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A Study on the Australian Law Regarding RPAS (Remotely Piloted Aircraft System): Need for an International Approach

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Ⅰ. Introduction

Once acceptable in the public's eyes, and commercially feasible, then pilotless passenger flight is something which represents an inevitable development, with unmanned airline cargo transport likely to occur much sooner. Passenger carriage is already at the point of serious consideration for other commercial aviation applications which could be rendered safer or more economical by the removal of traditional occupant-pilots.[1] Clearly, domestic law will principally deal with *domestic* pilotless flight. When pilotless *international* flight comes to fruition, however, the legal response will be more complicated.

It is suggested that there must be purposeful engagement with certain legal and policy issues before there can be any serious thought about lawfully permitting remotely piloted or autonomous civilian air transport (whether passenger or cargo). One such consideration must be whether civilian air transport principles of private international law with respect to compensation for injury and death, can be applied to the context of remotely piloted or autonomous commercial remotely piloted aircraft system (RPAS) passenger carrying operations.

These matters are not presently the subject of ICAO guidance nor explicit national legislation but should be addressed by way of ICAO guidance and/or relevant standards and recommended practices (SARPs) to facilitate the streamlined development of pilotless flight without hindrance to the potentially myriad commercial applications. The 36th ICAO Legal Committee is scheduled to discuss these matters in December 2015, confirming the timeliness of the policy questions asked below. The Working Paper on the topic of RPAS describes the impending need for such regulation in a practical sense, by reference to studies that predict that "within forty years up to forty-percent of air-cargo will be transported by unmanned aircraft.[2] In light of this the time for

1) Tests were conducted in June, 2015 using light pilotless remote aircraft, for tasks marketed as a cheaper way for pipeline operators or mining companies to survey their property.

States to be contributing to the discussion with lessons learned within the more mature RPAS regulatory regimes, is now.

In this article, the current international law regarding RPAS will first be examined from both the public air law and private air law perspectives. Then, we will survey the current and proposed Australian domestic RPAS regulation while emphasizing the peculiar risks in operation of RPAS; and how they affect concepts of liability, safety and privacy. We will conclude by suggesting coordination between a domestic approach and an international approach to deal with future risks and problems in the operation of RPAS.

Ⅱ. International RPAS Regulation

1. Public Air Law Aspect

Unmanned aircraft vehicles have been used since the turn of the 20th century, and were first "regulated" as early as 1919 in the *Convention Relating to the Regulation of Aerial Navigation* (the "Paris Convention 1919"). The wording of Article 8 of the present *International Convention on Civil Aviation*, (the "Chicago Convention 1944") actually reflects the wording of Article 15 of an amending Protocol of the Paris Convention which added the term "pilotless aircraft" into the aviation legal vernacular. The provision read:

> No aircraft of a contracting State capable of being flown without a pilot shall, except by special authorization, fly without a pilot over the territory of another contracting State.[3)]

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2) ICAO Working Paper for 36th Legal Committee Session, LC/36-WP/2-4, 26/10/15, "Study of Legal Issues Relating to Remotely Piloted Aircraft", available at http://www.icao.int/Meetings/LC36/Working%20Papers/LC%2036%20%20WP%2024.en.pdf.

3) Chicago Convention 1944, Art 8.

The concept of the need for regulation of pilotless aircraft first featured in the 1929 Protocol to the Paris Convention 1919. In 1944 the Chicago Convention, following a proposal by the Indian delegation[4], resulted in a new provision which brought the same concern to the modern perspective of regulating civilian air transport:

> 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. 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.[5]

A more comprehensive summary of the historical framework of ICAO regulation of RPAS is provided in chapter 1.2 of the First ICAO RPAS Manual (RPASM),[6] but suffice it to say that the purpose of such regulation as early as 1929 arose in the context of the potential security risks to sovereignty that pilotless aircraft posed, and so the provision in Article 8 relies on the principle of "due regard". That is, when issuing regulations for state aircraft States are under an obligation to:

> …have due regard for the safety of navigation of civil aircraft.[7]

The implication that non-civil aircraft are likely the ones that will eventually be, or emerge as, "pilotless" and the reference to "due regard" indicate that *civilian* RPAS use, though anticipated by the Chicago provisions, was not practically conceived of. Thus, civilian RPAS use neither motivated the legal

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4) Chicago Convention 1944 commentary, App 2, p 1382.
5) Chicago Convention 1944, Art 8.
6) ICAO Doc 10019; *Manual on Remotely Piloted Aircraft Systems*, ICAO, First Edition – 2015.
7) Chicago Convention 1944, Art 3(d).

framework requiring separation of pilotless-s aircraft from piloted-, nor the restrictions against traversing sovereign airspace without authorisation.

