UK Civil Aviation Authority

UK Unmanned Aircraft Systems Traffic Management (UTM) Policy Concept

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This document uses the term “Unmanned” throughout rather than “uncrewed”. Unmanned is the terminology currently used within legislation and regulation; given this, the term has continued to be used for these documents. There is work ongoing at the CAA to review the correct use of these terms, and this will be reflected in any further iterations of this document.

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The latest version of this document is available in electronic format at: www.caa.co.uk

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Revision History

Revision	Affected Pages	Change
First Edition	All	Initial UTM Policy Concept Publication

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Chapter 1

Introduction

Context

1.1 The UK Airspace Modernisation Strategy (AMS)[1] sets out the vision and objectives for the modernisation of the UK airspace and air traffic management (ATM) system. It includes the integration, where practicable, of all airspace users through new airspace designs, air traffic management concepts, operational procedures, technology, data and equipment. This policy concept document meets the strategic objectives of CAP1711, and forms part of the delivery elements identified in CAP 1711a. It will assist in the deployment plan found in Part 3 of the AMS, CAP 1711b. The UK Airspace Modernisation Strategy aims to safely facilitate access by diverse airspace users, with a transition towards greater integration of air traffic, where it is safe to do so. It constitutes a part of the delivery elements identified in CAP 1711a and the deployment plan found in Part 3 of the AMS, CAP 1711b[2].

1.2 It is forecast that the development of unmanned aviation provision and capability will lead to a significant increase in the volume of unmanned aircraft (UA) (upwards of 700k+ UA claimed in reports)[3] operating in UK airspace. Routine beyond visual line of sight (BVLOS) operations of commercial unmanned aircraft systems (UAS), at scale will be the principal driver for unmanned aircraft systems traffic management (UTM) solutions[4]. Technological development in the UA industry has introduced enhanced capabilities at an unprecedented pace, this technology will be an important enabler in delivering the safe integration of diverse users in UK airspace.

1.3 The delivery of the AMS will be the enabler for some of the more capable aircraft to be able to integrate with manned operations through the carriage of onboard technology. These platforms will be predominantly the certified remotely piloted aircraft systems (RPAS). The larger proportion of UA, those operating in the specific category, may be too small, or of limited technological capability, to carry an onboard facility to mitigate air risk. These airframes will need to rely upon the provision of digital data, from ground infrastructure, to provide capability to mitigate

[1] CAP 1711 The Strategic Vision for Airspace Modernisation to 2040.

[2] The delivery work of the AMS is currently addressed by the CAA Future ATM/ANS and Future of Flight guidance in CAP3182 (FoF BVLOS Roadmap). https://www.caa.co.uk/publication/download/26211

[3] New Horizons, 2024 Baringa. New horizons: The case for public sector drone investment | Baringa

[4] Strategic Insights for Thriving in the Unmanned Traffic Management Ecosystem. Price Waterhouse Cooper

the mid-air collision risk (MAC)[5] and controlled flight into terrain (CFIT) and obstacles; especially when operating within uncontrolled airspace with geographically inconsistent ATM provision and fluctuating types of supporting air traffic services and surveillance coverage. In these cases, aircraft can be operating in an environment where the overarching MAC risk and near mid-air collision (NMAC) risk is the application of 'see and avoid' mitigations.

1.4 Safety is an overarching principle at the forefront of every development and is a key requirement of the AMS[6]. There is a requirement for airspace modernisation to enable aviation innovation whilst at the same time maintaining and, where possible, improving the UK's high levels of aviation safety. This 'safety principles' approach to aviation sets a standard which any new entrants must be required to achieve and adhere to.

1.5 The introduction and management of unmanned traffic as well as the development of associated UTM capabilities should not negatively affect the safety or efficiency of the existing ATM system. Modernisation of ATM and airspace will use technology to manage airspace in a flexible, near real-time operation, from high-altitude airspace to very low urban airspace environments in all classes of airspace.

1.6 UTM is considered as a set of digitised airspace and traffic management services that form part of the air traffic management and air navigation services (ATM/ANS[7]). These are intended to ensure safe and efficient operations of UAS within a volume of airspace, and to be compliant with regulatory requirements that will facilitate integration with other UAS and manned aviation. The early expectation is that UTM will develop from a subset of ATM/ANS to merge with ATM/ANS to create a combined system, aiming to evolve toward a concept for integrated air and space management services for enhanced safe, expeditious and orderly airspace operations[8].

1.7 Certification and oversight: It is proposed unmanned aircraft systems traffic management service providers (UTMSP's) will be certified in accordance with proposed revisions[9] to UK Regulation (EU) 2017/373 to enable UTM services and data/information provision to be certified in accordance with the requirements of the annexes of that regulation.

1.8 As ATM/ANS providers, UTMSP's are providing services and additional data and information of which some of this data, and information, is consumed from other 'service providers' some of it is created by the UTMSP. Where a UTM service

[5] Through Detect and Avoid capability, either airborne or ground based.

[6] This is a statutory duty for the CAA under section 70(1) of the Transport Act.

[7] UK Regulation (EU) 2017/373

[8] UK-AMS AM/5

[9] Unmanned Aircraft Systems Traffic Management Certification Consultation

provider takes data from an assured or certified source, using the appropriate data quality requirements, and passes that data onto the operator, unmodified, they are not providing a 'service'. The handling of that data will require the application of some elements of Annex III of UK Regulation (EU)2017/373 especially addressing appropriate data quality (ADQ). Where UTMSP's take that data, modify, enhance or package that data together with other data to provide a full information picture, they become the both the consumer and producer of that enhanced data and will require additional elements of the Regulation[10] to apply.

1.9 Some recognition and potential alignment will be required with international and EASA work to allow harmonisation between UTM systems globally and provide a stepped approach towards integration into the ATM/ANS system. This would enable industry, including manufacturers, service providers and end users, to grow safely and efficiently without disrupting the existing manned aviation system.

Applicability

1.10 This UTM Policy is intended for a broad range of stakeholders involved in facilitating safe BVLOS integration through ATM/ANS service and data provision including

1.11 Service and data providers[11] providing specific category BVLOS operators with the capability to mitigate air risks as part of a specific operational risk assessment (SORA) application.

1.12 New and existing air navigation service providers (ANSP) providing data and services to UA.

a) CAA policy, oversight and certification stakeholders.

1.13 This policy, along with the UTM ConOps, is intended to guide and assist service providers and operators to understand the scope and requirements of UTM service and data provision and its applicability to risk mitigated, safe air operations.

Scope

1.14 This policy shall apply to BVLOS UAS in the specific category (utilising service and data/information from a UTMSP, providing 'services' as an ATM/ANS provider certified under UK Regulation (EU)2017/373[12]). Elements of this policy may be

[10] UK Regulation (EU) 2017/373.

[11] Excluding Common Information Service Providers.

