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U-Space – Civil Liability for damages caused by Unmanned Aircraft

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Abstract

The global drone market has been showing steady growth year by year. This article will analyze existing regulations and materials on UAV operations in U-Space, as well the infrastructure concept of U-Space and its economic aspects, as the system aims to ensure the safe, fast and effective development of services relying on UAVs equipped with new technologies, the foundation of which is a safe, traffic management system (ultimately automatic). The goal of this article is to showcase the possible entities liable for damage caused by a drone flying in U-Space airspace and demonstrate the PansaUTM system – the backbone of PANSA's U-Space. The method of study comprises a content analysis of existing legislations. The current doctrine were confronted with existing regulations, documents and materials. It is too early to make an assessment of existing regulations concerning U-Space. However, the study makes it clear that, taking into account the complexity of the concept itself and its substantial impact on the aviation industry and beyond, the biggest challenges for national (or EU) legislators is the creation of standards for U-Space service provision and the identification of entities responsible for damages caused by UAVs used in it. The study shows that U-space concept requires much more involvement of the legislator and stakeholders to ensure the safety of airspace users, people and infrastructure on the ground. Moreover, the article proposes a solution for compensation for damages caused to third parties in U-Space.

Keywords: U-Space; UTM; UAVs; liability; responsibility; drone; drone operators

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1. Introduction

Opening of the aviation market to the civil use of unmanned aircraft (UA) started a *A new era for aviation*[1]. The civil use of drones is already significant. (Roma, 2014). It can be used in logistics and transport services, fleet management, medical transport (Konert et al., 2019) services for electronic media, films and entertainment, in agriculture (inventory of crops, forests, farming, etc.) in law enforcement and policing activities, border patrols, fire services, traffic management and monitoring, fisheries protection, oil and gas pipeline surveying, coverage of large public events, aerial photography, review and assessment of mines, quarries, dams, construction sites, houses, critical infrastructure assessments in hazardous and non-hazardous environments, missing person searches, etc. (Jacques et al., 2014; Zieliński, 2014; Rupprecht, 2015).

Drone markets in Europe have been showing steady growth year after year. Some of the world's top drone service providers are based here, and their business results are proof of continuous and considerable market growth[2]. Some forecasts predict that the European drone market will more than double in size between the years 2018 and 2024[3]. The possibilities of engaging this new branch in aviation, and how this could support the creation of the new services and boost the economy was the main topic of EASA's High Level Conference entitled *"Drones as a leverage for jobs and new business opportunities"*, which took place on 23-24 November 2016 in Warsaw, Poland. The event was co-organized by the Polish Ministry of Infrastructure and the Polish CAA concluded with the so-called 'Warsaw Declaration', urging all stakeholders to continue with the further development of drone services to support EU competitiveness and global leadership, while also calling for the swift development of a legal drone ecosystem[4]. The declaration called for full participation of the EU drone community in demonstrators to test – as rapidly and as efficiently as possible – the feasibility of the requirements and standards of U-Space.

The declaration also called for the creation an effective coordination mechanism between the European Commission, relevant European agencies, including the European Defense Agency, and all stakeholders in order to assist with:

(a) the establishment of a regulatory framework, including the timely delivery of industry standards;
(b) the efficacy and funding of drone integration projects; and
(c) the development of U-Space.

Taking into account the complexity of the concept itself, and its big impact on all possible aviation industry sectors and beyond, the biggest challenges for national (or EU) legislators would be the creation of standards for U-Space service provision and the identification of entities responsible for damages caused by UAVs used in it. The goal of this article is to analyse the existing documents on U-Space and demonstrate the PansaUTM system – the backbone of PANSA's U-Space.

A growing number of drone operations have increased the number of dangerous events involving UAS, and this is not just incidents and airprox with UAS reported by aircraft crews in recent years. This also includes accidents that result in damage or destruction of UAS. It is therefore important to analyse the question of civil liability for damages caused by drones (Włodarczyk, 2017). The paper will identify if there are existing regulations in place concerning civil liability.

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[1] COM (2014) 207 final.
[2] https://uavcoach.com/droneii-2019-reports/
[3] https://www.droneii.com/the-drone-market-2019-2024-5-things-you-need-to-know
[4] https://www.easa.europa.eu/newsroom-and-events/events/high-level-conference-drones-leverage-jobs-and-new-business

2. The U-Space concept and current rulemaking processes in U-Space regulation

U-Space is a general n infrastructure concept, supported by an economic aspect, aimed at ensuring safe, fast and effective development of services based on UAVs equipped with new technologies in an attempt to integrate unmanned and manned aviation (Peterson, 2006).

