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THE MARKET FOR UAV TRAFFIC MANAGEMENT SERVICES 2024-2028

BY PHILIP BUTTERWORTH-HAYES

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Market overview

1.1 Industry, government, standards and research UTM milestones in the first half of 2024

Although by September 2024 there were still no national regulator fully-certified UTM/U-space infrastructure managers and service providers managing complex drone operations (BVLOS, flights over people, nighttime flights and one operator to multiple drones) there were several localised UTM operations – in Dallas in the USA, Tel Aviv and the North Sea ports of Europe - where UTM operations are in now place managing operational drone traffic. These operations included both highly centralised UTM architecture (North Sea ports and Tel Aviv) and highly decentralised (Dallas) services.

In July 2024 UTM development took a major step forward with operational delivery drones now being able to share the same airspace. Wing and Manna delivery drones began to operate together within the Alliance Texas Innovation Zone in Dallas, Texas, USA, using ASTM standards to strategically deconflict live flights in a commercial environment, with these first operations being witnessed by the FAA and NASA.

According to a Linkedin post from Joseph Rios, Chief Technologist, Aviation Systems Division at NASA Ames Research Center: "The system is designed such that a company can build this strategic conflict detection service for its own use, like Wing does. Or an organization can partner with a service supplier, like Manna does with ANRA Technologies….Multiple service suppliers have a shared governance agreement to ensure interoperability and common understanding of requirements and responsibilities….In just a small handful of years, this will be commonplace – there will be hundreds of millions of instances each year where drone delivery aircraft will safely pass each other in the airspace to deliver food, medicines and other essential items to households," said Manna Drone Delivery's Bobby Healy, in another Linkedin post. "Proud to take this first step with our UTM provider ANRA Technologies and with Wing."

Dallas is one of the UTM Key Sites identified by the FAA for evaluating operating procedures and technologies between operators and UAS Service Suppliers (USSs), working together to obtain the necessary exemptions to operate BVLOS services. "The FAA is also exploring how it will recognize the capabilities of USSs for the safety and efficiency benefits they provide," says the agency. "Data and information from operations at the key site will inform policies in the critical path to the FAA's BVLOS rulemaking, which will provide a regulatory approval path for UTM services to be used more broadly within the NAS. Key site operations will occur in Class G airspace at altitudes up to 400 feet AGL."

In Europe, during Amsterdam Drone Week in early 2024 the first meeting of representatives of the ports of Hamburg, Rotterdam and Antwerp involved in the development of complex drone operations at their ports was held. All three ports have developed ecosystems, including UTM systems, in which several drone operating companies are engaged in increasingly complex missions, including the first BVLOS operations.

While there are long standing high level cooperative agreements between them, this is the first time the drone operating teams have decided to work together. Areas of cooperation will include sharing experiences and best practices and, potentially, the development of joint programmes.

Probably the single largest obstacle to unblocking the logjam of U-space implementation within the European Union is the lack of agreement between Member States on the number

and type of services which should be provided within the U-space Common Information Service (CIS).

Table one: Global highpoints in the UTM calendar January-August 2024

August
Singapore proposes remote ID requirement for all UAS above 250g The Civil Aviation Authority of Singapore (CAAS) has launched a month-long public consultation exercise to seek public feedback on the proposed implementation plan to support the introduction of a Broadcast Remote Identification (B-RID) requirement for uncrewed aircraft systems (UAS). The public consultation exercise runs from 2 September through 1 October 2024. The feedback received will help shape the implementation plan. **US Drone Advisory Council calls for deferred SRID enforcement for mid-sized manufacturers** The Drone Advisory Council (DAC) has published a paper on standard Remote ID implementation for smaller and mid-size manufacturers. The paper includes a set of recommendations and the DAC is seeking comment on how these might be revised in order to benefit drone manufacturers, particularly those based in the United States. **FAA's initial roadmap for AI safety assurance says UAS could help shape policy** The US Federal Aviation Administration (FAA) has released its initial Roadmap for Artificial Intelligence Safety Assurance, which recognises the growing use of AI technologies in the aviation sector, including autonomous systems. **Aloft completes FAA LAANC onboarding** Aloft has completed the FAA Low Altitude Authorization and Notification Capability (LAANC) onboarding for the latest version of its LAANC platform, which is designed to provide more timely and actionable information for uncrewed aerial systems (UAS) operators. **European Commission publishes decision on remote ID harmonised standards** The European Commission Implementing Decision (EU) 2024/2103 of 30 July 2024 on harmonised standard for direct remote identification for unmanned aircraft drafted in support of Delegated Regulation (EU) 2019/945 has been published. The full text is available here.
July
AeroVision Canada, Clearsky Connect, ANRA to build new Transport Canada UTM system A consortium led by AeroVision Canada along with principal partners ANRA Technologies and ClearSky Connect, has been selected by Transport Canada, the Canadian aviation authority, and NAV CANADA (the Canadian air navigation service provider) to deliver a Phase 2 trial of Remotely Piloted Aircraft Systems (RPAS) Traffic Management (RTM). **FAA "authorises UTM-based multi-operator BVLOS flights in Dallas ahead of schedule"** The FAA reports it has authorized commercial drone flights without visual observers in the same Dallas-area airspace. "The authorizations for Zipline International and Wing Aviation allow them to deliver packages while keeping their drones safely separated using Unmanned Aircraft System Traffic Management (UTM) technology," according to the FAA. " **World's first municipal airspace management/autonomous vehicle ops centre opens in Israel** Israeli companies and government officials have developed the world's first municipal airspace control centre, designed to manage autonomous drone and eventually eVTOL flights in and around cities. The new control centre has been built in Askelon and equipped with the Cando platform which integrates data from combined stationary sensors on masts, drones and mobile devices, along with the HighLander Orion DFM (drone fleet management) and Vega UTM (unmanned traffic management) systems.

