Global UTM Association

Global UTM Ecosystems' Readiness Index 2024 - to enable commercial drone services.

Where can drones commercially fly and be scaled?

Global UTM Association (GUTMA)
UTM Ecosystems' Readiness Task Force

Global UTM Ecosystems' Readiness Index 2024

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All data in this report reflects the situation until December 2024. Version 1.0

GUTMA welcomes any feedback. Potential omissions do not imply the absence of UTM-related initiatives in excluded regions and countries. Stakeholders from these areas are invited to submit updated and verifiable information to ensure future iterations of the index offer a more comprehensive and accurate representation of global UTM ecosystems' readiness. For any corrections or additions, please contact GUTMA at Koen De Vos — GUTMA Secretary General at kdevos@gutma.org and Tomasz Kłosowicz, PwC Drone Powered Solutions — Task Force Leader at tomasz.klosowicz@pwc.com. For full information please refer to the Disclaimers section.

Special thanks to the GUTMA Secretariat's Valentica Bacco, PwC Drone Powered Solutions' Daniel Abadie, Anhelina Kamenska, Mariia Tomilina and Marta Khemich, the Joint European Drone Associations' (JEDA) and Eurocontrol's Andrew Hately, for significant contributions to the development or review process of this report.

TASK FORCE LEADS

Sebastian Babiarz
(GUTMA Co-President)

The Global UTM Ecosystems' Readiness Index 2024 is a landmark document that provides a comprehensive yet concise overview of the global state of UTM and drone service adaptation. Leveraging PwC's robust methodology, the index offers a clear framework for assessing and measuring each nation's readiness and approach to integrating UTM and broader drone services.

I am immensely proud of the GUTMA Task Force's dedicated efforts in delivering this pivotal resource, which empowers nations to chart their development paths with greater clarity and precision. This initiative underscores GUTMA's commitment to advancing the global drone ecosystem, and I am eager to collaborate on the next steps to realize our shared vision for the industry.

Tomasz Kłosowicz
(GUTMA Task Force Leader)

We're thrilled about the value offered by the Global UTM Ecosystems' Readiness Index 2024 in contributing to one of the foundational GUTMA's goals of tracking the UTM development globally and promoting the best practices in order to achieve the commercial and scalable BVLOS drone operations. The work conducted by GUTMA Task Force members — built on PwC Drone Powered Solutions' proven methodology — allowed to assess the 2024 UTM maturity picture in nearly 70 countries, within 7 geographic regions, also showing the importance of UTM dimensions of governance, strategy, as well as business and market tools, in addition to commonly addressed regulatory, operational and technological ones.

GUTMA SECRETARY GENERAL

Koen de Vos
(GUTMA Secretary General)

The Uncrewed Traffic Management (UTM) system represents much more than just the first large-scale Beyond Visual Line of Sight (BVLOS) operations. UTM is a significant milestone in building a strong and resilient digital aviation system. Success, however, depends on clear rules, strategic planning, and measurable results. States cannot afford to miss this crucial first step toward the automation and digitalization of their skies and economies.

This report highlights the progress made by countries worldwide. Its purpose is to share best practices and to guide the adoption of digital technologies in aviation along an even more robust trajectory.

Enjoy your reading!

CONTRIBUTING INDUSTRY EXPERT

Philip Butterworth-Hayes
(Unmanned Airspace)

The Global UTM Ecosystems' Readiness Index 2024 offers a critical consolidation of insights from UTM stakeholders worldwide, providing unparalleled value by drawing directly from primary sources and combining them with top-tier news analysis and research, such as that in The Market for UAV Traffic Management Services 2024-2028 of Unmanned Airspace. This comprehensive approach delivers a clear guide to the frameworks necessary for scaling commercial BVLOS drone operations, making it an essential reference for stakeholders in the evolving uncrewed aviation sector.

TASK FORCE MEMBERS

Airwayz, ARCGine Technologies, CAA Israel, DroneUp, Ericsson, FOCA, Heron Airbridge, High Lander, INVOLI, OneSky Systems, PwC Drone Powered Solutions, Resilienx, R-SYS, SkyGrid, TruWeather Solutions, Unifly

Global UTM Association

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Introduction

Vision

Drones and an Uncrewed Traffic System (UTM) are a clear manifestation of the digital transformation reshaping aviation. Digitalization presents vast opportunities to automate and scale drone operations and offer innovative services. Commercial BVLOS drone operations worldwide depend on robust frameworks that enable authorities and industry to collaborate in unlocking the potential of digital drone technologies.

Globally, countries are developing safe and efficient solutions in regulations, technologies, processes, and tools to support commercial BVLOS drone operations within an Uncrewed Traffic System (UTM) ecosystem. The Global UTM Ecosystems' Readiness Index 2024 measures progress, offering insights into how each country advances in developing its own UTM ecosystem.

This report also aims to highlight best practices in enabling commercial BVLOS drone operations and expanding innovative services to a global audience. By adopting these practices, stakeholders can accelerate progress and fully realize the transformative potential of digital drone technologies in aviation.

Problem Statement

Anecdotal information on the enablement and scaling of commercial BVLOS drone services and UTM implementation is widely circulated, but a precise framework for collecting and analyzing this data is lacking. To address this gap, the GUTMA Task Force developed an assessment methodology, collected data from various stakeholders, and analyzed how commercial BVLOS drone services are being enabled and scaled across regions and countries. The GUTMA Task Force also assessed the global readiness of UTM ecosystems.

Task Force Objectives

Objective 1: Create a methodology and questionnaire to map what countries and stakeholders did at the respective national level to create a low altitude economy[1] on the basis of commercial drone BVLOS operations. The questionnaire looked not only at the UTM technology implementation but also broadly at the other measures that support operations, and thus create a low altitude economy on the basis of commercial BVLOS drone operations. The Objective 1 deliverables were methodology and the following questionnaire.

Objective 2: Reach out to stakeholders and cooperate with partners to receive thorough and detailed replies to the questionnaire from both authorities and industry (e.g. Civil Aviation Authorities — CAAs, Air Navigation Services Providers — ANSPs, government/ministries/departments, UTM service providers, UTM technology providers, end users/clients/citizens, other drone associations, etc.). The Objective 2 deliverables were communications and data gathering activities around the questionnaire of/to/from

[1] The low-altitude economy generally refers to the economic activity of both crewed and uncrewed aerial vehicles below 1,000 metres (3,280 feet), including air mobility of both goods and passengers.

authorities and industry around the world. The stakeholders inputs from the questionnaire replies were additionally supported by the 'Market for UAV Traffic Management Services 2024-2028' of Unmanned Airspace, as well as GUTMA Task Force's own research.

Objective 3: Analyse the results and assess the UTM ecosystems' readiness, with identifying main obstacles to open the commercial drone operations market, and best practices to mitigate around the world. The Objective 3 deliverable is this report.

Methodology

Based on the vision, problem statement and objectives, GUTMA Task Force created a global benchmarking methodology (powered by PwC) consisting of six dimensions contributing to achievement of the mature UTM ecosystem in a country. Maturity parameters (Readiness Index) were proposed for each identified dimension, to score each ecosystem, and ultimately to map the best practices to scale commercial BVLOS drone services around the world.

UTM Ecosystem's Dimensions

DIMENSION:	DESCRIPTION:
1 — Legislation	How developed is the regulatory framework concerning UAS operations or UTM relating to operational, as well as technical, governance and economical aspects?
2 — Governance	How diverse is the collaboration between public and private stakeholders in decision-making processes related to the UTM ecosystem (such as structure, roles, financing, etc.)?
3 — Strategy	Do the stakeholders have clear visions, objectives and approaches, supported by a detailed strategic document, to develop the UTM ecosystem?
4 — Operations	How are the operational methods designed to enable and sustain the commercial and scalable BVLOS drone services within the UTM ecosystem?
5 — Technology	What operational UTM tools, representing different levels of UTM services, have been implemented to enable and sustain commercial and scalable BVLOS drone services within the UTM ecosystem?
6 — Business and Market	What is the maturity of stakeholders' economic understanding of the low-altitude economy enabled by commercial and scalable BVLOS drone services within the UTM ecosystem?

UTM Ecosystem's Readiness Index (simplified summary)

For a full description of the UTM Ecosystems' Readiness Index, please refer to Annex 1.

Dimension/ Index	1. Nascent	2. Emerging	3. Developed	4. Advanced	5. Mature
1 — Legislation	No basic UAS operations regulations.	Basic UAS operations regulations covering foundational aspects.	Nationally implemented UAS operations regulations; initial UTM framework released.	Advanced UTM regulations for commercial BVLOS operations.	Fully implemented UTM regulations aligned with international standards.
2 — Governance	No public-private UAS operations/ UTM collaboration.	UAS operations/ UTM led by public sector with limited private sector involvement.	Active public-private collaboration on UAS operations/ UTM decision making.	UTM governance structures defined and partially implemented.	UTM governance structures implemented with smooth collaboration between public-private stakeholders.
3 — Strategy	No overarching strategic vision.	Organisational-level UAS operations/ UTM strategies.	UAS operations/ UTM national strategies supported by roadmaps.	UTM strategies pre-defined and aligned with aviation goals like the Advanced Air Mobility.	UTM strategies implemented and aligned with aviation and digitalisation goals.
4 — Operations	No airspace structures segregation for UAS operations.	Traditional airspace structures segregation for UAS operations.	Implemented UAS operations airspace structures	Segregated UTM airspace.	Seamless ATM/UTM airspaces integration.

			(e.g. geozones).		
5 — Technology	No UAS operations/ UTM tools or systems.	UAS operations foundational tool (e.g. geo-awareness website/mobile app).	Basic UTM system with foundational services (e.g. flight authorisation)	Advanced UTM system with advanced services (e.g. dynamic airspace management).	Seamless ATM/UTM systems integration.
6 — Business and Market	No use of economic tools for low altitude economy.	Initial market analysis identifies demand.	High-level value chain mapping identifies services and costs/revenues.	End-level pricing strategy identifies services/ value.	Complete business plan ensures growth.

Executive Summary

The **Global UTM Ecosystems' Readiness Index 2024** outlines each country's **UTM ecosystem readiness** levels and showcases **best practices for enabling commercial and scalable BVLOS drone services** to assist stakeholders globally.

The report addresses the GUTMA Task Force vision on the enablement of commercial and scalable advanced drone operations and UTM implementation across the globe, the current problem, which lays in the absence of precise framework to gather and analyse the publicly available data, and other defined Task Force objectives.

Based on the above vision, problem statement and objectives, GUTMA Task Force created a **global benchmarking methodology** (powered by PwC) consisting of six dimensions: **legislation, governance, strategy, operations, technology, and business & market**, contributing to achievement of the mature UTM ecosystem in a country.

Maturity parameters (Readiness Index) were proposed for each identified dimension to score each country's ecosystem, and ultimately to map the best practices to scale commercial BVLOS drone services around the world.

The report presents the **key findings for each country** grouped by region: Africa, Asia, Australia & Oceania, Europe, Middle East, North and South America. Each country is assessed against six UTM ecosystem`s dimensions and what is its level of maturity.

The Global UTM Ecosystems' Readiness Index **identified global and regional leaders demonstrating the examples of dimension`s best practices** and **highlighted the key dimensions requiring improvement for a harmonised UTM ecosystem**.

In **legislation**, the European Union leads with its U-Space Regulations (2021/664-666), which establish a regulatory framework to enable commercial and scalable BVLOS drone operations. In **governance**, Japan exemplifies a developed culture of cooperation among public and private stakeholders, fostering collaboration for UTM adoption. Switzerland further showcases effective governance through its SUSI (Swiss U-Space Implementation) initiative.

For **strategy**, Belgium serves as an exemplary leader, with the ANSP's Skeyes and its affiliate SkeyDrone launching a comprehensive strategy integrating drone operations, data analytics, and protection systems, setting a proactive foundation for UTM development. However, many regions lack updated strategic documents addressing UTM implementation and the low-altitude economy. In **operations**, the United States has set a benchmark, deploying commercial and scalable BVLOS drone services through companies like Zipline, Wing, DroneUp, and MANNA together with ANRA in the Dallas - Fort Worth area, leveraging UTM technology for safe drone-to-drone and airspace interactions.

The **technology** dimension remains underdeveloped, with most countries relying on basic airspace management tools and limited advanced UTM implementations. Lastly, in **business and market development**, Australia serves as an example of detailed market-sizing efforts, forming the basis for pricing strategies and financing models for UTM development. ANSP Airservices Australia's work exemplifies how strategic alignment can foster greater economic understanding of the low-altitude economy, and thus commercial and scalable BVLOS drone services.

The work conducted by the GUTMA Task Force, **underlines the key areas that must be addressed to advance UTM ecosystems globally**, focusing first on the need for **BVLOS-**

oriented regulations. Governments should create harmonized frameworks with clear roles, responsibilities and standards tailored for advanced drone operations. This requires commercial understanding and the ability to manage multi-stakeholder environments.

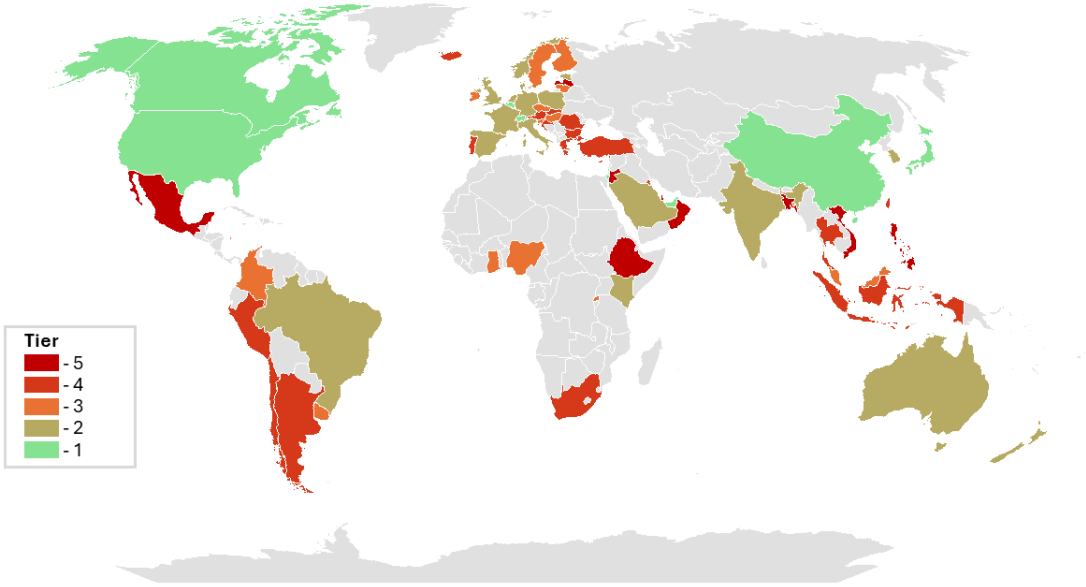
Secondly, there is a **need for greater private-sector engagement** to ensure effective collaboration between public agencies and private innovators. Public-private partnerships are crucial for unlocking UTM potential, aligning on governance, funding, and execution.

Thirdly, **new or updated strategies at national and organizational levels are critical**, as many regions lack plans incorporating the latest UTM technologies and market trends. Strategies should address market entry, scalability, and cooperation to remain relevant.

Furthermore, operational and technological solutions for BVLOS services are vital. **Advanced UTM systems with dynamic airspace management are needed for safe and scalable operations**. **Business tools like market-sizing methodologies and value chain analyses are essential to establish a low-altitude economy foundation understanding**, enabling stakeholders to evaluate opportunities and drive growth.

Addressing these areas requires insights, planning, and stakeholder alignment to create resilient UTM ecosystems that balance safety, commercial interests, technological innovation, and sustainable growth for long-term success.

The map below provides an overview of the global ranking based on the UTM ecosystem`s dimensions and their level of maturity. The countries are divided into five tiers, where 1 means that the country is quite mature in all dimensions, while 5 means nascent state of commercial and scalable BVLOS drone services and UTM implementation.



Key Findings

Africa

Ethiopia

ETHIOPIA		SCORE 10/30
1 – Legislation (3/5) Ethiopia has established a general regulatory framework for UAS operations and UTM. The Ethiopian Civil Aviation Authority introduced Part 22 — Remotely Piloted Aircraft Systems (RPAS) of Civil Aviation rules and standards, which include provisions for BVLOS operations. These regulations were initially established in March 2022 and were last amended in April 2023.	**2 – Governance (2/5)** In Ethiopia, discussions and implementations regarding UAS operations and UTM governance have primarily been public, involving collaborations between government entities such as the Ethiopian Civil Aviation Authority (ECAA), the Air Navigation Services Directorate, and the Ministry of Transport and Logistics. Notably, one such collaboration occurred between the ECAA and the Information Network Security Agency (INSA), focusing on the import, operation, and production of drones in Ethiopia.	**3 – Strategy (1/5)** There is a lack of information regarding the definition of UAS operations and UTM strategies at the level of individual stakeholders in Ethiopia, such as the Ethiopian Civil Aviation Authority (ECAA), the Air Navigation Services Directorate, the Ministry of Transport and Logistics, and the Information Network Security Agency (INSA). This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Ethiopia may not be widely accessible or fully developed.
4 – Operations (2/5) In Ethiopia, traditional airspace structure segregations have been established to manage UAS operations.	**5 – Technology (1/5)** There is a lack of information on the existing technology implemented for UAS operations and UTM by organizations such as the Ethiopian Civil Aviation Authority (ECAA) and the Air Navigation Services Directorate.	**6 — Business and Market (1/5)** There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations

		such as the Ethiopian Civil Aviation Authority (CAA), the Air Navigation Services Directorate, and the Ministry of Transport and Logistics.

Ghana

	GHANA	SCORE **14/30**
1 – Legislation (3/5) Ghana has established a general regulatory framework for UAS operations and UTM. The Ghana Civil Aviation Authority released the 'Ghana Civil Aviation (Remotely Piloted Aircraft Systems) Directives, 2018,' Part 28, which covers UAS operations and addresses the specific aspects of BVLOS operations.	**2 – Governance (3/5)** In Ghana, there have been active public-private discussions and implementations concerning UAS operations and UTM governance. These involve public stakeholders, including local governments, alongside active participation from the private market. For example, the Ghana Civil Aviation Authority (GCAA) has been actively engaging with private sector stakeholders, such as Zipline, to deploy drones for healthcare delivery and to explore other use cases for UAS delivery.	**3 – Strategy (2/5)** In 2024, the Ghana Civil Aviation Authority (GCAA) released a draft edition of the "Unmanned Aircraft Systems Traffic Management (UTM) A Common Framework with Core Principles for National Harmonization."
4 – Operations (4/5) In Ghana, traditional airspace structure segregation has been established for UAS operations. Despite this, regular BVLOS operations are conducted, with services provided by companies such as Zipline.	**5 – Technology (1/5)** There has been no technology implemented regarding UAS operations and UTM by the Ghana Civil Aviation Authority (GCAA) or the Ministry of Transport.	**6 — Business and Market (1/5)** There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations such as the Ghana Civil

		Aviation Authority (GCAA) and the Ministry of Transport.

Kenya

KENYA		SCORE 17/30
1 – Legislation (3/5) Kenya has established a general regulatory framework for UAS operations and UTM. In 2020, the Kenya Civil Aviation Authority (KCAA) released Legal Notice No. 42 under the Civil Aviation Act, titled 'The Civil Aviation (Unmanned Aircraft Systems) Regulations.' This framework covers Beyond Visual Line of Sight (BVLOS) operations within category C, detailing the necessary approvals via a digital process such as a Certificate of Airworthiness and valid licenses for personnel to conduct these operations.	**2 – Governance (3/5)** In Kenya, there have been active discussions and implementations concerning UAS operations and UTM governance, primarily among public stakeholders like the Kenya Association of Air Operators. The Kenya Civil Aviation Authority (KCAA) governs most aspects of UAS operations. Additionally, the Elevate Africa UAS Summit 2024, organized by Kenya Flying Labs in partnership with KONZA Technopolis and KCAA, brought together international participants from various sectors to further discuss and advance these topics.	**3 – Strategy (3/5)** Kenya has defined a UAS operations and UTM strategy at the national level. The Kenya Civil Aviation Authority (KCAA) has released a 'National Drones Strategy,' which provides a clear roadmap for integrating drone technology across various sectors. This strategy places particular emphasis on supporting drone startups and research initiatives.
4 – Operations (4/5) In Kenya, traditional airspace structure segregation has been established for UAS operations. Despite this, regular BVLOS operations are conducted, with services provided by companies such as Zipline.	**5 – Technology (3/5)** The Kenya Civil Aviation Authority (KCAA) has implemented a basic UTM system through a website known as the RPAS Operations Management System (ROMS Version 2.0.0). This desktop application facilitates drone operator registration, digital drone flight planning, and approvals.	**6 — Business and Market (1/5)** There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations such as the Kenya Civil Aviation Authority (KCAA)

		and the Ministry of Roads and Transport.

Nigeria

NIGERIA		SCORE 15/30
1 – Legislation (3/5) Nigeria has established a general regulatory framework for UAS operations and UTM, which is implemented by the Nigerian Civil Aviation Authority (NCAA). In 2023, the NCAA released 'Part 21 — Remotely Piloted Aircraft Systems (RPAS) Regulations,' outlining the approvals required for Beyond Visual Line of Sight (BVLOS) operations.	**3 – Governance (3/5)** In Nigeria, discussions and implementations regarding UAS operations and UTM governance have been predominantly public. A key public initiative is the Nigeria Unmanned Systems and Robotics Association (NUSA), established by the Nigerian Civil Aviation Authority (NCAA). This association aims to shape national policy and rule-making around uncrewed systems, particularly UAS, and includes individuals and interest groups from government, the military, industry, and academia.	**3 – Strategy (2/5)** In 2019, the Nigerian Civil Aviation Authority (NCAA) issued the "Unmanned Aircraft System Operations in Nigeria's Airspace — Guidance" document. This provided details on the regulatory framework, operational guidelines, and requirements for UAS operations in Nigeria. However, there is a lack of information regarding updated UAS/UTM strategies from key organizations such as the NCAA and the Nigerian Airspace Management Agency (NAMA).
4 – Operations (4/5) In Nigeria, a traditional airspace structure segregation has been established for UAS operations. Despite this structure, regular BVLOS operations are conducted, with services provided by companies such as Zipline, Aerial Robotix, and Arco Worldwide, which have collectively accumulated more than 7,000 hours of BVLOS operations.	**5 – Technology (2/5)** In Nigeria, a UAS operations tool in the form of a mobile application has been implemented to provide foundational UTM services, including airspace geo-awareness. IRIS UxS is a situational awareness application, developed by Kongsberg Geospatial, UTM technology provider. The initiative is supervised by the Nigerian Civil Aviation Authority (NCAA) to facilitate the conduct of	**6 — Business and Market (1/5)** There is a lack of information on the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations like the Nigerian Civil Aviation Authority (NCAA) and the Nigerian Airspace Management Agency (NAMA).

	long-range BVLOS operations. Additionally, the NCAA has established a UAS integration unit, which serves as a hub for the registration, licensing, and monitoring of UAS.	

Rwanda

	RWANDA	SCORE **15/30**
1 – Legislation (3/5) Rwanda has established a general regulatory framework for UAS operations and UTM. The Rwanda Civil Aviation Authority released 'Part 27: Unmanned Aircraft Systems' as part of the 'Rwanda Civil Aviation Regulations.' This framework provides detailed coverage of BVLOS operations in section 27.105, which includes numerous subparts.	**2 – Governance (3/5)** In Rwanda, there have been active public-private discussions and implementations regarding UAS operations and UTM governance, involving public stakeholders such as local governments alongside active participation from the private market. The country is in the process of developing a Drone Operation Centre (DOC), which is expected to be completed by 2026. This initiative is led by the Ministry of Information, Communication and Technology (ICT) and Innovation, with significant interest from various stakeholders (FARADA, METEO-Rwanda, ADDA UNICEF, Auterion Limited, ENI, FlyPyka Softbank, Mira Aeronautics) and a partnership with Thales, UTM technology provider to support the DOC.	**3 – Strategy (1/5)** There is a lack of information regarding the definition of UAS operations and UTM strategies at the level of individual stakeholders in Rwanda, such as the Rwanda Civil Aviation Authority, the Ministry of Information, Communication and Technology (ICT) and Innovation, the Rwanda Information Society Authority (RISA), and the Ministry of Infrastructure. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Rwanda may not be widely accessible or fully developed, despite the plans announced by the Ministry of Information, Communication and Technology (ICT) at the “Unlocking Opportunities:

		Advancing Rwanda's Drone Ecosystem" in 2023.
4 – Operations (4/5) In Rwanda, traditional airspace structure segregation has been put in place for UAS operations. Despite this, regular BVLOS operations are carried out, with services provided by companies such as Zipline.	**5 – Technology (3/5)** The Rwanda Civil Aviation Authority and Rwanda Airports Company (RAC) has implemented a basic UTM system through a cooperation with Innov'ATM solution known as the DronePortal/U-SpaceKeeper. This desktop application facilitates drone operator registration, digital drone flight requests, and approvals, as well as detection and monitoring of collaborative UAS and non-collaborative UAS in the Kigali airport.	**6 — Business and Market (1/5)** There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations such as the Rwanda Civil Aviation Authority, the Ministry of Information Communication Technology (ICT) and Innovation, the Rwanda Information Society Authority (RISA), and the Ministry of Infrastructure.

South Africa

	**SOUTH AFRICA**	SCORE **13/30**
1 – Legislation (3/5) South Africa has a general regulatory framework for UAS and UTM, implemented by the South African Civil Aviation Authority (SACAA), which includes provisions for commercial operations. This framework is outlined in the Civil Aviation Regulations and governs both Visual Line of Sight (VLOS) and Beyond Visual Line of Sight (BVLOS) operations. For BVLOS operations, approval must	**2 – Governance (2/5)** In South Africa, there have predominantly been public discussions and implementations concerning UAS operations and UTM governance. A significant development in this domain is the establishment of a national-level Flying Lab South Africa hub, which was created in 2021 during the South Africa Drone and Unmanned Aviation Conference. The hub's primary aim is to accelerate	**3 – Strategy (2/5)** South Africa has defined a strategy for UAS operations and UTM at the organizational (country) level. The South African Air Navigation Service Provider, Air Traffic Navigation Services (ATNS), presented a foundational Concept of Operations (ConOps) for its UTM system during a webinar titled 'Harmonising manned

be obtained from the SACAA. The South African Minister of Transport has signed the 8th amendment to the Civil Aviation Regulations 2011, which introduces Part 101: Remotely Piloted Aircraft Systems. Under Regulation 101.05.11, BVLOS operations are covered, although the information available is very limited.	the development of a regulatory framework and to expand the use of drones, particularly focusing on drones for good initiatives. Additionally, private initiatives are also contributing to the landscape, such as the partnership between Altitude Angel, a UTM technology company, and iOCO, South Africa's largest ICT solutions provider, with the goal of making BVLOS flights an everyday occurrence.	and unmanned aviation in a disrupted airspace.'
4 – Operations (3/5) In South Africa, drone geozones are incorporated into the UAS operations tool available on the website of the Private Drone Association of South Africa.	**5 – Technology (2/5)** The Private Drone Association of South Africa has implemented a UAS operations tool on their website, which provides airspace geo-awareness. This tool offers information on airspace restrictions and drone geozones.	**6 — Business and Market (1/5)** There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations such as the Air Traffic Navigation Services (ATNS), the South African Civil Aviation Authority (SACAA), and the South African Department of Transport (DoT).

Asia

Bangladesh

BANGLADESH	SCORE 9/30

1 – Legislation (3/5) In Bangladesh, the Civil Aviation Authority of Bangladesh (CAAB) has released a general regulatory framework, which facilitates limited commercial drone operations and services. This framework is established through the initial set of updated standards in the 'Air Navigation Order' (ANO) on CAAB Part 947 and Part 945. These regulations, which were further updated in 2021, cover UAS operations and include provisions for Beyond Visual Line of Sight (BVLOS) operations.	**2 – Governance (1/5)** There is a lack of information regarding collaboration between public and private stakeholders in the decision-making processes related to the UTM ecosystem in Bangladesh. This includes key organizations such as the Civil Aviation Authority of Bangladesh (CAAB) and the Ministry of Civil Aviation and Tourism, indicating that details about their interactions and joint efforts in developing UTM frameworks are not well-documented or publicly available.	**3 – Strategy (1/5)** There is a lack of information regarding the definition of UAS operations and UTM strategies at the level of individual stakeholders in Bangladesh, such as the Civil Aviation Authority of Bangladesh (CAAB) and the Ministry of Civil Aviation and Tourism. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Bangladesh may not be widely accessible or fully developed.
4 – Operations (2/5) In Bangladesh, traditional airspace structure segregations have been established for UAS operations. With the approval of the new legislation, the airspace will be divided into three distinct zones: green, yellow, and red zones. These zones are designed to regulate drone activities by specifying where operations are permitted, restricted, or prohibited, thereby enhancing the	**5 – Technology (1/5)** There is a lack of information regarding the existing technology implemented for UAS operations and UTM by the Civil Aviation Authority of Bangladesh (CAAB). This indicates that details about the technological infrastructure and systems supporting UAS and UTM in Bangladesh are not widely available or may still be under development.	**6 — Business and Market (1/5)** There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations in Bangladesh, such as the Civil Aviation Authority of Bangladesh (CAAB) and the Ministry of Civil Aviation and Tourism. This suggests that comprehensive data

safety and security of airspace management.		and strategic plans related to the drone industry and UTM are not readily accessible or may not yet be fully developed.