Following the second ICAO meeting on (as then termed "unmanned aircraft systems") in 2007, it was determined that any potential unmanned aircraft standards and recommended practices should be developed in an orderly and harmonious way, and the responsible Unmanned Aircraft Systems Study Group (UASSG) was set up to take advantage of the ongoing work of a variety of global regulatory bodies on this subject.

In early 2015 the first edition of the RPASM was published and provides guidance on a variety of technical and operational issues in the use of RPAS in non-segregated airspace and at aerodromes. It needs to be read in the context of the matters which ICAO itself prioritises in terms of the need for uniform standards and recommended practices (SARPs), that is, international operations. As such the RPASM is less concerned with issues on a smaller scale which nonetheless remain important from the perspective of local/domestic RPAS operators and related stakeholders. The aim of ICAO is to facilitate within the next decade seamless integration of RPAS into controlled airspace using instrument flight rules flight.[8)]

The primary goal at ICAO level of making SARPs in respect of RPAS is to facilitate the orderly development of RPAS while mitigating the risks of the major hazards of such flight (ie, mid-air collisions, and other accidents). The RPASM guidance and SARPs in Annex 2 to the Chicago Convention 1944 are based on technical and operational considerations to regulate conduct, and thus minimise the risk of harm.

8) RPASM, p 1-8.

2. Private Air Law Aspect

We now look at the forms of *civil* liability which might be raised in the context of remotely piloted aircraft systems' (RPAS) use, noting the antecedents of the kinds of liability triggered in the context of the various kinds of potential damage that may materialise.

Some are relatively well established, while others remain to be devised or are technically challenged by the context of RPAS operations and its peculiar separation of pilot and operator from the proximity (both in space, time and relative culpability as well as potentially, jurisdiction) of an air accident. It is hoped that by identifying the areas in need of further examination, whether or not they be eventually resolved by the explicit application of current laws on aviation liability, or by the creation of newer instruments than those used in the context of piloted civil aviation, a more robust and complete legal liability picture will emerge. This exercise lends itself to greater certainty for insurers, pilots, regulators and the public.

Again, it is an underlying thesis of this paper that regulation in the RPAS field is still in its infancy and thus fails to look outside the scope of technical and purely safety oriented regulation. Such was the case in "normal" civil aviation historically – public international air law principles, technical and operational rules preceded substantive considerations of the civil liability of air operators to those who might be caused harm by them. Thus it was that the Paris Convention 1919 addressed safety and navigation, but the Warsaw Convention of 1929 addressed private international air carrier liability law, and sought the uniformity now emblematic of the Montreal Convention 1999 system of aviation carriers' liability.

Internationally, depending on the kind of aircraft used for (for example, a September 11 type attack with an RPAS being used in an international operation), one of several types of law may control the avenues of compensation

for those killed, injured, or otherwise caused damage on the ground. The availability of damages is dependent on whether a court holds that domestic law should apply, or the appropriate international convention is triggered. The options include:

- the *Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface 1952* ("1952 Rome Convention") and *Protocol to Amend the Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface* 1978)the "1978 Protocol"); or
- *Convention on Compensation for Damage Caused by Aircraft to Third Parties* 2009 ("General Risks Convention"); or
- *Convention on Compensation for Damage to Third Parties, Resulting from Acts of Unlawful Interference Involving Aircraft*, 2009 ("Unlawful Interference Convention").

At this time neither the General Risks nor Unlawful Interference Convention has come into force, by virtue of their respective provisions. All of these treaties impose strict liability on owners/operators of aircraft, and provide varying levels of compensation limits. The difficulties with attempts to apply them to an RPAS flight are manifold. Article 2(3) of the Rome Convention provides:

> The registered owner of the aircraft shall be presumed to be the operator and shall be liable as such unless, in the proceedings for the determination of his liability, **he proves that some other person was the operator and, in so far as legal procedures permit, takes appropriate measures to make that other person a party in the proceedings.**[9][emphasis added]

This problematic escape for the owner of the aircraft would be invoked if the owner demonstrated that the aircraft itself was the operator at the time in question,

9) Art 2(3) Rome Convention 1952.

particularly during autonomous operation. It is as likely that a court could find that the question of "operator" is more a factual and commercial enquiry, but these remain open policy questions which should be addressed in order to seamlessly facilitate the development of RPAS flight at international level.

For *passengers* on an RPAS, for air carrier liability law to be activated as it would if an air transport aircraft were used (ie, the *Convention for the Unification of Certain Rules Relating to International Carriage by Air* ["Montreal Convention 1999"] and its parent treaties) it would require that there be acceptance that contracts of carriage for travel by RPAS be embraced by the "Scope of Application" (Art 1) of the Conventions, and liability triggered by the same matters as presently for commercial air travel (Art 17 "Accident"). The application of the Convention presents no apparent difficulties as this is by virtue of a valid contract for "international carriage" as that term is defined in Article 1(2):

> For the purposes of this Convention, the expression international carriage means any carriage in which, according to the agreement between the parties, the place of departure and the place of destination, whether or not there be a break in the carriage or a transhipment, are situated either within the territories of two States Parties, or within the territory of a single State Party if there is an agreed stopping place within the territory of another State, even if that State is not a State Party. Carriage between two points within the territory of a single State Party without an agreed stopping place within the territory of another State is not international carriage for the purposes of this Convention.[10)]

The activation of the carrier's liability in any particular incident is dependent on whether Article 17 can be said to apply. Article 17(1) provides:

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10) Art 1(2), Montreal Convention 1999.

