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THE RISE OF THE DRONES: FRAMEWORK AND GOVERNANCE—WHY RISK IT!

DR. SARAH JANE FOX*

ABSTRACT

Some seventy-one years ago, it was found that drones could play a role within our society. While the military was quick to realize this and develop the technology, it is only recently that the civilian application is being explored *en masse*. That said, given this prediction and the military direction, legislators find themselves now unprepared for the civilian use and market potential. However, this is not an unprecedented situation; the civil aviation (manned) market has often shown an inability to work together, be prepared, and cooperate. As a consequence, there has been fragmentation and, arguably, casualties associated with such lethargy.

This article discusses the aspects of risk, governance, liability (predominately covering safety and security), and the need for a suitable framework relating to drone usage (particularly viewed from the perspective of third parties). This article identifies the

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challenges, while the research focuses on the direction of the European Union (EU) and the lessons learned from the unity and development within the manned civil aviation framework. It is argued that, going forward, there is a need not just to adapt existing aviation systems and mechanisms, and to apply best practices, but to learn from past failures and the successes of other modes and systems.

I. INTRODUCTION

IN 1946, THE AMERICAN magazine *Popular Science* recognized that "[d]rones, as the radio-controlled craft are called, have many potentialities, civilian and military."[1] It is therefore not surprising that in the seventy-year period since, technological advancements have realized the this statement, alongside the full potential of the newer, advanced drones (which, in many instances, bear little physical resemblance to their earlier miniature-aircraft counterparts).

Warfare has long had a synergy with aviation.[2] It "has been instrumental in aiding and developing aviation technology" and in advancing the development of the aircraft, so it is therefore unsurprising to see drones also advancing through military intervention.[3] While the military and border authorities have long been using unmanned aerial vehicles (UAV), unmanned combat aerial vehicles (UCAV), and drone aircraft in their respective roles, the use of civilian unmanned aircraft is relatively newer in comparison. That said, innovative usage of drones is now widely being explored under the civilian remit.

However, what is perhaps surprising is that despite this predicative statement within an eminent publication, and despite the proven military and security worth of modern drones, only recently has consideration been given to mechanisms that allow opportunities while respecting the associated challenges. In this regard, there are lessons to be learned regarding military usage, where drones have struck at targets and have remained relatively unaccountable, and in essence, untraceable. There are close links to the missiles and other projectiles discharged, in terms of

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[1] *Grumman Hatches a Mallard*, POPULAR SCIENCE, Nov. 1946, at 121, 122, https://books.google.com/books?id=_CADAAAAMBAJ&lpg=PA121&dq=Grumman%20Hatches%20a%20Mallard&pg=PA121#v=onepage&q&f=false [https://perma.cc/6MW8-QC7H].

[2] Sarah Jane Fox, *The Evolution of Aviation in Times of War and Peace: Blood, Tears, and Salvation*, 31 INT'L J. ON WORLD PEACE 49, 49–52 (2014).

[3] *Id.*

being a formidable weapon, which, in the wrong hands, could easily be replicated against civil society. Therefore, there is a fine line in determining what a drone actually is—in the right hands and in a safe and secure setting, these machines remain an aid to society, arguably a transport system for assistance and support. And, in essence, this new "transport system" is set to become part of our everyday lives. But, as so often has been the case in civil aviation development, legislators, particularly from a governance perspective, have been slow to keep pace and arguably to recognize this growning risk of unmanned machines that will increasingly be seen flying above us.

II. DEFINING DRONES: WHAT DO YOU MEAN!

The term "drone" is now synonymous with a machine that flies above us, but the word itself has many applications and meanings extending past this more recent man-made definition. According todictionaries, "drone" refers to a low and continuous humming sound,[4] or repetitive action (sometimes lacking meaning, but of a monotonous nature).[5] It also refers to a stingless male bee that mates with the queen and does not gather nectar or pollen.[6] In this respect, the use of the word drone for an apparatus that takes to the air and that, certainly in the past, had a continuous buzz, seems remarkably apt.[7] And it is only now that the opportunities to use a drone for applications that benefit society are beginning to be fully explored. Global expenditure on the acquisition of drones is expected to double to $91 billion in the ten-year period between 2014 and 2024, making the drone sector the most dynamic growth sector of the global aviation industry.[8]

The EU anticipates that in the next twenty years, its drone industry will directly employ over 100,000 people and will im-

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[4] *Drone*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/drone (last visited Oct. 24, 2017) [https://perma.cc/TXG2-J2MC].

[5] *Id.*

[6] *Id.*

[7] It is reported that the name drone stems from the DeHavilland Queen Bee developed in the United Kingdom and produced between 1934–1943. Brian Benchoff, *A Brief History of 'Drone'*, AMA FLIGHT SCHOOL: THE EVOLUTION OF DRONES (Sept. 26, 2016), www.amaflightschool.org/DRONEHISTORY [https://perma.cc/3BK2-KJTT].

[8] Press Release, Teal Grp. Corp., Teal Group Predicts Worldwide UAV Market Will Total $91 Billion in Its 2014 UAV Market Profile and Forecast (July 17, 2014), www.tealgroup.com/index.php/about-teal-group-corporation/press-releases/118-2014-uav-press-release [https://perma.cc/33M9-U3FC].

pact the economy in excess of 10 billion euros per year—which will mostly be associated with the service sector.[9] However, while the potential to use drones is becoming realized, the wider international community is far from coordinated in its approach to regulate such usage. They even seem unsettled in defining a drone in the first instance, let alone where drones fit in existing legislation and governance systems. John Villasenor provided a simplistic definition that "a drone is an unmanned aircraft that can fly autonomously."[10] This alone is a statement of contention—taking the first part in isolation, what exactly is an unmanned aircraft? In reality, there exists an incredible range of shapes, sizes, and capabilities that characterize a drone.[11] The EU states that there are over 1,700 different types of drones produced by official manufacturers (with approximately one-third made in the EU).[12] Further, this number fails to account for the drones made by individual persons and by unregistered or unrecognized sources.

In defining "autonomously," Villasenor added that he meant, "without a human in control."[13] Yet, in his attempt to specify, this is now a far too simplistic definition.[14] And while further clarity can be given to size, weight, and shape—in other words, specifications—it is the human aspect of "control" that will largely be the disputed element going forward. Some potential issues (particularly in litigation) concern the degree of control and location of the person who ultimately needs to assume re-

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[9] *Unmanned Aircrafts*, EUR. COMM'N, ec.europa.eu/growth/sectors/aeronautics/rpas_en (last updated Oct. 23, 2017) [https://perma.cc/QR7Z-52MF].

[10] John Villasenor, *What Is a Drone, Anyway?*, SCI. AM. (Apr. 12, 2012), https://blogs.scientificamerican.com/guest-blog/what-is-a-drone-anyway/ [https://perma.cc/6GAC-T44X]. John Villasenor is a non-resident senior fellow at the Brookings Institution and a professor of electrical engineering at UCLA. His quote is taken from the Scientific American online platform.

[11] While drones come in a variety of formats, there are two broad categories: (1) fixed wing and (2) rotary wing. Most light drones are of the rotary-wing type, with four, six, or eight sets of rotors. A common format is the quadcopter, a helicopter that is lifted and propelled by four rotors. The quadcopter can be used to carry a camera, which may have a wireless data link to the ground. This would allow real-time surveillance to be carried out at minimum cost. Andrew Chapman, *Types of Drones: Multi-Rotor vs Fixed-Wing vs Single Rotor vs Hybrid VTOL*, AUSTRALIAN UAV (June 2016), https://www.auav.com/au/articles/drone-types/ [https://perma.cc/Z7SY-ECCM].

[12] European Commission Memo 14/259, Remotely Piloted Aviation Systems (RPAS) - Frequently Asked Questions (Apr. 8, 2014) [hereinafter Eur. Comm'n Memo 14/259].

[13] Villasenor, *supra* note 11.

[14] *Id.*

sponsibility for the drone's action, purpose, and, inevitably, consequences. As it currently stands, categorizing drones and determining responsibility are engulfed in a myriad of different opinions and perspectives—starting with what to call the "machine" in the first place! The list below provides commonly used words and abbreviations found in this article[15]:

- Drone—much-favored by the French; for example, see the French Directorate for Civil Aviation (DGAC);
- RPA/S (Remotely Piloted Aircraft or Remotely Piloted Aircraft System)—used mostly by International and National Aviation Agencies;
- UAS (Unmanned Aerial System)—still largely used by the United States and United Kingdom;
- UA (unmanned aircraft)—cited within EU (proposed) legislation; and
- UAV—mostly used as a generic reference (alongside drone) by the general population.

A. International Assistance

The Convention on International Civil Aviation (Chicago Convention) is applicable to the operations of civil aircraft,[16] but it is likely that the talks leading to it implementation did not envisage its application to today's drones. In fact, none of the above abbreviations or words can be found within the Chicago Convention.

