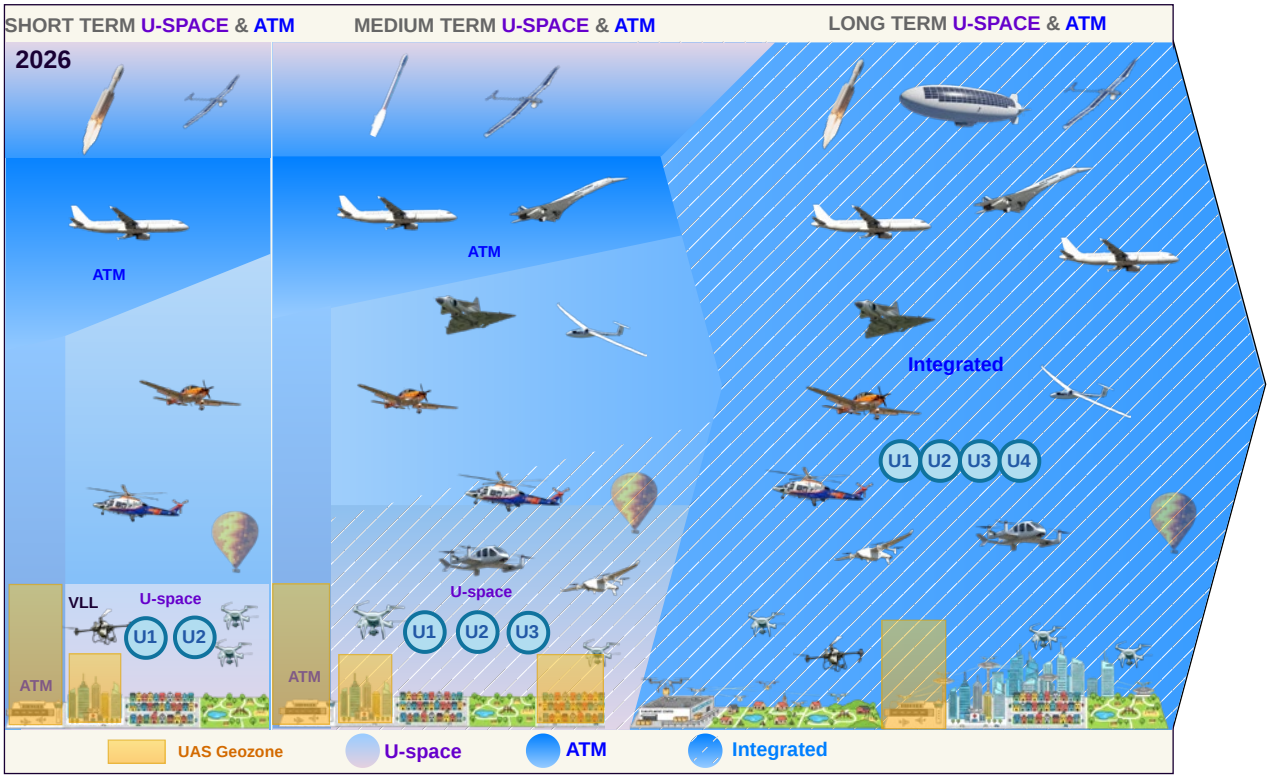
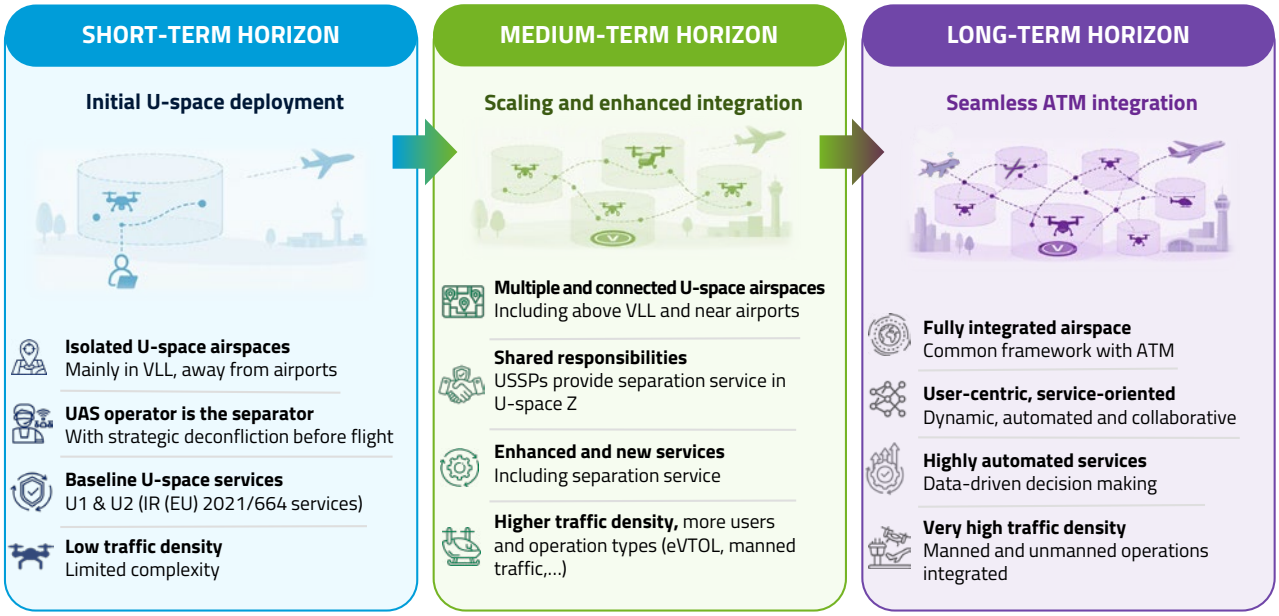