Major step forward for UTM as Manna and Wing delivery drones share the same airspace
UAS traffic management (UTM) development has taken a major step forward with operational delivery drones now being able to share the same airspace. Wing and Manna delivery drones have begun to operate together within the AllianceTexas Innovation Zone in Dallas, Texas, USA, using ASTM standards to strategically deconflict live flights in a commercial environment, with these first operations being witnessed by the Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA)..

GUTMA launches UTM ecosystems' readiness task force
The Global UTM Association (GUTMA) has launched the GUTMA UTM Ecosystems' Readiness Task Force powered in cooperation with PwC Drone Powered Solutions. The initiative aims to map and analyse the readiness of uncrewed traffic management (UTM) ecosystems globally, focusing on the scalability of commercial drone operations.

Finland's VTT publishes tender for pre-commercial U-space system
Finland's VTT has published a tender for the supply of a pre-commercial U-space system. According to the tender document: "The object of the tender process is to award a single contract to a supplier that can provide the licenses for a precommercial U-Space system application and hosting in cloud environment (SaaS) (later also "Service"). VTT aims to purchase 25 simultaneous per-user licenses with an option to purchase perpetual and/or additional licenses in the future.

June

Project BLUEPRINT trials lay groundwork for open-architecture UK UTM system
Beyond visual line of sight (BVLOS) operations have taken a step forward in the UK with the culmination of the Project BLUEPRINT showcase presented at Cranfield University's Digital Aviation Research and Technology Centre (DARTeC) on 25 June. This initiative, under the Innovate UK Future Flight Challenge, aims to develop open-source solutions for establishing drone zones in local areas, ensuring safe and efficient operations.

ENAIRE outlines next stage in U-space platform development – plans to be a service provider
ENAIRE will publish drone flight areas and centralize all U-space information following the publication of Royal Decree 517/2024 approved on 4 June by the Council of Ministers, which designates ENAIRE as the entity responsible for making available, in a common digital format, information on the geographical areas for drones identified in sovereign Spanish territory and airspace. ENAIRE also plans to be certified as a U-space service provider.

NAV CANADA reports major upgrade to its drone flight authorisation app NAV DRONE
NAV CANADA has deployed the latest version of NAV DRONE, "the only RPAS app in Canada that uniquely enables drone pilots to request permission to fly their drones in civilian controlled airspace," according to NAV CANADA's Senior Project manager Catheleen Cziszler in a Linkedin post. "These updates bring numerous enhancements designed to improve the experience for both RPAS pilots and NAV CANADA employees," she writes. "For RPAS pilots and operators, the new features include:

Pakistan issues new rules on UAS registration

The Civil Aviation Authority of Pakistan has issued new rules on the registration of uncrewed aerial systems (UAS). The *Civil Unmanned Aircraft Rules, 2024* make registration mandatory with current UAS owners needing to apply for registration within 180 days. Those who acquire their UAS after the new regulations are in place will have 15 days to apply for registration. Applications must mention intended use.

JARUS publishes SORA 2.5 for specific category UAS risk assessment
The Joint Authorities for Rulemaking on Unmanned Systems (JARUS) published the SORA 2.5, agreed at the Plenary in Kazakhstan on May 13, 2024 and can be downloaded on the JARUS webpage. According to JARUS:"The Specific Operations Risk Assessment (SORA) process is intended to provide a risk-proportionate method to determine the required evidence and assurances needed for an Unmanned Aircraft System (UAS) to be acceptably safe within the "Specific" category of UAS Operations (defined as Category B in the JARUS document "UAS Operational Categorization").