Article 8 of the Chicago Convention titled "Pilotless aircraft" states: "No aircraft capable of being flown without a pilot shall be flown without a pilot over the territory of a contracting State without special authorization by that State and in accordance with the terms of such authorization."[17] In this regard, the statement is applicable to the over-flight of such a pilotless aircraft outside its own territory and within the territory of one of the other contracting States.

Article 8 goes on to identify that "[e]ach contracting State undertakes to insure that the flight of such aircraft without a pilot in regions open to civil aircraft shall be so controlled as to obvi-

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[15] When referring to websites and citing documents, this article usually uses the definition contained in the source.

[16] Convention on International Civil Aviation art. 3 para. (a), Dec. 7, 1944, 61 Stat. 1180, 15 U.N.T.S. 295 [hereinafter Chicago Convention].

[17] *Id.* art. 8.

ate danger to civil aircraft."[18] Therefore, the responsibilities for ensuring safe operations for all civilian aircraft from the dangers of such unmanned aircraft lie clearly upon each contracting State. This means, per Article 1, the Sovereignty element lies exclusively with each contracting State to ensure that any civil aircraft remains safe from the dangers that such unmanned craft could cause.[19] The reference to "insure"[20] is therefore one of assurance rather than indemnity or remuneration; nevertheless, if applied literally, this would add a completely different perspective to the picture of governance, and may serve as a different avenue to be explored regarding today's drones—however they are to be defined. This said, there remains some disagreement as to what "pilotless aircraft" actually covers, with its interpretation now extending to the realms of Remotely Piloted Aircraft Systems (RPAS)[21] within this definition.[22] The Global Air Transport Management Operational Concept (Doc 9854) states, "[a]n unmanned aerial vehicle is a pilotless aircraft, in the sense of Article 8 of the Convention on International Civil Aviation Organization (ICAO), which is flown without a pilot-in-command on-board and is either remotely and fully controlled from another place (ground, another aircraft, space) or programmed and fully autonomous."[23]

So conversely, perhaps this attempt to define "drone" is best approached by defining "aircraft" first—regardless of the position of the pilot. According to U.S. federal law, for instance, an aircraft is defined as "any contrivance invented, used, or de-

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[18] *Id.* (emphasis added).

[19] *Id.* art. 1.

[20] *Id.* art. 8.

[21] Even in this regard, there lies some dispute as to whether Unmanned Aircraft Systems (UASs) are one in the same. Within COM(2014) 207, it is stated that "RPAS form part of the wider category of Unmanned Aerial Systems (UAS)." Communication from the Commission to the European Parliament and the Council, *A New Era for Aviation: Opening the Aviation Market to the Civil Use of Remotely Piloted Aircraft Systems in a Safe and Sustainable Manner*, at 2, COM(2014) 207 final (Apr. 8, 2014) [hereinafter *A New Era for Aviation*]. It is further stated that UASs also include "aircraft that can be programmed to fly autonomously without the involvement of a pilot." *Id.*

[22] Eur. Comm'n Memo 14/259, *supra* note 13, at 1; *see also* Int'l Civil Aviation Org., Unmanned Aircraft Systems (UAS), at 11, Cir 328-AN/190 (2011) [hereinafter ICAO Unmanned Aircraft].

[23] Int'l Civil Aviation Org., Global Air Traffic Management Operational Concept, at Appendix B-6, Doc 9854-AN/458 (2005) [hereinafter ICAO Global Air Traffic]. This understanding of UAVs was later endorsed by the 35th Session of the ICAO Assembly.

signed to navigate, or fly in, the air."[24] The Federal Aviation Administration (FAA) defines "aircraft" very simply, as a "device that is used or intended to be used for flight in the air."[25] Professor Marshall, referring to the Chicago Convention, states that "[i]t is thus clear that the ICAO definitions of aircraft that are subject to its Articles, Annexes, and Supplementary Agreements include any man-made contrivance that is capable of sustained flight above the immediate surface level of the Earth."[26] Therefore an aircraft is "[a]ny machine that can derive support in the atmosphere from the reactions of the air."[27] Arguably, this definition also encompasses drones.

According to the EU, "The rules covering drones are currently set at UN level, by the International Civil Aviation Organisation (ICAO),"[28] adding that, in general, this extends to forbidding "unmanned aircraft to fly unless the national competent authorities issue a specific individual authorization."[29] As this paragraph alone shows, there remains a degree of contradiction, which has subsequently been translated into a failure to assume and ensure proper governance. In this period of ten years, while there have been some discussions concerning the need to have a framework in place to recognize the anticipated rise of drone numbers, developments have been noticeably slow.

It was on April 12, 2005, at the commencement of its 169th Session, when the Air Navigation Commission asked the Secretary General to begin consulting selected States and other international organizations regarding "present and foreseen international civil unmanned aerial vehicle (UAV) activities in civil airspace."[30] In a follow-up meeting held in Montreal (May 23–24, 2006),[31] it was decided that the ICAO was not the most appropriate organization to spearhead the development of technical and performance specifications for UAVs; nevertheless it was recognized that the ICAO did have a role to play by acting as

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[24] 49 U.S.C. § 40102(a)(6) (2012).

[25] 14 C.F.R. § 1.1 (2016).

[26] Douglas M. Marshall, *International Regulation of Unmanned Aircraft Operations in Offshore and International Airspace*, 8 ISSUES AVIATION L. & POL'Y 87, 93 (2008).

[27] IACO Unmanned Aircraft, *supra* note 23, at ix. On November 6, 1967, the International Civil Aviation Organization issued a new definition: Aircraft is "[a]ny 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." *Id.*

[28] Eur. Comm'n Memo 14/259, *supra* note 13, at 2.

[29] COM(2014) 207 final, *supra* note 22 at 4.

[30] ICAO Unmanned Aircraft, *supra* note 23 at 1.

[31] *Id.* (deemed the first informal ICAO meeting on UAVs).

a "focal point."[32] Also stressed was a need for a coordinated regulatory framework based upon global interoperability.[33] However, the ICAO identified further limitations of governance, particularly regarding "model aircraft," which are intended for recreation and fall outside the provisions of the Chicago Convention.[34] The difficulty here undoubtedly remains the fine line between the hobbyist's recreational drones and how they fit within a framework, particularly given the exclusion that already has existed for the model aircraft and the potential risk that still exists in terms of their operations. For instance, will limitations be placed on non-commercial purchases of drones? Will categorization be related to the drone's size, purpose, or usage? Will "remotely operated" actually be defined (in terms of defining where the operator should be located—relative to the device and in what circumstances)? And ultimately, how will a framework and governance system be applied? In essence, there are many questions still to be answered, and even to be raised, as to how a framework will work and be applied.

With the growing numbers of drones (since 2005), the perceived and possible risks have also increased, not only to civil aviation operations but also to the greater society. The stance initially taken by the ICAO may have changed somewhat; it is now stepping forward to expand its portfolio to include unmanned aircraft or RPAS, officially formalizing its efforts in November 2014 with the creation of the RPAS Panel. [35] While there has been more direction from the ICAO than was first intentionally or unintentionally implied—such as its recent *Manual on Remotely Piloted Aircraft Systems*[36]—the ICAO has nevertheless struggled to keep pace with the technological advancements and demands of this extending sector of the aviation industry. In fact, producing the guidance before the standards and recommended practices (SARPs) was unprecedented. But importantly, it was necessary because the industry was developing so swiftly.[37] Stephen Creamer, the director of the ICAO's Air Navi-

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[32] *Id.*

[33] *Id.*

[34] *Id.*

[35] Int'l Civil Aviation Org., Manual on Remotely Piloted Aircraft Systems (RPAS), at 1-3, Doc 10019-AN/507 (2015) [hereinafter ICAO Remote Pilot Manual].

[36] *Id.* (produced by the former ICAO UAS Study Group (now replaced by the ICAO RPAS Panel)).

[37] Dee Ann Divis, *ICAO Tackles International Standards for Unmanned Aircraft*, INSIDE UNMANNED SYS., http://insideunmannedsystems.com/icao-tackles-interna

gation Bureau, which leads the RPAS, reinforced this when he expressed the need for a new way of addressing development and cooperation, including the lessons learned from civil aviation.[38] Creamer explained that "relatively simple standards" had taken the ICAO "25 years to develop and implement across the globe," adding that "we don't have that kind of time with RPAS because the technology simply has outpaced us."[39] In just over the ten-year period since the "present and foreseen" situations and potential were first broached and discussed at an international level, Member States have continued to apply differing requirements and obligations on operators. This fact is emphasized by the UAS Toolkit (hosted by the ICAO), which only too clearly highlights the differences concerning requirements relating to UASs on a country-by-country basis.[40] This includes within the EU, where the twenty-eight Member States have, for the most part, responded from a unilateral perspective.