> The carrier is liable for damage sustained in case of death or bodily injury of a passenger upon condition only that the accident which caused the death or injury took place on board the aircraft or in the course of any of the operations of embarking or disembarking.

The history of this provision which originates in the Convention of the same name done in Warsaw, Poland in 1929 (the "Warsaw Convention"), demonstrates that strict, though limited, liability was imposed on the carrier in this way partly for economic reasons (ie, to protect the nascent aviation industry from crippling compensation claims). The provision remains in the present (Montreal) Convention notwithstanding a more resilient industry, together with requirements for mandatory liability insurance in both the Convention and in bilateral agreements as a condition precedent to international operation.[11)]

The difficulty arises in how the term "accident" has developed through compensation litigation over time. A variety of circumstances are considered to satisfy the judicial construction of "accident" – everything from passenger on passenger intentional torts,[12)] to being injured by defective seat backs,[13)] and refusal of flight attendants to reseat passengers which lead to injury/death.[14)] More "traditional" or uncontroversial species of "accident" include severe turbulence,[15)] aircraft crashes,[16)] and terrorist attacks.[17)]

Were passengers to be carried on RPAS (without a pilot), many of these accident types would remain possible and thus liability would likely comfortably attach to a carrier and passenger which suffered them. However, newer

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11) Art 50, Montreal Convention 1999.
12) *Brandi Wallace v. Korean Air*, 214 F. 3d 293. (2nd Cir. 2000).
13) *Malaysian Airline Systems Berhad v Krum* [2005] VSCA 232.
14) *Olympic Airways v Rubina Husain, Individually, and as Personal Representative of the Estate of Abid M. Hanson, Deceased, et al.* 540 US 644 (2004).
15) *Weintraub v. Capitol Int'l Airways*, 16 Av. Cas. (CCH) 18,058 (N.Y. App. Div. 1981).
16) *In re Air Crash Over the Mid-Atlantic on June 1, 2009*, F.Supp.2d, 2010 WL 3910354 (N.D. Ca). Oct. 4, 2010).
17) *Day v Trans World Airlines Inc* 13 CCH 18,144, (CA, 2, 1975).

mechanisms causative of injury would likely also emerge, many akin to the component avionic and similar flight control faults which have to date prompted product liability claims in manufacturers' jurisdictions in several instances.[18] Typically, errors in such microelectronic systems would likely increase in the global frequency of such incidents, as RPAS operations are so reliant on such systems.[19]

The problem this raises from the view of private international law is the prospect for increased forum shopping to the United States by foreign plaintiffs in damages actions, in preference for the courts of their own nations. A commonly used quotation from a case in 1983 is "[a]s a moth is drawn to the light, so is a litigant drawn to the United States."[20]

While this is not a new problem, a technological shift to potential accidents more frequently being caused by such onboard mishaps will lead to a "forum shopping" epidemic to the US, where many components are sourced.[21] While *forum non conveniens* dismissals are on the rise in the US,[22] the trend may moderate if the volume of claims increases with a higher number of claims against "drone" manufacturers and component manufacturers (in the absence of better or binding standards of airworthiness akin to modern air transport SARPs).[23]

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18) An important case is Qantas Flight QF72 (7 October, 2008) Following the sudden nosedives caused on this flight by a faulty air data inertial reference unit (ADIRU), product liability litigation was commenced in the United States on behalf of many non-US citizens against Northrop Grumman, the US manufacturer of the ADIRU.

19) The Senate Report referenced above at n 24 provided:
Even RPAs built to military standards – which are much higher standards than current civil and recreational RPAs are built to – may require improvements before CASA would consider integrating them into Australian airspace: the military is prepared to accept losses and in the operational sphere they do accept that some of these will not come back, as we have seen reported often in the newspapers. Of course, to the civilian world that is intolerable. We would like to get that risk as low as reasonably practicable.

20) *Smith Kline & French Lab. Ltd. v. Bloch*, 1 W.L.R. 730 (1983).

21) See for example http://fortune.com/2013/05/13/where-americas-drones-are-made/.