Hamburg opens dronePORT with HHLA Sky control centre
HHLA Sky has provided new technology for automated drone flights at the recently opened dronePORT Hamburg. Opened on June 14 by the Hamburg Port Authority, Hamburg Police and Hamburg Aviation, dronePORT Hamburg is a ground infrastructure facility focusing on uncrewed aerial systems and mobile sensor technology. In future, a wide variety of missions will be initiated and monitored from the dronePORT, with potential for both public and private-sector use.

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

GAO calls for action to improve drone identification in the national airspace
The United States Government Accountability Office (GAO) has found that drone integration into the national airspace may be at risk if the Federal Aviation Administration (FAA) does not address shortcomings with its Remote ID initiative. In 2023, the FAA forecast that based on registration data, the commercial drone fleet would grow from around 727,000 at the end of 2022 to 955,000 by 2027. For the same period, the FAA forecast the recreational fleet would increase from 1.69 million to 1.82 million.

Spain issues new UAS regulations – ENAIRE to be the sole provider of common information services
Spain has published a Royal Decree on uncrewed air system regulations which includes major provisions for the implementation of U-space. See: https://boe.es/buscar/doc.php?id=BOE-A-2024-11377. According to the new decree: "To ensure the effective implementation of U-Space, ENAIRE is designated as the sole provider of common information services to provide its services exclusively in all U-Space airspaces designated in airspace under Spanish responsibility, for a period of ten years., extendable by agreement of the Ministry of Transport and Sustainable Mobility.

May

EASA published first U-space Easy Access Rules
The European Union Aviation Safety Agency (EASA) has published the first Easy Access Rules (EAR) for U-space (Regulation (EU) 2021/664). According to EASA: "The EAR for U-space incorporate Regulation (EU) 2021/664, the 'U-space Regulation', setting a regulatory framework for the U-space, an airspace defined by certain drone geographical zones, Regulation (EU) 2023/203 on information security, amending the U-space Regulation, and ED Decision 2022/022/R with the acceptable means of compliance (AMC) and guidance material (GM) to the U-space Regulation."

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

EASA publishes completed package of advanced air mobility regulations
The European Union Aviation Safety Agency has released its finalised package of Innovative Air Mobility regulations, comprising "a comprehensive set of requirements for piloted electric air taxis, spanning the domains of Air Operations (Air OPS), Flight Crew Licensing (FCL), Standardised European Rules of the Air (SERA) and Air Traffic Management (ATM). It also establishes criteria and processes for the certification and maintenance of drones."

FAA Reauthorization Act passes House of Representatives
The US drone and advanced air mobility (AAM) industries have broadly welcomed today's passage of the FAA Reauthorization Act. According to US drone trade association AUVSI: "The bipartisan legislation reauthorizes the FAA through Fiscal Year 2028 and requires the FAA to issue a notice of

proposed rulemaking for UAS operations beyond visual line of sight (BVLOS) within four months. The bill also includes a mandate for the FAA to publish a final special rule for operations of powered lift aircraft within seven months, which will help to meaningfully move the Advanced Air Mobility (AAM) industry forward.

April

InterUSS Platform launches Advisory Council to progress standards development
The InterUSS Platform, a Linux Foundation organisation, has announced the formation of the InterUSS Platform Advisory Council, a voluntary consortium developed to share direct regulatory and standards inputs on the development of the InterUSS Platform's open source tools in the UAS traffic management (UTM) sector, which currently includes automated testing and discovery & synchronisation services (DSS).

FAA approves new method for flying drones over people
The FAA has approved a test method from the Virginia Tech Mid-Atlantic Aviation Partnership that allows drones to be flown over people. The new testing methods allow the use of parachutes when assessing potential failure modes. Tests were conducted in partnership with the Center for Injury Biomechanics.

March

Europe awards EUR26m digital sky funding, selects leading U-space and UAM research projects
The SESAR Joint Undertaking has selected 18 new exploratory research projects within the framework of its Digital European Sky research and innovation programme. The projects address a wide range of topics aimed at generating innovative concepts, methodologies and technologies, all with a view to making air traffic management in Europe smarter and more sustainable. The projects represent a total investment of EUR26 million by the aviation industry and the European Union through Horizon Europe.