China

	CHINA	SCORE 22/30
1 – Legislation (3/5) China has adopted a more general regulatory framework that includes UTM regulations covering BVLOS drone operations and services, supported by a comprehensive set of standards. In the past the 'Interim Regulations on the Flight Management of Unmanned Aircrafts' national decree no. 761 and currently 'CCAR-92' which was developed by the Civil Aviation Administration of China (CAAC) and issued by the Ministry of Transport.	**2 – Governance (4/5)** In China, there have been advanced public-private discussions and implementations regarding UAS operations and UTM governance, involving public stakeholders, including local governments, and active participation from the private market. A key initiative is the USS expert group known as the Special Working Group on the Provision of Unmanned Aircraft Services, established by the Civil Aviation Administration of China (CAAC). This group comprises public and private stakeholders, including 12 member units and 5 observer units, representing ANSPs, operators, manufacturers, universities, scientific research entities, and the CAAC itself. It is responsible for analysis, research, and the construction of regulations and systems related to UAS operations. The Civil Aviation Administration of China (CAAC) also aims to	**3 – Strategy (4/5)** In China, there have been discussions between public and private stakeholders regarding UTM strategy aspects, focusing on industries such as the economy, society, environment, and security, and their needs with correlated services like Advanced Air Mobility and Counter-UAS. In 2022, the Civil Aviation Administration of China (CAAC) released the 'Civil Unmanned Aerial Vehicle Development Roadmap V1.0' as a draft for comments from stakeholders. This document provides guidance on civil aviation efforts, emphasizing the development of an innovative, coordinated, green, and open smart civil aviation era. It describes the 'seamless integration' of uncrewed aviation into the national airspace system and outlines plans for achieving this integration over the next five years.

	develop the Chinese AAM industry by focusing on autonomous flight operations for AAM from the early beginning. Additionally, local governments try to incorporate new initiatives and establish strategic partnerships to support AAM ecosystem.	
4 – Operations (4/5) The Civil Aviation Administration of China (CAAC) has implemented drone airspace structures for UAS operations. In accordance with the Basic Flight Rules of the People's Republic of China, the airspace is divided into seven categories: A, B, C, D, E, G, and W. Each zone has distinct service contents and requirements tailored to accommodate different types of UAS operations within the national airspace system.	**5 – Technology (4/5)** The Civil Aviation Administration of China (CAAC) has implemented an advanced UTM system that provides basic UTM services, including static and dynamic geofencing, flight plan approval, traffic capacity and flow management, and a flight surveillance and warning system. This system is a result of the Civil UAS Aviation Operation Management System (UOMS). Both Network and Broadcast Remote Identification has been adopted by CAAC as a mandatory capability for all UAS that weights above 4kg after June 1st, 2024. Thanks to the well coverage of cellular network in China, the network identification is able to provide a good enough dynamic monitoring of all the civilian UAS flights across the country. On the other hand, Broadcast RID receiver has been selected by USS at municipal level as the	**6 — Business and Market (3/5)** There has been a UTM high-level value chain mapping in China. A report under China's Ministry of Industry and Information Technology has depicted the low altitude economy, focusing on the civilian drone sector and eVTOLs.

	means to provides coverage for real-time traffic surveillance.	

India

	INDIA	SCORE **18/30**
1 – Legislation (3/5) In India, the Ministry of Civil Aviation has released a general regulatory framework to facilitate limited commercial drone operations and services, established through an initial set of standards. In 2021, the Ministry introduced the 'Drone Rules,' which have undergone two amendments in subsequent years. This legislation covers various aspects of UAS operations, including registration and classification. The regulation covers the 'Unmanned Aircraft System Traffic Management'. The Ministry of Civil Aviation issues waivers to conduct BVLOS drone flights. In 2021, 20 entities granted permission from the Ministry.	**2 – Governance (3/5)** In India, discussions and implementations related to UAS operations and UTM governance have primarily been public, involving the Ministry of Civil Aviation and the Directorate General of Civil Aviation (DGCA). While there are mentions in policy documents that the UTM ecosystem will be collaborative, the authorities have expressed openness to receiving "implementable insights" from stakeholders to enhance the framework and ensure effective integration of UAS operations. In 2021, Directorate General of Civil Aviation (DGCA) and EASA signed letters of intent for a collaboration to establish new regulations for UAS and UTM in India. Also, the Federation of Indian Chambers of Commerce and Industry (FICCI) has a dedicated Committee on Drones. This Committee has been engaged in the public consultations along with the drone OEMs and industry end-users of the	**3 – Strategy (3/5)** There has been a definition of UAS operations and/or UTM strategy at national (country) level. The Ministry of Civil Aviation has released the 'National Unmanned Aircraft System Traffic Management (UTM) Policy Framework,' which depicts plans for an active UTM collaboration between UTM stakeholders and public authorities on UTM services, providers, etc. Also, the vision of India becoming a global drone hub by 2030 was established by Indian`s government in the face of its Prime Minister and supported by the Ministry of Civil Aviation. To promote drone industry such initiative as the Production-Linked Incentive (PLI) scheme for droned and drone components, "Drone Shakti" by brining industry, academia and startups together, and drone festival, Bharat Drone Mahotsav. Moreover, the World Economic Forum,

	draft UAS Rules 2020. Also, this Committee works on various aspects such as policy advocacy, industry collaboration, and promoting the responsible use of drones across different sectors. Thales and Garuda Aerospace signed MoU to accelerate India's drone development, production, and deployment capabilities.	published "The Skyways to the Future: Operational Concepts for Advanced Air Mobility in India" report which explores how AAM can reshape India's urban and regional transport landscape.
4 – Operations (3/5) In India, drone airspace structures have been implemented to manage UAS operations, supported by the DigitalSky application. This system incorporates dynamic, interactive zones ranging from green to red. It facilitates real-time permissions for flying in yellow and green zones and tracks drone activities. For operations in high-risk zones, prior permissions are required, and compliance with the No Permission, No Takeoff (NPNT) protocol is mandatory to ensure safety and regulatory adherence. There are BVLOS operations performed by Skye Air in partnership with BlueDart followed by Dunzo and Flipkart, Zipline, and others.	**5 – Technology (3/5)** In India, the DigitalSky platform includes a UAS operations tool in the form of a mobile application that provides foundational UTM services such as airspace flight authorization. The Directorate General of Civil Aviation (DGCA) advises users to manually check flight zones before conducting a flight to ensure compliance with airspace regulations and safety protocols.	**6 — Business and Market (3/5)** In India, a market size and value chain analysis of the UAS operations have been conducted, identifying significant demand potential. In August 2022, the Federation of Indian Chambers of Commerce and Industry (FICCI) released the report "Making India the drone hub of the world," where they analysed the Indian`s market potential around drone sector until 2030, manufacturing of drones and its value chain, and advised the action points for demand creation, manufacturing facilitation, investment attraction, export, etc.

Indonesia

INDONESIA	SCORE 11/30

1 – Legislation (2/5)

In Indonesia, a general legal framework has been implemented to support limited commercial drone operations and services, guided by an initial set of standards. The 'Civil Aviation Safety Regulations — CSAR 107 — Small Unmanned Aircraft Systems' was released by the Republic of Indonesia Ministry of Transportation. This document outlines operating rules, certification, registration, and identification requirements for drone operations. While it establishes a foundational regulatory framework, it does not specifically address UTM and BVLOS operations in detail.

2 – Governance (3/5)

In Indonesia, there have been active public-private discussions and implementations concerning UAS operations and UTM governance. These discussions involve key stakeholders such as the Directorate General of Civil Aviation (DGCA), ANSP AirNav Indonesia, and the Ministry of Transportation. For example, a notable discussion on the management of drone operations in Indonesia was led by the Directorate General of Civil Aviation, AirNav Indonesia, the Agency for Technology Assessment and Application (BPPT), and the Indonesian Drone Pilot Association.

3 – Strategy (1/5)

There is a lack of information regarding the definition of UAS operations and UTM strategies at the level of individual stakeholders in Indonesia, such as the Directorate General of Civil Aviation (DGCA), ANSP AirNav Indonesia, and the Ministry of Transportation. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Indonesia may not be widely accessible or fully developed.

4 – Operations (3/5)

In Indonesia, drone airspace structures have been implemented to facilitate UAS operations. These structures are designed to manage and regulate the use of airspace for drones, ensuring safe and efficient integration with other airspace users.

5 – Technology (1/5)

There has been no existing technology implemented for UAS operations and UTM by the Directorate General of Civil Aviation (DGCA), ANSP AirNav Indonesia, and the Ministry of Transportation in Indonesia. However, the DGCA is currently in the development stage of a UTM system, which is being implemented by Terra Drone. This initiative is financed by the Ministry

6 — Business and Market (1/5)

There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations in Indonesia, such as the Directorate General of Civil Aviation (DGCA), ANSP AirNav Indonesia, the Ministry of Transportation, and the Ministry of

	of Economy, Trade and Industry.	Economy, Trade and Industry.

Japan

JAPAN	SCORE 20/30

1 – Legislation (4/5)	2 – Governance (4/5)	3 – Strategy (4/5)
Japan has adopted a more general regulatory framework that includes regulations covering BVLOS drone operations and services, supported by a comprehensive set of standards. The Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT), through its Japan Civil Aviation Bureau (JCAB), has eased regulations to permit Level 4 operations. These changes, part of the amendments to the 'Civil Aeronautics Act' effective from December 2022, allow automated drone flights over residential and urban areas where the operator does not have direct sight of the drone.	In Japan, there have been advanced public-private discussions and implementations concerning UAS operations and UTM governance. These involve public stakeholders, including local governments, along with active participation from the private market. A notable initiative is the public-private committee for Advanced Air Mobility (ReAMo), established by the Japan Civil Aviation Bureau (JCAB) and the Ministry of Economy, Trade and Industry (METI). This committee includes stakeholders from both the public and private sectors, such as PwC, Zipline, AIRBUS HELICOPTERS JAPAN, Joby Aviation, and Volocopter GmbH.	In Japan, discussions between public and private stakeholders have taken place regarding UTM strategy aspects, focusing on industries such as the economy, society, environment, and security, and their needs with correlated services like Advanced Air Mobility (AAM) and Counter-UAS. The public-private AAM committee, established by the Ministry of Economy, Trade and Industry (METI) and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), has released an AAM roadmap. This roadmap outlines the utilization, environmental considerations, and technology development related to AAM, with a vision extending up until 2030 and beyond.
4 – Operations (3/5)	**5 – Technology (3/5)**	**6 — Business and Market (2/5)**
In Japan, drone airspace structures have been implemented to facilitate UAS operations. The country also plans to unveil commercial Advanced Air Mobility (AAM) services at an Expo in 2025,	The Japan Civil Aviation Bureau (JCAB) has implemented a basic UTM system known as the "Flight Information Management System" (FIMS). This system provides essential UTM	There is limited information available on the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and

showcasing its advancements in integrating these technologies into its airspace infrastructure.	services, including airspace management, real-time tracking, and communication protocols to support both commercial and recreational drone activities, as well as flight authorization.	business plan from organizations such as the Japan Civil Aviation Bureau (JCAB), the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), and the Ministry of Economy, Trade and Industry (METI). However, in 2016, the EU-Japan Centre for Industrial Cooperation released a report on the drone market in Japan, providing some insights into the sector.

Malaysia

MALAYSIA		SCORE 15/30
1 – Legislation (3/5)	**2 – Governance (2/5)**	**3 – Strategy (3/5)**
In Malaysia, the Civil Aviation Authority of Malaysia (CAAM) has established a general regulatory framework that supports limited commercial drone operations and services. This framework is outlined in the Civil Aviation Regulation 2016 (CAR 2016), specifically in Regulations 140-144. While the regulations provide an initial set of standards, there are waivers available for BVLOS operations. However, detailed information on BVLOS operations remains limited, indicating that this area may still be in the development phase or not fully documented.	In Malaysia, discussions and implementations related to UAS operations and UTM governance have primarily involved public stakeholders. Key organizations participating in these efforts include the Civil Aviation Authority of Malaysia (CAAM), the Standards and Industrial Research Institute of Malaysia (SIRIM), the Malaysian Communications and Multimedia Commission (MCMC), the Department of Survey and Mapping Malaysia (JUPEM), and the Chief Government Security Office (CGSO). These entities collaborate to shape policies and frameworks for the safe and efficient integration of	There has been a development of the UAS operations and/or UTM strategy at national (country) level. The 'Malaysian Drone Technology Action Plan 2022-2030 (MDTAP30)' will be developed as a national agenda to support the drone ecosystem. It is still under development.

	uncrewed aircraft systems in Malaysia.	
4 – Operations (3/5) In Malaysia, drone airspace structures have been implemented to manage UAS operations, comprising different zones classified as A, B, C, and G. For certain categories of drones and operations within restricted airspace, submission and approval of flight plans are mandatory via the Civil Aviation Authority of Malaysia (CAAM). This structured approach helps ensure the safe and organized integration of drones within the national airspace. The Ministry of Science, Technology, and Innovation (MOSTI) formed the Drone Services Special Emergency Response Team (PTK2Dron) for monitoring purposes and delivery of vital goods by drones (supplied by private companies) to flood-hit areas.	**5 – Technology (2/5)** In Malaysia, a UAS operations tool has been implemented through a mobile application from the LOOKA platform, providing foundational UTM services such as airspace geo-awareness. Additionally, the 'Traffic Management for Unmanned Aircraft System' (UAS-TM) is being developed to enhance the efficiency of the drone operator registration process, with the goal of increasing UAS registration by 2030.	**6 — Business and Market (2/5)** In Malaysia, a market size analysis of the UAS operations and UTM market has been conducted, identifying significant demand potential. The assessment, carried out for the Malaysian government, indicates that the drone industry could contribute RM50.71 billion to the GDP and is capable of creating 100,000 jobs by 2030. This highlights the substantial economic impact and growth potential of the drone sector in Malaysia.

Philippines

	**PHILIPPINES**	SCORE **10/30**
1 – Legislation (3/5) In the Philippines, a comprehensive regulatory framework for UAS operations has been established and adopted by the Civil Aviation	**2 – Governance (2/5)** In the Philippines, UAS operations and UTM governance discussions and implementations have primarily involved public stakeholders. These efforts	**3 – Strategy (1/5)** There is a lack of information regarding the definition of UAS operations and UTM strategies at the level of individual stakeholders in

Authority of the Philippines (CAAP). This framework includes UTM regulations that cover BVLOS drone operations and services, supported by a broader set of standards. The 'Philippine Civil Aviation Regulations' (PCAR) outline various aspects of UAS and UTM regulations. Specifically, PCAR Part 1 addresses general policies, procedures, and definitions; Part 2 covers personnel licensing; Part 4 pertains to aircraft registration and marking; and Part 11 focuses on aerial work and operating limitations for non-type certificated aircraft, encompassing both commercial and non-commercial RPAS operations.	are centered around key governmental bodies, namely the Civil Aviation Authority of the Philippines (CAAP) and the Department of Transportation. These entities collaborate to shape and implement policies and regulations related to uncrewed aircraft systems within the country.	the Philippines, such as the Civil Aviation Authority of the Philippines (CAAP) and the Department of Transportation. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Philippines may not be widely accessible or fully developed.
4 – Operations (2/5) In the Philippines, traditional airspace structure segregations have been established to manage UAS operations. These structures are designed to ensure the safe and orderly integration of uncrewed aircraft systems into the national airspace, helping to prevent conflicts with manned aviation and maintain overall airspace safety.	**5 – Technology (1/5)** There is a lack of information regarding the existing technology implemented for UAS operations and UTM by the Civil Aviation Authority of the Philippines (CAAP). This gap highlights the need for more transparency or development in the technological infrastructure supporting UAS and UTM systems in the country.	**6 — Business and Market (1/5)** There is a lack of information concerning the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations in the Philippines, such as the Civil Aviation Authority of the Philippines (CAAP) and the Department of Transportation.

Singapore

SINGAPORE	SCORE 17/30

1 – Legislation (3/5)

Singapore has adopted a comprehensive regulatory framework for UAS operations, including UTM regulations that encompass BVLOS drone operations and services, supported by a broader set of standards. The UAS regulations are detailed in the 'Air Navigation Act (Chapter 6) — Air Navigation (101 — Unmanned Aircraft Operations Regulations 2019) No. S 833.' Specifically, BVLOS operations are addressed in the Advisory Circular AC 101-2-2(0), which provides guidance for BVLOS operations for uncrewed aircraft.

2 – Governance (4/5)

In Singapore, there have been advanced public-private discussions and implementations regarding UAS operations and UTM governance. These involve public stakeholders, including local governments, alongside active participation from the private market. The Civil Aviation Authority of Singapore (CAAS) has engaged in active consultations with private entities for UTM-related decisions and launched a month-long public consultation on the implementation plan to support the introduction of a Broadcast Remote Identification requirement for UAS.

Additionally, a multinational consortium was awarded an innovation research fund by the Civil Aviation Authority of Singapore (CAAS) and the Ministry of Transport in 2018 to develop a prototype UTM system for CONOPS development purpose. This consortium was led by Nova Systems and includes members such as OneSky, Scout Aerial Media, M1 Limited, and Rhode and Schwarz. The consortium work was completed in 2021.

3 – Strategy (3/5)

In Singapore, the Civil Aviation Authority of Singapore (CAAS) has defined a national-level strategy for UAS operations and UTM. This is encapsulated in the published Concept of Operations (CONOPS) for UTM, which outlines the framework and approach for integrating UAS into Singapore's airspace. This document serves as a strategic guide for the safe and efficient incorporation of uncrewed aircraft systems into the national aviation system.

4 – Operations (3/5)	5 – Technology (3/5)	6 — Business and Market (1/5)
In Singapore, the Civil Aviation Authority of Singapore (CAAS) has implemented specific airspace structures to manage and integrate UAS operations safely. This includes the establishment of designated areas for drone flying, as well as no-fly zones, to ensure the safe coexistence of manned and uncrewed aircraft within the national airspace. The Centralised Flight Management System (CFMS) was introduced to manage and monitor real-time commercial drone operations.	In Singapore, the Civil Aviation Authority of Singapore (CAAS) operates a basic UTM system known as the Centralised Flight Management System (CFMS), which has been in place since early 2022. It is designed primarily to regulate commercial drone operations. CFMS integrates with the Enterprise Safety Oversight Management System (eSOMS) portal. It enables real-time flight approvals and monitoring of commercial drone activities. Additionally there is a mobile application "FlyItSafe," which provides basic UTM services such as geo-awareness. Moroever, the CAAS has announced a tender for an advanced UTM system that will include approval and tracking services, further enhancing the management and integration of UAS operations within the national airspace.	There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations in Singapore, such as the Civil Aviation Authority of Singapore (CAAS) and the Ministry of Transport.

South Korea

SOUTH KOREA	SCORE 18/30

1 – Legislation (2/5)	2 – Governance (4/5)	3 – Strategy (4/5)
South Korea has established a general legal framework for drone operations, overseen by the Ministry of Land,	In South Korea, there have been advanced public-private discussions and implementations concerning UAS operations	In South Korea, discussions between public and private stakeholders have focused on UTM strategy aspects, considering industries such

Infrastructure and Transport (MOLIT) and implemented by the Korea Office of Civil Aviation (KOCA). This framework has facilitated limited commercial drone operations and services through an initial set of standards. The country has enacted the 'Act on Promotion of Utilisation of Drones and Creation of Infrastructure Therefore,' Act No. 16420, which was amended by Act No. 18556. This act outlines initial regulatory standards focusing on safety and industry support for drone operations. It also includes provisions for establishing a UTM system, although these details are not extensively covered.	and UTM governance. These involve public stakeholders, including local governments, with active participation from the private sector. A notable initiative is the public-private committee called the 'Urban Air Mobility Team Korea,' created by the Ministry of Land, Infrastructure and Transport (MOLIT) in June 2020. This was established following the 'Act on Promotion of Utilisation of Drones and Creation of Infrastructure Therefore,' Article 7, which called for a Consultative Body on the Drone Industry. The team's role is to commercialize air taxis by the end of 2025, and as part of this effort, South Korea will invest USD 22.4 million to build a future aviation testing center. The team includes major companies such as Hyundai Motor, Hanwha Systems, Korean Air, SK Telecom, and Doosan Mobility. Another significant public-private organization is the Drone Demonstration Program, which showcases UTM operational concepts and capabilities. This program is supported by MOLIT and involves various stakeholders, including the Korea Institute of Aviation Safety Technology (KIAST), Korea Aerospace Research Institute (KARI), and private companies like Korea Telecom (KT).	as the economy, society, environment, and security, and their needs with correlated services like Advanced Air Mobility and Counter-UAS. The country mandates a five-year master plan for the drone industry under Article 5 of the Drone Act, which includes provisions for international cooperation and fostering private sector growth. Hyundai has introduced a roadmap for an autonomous air cargo system, aiming for commercialization in 2026. Additionally, the Ministry of Land, Infrastructure and Transport (MOLIT) has unveiled a roadmap for the commercialization of drone taxis by the end of 2025 and autonomous flights by the end of 2035. In 2022, the Advanced Aviation Research Division of the Korea Institute of Aviation Safety Technology, a leader in UTM research financed by MOLIT, presented the Concept of UTM in Korea, further outlining the strategic direction for integrating uncrewed systems into the national airspace.

4 – Operations (3/5)	5 – Technology (4/5)	6 — Business and Market (1/5)
In South Korea, the Ministry of Land, Infrastructure and Transport (MOLIT), through the Korea Office of Civil Aviation (KOCA), has implemented drone airspace structures for UAS operations. These structures include strict no-fly zones, encompassing areas such as Seoul, to ensure safety and security in sensitive regions.	In South Korea, the Ministry of Land, Infrastructure and Transport (MOLIT) has implemented an advanced UTM system known as the K-drone system. This system provides basic UTM services, including flight authorization, real-time flight data exchange, air traffic monitoring, and dynamic airspace management, supporting the safe and efficient integration of drones into the national airspace.	There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations such as the Ministry of Land, Infrastructure and Transport (MOLIT) and the Korea Office of Civil Aviation (KOCA).

Taiwan

TAIWAN	SCORE 12/30

1 – Legislation (2/5)	2 – Governance (3/5)	3 – Strategy (1/5)
In Taiwan, the Civil Aviation Administration and the Ministry of Transportation and Communications (MOTC), R.O.C., have released a general regulatory framework titled the 'Regulations of Drone.' This framework covers basic aspects of UAS operations, including registration and certifications, and is enacted in accordance with Chapter 9-2, Articles 99-9 to 99-19, of the Civil Aviation Act. While it provides a foundational regulatory framework for drone operations, it does not specifically address UTM and BVLOS	In Taiwan, active public-private discussions and implementations regarding UAS operations and UTM governance have been taking place. These efforts involve public stakeholders, including local governments, with active participation from the private market. While the Taiwanese Civil Aviation Administration and the Ministry of Transportation and Communications are the primary authorities governing UAS aspects, there have been notable collaborations with the private sector. For instance, Thales demonstrated its	There is a lack of detailed information regarding the definition of UAS operations and UTM strategies at the level of individual stakeholders in Taiwan, such as the Taiwanese Civil Aviation Administration, Air Navigation and Weather Services (ANWS), and the Ministry of Transportation and Communications. However, plans are reportedly underway to regulate the drone sector by 2027, involving a collaboration between the Taiwanese Civil Aviation Administration, the Ministry of Digital Affairs (MODA), the National

operations in detail, indicating that these areas may require further development or clarification.	UTM system, an event witnessed by the Minister of Transportation and Communications. This demonstration was part of a project commissioned by Chunghwa Post and the Coretronic Intelligent Robotics Corporation (CIRC) focusing on the study of logistics using remote UAVs.	Communications Council (NCC), the Ministry of Economic Affairs (MOEA), and the Ministry of Finance (MOF). These plans, while indicative of future regulatory developments, are not yet supported by an official document, suggesting that formal strategies and frameworks are still in the planning stages.
4 – Operations (3/5) In Taiwan, drone airspace structures have been implemented to facilitate and manage UAS operations. These structures are designed to ensure the safe integration of drones into the national airspace by defining specific zones and guidelines that must be adhered to by drone operators. This helps maintain safety and order in airspace usage, balancing the needs of various airspace users.	**5 – Technology (2/5)** In Taiwan, the Taiwanese Civil Aviation Authority has implemented a UAS operations tool in the form of a website that provides foundational UTM services, including geo-awareness. This tool is designed to enhance the situational awareness of drone operators by offering information about airspace usage and restrictions, thereby supporting safe and compliant UAS operations.	**6 — Business and Market (1/5)** There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations in Taiwan, such as the Taiwanese Civil Aviation Administration, Air Navigation and Weather Services (ANWS), and the Ministry of Transportation and Communications. This suggests that comprehensive data and strategic plans concerning the drone industry and UTM systems are not readily available or may still be under development.

Thailand

	THAILAND	SCORE **13/30**

1 – Legislation (2/5) In Thailand, a general framework has been implemented to support limited commercial drone operations and services, guided by an initial set of standards outlined in the 'Rules to apply for Permission and Conditions to Control and Launch Unmanned Aircraft in the Category of Remotely Piloted Aircraft — B.E. 2558 and B.E. 2567.' These regulations were established by the Ministry of Transport and are overseen by the Civil Aviation Authority of Thailand (CAAT). They primarily focus on general operational guidelines, including registration, weight limits, and maintaining Visual Line of Sight (VLOS) during flights. However, they do not specifically address UTM and BVLOS operations.	**2 – Governance (3/5)** In Thailand, there have been active public-private discussions and implementations regarding UAS operations and UTM governance. These efforts involve public stakeholders, including local governments, and active participation from the private market. Key stakeholders in these discussions include the Head of the Economic Section of Bangkok, King Mongkut's Institute of Technology Ladkrabang (KMITL), and Innov' ATM, a UTM technology provider.	**3 – Strategy (3/5)** In Thailand, a national-level strategy for UAS operations and UTM has been defined. King Mongkut's Institute of Technology Ladkrabang (KMITL) initiated a project titled 'The Development of Technology for Unmanned Aircraft in Compliance with Safety and Security Measures of the State,' which aims to align drone technology with state safety and security measures. Additionally, Thales and a subsidiary of Thaicom have collaborated to develop a feasibility study on the deployment of UTM services in Thailand, further contributing to the strategic framework for integrating drones into the national airspace.
4 – Operations (3/5) In Thailand, the Civil Aviation Authority of Thailand (CAAT) has implemented drone airspace structures to facilitate UAS operations. These structures are designed to regulate and manage the use of airspace for drones, ensuring safe and coordinated integration with other airspace users.	**5 – Technology (1/5)** In Thailand, there has been no technology implemented yet for UAS operations and UTM by the Civil Aviation Authority of Thailand (CAAT), King Mongkut's Institute of Technology Ladkrabang (KMITL), or the Ministry of Transport. However, KMITL has initiated 'The Development of Technology for Unmanned Aircraft in Compliance with Safety	**6 — Business and Market (1/5)** There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations in Thailand, such as the Ministry of Transport, the Civil Aviation Authority of Thailand (CAAT), and King Mongkut's Institute of

	and Security Measures of the State.' This project includes collaboration with Innov'ATM to develop automated UTM systems around Bangkok airport. The system will aim to provide services such as geo-awareness, flight authorization, network identification, and traffic information. Moreover, Thales and Thaicom established the foundation to lead the future UTM system deployment in Thailand.	Technology Ladkrabang (KMITL).

Vietnam

VIETNAM		SCORE 8/30
1 – Legislation (2/5)	**2 – Governance (1/5)**	**3 – Strategy (1/5)**
In Vietnam, the Civil Aviation Authority has released a general regulatory framework that covers basic UAS operations. This includes the 'Decision establishing prohibited airspace and flight restriction zones for UAS and ultra light aerial vehicles.' However, there is a lack of additional information regarding UAS, BVLOS operations, or UTM legislation, indicating that detailed regulations and guidelines for these areas may not yet be fully developed or publicly available in Vietnam.	There is a lack of information regarding collaboration between public and private stakeholders in the decision-making processes related to the UTM ecosystem in Vietnam. This includes key organizations such as the Civil Aviation Authority of Vietnam, the Ministry of Transport, and the Vietnam Air Traffic Management Corporation (VATM), suggesting that details about their interactions and joint efforts in developing UTM frameworks are not readily available.	There is a lack of information regarding the definition of UAS operations and UTM strategies at the individual stakeholder level in Vietnam. This includes organizations such as the Civil Aviation Authority of Vietnam, the Ministry of Transport, and the Vietnam Air Traffic Management Corporation (VATM), This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Vietnam may not be widely accessible or fully developed.