The functions offered as part of U-Space are to be provided by the so-called U-Space Service Providers, in cooperation with other interested entities (e.g. air traffic control, police, fire brigade, medical rescue, etc.). The understanding of U-Space has evolved since its first introduction. This paper does not aim to describe in detail the different approaches to the U-Space concept and the evolvement of the concept itself, however, because the subject of this paper is focused on the responsibility and liability of it, it is crucial to note that the final definition of U-Space and its applicability is still unclear and under development. Below is a brief note on the changing definition of U-Space the regulation drafting process.

The SESAR U-Space blueprint issued in 2017[5] stated that U-Space will enable complex drone operations with a high degree of automation to take place in all types of operational environments, including in urban areas. U-Space was understood to be flexible enough to encourage innovation, support the development of new businesses, and facilitate the overall growth of the European drone services market while properly addressing, at an EU level, safety and security issues, respecting the privacy of citizens, and minimizing the environmental impact of such operations.

The blueprint defines U-Space as a set of new services and specific procedures designed to support safe, efficient and secure access to airspace for a large numbers of drones. These services rely on a high level of digitalization and automation of functions, whether on board a drone itself, or as part of equipment on the ground. U-Space provides an enabling framework to support routine drone operations, as well as a clear and effective interface for manned aviation, ATM/ANS service providers and authorities. According to the blueprint, U-Space is not to be considered as a defined volume of airspace, which is segregated and designated for the sole use of drones. It is rather a system capable of ensuring the smooth operation of drones in all operating environments, and in all types of airspace (in particular, but not limited to, very low level airspace). It addresses the needs to support all types of missions and may concern all drone users and categories of drones. The blueprint set the stage for the deployment of U-Space in blocks, depending on the maturity of services and existing technologies within a region which would support more and more advanced types of drone operations. The timeframe of the blueprint presented a schedule for implementing various services, beginning with U-Space foundation services such as e-registration, e-identification and geofencing, through U-Space initial services (flight planning, flight approval, tracking, airspace dynamic information and procedural interfaces with air traffic control), to advanced services to support more complex operations (detect and avoid – DAA) capabilities, and full services (integrated interfaces with manned aviation that rely on very high levels of automation, connectivity and digitalization). In order to assist with the creation of this ecosystem, SESAR funded numerous drone-related project such as CORUS, Gulf of Finland, Diode, PODIUM and many others[6]. In late 2018, the European Commission launched the European Network of U-Space Demonstrators – a forum dedicated to share knowledge on how to keep drone operations safe, secure and green. The aim of the Network was to focus on U-Space: “a system that connects all drones flying in the air and that makes all drones visible for authorities and citizens”. Simultaneously, a so-called “support cell” was established: a support cell to the network was created to bundle the regulatory and safety competence of the European Aviation Safety Agency, R&D management expertise of the SESAR Joint Undertaking and the technical and operational air traffic management expertise of EUROCONTROL[7]. These actions were in preparation for the development of standards for the entire European drone industry and the beginning of the drafting process of unified U-Space regulations.

EASA and the European Commission have jointly prepared a draft opinion for U-Space regulatory framework. This deliverable follows the conclusions of the Declaration at the High Level Conference on Drones in December

[5] See: SESAR U-space Blueprint.
[6] See more: https://www.sesarju.eu/U-space
[7] https://ec.europa.eu/transport/modes/air/news/2018-10-19-network- U-Space-demonstrators_en

2018, that priority is given to develop an "institutional framework for a competitive U-Space services market and how drones need to be operated in the Single European Sky". The drafting of the opinion was followed by consultations with U-Space stakeholders; representatives and authorities involved in UAV industry[8]. In the very first draft of the opinion, published in July 2019, the definition of U-Space changed slightly from the one presented at the SESAR U-Space Blueprint. The draft consisted of a new approach to U-Space airspace: "*U-Space airspace' means the airspace structure/volume designated by the MS where U-Space services are provided or where certain capabilities and actions from the unmanned aircraft operators are required or both.*" To complement the definition, the draft defined "U-Space services" as the provision of required data and information in order to keep aircraft operations safe and in accordance with applicable requirements.[9] The initial draft regulation introduced the obligation for ATS providers, and also established the responsibility of ATS providers in terms of which areas of responsibility coincide partially or entirely with designated U-Space airspace to:

1. provide static and dynamic data and information listed in Article 6 of the draft regulation; and
2. establish a coordination procedure with U-Space service providers to exchange information.