III. CHALLENGES AND OPPORTUNITIES—A NEW, "RISKY" ERA FOR AVIATION

The 2014 EU publication discussed earlier addresses the potential for civil use of RPAS, clearly recognizing the worth of this adapting and evolving transport mode in terms of new jobs and growth.[41] It is clear that technological expertise in the civil drones (or RPAS) sector is crucial to Europe's ability to compete in the aeronautics field[42]—which, according to some estimates, could compose ten percent of the aviation market in the next ten years.[43]

On the whole, it is largely recognized that transport modes will become more automated, which includes the evolution of the civil aviation sector. Drones certainly have various roles to play—for example, in inspections of critical infrastructure, such as rail tracks or power grids, or in emergency relief and other disaster situations, such as fighting forest fires, surveying devel-

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tional-standards-for-unmanned-aircraft/ (last visited Oct. 24, 2017) [https://perma.cc/3LL5-TYC9].

[38] *Id.*

[39] *Id.*; *see Integrating RPAS into Airspace*, 70 ICAO J. 4, 4 (2015).

[40] *ICAO Launches Unmanned Aircraft Systems Toolkit*, ICAO: NEWS RELEASES (Dec. 13, 2016), http://www.icao.int/Newsroom/Pages/icao-launches-unmanned-aircraft-systems-toolkit.aspx [https://perma.cc/6T4P-KSZ3].

[41] *A New Era for Aviation*, *supra* note 22, at 2–3.

[42] *Id.*

[43] Eur. Comm'n Memo 14/259, *supra* note 13, at 2.

oping situations, and providing necessary aid.[44] There is no doubt that drones are capable of saving lives. Indeed, the worth of such drones is already being recognized.[45] For example, drones can prevent crimes (such as poaching in Kenya), [46] protect crops[47] and borders,[48] and provide humanitarian aid.[49] Opportunities are immense and not even fully known, realized, and even explored with respect to societal needs and requirements. However, there remain concerns of public acceptance of what is seen as a futuristic device (though it exists today) in relation to safety, security, privacy, and the related aspect of liability of unmanned aircraft within the EU (and elsewhere). After all, the drone is often portrayed in science fiction films as a predator and aggressor—a factor that has no doubt been amplified by the frequently publicized military use of such technologies, remotely controlled and used in foreign zones to take lives and destroy property.

Likewise, there is no doubt that challenges remain, and that now is the time to review all aspects of new, emerging risks related to this nascent technology. Such action is essential in order to develop an appropriate governance system to protect, monitor, and enforce suitable drone use where necessary. While consideration is given to the commercial drone industry and

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[44] Testimony – Statement of Michael G. Whitaker, FED. AVIATION ADMIN. (Oct. 7, 2015) [hereinafter Whitaker Testimony], https://www.faa.gov/news/testimony/news_story.cfm?newsid=19558 [https://perma.cc/9P3X-K38E].

[45] *See id.*

[46] Gitonga Njeru, *Kenya to Deploy Drones in All National Parks in Bid to Tackle Poaching*, THE GUARDIAN (Apr. 25, 2014, 6:49 AM), https://www.theguardian.com/environment/2014/apr/25/kenya-drones-national-parks-poaching [https://perma.cc/C2P9-AXKJ].

[47] In Japan, drones are used to spray approximately forty percent of the rice crop, with over 2,400 drones estimated to now in service. *Commercial UAV Applications in Asia: Industry Report*, TERRAPINN 9 (Aug. 8, 2017) https://www.terrapinn.com/template/Live/documents/7036/15870#sthash.KjR5wlJF.dpbs; *see also* Kenzo Nonami, *Prospect and Recent Research & Development for Civil Use Autonomous Unmanned Aircraft as UAV and MAV*, 1 J. SYS. DESIGN & DYNAMICS 120, 120–28 (2007).

[48] For example, use of drones to patrol the U.S. borders with Mexico and Canada has significantly contributed to border security. Bob Orr, *Predator Drones Shift from Battlefield to Border*, CBS NEWS (Nov. 9, 2010, 6:04 PM), https://www.cbsnews.com/news/predator-drones-shift-from-battlefield-to-border/ [https://perma.cc/8XSM-MZU3].

[49] *See* Denise Soesilo, *How Drones Can Help in Humanitarian Crises*, EUR. COMM'N, http://ec.europa.eu/echo/field-blogs/stories/how-drones-can-help-humanitarian-crises_en (last updated Nov. 21, 2016) [https://perma.cc/YN9J-C46H] (discussing the EU's use of drones for humanitarian aid).

creating a suitable framework in place to cover that new sector of growth, "the demand for recreational drones has exceeded anyone's expectations."[50]

One key aspect going forward will be preventing the means for abuse of all systems and having the mechanisms to take action—whether this is accomplished through compensation, enforcement, or prohibition. In 2015, Lloyd's of London[51] published a report on the associated threats of drones in terms of not having a strong regulatory framework in place. It identified the need, from an insurance perspective, to have coordinated international standards and clarity on third-party liability, alongside other insurance needs relating to use.[52] In the coming years, there is little doubt that we will see a new area of litigation relating to a whole spectrum of claims and areas involving civil drones—the impact of which, in terms of development and contribution, has been compared to that of the Internet.[53] However, there are warnings to heed from this comparison regarding abuse and the ability to effectively regulate a sector that itself lacks a suitable governance framework. There are also lessons to be learned in terms of being prepared from both safety and security perspectives. There can be little disputing the potential for disaster due to security breaches and failure to ensure a high level of safety. History has clearly taught us lessons regarding abuse of aircraft in the wrong hands.[54] One essential factor in developing an appropriate framework is to recognize not only the threats, risks, and challenges that exist today, but also those that will exist and intensify tomorrow.

A. Accidents, Incidents (Safety, Security) and Drones: Framing the Future

There is ultimately a fine line between the definitions of safety and security. Safety can be perceived as *including* the concept of security from the stance of ensuring the absence of danger that

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[50] Whitaker Testimony, *supra* note 45.

[51] Lloyd's of London is recognized as the world's only specialist insurance and reinsurance market with extensive experience in the aviation market.

[52] *Drones Take Flight: Key Issues for Insurance*, Lloyd's 3 (2015), https://www.lloyds.com/news-and-insight/risk-insight/library/technology/drones-take-flight [https://perma.cc/PMH9-C4U8].

[53] Eur. Comm'n Memo 14/259, *supra* note 13, at 2.

[54] Sarah Jane Fox, *"To Practise Justice and Right"—International Aviation Liability: Have Lessons Been Learnt?*, 5 Int'l J. Pub. Law & Pol'y 162, 162–82 (2015) [hereinafter Fox, *International Aviation Liability*].

would compromise human life.[55] Taking these words collectively, passengers expect to be safe and secure when flying in aircraft, although it is argued that they accept a level of voluntary risk;[56] certainly, when undertaking their day-to-day lives on the ground, there is not an expectation to be hit by something from the sky. That said, very few things are one hundred percent guaranteed safe, and risk has now become an accepted factor of our lives. Modes of transport have always had a high element of risk, although it is recognized that "[a]irline services involving the movement of scheduled passengers has become one of the safest modes of transport."[57] However, this had not always been the case, and it is far from consistent across the globe.[58]

Although "risk" has been defined in various ways, an accepted view is the probability of an occurrence concerning a hazardous event (or events) during a given timeframe.[59] The probability of accidents and incidents involving drones is for the most part unknown and unpredictable due to the fact that they are not operating *en masse* yet. However, the sheer fact that they will be in the sky does present risks.

That said, there are other variable factors to take into account—use, location (built-up areas or other hazards, such as physical features, whether mobile or static), the skills and location of the operator, any material or cargo carried, the time of day, and reliability and maintenance of the device, including the

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[55] Within the Spanish language, the word "seguridad" is used in terms of safety and security. *Seguridad*, MERRIAM-WEBSTER'S SPANISH-ENGLISH DICTIONARY (2003).

[56] Sarah Fox, *Safety and Security: The Influence of 9/11 to the EU Framework for Air Carriers and Aircraft Operators*, 45 RES. TRANS. ECON. 24, 26 (2014) [hereinafter Fox, *Safety and Security*]; *see also* Fedja Netjasov & Milan Janic, *A Review of Research on Risk and Safety Modelling in Civil Aviation*, 14 J. AIR TRANSPORT MGMT. 213, 213–20 (2008); Milan Janic, *An Assessment of Risk and Safety in Civil Aviation*, 6 J. AIR TRANSPORT MGMT. 43, 43 (2000).

[57] Fox, *Safety and Security*, *supra* note 57, at 24 (citing data from the FAA, the NTSB, and the ICAO, among others. *Data & Research: Safety*, FED. AVIATION ADMIN., http://www.faa.gov/data_research/safety (last visited Oct. 24, 2017); NAT'L TRANSP. SAFETY BD., http://www.ntsb.gov (last visited Oct. 24, 2017); INT'L CIV. AVIATION ORG., http://www.icao.int/safety/Pages/default.aspx (last visited Oct. 24, 2017)); *see also Safety Analysis*, EUROPEAN AVIATION SAFETY AGENCY, easa.europa.eu/safety-and-research/safety-analysis-and- research.php (last visited Oct. 24, 2017); Clinton V. Oster Jr. et al., *Analyzing Aviation Safety: Problems, Challenges, Opportunities*, 43 RES. TRANS. ECON. 148, 163 (2013).