4 – Operations (2/5)	5 – Technology (1/5)	6 — Business and Market (1/5)
In Vietnam, traditional airspace structure segregations have been established for UAS operations, including specific regulations that designate prohibited and restricted flying zones. These zones include areas around national defense structures, state agency offices, and airports, aiming to ensure security and safety by preventing unauthorized drone activities in sensitive areas.	There is a lack of information regarding the existing technology implemented for UAS operations and UTM by organizations such as the Civil Aviation Authority of Vietnam and the Vietnam Air Traffic Management Corporation (VATM). However, in May 2017, Terra Drone conducted a BVLOS drone trial flight using Terra UTM under the full cooperation of Ministry of Planning and Investment (MPI). This suggests that details about the existing technological infrastructure and systems supporting UAS and UTM in Vietnam are not widely available or may still be under development.	There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations in Vietnam, such as the Civil Aviation Authority of Vietnam, the Ministry of Transport, and the Vietnam Air Traffic Management Corporation (VATM). This indicates that comprehensive data and strategic plans related to the drone industry and UTM are not readily accessible or may not yet be fully developed.

Australia & Oceania

Australia

AUSTRALIA	SCORE 19/30

1 – Legislation (3/5)

In Australia, the initial regulatory framework for drone operations is established under the 'Civil Aviation Safety Regulations 1998.' This framework includes UAS regulations detailed in Volume 3, under Part 101, which provides an initial set of standards for limited commercial drone operations and services. Regarding BVLOS operations, the regulations specify that exceptions are permitted only with approval from the Civil Aviation Safety Authority (CASA), indicating that such operations require special authorization.

The Civil Aviation Safety Authority (CASA) has established regulatory frameworks and operational approvals to facilitate safe and efficient BVLOS operations, ensuring alignment with global best practices. This includes provisions for risk assessments, operator certification, and the integration of emerging technologies like detect-and-avoid systems. These advancements position Australia as a regional and

2 – Governance (3/5)

In Australia, there have been ongoing public-private discussions and implementations regarding UAS operations and UTM governance. These efforts involve collaboration among public stakeholders, including local governments, with active participation from the private market. The Australian Government and the Civil Aviation Safety Authority (CASA) work closely together on policy making and regulatory matters related to UAS. Additionally, the Department of Infrastructure, Transport, Regional Development, Communication and the Arts engages extensively with both public and private sectors in the design, development, and implementation of policies. An example of such collaboration is the 'Infrastructure Planning Guidelines for Drone Delivery Services,' released in November 2022, which provides strategic guidance for incorporating drone delivery services into existing infrastructure frameworks.

3 – Strategy (4/5)

In Australia, discussions between public and private stakeholders have addressed UTM strategy aspects, focusing on industries such as the economy, society, environment, and security, along with correlated services like Advanced Air Mobility and Counter-UAS. The country has developed in-depth strategic roadmaps for the national airspace, as outlined in the Government's new Aviation White Paper, which details 56 new policy initiatives across 10 areas aimed at guiding aviation development up to 2030.

Additionally, Australia released the Uncrewed Aircraft System Traffic Management Action Plan to further enhance UTM frameworks. This plan complements the existing 'RPAS and AAM Strategic Regulatory Roadmap,' which has already been released by the Civil Aviation Safety Authority (CASA), providing a comprehensive strategy for integrating emerging aviation technologies and services into the national airspace system.

one of global leaders in BVLOS readiness, fostering innovation and paving the way for seamless integration into the UTM ecosystem.	Moreover, ANSP Airservices Australia launched expression of interests to join its Automated Airspace Authorisations working group.	
4 – Operations (3/5) In Australia, drone airspace structures have been implemented to facilitate and manage UAS operations. These structures are designed to ensure the safe integration of drones within the national airspace by defining specific zones, guidelines, and operational parameters that must be followed by drone operators. This framework helps maintain safety and efficiency in airspace usage, accommodating both crewed and uncrewed aircraft.	**5 – Technology (3/5)** In Australia, a basic UTM system has been implemented to provide essential UTM services, including flight authorization. Several CASA-approved apps are available for geo-awareness and flight authorization. 6 apps offer geo-awareness capabilities, while an additional 5 apps offer both geo-awareness and flight authorization services. CASA and Airservices Australia, the ANSP, have operated the automated flight authorization trial since 2021, which simplifies approvals for eligible drone operators, enabling safe operations in traditionally restricted areas. By reducing costs and accelerating access, the trial drives UTM readiness by fostering innovation and building industry confidence. Additionally, Airservices Australia, has contracted a provider to develop the Flight Information Management System (FIMS), further enhancing the UTM infrastructure and supporting the integration	**6 — Business and Market (3/5)** In Australia, a market size analysis of the UAS operations and UTM market has been conducted, identifying significant demand potential. Airservices Australia commissioned a report titled "Sizing the Future Drone and Advanced Air Mobility Market in Australia". This report provides insights into the expected growth and opportunities within the drone and advanced air mobility sectors, highlighting their potential impact on the Australian economy and infrastructure.

	of uncrewed aircraft into the national airspace. FIMS and an initial cohort of several industry-provided USS operating in the open market will commence delivery of expanded UTM services in late 2025.	

New Zealand

NEW ZEALAND	SCORE 17/30

1 – Legislation (3/5)

In New Zealand, the Civil Aviation Authority has implemented initial regulations that facilitate limited commercial drone operations and services, supported by an initial set of standards. This regulatory framework is outlined in Part 101 of the Civil Aviation Rules, which provides general guidelines for drone operations. Additionally, Part 102 offers a certification process for exemptions, allowing operators to conduct activities that fall outside the standard regulations under specific conditions. These parts together create a structured approach for integrating drones into New Zealand's airspace while maintaining safety and compliance.

2 – Governance (3/5)

In New Zealand, there have been standard public-private discussions and implementations regarding UAS operations and UTM governance. These initiatives involve collaboration between public stakeholders, including local governments, with active participation from the private market. A notable development is the New Zealand Government's signing of a Memorandum of Understanding (MoU) with the Urban Air Mobility (UAM) company Wisk to support a trial of the company's Cora air taxi, highlighting the country's commitment to advancing UAM technologies.

Additionally, the state-owned ANSP, Airways New Zealand, has established an API called AirShare, which enables stakeholders to integrate and enhance their UTM services. Flyfreely was the first organization to utilize this API, demonstrating the collaborative approach to developing a robust UTM ecosystem in New Zealand.

3 – Strategy (3/5)

In New Zealand, a national strategy for UAS operations and UTM has been articulated through the release of the 'New Zealand Space and Advanced Aviation Strategy 2024-2030.' This strategy was developed by the Ministry of Business, Innovation and Employment (MBIE) in collaboration with the Minister of Space New Zealand. It outlines the country's strategic vision and goals for integrating advanced aviation technologies, including UAS, into its broader aviation and space sectors, covering the period from 2024 to 2030. This strategy aims to advance New Zealand's position in the global space and aviation industries by setting clear objectives and initiatives for development and innovation.

4 – Operations (3/5)

In New Zealand, drone airspace structures have

5 – Technology (3/5)

In New Zealand, a basic UTM system has been

6 — Business and Market (2/5)

been implemented to manage and facilitate UAS operations. These structures are designed to ensure the safe integration of drones within the national airspace, providing clear guidelines and designated areas for drone activities. This helps maintain safety and efficiency in airspace usage, accommodating both crewed and uncrewed aircraft operations.	implemented to provide essential UTM services, including flight authorization. The Airshare UTM system, developed by Airways New Zealand, facilitates collaboration among stakeholders, allowing them to enhance and integrate their UTM services. This collaborative approach supports the safe and efficient management of drone operations within New Zealand's airspace.	In New Zealand, a market size analysis of the UAS operations and UTM market has been conducted, identifying significant demand potential. The Ministry of Transport released a 'Drone Benefit Study' in 2019, which highlighted potential growth and opportunities for the business and transport sectors. However, there have been no further updated studies from the Civil Aviation Authority or the Ministry of Transport since then, indicating a gap in current data and analysis regarding the evolving drone market landscape.

Europe

Austria

AUSTRIA	SCORE 12/30

1 – Legislation (2/5)	2 – Governance (2/5)	3 – Strategy (1/5)
In Austria, while there is a general European regulatory framework for UAS operations and UTM, established through EU Regulation 2019/945, EU Regulation 2019/947, and EU Regulations 2021/664-666, there is a lack of detailed information on how these regulations have been implemented at the national level. This suggests that specifics about Austria's adaptation and enforcement of these EU regulations are not widely documented or accessible, creating a gap in understanding the country's approach to integrating these frameworks into its national regulatory landscape for drone operations.	In Austria, while there are various organizations involved in the drone sector, such as the national-level Austrian Association for Drones (AAD), the regional-level Unmanned Aviation Association (UAV DACH), and the European-level Joint European Drone Associations (JEDA), there is a lack of detailed information regarding the cooperation between the private and public sectors. Specifically, the extent of collaboration and the role of the private sector in UAS operations and UTM decision-making with public entities like ANSP AustroControl and the Supreme Civil Aviation Authority, which is part of the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), are not well-documented. Additionally, there is limited information available on the future governance of U-Space (CISP/USSP), which is crucial for integrating uncrewed aircraft into the airspace efficiently and safely. This	There is a notable lack of information regarding the existing UAS operations and UTM strategies from key organizations in Austria, such as ANSP AustroControl and the Supreme Civil Aviation Authority, which is part of the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK). This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Austria may not be widely accessible or fully developed.

	gap highlights the need for clearer communication and documentation of the collaborative frameworks and governance models that will guide the development and implementation of U-Space in Austria.	
4 – Operations (3/5) In Austria, drone geozones are incorporated into the basic UTM system. These geozones are designated areas within the airspace that have specific rules and restrictions for drone operations, helping to ensure safety and compliance with regulations. This system provides drone operators with essential information on where they can and cannot fly, facilitating safer integration of drones into the national airspace.	**5 – Technology (3/5)** In Austria, a basic UTM system has been implemented by ANSP AustroControl in collaboration with Frequentis. This system, accessible via the website and mobile application called Dronespace, facilitates drone operator registration and digital drone flight planning and approval. It provides users with essential information on airspace restrictions and drone geozones and supports direct non-verbal communication, enhancing the efficiency and safety of drone operations within the Austrian airspace.	**6 — Business and Market (1/5)** There is a lack of information regarding the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plan from key organizations in Austria, such as ANSP AustroControl and the Supreme Civil Aviation Authority, which is part of the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK). This absence of detailed analyses and strategic documents suggests that comprehensive insights into the economic and strategic frameworks for drone operations and UTM in Austria are not readily available or may still be under development.

Belgium

BELGIUM	SCORE 22/30

1 – Legislation (4/5)

In Belgium, the European regulatory framework for UAS operations and UTM, defined by EU Regulations 2019/945, 2019/947, and 2021/664-666, is being implemented at the national level. This includes the concept of drone geozones, where specific areas of airspace are managed with defined rules and restrictions to ensure safe and compliant drone operations. While these frameworks are being integrated, detailed information on Belgium's national implementation specifics and geozone management may be limited.

2 – Governance (4/5)

In Belgium, cooperation between the private and public sectors in UAS operations is facilitated by national entities such as the Belgian Drone Association and Flanders Make, as well as the European-level Joint European Drone Associations (JEDA). This collaboration extends to the Advisory Board of the Belgian Civil Aviation Authority, where stakeholders come together to shape drone-related policies.

Emerging U-Space governance is taking shape through the U-Space certification process, involving key players like ANSP skeyes, which is set to become a Common Information Service Provider (CISP). Additionally, SkeyDrone, a joint venture of ANSP, is poised to be one of the future U-Space Service Providers (USSPs), highlighting the structured approach to integrating U-Space services in Belgium.

3 – Strategy (3/5)

Belgium has strategic frameworks for airspace management, such as the "Belgium's Airspace Vision 2030," endorsed by skeyes and Belgian Defence, as well as a drone strategy by the skeyes in 2018. The strategy contributed to establishing the ANSP and Brussels Airport Company drone joint venture SkeyDrone. However, there is a lack of information on updated UTM strategies from entities like the ANSP joint venture SkeyDrone and the Belgian Civil Aviation Authority. This gap indicates that recent developments and detailed plans regarding UTM integration and management may not be widely documented or publicly accessible.

4 – Operations (4/5)

In Belgium, the U-Space certification process includes the preparation of U-Space airspace designation over the

5 – Technology (4/5)

In Belgium, an advanced UTM system has been implemented through a collaboration involving ANSP skeyes, the ANSP

6 — Business and Market (3/5)

In Belgium, business plans exist for the single Common Information Service Provider (CISP),

Antwerp harbor area by the Belgian Civil Aviation Authority. This process supports the development of a comprehensive U-Space framework. Several drone geozones, with local UTM system deployments in areas like Antwerp, Brussels, and Liege, form the foundation of the BVLOS framework, enabling more advanced drone operations. Additionally, the implementation of U-Space in Belgium is being facilitated through the SESAR JU BURDI project. As part of this initiative, an overarching U-Space Concept of Operations (ConOps) has been developed and submitted to the Belgian CAA for endorsement, further advancing the integration of U-Space services in the country.	joint venture SkeyDrone, the Belgian Civil Aviation Authority, Belgian Defence, and Unifly. This system, known as Droneguide, facilitates digital drone planning and approval, including management of airspace restrictions and drone geozones. It also provides a Traffic Information Service for real-time traffic updates and integrates with the Drone and Aerial Activities Platform to manage special air activities such as parachuting and fireworks. The Belgian Civil Aviation Authority has endorsed the BVLOS enablement framework developed by SkeyDrone. This framework is available to drone operators seeking operational authorization for BVLOS flights within a predefined set of drone geozones, which are supported by local UTM deployments. This comprehensive approach enhances the safety and efficiency of advanced drone operations in Belgium.	ANSP skeyes, and for one of the future U-Space Service Providers (USSPs), the ANSP joint venture SkeyDrone. However, there is a lack of detailed information on the content of these business plans, as well as on other national drone operations and UTM market sizing analysis, high-level value chain mapping, and end-level pricing strategies. This suggests that comprehensive insights into the economic and strategic frameworks governing the drone industry and UTM services in Belgium are not widely documented or accessible.

Bulgaria

BULGARIA	SCORE 12/30

1 – Legislation (4/5)	2 – Governance (2/5)	3 – Strategy (1/5)
In Bulgaria, the European regulatory framework for UAS operations and UTM is being implemented in	In Bulgaria, organizations like the Bulgarian Aviation Industry Association (BAIA) and Cluster Aerospace	In Bulgaria, there appears to be a lack of strategic discussions or implementations

accordance with EU Regulations 2019/945, 2019/947, and 2021/664-666. The Bulgarian Directorate General Civil Aviation Administration (DGCAA) manages this national implementation, aligning Bulgaria's drone regulations with EU standards to ensure safety and integration into the European airspace. Detailed specifics on the national adaptation process may be limited.	Technologies Research and Applications (CASTRA) operate at the national level, with the Joint European Drone Associations (JEDA) at the European level. However, there is limited information on the cooperation between the private and public sectors, such as ANSP BULATSA or the Directorate General Civil Aviation Administration within the Bulgarian Ministry of Transport and Communications. The role of the private sector in UAS operations and UTM decision-making appears to be minimal. Regarding U-Space governance, details are scarce apart from a few unofficial statements in working groups. A U-Space Coordination mechanism exists but is reportedly fragile. BULATSA is designated as the centralized provider for the Common Information Service Provider (CISP) and will also be the first U-Space Service Provider (USSP).	specifically focused on UAS operations and UTM. Additionally, there is limited information available regarding existing UAS operations or UTM strategies from key organizations such as ANSP BULATSA or the Directorate General Civil Aviation Administration, which is part of the Bulgarian Ministry of Transport and Communications. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Bulgaria may not be widely accessible or fully developed.
4 – Operations (3/5) In Bulgaria, traditional airspace structure segregations have been established for UAS operations, with drone geozones detailed on the Directorate General Civil Aviation Administration's website. Additionally, a U-space Airspace Risk	**5 – Technology (1/5)** In Bulgaria, there is currently no fully implemented technology for UAS operations and UTM. However, ANSP BULATSA has announced the development of a basic UTM system in collaboration with Frequentis, Unifly, and a	**6 — Business and Market (1/5)** In Bulgaria, there appears to be no significant consideration or analysis of business and market data concerning UAS operations and UTM. There is a notable lack of information on existing national drone operations and UTM

Assessment (ARA) is currently underway for Sofia city, aimed at evaluating and managing the risks associated with integrating drones into the urban airspace.	local IT service provider. This system is expected to include a desktop and mobile application designed for drone operator registration and digital drone flight planning and approval. It will provide information on airspace restrictions and drone geozones, as well as facilitate direct non-verbal communication between operators and authorities.	market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP BULATSA or the Directorate General Civil Aviation Administration within the Bulgarian Ministry of Transport and Communications. This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Bulgaria are not currently available or have not been developed.

Croatia

CROATIA	SCORE 11/30

1 – Legislation (2/5)	2 – Governance (2/5)	3 – Strategy (1/5)
In Croatia, while the European regulatory framework for UAS operations and UTM, established by EU Regulations 2019/945, 2019/947, and 2021/664-666, is in place, there is limited information available on how these regulations are being implemented at the national level. Specifics about Croatia's adaptation and enforcement of these EU standards are not extensively documented.	In Croatia, the Croatian Unmanned Systems Association (HUBS) operates at the national level, and there is involvement at the European level through the Joint European Drone Associations (JEDA). However, there is limited information on the cooperation between the private and public sectors, such as ANSP Croatia Control, the Croatian Civil Aviation Agency, and the Ministry of the Maritime Affairs, Traffic and Infrastructure. The role of the private sector in UAS	In Croatia, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as ANSP Croatia Control and the Ministry of the Maritime Affairs, Traffic and Infrastructure. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Croatia may not be widely accessible or fully developed.

	operations and UTM decision-making is not well-documented. Additionally, there is a lack of information on the future governance of U-Space, including the roles of Common Information Service Providers (CISP) and U-Space Service Providers (USSP).	
4 – Operations (3/5) In Croatia, the UAS operations tool includes the implementation of drone geozones, which provide specific information on designated airspace areas with particular operational restrictions and permissions for drones. These geozones help ensure that drone activities are conducted safely and in compliance with national regulations by offering clear guidance on where drones can operate.	**5 – Technology (2/5)** In Croatia, ANSP Croatia Control has implemented the DAMC Portal website as a UAS operations tool to enhance airspace geo-awareness. This portal provides essential information on airspace restrictions and drone geozones, helping drone operators plan and conduct their flights safely and in compliance with regulatory requirements.	**6 — Business and Market (1/5)** In Croatia, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key entities such as ANSP Croatia Control, the Croatian Civil Aviation Agency, and the Ministry of the Maritime Affairs, Traffic and Infrastructure. This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services may not be fully developed or publicly accessible.

Cyprus

	CYPRUS	SCORE 12/30

1 – Legislation (4/5)

In Cyprus, the basic European regulatory framework for UAS operations, as outlined in EU Regulations 2019/945 and 2019/947, is being implemented nationally. Additionally, the country is working on integrating UTM-related EU Regulations 2021/664-666 into its national framework. Specific details about the national implementation process may not be extensively documented.

2 – Governance (1/5)

In Cyprus, there is limited information on the existing cooperation between the private and public sectors, such as the ANSP/CAA Department of Civil Aviation, particularly regarding the role of the private sector in UAS operations and UTM decision-making. Additionally, there is a lack of detailed information on future U-Space governance, including the roles and responsibilities of Common Information Service Providers (CISP) and U-Space Service Providers (USSP). This suggests that these areas may still be under development or not fully communicated.

3 – Strategy (1/5)

In Cyprus, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as the ANSP/CAA Department of Civil Aviation. This indicates that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Cyprus may not be widely accessible or fully developed.

4 – Operations (3/5)

In Cyprus, the UAS operations tool includes the implementation of drone geozones, which provide information on designated areas of airspace with specific operational restrictions and permissions for drones. These geozones help ensure that drone activities are conducted safely and in compliance with national regulations by offering clear guidance on where

5 – Technology (2/5)

In Cyprus, the ANSP/CAA Department of Civil Aviation has implemented a UAS operations website that facilitates airspace geo-awareness. This platform provides essential information on airspace restrictions and drone geozones, aiding drone operators in planning and conducting their flights safely and in compliance with regulatory requirements.

6 — Business and Market (1/5)

In Cyprus, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key entities such as the ANSP/CAA Department of Civil Aviation. This absence suggests that comprehensive economic and strategic insights into

and how drones can operate.		the drone industry and UTM services in Cyprus may not be fully developed or publicly accessible.

Czechia

	CZECHIA	SCORE 15/30
1 – Legislation (4/5) In Czechia, the European regulatory framework for UAS operations and UTM, as outlined in EU Regulations 2019/945, 2019/947, and 2021/664-666, is being implemented nationally. This involves adapting EU guidelines to fit local needs, overseen by the Civil Aviation Authority of the Czech Republic. While the general framework is in place, detailed national implementation specifics may not be widely documented.	**2 – Governance (2/5)** In Czechia, while there is a national-level organization such as the Unmanned Aerial Vehicle Alliance (UAVA), there is limited information regarding the cooperation between the private and public sectors, such as ANSP ANS CR or the Civil Aviation Authority of the Czech Republic. Additionally, the role of the private sector in UAS operations and UTM decision-making appears underreported. Furthermore, there is a lack of detailed information on the future governance of U-Space, including the designation of Common Information Service Providers (CISP) and U-Space Service Providers (USSP).	**3 – Strategy (3/5)** In Czechia, the governmental strategy titled "SmartSky," introduced in 2019, outlines the country's vision for integrating advanced aviation technologies, including UAS. However, there is a lack of updated information on UTM strategies from organizations like ANSP ANS CR or the Civil Aviation Authority of the Czech Republic. This suggests that recent developments or strategic updates regarding UTM integration and management may not be widely documented or publicly available.
4 – Operations (3/5) In Czechia, drone geozones are integrated into the UAS operations tool, providing operators with vital information on designated airspace areas and their specific restrictions or permissions. This tool helps ensure that drone	**5 – Technology (2/5)** In Czechia, the ANSP ANS CR has implemented a UAS operations tool known as the DronView website. This tool provides airspace geo-awareness by offering information on airspace restrictions and drone geozones. It helps drone	**6 — Business and Market (1/5)** In Czechia, there is a lack of information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key

operations are conducted safely and in compliance with national regulations by clearly delineating where drones can and cannot fly.	operators navigate the regulatory landscape by identifying where they can safely and legally conduct their flights.	organizations such as ANSP ANS CR or the Civil Aviation Authority of the Czech Republic. This gap indicates that comprehensive data and strategic insights into the economic aspects of the drone industry and UTM services in Czechia are not readily accessible or may not have been fully developed.

Denmark

DENMARK		SCORE 17/30
1 – Legislation (4/5)	**2 – Governance (3/5)**	**3 – Strategy (3/5)**
In Denmark, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally through Order no. 1649 of 12/12/2023. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	In Denmark, the private sector, local governments, and academia, including institutions like the University of Southern Denmark, HCA Airport, and UAS Denmark (an international testing center), actively participate in UAS operations and UTM decision-making. There is close collaboration with public entities such as ANSP Naviair, the Danish Civil Aviation and Railway Authority, and the Danish Transport, Construction and Housing Authority, particularly in testing UTM systems. However, there is limited information on the future governance of U-Space, including the roles and responsibilities of Common Information Service Providers (CISP)	Denmark has defined a national strategy for UAS operations and UTM through the release of a "Strategy for Civilian Drones in Danish Airspace." This strategy includes plans for implementing EU Regulations 2021/664-666 as part of one of its seven themes. It incorporates environmental considerations, and outlines a 1-5 year implementation plan. However, the process of strategy update, initiated in March 2023, has not yet been finalised by the Danish Civil Aviation and Railway Authority.

	and U-Space Service Providers (USSP).	
4 – Operations (3/5) In Denmark, the UAS operations tool incorporates drone geozones, providing detailed information about designated airspace areas with specific operational restrictions and permissions for drone activities. These geozones help ensure that drone operations are conducted safely and in compliance with national regulations by offering clear guidance to operators on where and how they can fly their drones.	**5 – Technology (3/5)** In Denmark, ANSP Naviair has implemented a basic UTM system through the UTM Flight Tracker mobile application. This application facilitates drone operator registration and digital drone flight planning and approval, providing essential information on airspace restrictions and drone geozones. Additionally, ANSP Naviair has announced plans for an advanced UTM system, further enhancing the management and integration of drone operations in Danish airspace.	**6 — Business and Market (1/5)** In Denmark, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP Naviair, the Danish Civil Aviation and Railway Authority, and the Danish Transport, Construction and Housing Authority. This suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Denmark may not be fully developed or publicly accessible.

Estonia

	**ESTONIA**	SCORE **17/30**
1 – Legislation (4/5) In Estonia, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may	**2 – Governance (3/5)** In Estonia, the private sector and local governments, including entities like the Estonian Aviation Cluster, the Joint European Drone Associations (JEDA), and the Tartu Science Park Foundation, actively participate in UAS operations and UTM decision-making. There is	**3 – Strategy (3/5)** In Estonia, a national UAS operations and UTM strategy has been established through a U-Space strategy outlined in a Concept of Operations (ConOps) developed by ANSP EANS in cooperation with DroneUp. This strategy was set by the Ministry of Economic Affairs and Communications, providing

not be extensively documented.	close collaboration with public bodies such as ANSP EANS, the Estonian Civil Aviation Authority within the Estonian Transport Administration, and the Estonian Business and Innovation Agency. However, there is limited information on future U-Space governance, although initial indications suggest that ANSP EANS may become a Common Information Service Provider (CISP).	a framework for integrating U-Space services into the national airspace.
4 – Operations (3/5) In Estonia, the basic UTM system includes the implementation of drone geozones, which provide detailed information about designated airspace areas with specific operational restrictions and permissions for drone activities. These geozones help ensure safe and compliant drone operations by offering clear guidance to operators on where and how they can fly their drones.	**5 – Technology (3/5)** In Estonia, a basic UTM system has been implemented by ANSP EANS in collaboration with Frequentis. This system provides a website for drone operator registration and digital drone flight planning and approval, offering essential information on airspace restrictions and drone geozones. This setup helps facilitate safe and compliant drone operations within the national airspace.	**6 — Business and Market (1/5)** In Estonia, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP EANS or the Estonian Civil Aviation Authority within the Estonian Transport Administration. This suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Estonia may not be fully developed or publicly accessible.

Global UTM Association

Finland

FINLAND	SCORE 14/30

1 – Legislation (2/5)

In Finland, the European regulatory framework for UAS operations and UTM, as outlined in EU Regulations 2019/945, 2019/947, and 2021/664-666, provides standardized guidelines for integrating drones into the airspace across EU member states. However, there is limited information available on the specifics of how these regulations are being implemented nationally in Finland. While these EU frameworks set the overarching rules, the details of their adaptation and application within Finland, such as unique national measures or procedures, are not extensively documented or publicly disclosed.

2 – Governance (2/5)

In Finland, while there is a national organization like RPAS Finland RY, there is limited information on the cooperation between the private and public sectors, such as ANSP Fintraffic ANS or the Finnish Transport and Communications Agency Traficom. The role of the private sector in UAS operations and UTM decision-making is not well-documented, suggesting a potential gap in understanding these interactions. Additionally, there is a lack of detailed information on future U-Space governance, including the roles and selection of Common Information Service Providers (CISP) and U-Space Service Providers (USSP), indicating that these aspects may still be under development or not fully communicated.

3 – Strategy (1/5)

There is a lack of detailed information regarding the existing UAS operations and UTM strategies from key organizations in Finland, such as ANSP Fintraffic ANS and the Finnish Transport and Communications Agency Traficom. This absence suggests that comprehensive strategic plans or documented approaches for managing UAS operations and UTM integration in Finland are not widely accessible or may not be fully developed and publicly communicated.

4 – Operations (3/5)

In Finland, the basic UTM system includes the implementation of drone geozones, which are specific areas designated within the airspace that outline where drones can operate under certain conditions. These geozones help ensure that

5 – Technology (3/5)

In Finland, a basic UTM system has been implemented by ANSP Fintraffic ANS in collaboration with AstraUTM. This system facilitates digital drone planning and approval, providing essential services such as information on

6 — Business and Market (3/5)

In Finland, the Finnish Transport and Communications Agency (Traficom) has released a report on Urban Air Mobility (UAM) that predicts demand over the next 5-10 years, offering insights into the potential growth and

drone operations are conducted safely and in compliance with regulations by providing clear information about airspace restrictions and permitted activities. This system aids operators in planning their flights while maintaining safety and regulatory compliance.	airspace restrictions and drone geozones. Additionally, there is a tender for an advanced UTM system, which is set to be implemented by VTT, indicating ongoing efforts to enhance the capabilities and sophistication of UTM services in Finland.	opportunities within this sector. However, there is a lack of information on other aspects of national drone operations and UTM, such as high-level value chain mapping, end-level pricing strategies, and comprehensive business plans. This indicates that detailed economic and strategic analyses in these areas may not be fully developed or publicly available.