DLR publishes initial concept of operations for all airspace users within U-space
Germany's DLR Institute of Flight Guidance has developed a Blueprint titled "U-space Flight Rules" (UFR). This framework of new flight rules aims to establish standardized rules for all airspace users within U-spaces, seamlessly integrating UAS alongside traditional crewed aircraft. Under the UFR Blueprint, airspace users will operate within designated UFR operational blocks, each mandating specific U-space services to meet technical and operational airspace requirements. These services are pivotal in ensuring the safety and reliability of UAS operations within U-space airspaces.

Brazil plans to move eVTOL traffic management from visual to digital flight rules
Brazil's aviation regulator DECEA (The Department for Airspace Control, an organization under SISCEAB – System for Control of the Brazilian Airspace, the country´s authority for Air Navigation Services) has recently published a national UAM Concept of Operations (PRENOR DCA-351-7). The CONOPs proposes to organize urban air mobility (UAM)/eVTOL airspace initially around current helicopter operations to allow for early integration; once eVTOLs are type-certified and in more general use, however, new airspace procedures and technologies will be required to allow for more extensive operations.

Airservices selects Frequentis to develop Australia's drone traffic management system
Australian air navigation service provider Airservices Australia has selected Frequentis Australasia to develop a Flight Information Management System (FIMS) that will enable Airservices to seamlessly incorporate drones, air taxis and other uncrewed aircraft into Australian airspace. The FIMS will be at the core of Australia's Uncrewed Aircraft Systems Traffic Management (UTM) ecosystem. It will enable Airservices to share flight information between air traffic control, traditional aircraft, and uncrewed airspace users, says the press release.

Belgium expands network of ground stations to support low level surveillance
Cooperation between SafeSky, Avionix Engineering and experts of the Open Glider Network are cooperating to establish a low-level surveillance network. Since the beginning of 2024, three air sports federations have started to deploy a network of ground stations/receivers in Belgium. The aim is to make air traffic electronically visible to all pilots in the sky.

February

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

Airbus to launch sustainable aviation hub in Singapore, focus to include UTM
Airbus has signed a Memorandum of Understanding (MOU) with the Singapore Economic Development Board (EDB) to facilitate the establishment of a Sustainable Aviation Hub with a specific focus on technology, research and innovation. The hub will be hosted within Airbus' Singapore Campus in Seletar Aerospace Park. Included in the key areas of development, unmanned traffic management projects are set to benefit from design, development, and the test and validation of sustainable next-generation aviation technologies and best practices in the industry, says the press release.

ASTM publishes F3623-23 standard, sets requirements for surveillance data services
International standards agency ASTM has published F3623-23 standard specification for surveillance supplementary data service providers (SDSP). The SDSP standard provides benchmark requirements for collecting air traffic surveillance data and then disseminating it to users. SDSPs can now develop data fusion capabilities for a single, fused track, eliminating the complexity and providing a "one-stop shop" for surveillance services.

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

ASTM focus group accepts GUTMA recommendations for USSP interoperability
The international standards body ASTM Focus Group has officially accepted GUTMA's recommendations and updated the mapping of ASTM standards F3411-22a and F3548-21 accordingly, says GUTMA. This accomplishment stems from the work of the GUTMA Task Force co-led by ANRA Technologies and Wing, and featuring 20 GUTMA Members representing several companies, including Airwayz, ANGOKA, Heron AirBridge, HHLA, High Lander, NEC, TII and TruWeather Solutions.

January

Federal Aviation Administration expands B4UFLY application for recreational drone users
The FAA is expanding its B4UFLY service to support more activities and help recreational drone users to fly safely. From 1 February 2024, FAA-approved companies will offer multiple ways to access B4UFLY and bring recreational flyers official airspace awareness. The FAA's B4UFLY service shows where recreational flyers can and cannot fly. Starting February 1, 2024, recreational flyers who only fly their drone for fun have more resources to choose from.

SAFIR-Ready U-space project develops real-time positioning data fusion technology
Within WP-3 of the Safir-Ready project, project partners are developing positioning data fusion technology designed to deliver reliable positioning information, with pre-defined performance characteristics (i.e., the probability of the integrity loss shall be no higher than 10e-5). Onboard GNSS data, general aviation conspicuity information, independent surveillance systems, and data from cellular networks are combined to infer and extrapolate the most accurate position. The technology features a complex algorithm developed to compare and use diverse data flows in real time.

UN Security Council publishes principles for national C-UAS strategies – including UTM and data sharing
According to a statement by the United Arab Emirates Ministry of Foreign Affairs: "The document is the first of its kind at the United Nations to address the increasing challenges posed by UAS in the context of counter-terrorism. It consists for four guiding principles, each focusing on a different

aspect: the integration of UAS threats into national counter-terrorism strategies and establishment of legal frameworks; increased understanding and awareness of UAS threats; developing measures to detect, identify, deter, and respond to UAS threats; and capacity development and information exchange to promote international cooperation.