[58] Sarah Jane Fox, *Aviation: A Risky Business. Green and Level Playing Fields? A Paradox of Virtues 'Dumping'—Anti-Competitiveness!*, 5 INT'L J. PUB. L. & POL'Y 333, 336–38 (2016) [hereinafter Fox, *Aviation: A Risky Business*].

[59] Janic, *supra* note 57, at 43.

ability to take collision-avoiding action, etc. As with civil aviation, the human element will be one crucial aspect going forward—the ability to conduct safe and orderly operations will be a critical factor in determining the rate of safety incidents and accidents.

There is also the issues with the associated terminology: Will they just operate or pilot the RPAS/UAVs in some circumstances, albeit, remotely from the ground? What level of training will be required? Will this be related to the use or size of the drone? Is the drone itself to be classified as a transportation vehicle? Or will this again depend upon the use—commercial purposes, which could cover the aspects of both transportation and service (including for delivery), or leisure and hobby pursuits? The 2014 EU Communications paper[60] certainly recognized the contribution drones will make within an integrated logistical transport chain, but classification is also required in terms of operational needs.

Arguably, drones could have more commonality with a road transport system than the current aviation air travel system. Going forward, the automation of the autonomous road vehicular system will also require the same thought and consideration as to the licensing and operation of such vehicles and systems, including in terms of accountability. And while there are undoubtedly lessons to be learned from the manned aviation sector, it is also suggested that there are, and will be, similarities and lessons to be learned from other transport modes, particularly road transport (a point to be returned to later in this article).

There is no doubt that a framework should clearly identify all of these aspects in order to recognize and minimize the potential for risks, such as accidents or incidents, and indeed, litigation. It will also need to cater for the interaction of RPAS with manned aircraft, from both a safety and security perspective.[61]

In 2015, the Riga Declaration (on drones) also stated the need and worth of a framework, identifying that the "basic regulatory framework should be put in place without delay, in order to help the private sector to take well-informed investment decisions, and to provide a basic set of rules for the many operators who are increasingly eager to begin providing services."[62]

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[60] *A New Era for Aviation, supra* note 22, at 2.

[61] Note: The sharing of airspace remains outside of the scope of this article.

[62] *Riga Declaration on Remotely Piloted Aircraft (Drones): "Framing the Future Of Aviation"*, § 1 (Mar. 6, 2015) [hereinafter *Riga Declaration*].

The Riga Declaration added that drones, "must not be less safe than is accepted from civil aviation in general. . . . The way safety is regulated must be proportional to the operational risk involved."[63] Safety threats present themselves clearly to people on the ground as well as those in the sky. The following are just a few examples of such safety threats:

(1) April 2014: An Australian triathlete sustained minor head injuries after a drone fell from the sky.[64]

(2) November 2015: An eighteen-month-old boy lost an eye after being hit by a drone flown by a family friend.[65]

(3) March 2016: A drone came within approximately 200 feet of a Lufthansa Airbus A380 approaching Los Angeles International Airport.[66]

These incidents, together with a growing number of reports, only too clearly shows the potential risk (and risk of disaster) to manned aircraft. The number of close encounters between drones and manned aircraft (regardless of whether deemed accidental safety events or security incidents) will no doubt increase. Therefore, regardless of the size and use of the drone, any framework must cater for such recognition.

From a security perspective, drones will pose a security threat no matter the operator's intentions.[67] We are constantly seeing all transport modes being targeted, and it should therefore be accepted that this is a mode that will inevitably be utilized as a weapon; indeed, military use has clearly shown this to be the case. Criminals and terrorists could clearly utilize their own UAVs or drones, which could carry explosives or other airborne

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[63] *Id.* at §2.

[64] *Australian Triathlete Injured After Drone Crash*, BBC NEWS (Apr. 7, 2014), http://m.bbc.co.uk/news/technology-26921504 [https://perma.cc/W94L-BSS2].

[65] *Toddler's Eyeball Sliced in Half by Drone Propeller*, BBC NEWS (Nov. 26, 2015), http://www.bbc.co.uk/news/uk-england-hereford-worcester-34936739 [https://perma.cc/3XRG-UTH2].

[66] Joseph Serna, *Lufthansa Jet and Drone Nearly Collide Near LAX*, L.A. TIMES (Mar. 19, 2016, 8:57 AM), http://www.latimes.com/local/lanow/la-me-ln-drone-near-miss-lax-20160318-story.html [https://perma.cc/LD58-WJTM].

[67] For example, in 2015, a drone reportedly crashed into a prison wall while attempting to deliver drugs, phones, and weapons. *Jail Bird: Drone Crashes into Prison Wall: Attempting to Deliver Drugs, Phone & Weapons*, RT (Mar. 23, 2015, 3:16 PM), https://www.rt.com/uk/243245-drone-crash-prison-drugs/ [https://perma.cc/YZR5-PL9D].

viruses, diseases, etc., and in essence, they could be used in (terrorist) warfare, within a home country to attack targets on the ground and flying low in the air.

There is also a cybersecurity threat, whereby terrorists and other criminals can block the navigation or communication system of someone else's UAV, thus taking control of it (or simply ending control of it). The Lloyd's of London report highlighted that the unencrypted data links for command, control, and navigation that are used by most civilian drone owners make the drones especially susceptible to jamming, interception, and manipulation. [68] It was further stated that research highlighted the ease with which drones can be attacked in this manner, but at this time, such vulnerability was not being factored in by insurers' assessment of drone risks, and hence, government developments.[69] It was added that cybersecurity will be, and indeed must be, an increasingly important consideration for commercial drone operations.[70]

Such possibilities, while frightening, are both potential and realistic, and are factors that an appropriate framework must consider. Cyberthreats to manned systems are today's challenge, which will only increase alongside the threats posed by and to drones.[71] Safety and security for manned operation remains of paramount importance within the strategic objectives of the ICAO and the EU aviation policy, and going forward, it will be necessary to see this translated and applied to the UAV market. The protection of society must be the primary concern—above the commercial worth of the new drone industry.

IV. THE EU

The Treaty of Rome (establishing the European Economic Community) was not signed until March 25, 1957, and entered into force on January 1, 1958.[72] This means that the European Community did not exist until virtually ten years after the establishment of the ICAO. Membership to what is now the EU has grown to currently twenty-eight Member States, all of which are members of the United Nations in their own right. The EU (as a

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[68] *Drones Take Flight: Key Issues for Insurance*, *supra* note 53, at 12.

[69] *Id.*

[70] *Id.*

[71] Sarah Jane Fox, *Flying Challenges for the Future: Aviation Preparedness – in the Face of Cyber-Terrorism*, 9 J. TRANSP. SEC. 191, 191–93 (2016) (portion delivered to the United Nations in Geneva, May 2016).

[72] Treaty of Rome, Mar. 25, 1957, 298 U.N.T.S. 140.

body) only has observer status at the United Nations, and has since 1974. Even then the position of the EU remains questionable, because it has not managed to obtain Community membership of the ICAO as a single entity, given that Article 92 of the Chicago Convention states that it is only open to States. Nevertheless, the EU has shown that, by taking a united approach, it has been able to achieve significant success in terms of aviation, particularly internally. In many ways, it has demonstrated to all ICAO members and the aviation community at large what can be achieved by a collective approach in a relatively short period of time.

A. The EU Approach

Until 1987, the civil aviation market in Europe was protected and fragmented, with differing practices and standards across the then-Member States, and in order to create a unitary market, a succession of packages had to be introduced.[73] The 2008 Regulation, (EC) 1008/2008,[74] established common rules for the operation of air services in the Community (the Air Service Regulation).

Through a steady stream of legislative approaches, the EU created a single aviation market that has encompassed virtually the entire spectrum of civil aviation, including airports (ground handling, slots, air traffic management, etc.), environmental issues, competition rules (including state aid), personnel, social issues, and passenger rights. However, the events of September 11, 2001, highlighted that more unity was still needed within the EU regarding both safety and security measures.[75] This led to the EU taking swift action through revisions, regarding both preventative measures and related legislation, which resulted in the European Commission making a legislative proposal to bring aviation security under the EU's regulatory area of competence. This led to the adoption of a framework Regulation (Reg-

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[73] Fox, *Safety and Security*, *supra* note 57, at 28; *see also* Sarah Fox, *Single European Skies: Functional Airspace Blocks – Delays and Responses*, 41 Air & Space L. 201, 205–10 (2016).

[74] Council Regulation (EC) No. 300/2008 of 11 March 2008, 2008 O.J. (L 97/72) [hereinafter Reg. No. 300/2008]. This Regulation is on common rules in the field of civil aviation security and repealing and replaced the Third Package.