[12] The Statutory Instrument to amend UK Regulation (EU) 2017/373 are scheduled to be enacted in 2028. Until then this policy will set down the guidance for UTMSP's prior to that regulatory change.

applicable to the open and certified categories[13] operating in United Kingdom (UK) national airspace and the high seas airspace which lies within the London and Scottish flight information regions (FIR) and upper information regions (UIR)[14].

1.15 This policy is not intended to apply to remotely piloted aircraft (RPA), operating within the traditional air traffic management (ATM) system, and complying fully with the existing ruleset of the airspace within which the aircraft is flying.

1.16 Currently the following are outside the scope of this document:

- regulatory requirements relating to safety of persons on the ground[15];
- standards for technological solutions and the evaluation of security and environmental risks.
- the design, certification, and standards of the UAS and
- data and information utilised by a sole operator to provide the capability to manage the operation and arrangement of their own fleet of UA[16].

1.17 This policy does not specify technologies, the 'standards' to be applied to these UTM services, or the certification requirements that will be established to address service provision.

1.18 The service provision model or the extent to which UTM Services and additional information and data services are centralised, or involve multiple providers (i.e., distributed, federated[17] or competitive model) is outside of the scope of this document. This question is reserved for future discussion around implementation. This policy has been constructed to allow all service provision models to be facilitated and to enable the DfT and the CAA to take a view on any preferred model as UTM and integration work develops.

1.19 This policy supplements existing UK regulatory requirements[18] and is intended to identify the policy requirement applicable to UK UTM system service provision. A UTM system will be required to interact with the ATM/ANS system in the short term

[13] This policy will apply to UAS in the Open and Certified category to the extent deemed necessary when operations are being undertaken or being approved.

[14] Exemptions: Operations wholly within segregated or restricted airspace under an agreed ANSP's procedures, military operations and experimental test sites where alternative arrangements have been approved.

[15] SORA Ground Risk Classification.

[16] The data and information required by an operator will be assessed through their SORA application. Service provision to UAS will remain in scope of this policy.

[17] The effectiveness of a federated approach, in supporting competition and choice will depend on how it operates in practice as the market develops.

[18] CAP 722 and the UK Regulation (EU) 2018/1139 (The Basic Regulation) CAP3105 and CAP2610.

and integrate with the ATM/ANS system in the long term. The aim of this system must ensure the continued safety of all air traffic, manned and unmanned.

1.20 The Regulatory aspects addressed in this policy cover legislation, licensing, and authorisations, crucial for ensuring compliance and safety within national airspace. Standardisation is equally vital, ensuring uniform application of specifications essential for international air navigation safety. Certification plays a pivotal role, confirming that personnel, equipment, and operations meet regulatory requirements.

1.21 The provision of these services will mitigate the risk associated with no pilot on board (NPOBA) and support geo consciousness, flight authorisation and strategic/tactical deconfliction. This will enable UAS operators to meet the UTM operational requirements that enable safe and efficient use of airspace.

1.22 For the purposes of this policy UTM is considered a separate system with an interface to ATM/ANS, whilst convergence with ATM/ANS is a future vision to achieve complete integration, significant standardisation issues will have to be addressed. The services identified in this document will achieve this future alignment to enable compatibility and comparability of future service provision.

1.23 This emerging vision will allow UTMSP's to be able to provide services without reliance upon traditional ANSPs in airspace volumes where no ANSPs exists and/or at times of the day where traditional ATM/ANS is not available.

1.24 Data exchange between UAS operators, and other stakeholders will eventually be through a network of highly automated digital systems; but it is accepted that early iterations of UTM will utilise to a greater or lesser extent the provision of information between pilots and air traffic controllers/aerodrome flight information service officers using the more traditional systems and services of existing ANSP's.

Responding to this consultation

1.25 The consultation process is an integral part of CAA and government's policy development approach, allowing us to understand the impact of possible policy changes on stakeholders. We welcome responses to the consultation from any stakeholder impacted by these proposals, including recreational and commercial UAS remote pilots/operators, potential UTMSPs, external data providers, and UAS service providers, amongst others.

1.26 The consultation is open until 23:59 19th June 2026. Responses can be provided via Citizen Space.

1.27 Our strong preference is that you complete the online consultation. We understand that some stakeholders prefer not to be constrained by the questions alone and will want to send a self-contained response. While we will accept these submissions, we

ask that they are structured around our questions. Otherwise, we will not be able to analyse the submissions in the same way that we analyse the online responses.

1.28 We will assume that all responses can be published on our website. When you complete the online consultation, there will be an option for you to hide your identity or refuse publication. (In any event, your email address will not be published.) In the interests of transparency, we hope people will not refuse publication. If you do send us a separate submission and it includes any material that you do not want us to publish, please also send us a redacted version that we can publish. You should be aware that information sent to and therefore held by the CAA is subject to legislation that may require us to disclose it, even if you have asked us not to (such as the Freedom of Information Act and Environmental Information Regulations). Therefore, if you do decide to send information to the CAA but ask that this be withheld from publication via redacted material, please explain why, as this will help us to consider our obligations to disclose or withhold this information should the need arise.

1.29 If you would like to discuss anything about how to respond to the consultation, please email airspacemodernisationdelivery@caa.co.uk .

1.30 Once the consultation has closed and we have considered feedback, we will publish our consultation reply document. This will summarise the feedback and set out our proposed updates.

Question 1*: Do you agree with our position on the applicability and scope of UTM?*

Question 2*: Whilst market service provision models are not addressed specifically in this version of the policy, what economic model would you support for UTM (centralised, single service provider or decentralised/federated multiple service providers)?*

Chapter 2

UTM Services Policy

Purpose

2.1 The initial concept of UTM is accepted as supporting the real-time or near-real-time organisation, coordination, and management of UAS operations and to mitigate the air risks identified for UA operations, including the potential for multiple BVLOS operations[19]. The purpose of this policy is to provide a regulatory framework that enables the safe secure efficient and scalable integration of unmanned aircraft systems into UK airspace through an unmanned aircraft systems traffic management regime consistent with international[20] guidance.

2.2 Incorporating this, ever more complex and growing mix of traffic, at scale, requires advanced technological tools and ATM/ANS solutions. Through UTM, it is envisaged that ANSPs including UTMSPs and other involved entities, will be able to provide real-time information regarding airspace constraints and the intentions of other aircraft to UAS operators directly through a UTMSP. UAS operators would then be responsible for managing their operations safely within these constraints. The UTMSP is an entity that would assist UAS operators with meeting UTM operational requirements that enable safe and efficient use of airspace, through the provision of UTM services.

2.3 These services[21] will be required to demonstrate they can provide the UAS with the digital information necessary to meet the requirements of the airspace within which the UAS is operating and to mitigate the primary risks for UA operators utilising SORA requirements that allows different levels of data requirements based on operational risk and system capability[22].

[19] ICAO

[20] ICAO guidance

[21] See Appendix B

[22] UTM service provision addresses air risk and not ground risk although it is accepted that UTMSP's may assist in providing data to assist the operator with ground risk.