22) See Dempsey, P, "All along the watchtower: Forum non conveniens in international aviation", at https://www.mcgill.ca/iasl/files/iasl/ForumNonConveniensInInternationalAviation.pdf

23) On the issue of product liability related to drones in Korea, see Sun-Ihee, Kim, "A study on the product liability for defects of unmanned aerial vehciles", *Journal of Korea Air & Space Law and Policy*, Vol.30(1), Korea Society of Air & Space Law and Policy, 2015.

Ⅲ. Current and Proposed Australian RPAS Regulation

1. Overview

Australia has been recognized as one of the first states to have established binding domestic legislation with respect to RPAS.[24] In Australia the primary regulatory tool within domestic legislation used to control the inherent safety risks of remote flight are criminal sanctions. These are typically strict liability statutory offences with monetary penalties. Australia is presently moving towards a more risk based system in which the level of operational risk of certain operations moderates the level of regulatory intervention by the air safety regulator. However, as it stands, the principal motivator for compliance with safety regulation remains a relatively blunt instrument.

It is uncontentious that Australia first sought to address the challenges of recreational and commercial aviation applications with a set of aviation safety laws contained in Part 101 of the *Civil Aviation Safety Regulations 1998* (CASR).[25] This legislation creates a framework for the certification and regulation of certain kinds of unmanned flight operations, and separates categories and types of such flight (including commercial, tethered and unmanned free balloons, kites, rockets, model aircraft, model rockets), and puts in place a variety of rules for large and small "UAVs".[26]

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24) E.g. Jong-Bok, Kim, "A Study on the Legislation for the Commercial and Civil Unmanned Aircraft System Operation", *Journal of Korea Air & Space Law and Policy*, Vol.28(1), Korea Society of Air & Space Law and Policy, 2013.

25) Civil Aviation Safety Regulation 1998 (Cth), Part 101, available at https://www.comlaw.gov.au/Details/F2015C00762.

26) The terminology is presently being updated to reflect the ICAO nomenclature.

Broadly, the regulation accomplishes two main objectives: first, it criminalises hazardous use of any of the various kinds of unmanned or pilotless technologies with a general prohibition on unsafe operation. This is exemplified by the inclusion of statutory offences for such misuse, and the prescription of certain limitations on flight which are considered dangerous, such as:

- flight within prohibited or restricted areas;[27)]
- operation in controlled airspace (without specific approval and air traffic control clearances);[28)]
- operation near aerodromes (defined as being within 3 nautical miles of an aerodrome);[29)]
- operation at or above certain heights without permission (defined as 400 feet above ground level);[30)]
- dropping or discharging of things from the aircraft;[31)] and
- weather and day limitations (generally limiting "unauthorised" pilotless flights to visual day meteorological conditions).[32)]

Some of the concepts and definitions relating to "large" and "small" UAVs are acknowledged by the Australian air safety regulator, the Civil Aviation Safety Authority (CASA), to be outdated. In a briefing paper to the Australian Senate on RPAS for the Standing Committee on Foreign Affairs and Trade, CASA stated:

> CASR Part 101 was promulgated in 2002 in anticipation of civil operations of unmanned aircraft. At the time there was little civil operational experience to draw on from other States and, as a consequence, there was limited detail included in the regulation.

27) Part 101 CASR, at Reg 101.065.
28) Ibid at Reg 101.070.
29) Ibid at Reg 101.075 and 101.080.
30) Ibid at Reg 101.085.
31) Ibid at Reg 101.090.
32) Ibid at Reg 101.095.

> This regulation is now outdated in terms of terminology and operational capabilities due to technological developments.[33]

The amendments to CASR Part 101 will be for commercial operations, and excludes model aircraft used for recreational purposes. It establishes a revised risk based framework for regulating such operations. In terms of the sizes of the relevant aircraft one learning being incorporated into the legislation is that there is considered to be a "low risk" class of RPAS operations, which are determined as those with a gross weight of 2 kilograms and below while they are being operated under certain "standard" conditions as defined and discussed in the CASA Notice of Proposed Rule Making.[34] CASA will not require a controller or operator certificate for such operations. RPAS with a gross weight above 2 kilograms (no matter what operating conditions), and all RPAS operating outside of the standard RPAS operating conditions, will require an operational approval from CASA.[35]

More machinery-type amendments make up the bulk of the remainder of the presently awaited rule changes and include:

- updating the terminology used within CASR Part 101 to bring it in line with the latest used by ICAO in the SARPs within Annex 2 to the Chicago Convention 1944;
- clarifying the requirements for RP training and RP certification; and
- removing redundant requirements and to simplify the approval process.[36]

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33) Available at www.aph.gov.au, dated 4 May 2015.

34) These are prescribed, at pp8-9 of the NPRM, as:
- Visual Line Of Sight (VLOS). An operation in which the remote crew maintains direct visual contact with the RPA, only aided by spectacles or contact lenses (not binoculars or telescopes etc.) to manage its flight and meet separation and collision avoidance requirements
- Less than 400 feet above ground level (AGL) and over water
- In non-populous areas, including more than 30 metres from any person not directly involved in the operation of the RPA
- Day Visual Meteorological Conditions (VMC), i.e., day time operations only
- Outside of controlled airspace (OCTA), including outside of prohibited and restricted areas
- Greater than 3NM (5 kms) from an aerodrome boundary.