[75] Fox, *Safety and Security*, *supra* note 57, at 25.

ulation EC 2320/2002)[76] as well as sweeping revisions to the insurance protection and compensation mechanism. Regulation (EC) 785/2004[77] established minimum insurance requirements for air carriers and aircraft operators regarding passengers, baggage, cargo, and third parties, while also recognizing the need to partly address the reduced insurance supply for the risks of war and terrorism.[78] In this regard, there are lessons to be learned and applied to the use of civil drones and to recognize the potential for drones to be equally capable of causing devastation.

Later, the Treaty of Lisbon[79] clearly defined that the transport chapter (as within Articles 90 through 100 of the Treaty on the Functioning of the European Union (TFEU))[80] remains a shared competence with Member States[81] (and reference is made to the fact that the EU has competence regarding a framework of a common transport policy, Article 90, as stated within Title VI of TFEU).[82] This clearly provides the mechanism, at an EU level, for a framework to be developed that addresses the related operational issues of the drones collectively among the Member States.

That said, the current position regarding RPAS in the EU is, arguably, where the civil aviation market was in the early 1980s in terms of being fragmented, unregulated, or both.

V. APPLYING LESSONS LEARNED TO THE RPA AND UNMANNED AVIATION (DRONE) SECTOR

There are various lessons to learn from the development of the manned EU aviation sector—including the length of time after the Rome Treaties for it to both get recognized and then

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[76] Council Regulation (EC) No. 2320/2002 of 16 December 2002, 2002 O.J. (L 355/1) (Establishing Common Rules in the Field of Civil Aviation Security) [hereinafter Reg. No. 2320/2002].

[77] Council Regulation (EC) No. 785/2004 of 21 April 2004, 2004 O.J. (L 138/1) (on Insurance Requirements for Air Carriers and Aircraft Operators) [hereinafter Reg. No. 785/2004]. The Regulation was signed on April 21, 2004, but it did not enter into force until April 30, 2005.

[78] Fox, *Safety and Security*, *supra* note 57, at 30.

[79] Treaty of Lisbon Amending the Treaty on European Union and the Treaty Establishing the European Community, Dec. 13, 2007, 2007 O.J. (C 306) [hereinafter Treaty of Lisbon].

[80] Consolidated Version of the Treaty on the Functioning of the European Union art. 90-100, Oct. 26, 2012, 2012 O.J. (C 326) 47 [hereinafter TFEU].

[81] Treaty of Lisbon, *supra* note 79, at 47; TFEU, *supra* note 80, art. 4.

[82] Treaty of Lisbon, *supra* note 79, at 47.

evolve into a framework.[83] But applying some of the existing provisions may not be the most logical approach with the drone sector, and so it is necessary to recognize successes while adapting these to the different and newer challenges that UAVs bring. Key aspects to factor in relate to safety and security provisions (which remain the main focus of this paper). While safety standards need to be in place, it is recognized that accidents and incidents will occur, so there is a need to ensure that compensation is available to victims (particularly regarding third-party liability and insurance).[84] This must remain a priority of any framework.

A. Safety And Insurance

1. Regulation (EC)785/2004 and the Evolving Role of the European Aviation Safety Agency (EASA)

The scope of Regulation (EC) 785/2004 is detailed within Article 2 encompassing "all air carriers and to all aircraft operators flying within, into, out of, or over the territory of a Member State to which the Treaty applies."[85] In this regard, it seems unlikely the Regulation initially intended to cover commercial or non-commercial drones, regardless of size.

Clarity is provided in Article 2(2), however, where specific exclusions exist regarding insurance requirements:

(a) State aircraft as referred to in Article 3(b) of the Convention on International Civil Aviation, signed at Chicago on 7 December 1944;
(b) model aircraft with an MTOM of less than 20 kg;
(c) foot-launched flying machines (including powered paragliders and hang gliders);
(d) captive balloons;
(e) kites;
(f) parachutes (including parascending parachutes);
(g) aircraft, including gliders, with a MTOM of less than 500 kg, and microlights, which:
- are used for non-commercial purposes, or
- are used for local flight instruction which does not entail the crossing of international borders.[86]

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[83] Fox, *Safety and Security*, *supra* note 57, at 28–29.

[84] *See* Fox, *International Aviation Liability*, *supra* note 55, at 162, 164; Fox, *Safety and Security*, *supra* note 57, at 24–33.

[85] Reg. No. 785/2004, *supra* note 77, at 3.

[86] *Id.*

Article 3 provides further assistance, in particular defining:

(a) 'air carrier' means an air transport undertaking with a valid operating licence;
(b) 'Community air carrier' means an air carrier with a valid operating licence granted by a Member State in accordance with Regulation (EEC) No 2407/92;
(c) 'aircraft operator' means the person or entity, not being an air carrier, who has continual effective disposal of the use or operation of the aircraft; the natural or legal person in whose name the aircraft is registered shall be presumed to be the operator, unless that person can prove that another person is the operator;
(d) 'flight' means: . . .
  - with regard to third parties, the use of an aircraft from the moment when power is applied to its engines for the purpose of taxiing or actual take-off until the moment when it is on the surface and its engines have come to a complete stop; additionally, it shall mean the moving of an aircraft by towing and push-back vehicles or by powers which are typical for the drive and the lift of aircraft, particularly air streams; . . .
(h) 'third party' means any legal or natural person, excluding passengers and on-duty members of both the flight crew and the cabin crew;
(i) 'commercial operation' means an operation for remuneration and/or hire.[87]

The coverage of Regulation (EC) 785/2004 includes air carriers and aircraft operators obligations regarding passengers, baggage, cargo, and third parties. A review by the European Commission of the effectiveness and application of the Regulation stated that it "imposes minimum insurance obligations on air carriers and *non-commercial* aircraft operators in respect of liability for passengers, baggage, cargo and third parties."[88]

Applied to the operation of drones (carrying zero passengers), these provisions are only relevant to any cargo carried and to third parties. However, it has been questioned as to whether third-party liability legislation is equally applicable to unmanned aircraft as it is to manned aircraft.[89] And while there may be a

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[87] *Id.* at 3–4.

[88] Communication from the Commission to the European Parliament and the Council, *Insurance Requirements for Aircraft Operators in the EU – A Report on the Operation of Regulation 785/2004*, at 2, COM(2008) 216 final (Apr. 24, 2008) (emphasis added).

[89] As also identified within Eur. Comm'n Memo 14/259, *supra* note 13, at 4.

difference of opinion, it has been interpreted that Regulation 785/2004 describes the insurance obligations for all aircraft operators, which necessitates equally that all "commercial" RPAS operations purchase third-party liability insurance.[90] Nonetheless, it has also been identified that there is no uniformity in Europe regarding the application of third-party liability to aviation.[91] While some Member States follow a strict liability regime (where the aviation company is automatically liable for any damage without the need to attribute fault or blame), other Member States carry out a fault-based analysis on a case-by-case basis.[92] Therefore, it is likely that a similar, misaligned approach will also be carried through to the RPAS market.[93] Additionally, while the Regulation specifies limits for the minimum amount of third-party liability insurance required (based on the mass of the aircraft on take-off as specified in the certificate of airworthiness),[94] the distinction between commercial, model, and leisure users, upon which the rules in EU Regulation 785/2004 on liability are based, is far from defined. Arguably, the interpretation remains limited by the lack of guidance and the rapid developments of the RPAS market, which has necessitated a commonsense approach to ensure that some degree of responsibility and liability is in place for their operations.

Likewise, the role of the EASA is currently limited regarding RPAS. The primary function of EASA is to ensure safety within the EU—this being cited as the main reason why it was established in 2003.[95] Regulations (EC) No 216/2008 (also called the EASA Basic Regulation) and (EC) No 1108/2009, amending the

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[90] *Explanatory Note: Prototype Commission Regulation on Unmanned Aircraft Operations*, EASA 1, 53–54 (Aug. 22, 2016) [hereinafter *EASA Explanatory Note*], https://www.easa.europa.eu/system/files/dfu/Explanatory%20Note%20for%20the%20UAS%20Prototype%20regulation%20final.pdf; *see* EUROPEAN UNION COMMITTEE, CIVILIAN USE OF DRONES IN THE EU, 2014–15, HL 122, at 53 (UK).

[91] Steer Davies Gleave, *Study on the Third-Party Liability and Insurance Requirements of Remotely Piloted Aircraft Systems (RPAS): Final Report*, at 1 (2014), http://ec.europa.eu/DocsRoom/documents/7661 [https://perma.cc/EZ2J-V4SX].

[92] *Id.*

[93] *Id.* at 15; *see also* Fox, *Safety and Security*, *supra* note 57.

[94] Reg. No. 785/2004, *supra* note 77, at 4–5. For example, for RPAS weighing less than 500kg, the minimum cover required is 750,000 SDR (0.75 million Special Drawing Rights), which is approximately _660,000.