Risk Mitigation

2.4 These services provide mitigation for the following air risks.

a) The mid-air collision risk with manned aircraft, through appropriate DAA capabilities[23] based upon the provision of a recognised air traffic environment[24] (RATE) using suitable and appropriate electronic conspicuity provisions to enable compliance with the appropriate ruleset for the appropriate airspace classification UTMSPs shall provide one or more of the UTM services[25] set down in this policy, to ensure safe and reliable service provision to address,

b) The mid-air collision risk with other UA (UA-UA) where such events present a risk to uninvolved third parties and where the application of an air risk mitigation to address ground risk is considered necessary.

c) The risk of controlled flight into terrain or obstacles through the provision of accurate and up to date ground, obstruction, and obstacle data appropriate to the operation of the UA.

d) The risk of unsafe operation through Compliance Monitoring to identify when the UAS departs from airspace where flight is authorised[26] into airspace and airspace structures where the UA is not permitted.

e) The risk of encountering of meteorological conditions that present a risk to the operation of the UA.

2.5 UTMSP's will be required to support dynamic airspace management and restrictions, including geofencing and flexible use of airspace, through the promulgation of temporary flight restrictions[27] (TFR's). UTMSP's must be able to communicate and coordinate these restrictions (for UA flights) with ANSP's and other airspace authorities.

2.6 UTMSP's shall have a flight planning (and strategic deconfliction) capability that requires UAS operators to submit flight plans giving notification of flight intent including all data required by the UTMSP in advance of any planned flight. The UTMSP will apply strategic deconfliction to prevent incompatible coincident flight

[23] CAP 3015 Detect and Avoid Policy.

[24] Recognised air traffic environment (RATE).The situation which results from the deployment of a transponder mandatory zone (TMZ) where all air traffic within a defined volume of airspace is conspicuous to air traffic services through the carriage and operation of a Mode S SSR transponder (unless operating in compliance with alternative provisions prescribed for that particular airspace by the TMZ Controlling authority that will achieve a cooperative electronic conspicuity environment), but where there is no requirement for air traffic to maintain continuous air-ground voice communication watch. CAP1430.

25 These services are identified as 'mandatory' as the provision of one or more of these services mandates the provider is a UTMSP under UK regulation.

[26] This will include any volume of airspace allocated from flight plan data as part of strategic deconfliction.

27 Through the creation of UAS Geo-zones for geo fencing or geo caging requirements.

paths as the primary means of reducing encounters with both manned and unmanned aircraft.

2.7 Conflict management (tactical), real time conflict detection and conflict resolution capability [28] , whether automated or assisted must be available. Where automated separation or deconfliction is not possible robust tactical procedures and human loop safeguards are required. Where flights are planned or occur within controlled airspace a clear technical and procedural understanding of the responsibilities of the UTMSP must be described; this may include handover including points and levels for operations entering controlled airspace including the potential for automated transfer of intent and surveillance state as to the ANSP must be enabled.

2.8 UTMSP's will also be required to provide procedures to allocate airspace including access and usage requirements. These procedures will facilitate the integration of manned and unmanned traffic. This will be achieved by flexibly using the airspace aligned with the principle of fair and equitable access to airspace.

2.9 UAS operations may occur in uncontrolled (class G) and controlled airspace (classes A-E), with each type of airspace requiring all or some of the specific UTM services for UA. If UAS operations were to occur in controlled airspace, UAS operators and/or the remote pilot would be required to follow the procedures and requirements for the classification of airspace, unless an appropriate type of special use airspace (SUA) has been established, relieving those operating in the UTM system from the established airspace rules applicable to the class of airspace.

2.10 The provisions of appropriate conspicuity capability or positional data to allow the UAS to 'be seen' by other aircraft. The information generated using an appropriate EC device[29] can be presented to pilots and air traffic services visually, audibly, or both to provide them with information on other traffic nearby. This strengthens the principle of 'see and avoid' by adding the ability to 'detect and be detected'. To be most effective it needs 100% of users operating in a designated block of airspace to be using compatible electronic conspicuity devices, and to be able to be detected by others[30].

2.11 UTM implementation will utilise existing ATM technologies and infrastructures to provide a strategic advantage, highlighting the importance of building on established systems to ensure continuity and efficiency. Services may be implemented with existing ANSP's during the initial phase to identify limitations, which will drive the

[28] Through information provided to the UAS operator to enable their own conflict resolution actions or instructions/advice to the UAS to achieve 'separation' from other known aircraft.

[29] CAP3139 EC Consolidated Study Report.

[30] CAP1711 - Future integration of air traffic page 19-22.

need for a digital system and demonstrate a methodical approach to the deployment of UTM.

2.12 UTM implementation shall focus on new service providers and data providers in future stages, driving innovation and addressing specific challenges that traditional ANSPs may not be equipped to handle.

2.13 SUA, particularly Temporary Reserved Areas (TRA's) will initially be used as a preferred tool for flexible use of airspace due to its capability to be activated and deactivated as needed.

2.14 It is not intended to create additional airspace structures to facilitate UTM deployment, and where possible, it is anticipated that existing or planned SUA structures will be used.

2.15 The objective of UTM implementation is not to transform ANSPs into UTMSPs but to leverage their existing capabilities for managing traffic and information, utilising the current ANSP infrastructure to support UTM operations.

2.16 It is proposed that UTM implementation will utilise existing aviation regulation, guidance material, and acceptable means of compliance, ensuring that new UTM operations are integrated within the current regulatory framework.

Question 3: *Do you agree with the purpose and justification for UTM as set down in Chapter 2?*

Question 4: *Do you agree that the risks identified in the document can be mitigated by UTM service provision? Are there any other areas of air risk you would like to be being included?*

Chapter 3

UTM Services Regulatory Requirements

Governance

3.1 Governance and approval in implementing UTM systems necessitates robust regulatory frameworks. The UK CAA will undertake the safety regulation and certifying requirements for UTMSP's delivering services in UK airspace. This includes setting technical standards, safety oversight, certification, enforcement including international coordination and alignment.

3.2 The CAA shall prescribe and maintain a regulatory framework for UTM that sets down the scope of UTM services and the requirements for certification of UTMSP's[31]. It will also identify the process for the enforcement, audit, and revocation of any certification or approval granted.

3.3 UTMSP's shall establish traffic management protocols, including standardised procedures for the coordination and management of UA traffic including flight planning, conflict detection and resolution[32], and compliance monitoring. UTMSP's shall identify communication systems; requirements for secure reliable and interoperable communication between other UTMSP's and the ATM network. UTMSP's shall identify the required performance-based navigation capability; specifications for the performance of UAS in terms of precision, accuracy and reliability to ensure they can safely navigate within a volume of airspace and accurately indicate their location.

3.4 The CAA will not prescribe the standards[33] to be used provided they meet the appropriate UK regulatory requirements and any associated AMC and guidance materiel.