35) The NPRM is available to view at https://www.casa.gov.au/sites/g/files/net351/f/_assets/main/newrules/ops/nprm/nprm1309os.pdf.

In addition to the legislative instrument a suite of advisory circulars (ACs) is expected to be promulgated, covering guidance on a range of relevant subjects for RPAS users:

- AC101-1 - General
- AC101-4 - Training and Licensing
- AC101-5 - Operations
- AC101-6 - Manufacturing and Initial Airworthiness
- AC101-7 - Maintenance and Continuing Airworthiness
- AC101-8 - Safety Management/Human Performance
- AC101-9 - Applying for an Operators Certificate
- AC101-10 - Operations in Controlled Airspace[37)]

A second phase of regulatory changes is expected, resulting in a new Part 102 of CASR, and involves a significant rewriting of the entire Part.

Elements of some of the ACs which are argued to not sufficiently mitigate risks, or which require further consideration and potentially greater harmonisation with current piloted civil aviation regulation, particularly with respect to passenger carrying commercial operations, are described further below.

2. Risks in Operation of RPAS – Liability Aspect

Describing all the kinds of damage that could result from the abuse, misuse, technical defect or other errors within any element of an RPAS system would be impossible. However, determining and confronting the challenge of ascribing legal blame for damage (through law) and prescription of the level of responsibility which should attach to each person within such systems, by

36) The proposed amendments are published in their entirety online at https://www.casa.gov.au/sites/g/files/net351/f/_assets/main/newrules/ops/nprm/nprm1309os_annexb.pdf.

37) See “CASA and remotely piloted aircraft” available at https://www.casa.gov.au/operations/standardpage/casa-and-remotely-piloted-aircraft.

reference to analogues in piloted commercial flight, presents a good policy analysis starting point. It is well understood that due to the dearth of airworthiness standards, the ability of such aircraft to have reliable system standards is highly variable. Australian CASA's Director of Aviation Safety (as he then was), Mr John McCormick said that:

> The difficulty with the proliferation of these UASs … is that they are not built to any standard. There is no international standard at this stage. So their ability to maintain altitude, their ability to maintain heading, their ability to suffer equipment failure and then not crash, have not been established.[38]

This section will look at some of the risks associated with RPAS flights, particularly were these to involve the commercial carriage or transport of persons whether as passengers or participants in a flight, and the following section will look at some of the potential solutions which should be considered in revised guidance/SARPs or domestic legislation.

It will be seen that it may not be as simple as one may think to simply apply the Montreal regime to commercial passenger remotely piloted flights, nor as simple to apply the existant regime of liability for damage by aircraft on the ground, to such flights too. RPAS flights are different to airlines, and so are the operators who control them. A look at how and why RPASs might fail will go a long way to helping us understand and select the right liability system for this quickly evolving technical frontier.

The risk is that the increased tolerance to danger that remote flights permit their controllers or operators to engage with, means that RPAS could be used with a higher frequency for unlawful activities, particularly use of RPAs as a

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38) See Australian Parliament Senate Standing Committee on Social Policy and Legal Affairs, "Eyes in the sky: Inquiry into drones and the regulation of air safety and privacy", July 2014, at p 14 quoting Committee Hansard, 28 February 2014, p 2, Canberra, available at http://www.aph.gov.au/Parliamentary_Business/Committees/House/Social_Policy_and_Legal_Affairs/Drones/Report.

missile or weapon. In such a potentially disastrous event, who would be liable for the death and destruction on the ground, and what can be done with existing regulation to safeguard against such risks?

As regards prevention and security screening; in Australia the proposed advisory circular (AC) for RPAS,"AC 101-1 (General)" includes only a brief paragraph to potential operators as follows:

> When operating an RPA from a security controlled airport, remote crew members should take into account the requirements for access to the airport operational areas and the aviation security requirements that apply to the security controlled airport.

Of concern is that there is little consideration of the potential dangers of RPAS use for unlawful purposes from any aerodrome (or outside line of sight from well away from aerodromes). Naturally subject only to the regulator's risk assessment for the kinds of operation that may be performed with the relevant scale of equipment, thought should be directed to the imposition of more stringent background checks and security clearance for those intending to operate aviation equipment which could be turned to unlawful and terrorist purposes, particularly given the already low "aviation" oversight of such operators.[39] This could be achieved by incorporating the stringent security requirements for an "ASIC" for commercial and airline pilots into the requirements for commercial remote operators and pilots. The kinds of damage that may be done with RPAS and airliners are on par, especially when one considers the larger aircraft which will be needed in time to operate international air transport flights.