[95] Council Regulation (EC) No. 1592/2002 of 15 July 2002, art. 2, 2002 O.J. (L 240/1) [hereinafter Reg. No. 1592/2002]. On July 15, 2002, the European Parliament and the Council of the European Union adopted Regulation (EC) No. 1592/2002 establishing common rules for the EU in the field of civil aviation and creating a new European Aviation Safety Agency (EASA).

former, have seen the current scope of EASA's development and expansion over the period of time since its formulation.[96] Presently, there is a further proposal to revise the remit of the Agency once again.[97] The reasons identified for these revisions, as within the proposal, are not only aviation safety but also the European Commission priorities of cultivating jobs leading to growth, "developing the internal market and strengthening Europe's role as a global actor."[98] This initiative's aims are therefore linked to the commercial competitiveness of the European aviation industry, including aeronautical manufacturing and technological innovation.[99] One key issue shown is the need to "create an effective regulatory framework for the integration of new business models and emerging technologies."[100] It is fervently identified that this initiative aims at the creation of a European Union framework for safe integration of unmanned aircraft within the European airspace.[101] This naturally links into the overarching and revised European Aviation Strategy, within which there is a stated need to revise Regulation (EC) No 216/2008, specifically citing the introduction of provisions on drones.[102]

In addition to safety, it is identified within the EASA proposal that drone "operators should be in a position to use the same unmanned aircraft and the same operating requirements with the same pilot at different places in the Union to develop their businesses." [103] Therefore, the need remains for consistency and common rules within the EU internal market, which, after all, has always been the primary reason for the developing Commu-

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[96] Council Regulation (EC) No. 216/2008 of 20 February 2008, 2008 O.J. (L 79/1) [hereinafter Reg. No. 216/2008]; Council Regulation (EC) No. 1108/2009 of 21 October 2009, 2009 O.J. (L 309/51) [hereinafter Reg. No. 1108/2009].

[97] *Proposal for a Regulation of the European Parliament and of the Council on Common Rules in the Field of Civil Aviation and Establishing a European Union Aviation Safety Agency, and Repealing Regulation (EC) No 216/2008 of the European Parliament and of the Council*, COM(2015) 613 final (Dec. 7, 2015) [hereinafter COM(2015) 613 final].

[98] *Id.* at 2.

[99] *Id.*

[100] *Id.*

[101] *Id.*

[102] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, *An Aviation Strategy for Europe*, at 13, COM(2015) 598 final (Dec. 7, 2015).

[103] COM(2015) 613 final, *supra* note 97, at 4.

nities.[104] However, subsidiarity is also identified as a key consideration, whereby "Member State authorities will carry out local risk assessments and decide which airspace shall be open or closed to unmanned aircraft operations, and under which conditions."[105] It is therefore recognized that most light unmanned aircraft operations will retain a local element, meaning the local authorities should assess the level of risk.[106]

In parallel to the proposal to see the role of EASA amended, a "Prototype" Commission Regulation on Unmanned Aircraft Operations has also been published.[107] It reiterates that while Regulation (EC) 785/2004 excludes "model aircraft" below 20 kilograms for the minimum insurance requirements, it does remain "applicable to an unmanned aircraft not qualifying as 'model aircraft.'"[108] That said, the explanatory note clearly identifies that insurance falls outside the scope of the EASA remit, although the proposal makes reference to a product legislation framework (and linked product liability) alongside a risk-impact mechanism relating to the impact by a UAV on the ground.[109] In this manner, a risk-centric approach is utilized to define the relationship between the kind or category of UA and the possible injury suffered by an "unprotected human hit by the UA."[110] This is an interesting statement to include, not least because it implies the need to conversely be protected from UAVs by some means. That said, determining risk is based on variable methods of "operation centric, proportionate, risk- and performance-based regulatory framework[s]."[111] To this aim, an injury scale is proposed and various weights are cited within the Prototype Regulation, which is also used to determine categories and injuries.[112] Risk can also be variable depending upon whether there is a line-of-sight operation or more remote control.[113] As it currently stands, unmanned drones, which are automatically

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[104] *Id.*

[105] *Id.*

[106] *Id.*

[107] *EASA Explanatory Note, supra* note 90.

[108] *Id.* at 6.

[109] *Id.* at 11.

[110] *Id.*

[111] *Id.* at 14; *see also Civil Drones (Unmanned Aircraft)*, EASA, https://www.easa.europa.eu/easa-and-you/civil-drones-rpas (last visited Oct. 24, 2017) [https://perma.cc/EP62-TSHN].

[112] *EASA Explanatory Note, supra* note 90, at 15.

[113] *Id.* at 10.

programed and unpiloted (even remotely), are still unauthorized for use by either ICAO or EU rules.[114]

The aspects of weight and liability will no doubt continue to linger on for RPAs, much in the same way they have for manned aircraft. This becomes even more relevant since it is predicted that small drones weighing less than fifty-five pounds (twenty-five kilograms)—including payloads—and which can be controlled remotely, will particularly experience growth over the coming years. Presently, the EU does not regulate the civilian use of an RPA with a mass of 150 kilograms or less.[115] This is because Regulation 216/2008 currently covers only aircraft whose mass is above that size.[116] The proposal to repeal and replace the current Regulation would significantly change this. In the meantime, RPAs with a mass of 150 kilograms or less remain subject to national rules adopted by the EU Member States. In other words, EASA would see an increase of its purview to include RPAS with a mass below 150 kilograms.

2. Rome Convention: Comparison with Regulation (EC) 785/2004

Similar to Regulation 785/2004, the Rome Convention states that liability for third party damage belongs to the operator of the aircraft, and does not require proof of the operator's intent or negligence.[117] Pursuant to Article 1 of the Convention, "Any person who suffers damage on the surface shall, upon proof only that the damage was caused by an aircraft in flight . . . be entitled to compensation."[118] Once again, the definition of "aircraft" is missing, but from an international perspective, it is has been argued that the 1952 Rome Convention equally applies to drones. However, it must be recognized that it was written long before today's usage of drones was anticipated. And it has further limitations in terms of coverage, specifically that the scope of the Rome Convention is essentially limited to certain international flights because it governs only ground damage "caused in the territory of a Contracting State by an aircraft registered in the territory of another Contracting State."[119] This means that when damage is caused by an aircraft registered in the State

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[114] Eur. Comm'n Memo 14/259, *supra* note 13, at 1.

[115] Reg. No. 216/2008, *supra* note 96, at Annex II.

[116] *Id.*

[117] Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface art. 2, 6, Oct. 7, 1952, 310 U.N.T.S. 181 [hereinafter Rome Convention].

[118] *Id.* art. 1.

[119] *Id.* art. 23.

where the damage occurred, national law applies (and for the EU, regional direction is provided by Regulation 785/2004). Later, the 1978 Montreal Protocol[120] widened the liability limits from the Rome Convention by adding when the damage is: "caused in the territory of a Contracting State . . . by an aircraft, whatever its registration may be, the operator of which has his principal place of business or, if he has no such place of business, his permanent residence in another Contracting State."[121]

Similar to the EU Regulation, the Rome Convention also provides categories for third party liability as determined by the stated "maximum take off weight" (MTOW).[122] However, there is a noticeably different banding system applied within the latter. In any event, as is a clear disadvantage with international conventions, the Rome Convention has not achieved widespread acceptance. With only forty-nine ratifications, the Convention is applicable in relatively few countries.[123] The 1978 Montreal Protocol achieved even less acceptance, having been ratified by only twelve countries, none of which are European countries. Therefore, within Europe, the Montreal Convention is normally irrelevant for third-party liability claims against the drone's operator.[124]

3. "Insuring" Protection

From an international perspective, there are key issues to recognize here. First, there have always been difficulties in translating the good intentions of international cooperation and adherence to a common goal. The compromises in the Chicago Convention in 1944 clearly show this to be the case.[125] And in more recent times, the attempt by ICAO to aid the facilitation of an international third-party insurance "mutual fund" as an alter-

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[120] Protocol to Amend the Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface, Sept. 23, 1978, 2195 U.N.T.S. 372 [hereinafter 1978 Montreal Protocol].

[121] *Id.* art. XII.

[122] Rome Convention, *supra* note 117, art. 11.

[123] *List of Parties: Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface*, ICAO, https://www.icao.int/secretariat/legal/List%20of%20Parties/Rome1952_EN.pdf#search=Rome%201952 [https://perma.cc/VVF5-EJCC].

[124] *List of Parties: Protocol to Amend the Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface*, ICAO, https://www.icao.int/secretariat/legal/List%20of%20Parties/Mtlpr78_EN.pdf [https://perma.cc/9F9N-2EJ8].