3.5 UTMSP's will be ANSP's that provide airspace information, strategic deconfliction, tactical conflict management, flexible use of airspace capability, geofencing and flight authorisation services. They will be certified by the CAA and abide by service level safety and security requirements.

3.6 Where UTM operations occur within controlled airspace the controlling authority or ATS provider is responsible for establishing the parameters for applicable procedures and service provision including the identification of appropriate data,

[31] A proposed amended version of UK Regulation (EU) 2017/373 to address UTM service provision.

[32] Including DAA.

[33] See Appendix C and Future ATM/ANS guidance in these areas.

interfaces, and technical APIs. This shall be set down in a letter of agreement. Where UTM operations are established in uncontrolled airspace (class G) in an area where an ANSP is providing services, then data exchange procedures and the API's identified in this policy[34] must be met.

The Management of Airspace

3.7 Airspace classifications define the requirements for the airspace in which UTMSP's will operate. Each airspace classification has stated services, access rules and other requirements[35] which must be considered for integration of UAS into those airspace classifications[36].

3.8 Initial UTM operations shall require the use of SUA to ensure safety, avoiding interference from non-cooperative and non-EC capable piloted aircraft and mitigating risks during early implementation stages.

3.9 UTM implementation in unsegregated airspace shall represent a long-term strategy aimed at integrating UTM within existing ATM systems, although this approach will involve overcoming significant technical and operational challenges.

3.10 The role of ATS provision in UTM operations within controlled airspace shall be clearly defined to ensure that interactions between manned and unmanned systems are managed safely and efficiently.

3.11 The requirements for interaction between ATS providers and UTMSP's, especially where large-scale operations of UAS occur in, or create high-density airspace, shall be determined to ensure safe and efficient airspace use.

Transparency and Accountability

3.12 The requirement for UTM service provision to be fair, equitable and transparent is crucial, it ensures that the air space is used safely, efficiently and in a manner that fosters innovation, whilst maintaining stakeholder trust and upholding regulatory standards.

3.13 Fairness in UTM means that all stakeholders including other operators, service providers and the public are treated impartially and without bias. This requires a provision to enable equal access to airspace and services, ensuring non-

[34] and identified as regulatory requirements in any revised version of 2017/373 addressing UTM service provision.

[35] Flight Rules and VFR/IFR is ongoing work.

[36] UK SORA and UTM mitigations to address Air Risk ARC will initially be addressed in the UTM ConOps.

discriminatory practises in operations whilst maintaining a consistency in the decision-making process.

3.14 UTMSP's shall ensure that all users regardless of size or economic power have fair access to the UTM services provided including access to airspace. In a competitive market this prevents monopolistic practises and encourages healthy competition. This will lead to better services, continued innovation and takes accounts of varying capabilities and resources amongst UA operators, ensuring smaller operators can compete with larger entities. Operators and other service providers should have confidence in a system that builds trust among stakeholders by demonstrating that rules and procedures are applied consistently and fairly. As demand increases, UTM should support a fair and predictable means to access airspace by establishing the requirements that will allow for multiple operators to plan and operate in shared airspace.

3.15 Equity in UTM involves recognising and accommodating the diverse needs and capabilities of different users and stakeholders. This may require differentiated services or resources to ensure all parties can operate effectively and safely. This will facilitate the idea of tailored solutions and will provide the flexibility needed to address specific challenges faced by different user groups, such as varying levels of technological access or differing operational requirements. This approach will encourage participation from a broad range of stakeholders including those who may be considered disadvantaged or underrepresented.

3.16 Transparency in UTM involves clear, open and accessible communication about policies, procedures, decision-making processes and data handling practices. Stakeholders should be able to understand how decisions are made and how their data is used and protected.

3.17 The mechanisms for accountability in decision-making, as well as any avenues for redress, must be clearly communicated to users of the services.

Technical Requirements of UK UTM Services

3.18 The UTM system will primarily provide a suite of services intended to ensure safe and efficient operations of UA within any airspace where UTM is in operation in compliance with UK regulatory requirements. UAS operations may occur in uncontrolled and controlled airspace, with each type of airspace potentially requiring specific services.

3.19 While this document does not specify technologies associated with these services, it intends to identify those UTM services.

3.20 Any such UTM system must be able to interact with the ATM/ANS system in the short term and integrate with the ATM/ANS system in the long term. The introduction and management of unmanned traffic as well as the development of associated UTM capability should not negatively affect the safety or efficiency of the existing ATM/ANS system. The UK has adopted the position that the provision of any of the services identified in this policy shall be provided by a certified UTMSP or ANSP. The services applicable to UAS operations in any UTM environment and provided by an ATM/ANS service provider under UK Regulation (EU) 2017/373 shall include, one or more of the following to mitigate air risks and meet the needs of the air risk classification (ARC) of a volume of airspace.

3.21 **UAS Flight Authorisation Service**, consisting of:

a) Airspace authorisation: a capability that provides airspace authorisation to the UTMSP to establish and promulgate airspace restrictions for UAS to restrict access to geofenced areas (geofencing) or restricting the UAS to a geographically defined area (geo caging). This can function as a strategic deconfliction service for UAS interactions in the same area of conflicting flight paths.

b) Flight Planning: A process that, prior to the flight of a UAS, arranges and optimizes intended operational volumes, routes and trajectories utilising the information provided by the operator as part of a UAS flight plan[37] (this is not intended to refer to the existing manned aircraft flight planning services). This element of airspace management, and planning will be trajectory centric. This function will form an important part of strategic deconfliction, where shared information will enable optimised operations for multiple UAS operating in the same airspace. The provision and exchange of real-time digital flight plan data will be used in compliance monitoring and will allow much better tactical management by service providers.

3.22 **Geo-consciousness Services**[38]. A service where the UTMSP monitors the flight path of a UAS that has filed a flight plan. The UTMSP will provide information and/or

[37] Strategic Deconfliction can be considered in two parts. The first may be considered as preflight where, based upon airspace constraints, flight prioritisation and other conflicting flight plans, UAS flights are deconflicted prior to departure as a function of the flight planning element of flight authorisation. This may be provided as a stand-alone capability. Full strategic deconflict is managed by the preflight element and the conformance monitoring function that will monitor the compliance of the flight to its notified flight intent.