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

3.1 Australasia

Australia will reform the administration and management of its national airspace by 2030, which will include airspace arrangements that allow for the increased use of drones and other new aviation technologies, according to the government's new Aviation White Paper. The document, released on August 26, includes 56 policy initiatives covering 10 key areas.

National airspace reform by 2030

The government will release a plan for the air traffic management of commercial drones and other uncrewed aircraft later this year. This Uncrewed Aircraft System Traffic Management Action Plan will outline steps to enable new types of air traffic management systems in Australia. In addition, the Australian government will produce a new Australian Airspace Policy Statement to replace the policy statement that came into effect in 2021. The new policy statement, also expected in 2024, will give clear direction to the Civil Aviation Safety Authority (CASA) on the government's priorities for airspace management, including in relation to drones and other new technologies. CASA will subsequently prepare a new framework for Australian airspace in 2026. The Australian Future Airspace Framework will describe how classes of airspace will be implemented and administered across Australia. The government expects to update relevant airspace legislation by 2030 and says that these changes will give government agencies the powers they need to regulate airspace use safely. Additionally, new legislation will be introduced by 2030 to protect Australian communities, infrastructure and businesses from the security risks of drones and AAM.

Flight information management system to roll out in 2025

Australia will implement a new system to enable air traffic management to communicate electronically with drones and other uncrewed aircraft. Initial capabilities of the Flight Information Management System will roll out in 2025 to support the safe integration of drones into controlled airspace, with additional features added over time. The government will also "continue to work with industry on the introduction of Remote ID requirements for drones to improve safety and enable responsible and accountable drone use". The government expects that legislation will be introduced and a mandate will be in place by 2030, subject to a regulatory impact analysis process.

Under a separate initiative, the government will expand requirements for aircraft to broadcast their location electronically. "By late 2025, the Australian Government will consider advice about a timetable for mandating ADS-B devices, while also extending subsidies for the purchase of ADS-B equipment until 2027," the white paper states.

Advancing air mobility

The Australian government has already expanded the drones.gov.au website to provide a single point of reference for the emerging aviation technologies sector to access a wide range of government funding and procurement opportunities. Later this year, the government will release an Advanced Air Mobility (AAM) Strategy that provides long-term policy settings to encourage investment in the nascent sector. The white paper also notes a requirement for CASA to update its Strategic Regulatory Roadmap for drones and AAM in 2024, outlining the safety regulator's strategic approach to working with industry to oversee the safe rollout of these new technologies.

The Australian government will also be consulting on regulatory amendments to manage noise impacts from AAM aircraft on communities as well as working with stakeholders to develop AAM infrastructure planning guidance to support the introduction of AAM.

In July 2024 Airservices Australia reported it was seeking feedback from technology providers to inform how the organisation can best support the development of digital services to drone operators, as part of Australia's future drone traffic management ecosystem.

"These innovative software solutions will ensure the safe growth of the drone industry – as part of the broader drone traffic management ecosystem – and connect to Airservices' new Flight Information Management System (FIMS), expected to go live in late 2025," said the ANSP.

In March Airservices Australia selected Frequentis Australasia to develop a Flight Information Management System (FIMS) that will enable Airservices to seamlessly incorporate drones, air taxis and other uncrewed aircraft into Australian airspace. The FIMS will be at the core of Australia's UTM ecosystem. It will enable Airservices to share flight information between air traffic control, traditional aircraft, and uncrewed airspace users, says the press release.

Meanwhile, Australia's Civil Aviation Safety Authority (CASA) said on August 6 that holders of remotely piloted aircraft operator's certificate (ReOC) who obtain CASA approval to fly over or near people, no longer need a separate exemption to fly in a populated area.

In November 2023 the Civil Aviation Safety Authority (CASA) and Airservices Australia announced new airspace, around Sydney Airport and Sydney Harbour, will be added in the automated airspace authorisations trial for certified commercial drone operators from mid-November 2023. Coinciding with this announcement is the extension of the automated airspace authorisations trial for a further 12-months.

The expansion of the trial means more remotely piloted aircraft operator's certificate (ReOC) holders will be able to use a participating CASA-verified drone safety app to apply to fly:

- within 5.5 km (3 nm) of Adelaide, Canberra, Perth and Sydney Airports
- in Restricted Areas near Sydney Harbour.

The automated authorisations reduce approval times from weeks to minutes, allowing ReOC holders to secure more business, in new locations, faster – saving time and money.