France

FRANCE		SCORE 17/30
1 – Legislation (4/5)	**2 – Governance (3/5)**	**3 – Strategy (3/5)**
In France, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	In France, the private sector and local governments, including companies and initiatives like Thales Aerospace, Parrot, Systematic Drone Hub, and CEDIF, actively participate in UAS operations and UTM decision-making. There is close collaboration with public bodies such as ANSP DSNA and the French Civil Aviation Authority (DGAC), as well as the Ministry of Territories, Ecology and Housing. However, there is limited information on the future governance of U-Space, including the roles and responsibilities of Common Information Service Providers (CISP) and U-	In France, a national strategy for UAS operations and UTM has been defined. The French Civil Aviation Authority (DGAC) has published information regarding U-Space in anticipation of EU Regulations 2021/664-666, detailing designated U-Space areas, U-Space services, and roles for Common Information Service Providers (CISPs). Additionally, there are various programs and projects, such as the Aeronautical Information Management (AIM) program, which includes trials for RPAS operations, further supporting the development and integration of U-Space services in the country.

	Space Service Providers (USSP).	
4 – Operations (3/5) In France, the basic UTM systems incorporate drone geozones, which provide detailed information about designated airspace areas with specific operational restrictions and permissions for drone activities. These geozones help ensure safe and compliant drone operations by offering clear guidance to operators on where and how they can conduct their flights.	**5 – Technology (3/5)** In France, multiple basic UTM systems have been implemented as part of ANSP DSNA's deployment program. These systems are designed to facilitate safe and efficient drone operations by providing essential services such as airspace awareness, flight planning, and compliance with geozone restrictions. This approach supports the integration of drones into the national airspace system, enhancing operational safety and coordination.	**6 — Business and Market (1/5)** In France, there is a lack of detailed information on national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP DSNA, the French Civil Aviation Authority (DGAC), and the Ministry of Territories, Ecology and Housing. This suggests that comprehensive economic and strategic insights into the drone industry and UTM services in France may not be fully developed or publicly accessible.

Germany

	**GERMANY**	SCORE **17/30**
1 – Legislation (4/5) In Germany, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	**2 – Governance (3/5)** In Germany, there is active cooperation between the private and public sectors in UAS operations and UTM development, involving regional and European organizations such as UAV DACH and the Joint European Drone Associations (JEDA), as well as the Alliance for New Mobility Europe. Key players in this cooperation include ANSP DFS, the	**3 – Strategy (2/5)** In Germany, a national U-Space strategy has been developed through a Concept of Operations (ConOps) by the German Aerospace Center (DLR). This strategy outlines the framework for integrating U-Space services into the national airspace, focusing on the safe and efficient management of drone operations. The ConOps serves as a foundational

	ANSP and Deutsche Telekom joint venture Droniq, the Ministry of Digital and Transport, and the German Aerospace Center (DLR). The future governance of U-Space, including roles for Common Information Service Providers (CISP) and U-Space Service Providers (USSP), is currently emerging as these entities work together to define and implement frameworks for U-Space services in Germany.	document guiding the development and implementation of U-Space infrastructure and services in Germany.
4 – Operations (3/5) In Germany, the basic UTM system includes the implementation of drone geozones, providing operators with information on designated airspace areas with specific restrictions and permissions. Additionally, a U-Space airspace sandbox has been established in the Port of Hamburg. This sandbox serves as a testing and development environment for integrating advanced U-Space services and exploring innovative drone operations within a controlled setting.	**5 – Technology (3/5)** In Germany, a basic UTM system has been implemented by ANSP DFS in collaboration with Deutsche Telekom's joint venture, Droniq. This system includes the mobile application TrackViewer, which facilitates digital drone flight planning by providing essential information on airspace restrictions and drone geozones. This tool supports safe and compliant drone operations by ensuring operators have the necessary information to navigate the airspace effectively.	**6 — Business and Market (2/5)** In Germany, ANSP DFS and Deutsche Telekom's joint venture, Droniq, have conducted a UAS operations/UTM market size analysis identifying significant demand potential. Droniq's target market primarily includes commercial users in sectors such as infrastructure, surveying, and agriculture, specifically for BVLOS operations. Additionally, the company caters to users in public safety, including police, fire and rescue services, as well as the General Aviation sector, highlighting the broad applicability of their services across various industries.

Greece

GREECE	SCORE 13/30

1 – Legislation (4/5)	2 – Governance (2/5)	3 – Strategy (1/5)
In Greece, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	In Greece, while national organizations like the Hellenic U-Space Institute (HUSI) and European-level entities such as the Joint European Drone Associations (JEDA) are involved in the drone sector, there is limited information on the cooperation between the private and public sectors. This includes entities like ANSP HASP and the Hellenic Civil Aviation Authority (HCAA). Additionally, the role of the private sector in UAS operations and UTM decision-making is not well-documented. Furthermore, there is a lack of detailed information on future U-Space governance, including the roles and responsibilities of Common Information Service Providers (CISP) and U-Space Service Providers (USSP).	In Greece, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as ANSP HASP and the Hellenic Civil Aviation Authority (HCAA). This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Greece may not be widely accessible or fully developed.

4 – Operations (3/5)	5 – Technology (2/5)	6 — Business and Market (1/5)
In Greece, the UAS operations tool includes the implementation of drone geozones, which provide specific information about designated airspace areas with operational restrictions and permissions for drones. These geozones help ensure that drone activities are conducted safely and in compliance with national regulations by offering clear guidance on where and how drones can operate.	In Greece, ANSP HASP has implemented a UAS operations tool called the Dron Aware website. This platform provides airspace geo-awareness by offering critical information on airspace restrictions and drone geozones, assisting drone operators in planning and conducting their flights safely and in compliance with regulatory requirements.	In Greece, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP HASP and the Hellenic Civil Aviation Authority (HCAA). This suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Greece may not be fully developed or publicly accessible.

Hungary

HUNGARY	SCORE 17/30

1 – Legislation (4/5)	2 – Governance (3/5)	3 – Strategy (3/5)
In Hungary, following the adoption of Act CLXXIX of 2020 ("Drone Act"), two additional government decrees were adopted as part of the legislative package establishing new rules for the operation and flight of drones. These are Government Decree 38/2021 (II. 2.) on the flight of unmanned state aircraft ("Drone Decree") and Government Decree 39/2021 (II. 2.) amending certain government decrees on aviation.In Hungary, BVLOS	In Hungary, the national-level Hungarian Drone Association (MDK) facilitates cooperation between the private and public sectors, with ANSP HungaroControl as one of its founders. However, there is limited information available on the future governance of U-Space, including details about Common Information Service Providers (CISP) and U-Space Service Providers (USSP). ANSP HungaroControl is a key player in	ANSP HungaroControl has developed a strategy focusing on various aspects of air navigation and potentially including UAS operations and UTM integration. However, Hungary's Drone Strategy is currently in draft form with ongoing modifications to address the rapidly changing environment, but it has not yet been legally adopted. The Hungarian Drone Strategy provides a detailed overview of the

(Beyond Visual Line of Sight) drone operations are permitted, but strict regulations and permits are required. The permits necessary for conducting BVLOS operations are issued by the National Transport Authority.	the Hungarian drone ecosystem, which, as part of N7 Holding National Defense Industrial Innovation Ltd., falls under the supervision of the Ministry of National Economy.	necessary developments within the domestic ecosystem and outlines the potential sources of funding for these initiatives. It also presents a high-level view of the value chain.
4 – Operations (3/5) In Hungary, the UAS operations tool includes the implementation of drone geozones. These geozones provide specific information on where drones can operate, detailing any restrictions or conditions, to ensure safe and compliant drone activities within the national airspace.	**5 – Technology (2/5)** In Hungary, ANSP HungaroControl has implemented a UAS operations tool called MyDroneSpace, available as a mobile application and website. This tool provides airspace geo-awareness by offering information on airspace restrictions and drone geozones, helping drone operators plan and conduct their flights safely and in compliance with regulations.	**6 — Business and Market (2/5)** ANSP HungaroControl has conducted a drone operations market sizing analysis with the assistance of PwC. However, there is a lack of information on other aspects such as a comprehensive national drone operations/UTM high-level value chain mapping, end-level pricing strategy, and business plans from key stakeholders like ANSP HungaroControl, Ministry of National Economy, or the Ministry of Construction and Transport in Hungary. This indicates that detailed strategic and economic insights in these areas may not be fully developed or publicly accessible.

Iceland

	ICELAND	SCORE **12/30**
1 – Legislation (4/5) In Iceland, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is	**2 – Governance (1/5)** In Iceland, there is limited information on the cooperation between the private and public sectors, such as ANSP Isavia ANS	**3 – Strategy (1/5)** In Iceland, there is a lack of detailed information regarding the existing UAS operations and UTM strategies from key

implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	and the CAA Icelandic Transport Authority, particularly regarding the role of the private sector in UAS operations and UTM decision-making. Additionally, there is a lack of detailed information on future U-Space governance, including the roles and responsibilities of Common Information Service Providers (CISP) and U-Space Service Providers (USSP). This indicates that these areas may still be under development or not fully communicated.	organizations such as ANSP Isavia ANS. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Iceland may not be widely accessible or fully developed.
4 – Operations (3/5) In Iceland, the UAS operations tool includes the implementation of drone geozones, which provide specific information about designated airspace areas with operational restrictions and permissions for drones. These geozones help ensure safe and compliant drone activities by offering clear guidance on where and how drones can operate within the national airspace.	**5 – Technology (2/5)** In Iceland, the CAA Icelandic Transport Authority has implemented a UAS operations tool in the form of a website designed to enhance airspace geo-awareness. This platform provides essential information on airspace restrictions and drone geozones, helping drone operators plan and conduct their flights safely and in compliance with regulatory requirements.	**6 — Business and Market (1/5)** In Iceland, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key entities such as ANSP Isavia ANS and the CAA Icelandic Transport Authority. This suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Iceland may not be fully developed or publicly accessible.

Ireland

	IRELAND	SCORE 16/30

1 – Legislation (4/5)	2 – Governance (3/5)	3 – Strategy (3/5)
In Ireland, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	In Ireland, while organizations like the Unmanned Aircraft Association of Ireland and the European-level Joint European Drone Associations (JEDA) exist, there is limited information on cooperation between the private sector and ANSP Air Nav Ireland and the CAA Irish Aviation Authority. However, Dublin Drone Innovation Partnership (launched at the offices of Dublin City Council by the Minister of State at the Department of Transport and the Department of the Environment, Climate and Communications) combines efforts of government, universities and the private sector. Additionally, there is a lack of detailed information on future U-Space governance, including the roles and responsibilities of Common Information Service Providers (CISP) and U-Space Service Providers (USSP). This indicates that these areas may still be under development or not fully communicated.	In Ireland, the Dublin City Council has released the 'Drone and Advanced Air Mobility Strategy 2024-2029,' outlining its vision and strategic goals for integrating drones and advanced air mobility into the city's infrastructure. Meanwhile, the Irish Department of Transport is still developing a 'Draft Policy Framework for Unmanned Aircraft Systems', which will provide further guidance and regulatory structure for UAS operations across the country once completed.
4 – Operations (3/5)	**5 – Technology (2/5)**	**6 — Business and Market (1/5)**
In Ireland, the UAS operations tool incorporates drone geozones, providing detailed information about designated airspace areas	In Ireland, the CAA Irish Aviation Authority has implemented a UAS operations tool in the form of a website to enhance airspace geo-awareness.	In Ireland, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis,

with specific operational restrictions and permissions for drones. These geozones help ensure safe and compliant drone operations by offering clear guidance to operators on where and how they can conduct their flights.	This platform provides essential information on airspace restrictions and drone geozones, assisting drone operators in planning and conducting their flights safely and in compliance with regulatory requirements.	high-level value chain mapping, end-level pricing strategy, and business plans from key entities such as ANSP AirNav Ireland, the CAA Irish Aviation Authority, and the Irish Department of Transport. This suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Ireland may not be fully developed or publicly accessible.

Italy

ITALY	SCORE 19/30

1 – Legislation (3/5)	2 – Governance (3/5)	3 – Strategy (3/5)
The Italian Civil Aviation Authority (ENAC) is currently consulting on a national implementation of the European regulatory framework for UAS operations and UTM, outlined in EU Regulations 2019/945 and 2019/947., .. However, in June 2024, ENAC published the first regulation at national level which regulates flight operations with vertical take-off and landing capable aircraft (VCAs) and introduces the requirements for the construction and operation of vertiports.	In Italy, the national-level Associazione Italiana per i Light RPAS (ASSORPAS) and the European-level Joint European Drone Associations (JEDA) play roles in the drone sector. However, there is limited information on the cooperation between the private and public sectors, such as ANSP ENAV, its joint venture D-Flight, and the Italian Civil Aviation Authority (ENAC), particularly regarding the private sector's role in UAS operations and UTM decision-making. Notably, D-Flight is currently undergoing the certification process to become a Common Information Service Provider (CISP) and	In Italy, a national strategy for Advanced Air Mobility (AAM) operations has been established. The Italian Civil Aviation Authority (ENAC), developed the AAM National Strategic Plan (2021-2030). This plan focuses on the provision of air taxi services using innovative aerial vehicles capable of vertical take-off and landing, primarily powered by electricity.

	U-Space Service Provider (USSP).	
4 – Operations (4/5) In Italy, the first U-Space airspace has been established in the Chieti province of the Abruzzo region, and it is integrated into the basic UTM system. Future candidate U-Space areas in Italy are planned to be centered around major regions, including Rome, Milan, Venice, and Campania, indicating a strategic expansion of U-Space services across the country.	**5 – Technology (3/5)** In Italy, a basic UTM system has been implemented by ANSP ENAV's joint venture D-Flight, in collaboration with Leonardo, Telespazio, and IDS. This system facilitates digital drone planning and approval, providing essential services such as information on airspace restrictions and drone geozones to ensure safe and compliant drone operations.	**6 — Business and Market (3/5)** In Italy, ANSP ENAV has developed a business plan that includes high-level value chain mapping and an end-level pricing strategy. However, there is a lack of information on the existing national drone operations and UTM market sizing analysis from key entities such as ANSP ENAV, its joint venture D-Flight, and the Italian Civil Aviation Authority (ENAC). This suggests that comprehensive market analyses and detailed economic insights into the drone sector in Italy may not be fully documented or publicly available.

Latvia

	**LATVIA**	SCORE **10/30**
1 – Legislation (2/5) In Latvia, there is a general European regulatory framework surrounding UAS operations and UTM released — EU Regulation 2019/945 and EU Regulation 2019/947, as well as EU Regulations 2021/664-666 but there is the lack of information on their national implementation.	**2 – Governance (1/5)** In Latvia, there is limited information on the cooperation between the private and public sectors, such as ANSP LGS or the CAA Civilas aviācijas aģentūra, particularly regarding the role of the private sector in UAS operations and UTM decision-making. Additionally, there is a lack of detailed information on	**3 – Strategy (1/5)** In Latvia, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as ANSP LGS, the CAA Civilas aviācijas aģentūra, and the Ministry of Transport. This suggests that comprehensive strategic plans or documented approaches for managing

	future U-Space governance, including the roles and responsibilities of Common Information Service Providers (CISP) and U-Space Service Providers (USSP). This indicates that these areas may still be under development or not fully communicated.	and integrating UAS operations and UTM in Latvia may not be widely accessible or fully developed.
4 – Operations (3/5) In Latvia, the UAS operations tool includes the implementation of drone geozones. These geozones provide specific information about designated airspace areas with operational restrictions and permissions for drones, helping to ensure that drone activities are conducted safely and in compliance with national regulations. They offer clear guidance to operators on where and how drones can operate within the national airspace.	**5 – Technology (2/5)** In Latvia, ANSP LGS has implemented a UAS operations tool called the Electronic Unmanned Aircraft Restrictions Viewer (eUARV) website. This platform provides airspace geo-awareness by offering crucial information on airspace restrictions and drone geozones, assisting drone operators in planning and conducting their flights safely and in compliance with regulatory requirements.	**6 — Business and Market (1/5)** In Latvia, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP LGS, the CAA Civilas aviācijas aģentūra, and the Ministry of Transport. This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Latvia may not be fully developed or publicly accessible.

Lithuania

	**LITHUANIA**	SCORE **14/30**
1 – Legislation (5/5) In Lithuania, the European regulatory framework for UAS operations and UTM, as per EU Regulations 2019/945, 2019/947, and 2021/664-666, is being	**2 – Governance (2/5)** In Lithuania, while there are organizations like Asociacija Dronea at the national level and Joint European Drone Associations (JEDA) at the	**3 – Strategy (1/5)** In Lithuania, there is a lack of detailed information on existing UAS operations and UTM strategies from key organizations such as ANSP Oro Navigacija and

implemented nationally. The aviation law has been amended to designate the authorities responsible for the certification and oversight of Common Information Service Providers (CISP) and U-Space Service Providers (USSP). Additionally, a procedure for issuing certificates to CISP/USSP has been approved, facilitating structured governance in U-Space services.	European level, there is limited information on the cooperation between the private and public sectors, such as ANSP Oro Navigacija or the Ministry of Transport and Communications. Additionally, the role of the private sector in UAS operations and UTM decision-making is not well-documented. There is also a lack of detailed information on future U-Space governance, including the roles and responsibilities of Common Information Service Providers (CISP) and U-Space Service Providers (USSP).	the Ministry of Transport and Communications. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Lithuania may not be widely accessible or fully developed.
4 – Operations (3/5) In Lithuania, drone geozones have been established for UAS operations. ANSP Oro Navigacija provides an online VFR aeronautical chart to assist with navigation. However, Oro Navigacija emphasizes that it does not accept liability for any direct or indirect damage resulting from improper use or inaccurate aeronautical data. Additionally, the ANSP does not guarantee the accuracy or reliability of the data provided, indicating that users should verify information independently to ensure safe operations.	**5 – Technology (2/5)** In Lithuania, while no specific technology has been fully implemented for UAS operations and UTM, a basic UTM system is currently being developed by ANSP Oro Navigacija in collaboration with Frequentis. This system will include a mobile application designed to provide services such as drone flight approval, traffic information, and other related functionalities to support safe and efficient drone operations.	**6 — Business and Market (1/5)** In Lithuania, there is a lack of information on the existing national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP Oro Navigacija and the Ministry of Transport and Communications. This indicates that comprehensive economic and strategic insights into the drone industry and UTM services in Lithuania may not be fully developed or publicly accessible.

Luxembourg

LUXEMBOURG	SCORE 13/30

1 – Legislation (4/5)

In Luxembourg, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.

2 – Governance (2/5)

In Luxembourg, while organizations like the Luxembourg Drone Federation and the European-level Joint European Drone Associations (JEDA) exist, there is limited information on the cooperation between the private and public sectors, such as EUROCONTROL MUAC, the CAA Directorate of Civil Aviation, and the Ministry of Mobility and Public Works. The role of the private sector in UAS operations and UTM decision-making is not well-documented. Additionally, there is a lack of detailed information on future U-Space governance, including the roles and responsibilities of Common Information Service Providers (CISP) and U-Space Service Providers (USSP), indicating that these areas may still be under development or not fully communicated.

3 – Strategy (1/5)

In Luxembourg, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as EUROCONTROL MUAC, the CAA Directorate of Civil Aviation, and the Ministry of Mobility and Public Works. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Luxembourg may not be widely accessible or fully developed.

4 – Operations (3/5)

In Luxembourg, the UAS operations tool includes the implementation of drone geozones. These geozones provide specific information about designated airspace areas with operational restrictions and permissions for drone

5 – Technology (2/5)

In Luxembourg, the CAA Directorate of Civil Aviation has implemented a UAS operations tool in the form of a website designed to enhance airspace geo-awareness. This platform provides essential information on airspace

6 — Business and Market (1/5)

In Luxembourg, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business

activities, helping ensure that drone operations are conducted safely and in compliance with national regulations. They offer clear guidance to operators on where and how drones can operate within the national airspace.	restrictions and drone geozones, assisting drone operators in planning and conducting their flights safely and in compliance with regulatory requirements.	plans from key organizations such as EUROCONTROL MUAC, the CAA Directorate of Civil Aviation, and the Ministry of Mobility and Public Works. This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Luxembourg may not be fully developed or publicly accessible.

Malta

MALTA		SCORE 12/30
1 – Legislation (4/5)	**2 – Governance (1/5)**	**3 – Strategy (1/5)**
In Malta, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	In Malta, there is limited information regarding the cooperation between the private and public sectors, such as ANSP MATS, the CAA Civil Aviation Directorate, and the Ministry of Transport, Infrastructure and Public Works, particularly concerning the role of the private sector in UAS operations and UTM decision-making. Additionally, there is a lack of detailed information on future U-Space governance, including the roles and responsibilities of Common Information Service Providers (CISP) and U-Space Service Providers (USSP). This suggests that these areas may still be under	In Malta, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as ANSP MATS, the CAA Civil Aviation Directorate, and the Ministry of Transport, Infrastructure and Public Works. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Malta may not be widely accessible or fully developed.

	development or not fully communicated.	
4 – Operations (3/5) In Malta, the UAS operations tool includes the implementation of drone geozones. These geozones provide specific information about designated airspace areas with operational restrictions and permissions for drone activities, helping ensure that drone operations are conducted safely and in compliance with national regulations. They offer clear guidance to operators on where and how drones can operate within the national airspace.	**5 – Technology (2/5)** In Malta, the CAA Civil Aviation Directorate has implemented a UAS operations tool in the form of a website to enhance airspace geo-awareness. This platform provides essential information on airspace restrictions and drone geozones, assisting drone operators in planning and conducting their flights safely and in compliance with regulatory requirements.	**6 — Business and Market (1/5)** In Malta, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP MATS, the CAA Civil Aviation Directorate, and the Ministry of Transport, Infrastructure and Public Works. This indicates that comprehensive economic and strategic insights into the drone industry and UTM services in Malta may not be fully developed or publicly accessible.

Netherlands

	NETHERLANDS	SCORE **18/30**
1 – Legislation (4/5) In the Netherlands, the European regulatory framework for UAS operations, as outlined in EU Regulations 2019/945 and 2019/947, is being implemented at the national level. These regulations provide the foundation for drone operations across the EU. Additionally, the Netherlands is working on	**2 – Governance (3/5)** In the Netherlands, organizations such as the Royal Dutch Aviation Association Drones (KNVVL) and Dutch Certified RPAS Operators (DCRO) operate at the national level, while the Unmanned Aviation Association (UAV DACH) and Joint European Drone Associations (JEDA) provide regional and European	**3 – (Strategy 3/5)** ANSP LVNL has developed a strategy, likely focusing on various aspects of air navigation services, including the integration and management of UAS operations and UTM frameworks. However, specific details about the content and focus areas of this strategy are not widely documented or publicly available.

integrating EU Regulations 2021/664-666, which focus on UTM services, into their national framework. The specifics of how these are adapted locally may not be extensively detailed.	perspectives. However, there is limited information on the cooperation between the private and public sectors, such as ANSP LVNL and the Ministry of Infrastructure and Water Management, particularly regarding UAS operations and UTM decision-making. The future governance of U-Space, including roles for Common Information Service Providers (CISP) and U-Space Service Providers (USSP), is being explored in reports prepared by various consultancies for the Ministry of Infrastructure and Water Management. These efforts are shaping the emerging framework for U-Space services in the Netherlands.	Additionally, there is a publicly available strategy with roadmap as part of the document "Advies Unmanned Air Mobility (UAM) in Nederland" developed by the Ministry of Infrastructure and Water Management and Royal Netherlands Aerospace Centre.
4 – Operations (3/5) In the Netherlands, the basic UTM system incorporates drone geozones, which are designated areas within the airspace that outline specific operational restrictions and permissions for drones. These geozones help ensure that drone activities are conducted safely and in compliance with national regulations by providing clear guidelines on where drones can operate.	**5 – Technology (3/5)** In the Netherlands, a basic UTM system has been implemented by ANSP LVNL in collaboration with Altitude Angel. This system includes the GoDrone desktop and mobile application, which facilitates drone operator registration and digital drone flight planning and approval. It provides essential information on airspace restrictions and drone geozones, and supports direct non-verbal communication to enhance the safety and efficiency of drone operations.	**6 — Business and Market (2/5)** The Ministry of Infrastructure and Water Management and Royal Netherlands Aerospace Centre conducted a market sizing of Unmanned Air Mobility (UAM). The document also presents the social effects that are necessary for a proper integral assessment of the usefulness and necessity of drones.

Norway

NORWAY		SCORE 19/30
1 – Legislation (4/5) In Norway, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, was adopted and is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	**2 – Governance (3/5)** In Norway, there have been standard public-private discussions and implementations regarding UAS operations and UTM governance, involving public stakeholders such as Norway's ANSP Avinor, CAA Luftfartstilsynet, the Ministry of Transport, and the Ministry of Digitalisation and Public Governance. These entities are the main decision-makers in this area. The RegulAIR project further exemplifies collaboration by bringing together public institutions and private companies, including partnerships with the CAA, UAS Norway, and the Oslo Police, to integrate drones into Norwegian and European airspace. However, there is limited information on the future U-Space governance, specifically regarding the roles of Common Information Service Providers (CISP) and U-Space Service Providers (USSP), although initial indications suggest that ANSP Avinor may become a CISP.	**3 – Strategy (3/5)** In Norway, a national-level UAS operations and UTM strategy has been defined through the release of the 'Drone Strategy' in 2018. This document outlines how Norway plans to adapt to new U-Space regulations emerging in Europe and develop complementary national regulations. It addresses aspects such as commercial operations, policies, and R&D for UTM systems but does not cover Advanced Air Mobility (AAM). Additionally, ANSP Avinor has developed a UTM strategic roadmap, further detailing the country's approach to integrating and managing drone operations within the national airspace.
4 – Operations (3/5) In Norway, the basic UTM system incorporates drone	**5 – Technology (3/5)** In Norway, ANSP Avinor, in collaboration with	**6 — Business and Market (3/5)**

geozones, providing operators with detailed information about designated airspace areas with specific operational restrictions and permissions for drones. These geozones help ensure that drone activities are conducted safely and in compliance with national regulations by offering clear guidance on where and how drones can operate.	Frequentis, has implemented a basic UTM system that includes the Avinor Drone Map website and the Ninox Drone mobile application. These tools provide digital drone flight planning and approval services, offering essential information on airspace restrictions and drone geozones, specifically covering 18 airports. Looking ahead, ANSP Avinor plans to implement a nationwide advanced UTM, with Thales powered by AstraUTM handling its development. This system will cover both controlled and uncontrolled airspace, as well as U-Space airspace, enhancing the integration and management of drone operations across the country.	In Norway, ANSP Avinor has conducted a UAS operations/UTM market size analysis and developed a high-level value chain mapping. These efforts serve as a basis for creating a business plan, providing strategic insights into the economic potential and organizational framework for drone operations and UTM services within the country.

Poland

POLAND	SCORE 18/30

1 – Legislation (4/5)	2 – Governance (2/5)	3 – Strategy (3/5)
In Poland, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may	In Poland, while the Polish Chamber of Unmanned Systems (PISB) exists at the national level, there is limited information on cooperation between the private and public sectors, such as the CAA Polish Civil Aviation Authority (ULC), ANSP Polish Air Navigation Services Agency (PANSA), and the Ministry of	In Poland, a national white paper on UAS operations and UTM was released in 2019, outlining the framework and guidelines for these sectors. However, there is a lack of detailed national and organizational strategies from key stakeholders such as the CAA Polish Civil Aviation Authority (ULC), ANSP

not be extensively documented.	Infrastructure. The involvement of the private sector in UAS operations and UTM decision-making appears limited, and there is a lack of public information on future U-Space governance, including the roles of Common Information Service Providers (CISP) and U-Space Service Providers (USSP). Despite this, the GREy UTM technology company, a subsidiary of Droneradar, has collaborated with Metropolia GZM to conduct workshops with local authorities, focusing on defining UAS geozones. This initiative represents a step towards enhancing cooperation and understanding between different stakeholders in the UAS ecosystem.	Polish Air Navigation Services Agency (PANSA), and the Ministry of Infrastructure. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Poland may not be fully developed or publicly accessible.
4 – Operations (4/5) In Poland, the basic UTM system includes the implementation of drone geozones, providing information about designated airspace areas with specific restrictions and permissions for drone operations. Additionally, three basic U-Space-like airspaces have been defined, offering advanced UTM services in GZM, Lublin, and south of Warsaw (Nadarzyn/Lesznowola). There are plans to expand these U-Space areas with an additional nine locations.	**5 – Technology (4/5)** In Poland, the ANSP Polish Air Navigation Services Agency (PANSA) has implemented a basic UTM system known as PansaUTM, which includes the DroneTower mobile application. This system facilitates drone operator registration and digital drone flight planning and approval, providing essential information on airspace restrictions and drone geozones, as well as supporting direct non-verbal communication.	**6 — Business and Market (1/5)** In Poland, there is limited information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key entities such as the CAA Polish Civil Aviation Authority (ULC) and ANSP Polish Air Navigation Services Agency (PANSA). Additionally, the Polish drone market assessment was conducted by the Aviation Institute and the

However, these areas currently do not support commercial BVLOS services, indicating a focus on foundational UTM capabilities. Moreover, existing in the past commercial BVLOS drone delivery services provided by FARADA (LabAir project) for over 15 months, have been suspended.	PansaUTM is being further developed to include additional public services such as e-Registration, e-Certification, e-Licensing, e-Learning, e-SORA (Specific Operations Risk Assessment), e-Identification, and Dynamic Safety and Security features for law enforcement services. This expansion aims to enhance the functionality and comprehensiveness of the UTM system in Poland. Additionally, three basic U-Space-like airspaces have been equipped with PansaUTM's DTM Autonomy module, offering advanced UTM services in GZM, Lublin, and south of Warsaw (Nadarzyn/Lesznowola).	Foundation Institute Mikromakro in cooperation with other industry players in 2024.