With respect to liability for harm to persons on the ground in such a situation, the matter is captured by the Australian *Damage by Aircraft Act 1999* (Cth) ("DBA"). This federal law provides a statutory cause of action by those harmed

39) We must always recall that typical RPAS operators are not aviators, and merely use the RPA as a tool or system to further some other commercial activity.

by certain acts or circumstances involving aircraft (which impliedly includes RPAS), to obtain compensation for proven loss from either the owner, operator or user of an aircraft (with certain exceptions and exclusions for persons such as employees of aircraft operators). The scheme is a no-fault system meaning that proof of intent of damage is not required. As such it has been tested in Australian courts mostly with respect to the kinds of losses incurred and mechanism of an aircraft actually causing damage to the person on the ground, rather than the intent of the aircraft operator.[40]

The issue with the concept of applying a DBA type statute to RPAS for those States which may consider doing the same, is that ascribing blame to the operator of an unmanned aerial vehicle presents a different level of complexity to the situation of ascribing blame to the operator of a piloted aircraft. It may well be

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40) See, for example, *ACQ Pty Limited v Cook; Aircair Moree Pty Limited v Cook* [2009] HCA 28 (5 August 2009). In *ACQ* the High Court of Australia dismissed appeals by ACQ Pty Ltd and Aircair Moree Pty Ltd, the owner and operator of a crop-dusting aircraft. They appealed findings that they were liable for damages to a man (Mr Cook) for serious injuries he suffered from an electric shock from a power line that was knocked down by the appellants' aircraft.
On 28 December 2000 the aircraft was crop dusting a cotton field over which a high voltage conductor hung at a height of at least 6.2 metres. During the flight the aircraft struck the conductor. It was dislodged from its supporting pole and left hanging about 1.5 metres above the ground. The energy company sent two employees – Mr Cook and Mr Buddee – to deal with the dislodged conductor. The two men agreed that Mr Buddee would drive to a links site about seven kilometres away and isolate the conductor, after which Mr Cook would commence an assessment of the situation in the cotton field. Despite this Mr Cook entered the field before the conductor had been isolated. The ground in the field was uneven and very boggy. Mr Cook stumbled in the muddy conditions and fell close to the conductor, received an electric shock, and was badly injured.
Mr Cook sued both ACQ and Aircair for damages pursuant sections 10 and 11 of the DBA. He was successful in the District Court of New South Wales, who awarded him damages of $953,141.00. ACQ's and Aircair's appeals to the High Court raised the issue of what had "caused" Mr Cook to suffer injury. ACQ and Aircair acknowledged that Mr Cook would not have been in the field except for the fact that the aircraft impacted the conductor and dislodged it. Oddly, they did not argue contributory negligence. ACQ and Aircair submitted that there was not a close enough temporal, geographical and relational connection between the dislodgement of the conductor and the injuries Mr Cook suffered.
In a unanimous decision the High Court rejected these arguments. The Court considered it did not strain the language of the DBA to characterise the events following the impact of the aircraft with the conductor as having "caused" Mr Cook's injuries. The Court concluded that Mr Cook's injuries were caused by the dangerous position of the conductor. The conductor was in a dangerous position because the aircraft had struck it.

that the policy basis for making a traditional air operator strictly liable for damage caused on the ground will not hold up when applied to the situation of RPAS. For example, consider the case of a software issue which causes an airliner to crash. Consider the same case for a 150kg RPAS which likewise crashes. While it may be appropriate to impose strict liability for damage on the ground to an air operator who has significant mandatory aviation safety obligations covering everything from pilot licensing to airworthiness, and thus must take responsibility for the software error, in the context of RPAS with (currently) no airworthiness standards, would it be fair to impose such a liability on the operator?

RPAS commercial operators are seldom aviation professionals and thus may be significantly less expert at operationally judging risk than the airline operator. Typically RPAS commercial operators are not in the business of aviation nor air transport, and may be more reliant on manufacturer information than air transport operators. The imposition of the same liability standard thus seems counter intuitive notwithstanding that the risks posed by negligence or recklessness could be injury or death.

In addition, what if the RPAS was operating in an autonomous mode, and thus there was no direct implication of an operator at all with the accident flight (except by virtue of owning the aircraft and potentially configuring it)? The attribution of liability (strict liability) in these circumstances is not comfortably imposed. This is a policy question which lawmakers in Australia will likely have to wrestle with in determining whether an RPAS operator should be liable in future, if and when a court action is brought and won against a RPAS operator, under the DBA, as it may highlight the imprecision and lack of suitability of the DBA for some RPAS applications.

It may well be better that in the present revisions to the RPAS legislation in Australia, thought be directed to the liability implications which arise due to the peculiar nature of the relationships between owners, operators, controllers, and remote station crew in RPAS operations.