[38] UTMSP's providing ATM services and additional data. The test of whether this data provision makes them a service provider will depend upon the use to which that data is put. They may be the consumers of that data or the owners/producers of that data. Where a UTM service provider takes data from an assured or certified source (the originator), use the appropriate data quality requirements and passes that data onto the operator, unmodified, they are not providing a 'service', they are the consumers of that data. As indicated the process of handling that data may require some standards and 373 requirements, but they are the information channel. Where UTMSP's take that data, modify, enhance or package that data together with other data to provide a full information picture, they become the both the consumer and originator of that enhanced data and will require additional elements of the annexes to apply.

advice to ensure the UAS (or the operator) is advised of the proximity, of their UAS, to the boundary of airspace volumes it cannot enter or leave by restricting access to geofenced areas (geofencing) or restricting the UA to a geographically defined area (geo caging). It will also advise the UAS operator when the flight is non conformant with the filed flight planned route, and/or is leaving the airspace volume provided by the operator for that flight.

a) This requirement to monitor the flight of the UA to confirm it is in compliance with its notified flight intent will be undertaken by a Compliance Monitoring function[39], which provides real-time monitoring and alerting of non-conformance to intended operational volumes, routes, or trajectories to the UAS operator or remote pilot. It shall alert, in real time, the non-compliance of a UAS with the flight authorisation issued and alert the operator and other service users when deviations from the volume of approved airspace occur. This may be combined with a Traffic Separation capability to allow traffic information and or separation instructions to be passed to the UAS to avoid conflictions with other aircraft because of non-conformance with the notified flight intent.

b) The service provider will need to access information and data that provides terrain and obstacle data (information) appropriate and necessary for meeting the SORA requirements of individual UAS operations or for supporting the UTM systems needs for the provision of deconfliction or flight planning services and Aeronautical Information Services/Aeronautical Information Management (AIS/AIM) data necessary for the safety, expeditious and orderly operation of aircraft using the service. Where this data is created by a UAS Data Service Provider[40] (UDSP) and shared, unmodified, with the UAS operator the UTMSP will not need to become a UDSP. Where this data is taken from a source that is not a UDSP, or the data is combined with other data or modified the UTMSP may require to meet additional regulatory requirements under 2017/373.

3.23 **Conflict Management Services**: Any UTM service will need to safely demonstrate a conflict management capability to tactical separate aircraft through the provision of appropriate ATS comparable services. This will provide real-time information about other aircraft[41] so that UAS can apply the relevant requirements of SERA when interacting with them, to include:

a) Traffic Information Service. A surveillance-based service where information is provided to the UAS regarding other air traffic which may be in proximity to the position or intended route of flight and to help the UAS avoid a collision by making the UAS situationally aware of known traffic through a RATE.

[39] also known as conformance monitoring.

[40] See consultation document on changes to UK Regulation (EU) 2017/373.

[41] Manned v's manned and unmanned v's unmanned.

b) Traffic Separation[42] Service. A surveillance-based service which provides specific surveillance derived traffic information and issues instructions to the UAS to achieve planned deconfliction minima against all known aircraft. This may form one component of a Traffic Management Service.

Question 5: *Do you agree with the Governance proposals made as part of this policy?*

Question 6: *Do you agree that transparency and accountability in UTM service provision is fundamental to fair service delivery and airspace access?*

Question 7: *Do you agree with the services identified as UTM services and that they provide the capability to mitigate the air risks identified in para 2.4?*

[42] The term separation is used here generically to cover the use of the term's separation or deconfliction. It does not indicate an ATC requirement. When applied to service provision, aircraft will be separated or deconflicted as appropriate to the class of airspace within which the aircraft is operating.

Chapter 4

Conclusion

4.1 UTM as a capability is still in the initial stages of development. This policy concept is not intended to endorse or propose any specific UTM system design or technical solutions to address the UTM challenge; instead, its aim is to provide a set of requirements for the service provision and an overarching framework for such a system.

4.2 This policy sets the UK on a path to safe, routine BVLOS operations, at scale in integrated volumes of air space, by requiring a) certified UTMSP's; b) ensuring seamless exchange of digital data and information between UTM and ATM ANSP's; c) protecting safety security and privacy requirements for the use of data to provide a service, and aligning UK practice with both ICAO and EASA by recognising international guidance material.

4.3 The developmental nature of UTM makes it difficult to predict how a follow-on framework will be organised, validated, certified and overseen. More participation from industry or future business advocates will be necessary to explore the safety issues and service requirements to enable UK deployment and development. Implementation should be phased and evidence led with clear objectives and a statutory basis for enforcement. This policy concept is intended to support the UTM Concept of Operations, for stakeholders, that wish to provide UTM services.

Review of Policy and Enquiries

4.4 The CAA shall review this policy concept and any associated annexes in the light of learnings from, current and future, trial and evaluation activities. Thereafter on a discretionary basis but not less than triennially from its publication date.

4.5 Enquiries concerning this UTM policy should be addressed to the CAA at: airspacemodernisationdelivery@caa.co.uk

Question 8: *Are there any outstanding concerns or recommendations on the contents of the Policy Concept that you would like to raise?*

APPENDIX A

Definitions

A1 The definitions used in this document are those set down in UK regulation and UK Civil Aeronautical Publications and are aligned with ICAO (unless otherwise stated). This list is not exhaustive. Where a definition is not contained below and is required in this document the definition and its source are stated.

- **Aeronautical Information Service (AIS)**. A service established within the defined area of coverage responsible for the provision of aeronautical data and aeronautical information necessary for the safety, regularity, and efficiency of air navigation. (UK Reg (EC) No 549/2004 Article 2 (3)).
- **Aeronautical Information Management (AIM).** The dynamic integrated management of aeronautical information through the provision and exchange of quality assured digital aeronautical data in collaboration with other parties. (DOC 10066 PANS-AIM).
- **Aeronautical Information Products**. Aeronautical data and aeronautical information provided either as digital data sets or as a standardized presentation in paper or electronic media. These include, Aeronautical Information Publications (AIP), including Amendments and Supplements; Aeronautical Information Circulars (AIC); aeronautical charts; NOTAM's; and digital data sets. (DOC 10066 PANS-AIM).
- **Aircraft**[43]. Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface. (ICAO).
- **Aeroplane**. A power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight. (UK Reg (EU) No 923/2012 Article 2(16)).
- **Air Traffic Management (ATM)**[44]**.** The aggregation of the airborne and ground-based functions (air traffic services, airspace management and air traffic flow

[43] The use of the term 'aircraft' and 'aeroplane' above includes UAS; thus, ATM includes the management of these aircraft which has been referred to as 'UAS traffic management (UTM)'. ICAO describes UTM as "a specific aspect of ATM which manages UAS operations safely, economically and efficiently through the provision of facilities and a seamless set of services in collaboration with all parties and involving airborne and ground-based functions".

[44] The use of the term 'aircraft' above includes UAS; thus, ATM includes the management of these aircraft which has been referred to as 'UAS traffic management (UTM)'. ICAO describes UTM as "a specific aspect of ATM which manages UAS operations safely,

management) required to ensure the safe and efficient movement of aircraft during all phases of operations (UK Reg (EC) No 549/2004 Article 2(10)).