Article 6 of the draft regulation introduced the entity of a common information services provider or flight information management system manager. The CIS/ FIMS was supposed to be an entity certified and designated by Member States on and exclusive basis in a defined area of responsibility to provide information whilst maintaining necessary quality integrity and continuous flow requirements.

The minimum information which CIS/ FIMS shall provide, according to the draft, are:

1. The CIS provider or the FIMS manager shall provide the relevant minimum information at all times:
   (a) horizontal and vertical limits of the airspace structure;
   (b) the allocation of airspace to airspace users;
   (c) the applicable airspace constraints;
   (d) the relevant information with neighboring U-Space airspace designated by other Member States;
   (e) the connectivity methods and constraints within the inter-U-Space service provider platform;
   (f) the information from ATM/ANS service providers, when required;
   (g) access points for information on operations as required; and
   (h) the list of all the publicly known authorities that can be contacted in relation with the CIS/FIMS.

The draft also introduced the necessity to create an inter -U-Space service provider platform, which U-Space service providers shall establish between them to enable the following information flows:

(a) The exchange of information between U-Space service providers;
(b) The exchange of identification and tracking of the unmanned aircraft; and
(c) The dissemination of USSP flight authorizations, when required.

The high number of entities involved in the creation of a U-Space ecosystem, coupled with unclear responsibility distribution, was one of the main concerns expressed by various stakeholders during the consultation process. Some stakeholders presented opinions that is important to ensure the establishment of an entity (or use CIS) which would serve as a proxy between ANSPs/ATS providers and multiple U-Space service providers in order to create "one source of truth" in U-Space, in a bid to prevent ambiguity in the quality of data presented by different U-Space service providers. The unclear responsibility of ANSPs in the process was also noted by CANSO. The different stakeholders coordinated their responses to the available drafts. It is worth noting that the *We are one in the sky* initiative, combined with different associations including: CANSO, ACI, ECA, IATA, IFALPA, IFATCA, A4E and

[8] https://www.unmannedairspace.info/emerging-regulations/easa-workshop-fine-tunes- U-Space-regulatory-opinion-before-public-consultation/
[9] Initial draft Regulation on U-space of July 2019

many others[10]. The letter among 5 key principles for successful regulatory framework for unmanned aviation operations & unmanned traffic management (UTM/U-Space) highlighted the need to ensure common airspace situational awareness through the exchange of information, and the need to clarify responsibilities and liabilities to be borne by different actors in U-Space. Air Navigation Service Providers associated in the A6 Alliance voiced their approach to U-Space deployment in the *"Safely integrating drones in to Europe's airspace: Building on experience, progressing through partnership"* position paper in which they present one of the approaches which uses the ANSP experiences and today's responsibilities and role in air traffic management in the creation of U-Space ecosystem[11].

The draft opinion on U-Space regulations announced by EASA in October 2019 once again slightly modified the definition of U-Space: *"U-Space airspace' means the volumes of airspace designated by Member States, where U-Space services are provided, or where certain capabilities from the unmanned aircraft and actions from the unmanned aircraft operators are required, or both.*" The definition of U-Space itself was not drafted in the regulation, however the summary of the opinion states: "*What is U-Space? There are many interpretations and perceptions of what the U-Space is. The regulatory approach in this Opinion is to define the U-Space as a set of services provided in an automated way through a digital system in a volume of airspace designated by a Member State".*[12]

The final draft of the opinion was originally due to be published in December during Amsterdam Drone Week, which hosts the EASA High Level Conference on Drones, and the pre-draft Opinion on U-Space received more than 3,000 comments – an unprecedented level of feedback from stakeholders and the industry. After consultations, the draft opinion had been postponed for reviews[13]. The second draft was published on 13 March 2020[14]. The definition of U-Space airspace in this draft states as follows: *"U-Space airspace' means a geographical zone, defined in accordance with Commission Implementing Regulation (EU) 2019/947, designated by Member States, where U-Space services are required."*