[125] Sarah Jane Fox, *"CONTEST"ing Chicago: Origins and Reflections: Lest We Forget!*, 8 INT'L J. PRIV. L. 73 (2015); Fox, *Aviation: A Risky Business*, *supra* note 59, at 342–44.

native to commercial insurance for airlines failed to receive the substantial support it needed to drive this initiative forward.[126] While the terrorist attacks of September 11, 2001, may have provided the impetus for revisiting the compensation mechanisms and schemes serving the aviation industry, the truth is that the later 2009 Convention on Compensation for Damage Caused by Aircraft to Third Parties[127] and the 2009 Convention on Compensation for Damage to Third Parties, Resulting from Acts of Unlawful Interference Involving Aircraft[128] also failed to receive buy-in from the international community.[129] So while the attacks provided the impetus for these progressive *thoughts* (namely of ensuring that suitable compensation schemes were put into place for such future eventualities), the reality is that it did not invariably lead to their achievement—even if, as Michael Milde states, these were largely misdirected in the first place.[130] That said, the EU Regulation showed that advancement could be made in terms of today's challenges (such as terrorism)—particularly by way of a comparison with an arguably outdated Convention—and one that is limited in terms of international recognition and agreement.

Second, while it is recognized that there is a need to ensure that mechanisms are in place to cover liability (particularly for third parties), there is an equal need to ensure that such schemes are fit for purpose and cover all eventualities. It has long been argued that applying MTOW to liability fails to appreciate the risks of anything airborne (such as a drone) being used as a weapon itself. From this perspective, Milde states that the MTOW is a disproportionate benchmark. [131] It is furthermore contended that a light aircraft, or equally a drone, may cause untold damage in sensitive areas, such as a nuclear plant or an oil refinery, disproportionate to its weight.[132] The "use" and "purpose" of the drone, linked to an associated risk, is also a contentious matter, and as identified previously, the line and

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[126] Fox, *International Aviation Liability, supra* note 55, at 174.

[127] Int'l Civil Aviation Org. [ICAO], Convention on Compensation for Damage Caused by Aircraft to Third Parties, ICAO Doc. 9919 (May 2, 2009).

[128] Int'l Civil Aviation Org. [ICAO], Convention on Compensation for Damage to Third Parties, Resulting from Acts of Unlawful Interference Involving Aircraft, ICAO Doc. 9920 (May 2, 2009).

[129] Fox, *International Aviation Liability, supra* note 55, at 162–82.

[130] MICHAEL MILDE, ESSENTIAL AIR AND SPACE LAW 309 (Marietta Benkö ed., 2d ed. 2012).

[131] *Id.* at 303.

[132] Fox, *International Aviation Liability, supra* note 55, at 162–82.

distinction between users is becoming further blurred in many cases. Moreover, it has been identified that a drone, whether used for commercial or recreational purposes, can cause the same damage and destruction to property or persons on the ground—"the risk to the public is really no different if this 10kg vehicle is being flown in the park by a child or used for survey purposes."[133] Going forward, there may also be a need to ensure more consistency in terms of applying strict liability, as opposed to considering a case-by-case approach when damage or injury has been caused, or even life lost.

There is no doubt that these factors will continue to be debated, but a logical consensus of agreement must be reached. It would be a common sense approach to take EU Regulation 785/2004 as a starting point—but whether or not this is used as a baseline in Europe or internationally remains to be seen. However, this Regulation coming at the time when it did (stemming from the events of September 11) demands that serious thought be given to ensuring that protection is available equally, particularly to persons (and property on the ground), including when the operators of a UAV cannot be traced. Unfortunately, the present times have shown that terrorism-related claims will be increasing, but across the globe there are differences as to the aid, assistance, and financial support available to victims.[134] All transport modes continue to be targeted by extremists, but beside security and terrorist threats, safety incidents will warrant the same concerns.

While Regulation 785/2004 and the Rome Convention state that the aircraft operator is responsible, it is surely an easier task

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[133] CIVILIAN USE OF DRONES IN THE EU, *supra* note 90, at 53–54.

[134] *See* Ben Emmerson (Special Rapporteur), *Promotion and Protection of Human Rights and Fundamental Freedoms While Countering Terrorism*, Symposium: The Rights of Victims of Terrorism (Apr. 2, 2012). For example, within the United Kingdom (UK), following the events of terrorist attacks perpetrated on British soil (e.g., the UK July 7 attacks where transport systems were targeted), victims were able to apply through the UK Criminal Injuries Compensation Authority, a government body that runs a compensation scheme for the victims of violent crime in England, Scotland, or Wales. *Government Support: United Kingdom*, U.N.: VICTIMS OF TERRORISM SUPPORT PORTAL, https://www.un.org/victimsofterrorism/en/node/613 (last visited Oct. 24, 2017) [https://perma.cc/LZ4C-W8HF]. However, that said, the same support has not been available in the same manner to British subjects that have suffered at the hand of terrorists abroad. Recognizing this, the UK has made some amendments to their systems of entitlement since 2012. *Compensation for Victims of Terrorist Attacks Abroad*, GOV.UK, https://www.gov.uk/compensation-victim-terrorist-attack (last visited Oct. 24, 2017) [https://perma.cc/EUW5-NYQN].

to regulate and police the current civilian manned aviation market—whether it is the commercial or general aviation arena—than the operator of a drone (particularly a drone that is used for leisure or hobby purposes). The Riga Declaration states that "[w]hen a drone service is delivered in prohibited airspace, in an unsafe manner, or for illegal purposes, the authorities should be able to act and hold the operator accountable."[135] However, while this may be a desired intention, in practice it will not be an easy task to accomplish. From a European perspective, it is indicated that this will shift back onto the national governance system. This seems not only an ineffective method, but also one that does not sit within the objectives of creating an internal market for the users of the drones to operate in. One suggestion advocated within the Riga Declaration is that identity chips should be fitted on drones (IDrones),[136] but this in itself does not seem a well-thought-through proposal in terms of acknowledging the potential for misuse and abuse by the criminal and terrorist markets. From the insurance perspective, consideration must be given to having a national, European, or international system in place (in a similar way as advocated by ICAO, by way of a mutual fund) to cover disasters where no individual or operator can be held accountable. The Chicago Convention states, "Each contracting State undertakes to *insure* that the flight of such aircraft without a pilot in regions open to civil aircraft shall be so controlled as to obviate danger to civil aircraft."[137] Argued literally, this implies an obligation for anything operating in the skies not just toward other civil aircraft, but also to persons on the ground.

Undoubtedly, there is more risk of operations being carried out by untraceable drone users than current manned aircraft users due to the very nature and usage methods of drones, which do not require the same supporting infrastructure as a manned aircraft (in terms of an airport, runway, or airfield) and, therefore, also do not require a recorded itinerary or path. This makes monitoring operations, ensuring compliancy, and ultimately, policing and enforcing much more complicated factors that have not yet been taken fully into account. These factors (and related considerations and concerns) bear more relation and synergy to road transport operations and vehicular

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[135] *Riga Declaration*, *supra* note 63, § 5.

[136] *Id.*

[137] Chicago Convention, *supra* note 17, art. 8 (emphasis added).

use than to current civilian aircraft movements and services. So, in developing a suitable framework, there are invariably lessons to be learned from other transport modes in addition to civil air transport.

B. Monitoring, Policing, Investigating, and Prosecuting

Currently, for civil aviation within Europe, there is a layered system of governance and accountability, with ICAO retaining an international role (to which Member States independently remain signatories to the Chicago Convention). The role of the European Commission for Mobility and Transport remains to "promote a mobility that is efficient, safe, secure and environmentally friendly and to create the conditions for a competitive industry generating growth and jobs" within the EU.[138] Related agencies, such as EASA, exist to facilitate certain aspects within this remit. So while the EU has established legislation and rules (e.g., common rule in relation to the field of aviation security),[139] the Directorate-General also works with the Member States to translate the related aims and associated objectives.

1. Aviation Security and Application to Drones

Regulation (EC) 300/2008 lays down common rules and basic standards on aviation security, as well as procedures to monitor its implementation.[140] The standards apply to:

- Screening of passengers, cabin baggage, and hold baggage;
- Airport security including access and surveillance;
- Aircraft security checks and searches;
- Screening of mail and cargo;
- Screening of airport supplies; and
- Staff recruitment and training.[141]

It is difficult to see how any of these areas will apply to commercial drone operations (or otherwise). It is therefore likely that a commercially-licensed operator will have to be accounta-

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[138] *About Us*, Eur. Comm'n: Mobility & Transport, https://ec.europa.eu/transport/about-us_it (last updated Oct. 24, 2017) [https://perma.cc/W977-YBDG].

[139] Reg. No. 300/2008, *supra* note 74. No. 2320/2002 was the initial framework Regulation, while Regulation 300/2008 has been supplemented several times to take account of new threats and challenges.

[140] *Id.*

[141] *Id.* at 76.

ble for both the security operations and the flight of the drone much in the same way that occurs within the road haulage, rail movement, or transport services that are provided within the Member State of operations (i.e., are not cross-border operations).

Delegated responsibilities include designating a single competent authority for aviation security within each Member State and setting up a national civil aviation security program and a national quality control program.[142] Again, it would be difficult to see how this would translate to drone operations because drones do not take off from existing designated airbases (airports or airfields) in the same way that commercial flights and services currently do—a primary difference.