3. Risks in Operation of RPAS - Safety Aspect

Australian regulation of remotely piloted aircraft systems are primarily motivated by "the safety of other aircraft in the airspace and of people and property on the ground."[41] In particular, the question of medical assessment and fitness for remote pilots requires more attention although it has only received marginal attention in the RPASM. The RPASM has considered medical assessment akin to the general requirements for medical fitness of air traffic control personnel (ie, class 3 medical certificate, which is a less onerous standard than that required of private pilots).[42] The RPASM guides states to make the medical assessment of remote pilots based on a review of the kind of operation proposed.

Given that the aim of ICAO is to facilitate IFR operations within a decade, this would seem to be a good start, but more is certainly needed. ICAO publishes a *Manual on Civil Aviation Medicine* for aviation medical examiners to be guided by.[43] However Annex 1 on Personnel Licensing contains certain prescriptive standards identified as necessary to determine early warnings of safety sensitive health conditions, and similar research and supported guidance material or SARPs need to be created for the peculiar circumstances of remote pilots, and the juxtapositions which their lives depict.[44]

These are matters which require expert attention and diplomatic effort to ensure appropriate consideration is given to appropriate regulatory solutions and

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41) CASA AC 101-1(1) DRAFT May 2014, p 12. Available at https://www.casa.gov.au/sites/g/files/net351/f/_assets/main/newrules/ops/nprm/nprm1309os_annexc.pdf.

42) RPASM, 8.7.1.

43) ICAO DOC 8984.

44) One description of the world of a remote pilot, albeit in a military setting, brings to the fore the peculiarity for humans (who are adapted to operating within the world they experience around them) operating aircraft in distant countries is available at "Overpaid, underworked and bored", http://www.motherjones.com/politics/2013/06/drone-pilots-reaper-photo-essay:
Mike's morning commute to the battlefield begins with his usual Egg McMuffin and black coffee from a McDonald's drive-through window in Alamogordo, New Mexico. After driving out of town in his Ford pickup, clearing a security checkpoint, and attending a daily briefing, he will be remote-controlling an MQ-9 Reaper drone 10,000 feet above Afghanistan.

bespoke technical solutions which sound in law. It is simply not the case that adapting civil aviation's liability standards and medical fitness standards will adequately reflect the novelty of RPAS operations in the modern world.

4. Risks in Operation of RPAS - Privacy Aspect

In principle, privacy is in the scope of domestic law rather than international law.[45] In the context of the international regulatory environment, the topic has limited relevance as ICAO is likely to unconcerned with this element of RPAS operation – RPAS operation internationally would likely have more concern for States themselves and their citizens in the context of spying. Privacy and military law is beyond the scope of this article.

However, it is worth noting that the question of breaches of privacy and the harm this causes has been the subject of other treatment, and review in Australia and elsewhere.[46] The subject does not fall within the scope of policy regulated by CASA in Australia.

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45) For the development of privacy issues of unmanned aircraft in Korea, see Sun—Ihee, Kim, "A Study on the infringement of privacy of unmanned aircraft: Focusing on the analysis of legislation and US policy", *Journal of Korea Air & Space Law and Policy*, Vol.29(2), Korea Society of Air & Space Law and Policy, 2014.

46) See for example, Butler, D, "The dawn of the age of the drones: an Australian privacy law perspective", *UNSW Law Journal* (2005) Vol 37(2); Australian Parliament Senate Standing Committee on Social Policy and Legal Affairs, "Eyes in the sky: Inquiry into drones and the regulation of air safety and privacy", July 2014, Canberra, available at http://www.aph.gov.au/Parliamentary_Business/Committees/House/Social_Policy_and_Legal_Affairs/Drones/Report; Cho, G "Unmanned Aerial Vehicles: Emerging Policy and Regulatory Issues"10, (2013) 22(2) *Journal of Law, Information and Science* 201; Research Group of the Office of the Privacy Commissioner of Canada, "Drones in Canada, "Will the proliferation of domestic drone use in Canada raise new concerns for privacy?", March 2013, available at https://www.priv.gc.ca/information/research-recherche/2013/drones_ 201303_e.asp.

Ⅳ. Conclusions

RPAS operations still constitute a minuscule, though growing sector within aviation. International pilotless flight for commercial air transport remains a future commercial and social reality but as the industry is developing so quickly the more time spent in pursuit of the right policy solutions, the better the law will be able to cope with the technological realities.

A domestic or regional approach to RPAS is and continues to be the principal measure to deal with RPAS issues globally, and safety remains the foremost factor in emerging RPAS regulation. With respect to the effort of making safety-related regulation, the international approach pursued through and under ICAO's auspices has been effective. Even though Australia has been praised for the quick establishment of RPAS rules, the present aviation safety focus provides a relatively blunt instrument and is recognised to be in need of updates to ensure their relevance as the technology develops.