Portugal

	PORTUGAL	SCORE **13/30**
1 – Legislation (4/5) In Portugal, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	**2 – Governance (2/5)** In Portugal, while organizations such as the Portuguese Association of Unmanned Aircraft (APANT) and the European-level Joint European Drone Associations (JEDA) are active, there is limited information on the cooperation between the private and public sectors, including ANSP NAV Portugal, the CAA National Authority of Civil Aviation, and the Ministry of	**3 – Strategy (1/5)** In Portugal, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as ANSP NAV Portugal, the CAA National Authority of Civil Aviation, and the Ministry of Infrastructure and Housing. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS

	Infrastructure and Housing. The role of the private sector in UAS operations and UTM decision-making is not well-documented. Additionally, there is a lack of detailed information on future U-Space governance, including the roles of Common Information Service Providers (CISP) and U-Space Service Providers (USSP), indicating that these areas may still be under development or not fully communicated.	operations and UTM in Portugal may not be widely accessible or fully developed.
4 – Operations (3/5) In Portugal, the UAS operations tool includes the implementation of drone geozones. These geozones provide specific information about designated airspace areas with operational restrictions and permissions for drone activities, helping ensure that drone operations are conducted safely and in compliance with national regulations. They offer clear guidance to operators on where and how drones can operate within the national airspace.	**5 – Technology (2/5)** In Portugal, the CAA National Authority of Civil Aviation has implemented a UAS operations tool in the form of a website designed to enhance airspace geo-awareness. This platform provides essential information on airspace restrictions and drone geozones, assisting drone operators in planning and conducting their flights safely and in compliance with regulatory requirements.	**6 — Business and Market (1/5)** In Portugal, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP NAV Portugal, the CAA National Authority of Civil Aviation, and the Ministry of Infrastructure and Housing. This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Portugal may not be fully developed or publicly accessible.

Romania

	ROMANIA	SCORE 13/30

1 – Legislation (4/5) In Romania, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	**2 – Governance (2/5)** In Romania, while national organizations like UVS Romania and the European-level Joint European Drone Associations (JEDA) exist, there is limited information on the cooperation between the private and public sectors, such as ANSP ROMATSA, the Romanian CAA, and the Ministry of Transport. The role of the private sector in UAS operations and UTM decision-making is not well-documented. Additionally, there is a lack of detailed information on future U-Space governance, including the roles of Common Information Service Providers (CISP) and U-Space Service Providers (USSP), indicating that these areas may still be under development or not fully communicated.	**3 – Strategy (1/5)** In Romania, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as ANSP ROMATSA, the Romanian CAA, and the Ministry of Transport. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Romania may not be widely accessible or fully developed.
4 – Operations (3/5) In Romania, the UAS operations tool includes the implementation of drone geozones, providing operators with information about designated airspace areas with specific operational restrictions and permissions for drone activities. These geozones help ensure safe and compliant drone operations by offering clear guidance on where and how drones	**5 – Technology (2/5)** In Romania, the Romanian CAA has implemented a UAS operations tool in the form of a website designed to enhance airspace geo-awareness. This platform provides essential information on airspace restrictions and drone geozones, assisting drone operators in planning and conducting their flights safely and in compliance with regulatory requirements.	**6 — Business and Market (1/5)** In Romania, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP ROMATSA, the Romanian CAA, and the Ministry of Transport. This absence suggests that

can operate within the national airspace.		comprehensive economic and strategic insights into the drone industry and UTM services in Romania may not be fully developed or publicly accessible.

Slovakia

SLOVAKIA		SCORE 13/30
1 – Legislation (4/5) In Slovakia, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	**2 – Governance (2/5)** In Slovakia, while the national-level Mam Drone (Slovak Drone Industry Association) exists, there is limited information on the cooperation between the private and public sectors, such as ANSP LPS SR, the Slovak CAA, and the Ministry of Transport. The role of the private sector in UAS operations and UTM decision-making is not well-documented. Additionally, there is a lack of detailed information on future U-Space governance, including the roles and responsibilities of Common Information Service Providers (CISP) and U-Space Service Providers (USSP), indicating that these areas may still be under development or not fully communicated.	**3 – Strategy (1/5)** In Slovakia, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as ANSP LPS SR, the Slovak CAA, and the Ministry of Transport. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Slovakia may not be widely accessible or fully developed.
4 – Operations (3/5) In Slovakia, the UAS operations tool includes the implementation of	**5 – Technology (2/5)** In Slovakia, a private UAS operations tool, the MamDron mobile	**6 — Business and Market (1/5)** In Slovakia, there is a lack of detailed information

drone geozones. These geozones provide specific information about designated airspace areas with operational restrictions and permissions for drone activities, helping ensure that drone operations are conducted safely and in compliance with national regulations. They offer clear guidance to operators on where and how drones can operate within the national airspace.	application, provides airspace geo-awareness by offering information on airspace restrictions and drone geozones. This tool helps drone operators plan and conduct their flights safely and in compliance with regulatory requirements by providing essential guidance on where and how drones can operate.	regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP LPS SR, the Slovak CAA, and the Ministry of Transport. This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Slovakia may not be fully developed or publicly accessible.

Slovenia

SLOVENIA	SCORE 14/30

1 – Legislation (4/5)	2 – Governance (1/5)	3 – Strategy (3/5)
In Slovenia, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	In Slovenia, there is limited information regarding the cooperation between the private and public sectors, such as ANSP Slovenia Control, the CAA Civil Aviation Agency, and the Ministry of Infrastructure. The role of the private sector in UAS operations and UTM decision-making is not well-documented, indicating a potential gap in understanding these interactions. Additionally, there is a lack of detailed information on future U-Space governance, including the roles and responsibilities of Common Information Service Providers (CISP) and U-	In Slovenia, a partial UAS operations and UTM strategy is outlined in the Slovenian Plan for Aviation Safety 2022-2026, which includes information on UAS. This plan provides some strategic direction for integrating uncrewed aircraft systems into the national airspace, although it may not fully cover all aspects of UTM or provide comprehensive details on future developments and governance.

	Space Service Providers (USSP), suggesting that these areas may still be under development or not fully communicated.	
4 – Operations (3/5) In Slovenia, the UAS operations tool includes the implementation of drone geozones. These geozones provide specific information about designated airspace areas with operational restrictions and permissions for drone activities, helping ensure that drone operations are conducted safely and in compliance with national regulations. They offer clear guidance to operators on where and how drones can operate within the national airspace.	**5 – Technology (2/5)** In Slovenia, the CAA Civil Aviation Agency has implemented a UAS operations tool in the form of a website designed to enhance airspace geo-awareness. This platform provides essential information on airspace restrictions and drone geozones, assisting drone operators in planning and conducting their flights safely and in compliance with regulatory requirements.	**6 — Business and Market (1/5)** In Slovenia, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as ANSP Slovenia Control, the CAA Civil Aviation Agency, and the Ministry of Infrastructure. This suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Slovenia may not be fully developed or publicly accessible.

Spain

	**SPAIN**	SCORE **19/30**
1 – Legislation (5/5) In Spain, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country also integrated UTM-related EU Regulations 2021/664-666 by the CAA State Aviation Safety Agency (AESA). The	**2 – Governance (4/5)** In Spain, there have been standard public-private discussions and implementations regarding UAS operations and UTM governance, involving collaboration between various public stakeholders and active participation from the private sector. Key public entities include the	**3 – Strategy (3/5)** In Spain, the Ministry of Transport, Mobility and the Urban Agenda (MITMA) has defined a national strategy for UAS operations and UTM through the release of the 'National Action Plan for the Development of U-Space in Spain (2022-2025).' This plan focuses on integrating UAS into the

Royal Decree 517/2024 established the responsible authorities for the certification and oversight of the CISP/USSP.	Directorate-General for Civil Aviation (DGCA), the CAA State Aviation Safety Agency (AESA), Air Staff (Jefatura de Estado Mayor del Aire), the Ministry of the Interior, and CIDETMA (Interministerial Commission for Defence and Transport, Mobility and Urban Agenda). On the private and semi-public side, organizations such as ANSP Empresa Nacional de Navegación Aérea y Aeropuertos (ENAIRE), Servicios Aeronáuticos Control y Navegación (SAERCO), and FerroNATS are involved. There are ongoing discussions about designating ENAIRE as a single Common Information Service Provider (CISP) and as one of the U-Space Service Providers (USSPs), highlighting its central role in the future governance of U-Space services in Spain.	national airspace alongside associated U-Space services, outlining strategic goals and initiatives to facilitate the safe and efficient incorporation of drones into Spanish airspace.
4 – Operations (3/5) In Spain, the basic UTM system includes the implementation of drone geozones, which provide specific information on designated airspace areas with operational restrictions and permissions for drone activities. These geozones help ensure that drone operations are conducted safely and in compliance with national regulations, offering clear guidance to operators on where and	**5 – Technology (3/5)** In Spain, a basic UTM system has been implemented by ANSP Empresa Nacional de Navegación Aérea y Aeropuertos (ENAIRE) in collaboration with Indra. This system includes a website and mobile application designed for digital drone flight planning and approval, providing essential information on airspace restrictions and drone geozones. This setup	**6 — Business and Market (1/5)** In Spain, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as the Directorate-General for Civil Aviation (DGCA), the CAA State Aviation Safety Agency (AESA), and ANSP

how drones can operate within the national airspace.	facilitates safe and compliant drone operations by enabling operators to access necessary regulatory and airspace information efficiently.	Empresa Nacional de Navegación Aérea y Aeropuertos (ENAIRE). This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Spain may not be fully developed or publicly accessible.

Sweden

	SWEDEN	SCORE **14/30**
1 – Legislation (4/5) In Sweden, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country is also working on integrating UTM-related EU Regulations 2021/664-666. Specific details on the national adaptation may not be extensively documented.	**2 – Governance (3/5)** In Sweden, the private market and local governments actively participate in UAS operations and UTM decision-making. The Swedish Transport Administration Agency and ANSP Luftfartsverket (LFV) are involved in various projects that facilitate collaboration between the public and private sectors. RISE, a state-owned research institute, plays a key role in bringing these sectors together, working with entities such as Altitude Angel, a UTM technology provider, to advance UAS and UTM initiatives.	**3 – Strategy (1/5)** In Sweden, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as ANSP Luftfartsverket (LFV) and the Swedish Transport Administration Agency. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Sweden may not be widely accessible or fully developed.
4 – Operations (3/5) In Sweden, the UAS operations tool incorporates drone geozones, which provide detailed information about designated airspace areas	**5 – Technology (2/5)** In Sweden, ANSP Luftfartsverket (LFV) has implemented a UAS operations tool in the form of a website designed to enhance airspace geo-	**6 — Business and Market (1/5)** In Sweden, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis,

with specific operational restrictions and permissions for drone activities. These geozones help ensure that drone operations are conducted safely and in compliance with national regulations, offering clear guidance to operators on where and how drones can operate within the national airspace.	awareness. This platform provides essential information on airspace restrictions and drone geozones, assisting drone operators in planning and conducting their flights safely and in compliance with regulatory requirements.	high-level value chain mapping, end-level pricing strategy, and business plans from key entities such as ANSP Luftfartsverket (LFV) and the Swedish Transport Administration Agency. This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Sweden may not be fully developed or publicly accessible.

Switzerland

SWITZERLAND		SCORE 20/30
1 – Legislation (5/5)	**2 – Governance (4/5)**	**3 – Strategy (3/5)**
In Switzerland, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, is implemented nationally. The country also integrated UTM-related EU Regulations 2021/664-666. Ordinance on the Air Navigation Service (ANSO) — covers roles and responsibilities within U-Space operations. Ordinance on Fees charged by Federal Office of Civil Aviation (FOCA) (FeeO-FOCA) — establishes the fee structure related to U-Space services. Ordinance on Special Category Aircraft (OSCA) — updated to address specific	In Switzerland, the private market and local governments actively participate in UAS operations and UTM decision-making. The CAA Federal Office of Civil Aviation (FOCA) oversees compliance and governance in this area. The Swiss U-Space Implementation (SUSI) is a public-private partnership established in December 2018 to facilitate the safe and secure integration of drones into Swiss airspace. SUSI brings together FOCA, ANSP Skyguide, and various companies involved in drones and UTM. However, there is no clear documentation on dedicated CISP governance.	In Switzerland, a national UAS operations and UTM strategy has been defined through a Concept of Operations (ConOps) and the Swiss U-Space Implementation (SUSI) initiative. This strategy outlines the framework for integrating U-Space services into Swiss airspace, focusing on the safe and efficient management of drone operations. SUSI serves as a collaborative effort between public and private sectors to implement and advance U-Space capabilities across the nation. The Federal Office of Civil Aviation (FOCA) published "Airspace and Aviation Infrastructure Strategy of Switzerland

operational aspects in U-Space.		(AVISTRAT-CH)", where Guidelines for airspace services in the U-Space are mentioned as part of underlying initiatives on integrating new aviation technologies. Moreover, in December 2024, the Swiss Federal Council published the Swiss Drone Strategy, while tasking the FOCA to implement it. The strategy defines inter alia that by 2030, all airspace users will be equipped with cost-efficient and internationally compatible position reporting systems, as well as that it will leverage both aviation and non-aviation data to support evidence-based regulatory processes for drone integration.
4 – Operations (3/5) In Switzerland, the basic UTM system incorporates drone geozones, providing information about designated airspace areas with specific operational restrictions and permissions for drone activities. The country is currently in the UTM/U-Space airspace designation stage, with Zurich being designated as the first U-Space airspace. This designation marks a significant step toward implementing advanced U-Space services to facilitate safe and efficient drone integration into the airspace.	**5 – Technology (3/5)** In Switzerland, ANSP Skyguide has implemented a basic UTM system through the Swiss U-Space mobile application, which facilitates digital drone planning and approval by providing information on airspace restrictions and drone geozones. Additionally, Skyguide manages the Flight Information Management System (FIMS), which integrates air traffic management with U-Space Service Providers (USSPs) to ensure efficient coordination between crewed and uncrewed aircraft operations.	**6 — Business and Market (2/5)** In Switzerland, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as the CAA Federal Office of Civil Aviation (FOCA) and ANSP Skyguide. However, the Drones Industry Association Switzerland (DIAS) is in charge of publishing annual versions of "Swiss Drone Industry Report", where the most important calculations are provided.

United Kingdom

UNITED KINGDOM	SCORE 18/30

1 – Legislation (4/5)

In the UK, the European regulatory framework for UAS operations, based on the basic EU Regulations 2019/945 and 2019/947, was adopted and is implemented nationally with the Air Traffic Management Act 2021. The country is also working on integrating UTM-related EU Regulations 2021/664-666.

2 – Governance (3/5)

In the UK, the private market and local governments actively participate in UAS operations and UTM decision-making. The UK Civil Aviation Authority (CAA) collaborates closely with public and private partners, including ANSP NATS (National Air Traffic Services) and Altitude Angel, a UTM technology provider, to develop the UTM ecosystem.

Additionally, the Aviation Autonomy project, led by the Law Commission of England and Wales, is reviewing legal frameworks for autonomous flight systems. A second consultation paper is scheduled for early 2025, with a final report expected later that year, aiming to address regulatory needs and support the integration of autonomous flight technologies.

In 2024, UK Civil Aviation Authority (CAA) launched a regulatory sandbox to help support the development for the integration of UAS into UK Airspace.

3 – Strategy (4/5)

In the UK, the UAS operations and UTM strategy is defined at the national level by the UK Civil Aviation Authority (CAA). The CAP 1711b (Airspace Modernisation Strategy Part 3) sets clear timelines for integrating UAS, targeting a demonstration of scalable BVLOS operations by 2027 and the routine integration of uncrewed aircraft into UK airspace by 2030.

Additionally, CAP 3038 outlines the technical strategy for scaling BVLOS operations, focusing on risk management and delivery models. These documents provide a comprehensive framework for the safe and efficient integration of drones into the national airspace.Also, UK Research and Innovation (UKRI) released “Future Flight Vision and Roadmap” until 2030 for the new classes of air vehicles: drones, advanced air mobility and regional air mobility. It also sets the strategic vision for the Future Flight Challenge in 2024 (a £300 million program, jointly funded by the Innovate UK and the Social and Economic Research Council).

4 – Operations (3/5)

In the UK, drone airspace structures, including geozones, have been implemented to manage UAS operations. Additionally, there have been public services focused UTM and BVLOS trials focused on integrating uncrewed and crewed aircraft in unsegregated airspaces. These trials particularly emphasize the development and testing of detect-and-avoid (DAA) systems to ensure safety and efficiency in mixed airspace environments.

Projects funded by Future Flight Challenge to test BVLOS operations include:

- **SWARM:** led by Windracers and others, testing drone swarming for fire detection and coordinated drops.
- **CAELUS:** led by NATS and others, a two-phased project in Scotland testing UTM systems for automated medical drone deliveries in rural areas.
- **Skyway:** led by Altitude Angels and others, developing a nationwide network of "Arrow Drone Zones" for large-scale BVLOS operations.

The National Police Chiefs' Council (NPCC) is conducting the first UK trial of Drone as First Responder (DFR) to test the

5 – Technology (2/5)

In the UK, ANSP National Air Traffic Services (NATS) has implemented a UAS operations tool in the form of a website designed to enhance airspace geo-awareness. This platform provides information on airspace restrictions and drone geozones, assisting drone operators in planning and conducting their flights safely and in compliance with regulations.

NATS plans to expand its UTM services in 2025, aiming to incorporate advanced features such as tracking, airspace deconfliction, and dynamic rerouting capabilities. These enhancements will further support the safe integration of drones into UK airspace.

NATS is currently working on NATS OpenAir — a digital integrated airspace management system designed to accommodate both traditional aircraft and new airspace users like drones and eVTOLs. It will enable the exchange of data on operators, flight plans, approval requests, approvals, check-ins, location/flight actuals, incidents/infringements, and central control directives.

6 — Business and Market (2/5)

In the UK, a market size analysis of the UAS operations and UTM market has been conducted, identifying significant demand potential. The PwC "Skies Without Limits v3.0" report provides detailed insights into the UK drone market, highlighting growth opportunities and the economic impact of integrating drones into various sectors. This report serves as a valuable resource for understanding the potential benefits and challenges of expanding drone operations in the UK.

Another PwC`s report – "Advanced Air Mobility. UK Economic Impact Study" – determines the potential for AAM in the UK and its net impact to the UK`s economy.

UK Research and Innovation (UKRI) as part of its "Future Flight Vision and Roadmap" projected the number of drones to be in use by industry on the UK by 2030 and its impact on country`s GDP.

concept, evaluate systems, and gather evidence of safe BVLOS operations. There have been airspace integration trials with the UK Ministry of Defence and Eagle Eye to manage conflicts between drones and Air Ambulance helicopters. Additionally, in 2023, there was a trial by King's College London and others testing drones delivering opioid overdose reversal kits.		

Middle East

Bahrain

BAHRAIN	SCORE 10/30

1 – Legislation (2/5)	2 – Governance (2/5)	3 – Strategy (1/5)
In Bahrain, the Department of Civil Aviation Affairs has released regulations under Bahrain's Civil Aviation Law that cover specific niches, including basic UAS operations. According to Article 62, unmanned aircraft are permitted to operate in Bahrain's airspace only with approval from the Department of Civil Aviation Affairs. However, the current regulations do not specifically address BVLOS operations or UTM, indicating that these areas may require further regulatory development.	In Bahrain, discussions and implementations regarding UAS operations and UTM governance have primarily involved public entities, particularly the Department of Civil Aviation Affairs and the Ministry of Transportation and Telecommunications. These discussions have mainly focused on developing and refining UAS regulations to ensure the safe and effective management of drone operations within the country. This public sector focus highlights the foundational steps being taken to establish a regulatory framework for UAS activities in Bahrain.	In Bahrain, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as the Department of Civil Aviation Affairs and the Ministry of Transportation and Telecommunications. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Bahrain may not be widely accessible or fully developed.
4 – Operations (2/5)	**5 – Technology (2/5)**	**6 — Business and Market (1/5)**
In Bahrain, traditional airspace structure segregations have been established to manage UAS operations. These segregations define specific zones and guidelines within the airspace to ensure that drone activities are conducted safely and in compliance with national regulations. This structured approach helps manage	In Bahrain, there is limited information available on the existing technology infrastructure implemented for UAS operations and UTM by the Department of Civil Aviation Affairs. While there is a government website that provides a drone operations application form for operators to seek necessary approvals, it does not offer information	In Bahrain, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as the Department of Civil Aviation Affairs and the Ministry of Transportation

airspace usage effectively, supporting the safe integration of both crewed and uncrewed aircraft operations.	on geo-awareness, such as details about airspace restrictions and drone geozones. This suggests that while basic administrative processes are in place, more advanced technological solutions for managing drone operations may not be fully developed or publicly detailed.	and Telecommunications. This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Bahrain may not be fully developed or publicly accessible.

Israel

	ISRAEL	SCORE 20/30
1 – Legislation (3/5)	**2 – Governance (3/5)**	**3 – Strategy (4/5)**
In Israel, the Civil Aviation Authority of Israel (CAAI) has implemented regulations to facilitate commercial drone operations and services, providing an initial set of standards. As of 2023, drones weighing over 200 grams are required to maintain an active connection to an approved UTM system during flight, as mandated by CAAI Regulation 10916. This regulation stipulates that drones must broadcast operational data, including location, altitude, speed, and direction, in compliance with ASTM F3411-22a and F3548-21 standards, as well as with improving DSS protocols. Such data must be accessible to Israeli authorities, including the military, police, and	In Israel, there have been active public-private discussions and implementations regarding UAS operations and UTM governance, involving public stakeholders, including local governments, and active participation from the private market. A significant development is the establishment of the world's first municipal airspace control center for autonomous drones and eVTOL flights. This sand-box initiative is part of the Israel National Drone Initiative (INDI), a partnership involving the Innovation Authority, the Civil Aviation Authority of Israel (CAAI) and many others like 8 municipalities and 18 hospitals. The Israeli Defence Force, along with Israeli companies, utilizes	In Israel, a national UTM strategy has been pre-defined to align with broader aviation goals, including Advanced Air Mobility. The INDI was launched by the Israel Innovation Authority, C4IR Israel, Ayalon Highways, the Ministry of Transport, and the Civil Aviation Authority of Israel (CAAI). This initiative aims to integrate UAS and UTM technologies, make UAS operations more affordable and accessible, and foster collaboration between public and private sectors. The initiative also focuses on integrating Advanced Air Mobility solutions, such as eVTOLs, into Israel's transportation system. Under this initiative, models like the AIR ONE and EHANG's EH216-S have been tested, demonstrating

intelligence services, upon request. Additionally, the CAAI issues waivers for BVLOS (Beyond Visual Line of Sight) operations, allowing for more advanced and expansive drone activities under specific conditions.	this center for conducting BVLOS trials, highlighting a collaborative effort to advance drone and eVTOL integration into the national airspace. Moreover, the government-funded project "Local UTM for Mass Events" allows to local authorities or public services to deploy temporary UTM airspaces for up to 48 hours to enhance UAS operations with the highest safety. Unlike the R&D focused INDI, this project focuses on public and authorities education and acceptance, and it involves the private commercial sector, taking all technologies and lessons learned from the INDI, and deploying UTM step by step in real operations in the airspace.	a commitment to advancing drone and air mobility technologies in the country.
4 – Operations (4/5) In Israel, drone airspace structures have been implemented to facilitate UAS operations. These structures define specific zones and guidelines within the airspace to ensure that drone activities are conducted safely and in compliance with national regulations. This framework helps manage airspace usage effectively, accommodating both crewed and uncrewed aircraft operations.	**5 – Technology (4/5)** In Israel, an advanced UTM system has been implemented using High Lander's Vega UTM platform. This platform provides advanced UTM services such as deconfliction and dynamic airspace management, which enable and support commercial and scalable BVLOS operations. The Israeli Government Companies Authority and the Israel Innovation Authority have selected High Lander's Vega UTM as an Israel National Drone	**6 — Business and Market (2/5)** In Israel, a market size analysis of the UAS operations and UTM market has been conducted, identifying significant demand potential. Startup Nation Central performed this analysis, focusing on Israeli startups and the funding they have received. This research provides insights into the growth opportunities and financial backing within the Israeli drone and UTM sectors, highlighting the dynamic

	Initiative (INDI) sand-box CIS, together with Airwayz software solution to contribute to the creation of UTM airspace, as UTM Service Providers further advancing the integration of drones into the national airspace.	and evolving nature of the industry.

Jordan

JORDAN	SCORE 9/30

1 – Legislation (2/5)	2 – Governance (2/5)	3 – Strategy (1/5)
In Jordan, the Civil Aviation Regulatory Commission (CARC) regulates the operation of drones under the Drones System of 2021. This framework is designed to ensure the safe and legal use of UAS within the country. However, the current regulations do not specifically address BVLOS operations or UTM systems, indicating that these areas may require further development or additional regulatory provisions in the future.	In Jordan, UAS operations and UTM governance discussions and implementations have primarily involved public entities such as the Civil Aviation Regulatory Commission (CARC), the Ministry of Transport, the Ministry of Interior, and the Royal Jordanian Air Force. These discussions focus on establishing frameworks for safe and efficient drone operations. Additionally, a test site for UAS, operated by Deep Element in cooperation with the Jordan Design and Development Bureau (JODDB), has been used to test VTOL medical deliveries, showcasing practical applications of drone technology. To further advance aerial mobility, CARC has formed a working group to develop a vision and strategy for implementing Advanced	In Jordan, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as the Civil Aviation Regulatory Commission (CARC). This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Jordan may not be widely accessible or fully developed.

	Air Mobility (AAM) by 2030, with a particular focus on eVTOL (electric Vertical Take-Off and Landing) vehicles. This initiative high	
4 – Operations (2/5) In Jordan, traditional airspace structure segregations have been established to manage UAS operations. These segregations define specific zones and guidelines within the airspace to ensure that drone activities are conducted safely and in compliance with national regulations. This structured approach helps manage airspace usage effectively, supporting the integration of both crewed and uncrewed aircraft operations.	**5 – Technology (1/5)** In Jordan, there is limited information available on the permanent technology infrastructure implemented for UAS operations and UTM by the Civil Aviation Regulatory Commission (CARC). However, during a specific testing exercise, CARC utilized Altitude Angel's GuardianUTM Enterprise system. This system was employed to provide situational awareness and flight authorizations, demonstrating the potential for advanced UTM solutions to enhance drone operations in Jordan.	**6 — Business and Market (1/5)** In Jordan, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from the Civil Aviation Regulatory Commission (CARC). This suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Jordan may not be fully developed or publicly accessible.

Kuwait

	**KUWAIT**	SCORE **13/30**
1 – Legislation (3/5) In Kuwait, the Directorate General of Civil Aviation (DGCA) has established initial regulations to facilitate limited commercial drone operations and services. These regulations are outlined in the Kuwait Civil Aviation Safety Regulation (KCASR) Part 22, titled "Unmanned Aircraft Systems," which became	**2 – Governance (1/5)** In Kuwait, there is limited information available regarding collaboration between public and private stakeholders in decision-making processes related to the UTM ecosystem. This includes interactions and cooperative efforts involving Kuwait's Directorate General of Civil Aviation (DGCA) and private sector entities. The lack of	**3 – Strategy (2/5)** In Kuwait, a UAS and UTM strategy has been defined solely at the organizational level, for instance a drone strategy was developed for a telecom operator. This strategy is aimed at enabling the telecom company to provide UTM services in Kuwait, highlighting a structured approach to integrating drone services into the

effective on January 5, 2020. This framework covers various aspects such as drone categories, permits, and registration requirements. For BVLOS (Beyond Visual Line of Sight) flights, operators must obtain special approvals from the DGCA, indicating an additional layer of oversight for more advanced drone operations.	detailed documentation or communication about these collaborative processes suggests that the development and integration of UTM systems in Kuwait may still be evolving or not fully transparent.	operator's business model and expanding the use of UAS technologies within the country.
4 – Operations (3/5) In Kuwait, drone airspace structures have been implemented to facilitate UAS operations. These structures define specific zones and operational guidelines within the airspace, ensuring that drone activities are conducted safely and in compliance with national regulations. This framework helps manage airspace usage effectively, supporting the integration of both crewed and uncrewed aircraft operations.	**5 – Technology (2/5)** In Kuwait, the Directorate General of Civil Aviation (DGCA) has implemented a basic UAS operations tool via a website. This platform includes a drone registration form, allowing operators to register their drones with the DGCA. Additionally, the website features a geo-awareness tool that provides information on restricted zones for drones, helping operators understand where they can safely and legally conduct their flights.	**6 — Business and Market (2/5)** In Kuwait, for instance a market size analysis of the UAS operations and UTM market was conducted as part of a project for a telecom operator. This analysis identified significant demand potential. This initiative highlights the growing interest and opportunity in expanding drone services in Kuwait's market.