Automated airspace authorisations were launched in 2021 by CASA in partnership with Airservices Australia. It uses historical flight data from crewed aircraft operations to identify locations at the selected trial sites where it's safe for licensed and certified commercial drone operators to fly. Since the trial began in 2021, more than 1,275 automated airspace authorisations have been issued in Adelaide, Canberra and Perth.

Also in November 2023, Australia's Department of Infrastructure, Transport, Regional Development, Communications and the Arts developed infrastructure planning guidelines to support the safe, secure and environmentally-considerate integration of drones and electric vertical take-off and landing (eVTOL) vehicles into communities and broader transport networks.

The guidelines are available here

CASA published its remotely piloted aircraft system (RPAS) and advanced air mobility (AAM) roadmap (https://www.casa.gov.au/rpas-aam-roadmap) in July 2022 and has been widely welcomed by industry. The report outlines CASA's plans for developing a national UAS traffic management system.

"The Australian Association for Uncrewed Systems welcomes the release of CASA's RPAS and AAM Strategic Regulatory Roadmap," said AAUS Executive Director, Greg Tyrrell. "For many years AAUS has been advocating for greater certainty to industry through the development of a roadmap and we see the release of this document as an important milestone for the RPAS and AAM sectors, giving them direction to investment and development as we move towards an uncrewed aviation future."

In June 2022 Airservices Australia selected OneSky to continue to Phase 3 in the development a working prototype of a Flight Information Management System (FIMS) for Australia's UTM ecosystem. OneSky is partnered with AAM Group, Airbus, and Resilienx to deliver a full system.

The Airservices tender called for providers to build out a concept for FIMS tailored to the needs of the Australian aviation industry. While FIMS can refer to an interface between an Air Traffic Management System and UTM for the transfer of data, OneSky aims is to collaborate with Airservices to create a platform for a wide variety of services: one that will ensure that drones operate safely within regulations and have minimum impact on other aircraft and the communities they fly over, and ensure "efficient, fair, and competitive access to airspace."

According to the OneSky press release, building a system that meets global standards presents a challenge. Integrating this system with the wide variety of aircraft, communications systems, and services that comprise a cooperative system is an even greater difficulty. OneSky's integration framework is designed to make it easy for new users to access the system. OneSky will deliver a fully functioning FIMS prototype that allows for qualified USS providers to participate, forming the bridge between the actual drone operator and the UTM system. Based on the prototype, the ASA concept could be used around the world to advance uncrewed systems.

In September 2022 Airservices moved onto Phase 4 of its Flight Information Management System (FIMS) working prototype project. Three companies continue to work with Airservices to develop a system that will support the safe and efficient integration of emerging airspace users, including drone operators and air taxis, into Australia's low-altitude airspace. The down-selection process sees Altitude Angel, Frequentis Australasia and OneSky Systems pursuing the development of a FIMS prototype tailored to the needs of Australia's aviation industry, with in-field trials expected later this year.

According to a OneSky press release, the FIMS solution will allow qualified U-space service providers to participate in an integrated airspace, forming the bridge between the actual drone operator and the Uncrewed Traffic Management (UTM) system. OneSky is working with AAM, Airbus, ResilienX and TruWeather Solutions.

Meanwhile in April 2022 Thales reported its ScaleFlyt Platform, which enables large-scale drone operations through planning, record keeping, risk assessment and corporate fleet management, had been approved by CASA. "Subsequent to being green-lighted by CASA, the ScaleFlyt Platform will be deployed from April 2022, offering operators access to all the information they need to safely and lawfully fly their drones fleet through a simple and intuitive tool. From planning the missions, creating flight plans according to local safety requirements, and managing the fleet, everything can now be easily managed in a single

platform powered by Thales," said the company. "The ScaleFlyt Platform grants access to all the official information from CASA and Airservices Australia to ensure local regulatory compliance and transparency, as well as the State Emergency Services, national parks and electricity power lines suppliers."

Formerly known as Soarizon, the ScaleFlyt Platform already operates worldwide, to schedule, send and fly safe and compliant drone missions.

And in the same month CASA verified Australian startup FlyFreely to provide instantaneous controlled airspace authorisations as part of its automated airspace authorisation trial. According to a company press release users will now be able to seek entry to the controlled airspace at Canberra, Adelaide and Perth airports.

Industry participants comprise

- AVCRM RPA Manager by AVCRM
- FlyFreely Drone Management Platform by FlyFreely
- ok2fly by AvSoft
- OpenSky by Wing Aviation

FlyFreely founder Dr David Cole said the trial would be a game-changer for commercial drone operators wanting to fly remotely piloted aircraft near controlled airports. "Australia's aviation rules restrict access to the airspace around airports, for safety reasons," he said. "The no-fly-zone extends in a 5km radius around controlled aerodromes, meaning many businesses that operate in and around these hubs are hamstrung in what they're able to do."