While security will remain a key issue of drone operations and, although this was stressed by the EU Commission,[143] very few suggestions for mitigating the risks as identified by Lloyd's of London[144] have been suggested. Security remains a major consideration in the EU Air Transport Management Master Plan (of which RPAS "will become an integral part"),[145] but it "will then need to be translated into legal obligations for all relevant players, such as the air navigation service provider."[146] In other words, security will be a delegated task likely to be assigned back to a State level. The intention linked to this is "Action 3: The Commission will ensure that security aspects are covered in the operations of RPAS to avoid unlawful interference, so that manufacturers and operators can take the appropriate security mitigating measures."[147]

This, therefore, implies a "compliancy and product liability" responsibility partly assigned to a manufacturer. But unless sales are to be confined to EU sources, it is difficult to see how this would equally work among all makers of drones (for example, those outside the EU), unless a duty was also placed on importers. The statement also reinforces the previous statement in terms of "[t]he operator of a drone" being "responsible for its use"[148]—pointing potentially to a direct "strict" liability standard for all factors linked to use (arguably extending into the remit

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142 *Id.* at 73.

143 *A New Era for Aviation*, *supra* note 22.

144 *Drones Take Flight: Key Issues for Insurance*, *supra* note 53.

145 COM(2014) 207 final, *supra* note 22, at 7.

146 *Id.*

147 *Id.*

148 *Riga Declaration*, *supra* note 63, § 5.

of ensuring compliancy by a manufacturer for adherence to security standards). However, the Riga Declaration, coming a year after the Communication document of the Commission, while equally recognizing the *security* risks, adds that "malicious use of drones cannot be entirely prevented by design or operational restrictions."[149] It then goes on to advocate that "[i]t is the task of the national police and justice systems to address those risks."[150] Without a clear framework in place, it is difficult to see how the police service will be equipped to actually undertake this assigned role. Unlike a motor vehicle, drones will not have vehicle identification marks visible when flying, so consideration will need to be given now (and in any framework) to any associated security risk of a drone in flight and the means and mechanism to stop it (and bring it down without further risk to persons on the ground).

In essence, a suitable governance framework will need to consider factors linked to both security and safety, such as (1) registration and identification of the drone (so as to determine age, location, description, specifications, where it is permanently housed, etc.), and therefore, the registration of the drone by the owner; (2) the registration and licensing of the drone operator (potentially commercial and non-commercial operations); (3) whether the device needs to be tested (potentially depending upon its role, use, weight, and location) for airworthiness (drone safety management); (4) location and time of use, etc.; and (5) the requirements for the "operator," viewed from the sense of the controller while in flight—i.e., the pilot or flyer role—and the respective license requirements (potentially depending upon the role, location, items carried, risk, etc.).

However, the real skill be monitoring and enforcing these requirements. The above shows that this role will lie not only with the national civil aviation authority, but also with the police of Member States. Of course, this leads to an obvious question regarding accident and incident investigations during use: Will someone unfortunate enough to sustain damage to their property or incur personal injury have to resort to a civil claim for compensation? Or will this role be undertaken by the national civil aviation authority (or even delegated on to the police)? Currently, in conjunction with the Annexes to the Chicago Convention, the EU has Regulation 996/2020, which concerns the

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[149] *Id.* § 4.

[150] *Id.*

investigation and prevention of accidents and incidents in civil aviation.[151] This Regulation reinforces that, in accordance with Annex 13, the "investigation of accidents and serious incidents is to be conducted under the responsibility of the State where the accident or serious incident occurs, or the State of Registry when the location . . . cannot definitely be established as being in the territory of any State."[152]

The applicability of this Regulation is stated in Article 2, which explains that it concerns "the operation of an aircraft,"[153] and here again, no clear definition of aircraft is provided. While it is implied that it is applicable to manned (and unmanned) operations, this is not clearly specified. However, it is stated that the investigations apply to aircraft registered in a Member State or operated by an undertaking established in a Member State, which includes aircraft with a maximum take-off mass less than or equal to 2250 kilograms.[154] At the current time, drone incidents and accidents have been investigated under this Regulation and related national legislation within the EU, but this has been the case when matters have also concerned manned aircraft (or have been in the vicinity of an airport). However, going forward it will be interesting to see how this Regulation, Annex 13, and other related Annexes to the Chicago Convention are applied to the use of drones.

As of May 5, 2017, EASA published a proposal to regulate the operation of small drones in Europe.[155] All interested parties had until mid-August 2017 to respond.[156] The intention of the Notice of Proposed Amendment (NPA) is to recommend creat-

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[151] Council Regulation (EU) No. 996/2010, of 20 October 2010, 2010 O.J. (L 295/35).

[152] *Id.* at 35. There is also a proviso that this may be delegated or that the assistance of another State may be requested.

[153] *Id.* at 38.

[154] *Id.* at 41.

[155] *NPA 2017-05: Introduction of a Regulatory Framework for the Operation of Drones—Unmanned Aircraft System Operations in the Open and Specific Category*, EASA (May 4, 2017) [hereinafter *Regulatory Framework for Drones*], https://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2017-05 [https://perma.cc/L4GX-M5KZ]. Published in a document called a Notice of Proposed Amendment (NPA), the proposal has been developed with the support of a large group of experts: representatives of the EASA Member States, the UAS industry, UAS operators, aviation representatives, and aero modeling associations.

[156] *Id.* The consultation period was since extended until September 15, 2017. For a full summary, see *EASA NPA 2017-05 – European UAS Regulatory Framework: Outline*, CIV. AVIATION AUTH. (June 2017), https://publicapps.caa.co.uk/docs/33/CAP%201559%20EASA%20NPA%202017-05%20outline_V2.pdf.

ing a new regulation (Regulation (EU) 201X/XXX') that defines:

> [T]he measures to mitigate the risk of operations in: [(1)] the open category through a combination of limitations, operational rules, requirements for the competence of the remote pilot, as well as technical requirements for the UAS; and [(2)] the specific category through a system including a risk assessment conducted by the operator before starting an operation, or the operator complying with a standard scenario, or the operator holding a certificate with privileges.[157]

The final Opinion will be submitted by EASA to the European Commission at the end of 2017. Going forward, it will be interesting to watch the proposal develop and see the various views of stakeholders being crafted into a final Regulation. Of course, it will be significant to see the EU's interpretation on many of the points and issues discussed within this article. In June 2017, EU Commissioner for Transport Violeta Bulc acknowledged:

> Drones mean innovation, new services for citizens, new business models and a huge potential for economic growth. We need the EU to be in the driving seat and have a safe drone services market up and running by 2019. The EU needs to take a leading role worldwide in developing the right framework for this market to flourish, by unleashing the benefits for key economic sectors.[158]

VI. CONCLUSION

While Member States of the EU have continued to apply the Chicago Convention and the related Annexes, subsequent international treaties have not always been met with equal enthusiasm and commitment—no doubt due to a legacy of wanting to retain sovereign control in the skies above a Member State's own airspace. But that said, the EU, once having a fragmented and disjointed civil aviation system amongst the State members, has successfully managed to remove decades of internal restrictions, which allowed for the creation of an open market. Subsequently, this had been extended through to a successful external aviation policy. In doing this, the EU States have achieved a joint agreement across safety and security provisions

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[157] *Regulatory Framework for Drones*, *supra* note 155, at 1.

[158] *Aviation: Commission is Taking the European Drone Sector to New Heights*, EUR. COMM'N (June 16, 2017) https://ec.europa.eu/transport/modes/air/news/2017-06-16-aviation-commission-taking-european-drone-sector-new-heights_en [https://perma.cc/UE3Y-APBV].

allowing them to face new challenges with arguably more success than the wider international aviation community. September 11 tested all civil aviation markets and providers, but the EU stood together and its competence was recognized as more effective at a supranational level in relation to security across the Union (albeit Member States were able to apply security provisions above the minimum level agreed). Yet, with the rise of drones on the horizon and the commercial potential just being realized, even the EU, alongside the wider international community, has recognized that it is not prepared and does not have a suitable framework in place to meet existing challenges and potential opportunities of this new unmanned flight era.

As the ICAO acknowledged, there must be a better collective way of approaching such developments and technological advancements, while realizing and learning from the mistakes of not being prepared and not working together cooperatively. The community does not have the luxury of twenty-five years to develop a new framework for the advancing drone and unmanned aviation systems now upon society. The statement at the beginning of the article,[159] made some seventy-one years ago, realized, or even arguably prophesized, where development of transport systems in the skies would take us. The world watched as this developed through the military usage of drones in combat and reconnaissance situations. However, while showing the power of unity and cooperation, the EU now finds itself in the same situation it was in during the 1980s regarding manned civil aviation. Member States are now developing their own approaches and frameworks to drones which can surely not be to any one Member State's advantage. In the EU, the stage appears set on the drone front for legislative movements by the end of 2020. The question remains: is this soon enough? There remains undoubtedly more risk to society, in terms of safety and security, by not having a common governance system in place that will meet the operational potential and the dangers of the drone!

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[159] *Grumman Hatches a Mallard*, *supra* note 1.