- **Air Navigation Services (ANS)**. Air Traffic Services; communication, navigation, and surveillance services; meteorological services for air navigation; and aeronautical information services. (UK Reg (EC) No 549/2004 Article 2 (4)).
- **Air Traffic Service (ATS).** means a generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service) (UK Reg (EU) No 923/2012 Article 2(32).
- '**Beyond visual line of sight operation (BVLOS)'.** Is a type of UAS operation which is not conducted in VLOS (UK Reg (EU) 2019/947 Article 2(8)).
- **Common information elements**. Information and data that is necessary to assure safety, regularity, and efficiency of air navigation.
- **Common Information Service Provider (CISP).** The provider of digital common information through a network or platform in which the common information elements (data) that support the implementation and proper functioning of the airspace are provided/exchanged but does not have active operational roles and responsibilities. (ICAO UTM-A common framework with core principles for global harmonisation. Edition 4)
- **'Controlled airspace'**. Is an airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification (UK Reg (EU) No 923/2012 Article 2(58)).
    - Note. Controlled airspace is a generic term which covers ATS airspace Classes A, B, C, D and E (UK Reg (EU) No 923/2012 Article 2(58) GM1).
- **Detect and avoid (DAA**). The capability to see, sense or detect conflicting traffic or other hazards and take the appropriate action. (ICAO).
- **Electronic Conspicuity** (**EC).** An umbrella term for the technology that can help pilots, remotely piloted aircraft systems and air traffic service providers be more aware of what is operating in surrounding airspace. Electronic conspicuity includes the devices fitted to aircraft that send out the information, and the supporting infrastructure to enable the position of the aircraft to be shared[45]. (CAP 1711 chapter 2)

economically and efficiently through the provision of facilities and a seamless set of services in collaboration with all parties and involving airborne and ground-based functions".

[45] The UK position for UAS is ADSB (1090 MHz for manned aircraft and 978 MHz for UAS) The specific guidance for EC can be found in the EC guidance material.

- **(e)VTOL (Vertical take-off and landing capable aircraft).** A subset of Vertically Capable Aircraft (VCA). A heavier-than-air aircraft capable of vertical take-off, vertical landing, and low-speed flight, which depends principally on electrically powered lift devices or engine thrust for the lift during these flight regimes and on non-rotating aerofoil(s) for lift during horizontal flight.
- **'VTOL-capable aircraft'.** Is a heavier-than-air aircraft, other than aeroplane or helicopter, capable of performing vertical procedures by means of more than two lift/thrust.
- **Filed flight plan (FPL).** The flight plan as filed with an ATS unit by the pilot or a designated representative, without any subsequent changes. (UK Reg (EU) No 923/2012 Article 2(73)).
- **Flexible Use of Airspace**. Concept wherein airspace is no longer designated as purely 'civil' or 'military' airspace but considered as one continuum and allocated according to user requirements[46]. (CAP 1711 Appendix C)
- **Flight information service (FIS).** A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. (UK Reg (EU) No 923/2012 Article 2(77)).
- **Flight information region (FIR).** Airspace of defined dimensions within which flight information service and alerting service are provided. (UK Reg (EU) No 923/2012 Article 2(76)).
- **Geofence.**[47] A virtual three-dimensional perimeter around a geographic point, either fixed or moving, that can be predefined or dynamically generated and that enables software to trigger a response when a device approaches the perimeter. A Geofence can delineate the area volume of a UAS Geographical Zone from which the UAS is excluded.
- **Geocage.** A virtual three-dimensional perimeter around a geographic point, either fixed or moving, that can be predefined or dynamically generated and that enables software to trigger a response when a device approaches the perimeter. A geocage can delineate the boundary of UAS Geographical Zone within which the UAS is required to remain.
- **High seas airspace.** Airspace beyond land territory and territorial seas, as specified in the United Nations Convention on the Law of the Sea (Montego Bay, 1982). (UK Reg (EU) No 923/2012 Article 2(86)).

[46] EASA term Dynamic Airspace Reconfiguration. (DAR).

[47] In the context of unmanned aircraft, an aircraft operation includes the unmanned aircraft system.

- **Mandatory UTM services.** The UTM services identified and defined within UK regulation and policy, the provision of one or more of these services mandates the provider to be certified under UK Regulation (EU) 2017/373.
- **NOTAM**. A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations. (ICAO PANS-ATM (Doc 4444)).
- **Recognised air traffic environment (RATE).** The situation which results from the deployment of a transponder mandatory zone (TMZ) where all air traffic within a defined volume of airspace is conspicuous to air traffic services through the carriage and operation of a Mode S SSR transponder (unless operating in compliance with alternative provisions prescribed for that particular airspace by the TMZ Controlling authority that will achieve a cooperative electronic conspicuity environment), but where there is no requirement for air traffic to maintain continuous air-ground voice communication watch. (UKCAA proposed definition).
- **Remotely piloted aircraft (RPA).** An unmanned aircraft which is piloted from a remote pilot station.
- **Remotely piloted aircraft system (RPAS**). A remotely piloted aircraft, its associated remote pilot station(s), the required C2 Link, and any other components as specified in the type design. (ICAO RPAS Manual Doc 10019).
- **Situational awareness.** The ability to keep track of the prioritized significant events and conditions in the environments of the subject.
- **System Wide Information Management (SWIM)**. A global air traffic management initiative to harmonise the exchange of aeronautical, weather, and flight information for airspace users, civil and military air navigation service providers, airport operators, meteorological service providers, and the European Network Manager. SWIM is the standards, infrastructure and governance, enabling the management of ATM/ANS information and its exchange between qualified parties via interoperable information services. The effective implementation of SWIM is the foundation of the UK's transition to a digital data driven ATM system.
- **Trajectory-based operations**. Defined in four dimensions (4D) – latitude, longitude, altitude, and time – the trajectory represents a common reference for where an aircraft is expected to be – and when – at key points along its route. The trajectory is defined prior to departure, updated in response to emerging conditions and operator inputs, and shared between stakeholders and systems.
- **Traffic information.** Information issued by an air traffic services unit to alert a pilot to other known or observed air traffic which may be in proximity to the position or intended route of flight and to help the pilot avoid a collision. (UK Reg (EU) No 923/2012 Article 2(132)).

- **Unmanned Aircraft System (UAS) Geographical Zone**. A portion of airspace established by the Secretary of State that facilitates, restricts or excludes UAS operations in order to address risks pertaining to safety, privacy, protection of personal data, security or the environment, arising from UAS operations. UK Regulation (EU) 2019/947
- **Unmanned Aircraft (UA).** Any aircraft operating or designed to operate autonomously or to be piloted remotely without a pilot on board. UK Regulation (EU) 2018/1139.
- **Unmanned aircraft system Traffic Management (UTM).** A specific aspect of air traffic management which manages UAS operations safely, economically, and efficiently through the provision of facilities and a seamless set of services in collaboration with all parties and involving airborne and ground-based functions. ICAO Unmanned Aircraft Systems Traffic Management (UTM) – A Common Framework with Core Principles for Global Harmonization edition 4.
- **Unmanned Aircraft System (UAS)**. An unmanned aircraft and the equipment to control it remotely.[48](UK Reg (EU) 2019/947 Article 2(1)).
- **Unmanned Aircraft System Operator (UAS Operator).** Any legal or natural person operating or intending to operate one or more UAS. UK Regulation (EU) 2019/947.