Dr Cole said the CASA trial would significantly reduce accessibility issues, helping to improve productivity across multiple industries. "Up until now, professional drone operators wanting to gain access to the controlled airspace have had to pay $800 per application and wait up to 30 days for CASA to approve the request," he said. "We're now able to provide instant authorisations at no cost during the trial."

Dr Cole said efficiencies would be felt across multiple sectors, including construction, real-estate, media, telecommunications, energy and building services. FlyFreely is one of just four companies to have been granted authorisation as part of the CASA and Airservices Australia trial

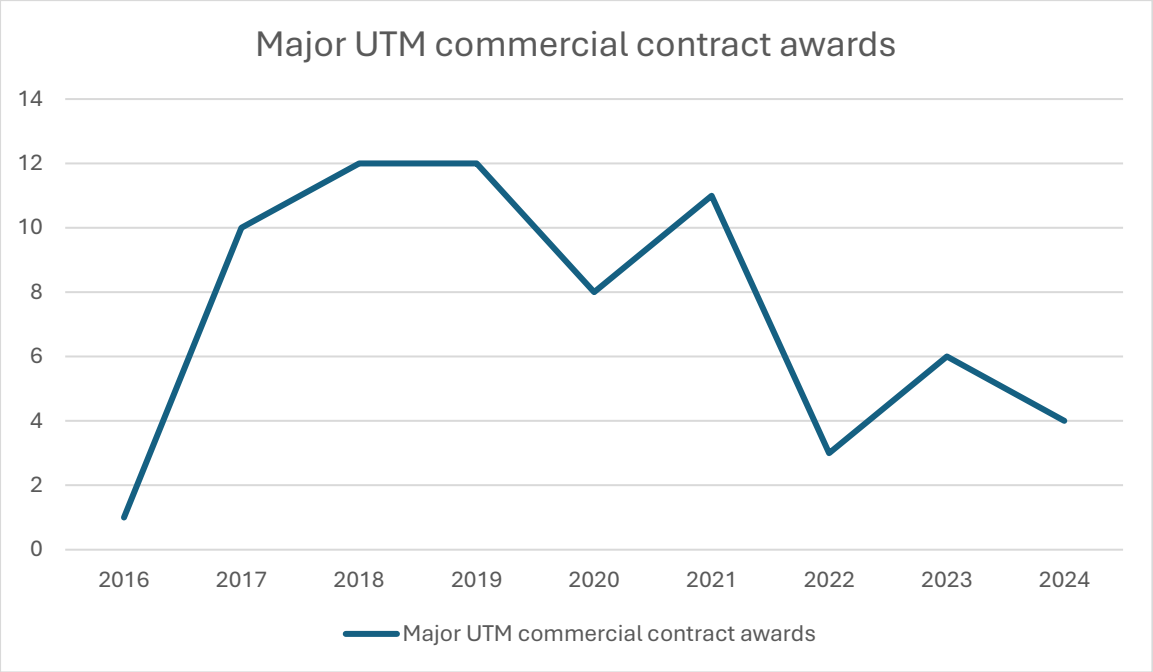
4.2 How the UTM market is really evolving – revenue streams for UTM infrastructure and service providers.

Even though the initial stages of the commercialisation of the global UTM market is not expected before 2025 there are eight current and potential revenue streams for UTM infrastructure and service providers:

1. Developing a national UTM programme in a commercial contract with a regulator/ANSP
2. National government and inter-governmental funded research
3. Prototype UTM service within a defined drone eco-system (eg a port or airport)
4. Income from operational UTM infrastructure provision
5. Income from operational UTM service provision
6. UTM-as-a-service for drone and eVTOL operators/OEMs
7. UTM partnership in vertiport-focused AAM eco-system
8. Consultancy and other revenue streams – from defence contracts, private landowners, airports etc.

For most independent (that is, non-ANSP funded) UTM companies their business plans rely on government funded research in the short term – they hope that this funding will last long enough to bridge the gap before commercial revenue starts to flow from eVTOL operators or drone operators flying autonomous BVLOS missions requiring complex, specialist, paid-for UTM services. The good news is that although more complex drone missions have been delayed as a result of complexities in the regulatory and standards development processes, eVTOL operations are still being fast tracked. Also, there is a growing demand for UTM services at ports and airports even before the full range of national regulations and certification processes are in place.