In this very draft, the regulator gives distinct responsibilities depending on how U-Space airspace is designated. If it is designated within controlled airspace: (a) air navigation service providers shall remain responsible for the provision of air navigation services to operators of manned aircraft, as well as for the dynamic reconfiguration of the airspace within the designated U-Space airspace to ensure that manned and unmanned aircraft remain segregated; (b) U-Space service providers shall be responsible for the provision of U-Space services to operators of unmanned aircraft[15]. The draft also provides an additional term: Dynamic Airspace Reconfiguration of Airspace. According to the draft: *"Dynamic reconfiguration of the airspace' means a temporary limitation of the area within the designated U-Space airspace where UAS operations can take place in order to respond to changes in manned traffic demand."* The introduction of such a function raised additional concerns about responsibility and posed the question which entity should be responsible and liable for this function. Should it be the Common Information Service Provider, U-Space service provider, ANSP, or the air traffic controller? In terms of applicability of the regulation, it is important to underline that the assumption for the impact assessment drafted in the opinion states that U-Space airspace is not present everywhere. but is designated mainly where needed: in low level airspace (below 500 ft outside of urban airspace, below the minimum height at the city within urban environment and around airports)[16].

The new revised text of the draft regulation was distributed in June 2020. Among the major changes to the concept based on comments received from stakeholders was a change of the definition of U-Space airspace and dynamic airspace reconfiguration. According to the current draft: *"U-Space airspace' means UAS geographical*

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[10] https://www.iata.org/contentassets/acfe622861ec4e16a75b5d6a71fd7a67/we-are-all-one-in-the-sky.pdf
[11] https://www.a6alliance.net/positions/a6-alliance-position-drones/
[12] Draft Opinion in accordance with Art. 16 (Accelerated procedure) of MB Decision No 18-2015, High-level regulatory framework for the U-space RMT.0230
[13] https://airtrafficmanagement.keypublishing.com/2019/12/11/utm-industry-dismayed-at-delay-of-euro- U-Space-rules/
[14] https://www.easa.europa.eu/document-library/opinions/opinion-012020
[15]https://www.easa.europa.eu/sites/default/files/dfu/Draft%20COMMISSION%20IMPLEMENTING%20REGULATION%20on%20a%20high-level%20regulatory%20fram....pdf
[16] https://www.easa.europa.eu/sites/default/files/dfu/Opinion%20No%2001-2020.pdf

zone designated by Member States, where UAS operations are only allowed to take place with the support of U-Space services provided by a U-Space service provider. However, *'dynamic airspace reconfiguration' means the temporary limitation of the U-Space airspace in order to accommodate short-term changes in manned traffic demand, by adjusting the geographical limits of that U-Space airspace."*

This new approach also changed the responsibility distinction between ANSP and USSP which was introduced in the previous draft. For the current state of the draft regulation, U-Space airspace is solely restricted to drones. If there is a need to enter U-Space airspace by manned traffic – the dynamic reconfiguration shall change temporarily the limits of the U-Space airspace in order to allow such flight. Introduction of this new approach raise additional questions about the assurance of such reconfiguration in timely manner (especially where there is a need for emergency access into the U-Space airspace by manned traffic). The questions are raised also about the safety and once again about the responsibility distribution.

To sum up the U-Space concept part and its impact on responsibility and liability – it is unclear for the time being how the U-Space will be finally defined, what will be the ultimate roles in the ecosystem. Thus the responsibility for U-Space service provision and the responsibility or liability for damage by the UAS in U-Space airspace will depend on the final version of the regulation in force as well as the event itself and the reasons for its occurrence.

3. PANSA UTM and U-Space

Despite of the ongoing rulemaking process of U-Space regulation, numerous Member States urged by the European Commission to quickly develop results on integrated manned air unmanned aviation have started to put efforts in order to create such ecosystem on basis of national regulations and available tools and standards. Poland is one of those proactive countries where the experiences in manual UAVs flight coordination gave the necessary feedback to create a digital solution (Konert and Kotliński, 2018b).

Poland was the first country in Europe, where a non-restrictive, mobile, cloud based system platform that allows the precise registration, monitoring and management of drone operations via procedurally sourced information and was funded in Poland in December 2015. The app is called DroneRadar and was one of the first mobile applications of its kind in Europe and probably worldwide[17]. Over the course of the first year alone, the mobile application was downloaded and accessed by over 140 000 users (iOS and Android). Airspace availability on both mobile and web applications was checked more than 1 000 000 times over this period, which shows the potential volume of UAV operations in just Poland itself.[18] Thanks to this application, the operator could check the restrictions in terms of the airspace with just one "click" (Konert and Kotliński, 2018b).

The Droneradar application does not exempt from the need to obtain approvals for flights from managers of individual zones, including approvals for flights in CTR zones (application form required) and other requirements established by the ANSP. All data in Droneradar were informative and can only be used as an additional material for flight planning. In 2017 Polish Air Navigation Service Agency (PANSA) started the testing process of Droneradar[19] which allowed to assess a necessary feedback for such tool in ATC/ ATS environment.