Oman

	**OMAN**	SCORE **10/30**
1 – Legislation (3/5) In Oman, the Oman Civil Aviation Authority (CAA) regulates drone operations under Civil Aviation Regulations CAR-102, titled "Remote Piloted Aircraft	**2 – Governance (2/5)** In Oman, UAS operations and UTM governance discussions and implementations have primarily occurred between public entities	**3 – Strategy (1/5)** In Oman, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as the

(Drones)," and CAR-107. These regulations establish the framework for limited commercial drone operations, covering aspects such as operations, registration, and licensing to ensure the safety and security of air navigation within the Sultanate. Under CAR-102, drones intended for BVLOS (Beyond Visual Line of Sight) operations must be equipped with monitoring and tracking capabilities, as well as collision avoidance systems. These requirements aim to enhance the safety and reliability of more advanced drone operations in Oman.	such as the Oman Civil Aviation Authority (CAA) and the Ministry of Transport, Communications and Information Technology. However, a notable example of emerging public-private cooperation is the collaboration with an Omani startup to launch the Serb platform. This new drone management system is designed to enhance UTM capabilities within the country, marking a positive step towards integrating private sector innovation into Oman's UAS infrastructure.	Oman Civil Aviation Authority (CAA) and the Ministry of Transport, Communications and Information Technology. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Oman may not be widely accessible or fully developed.
4 – Operations (2/5) In Oman, traditional airspace structure segregations have been established to manage UAS operations. These segregations define specific zones and operational guidelines within the airspace, ensuring that drone activities are conducted safely and in compliance with national regulations. This structured approach helps manage airspace usage effectively, supporting the integration of both crewed and uncrewed aircraft operations.	**5 – Technology (1/5)** In Oman, there is limited information available on the existing technology implemented for UAS operations and UTM by entities such as the Oman Civil Aviation Authority (CAA). However, in December 2024, the CAA granted a license to "Tahleeq Drone Services" (LLC) for the registration and management of drone air traffic. This service will be facilitated through the Serb platform, which represents a step forward in developing technological solutions for managing drone operations in the country.	**6 — Business and Market (1/5)** In Oman, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as the Oman Civil Aviation Authority (CAA) and the Ministry of Transport, Communications and Information Technology. This suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Oman may

		not be fully developed or publicly accessible.

Qatar

QATAR		SCORE 10/30
1 – Legislation (2/5) In Qatar, the Qatar Civil Aviation Authority has released QCAR No. 005 of 2017, a regulation that establishes formal technical requirements and administrative procedures for UAS. While this regulation covers basic UAS operations, there is no widely available legislative information specifically addressing BVLOS operations. For all types of UAS operations, including those potentially involving BVLOS, operators are required to submit requests to the Qatar Civil Aviation Authority for approval.	**2 – Governance (2/5)** In Qatar, UAS operations and UTM governance have predominantly involved public discussions and implementations led by the Qatar Civil Aviation Authority and the Ministry of Transport. However, there has been a notable collaboration involving the Qatar Civil Aviation Authority, ANRA Technologies (a UTM technology provider), and Fusion Technologies. This partnership aims to develop safe and secure operations in low-level airspace for drone operators, marking a positive step towards public-private cooperation in enhancing the country's UAS operational framework.	**3 – Strategy (2/5)** In Qatar, the Ministry of Transport has defined a UAS operations and UTM strategy at the organizational level, as part of its broader initiatives. During the Third Qatar National Development Strategy (NDS3) event, the Ministry announced plans to test air taxis and deliveries. This move indicates a strategic focus on integrating advanced aerial mobility solutions into the national transportation infrastructure, highlighting Qatar's commitment to exploring and adopting innovative UAS technologies.
4 – Operations (2/5) In Qatar, traditional airspace structure segregations have been established to manage UAS operations, ensuring the safe integration of drones into the national airspace. However, there is limited information available regarding specific	**5 – Technology (1/5)** In Qatar, while there is a website provided by the Qatar Civil Aviation Authority that includes registration and licensing forms for drone operators, including companies looking to register their drones, there is limited information available on	**6 — Business and Market (1/5)** In Qatar, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key

drone geozones, which would typically provide detailed guidance on designated areas with operational restrictions and permissions for drone activities. This lack of detailed geozone information suggests that more comprehensive frameworks for managing drone operations might still be under development or not widely communicated.	the existing technology implemented for UAS operations and UTM. Specifically, there is a noticeable absence of geo-awareness tools or systems that would provide detailed information on airspace restrictions and drone geozones. This suggests that while basic administrative processes for drone registration are in place, more advanced technological solutions for UAS operations and management may not be fully developed or publicly detailed.	organizations such as the Qatar Civil Aviation Authority and the Ministry of Transport. This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Qatar may not be fully developed or publicly accessible.

Saudi Arabia

	SAUDI ARABIA	SCORE 18/30
1 – Legislation (3/5) In Saudi Arabia, the General Authority of Civil Aviation (GACA) has implemented initial regulations to facilitate limited commercial drone operations and services. These are outlined in the 'GACAR — Safety Regulations,' which include: • **Part 107**: Non-recreational civil sUASs (small Unmanned Aircraft Systems). • **Part 048**: Registration and Marking requirements. • **Part 101**: Unmanned Amateur UASs.	**2 – Governance (3/5)** In Saudi Arabia, there have been active public-private discussions and implementations regarding UAS operations and UTM governance. The General Authority of Civil Aviation (GACA) engages with private stakeholders for policy feedback and UTM development. Key collaborations include partnerships with Kearney Middle East and Africa, NEXA Advisors, LLC, and the Northeast UAS Airspace Integration Research Alliance (NUAIR). Additionally, EHang has worked with GACA in collaboration with the	**3 – Strategy (4/5)** In Saudi Arabia, a comprehensive UAS operations and UTM strategy aligned with Advanced Air Mobility (AAM) has been established at the national level. The General Authority of Civil Aviation (GACA) released the 'Enabling Advanced Air Mobility in Saudi Arabia' document, which addresses technology, regulation, UTM, and ATM. GACA is actively developing a national UTM framework, as demonstrated in the NEOM UTM Concept of Operations.

According to Part 101.85, only Visual Line of Sight (VLOS) operations are currently allowed. Additionally, GACA has signed a Memorandum of Understanding (MoU) with Lilium to develop and implement the necessary regulations for eVTOL (electric Vertical Take-Off and Landing) operations in Saudi Arabia, indicating a move towards expanding and modernizing aerial mobility regulations.	Ministry of Transport and Logistics Services, the Ministry of Hajj, and the Ministry of Interior, highlighting a coordinated effort to integrate advanced aerial technologies and services in the country.	GACA has announced partnerships to develop and release the AAM Roadmap for the country. Additionally, a tailored strategy for the National Digital Transformation Unit (NDU) was developed, with identified initiatives to promote UAS technology adoption for the Saudi Federation for Cybersecurity, Programming, and Drones in 2019-2020. Moreover, the concept and implementation plan for a national UAS traffic control center in the country was developed.
4 – Operations (3/5) In Saudi Arabia, drone airspace structures have been implemented to facilitate UAS operations. These structures define specific zones and guidelines within the airspace, ensuring that drone activities are conducted safely and in compliance with national regulations. This framework helps manage airspace usage effectively, accommodating both crewed and uncrewed aircraft.	**5 – Technology (1/5)** In Saudi Arabia, while there is some information available about existing technology for UAS operations, such as the General Authority of Civil Aviation (GACA)'s online portal for registration and drone permits, there is a lack of detailed information on geo-awareness systems currently in use. Looking to the future, Unifly's UTM system, which offers services like flight authorization, is expected to be utilized in NEOM. Additionally, TerraDrone Arabia, a subsidiary of TerraDrone, is working on further developing the UTM system with the assistance of Unifly, aiming to enhance the capabilities	**6 — Business and Market (4/5)** In Saudi Arabia, a market size analysis of the UAS operations and UTM market has been conducted with the support of PwC, highlighting significant demand potential. It focuses on understanding the AAM market potential across various use cases. The analysis played a key role in estimating the market value of commercial UAS applications in the Kingdom. Additionally, the economic impact for the National Digital Transformation Unit (NDU), projecting revenue over five years, the number of new jobs created, and the anticipated number of

	and integration of drone operations in the region.	commercial UAS, was assessed, further underscoring the economic opportunities presented by the UAS sector in Saudi Arabia.

Turkey

	TURKEY	SCORE 13/30

1 – Legislation (3/5)

In Turkey, the General Directorate of Civil Aviation has implemented regulations under 'Law No. 2920 on Turkish Civil Aviation Law No. 5431,' along with SHT-İHA Rev.01. These regulations establish a framework for limited commercial drone operations and services, covering a range of aspects:

- **BVLOS Operations**: Operators must obtain specific permissions and adhere to safety guidelines for conducting Beyond Visual Line of Sight (BVLOS) flights.
- **Task Distribution**: The law outlines the distribution of responsibilities among the Department of Flight Operation, Department of Air Navigation, and Department of Airworthiness.
- **Operational Requirements**: The regulations specify

2 – Governance (3/5)

In Turkey, there have been active public-private discussions and implementations regarding UAS operations and UTM governance. The General Directorate of Civil Aviation, as the main governing body, collaborates with various stakeholders for technical insights and policy feedback. Key collaborations include:

- **Turkish Aerospace Industries (TAI) and ASELSAN**: These organizations provide technical insights and policy feedback to the General Directorate of Civil Aviation, contributing to the development of UAS regulations and technologies.
- **Teknopark Istanbul**: This innovation hub hosts UAS and UTM startups, supported by the General Directorate of Civil Aviation, fostering innovation and

3 – Strategy (1/5)

In Turkey, there is a lack of detailed information regarding existing UAS operations and UTM strategies from the General Directorate of Civil Aviation. This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Turkey may not be widely accessible or fully developed.

requirements for flight authorization, safety and technical standards, training and pilot certification, risk assessments, geo-zoning, and maintenance and reliability standards. This comprehensive regulatory framework aims to ensure safe and compliant drone operations throughout Turkey.	development in the drone sector. • **Urban Air Traffic Management Development & Demonstration Project**: Led by the Istanbul Kultur University Technology Transfer Office, this initiative focuses on transporting medical deliveries by drone in three different cities. Consortium partners include FIXAR AERO, ISBAK (Istanbul IT and Smart City Technologies Inc), FERROVIAL, Ada GUZEY Engineering, SME, and the University of Belgrade. These collaborations highlight Turkey's commitment to integrating public and private efforts in advancing UAS and UTM initiatives.	
4 – Operations (3/5) In Turkey, drone airspace structures have been implemented to facilitate UAS operations. These structures include designated green zones, where drone flights are permitted. These zones help ensure safe and compliant operations by providing clear guidance to drone operators on where they can fly their drones legally and safely within the national airspace.	**5 – Technology (2/5)** In Turkey, the Directorate General of Civil Aviation (DGCA) has implemented a UAS operations tool that provides geo-awareness, helping drone operators access essential information on airspace restrictions and permitted zones. This tool supports safe and compliant drone operations by offering guidance on where drones can be flown. Additionally, in 2022, there were plans to develop an Urban Air Traffic	**6 — Business and Market (1/5)** In Turkey, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as the General Directorate of Civil Aviation, the Ministry of Transport and Infrastructure, and the ANSP General Directorate of State Airports Authority.

	Management (UATM) System, led by the Istanbul Kultur University Technology Transfer Office. This initiative aims to enhance the integration of urban drone operations, focusing on managing air traffic in urban settings to facilitate safe and efficient drone use.	This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Turkey may not be fully developed or publicly accessible.

United Arab Emirates

UNITED ARAB EMIRATES	SCORE 21/30

1 – Legislation (3/5)

In the United Arab Emirates, initial regulations have been established to cover specific niches in UAS operations. The General Civil Aviation Authority (GCAA) issued 'Federal Decree-Law No. 26 of 2022 Concerning the Regulation of the Civil Use of Unmanned Aircraft and Related Activities,' which addresses air navigation services, UAS operations, and airspace management.

Building on this, Cabinet Resolution No. (110) of 2023 introduces certification requirements, documentation procedures, and outlines the responsibilities of manufacturers and importers.

GCAA outlined the regulatory framework for Urban Air Mobility (UAM) operations. In March 2023,

2 – Governance (3/5)

In the United Arab Emirates, particularly in Dubai, there have been active public-private discussions and implementations regarding UAS operations and UTM governance. The Dubai Future Foundation exemplifies public-private engagement initiated by the Dubai government, involving numerous stakeholders in initiatives such as Advanced Air Mobility (AAM).

Another significant initiative is the Dubai Sky Dome, led by the Dubai Civil Aviation Authority (DCAA) to support Law No. (4) of 2020. This initiative involves collaboration between the DCAA and private sector partners to develop UAS infrastructure, regulatory frameworks, and airspace management systems.

3 – Strategy (4/5)

In Dubai, several pre-defined UAS strategies have been developed, aligning with broader aviation goals such as Advanced Air Mobility (AAM) and including provisions for BVLOS operations. One notable initiative is the collaboration between Dubai's Road and Transport Authority and Skyports Infrastructure, which aims to develop and implement a vertiport network by 2026.

Additionally, the Dubai Program to Enable Drone Transportation and the Dubai Sky Dome initiative, spearheaded by the Dubai Civil Aviation Authority (DCAA), support Law No. (4) of 2020. These initiatives focus on developing UAS infrastructure, establishing regulatory frameworks for UAV traffic management, securing airspace, and

GCAA issued Civil Aviation Regulations on Heliports (Onshore/Offshore) and Vertiports (Onshore). In April 2014, GACA granted operational approval for the UAE's first vertiport. Additionally, local emirates have their own specific laws, such as Dubai's Law No. (4) of 2020, established by the Dubai Civil Aviation Authority (DCAA), which details operational requirements and restrictions for drone activities. In December 2024, the Dubai Civil Aviation Authority issued the first commercial license for BVLOS operations at Dubai Silicon Oasis (DSO), marking a significant step forward in expanding drone operations in the region.	Additionally, the Dubai Civil Aviation Authority has established the BVLOS Drone Delivery Program as a public initiative. This program aims to enable UAV deployment in commercial use cases by creating a BVLOS operational framework, further fostering the integration and expansion of drone operations in Dubai.	enhancing UAS services through the DCAA's website. Furthermore, a high-level roadmap and key milestones for the Smart Autonomous Vehicle Industries (SAVI) Cluster concept for the Department of Economic Development was developed. This roadmap outlines the implementation phases for air (including a regulatory sandbox, rollout of UAS companies, and transportation of goods with UAS), land, and sea, highlighting a comprehensive approach to integrating autonomous technologies across various domains.
4 – Operations (3/5) In the United Arab Emirates, drone airspace structures have been implemented to facilitate UAS operations. These structures include drone geozones, which are accessible through the 'My Drone Hub' app provided by the General Civil Aviation Authority (GCAA). This app offers essential information about designated airspace areas, operational restrictions, and permissions, helping ensure safe and compliant drone activities within the national airspace.	**5 – Technology (4/5)** In the United Arab Emirates (Abu Dhabi and Dubai), an advanced UTM system has been implemented by the Dubai Civil Aviation Authority (DCAA) using HighLander's Vega UTM system, EDGE and AstraUTM. These systems include all core and optional UTM modules, such as pilot and drone registration, centralized flight applications and evaluation, live flight tracking, and monitoring with GSM trackers, providing comprehensive	**6 — Business and Market (4/5)** In the United Arab Emirates, a comprehensive market size analysis of the UAS operations and UTM market, identifying significant demand potential was conducted. This analysis included market sizing and pricing assessments for various UAS services offered in the UAE. Additionally, the anticipated economic impact of the Smart Autonomous Vehicle Industries (SAVI) Cluster for the Department of

The first UTM airspace will be in Abu Dhabi with GCAA, providing all UTM services, including advanced features such as NCTR detection and mitigation, real-time prioritization and tactical deconfliction for highly integrated and automated UASs.	management of drone operations.	Economic Development was assessed. This assessment considered factors such as GDP growth, job creation, and foreign direct investments (FDI), highlighting the broader economic opportunities presented by the integration of autonomous technologies and UAS services in the UAE.

North America

Canada

CANADA	SCORE 21/30

1 – Legislation (3/5)

In Canada, Transport Canada has established a comprehensive regulatory framework for UAS operations, which includes provisions for commercial drone activities, such as BVLOS operations, through specific approvals. This framework is governed under the Canadian Aviation Regulations (SOR/96-433), specifically Part IX, which outlines operational requirements for both basic (VLOS) and advanced (BVLOS) operations.

Key standards published by Transport Canada include:

- **Standard 921**: this standard outlines the requirements for operating RPAS in controlled airspace, detailing pilot certification and operational guidelines.
- **Standard 922**: this standard addresses the certification of RPAS for advanced operations, covering aspects such as airworthiness, safety, and risk assessment criteria.

2 – Governance (4/5)

In Canada, there have been ongoing public-private discussions regarding UAS operations and UTM governance, with active participation from public stakeholders such as CAA Transport Canada, ANSP Nav Canada, local governments, and private industry players. These discussions focus on the integration and scaling of UAS operations within Canada's airspace, with a particular emphasis on Advanced Air Mobility (AAM).

The Canadian Drone Advisory Committee (CDAC) plays a significant role in advising Transport Canada on prioritizing work related to UAS and AAM. It provides recommendations on policies, regulatory frameworks, and strategic priorities. Transport Canada collaborates with organizations like the International Civil Aviation Organization (ICAO) and the National Research Council Canada to ensure alignment with international standards and promote innovation in UAS operations.

3 – Strategy (4/5)

Transport Canada has developed a comprehensive national strategy for UAS and UTM operations, detailed in the "Drone Strategy to 2025." This strategy focuses on advancing BVLOS operations, Counter-UAS (C-UAS) technologies, and Advanced Air Mobility (AAM). It sets specific goals for innovation, economic growth, and collaboration, while emphasizing safety and security measures.

Key elements of the strategy include proposed BVLOS rules introduced in 2023, aimed at enabling lower-risk operations like drone deliveries to remote communities and supporting emergency responses. The strategy also incorporates economic, social, and environmental considerations to modernize Canada's airspace management systems.

In December 2023, NAV CANADA and Transport Canada released “RPAS Traffic Management (RTM) System: Concept of Operations.” It presents a vision for Canada’s RPAS

Additionally, Transport Canada has conducted UTM trials to facilitate scalable BVLOS operations and integrate drones more effectively into the national airspace, supporting the development of a robust UAS ecosystem in Canada.	Additionally, Transport Canada works closely with a wide range of industry stakeholders to develop and refine operational standards, safety protocols, and UTM integration. These efforts underscore Canada's commitment to building a strong public-private governance structure, although full implementation and defined roles for UTM services and airspace management are still in development. As an example, a consortium led by AeroVision Canada, Inc., with partners ANRA Technologies and ClearSky Connect, has been chosen by Transport Canada and NAV CANADA for a Phase 2 trial of RPAS Traffic Management (RTM). ANRA Technologies will serve as the lead RTM Service Provider, integrating its traffic management system with its Flight Information Management Service for a complete RTM system.	Traffic Management framework as it may exist in the 2030 timeframe.
4 – Operations (4/5) In Canada, drone airspace structures have been implemented to facilitate UAS operations, with collaboration from NAV CANADA to integrate drone operations into controlled airspaces. Considering these advancements, a possibility to conduct safe and	**5 – Technology (4/5)** In Canada, an advanced UTM system has been implemented to provide sophisticated UTM services, including deconfliction and dynamic airspace management, which support commercial and scalable BVLOS operations. NAV CANADA has deployed the latest version of NAV DRONE,	**6 — Business and Market (2/5)** In Canada, a market size analysis of the UAS operations and UTM market has been conducted, identifying significant demand potential. This analysis involved collaboration with key industry stakeholders, including NAV CANADA, to provide assessments of

scalable commercial BVLOS operations is increasing. More and more companies are seen to receive approvals for executing advanced BVLOS drone operations.	offering features such as strategic deconfliction, adjustable flight path widths, distance calculators, operation timelines, and improved flight reports. These enhancements aim to facilitate safe and efficient drone operations within Canada's airspace, paving the way for broader adoption and scalability of BVLOS activities. High Lander`s Vega UTM will participate in Phase 2 of the Canadian RPAS Traffic Management Project in 2025.	market trends and growth opportunities. These insights help inform strategic planning and highlight the potential for expansion and innovation within the Canadian drone and UTM sectors.

Mexico

	MEXICO	SCORE **10/30**
1 – Legislation (2/5) In Mexico, foundational regulations for the operation of Remotely Piloted Aircraft Systems (RPAS) have been established, providing a framework for limited commercial drone operations. The Federal Civil Aviation Agency (Agencia Federal de Aviación Civil, AFAC) oversees these operations and published NOM-107-SCT3-2019 in 2019. This standard outlines requirements for drone registration, operational limitations, and safety measures, creating a basic regulatory structure for	**2 – Governance (2/5)** In Mexico, early-stage discussions regarding UAS operations and UTM governance have begun, involving public stakeholders such as the Federal Civil Aviation Agency (AFAC), the ANSP Servicios a la Navegación en el Espacio Aéreo Mexicano (SENEAM-SCT), local governments, and private industry players. These discussions are still in the emerging phase, and governance structures for UTM have not yet been fully defined. Stakeholder involvement is currently limited, with	**3 – Strategy (1/5)** In Mexico, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as the Federal Civil Aviation Agency (AFAC) and ANSP Servicios a la Navegación en el Espacio Aéreo Mexicano (SENEAM-SCT). This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Mexico may not be widely accessible or fully developed.

UAS activities in Mexican airspace. While these regulations permit some commercial use of drones, they remain restrictive. The focus is primarily on Visual Line of Sight (VLOS) operations, and there is not yet a comprehensive framework for advanced operations such as Beyond Visual Line of Sight (BVLOS) flights, flights over people, or scalable drone services. Additionally, the current regulations do not support the development of UTM systems or integration with broader airspace management for scalable drone operations.	minimal collaboration between the government, industry, and academia. As a result, there has been no significant progress toward implementing a comprehensive national UTM framework. The focus remains on establishing foundational discussions and exploring potential governance models for future UAS and UTM integration in the country.	
4 – Operations (2/5) In Mexico, traditional airspace structure segregations have been established for UAS operations. The Federal Civil Aviation Agency (AFAC) has issued regulations under NOM-107-SCT3-2019, which require drones to comply with specific operational zones. These zones are based on traditional airspace segregation methods rather than being specifically designated for UAS or UTM purposes. This approach ensures that drone activities align with existing airspace management practices, though it may not fully accommodate the unique requirements and potential	**5 – Technology (1/5)** In Mexico, there is currently no specific technology implemented for UAS operations and UTM. While foundational regulations exist to manage drone activities, the technological infrastructure and systems specifically designed for UTM, such as real-time tracking, airspace management, and integration with broader air traffic systems, have not yet been developed or deployed. This indicates that Mexico is still in the early stages of establishing a comprehensive technological framework for advanced drone operations and UTM.	**6 — Business and Market (2/5)** In Mexico, the Federal Civil Aviation Agency (AFAC) has undertaken studies to identify demand for UAS operations and explore potential market opportunities. These efforts aim to understand the landscape and opportunities for integrating drones into various sectors. Additionally, ANSP Servicios a la Navegación en el Espacio Aéreo Mexicano (SENEAM-SCT) contributes to market studies and collaborates with stakeholders to unlock business opportunities related to UTM. These activities are part of

of modern UAS and UTM systems.		broader efforts to develop and expand the drone industry and UTM capabilities in Mexico, despite the current lack of comprehensive UTM technology implementation.

United States

UNITED STATES		SCORE 22/30
1 – Legislation (3/5)	**2 – Governance (4/5)**	**3 – Strategy (4/5)**
In the United States, the Federal Aviation Administration (FAA) has established a comprehensive regulatory framework for small UAS operations under 14 CFR Part 107. This framework governs both commercial and recreational drone use for aircraft under 55 pounds, enabling basic operations such as Visual Line of Sight (VLOS) flights. It also allows for more advanced activities, including BVLOS flights, nighttime operations, and flights over people, through waivers and exemptions. These waivers provide a pathway for complex operations as the FAA develops broader regulatory frameworks for routine and scalable BVLOS operations. The FAA is actively working toward enabling scalable BVLOS and UTM systems. Although a formal BVLOS rule (Part 108) has not yet	In the United States, there have been ongoing public-private collaborations in UAS operations and UTM governance, involving key stakeholders such as the Federal Aviation Administration (FAA), National Aeronautics and Space Administration (NASA), local governments, and private industry partners. These efforts are focused on developing a robust UTM ecosystem that supports BVLOS operations and enhances airspace safety. The FAA is actively working with industry partners to create a UTM ecosystem that utilizes UAS Service Suppliers (USS) to mitigate collision risks between uncrewed aircraft by leveraging industry standards and real-time data sharing. A Governance Agreement has been established, along with cooperative operating principles in alignment with	In the United States, extensive discussions between public and private stakeholders have focused on developing a comprehensive UTM strategy. These discussions address various industries, such as the economy, society, environment, and security, alongside correlated services like Advanced Air Mobility (AAM) and Counter-UAS technologies. The Federal Aviation Administration (FAA) has played a leading role in these efforts by releasing the UTM Concept of Operations (ConOps) and the UTM Implementation Plan. These documents outline the technical and policy-related aspects of UTM development and its integration into the National Airspace System (NAS). The UTM Implementation Plan specifies steps for creating a scalable UTM ecosystem and emphasizes collaboration

been implemented, significant progress has been made. In 2022, the FAA released recommendations from its BVLOS Aviation Rulemaking Committee (ARC), outlining steps needed to establish scalable BVLOS operations. Additionally, the FAA has initiated the UTM Near Term Approvals Process, which allows for limited approval of UTM services ahead of formal rulemaking. Moreover, the FAA Reauthorization Act of May 2024 gave the FAA September 2024 deadline to publish a Notice of Proposed Rulemaking (NPRM) for Part 108. While a comprehensive UTM regulatory framework has not yet been fully implemented, the FAA is laying the groundwork for these systems. This includes collaborating with industry stakeholders to define operational and safety requirements, developing standards for UTM systems, and exploring technologies such as Counter-UAS solutions to manage uncooperative drones and ensure airspace safety.	FAA Order 8040.6A. To support these efforts, the FAA has instituted an Operational and Technical Committee structure, overseeing processes such as onboarding and offboarding USS, monitoring conformance issues, maintaining documentation, and addressing future technical roadmap items. These committees ensure continuous alignment between the FAA and private industry on UTM advancements. The UTM Key Site Operational Evaluation is a collaborative initiative involving the FAA, NASA, public safety agencies, and private stakeholders. This project aims to conduct flight test activities, validate industry-developed standards, and evaluate the maturity of UTM services in real-world environments. By fostering these partnerships, the FAA is advancing the integration of UTM services into the national airspace system, addressing governance, technical, and operational challenges to ensure scalability and safety.	with private stakeholders through programs like the UTM Pilot Program (UPP) and partnerships with organizations such as NASA and industry leaders. These initiatives aim to enable BVLOS operations, seamless data sharing, and strategic deconfliction to ensure safe and efficient UAS operations. FAA Order 8040.6A provides cooperative principles for UTM governance, ensuring alignment between public and private stakeholders. The U.S. UTM strategy also considers future integration of UTM with broader aviation initiatives, including Counter-UAS technologies, environmental sustainability, and the societal benefits of drone services.
4 – Operations (4/5) In the United States, the Federal Aviation Administration (FAA) has established drone-specific airspace structures, such as the Low Altitude	**5 – Technology (4/5)** In the United States, an advanced UTM system has been implemented to provide sophisticated UTM services such as deconfliction and dynamic	**6 — Business and Market (3/5)** In the United States, the Federal Aviation Administration (FAA) and industry stakeholders have extensively mapped the

Authorization and Notification Capability (LAANC), and initiated pilot programs to facilitate BVLOS operations, particularly through waivers. These efforts have enabled controlled airspace access for drones. The UTM Pilot Programs and NASA's Technical Capability Level (TCL) tests have been instrumental in validating segregated airspaces for drone operations. Additionally, UTM Key Site Operational Evaluations are laying the groundwork for BVLOS scalability by integrating UTM capabilities into the national airspace system. Plans are underway to further integrate UTM and Air Traffic Management (ATM) systems, as outlined in the FAA's UTM Implementation Plan and beyond. These initiatives aim to create a seamless, scalable framework for safe and efficient drone operations within the broader aviation ecosystem.	airspace management. This system supports commercial and scalable BVLOS operations, offering additional operational tools like weather information, risk management, and measures to enhance public acceptance. The Federal Aviation Administration (FAA) has successfully deployed the Low Altitude Authorization and Notification Capability (LAANC) to facilitate controlled airspace access for UAS operations at 400 feet and below, covering over 725 airports. Currently, the FAA authorizes various UTM services through waivers and exemptions to mitigate operational risks associated with scaling BVLOS operations. The UTM Key Site initiative is enabling the industry to establish UTM services that provide strategic coordination to manage UA-UA collision risks among multiple drone operators. Additionally, the Key Site has advanced the use of the InterUSS protocol for shared testing and a Discovery and Synchronisation Service instance, fostering a collaborative and integrated approach to UTM development and deployment.	UTM high-level value chain, focusing on defining roles for private-sector actors, such as UAS Service Suppliers (USS) providers, and public stakeholders. This mapping effort is part of the FAA's UTM Implementation Plan, which includes frameworks for service pricing models and cost recovery strategies. The UTM Pilot Program, conducted in collaboration with NASA, involved private companies like DroneUp, Wing, and Kittyhawk to explore end-level pricing strategies for UTM services. These efforts aim to establish sustainable business models and revenue streams for UTM services. Additionally, organizations like the Commercial Drone Alliance actively advocate for business models and partnerships to drive market growth and ensure the successful integration of UAS and UTM services into the national airspace.