[48] Note: The UAS comprises individual 'system elements' consisting of the unmanned aircraft (UA) and any other system elements necessary to enable flight, such as a command unit (CU), communication link and launch and recovery element. There may be multiple UAs, CUs or launch and recovery elements within a UAS. (CAP 722D).

APPENDIX B

UTM standards

B1 UK CAA Requirements.[49]

Requirements for communications navigation and surveillance (CN&S)

4.4 C2 link and contingency[50]. Primary command and control link requirements, redundancy, and the minimum performance requirements for latency, integrity, and availability shall be identified by the UTMSP. Contingency and lost C2 link procedures will be required for all UTM service provision where a C2 link is utilised.

4.5 Surveillance and position reporting. UA and manned traffic must be able to always provide their position and identity data to the appropriate service provider. The current requirement will be for the carriage of a CAP 1391 ADSB device[51]. Other EC devices are out of scope for the safety requirements of UTM service provision and DAA However it is envisaged that UTMSP's may wish to access other data, utilised for conspicuity, that may assist in identifying the presence of unauthorised aircraft entering the volume of airspace. this will allow strategic action to be taken to avoid MAC risk with unauthorised manned and unmanned aircraft.

a) Spectrum and Comms, the CAA will be required to coordinate with Ofcom on the protection of any spectrum requirements for UTM services that have a safety critical role.

B2 Requirements for data sharing privacy and security[52].

a) UTMSP's shall establish data governance standards for the handling and exchange of data between operators UTMSP's and other ANSP's. This data shall include (but is not limited to) the aircraft ID, its flight intent, aircraft position, the integrity or confidence of the data and any non-nominal events will need to be identified.

b) UTMSP's shall comply with current and future legal data privacy requirements. UTM data must be handled in such a way that it complies with relevant UK law including data protection law and GDPR.

[49] See Airspace ConOps or individual ConOps for relevant standards to be applied.

[50] UK CAA C2 Link ConOps

[51] UK CAA EC Policy

[52] UK CAA SWIM ConOps

b) UTMSP's shall use or describe Cyber security standards for UTM service provision and C2 link requirements. This will include authentication, encryption, and management procedures that will be required. Any certification will include cyber resilience testing and incident response obligations.

c) UTMSP's shall enable access and control as required by the State. There will be mechanisms for legally mandated access to UTM data for Accident Investigation or security provisions as directed by the CAA.

d) Early data exchange will be directly between localised UAS operators and any involved ANSP. The nature of the data to be exchanged and the requirements for accuracy and assurance still require definition and standards.

e) This policy document ensures data protection and cybersecurity requirements are considered for UTM service provision, to ensure UTM data is appropriately handled protecting privacy and national security requirements consistent with UK law

f) Data exchange requirements and SWIM standards, as part of an assured communication network, must be established to safely manage interactions between manned and unmanned aircraft, ensuring that both systems can operate without interference. GDPR and security must be addressed to ensure that exchanged information meets the appropriate safety assurance threshold for safe operations.

B3 Requirements for security and resilience.

a) Redundancy and contingency. UTM services must have fail safe degraded modes degraded separation buffers emergency priority routing for critical services and national contingency plans.

b) Threat response and mitigation. UTMSP's, and operators utilising the services, must have procedures to address intentional and malicious interference spoofing or jamming with a mandatory reporting capability to the CAA and other states or authorities as directed.

B4 Key International UTM Standards.

a) **ICAO.**

UAS Traffic Management (UTM) Framework, Edition 4. This guidance material is intended to provide States that are considering the implementation of a UTM system, with a framework and core capabilities of a "typical" UTM system. envisaged for a global application providing a framework that describes UTM core capabilities, architecture and a recommended phased implementation to harmonise UTM with ATM.

b) **British Standards Institute (BSI), International Standards Organisation ISO.**

The ISO 23629 series of publications define UTM concepts, functional architecture, data models and service provider requirements. It is intended to be used as internationally harmonised technical requirements. These are also adopted as British Standards by BSI The selected parts that address UAS traffic management (UTM) are.

- ISO23629-5:2023. UTM functional structure (defines UTM functional blocks of roles).
- ISO23629-7:2021 Data model for spatial data (data items for spatial, static and dynamic) use as required for UTM.
- ISO23629-9:2023. UAS Traffic Management (UTM) Interface between UTMSP's and Users.
- ISO23629-12:2022. UAS Traffic Management (UTM) Requirements for UTMSP's (The requirements for UTM and service providers addressing safety security privacy and organisational requirements).

c) **ASTM International**.

ASTM F3548-21[53] standard specification for UAS traffic management (UTM) - UAS Service Supplier (USS) Interoperability. An industry consensus specification for USS functionality and interoperability covering strategic conflict detection, intention exchange and conformance monitoring. It is widely used as a practical interoperability baseline for industry and regulators.

d) **EU/EASA & EUROCAE.**

U-space regulation (EU) 221/664[54] and EUROCAE WG-105 UAS/U-space work. EU (EASA) regulatory framework for U-space that sets mandatory rules for U-space Service Providers (USSP's) and services in EU member states. EUROCAE WG 105 is developing technical specifications and guidance for U-space/ UTM issues including e-identification, geo zones, data exchange, design, and airworthiness requirements. These technical specifications are the technical standards that support the EU regulation.

[53] This standard is written to mitigate ground risk only and will need careful interpretation to understand its applicability to air risk. Astm AND iso/BSI are currently collaborating on work to create an Air Risk Standard.

[54] The UK has not adopted U-space.

e) **FAA.**

UAS Traffic Management (UTM) concept of operations (ConOps) version 2.0. U.S. Federal conops describing the FAA vision including UTM service functions and operational scenarios (strategic deconfliction, the roles of the USS and interoperability expectations).

f) **RTCA (Radio Technical Commission for Aeronautics).**

RTCA DO documents set US minimum performance standards (MOPS) for the avionics, communications and surveillance components that enable safe UAS operations and integration with UTM.

- RTCA SC-228 RTCA DO document series setting US MOPS and minimum aviation system performance standards (MASPS) applicable to UAS traffic/ operations. These are
- DO-365 including revisions DO-365A, B&C. MOPS for detect and avoid (DAA) systems.
- DO 362A/ DO-377A/ DO-366A/ DO-381 MOPS/MASP for C2 (command and control) links, air to air radar, ground surveillance.

g) **NASA.**

Produces research reports and white papers on UTM technical demonstration and methods. These are guidance evaluation templates and research outputs.

APPENDIX C

Additional Data Provision

C1 In addition to existing aviation data, UAS operators will require access to additional data that is not currently available to aviation. This data will be necessary to address a variety of risks necessary for their SORA application. Where this data and information is used by the operator to mitigate an air risk this additional data must be certified and or assured to the extent necessary to ensure that the provision of unassured data and or information does not result in a Mid-Air Collision between aircraft.