Table seventeen: Major UTM commercial contract awards[1]



[1] *For 2024, the figure covers January-September*

While 2023 was meant to be the year that many States around the world launched their national UTM programmes, the number of large scale commercial UTM eco-system development contracts has not risen exponentially but has, instead, peaked during 2018 and 2019 (see tables seventeen and eighteen).

Table eighteen: UTM service providers and commercial contracts with ANSPs, civil aviation and military authorities for operational UTM systems

Date	UTM service supplier	Client	Country	Contract details
April 2016	Exponent/Astra UTM	Dubai Civil Aviation Administration	Dubai	Public launch of the Exponent Portal software which allows DCAA officials and other local authorities to track the location, speed and height of drones.
2017				
July	Unifly	DFS	Germany	UTM deployment with mobile app in July 2017
August	AirMap (nowDroneUp)	Kansas Department of Transportation (KDOT)	USA	The AirMap (nowDroneUp) UTM platform is deployed in Kansas where drones will be mobilised for disaster recovery, search-and-rescue, agriculture, construction, package delivery, and more.
August/ September	AirMap (nowDroneUp)	States of Texas and Florida	USA	Temporary UTM set up in wake of hurricanes Harvey and Irma
September	Kongsberg Geospatial	Public Services and Procurement Canada (PSPC)	Canada	A contract to produce an Emergency Operations Airspace Management System (EOAMS) for evaluation by Canadian government agencies for safely managing drones at emergency and disaster scenes.
October	Skyward	FAA	USA	Approval to give commercial drone operators instant access to controlled airspace with the Low Altitude Authorisation and Notification Capability (LAANC)
October	Unifly	Danish Transport, Construction and Housing Authority	Denmark	Launch of "Droneluftrum" app centred on interactive map based on Unifly software
November	AirMap (nowDroneUp)	FAA	USA	Approval to give commercial drone operators instant access to controlled airspace with the Low Altitude Authorisation and Notification Capability (LAANC)

5. Advanced/urban air mobility UTM technology development

5.1 Governmental and inter-governmental urban air transport research and collaborative programmes

Introduction

Billions of dollars have been spent by special purpose acquisition companies (SPACs) and governments to develop a first generation of passenger-carrying eVTOL aircraft, with the first of these targeted for commercial operations in North America and Europe by 2024 or 2025. Regulators and standards authorities are working hard to ensure the certification regimes are in place and critical safety-related data can be standardised and streamed seamlessly between stakeholders in this timescale. The first set of vertiport concept of operations have now been published.

And concept of operations for UAM missions, including UTM with its related communications, navigation and surveillance (CNS) infrastructure, have now been published. Airservices Australia/Eve and NASA among others, have all developed high level urban UTM concept of operations. The European Union, with its CORUS-XUAM programme will be running six very large demonstration programmes as part of its work to develop a European concept of operation for urban UTM.

Unfortunately, very few of these concepts, although giving valuable high-level guidance, offer UAM eco-system managers the granularity of detail needed to plan in detail the milestones they will need to reach to develop a UTM system to support hundreds of simultaneous drone and passenger flights. There is no clear roadmap showing the roles of responsibilities of each stakeholder, how scalability will be in-built from day one, the key technologies and their operational performance requirements (especially for communications and surveillance) and the revenue streams which will be required by each stakeholder group to ensure the investment required will generate sufficient revenue. These are yawning gaps which, if left unfilled for long, could delay the implementation of UAM services and add billions of dollars to infrastructure costs – as many elements may have to be retrofitted with systems allowing for the necessary levels of integration and scalability.

While work is underway currently with the FAA in the BEYOND programme and in Europe with the very-large-demonstrator programmes) to fill in some of these gaps. One missing part of the puzzle is a detailed, modular comprehensive map of the "end-state" UAM eco-system, identifying the critical certifiable technologies, standards, regulations and business-cases which will support hundreds of simultaneous drone and passenger eVTOL flights and integration with ground-based transport networks.

But perhaps the first UAM operations do not need one. Eve UAM (EmbraerX) in its work with Airservices Australia and Joby Aviation to design first-stage UAM operational concepts in Melbourne and Los Angeles, has outlined a plan which uses current technology ATM systems and procedures to support the first passenger flights. Melissa Alexiou, A/G Program Director at Airservices Australia, speaking at the May 20, 2021"Connected Skies" webinar organised by the Global UTM Association (GUTMA) reported that following simulations with Eve to look at how air taxis can be integrated into Melbourne's highly complex airspace: "It is likely that UAM operations could operate within the requirements of the current ATM environment in accordance with existing procedures, or new ones we could easily accommodate," she said.