South America

Argentina

ARGENTINA	SCORE 13/30

1 – Legislation (3/5)

In Argentina, the National Civil Aviation Administration (ANAC) has implemented initial regulations to support limited commercial drone operations and services. This is outlined in the 'Regulation of Unmanned Aerial Vehicles (VAT) and Unmanned Aerial Vehicle Systems (SVANT),' which provides a framework for drone operations, including provisions for Beyond Visual Line of Sight (BVLOS) flights. These BVLOS operations require specific approval, ensuring that such activities are conducted safely and in compliance with regulatory standards. This regulatory framework establishes foundational guidelines for expanding drone operations within Argentina.

2 – Governance (2/5)

In Argentina, discussions and implementations regarding UAS operations and UTM governance have primarily involved public entities such as the National Civil Aviation Administration (ANAC) and EANA S.E., the Argentine State-Owned Air Navigation Company responsible for air traffic control.

At the national level, CAEDYA (Cámara Argentina de Empresas de Drones y Afines) plays a crucial role in promoting the growth of the drone sector. The association works to professionalize the industry and fosters awareness and consensus among private sector stakeholders, public entities, and non-governmental organizations.

However, there is limited information available on the future governance of UTM in Argentina, comprehensive frameworks or strategies for integrating UTM services may still be under development or not fully communicated.

3 – Strategy (2/5)

In Argentina, there is a lack of information on a cohesive national UAS and UTM strategy. However, there are emerging collaborations that indicate progress in the sector. For instance, High Lander, an Israeli UTM technology provider, has partnered with Drone Solutions of Argentina. Licensed by Argentina's National Civil Aviation Administration (ANAC), Drone Solutions implements UAV solutions across various industries in the country. This partnership highlights an effort to integrate advanced UTM technologies into Argentina's drone operations, potentially paving the way for more structured UTM development in the future.

4 – Operations (3/5)	5 – Technology (1/5)	6 — Business and Market (2/5)
In Argentina, drone airspace structures have been implemented to facilitate organized and safe UAS operations. These include the establishment of specific drone zones or geozones, which designate particular areas within the airspace for drone activities. These geozones help manage drone traffic effectively by providing clear guidelines on where drones can operate, ensuring compliance with safety regulations and minimizing conflicts with manned aircraft.	In Argentina, there is a lack of detailed information regarding the existing technology implemented for UAS operations and UTM by the National Civil Aviation Administration (ANAC). This suggests that while regulatory frameworks may be in place, the technological infrastructure and systems specifically designed for UTM and advanced drone operations might not be fully developed or publicly detailed. More comprehensive technological solutions may be necessary to enhance the management and integration of drone operations within the national airspace.	In Argentina, the Ministry of Productive Development has conducted a market analysis of UAS operations, identifying key aspects such as supply and demand potential, as well as the main players within the industry. This analysis provides valuable insights into the current state and future opportunities for the drone sector in Argentina, helping to inform strategic planning and support the growth and development of UAS operations in the country.

Brazil

BRAZIL	SCORE 17/30

1 – Legislation (3/5)	2 – Governance (3/5)	3 – Strategy (3/5)
In Brazil, the regulatory framework for UAS operations has been established to support limited commercial drone activities, guided by an initial set of standards. The National Civil Aviation Agency (ANAC) released RBAC-E94, which complements legislation from the Department of Airspace Control (DECEA), operating under SISCEAB,	In Brazil, active public-private collaboration on UAS operations and UTM decision-making is evident through standard governance discussions and implementations such as BR-UTM project, which aims to develop drone-enabled infrastructure. Key public entities like DECEA (Department of Airspace Control), ANAC (National Civil Aviation Agency) and	In Brazil, a national strategy for UAS operations and UTM has been defined by the Department of Airspace Control (DECEA) through the release of a national UAM (Urban Air Mobility) Concept of Operations. This document identifies current gaps in the existing Air Traffic Management (ATM) infrastructure and outlines the need for new legislation and standards to

the Authority for Air Navigation Service Providers. This framework aligns with various DECEA legislations, including AIC-N 24/17, 23/17, and 17/17. In 2023, the Brazilian Air Force (FAB), through the DECEA, has updated ICA 100-40, the document that regulates drone flights in the country, facilitates requests for flights and reduces the response time for users. Additionally, the Brazilian Code of Aeronautics (CBA), Law No. 7565, stipulates that BVLOS flights are permitted only if the aircraft is certified. In 2022, DECEA approved the Air Force Command Directive DCA 351-6,149, aimed at disseminating the Operational Concept for the UTM system and guiding strategic implementation actions. This directive supports the development and integration of UTM systems to enhance drone operations within Brazil's airspace.	Institute of Airspace Control (ICEA) work alongside private companies, such as BIRDS (a subsidiary of High Lander, SpeedBird Aero, and CANDO), in cooperative efforts to advance drone integration and regulation. Additionally, several national-level associations, including Associação Brasileira de Multirrotores, Associação Brasileira de Drones, Associação Brasileira de Assistência em VANT, Associação Cearense dos Operadores de Drones, and Associação Nacional de Empresas de Aerolevantamentos, play vital roles in uniting various private stakeholders. These associations facilitate conversations and debates about regulations, market trends, technology developments, and the future of the drone industry in Brazil. Some of these associations collaborate with regulatory bodies like DECEA, ANAC, ICEA and ANATEL (National Telecommunication Agency) to ensure that the evolving regulatory landscape aligns with industry needs and technological advancements. This collaborative approach helps foster a dynamic and responsive UAS ecosystem in Brazil.	support the integration of UAS and UAM technologies. By addressing these gaps, the Concept of Operations aims to enhance the safety, efficiency, and scalability of drone operations within Brazil's airspace, paving the way for future advancements in urban air mobility and related services.

4 – Operations (3/5)	5 – Technology (3/5)	6 — Business and Market (2/5)
In Brazil, drone airspace structures have been implemented to facilitate organized and safe UAS operations. This includes the establishment of specific drone zones or geozones, which designate particular areas within the airspace for drone activities. These geozones help manage drone traffic effectively by providing clear guidelines on where drones can operate, ensuring compliance with safety regulations and minimizing conflicts with manned aircraft.	In Brazil, a basic UTM system has been implemented to provide essential UTM services, such as flight authorization. The Department of Airspace Control (DECEA) operates the Airspace Access Request System (SARPAS) through a website, which facilitates the submission and processing of requests to access national airspace. This system also authorizes BVLOS flights, provided they have prior approval from the National Civil Aviation Agency (ANAC). SARPAS helps streamline the process for drone operators, ensuring that operations are conducted safely and in compliance with national regulations. In November 2024, as part of BR-UTM project, High Lander`s Vega UTM was used during demonstration in one Brazilian city.	In Brazil, a market size analysis of the UAS operations and UTM market has been conducted, identifying significant demand potential. This analysis was carried out by key organizations, including the Department of Airspace Control (DECEA), the Authority for Air Navigation Service Providers (SISCEAB), the National Civil Aviation Agency (ANAC), and the Institute of Airspace Control (ICEA). The insights from this analysis help inform strategic planning and highlight opportunities for expansion and innovation within the Brazilian drone and UTM sectors.

Chile

CHILE	SCORE 13/30

1 – Legislation (3/5)	2 – Governance (2/5)	3 – Strategy (2/5)
In Chile, the Directorate General of Civil Aviation (DGAC) has implemented regulations to support limited commercial drone operations and services, outlined in the 'Normas Aeronáuticas (DAN).' The	In Chile, UAS operations and UTM governance discussions and implementations have primarily been led by the Directorate General of Civil Aviation (DGAC). National-level associations such as	In Chile, there is a lack of comprehensive information on UAS operations and UTM strategies at the governmental level. However, individual stakeholders are making strides toward more

relevant regulations include: • **DAN 151**: Specifically addresses BVLOS operations, requiring operators to have sufficient environmental and situational awareness, adhere to operating limitations, and specifying that such operations can only be carried out by public service entities. • **DAN 91, DAN 119, and DAN 137**: Cover RPAS and general civil aviation laws, providing a regulatory framework for drone operations within the broader context of civil aviation. These regulations were initially established in 2015 and have been updated as recently as 2024, reflecting Chile's ongoing efforts to ensure safe and effective integration of drones into its airspace.	the Asociación de Pilotos de Aeronaves No Tripuladas (APANT) and Drone SAR Chile play significant roles in the drone community. Notably, APANT is accredited by the DGAC, indicating a level of formal recognition and collaboration. However, there is limited information available about the extent of cooperation between these private associations and public sectors, as well as the details of future UTM governance. This suggests that while foundational relationships exist, comprehensive frameworks or strategies may be necessary to enhance further governance development.	scalable UAS operations. For instance, BIAS Aeronautics, a subsidiary of SOMACOR, has been certified by the Directorate General of Civil Aviation (DGAC) to conduct heavy cargo transport using drones, including BVLOS flights. This certification indicates progress at the organizational level, reflecting efforts to expand the scope and scale of drone operations in Chile. This development points to a growing recognition of the potential for advanced drone applications, even as broader governmental strategies continue to evolve.
4 – Operations (3/5) In Chile, drone airspace structures have been implemented to facilitate organized and safe UAS operations. These structures include the establishment of specific drone zones or geozones, which designate particular areas within the airspace for drone activities. These geozones help manage drone traffic effectively by providing clear guidelines on where drones can	**5 – Technology (2/5)** In Chile, the Directorate General of Civil Aviation (DGAC) has implemented a UAS operations tool in the form of a website that provides foundational UTM services, including airspace geo-awareness. This website includes access to NOTAMs (Notices to Airmen), some of which specify areas designated for RPAs (drones) and outline the operational limitations within those	**6 — Business and Market (1/5)** In Chile, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as the Directorate General of Civil Aviation (DGAC). This suggests that comprehensive economic

operate, ensuring compliance with safety regulations and minimizing potential conflicts with manned aircraft.	areas. This tool helps drone operators understand airspace restrictions and plan their flights safely and in compliance with regulatory requirements.	and strategic insights into the drone industry and UTM services in Chile may not be fully developed or publicly accessible.

Colombia

COLOMBIA		SCORE 15/30
1 – Legislation (3/5)	**2 – Governance (2/5)**	**3 – Strategy (3/5)**
In Colombia, the Civil Aviation Authority, known as Aeronautica Civil (Colombia Aerocivil), has implemented initial regulations to facilitate limited commercial drone operations and services. This regulatory framework includes: • **RAC 100 and RAC 91**: foundational standards for drone operations, including BVLOS (Beyond Visual Line of Sight) operations under the 'specific' category, ensuring that such activities are conducted safely and in compliance with established guidelines. • **Resolution 4201 of 2018**: supporting documentation outlining specific requirements and procedures to ensure safe and effective drone activities within Colombia's airspace. These regulations establish a structured approach for	In Colombia, UAS operations and UTM governance have primarily involved public discussions and implementations led by Aeronautica Civil under the Colombian Ministry of Transport. Operations conducted by the Colombian state, such as those for security, emergency services, and government use, are supervised and regulated by the State Aviation Authority (Autoridad Aeronáutica del Estado, AAAE), following the regulations set by Aeronautica Civil. While there is an international and privately held organization, the Asociación de Profesionales de Drones (APD), with headquarters in Colombia, there is limited information on the existing cooperation between public and private stakeholders regarding the governance of UAS and UTM. This suggests that collaborative frameworks	There has been a definition of UAS operations and/or UTM strategy at the national (country) level. Aeronautica Civil has released the "Colombian UAS Strategic Plan," which entails regulatory frameworks, sector analysis, growth, and future visions.

expanding drone operations, allowing for more advanced uses while maintaining safety and compliance.	or partnerships between these sectors may not be fully developed or publicly detailed.	
4 – Operations (3/5) In Colombia, drone airspace structures have been implemented to facilitate organized and safe UAS operations. This includes the establishment of specific drone zones or geozones, which designate particular areas within the airspace for drone activities. These geozones help manage drone traffic effectively by providing clear guidelines on where drones can operate, ensuring compliance with safety regulations and minimizing the potential for conflicts with manned aircraft.	**5 – Technology (2/5)** In Colombia, Aeronautica Civil has implemented a UAS operations tool in the form of an online ArcGIS geo-awareness platform. This tool provides foundational UTM services, offering essential information about airspace restrictions and drone geozones. It assists drone operators in planning and conducting their flights safely and in compliance with regulatory requirements by enhancing their awareness of the airspace environment.	**6 — Business and Market (2/5)** In Colombia, Aeronautica Civil conducted a market size analysis of the UAS operations and UTM market through the "Reporte Encuesta Aviación No Tripulada — 2023," a survey targeting UAS operators and pilots. The findings from this survey indicated significant economic potential for growth within the drone sector, highlighting the expanding opportunities and demand for UAS operations in the country. This analysis provides valuable insights for strategic planning and development in Colombia's drone industry.

Peru

	PERU	SCORE 11/30
1 – Legislation (3/5) In Peru, the Ministry of Transport and Communications (MTC) of the General Directorate of Civil Aeronautics (DGAC) have implemented regulations to support limited commercial drone operations and services. Initially established with	**2 – Governance (2/5)** In Peru, UAS operations and UTM governance discussions and implementations have primarily been led by the General Directorate of Civil Aeronautics (DGAC) of the Ministry of Transport and Communications (MTC). While there are national-	**3 – Strategy (1/5)** In Peru, there is a lack of detailed information regarding existing UAS operations and UTM strategies from key organizations such as the General Directorate of Civil Aeronautics (DGAC) of the Ministry of Transport and Communications (MTC).

Law No. 30740 in 2018, these regulations govern the use and operations of Remotely Piloted Aircraft Systems (RPAS), covering basic elements such as licensing, registration, and exclusions. In 2020, these regulations were updated to include more specific requirements for UAS operations, as outlined in the 'Proyecto de Decreto Supremo' for Law No. 30740. The updates introduced including conditions for airworthiness, restricted areas, and flights over urban spaces. Additionally, they specified that BVLOS (Beyond Visual Line of Sight) operations are permitted only under certain circumstances, ensuring that such activities are conducted safely and in compliance with established guidelines.	level associations such as the Asociación Peruana de Pilotos de Drones de Uso Civil (APPDRONE) and DronePerú, clear evidence of their collaboration with public stakeholders is limited.	This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Peru may not be widely accessible or fully developed.
4 – Operations (3/5) In Peru, drone airspace structures have been implemented to facilitate organized and safe UAS operations. This includes the establishment of specific drone zones or geozones, which designate particular areas within the airspace for drone activities. These geozones provide clear guidelines on where drones can operate, ensuring compliance with safety regulations and minimizing potential conflicts with manned	**5 – Technology (1/5)** In Peru, there is limited information available regarding the existing technology implemented for UAS operations and UTM by the General Directorate of Civil Aeronautics (DGAC) of the Ministry of Transport and Communications (MTC). This suggests that while regulatory frameworks might be in place, the technological infrastructure and systems specifically designed for UTM and advanced drone operations	**6 — Business and Market (1/5)** In Peru, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from key organizations such as the General Directorate of Civil Aeronautics (DGAC). This absence suggests that comprehensive economic and strategic insights into the drone industry and

aircraft. This structured approach helps manage drone traffic effectively, supporting the safe integration of drones into Peru's national airspace system.	may not be fully developed or publicly detailed. More comprehensive technological solutions and their integration into the national airspace management system might still be in progress or require further documentation and communication.	UTM services in Peru may not be fully developed or publicly accessible. More detailed studies and strategic documents could help in understanding the potential for growth and development in Peru's UAS sector.

Uruguay

URUGUAY		SCORE 14/30
1 – Legislation (3/5)	**2 – Governance (3/5)**	**3 – Strategy (1/5)**
In Uruguay, the General Directorate of Civil Aviation (DINACIA) has established initial regulations for UAS operations through 'Resolution no 291/2014'. Under this regulation, only Uruguay-owned companies registered with DINACIA can apply for commercial operation permits. Foreign companies may receive a temporary authorization with DINACIA's approval. For BVLOS (Beyond Visual Line of Sight) operations, special permission is required through PortableUTM. Between 2018 and 2021, DINACIA issued additional resolutions, forms, and circulars to complement and refine the existing regulations, enhancing the framework for safe and	In Uruguay, there is active public-private collaboration in UAS operations and UTM decision-making, exemplified by the partnership between the General Directorate of Civil Aviation (DINACIA) and Dronefies Lab. Dronefies Lab developed PortableUTM, an open-source UTM system designed for use in Uruguay. This system was actively refined through collaboration and consultation with DINACIA and commercial operators following trials. As a result, PortableUTM has become the official UTM system of DINACIA, highlighting successful cooperation between public and private entities in enhancing UAS operational capabilities in Uruguay.	In Uruguay, there is a lack of detailed information regarding existing UAS operations and UTM strategies from the General Directorate of Civil Aviation (DINACIA). This suggests that comprehensive strategic plans or documented approaches for managing and integrating UAS operations and UTM in Uruguay may not be widely accessible or fully developed.

compliant drone operations in Uruguay.		
4 – Operations (3/5) In Uruguay, drone airspace structures have been implemented to facilitate organized and safe UAS operations. This includes the establishment of specific drone zones or geozones, which designate particular areas within the airspace for drone activities. These geozones provide clear guidelines on where drones can operate, ensuring compliance with safety regulations and helping to minimize potential conflicts with manned aircraft. This structured approach aids in managing drone traffic effectively, supporting the safe integration of drones into Uruguay's national airspace system.	**5 – Technology (3/5)** In Uruguay, the General Directorate of Civil Aviation (DINACIA) has implemented a basic UTM system through the mobile application PortableUTM. This application provides essential UTM services, including flight authorization, facilitating the management of drone operations within the country's airspace. PortableUTM helps ensure that drone activities are conducted safely and in compliance with regulatory requirements, supporting the organized integration of UAS into Uruguay's aviation system.	**6 — Business and Market (1/5)** In Uruguay, there is a lack of detailed information regarding national drone operations and UTM market sizing analysis, high-level value chain mapping, end-level pricing strategy, and business plans from the General Directorate of Civil Aviation (DINACIA). This absence suggests that comprehensive economic and strategic insights into the drone industry and UTM services in Uruguay may not be fully developed or publicly accessible. More thorough analyses and strategic documentation could help in understanding the potential for growth and development in Uruguay's UAS sector.

Commercial BVLOS services (examples)

REGULATORY COMPLIANCE FOR CRITICAL MEDICAL SERVICES

China

Antwork, founded in 2015, is a Chinese leader in BVLOS drone operations, specialising in medical logistics. In 2019, it became the first company in China to secure a licence for urban drone deliveries after passing the Civil Aviation Administration's Specific Operations Risk Assessment (SORA). Its drones transport medical supplies like vaccines and test samples between healthcare facilities. Also, Antwork serves in other sectors such as postal (China post) and meal deliveries (KFC and Starbucks). The company operates a complete ecosystem with UAV platforms, drone ports, and a cloud-based UTM system. Its emphasis on healthcare logistics demonstrates the transformative potential of drones in critical services.

Regulatory Compliance: Successfully securing the first licence for urban BVLOS operations in China through the Civil Aviation Administration's SORA process demonstrates the importance of meeting stringent regulatory requirements for scaling operations.

Integrated Ecosystem: The development of a comprehensive drone ecosystem, including UAV platforms, drone ports, and a cloud-based UTM system, ensures seamless and reliable operations.

Focus on Critical Services: Prioritising medical logistics, such as the delivery of vaccines and test samples, postal and meal deliveries highlight the value of targeting high-impact industries where drones can significantly improve efficiency and outcomes.

Operational Efficiency: Using autonomous drones to drastically reduce delivery times exemplifies how automation can transform time-sensitive logistics.

MULTI-STAKEHOLDER GOVERNANCE FOR DRONE DELIVERY

United States

The Dallas–Fort Worth (DFW) metroplex has emerged as a global leader in Beyond Visual Line of Sight (BVLOS) drone operations, driven by collaborations between major operators like Wing Aviation, DroneUp, Zipline, and Manna, alongside advanced UTM technology providers such as ANRA Technologies. Approved by the FAA as a UTM Key Site, DFW leverages federated UTM systems to ensure airspace safety through conflict detection, route conformance monitoring, and constraint management. These systems enable real-time coordination, eliminating the need for visual observers and proving BVLOS operations can scale safely in complex urban airspaces.

Wing Aviation initially reached 60,000 households and aims to serve the metroplex's 8 million residents, while Walmart, in partnership with Wing, DroneUp and Zipline, has launched extensive drone delivery networks targeting over 30 towns, with plans to reach 75% of the metroplex. Zipline's Platform 2 system, introduced in North Texas, integrates directly into buildings to facilitate precise, zero-emission deliveries. ANRA Technologies supports these operations with advanced UTM capabilities, particularly for Manna's services. With tens of thousands of deliveries completed, DFW demonstrates the viability of BVLOS operations and provides valuable insights for national BVLOS regulations.

Collaborative Ecosystem: Operators like Wing, Zipline, DroneUp, and Manna, along with UTM providers and the FAA, showcase how collaboration can enable the safe integration of multiple operators in the same airspace.

Federated UTM System Implementation: DFW employs a federated UTM model using the ASTM F3548-21 standard, enabling multiple UTM Service Suppliers (USSs) to coordinate airspace safely and efficiently.

Real-Time Data Sharing and Adaptation: Continuous data sharing between operators and UTM systems enables refinement of protocols and efficiency improvements, supporting the evolution of BVLOS operations.

Strategic Deconfliction: Automated conflict detection and resolution ensure route overlaps are avoided, enhancing safety without manual intervention, while aggregate conformance monitoring maintains operational integrity.

Scalable and Sustainable Operations: Zero-emission solutions like Zipline's Platform 2 and the scale of operations targeting millions of residents demonstrate the environmental and logistical viability of urban drone deliveries.

CLOSED OPERATIONAL ENVIRONMENT FOR INDUSTRIAL MONITORING

Belgium

The Port of Antwerp-Bruges, Europe's second-largest and one of the busiest ports globally, has become the first to implement a drone network for monitoring a closed industrial environment. Thousands of BVLOS drone flights are conducted annually, with six autonomous drones performing 18 daily missions across the 120 km^2 port. These drones provide real-time video feeds to enhance perimeter security, detect unauthorised activities, and monitor environmental risks such as oil spills or floating debris.

Operating within this controlled and closed environment, the initiative builds on the SAFIR (Safe and Flexible Integration of Initial U-Space Services in a Real Environment) project, which demonstrated the potential of drone integration in complex industrial settings. In collaboration with DroneMatrix, SkeyDrone, Proximus, and Unifly, the port uses U-Space services and advanced UTM systems to streamline operations, manage traffic, and ensure safety. Centrally controlled, the drones are critical for infrastructure inspections, security patrols, and environmental monitoring, setting a global standard for integrating drones into secure and industrial environments.

Closed Environment Operations: Operating in a controlled, closed industrial environment allows for safer and more efficient BVLOS operations without external airspace conflicts.

Centralised Command and Control: A centralised system ensures seamless drone operation, rapid responses to incidents, and efficient management of surveillance and monitoring workflows.

Integration of U-Space Services: Advanced U-Space services and UTM systems enable streamlined flight approvals, real-time traffic management, and safe coordination of drone operations.

Multi-Function Deployment: The drones handle diverse tasks, including perimeter security, environmental monitoring, and infrastructure inspections, maximising their utility.

ADVANCED TECHNOLOGIES FOR CRITICAL INFRASTRUCTURE INSPECTION

Israel

In 2024, Propeller Drones partnered with the Israel Electric Corporation (IEC) on a project to carry out Israel's first pre-approved BVLOS inspections of electrical infrastructure. Using Airwayz's AI-driven UTM system, the drones inspect high-voltage power lines, substations, and other critical assets, identifying faults, corrosion, and damage with high precision. These autonomous flights enhance safety by reducing the need for human inspections in hazardous locations and improve efficiency with real-time reporting.

Airwayz's UTM dynamically manages multiple drone fleets, optimising flight paths and ensuring safe operations. FlightOps enhances the drones' AI capabilities, meeting stringent safety and regulatory standards. This initiative showcases how pre-approved autonomous BVLOS drones can transform infrastructure inspections, offering a scalable and reliable solution for complex industrial environments.

Dynamic UTM Management: The use of Airwayz's AI-driven UTM system enables real-time airspace coordination, optimised flight paths, and safe management of multiple drone fleets.

Pre-Approved BVLOS Operations: Securing government pre-approval for BVLOS flights ensures regulatory compliance and establishes a foundation for widespread autonomous inspections in industrial sectors.

Safety in Hazardous Environments: Autonomous drones eliminate the need for human inspectors in high-risk locations like power lines and substations, enhancing worker safety.

Collaboration Across Stakeholders: Partnerships with Airwayz and FlightOps integrate cutting-edge UTM technology and AI enhancements, showcasing the value of multi-stakeholder collaboration in scaling drone operations.