C2 This data may already be available and be provided to UAS operators directly by the originator (creator) or collector of such data. It is not within scope of this UTM Policy document to address the requirements to ensure that the data used by UAS operators direct from these providers meets any required standards[55].

C3 UTMSP's may choose to provide this additional data to UAS operators as an additional benefit in addition to the identified UTM Service(‘s) they provide under UK Regulation 2017/373. UTMSP's may choose to access many different sources of additional data to assist the UAS operator in their SORA application. This data may come from the same source that is providing data and information directly to the UAS operator; however, where such data is accessed by or provided to a UTMSP’s that data will be identified as additional data. The provider of this data and information will be an Unmanned Aircraft Systems Data Service Provider[56] (UDSP).

C4 This data may come from providers already certified under UK Regulation 2017/373 Annex v Part MET, Annex VI Part AIS, Annex VII Part DAT or Annex VIII Part CNS. Where this is the case then the general requirements in sub-part A of Annex III ATM/ANS.OR.A.080 Provision of aeronautical data and ATM/ANS.OR.A.085 Aeronautical data quality management will apply.

C5 UTMSP's may supply additional data and information, not provided by a certified source, to a UAS operator to meet the safety risk mitigation for their SORA. This data may not come from a data provider certified under the regulation. Where this data is provided, a means to ensure that the data meets the appropriate standards and requirements, for the risk that it is being used to mitigate, shall be identified.

C6 Where additional data is provided by a UTMSP, to meet the air risk mitigations of a UAS operator as part of their SORA and does not come from a source certified under UK Regulation (EU) 2017/373 the source will be required to be certified as a

[55] Any requirements shall be addressed as part of a SORA application.

[56] This term will replace Supplementary Data Service Provider

UDSP. Where the source chooses not to undertake the certification process for the provision of additional data then to provide assured information, drawn from uncertified sources the UTMSP will be required to additionally apply for certification as a UDSP. UTMSP's will be required to undertake additional specific elements of certification to provide this data to UAS operators.

C7 This additional data will be assured by the UTM service provider or the UDSP to allow UAS operators to mitigate air and where appropriate and ground risks.

C8 The following services are not exhaustive but an indicator of additional information and/or data elements for UTMSPs to offer, enhancing operational capabilities where required. These services may be provided by a third-party (other ANSP's or entities or through common information provision). The services applicable to UAS operations in any UTM environment, may include, one or more of the following as the requirements of the operation demand:

a) Network Registration and Identification service: a service that enables UAS operators to register their UAV and provide any required data related to their UAS. The system should also include an 'enquiry' function enabling authorised stakeholders (e.g. regulators or police services) to request registration data.

b) Meteorological data/service. Data and information, regarding meteorological condition, that provides individual UAS operators/remote pilots or UTMSP's with the meteorological information necessary for the to mitigate the operational safety risk to the UAS. It should provide real-time meteorological data, including wind conditions, precipitation forecasts, and turbulence warnings, allowing UAS operators to make informed flight planning decisions. The requirement for digital meteorological systems shall improve real-time weather monitoring and forecasting, enhancing UAS operational safety under varying atmospheric conditions.

c) Common Altitude Reference provision. The provision of altitude or level information in a format that is harmonised and compatible with existing altitude referencing methods[57] is important outstanding work but is a crucial enabler for the integration of UAS and manned aviation.

d) Registration and Validation Services will integrate with the UK's UAS and The CAA Drone & Model Aircraft Registration and Education System (DMARES) to verify operator credentials before flight.

e) System Wide Information Management will establish secure and reliable data exchange between UAS, UTMSPs, ANSPs, and regulators, ensuring seamless coordination of operations.

[57] UK Regulation (EU) 2017/373 Annex III ATM/ANS.OR.A.090 Common reference systems for air navigation. For the purpose of air navigation, service providers shall use the mean sea level (MSL) datum as the vertical reference system.

f) Data Logging and Analysis Services will support post-flight review, regulatory compliance assessments, and airspace performance optimisation, ensuring continual improvements to UAS operations.

C9 Although these services are not required for basic UTM compliance, they will offer significant operational benefits, enhancing the efficiency, scalability, and resilience of the UTM system.

APPENDIX D

Common Information Service Provision and System Wide Information Management[58]

SWIM

D1 System Wide Information Management (SWIM) is the standards, infrastructure and governance, enabling the management of ATM/ANS information and its exchange between qualified parties via interoperable information services. The effective implementation of SWIM is the foundation of the UK's transition to a digital data driven ATM system.

D2 To deliver the ambitions of the AMS, Future of Flight (FoF), and the Global Air Navigation Plan (GANP), the aviation system must transition from legacy, fragmented information exchange to a modern digital infrastructure.

D3 SWIM is the strategic enabler of this transformation, providing service-oriented framework for appropriate access to high-quality, standardised data.

D4 This capability unlocks innovation and supports value-added services across all aspects of aviation critical information, including AIM, MET and emerging data requirements required for UAS operations.

D5 SWIM will be a crucial element to facilitate data exchange and enable provision of assured data as part of UTM service provision and UAS data service provision. The adoption of SWIM will be one of the enablers for operations at scale and complex operations.

Common Information Service (CIS)

D6 The concept of what constitutes common information, provided as a service (CIS) is not globally defined, but conceptually, common information service provision will be defined within the UTM architecture and provide a "Single Point of Truth" for critical data that enables safe and efficient UTM operations. There are many potential airspace stakeholders who will need access to this common information.

D7 Whilst an emerging concept, it is recognised that CISP functionality is the enabler for shared critical data between a range of stakeholders, but relevant to this policy are the ATS ANSP's providing services to manned traffic and the UTM ANSP's providing services to UAS. This data and information exchange will need to be developed wherever those ANSP's provide services in the same volume or area of

[58] This work is being developed in CISP boost and the SWIM ConOps.

airspace. This interaction is easier to recognise in controlled airspace where the controlling authority is a single ANSP is providing services; the relationship may be more complex in uncontrolled airspace where several service providers operate.

APPENDIX E

Summary of Questions

Question 1: Do you agree with our position on the applicability and scope of UTM?

Question 2: Whilst market service provision models are not addressed specifically in this version of the policy, what economic model would you support for UTM (centralised, single service provider or decentralised/federated multiple service providers)?

Question 3: Do you agree with the purpose and justification for UTM as set down in Chapter 2?

Question 4: Do you agree that the risks identified in the document can be mitigated by UTM service provision? Are there any other areas of air risk you would like to be being included?

Question 5: Do you agree with the Governance proposals made as part of this policy?

Question 6: Do you agree that transparency and accountability in UTM service provision is fundamental to fair service delivery and airspace access?

Question 7: Do you agree with the services identified as UTM services and that they provide the capability to mitigate the air risks identified in para 2.4?

Question 8: Are there any outstanding concerns or recommendations on the contents of the Policy Concept that you would like to raise?