On the basis of the experience with Droneradar, in 2018 PANSA started the process of implementing the so-called PansaUTM system – Unmanned Aerial Systems Traffic Management with cooperation with technological partners (HAWK-E and Droneradar). The system was developed in order to digitize the UAV flight coordination which has been conducted by PANSA since 2013 and to enable the non-verbal communication between drone operators and air traffic controllers / flight information service officers. PansaUTM is a digitized and automated UAV flights coordination and flight plans management concept which is comprised of PANSA's signature operational solutions. The system is partly delivered by the technology partner HAWK-E and integrated with DroneRadar mobile app. The PansaUTM system serves as the source of primary information and aeronautical data and facilitates the UAV flight coordination process, providing the information on drone operators, their certificates

[17] http://www.swiatdronow.pl/droneradar-polska-aplikacja-mobilna-dla-operatorow-dronow
[18] https://droneradar.eu
[19] https://www.pansa.pl/aplikacja-droneradar-uznana-przez-polska-agencje-zeglugi-powietrznej/

and registered drones – if needed – to assess flight requests. The PansaUTM system with the dFPL (drone Flight Plan) functionality also allows for the electronic creation of VLOS and BVLOS missions in accordance with applicable laws and regulations taking into account terrain and airspace structures and operational limitations within specific airspace. Drone missions thus created primarily in CTRs are analyzed by the system in order to issue digitalized permission for specific UAV flights at the pre-tactical stage.

The entire process takes place electronically and in real-time detecting potential conflicts in the airspace. However, the most important element of the system is the ATC interface and support of safe air navigation services provisions (Kotliński, 2020).

PansaUTM after one year of certification process with the Civil Aviation Authority of Poland obtained a positive decision of the President of the Civil Aviation Authority of Poland of 28 February 2020 gave a new tool for operational use in the Polish TWRs and FIS Sectors. The system became operational on 3 TWRs (TWR EPMO, TWR EPBY and TWR EPPO on 2 March 2020 and became the first operational system in Europe which involves Air Traffic Controllers[20]. The implementation process was done in stages adding few more units every couple of weeks and on 15 July 2020 it reached 14/15 civil active TWRs implemented and 5/ 5 FIS Sectors. It means that almost all drone operators in Poland can conduct the digital coordination of UAV flights with Polish Air Navigation Services Agency and their air traffic controllers and flight information service officers using PansaUTM system. The last TWR EPWA accordingly to PANSA is scheduled to be implemented in September[21] (Kotliński, 2020).

4. Discussion (case study)

In the case we analyze is a road accident to which a helicopter-ambulance is heading, medical rescue delivers to the scene of the accident a defibrillator placed on board of a drone (Konert et al, 2019) , the firemen monitor the area in order to make a decision about intervention, the police collect evidence, and the press and television gather material information by taking photos or recording an image. There is no doubt that there should be traffic rules similar to those in road traffic, and then privileged services would have priority. In addition, it seems necessary to close the space above the area where the accident takes place, so that it is not possible to record an image or take photos for entities other than privileged services, e.g. by geofencing.

What happen if a drone will cause a damage for a third party on the ground ?

If the "guardian of the drone" does not give way, despite the order, causing a collision and possible damage to a person, there is no doubt that he will be liable (fault liability). However, we should also consider the strict liability of the operator of a drone (as an operator of an aircraft). However, the question arises whether it will always be decided by a man or a machine / system?

If, therefore, the drone is considered to be a robot/machine (autonomous operation) that is equipped with a system that detects emergency vehicles and gives way to them, and its guardian had no possibility of controlling it, and due to a system defect, the drone did not stop and caused a collision, the question of the responsible entity remains more debatable. It would be worth considering the issue of introducing joint and several liability of the system producer and drone operator, with appropriate recourse law, preferably enriched with compulsory insurance. As the drone is registered, the system should automatically combine the elements described in the register with the flight request elements and its behavior in emergency situations. So if the drone crashes at any time during the flight, it will behave in a predictable manner, minimizing the risk to people and property on the ground.