Therefore, ICAO can and should play an important role in this area. Setting safety-related rules is also important for liability rules because they are linked. The flipside of a lack of binding airworthiness standards for RPAS operators is potentially a strong argument that the liability regime (and particularly strict liability of operators) is unfair and unsuited to pilotless flight. The potential solutions include the need for revised guidance and, in particular, SARPs with respect to air safety, airworthiness, and potentially liability issues for participants/passengers, and those on the ground. Such guidance could then be adapted swiftly for appropriate incorporation into domestic laws without the need for or administrative burden of the treaty process.

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초 록

본 논문은 무인항공기 관련 현행 국제법을 국제항공공법과 국제항공사법의 관점에서 조사하고, 무인항공기관련 현행 호주 국내법과 입법 예고된 호주 국내법을 무인항공기 운항에 따른 위험요소 (민사책임, 안전, 사생활보호)에 중점을 두면서 검토한다. 현재 전체 상업용 비행에서 무인항공기 운항이 차지하는 비율은 미미한 수준이지만, 상업용 목적의 국제무인항공비행은 현실이 될 것이다. 무인기 관련산업이 빠르게 발전하고 있으므로, 빠른 시일 내에 정책적인 해결방안이 연구되어야만, 무인항공기관련 위험요소들이 실제로 일어났을 때 적절하게 대응할 수 있는 법규범이 만들어 질 수 있을 것이다.

호주의 무인항공기관련 성공적인 국내입법에서 보듯이, 국내법적 또는 지역단위의 접근이 무인항공기 관련 문제를 주도하고 있고, 계속해서 주도할 것이다. 안전문제는 호주의 현행·입법 예고된 무인항공기관련 법규에 가장 중요한 요소이고, 국제적으로도 마찬가지이다. 안전관련 법규를 만드는 것은 매우 중요하고, 민사책임 관련법규를 만드는 것보다 선행되어야 한다. 그 이유는 안전관련 법규를 만드는 것이 민사책임 법규가 적용되는 사고의 발생위험 자체를 줄일 수 있기 때문이다. 무인항공기 운항자에 대한 구속력 있는 감항기준이 구비되어 있지 않다는 점은, 운항자의 엄격책임이 적용되는 민사책임 체계가 무인항공기 분야에는 적절하지 않다는 주장을 가능하게 할 수 있다.

이에 대한 해결책으로 ICAO 지침개정과 무인기 안전 및 감항관련 SARPs 개정, 또한 잠재적으로는 민사책임 (참가자, 승객, 지상손해 대상)관련 문제들을 포함하는 SARPs 개정의 필요성을 제안한다. 이러한 ICAO지침은 적절한 절차를 거쳐서 각국의 국내법으로 차용될 수 있을 것이고, 이럴 경우 국제협약을 제정하고 발효까지 필요한 행정적 부담과 시간을 피할 수 있을 것이다.

주제어 : 무인항공기, 드론, 국제민간항공기구, 호주 무인항공기법, 무인기 관련법

Abstract

A Study on the Australian Law Regarding RPAS (Remotely Piloted Aircraft System): Need for an International Approach

Joseph Wheeler · Lee, Jae-Woon

This article surveys the current international law with respect to RPAS from both the public air law and private air law perspectives. It then reviews current and proposed Australian domestic RPAS regulation while emphasizing the peculiar risks in operation of RPAS; and how they affect concepts of liability, safety and privacy. While RPAS operations still constitute only a small portion of total operations within commercial aviation, international pilotless flight for commercial air transport remains a future reality. As the industry is developing so quickly the earlier the pursuit of the right policy solutions begins, the better the law will be able to cope with the technological realities when the inevitable risks manifest in accidents.

The paper acknowledges that a domestic or regional approach to RPAS, typified by the legislative success of the Australian experience, is and continues to be the principal measure to deal with RPAS issues globally. Furthermore, safety remains the foremost factor in present and revised Australian RPAS regulation. This has an analogue to the international situation. Creating safety-related rules is imperative and must precede the creation or adoption of liability rules because the former mitigates the risk of accidents which trigger the application of the latter. The flipside of a lack of binding airworthiness standards for RPAS operators is potentially a strong argument that the liability regime (and particularly strict liability of operators) is unfair and unsuited to pilotless flight.

The potential solutions the authors raise include the need for revised ICAO guidance and, in particular, SARPs with respect to RPAS air safety, airworthiness, and potentially liability issues for participants/passengers, and those on the ground. Such guidance could then be adapted swiftly for appropriate incorporation into domestic laws bypassing the need for or administrative burden and time it would take to activate the treaty process to deal with an arm of aviation that states know all too well is in need of safety regulation and monitoring.

Key words : Unmanned Aircraft System (UAS), Remotely Piloted Aircraft System (RPAS), ICAO, Drone, Liability