Regional Ranking

Africa

		Legislation	Governance	Strategy	Operations	Technology	Business & Market	Score (0-30)	Tier (5-1)
1.	Kenya	3	3	3	4	3	1	17	2
2.	Nigeria	3	3	2	4	2	1	15	3
2.	Rwanda	3	3	1	4	3	1	15	3
3.	Ghana	3	3	2	4	1	1	14	3
4.	South Africa	3	2	2	3	2	1	13	4
5.	Ethiopia	3	2	1	2	1	1	10	5

Global UTM Association

Asia

		Legislation	Governance	Strategy	Operations	Technology	Business & Market	Score (0-30)	Tier (5-1)
1.	China	3	4	4	4	4	3	22	1
2.	Japan	4	4	4	3	3	2	20	1
3.	India	3	3	3	3	3	3	18	2
3.	South Korea	2	4	4	3	4	1	18	2
4.	Singapore	3	4	3	3	3	1	17	2
5.	Malaysia	3	2	3	3	2	2	15	3
6.	Thailand	2	3	3	3	1	1	13	4
7.	Taiwan	2	3	1	3	2	1	12	4
8.	Indonesia	2	3	1	3	1	1	11	4
9.	Philippines	3	2	1	2	1	1	10	5
10.	Bangladesh	3	1	1	2	1	1	9	5
11.	Vietnam	2	1	1	2	1	1	8	5

Australia & Oceania

		Legislation	Governance	Strategy	Operations	Technology	Business & Market	Score (0-30)	Tier (5-1)
1.	Australia	3	3	4	3	3	3	19	2
2.	New Zealand	3	3	3	3	3	2	17	2

Global UTM Association

Europe

		Legislation	Governance	Strategy	Operations	Technology	Business & Market	Score (0-30)	Tier (5-1)
1.	Belgium	4	4	3	4	4	3	22	1
2.	Switzerland	5	4	3	3	3	2	20	1
3.	Italy	3	3	3	4	3	3	19	2
3.	Norway	4	3	3	3	3	3	19	2
3.	Spain	5	4	3	3	3	1	19	2
4.	Netherlands	4	3	3	3	3	2	18	2
4.	Poland	4	2	3	4	4	1	18	2
4.	United Kingdom	4	3	4	3	2	2	18	2
5.	Denmark	4	3	3	3	3	1	17	2
5.	Estonia	4	3	3	3	3	1	17	2
5.	France	4	3	3	3	3	1	17	2
5.	Germany	4	3	2	3	3	2	17	2
5.	Hungary	4	3	3	3	2	2	17	2
6.	Ireland	4	3	3	3	2	1	16	3
7.	Czechia	4	2	3	3	2	1	15	3
8.	Finland	2	2	1	3	3	3	14	3

8.	Lithuania	5	2	1	3	2	1	14	3
8.	Slovenia	4	1	3	3	2	1	14	3
8.	Sweden	4	3	1	3	2	1	14	3
9.	Greece	4	2	1	3	2	1	13	4
9.	Luxembourg	4	2	1	3	2	1	13	4
9.	Portugal	4	2	1	3	2	1	13	4
9.	Romania	4	2	1	3	2	1	13	4
9.	Slovakia	4	2	1	3	2	1	13	4
10.	Austria	2	2	1	3	3	1	12	4
10.	Bulgaria	4	2	1	3	1	1	12	4
10.	Cyprus	4	1	1	3	2	1	12	4
10.	Iceland	4	1	1	3	2	1	12	4
10.	Malta	4	1	1	3	2	1	12	4
11.	Croatia	2	2	1	3	2	1	11	4
12.	Latvia	2	1	1	3	2	1	10	5

Global UTM Association

Middle East

		Legislation	Governance	Strategy	Operations	Technology	Business & Market	Score (0-30)	Tier (5-1)
1.	United Arab Emirates	3	3	4	3	4	4	21	1
2.	Israel	3	3	4	4	4	2	20	1
3.	Saudi Arabia	3	3	4	3	1	4	18	2
4.	Kuwait	3	1	2	3	2	2	13	4
4.	Turkey	3	3	1	3	2	1	13	4
5.	Bahrain	2	2	1	2	2	1	10	5
5.	Oman	3	2	1	2	1	1	10	5
5.	Qatar	2	2	2	2	1	1	10	5
6.	Jordan	2	2	1	2	1	1	9	5

Global UTM Association

North America

		Legislation	Governance	Strategy	Operations	Technology	Business & Market	Score (0-30)	Tier (5-1)
1.	 United States	3	4	4	4	4	3	22	1
2.	 Canada	3	4	4	4	4	2	21	1
3.	 Mexico	2	2	1	2	1	2	10	5

Global UTM Association

South America

		Legislation	Governance	Strategy	Operations	Technology	Business & Market	Score (0-30)	Tier (5-1)
1.	Brazil	3	3	3	3	3	2	17	2
2.	Colombia	3	2	3	3	2	2	15	3
3.	Uruguay	3	3	1	3	3	1	14	3
4.	Argentina	3	2	2	3	1	2	13	4
4.	Chile	3	2	2	3	2	1	13	4
5.	Peru	3	2	1	3	1	1	11	4

Global UTM Association

Global Ranking

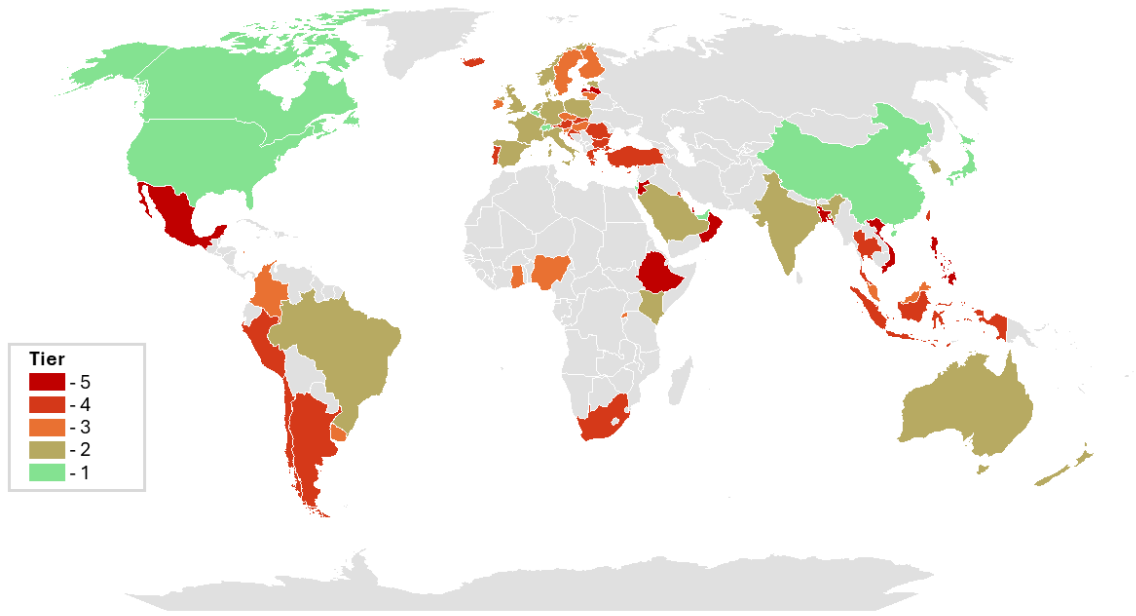
		Legislation	Governance	Strategy	Operations	Technology	Business & Market	Score (0-30)	Tier (5-1)
1.	Belgium	4	4	3	4	4	3	22	1
1.	China	3	4	4	4	4	3	22	1
1.	United States	3	4	4	4	4	3	22	1
2.	Canada	3	4	4	4	4	2	21	1
2.	United Arab Emirates	3	3	4	3	4	4	21	1
3.	Israel	3	3	4	4	4	2	20	1
3.	Japan	4	4	4	3	3	2	20	1
3.	Switzerland	5	4	3	3	3	2	20	1
4.	Australia	3	3	4	3	3	3	19	2
4.	Italy	3	3	3	4	3	3	19	2
4.	Norway	4	3	3	3	3	3	19	2
4.	Spain	5	4	3	3	3	1	19	2
5.	India	3	3	3	3	3	3	18	2
5.	Netherlands	4	3	3	3	3	2	18	2
5.	Poland	4	2	3	4	4	1	18	2
5.	Saudi Arabia	3	3	4	3	1	4	18	2

5.	South Korea	2	4	4	3	4	1	18	2
5.	United Kingdom	4	3	4	3	2	2	18	2
6.	Brazil	3	3	3	3	3	2	17	2
6.	Denmark	4	3	3	3	3	1	17	2
6.	Estonia	4	3	3	3	3	1	17	2
6.	France	4	3	3	3	3	1	17	2
6.	Germany	4	3	2	3	3	2	17	2
6.	Hungary	4	3	3	3	2	2	17	2
6.	Kenya	3	3	3	4	3	1	17	2
6.	New Zealand	3	3	3	3	3	2	17	2
6.	Singapore	3	4	3	3	3	1	17	2
7.	Ireland	4	3	3	3	2	1	16	3
8.	Colombia	3	2	3	3	2	2	15	3
8.	Czechia	4	2	3	3	2	1	15	3
8.	Malaysia	3	2	3	3	2	2	15	3
8.	Nigeria	3	3	2	4	2	1	15	3
8.	Rwanda	3	3	1	4	3	1	15	3
9.	Finland	2	2	1	3	3	3	14	3
9.	Ghana	3	3	2	4	1	1	14	3

9.	Lithuania	5	2	1	3	2	1	14	3
9.	Slovenia	4	1	3	3	2	1	14	3
9.	Sweden	4	3	1	3	2	1	14	3
9.	Uruguay	3	3	1	3	3	1	14	3
10.	Argentina	3	2	2	3	1	2	13	4
10.	Chile	3	2	2	3	2	1	13	4
10.	Greece	4	2	1	3	2	1	13	4
10.	Kuwait	3	1	2	3	2	2	13	4
10.	Luxembourg	4	2	1	3	2	1	13	4
10.	Portugal	4	2	1	3	2	1	13	4
10.	Romania	4	2	1	3	2	1	13	4
10.	Slovakia	4	2	1	3	2	1	13	4
10.	South Africa	3	2	2	3	2	1	13	4
10.	Thailand	2	3	3	3	1	1	13	4
10.	Turkey	3	3	1	3	2	1	13	4
11.	Austria	2	2	1	3	3	1	12	4
11.	Bulgaria	4	2	1	3	1	1	12	4
11.	Cyprus	4	1	1	3	2	1	12	4
11.	Iceland	4	1	1	3	2	1	12	4

11.	 Malta	4	1	1	3	2	1	12	4
11.	 Taiwan	2	3	1	3	2	1	12	4
12.	 Croatia	2	2	1	3	2	1	11	4
12.	 Indonesia	2	3	1	3	1	1	11	4
12.	 Peru	3	2	1	3	1	1	11	4
13.	 Bahrain	2	2	1	2	2	1	10	5
13.	 Ethiopia	3	2	1	2	1	1	10	5
13.	 Latvia	2	1	1	3	2	1	10	5
13.	 Mexico	2	2	1	2	1	2	10	5
13.	 Oman	3	2	1	2	1	1	10	5
13.	 Philippines	3	2	1	2	1	1	10	5
13.	 Qatar	2	2	2	2	1	1	10	5
14.	 Bangladesh	3	1	1	2	1	1	9	5
14.	 Jordan	2	2	1	2	1	1	9	5
15.	 Vietnam	2	1	1	2	1	1	8	5

Map of Global Ranking



UTM Ecosystem Dimensions' Best Practices (examples)

Legislation	**Harmonized UAS & UTM regulations**	U-Space is Europe's unified regulatory framework for safely integrating drones into airspace through digital and automated services	U-space
Governance	**Open discussion with the industry**	SUSI (Swiss U-Space Implementation) is a Swiss initiative uniting public and private stakeholders to integrate drones safely into airspace using advanced U-Space technologies and frameworks	SUSI SWISS U-SPACE IMPLEMENTATION
Strategy	**Strategy as a starting points**	ANSP Skeyes launched its larger-scale drone activities in 2018 with a comprehensive strategy focused on integrating drone operations, data analytics services, and drone detection and protection (ANSP JV SkeyDrone)	skeyes nice to guide you
Operations	**BVLOS operations deployment**	The FAA authorized multiple commercial drone operations in the Dallas area, allowing companies like Wing, DroneUp and Zipline to conduct package deliveries BVLOS without visual observers, deploying their own UTM technology to safely manage drone-to-drone interactions in shared airspace	Wing zipline
Business and Market	**Market sizing for informed decision making**	Airservices Australia began with detailed market sizing, forming the basis for their pricing strategy, operating strategy, and business case for financing UTM development	airservices

Technology	**Advanced UTM systems beyond pure geo-awareness service**	In many countries and geographies advanced UTM systems have been already implemented, laying technological foundation for commercial BVLOS drone operations

UTM Ecosystem Dimensions' Best Practices (conclusions)

The UTM ecosystem is built on the seamless collaboration of regulatory frameworks, technological infrastructure, and market demand, forming a cycle that highlights its growth and financial sustainability. A robust demand for advanced BVLOS drone services, particularly in Advanced Air Mobility (AAM) such as drone deliveries and air taxis, is pivotal in driving higher uncrewed traffic volumes and establishing the ecosystem's financial foundation. To enable scalable BVLOS operations, foundational UTM systems and services, including integrated infrastructure and widespread regulatory authorisations, are essential. The interdependence of these components ensures that each success reinforces the others, securing the ecosystem's long-term viability. Collaboration between stakeholders—governments, regulators, airspace managers, UTM technology and service providers — is critical to foster thriving commercial advanced drone services and drive the growth of a low-altitude economy.

The Global UTM Ecosystems' Readiness Index highlights key dimensions requiring improvement for a harmonised UTM ecosystem, while identifying regional leaders demonstrating best practices. In **legislation**, the European Union leads with its U-Space Regulations (2021/664-666), which establish a regulatory framework to enable commercial and scalable BVLOS drone operations. However, national implementation has been slow, highlighting the challenge for authorities to implement digital processes and managing big data. In **governance**, Japan exemplifies a developed culture of cooperation among public ministries, especially the METI (Ministry of Economy, Trade and Industry), CAA, and industries such as UTM technology and service providers and UAS manufacturers, fostering collaboration for UTM adoption. Switzerland further showcases effective governance through its SUSI (Swiss U-Space Implementation) initiative, which unites public and private stakeholders to safely integrate drones into airspace using advanced U-Space technologies and frameworks.

For **strategy**, Belgium serves as an exemplary leader, with the ANSP's Skeyes and its affliate SkeyDrone launching a comprehensive strategy integrating drone operations, data analytics, and protection systems, setting a proactive foundation for UTM development. However, many regions lack updated strategic documents addressing UTM implementation and the low-altitude economy. In **operations**, the U.S. has set a benchmark, deploying BVLOS commercial operations through companies like Zipline, Wing, DroneUp, and Manna together with ANRA in the Dallas — Fort Worth area, leveraging UTM technology for safe drone-to-drone and airspace interactions.

The **technology** dimension remains underdeveloped, with most regions relying on basic airspace just geo-awareness tools and limited advanced UTM implementations. Lastly, in **business and market** development, Australia serves as an example of detailed market-sizing efforts, forming the basis for pricing strategies and financing models for UTM development. ANSP Airservices Australia's work exemplifies how strategic alignment can foster greater economic understanding of the low-altitude economy. These examples reflect the potential for regional best practices to guide global UTM standardisation while highlighting gaps that require collective action.

The work conducted by the GUTMA Task Force, underlines the key areas that must be addressed to advance UTM ecosystems globally. Foremost, in the legislation dimension, is the **need for BVLOS operations-oriented regulations**. Governments and regulators must develop harmonised frameworks to support scalable advanced drone operations, with clearly defined roles, responsibilities and standards tailored to the unique requirements of BVLOS operations. Designing these frameworks requires deep regulatory insights of an operation-centric risk approach, as well as the ability to navigate the complexities of multi-stakeholder non and commercially driven environments.

Secondly, in the governance dimension, there is a pressing **need for broader private-sector engagement**, ensuring that public ministries, aviation authorities, and municipal stakeholders collaborate effectively with private sector innovators. Public-private partnerships are essential to unlock the full potential of UTM ecosystems as building blocks toward digital aviation, requiring alignment on governance, funding, and execution models.

Third, in the strategy dimension, the **need for updated strategies at both the national and organisational levels** is critical. Many regions lack forward-looking plans that incorporate the latest UTM technologies and market trends. It highlights the urgent need for strategies that prioritize business and market analysis. Without such analysis, stakeholders cannot navigate modern market complexities or seize new opportunities. With business data becoming available, it is an opportune time for stakeholders to develop strategies that address market entry pathways, operational scalability, and stakeholder cooperation, ensuring they remain relevant in this rapidly evolving sector.

Equally, in the operations and technology dimensions, vital are the **operational and technological solutions designed specifically for BVLOS operations**. Advanced UTM systems with dynamic airspace management, and data exchange standards are needed to ensure safe and efficient advanced drone operations. Finally, in the business and market dimension, more than 60% of surveyed countries scored 1 out of 5, indicating the lack of business tools - including market-sizing methodologies, value chain analyses, and tailored business cases, among mostly public stakeholders, like responsible ministries and departments, CAAs and ANSPs. It results in very low economic understanding of the low-altitude economy enabled by commercial and scalable BVLOS drone services within the UTM ecosystem. This result also reflects the absence of publicly available information in this domain. The **adoption of business tools** is essential to establish a strong foundation for the low-altitude economy. These tools will enable stakeholders to evaluate opportunities, design sustainable financing models, and drive long-term growth.

Addressing these needs will require actionable insights, detailed planning, and alignment across diverse stakeholders. By focusing on these areas, there is a clear opportunity to create resilient UTM ecosystems that balance safety with commercial interests in digitalization and automation, as well as technological innovation with sustainable economic growth, positioning all stakeholders for long-term success.

Disclaimers

Data Collection Source Disclaimer:

The data for the Global UTM Ecosystems' Readiness Index 2024 was primarily collected through a questionnaire distributed to relevant stakeholders. This questionnaire served as a primary source of information. However, in cases where responses were insufficient, appeared biased, or where conflicting information arose from multiple sources, additional references were consulted.

In particular, Philip Butterworth-Hayes' Unmanned Airspace report, *The Market for UAV Traffic Management Services 2024-2028*, was used to supplement and validate findings. As a recognised expert in the UTM, with extensive experience in aviation journalism, research and consultancy, his work provided an authoritative perspective on national UTM developments.

For further clarification, official documents from regulatory, operational and governmental bodies such as Civil Aviation Authorities (CAA), Air Navigation Service Providers (ANSPs), ministerial publications, etc., were referenced.

Disclaimer on GUTMA's Role and Opportunity for Stakeholder Input:

The Global UTM Association (GUTMA) supports and fosters the development of UTM ecosystems worldwide. The Global UTM Ecosystems' Readiness Index 2024 aims to provide an accurate and comprehensive overview of UTM maturity; however, it reflects the dynamic nature of the field and is reliant on the availability and accuracy of collected data. As such, some information may be unavailable, incomplete, or outdated.

Where information was available exclusively in native languages, there was a potential for mistranslation or interpretation errors. In certain jurisdictions, the restricted nature of information further limited data accessibility. Some countries were excluded from the index due to lack of accessible official information, unverifiable questionnaire responses, or conflicting sources. In some cases, stakeholder responses were received, but data validation could not confirm their accuracy or completeness.

Potential omissions do not imply the absence of UTM-related initiatives in excluded regions and countries. Stakeholders from these areas are invited to submit updated and verifiable information to ensure future iterations of the index offer a more comprehensive and accurate representation of Global UTM ecosystems' readiness. For any corrections or additions, please contact GUTMA Secretary General — Koen De Vos at kdevos@gutma.org and GUTMA Task Force Leader — Tomasz Kłosowicz at tomasz.klosowicz@pwc.com.

Disclaimer on Liechtenstein's Exclusion:

Although Liechtenstein is a member state of the European Union Aviation Safety Agency (EASA), it has not been included in the Global UTM Ecosystems' Readiness Index 2024. This exclusion is due to the unavailability of sufficient or verifiable information specific to its UTM ecosystem.

Disclaimer on Albania, Bosnia & Herzegovina, Serbia and Georgia's Exclusion:

Responses were received from stakeholders in Albania, Bosnia & Herzegovina, Serbia and Georgia through the questionnaire distributed. However, the answers provided could not be independently verified due to incomplete or conflicting data. As a result, these countries have been excluded from the index.

Terms and Acronyms

TERM/ACRONYM:	DESCRIPTION:
AAM	Advanced Air Mobility
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
BVLOS	Beyond Visual Line Of Sight
CAA	Civil Aviation Authority
CISP	Common Information Service Provider
ConOps	Concept of Operations
EASA	European Union Aviation Safety Agency
eVTOL	Electric Vertical Take-off and Landing
EU Regulation 2019/945	Sets product requirements for drones, mandating CE marking, safety standards, and classifications (C0-C4) based on risk and operation type. Manufacturers must ensure compliance, provide user instructions, and enable traceability.
EU Regulation 2019/947	Defines rules for drone operations across three risk categories (Open, Specific, Certified), requiring pilot registration, competency certification, and operational authorisations for higher-risk activities.
EU Regulations 2021/664-666	Establishes the U-Space framework for uncrewed traffic management, detailing services like network identification, geo-awareness, and traffic information, while aligning crewed and uncrewed aviation operations.
FAA	Federal Aviation Administration

TERM/ACRONYM:	DESCRIPTION:
FIMS	Flight Information Management System
ICAO	International Civil Aviation Organization
MoU	Memorandum of Understanding
Part 107 rule in the US	Governs commercial drone operations under 55 lbs, requiring pilots to pass an FAA knowledge test, operate within visual line-of-sight (VLOS), and comply with restrictions on altitude, speed, and airspace use unless granted waivers.
Part 108 rule in the US	Addresses advanced drone operations, including cargo delivery and higher-risk use cases, focusing on safety requirements, operator certification, and airspace integration for expanded applications like BVLOS (beyond visual line-of-sight) operations.
RPAS	Remotely PIloted Aircraft System
SUSI	Swiss U-Space Implementation
UAS	Uncrewed Aircraft System
USS	UTM Service Supplier
USSP	U-Space Service Provider
UTM	Uncrewed Traffic Management
VLOS	Visual Line of Sight

Annex 1

1 LEGISLATION

How developed is the regulatory framework concerning UAS operations or UTM relating to operational, as well as technical, governance and economical aspects?

Index:	Criteria:	Description:
1 — Nascent	None	There has been no legislation released regarding UAS operations and/or UTM.
2 — Emerging	Regulations regarding UAS operations released	There have been first regulations released that cover specific niches, such as UAS operations basic regulations. E.g. EU Regulation 2019/945 & EU Regulation 2019/947 in Europe or the Part 107 rule in the US.
3 — Developed	Regulations regarding UAS operations nationally implemented	The first regulations are generally implemented, giving rise to limited commercial drone operations/services, including through an initial set of standards, E.g. EU Member States implemented the EU Regulation 2019/945 & EU Regulation 2019/947 in Europe or the wider implementation of the Part 107 rule in the US.
4 — Advanced	Regulatory framework regarding UTM released	There has been a more general regulatory framework adopted, including UTM regulations that cover commercial and scalable BVLOS drone operations/services, that are supported by a wider set of standards. E.g. EU Regulations 2021/664-666 in Europe or the future Part 108 rule in the US.
5 — Mature	Regulations regarding UTM nationally implemented and complemented with other aspects (e.g. related to uncooperative drone operations and Counter-UAS technologies)	Stakeholders are in positions to implement and manage the more general regulatory framework, including UTM regulations that fully enable and sustain commercial and scalable BVLOS drone operations/services, with international standards generally applied. E.g. EU Member States implemented EU regulations, including EU Regulations 2021/664-666 in Europe.

2 GOVERNANCE

How diverse is the collaboration between public and private stakeholders in decision-making processes related to the UTM ecosystem (such as structure, roles, financing, etc.)?

Index:	Criteria:	Description:
1 — Nascent	None	There have been no governance discussions or implementations regarding UAS operations and/or UTM.
2 — Emerging	Mostly public stakeholders UAS operations/UTM decision-making	There have been mostly public UAS operations/UTM governance discussions and implementations between the axis of the public government/ministry-Civil Aviation Authority (CAA) and Air Navigation Service Provider (ANSP).
3 — Developed	Private market and local governments actively participate in UAS operations/UTM decision-making	There have been standard public-private UAS operations/UTM governance discussions and implementations, between the above public stakeholders, including local governments, and the private market actively participates. E.g. SUSI (Swiss U-Space Implementation) public-private initiative in Switzerland.
4 — Advanced	Overall UTM governance pre-defined	There has been clear allocation of responsibilities between public and private stakeholders regarding UTM governance including aspects such as structure, roles, financing, etc. There have been discussions on the management of common space between CISP/FIMS and USSPs/USS (3rd party services). E.g. Pre-defined governance of CISP/USSP in Europe and FIMS/USS in the US.
5 — Mature	Overall UTM governance fully defined, implemented and known	There have been implementations with public and private stakeholders regarding UTM governance including aspects such as structure, roles, financing, etc. There have been implementations on the management of common space between CISP/FIMS and USSPs/USS (3rd party services). E.g. Fully defined governance of CISP/USSP in Europe and FIMS/USS in the US.

3 STRATEGY

Do the stakeholders have clear visions, objectives and approaches, supported by a detailed strategic document, to develop the UTM ecosystem?

Index:	Criteria:	Description:
1 — Nascent	None	There have been no strategic discussions or implementations regarding UAS operations and/or UTM.
2 — Emerging	UAS operations and/or UTM strategy at each stakeholder's level	There has been a definition of UAS operations and/or UTM strategy at each stakeholder's (organisation) level. E.g. public or private market stakeholders' own strategies.
3 — Developed	UAS operations and/or UTM strategy at national level	There has been a definition of UAS operations and/or UTM strategy at national (country) level. E.g. national strategy preceded by white / policy paper and supplemented by roadmap / action plan / blueprint, etc.
4 — Advanced	Overall UTM strategy pre-defined, also in the context of broader aviation strategy	There have been discussions between public and private stakeholders regarding UTM strategy aspects such as industries (economy, society, environment, security, etc.) and their needs with correlated services (Advanced Air Mobility, Counter-UAS, etc.), etc.
5 — Mature	Overall UTM strategy fully defined and implemented, also in the context of broader aviation and digitalisation strategies	There have been implementations between public and private stakeholders regarding UTM strategy aspects such as industries (economy, society, environment, security, etc.) and their needs with correlated services (Advanced Air Mobility, Counter-UAS, etc.), reaching out towards broader aviation and digitalisation agendas.

4 OPERATIONS

How designed are the operational methods to enable and sustain the commercial and scalable BVLOS drone services within the UTM ecosystem?

Index:	Criteria:	Description:
1 — Nascent	None	There have been no discussions or implementations regarding UAS operations and/or UTM.
2 — Emerging	Airspace structures segregation	There has been a segregation of traditional airspace structures, put in place for UAS operations.
3 — Developed	Drone zones	Drone airspace structures have been implemented for UAS operations. E.g. geozones in Europe.
4 — Advanced	Segregated UTM airspaces	Drone airspace structures have been implemented with required UTM services, thus enabling and sustaining commercial and scalable BVLOS operations.
5 — Mature	UTM/ATM integration	Drone airspace structures have been implemented, with required UTM services, thus enabling and sustaining commercial and scalable BVLOS operations. UTM airspaces are integrated with crewed airspace structures and required ATM services.

5 TECHNOLOGY

What operational UTM tools, representing different levels of UTM services, have been implemented to enable and sustain commercial and scalable BVLOS drone services within the UTM ecosystem?

Index:	Criteria:	Description:
1 — Nascent	None	There has been no technology implemented regarding UAS operations and/or UTM.
2 — Emerging	UAS operations mobile application with foundational UTM services	There has been an UAS operations mobile application implemented providing foundational UTM services such as airspace (geo-)awareness.
3 — Developed	UAS operations system with basic UTM services	There has been a basic UTM system implemented, providing basic UTM services such as flight authorisation.
4 — Advanced	UTM system with advanced UTM services	There has been an advanced UTM system implemented, providing advanced UTM services such as deconfliction and dynamic airspace management, thus enabling and sustaining commercial and scalable BVLOS operations, with additional operational services and tools for e.g. weather information (e.g. micro-wind and sensible weather detection), risk management (e-SORA, ARA), and public acceptance. E.g. CISP/USSP systems in Europe, or the use of an InterUSS protocol and of a Discovery and Synchronisation Service.
5 — Mature	UTM/ATM integration	There has been an advanced UTM system implemented, providing all UTM services (please refer to Annex 2), thus enabling and sustaining commercial and scalable BVLOS operations, with additional operational services and tools for e.g. weather information (e.g. micro-wind and sensible weather detection), risk management (e-SORA, ARA), and public acceptance. The UTM system is fully integrated with the ATM system.

6 BUSINESS & MARKET

What is the maturity of stakeholders' economic understanding of the low-altitude economy enabled by commercial and scalable BVLOS drone services within the UTM ecosystem?

Index:	Criteria:	Description:
1 — Nascent	None	There has been no consideration or analysis of business and/or market data regarding UAS operations and/or UTM.
2 — Emerging	UAS operations/UTM market size analysis	There has been a market size analysis of the UAS operations/UTM market, identifying demand potential.
3 — Developed	UTM high-level value chain mapping	There has been mapping of the UTM high-level value chain, identifying services with cost recovery and revenue streams.
4 — Advanced	UTM services end-level pricing strategies	There have been UTM end-level pricing strategies defined, identifying services' value.
5 — Mature	UTM overall business plan	There have been UTM business plans defined, identifying a roadmap and business growth framework.

Annex 2

UTM Services[2]						
Airspace Management	**Conflict Management**	**Identification & Tracking**	**Monitoring**	**Environment**	**Contingency**	**ATC Interface**
1) Geo-awareness (EASA)	5) Flight Authorisation (EASA)	18) Network Identification (EASA)	22) Traffic Information (EASA)	30) Weather Information (EASA)	43) Accident and Incident Reporting (SESAR)	45) Procedural ATC Interface (SESAR)
2) AIM for UAS (SESAR)	6) UAS Flight Planning (SESAR)	19) Registration (SESAR)	23) Conformance Monitoring (EASA)	31) Geospace Information Service (SESAR)	44) Emergency Situation Resolution (SESAR)	46) Collaborative ATC Interface (SESAR)
3) Geofencing (SESAR)	7) Strategic Deconfliction (SESAR)	20) Tracking (SESAR)	24) Recording Service (SESAR)	32) Population Density Map (SESAR)		
4) Airspace authorisation service (ICAO)	8) Dynamic Capacity Management (SESAR)	21) UTM communicati on service (ISO)	25) Digital Logbook (SESAR)	33) ELMG Interference Information (SESAR)		
	9) Tactical Deconfliction (SESAR)		26) Activity reporting service (ICAO)	34) Navigation Equipment Information Service (SESAR)		
	10) Vertical alert service (ISO)		27) FAA Messaging (FAA)	35) Telecomm. Equipment Information Service (SESAR)		
	11) UTM route design service (ISO)		28) USS Network Discovery (FAA)	36) Real-time GIS (ISO)		
	12) Operational plan preparation (ISO)		29) UAS System Monitoring (FAA)	37) Vertical conversion service (ISO)		
	13) Aeronautical Information Service (ICAO)			38) Maintenance management (ISO)		

UTM Services[2]						
Airspace Management	**Conflict Management**	**Identification & Tracking**	**Monitoring**	**Environment**	**Contingency**	**ATC Interface**
	14) Tactical separation with manned aircraft service (ICAO)			39) Risk analysis assistance (ISO)		
	15) Conflict advisory and alert service (ICAO)			40) Discovery service (ICAO)		
	16) Surveillance (FAA)			41) Mapping service (ICAO)		
	17) Navigation (FAA)			42) Restriction management service (ICAO)		

[2]A. Kleczatský, J. Kraus, 2024, *Analysis of duplicate UTM services and their context of influence on airspace capacity*.

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