In addition, another entity that is required to provide information on an ongoing basis to air traffic participants within the U-Space may be pursuing here, i.e., for example, air traffic controllers using UTM will not inform other operators about upcoming emergency vehicles. Then, the responsibility of UTM for damages caused by a collision may come into play. However on basis of the currently applicable Regulation of the Minister of Transport, Construction and Maritime Economy of 26 March 2013 *on the exclusion of certain provisions of the Air Law Act as*

[20] https://www.pansa.pl/index.php?menu_lewe=ops_drony&lang=_pl&opis=OPS/ops_rpa_vlos
[21] https://www.pansa.pl/system-pansautm-oddany-do-uzytku-operacyjnego-na-kolejnych-lotniskach-3/

non-applicable to certain types of aircraft and defining conditions and requirements for the use of these aircraft (hereinafter: Regulation on the exclusion), the UAV operator is solely responsible for the flight conduct.

There are no special regulations for drones regarding civil liability. Therefore the general rules on civil liability would apply. (Scott, 2016; Żylicz, 2011 and 2016). For damages caused to third parties the general rules of liability of an operator of manned aircraft would apply in a specific country since the civil liability rules are always national. (Konert and Kotliński, 2018a). It is important to highlight that in the concept of U-Space.is is necessary to create a new rules. First of all, this concept would be the same for every country (with different national rules). Secondly, most of the operations will be autonomous and it is unacceptable to apply in such a case a drone operator general rules liability. Finally, as it was shown in the case study, there are many different entities in U-Space which could be held liable in case of a damage for a third party and it needs to be regulated.

Taking into account this arguments, one should consider channeling the obligation to pay compensation to a single entity that can minimize the risk and take action in relation to the negative effects, and which benefits financially from the activity. We can therefore speak of responsibility for all events within the U-Space in relation to the entity that provides services while using the airspace control assigned to it, i.e. U-Space Service Provider (USSP). Firstly, whether we are dealing with the control of an operation performed by a drone by a human or not (automatic/ autonomous flights), information about specific threats always comes from the USSP. Secondly, U-Space for time being could be a separate geographical zone over which one entity exercises complete control. Third, each drone user / operator will be required to pay USSP for the proper provision of services. Finally, such liability channeling may result in easier risk assessment and the introduction of compulsory insurance of the entity, the premiums of which may be included in the price of services paid by U-Space users (Konert and Kasprzyk, 2020).

5. Summary

The UA market poses a real opportunity to foster job creation and a source for innovation and economic growth for the years to come. The development of UA is therefore one of the most important challenges for the future of aviation and requires the development of provisions that regulate issues related to the use of UA (Kasprzyk and Konert, 2018; Valavanis and Vachtsevanos, 2018).

The European U-space concept provides a solution on two fronts: first it consists of regulatory requirements and practices, calling for registration, identification, and flight planning and second U-space is all about new technological solutions, like electronic and interoperable registration, identification, and geofencing (Huttunen, 2019).

The implementation of the U-Space or UTM concept and integration of unmanned aviation with manned aviation will probably trigger introduction of different legal acts or amendment of existing ones, however it can be stated that Polish regulations at the moment allow for the sustainable development of the unmanned aircraft sector and are a good basis for further work on legislation.

Taking into account the complexity of the concept itself, and its big impact on all possible actors in aviation industry and beyond, the biggest challenges for the national (or EU) legislator would be creation of standards for the U-Space service provision and the identification of entities responsible for the damage caused by unmanned aerial vehicles used in the so-called U-Space.

The implementation of the environment based on operational PansaUTM system was the backbone of PANSA's U-Space Program and their signature take to put the U-Space concept into reality. Taking into account the SESAR Blueprint and functionality provided by the system – it is an upper U3 level of maturity. It is another step towards the implementation of the U-Space concept, the key elements of which are the UTM (Unmanned Traffic Management) acting as orchestrator and several DTMs (Drone Traffic Managements) created for smaller volume of airspace i.e. for CTRs, metropolitan or military areas (Takahashi, 2012) .

There is a long way to go before a fully validated concept of operations allows drones to fly safely in an integrated airspace. (Kapnik, 2012; Mumm, 2015). As it was rightly noticed in the literature (Barrado et al., 2020), the U-Space concept needs to be validated and requires much more work to ensure the safety of all airspace users, and people and infrastructure on the ground. Once the U-Space concept is regulated, one would need a clear rules in case of damages caused by a drone to third parties. The analysis of hypothetical case allows for the formulation of the following conclusion and for the time being: the third party civil liability should be channeled to the U-Space

Service Provider (USSP). However the lack of clarity of the final text of U-Space regulation now being shaped and polished and role and responsibility distribution in the U-Space ecosystem leaves as with the remained question on how the liability for similar case would look like if the U-Space was deployed accordingly to the U-Space regulation.

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