FIGURE 22. U-SPACE EVOLUTION FROM STH TO LTH



Evolution of services

The LTH does not simply add another independent set of U-space services. Instead, U4 services provide the digital bridge through which U-space and ATM capabilities become increasingly compatible and, where appropriate, common to both environments.

Area	Evolution / direction in the LTH
Airspace management	Predictive and real-time configuration of airspace, capacity and responsibilities according to traffic demand.
Aerodrome and vertiport services	Network-level coordination, automated facility management and integration with airspace and trajectory decisions.
Airspace user operations	Scalable fleet-based operations, relying on shared flight intent between U-space and ATM.
Conflict management	Continuous strategic coordination and tactical conflict resolution supported by interoperable services and onboard DAA.
Flight planning	Harmonisation of the U-plan and ICAO flight plan through consistent, high-precision 4D trajectory information.
Service delivery management	Convergence of the separate U-space and ATM decision-making layers into a coordinated function covering all aircraft.
Information services	Progressive convergence of CIS and digital aeronautical information services within an ATM-compatible information environment.



Public acceptance and economic aspects

The successful deployment of U-space depends not only on technical and operational performance, but also on its acceptance by society and its economic sustainability. Large-scale BVLOS operations will only become viable if U-space delivers recognisable benefits, addresses its external impacts and supports sustainable business models.

Public acceptance

Routine, large-scale BVLOS operations require both demand for services provided using UAS and public acceptance of their impacts, particularly regarding **safety, noise, environmental impact, privacy, security and liability**. The CORUS five ConOps therefore treats public acceptance as a dynamic factor that must be monitored and managed throughout the lifecycle of each U-space airspace.

This approach is based on two principles:

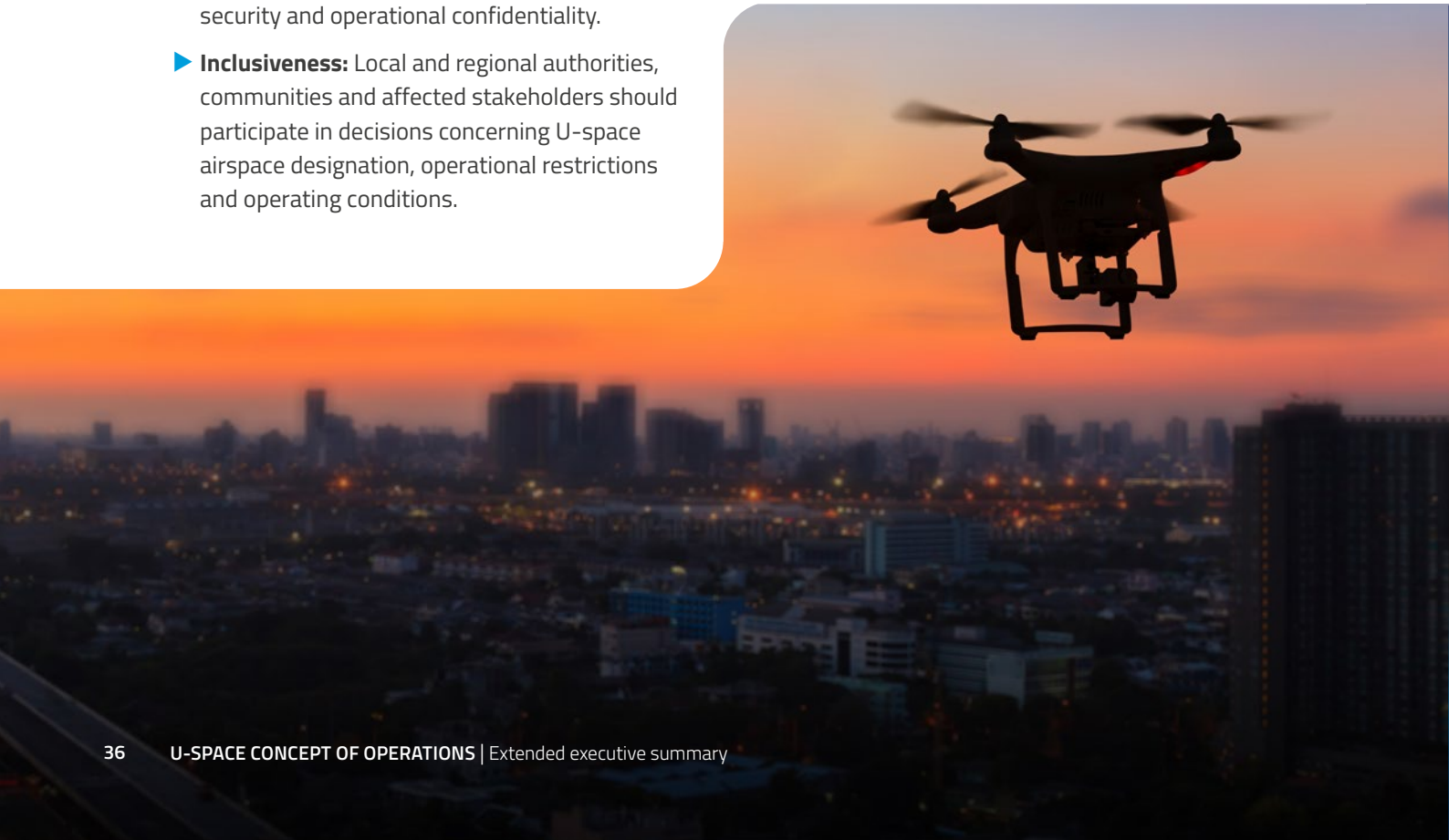
- **Transparency:** Communities should receive timely and understandable information about UAS operations, applicable rules, operational impacts and enforcement, while respecting security and operational confidentiality.
- **Inclusiveness:** Local and regional authorities, communities and affected stakeholders should participate in decisions concerning U-space airspace designation, operational restrictions and operating conditions.

The Societal Readiness Level (SRL) complements technical readiness by assessing how well U-space aligns with societal needs, values and expectations. It should inform the design, implementation, evaluation and scaling of U-space deployments.

A local Governance Board should periodically assess public acceptance using complementary evidence:

Objective evidence	Indicators measuring noise, privacy, visual polution, security, citizen reports and socio-economic benefits
Public perception	Standardised surveys covering mission support, public attitude, policy support, institutional trust and willingness to use services provided by UAS

The results should inform decisions on operational conditions, local constraints and impact mitigations. Over time, the assessment should evolve from monitoring local reactions to integrating societal indicators into the wider ATM performance framework.



Economic aspects

U-space must balance the recovery of service-provision costs with the need to encourage market development. Its economic model differs from traditional ATM: while ATM generally relies on a single service provider and regulated cost recovery, U-space is conceived as a competitive and service-oriented ecosystem involving multiple USSPs.

Initial deployments are unlikely to generate sufficient demand to recover their full costs and may therefore require external or public funding. As traffic volumes grow, the model should progressively move towards greater cost recovery from service users.

The ConOps identifies the following principles:

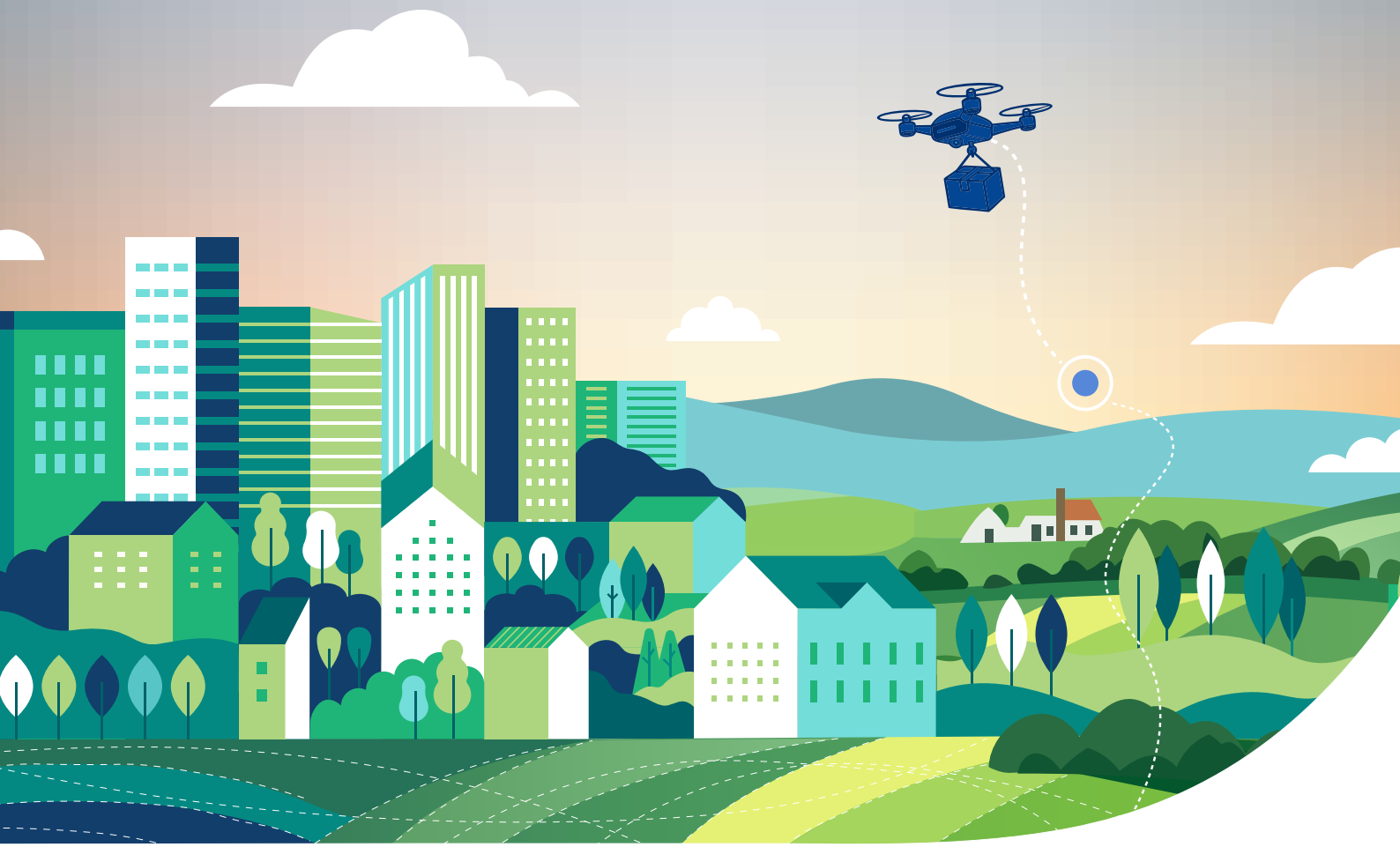
- **End users pay** for the services they consume.
- Fees should not create barriers to U-space access or cost more than the operation they support.
- USSP fees may combine a fixed component with a variable component reflecting the **4D volume occupied by the operation**.

U-space can scale only if communities trust its deployment, operators perceive value in its services, and access remains economically viable and fair.

- Payment must not be used to obtain higher priority during strategic deconfliction.
- U-space and ATM should avoid undue cross-subsidisation, although users receiving services from both environments may contribute to both.
- Urgent flights (life saving, state, military) should receive priority, while access rules and decision-making must remain transparent, simple and consistently enforced.

For more detailed information on the content presented in this document, please refer to the U-space ConOps Ed 5.0.





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