

Drones, Airprox, and the Regulatory Environment: Cause for Concern?



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This article begins by exploring the institutions, hard regulations and soft guidance that make up the regulatory environment surrounding drones. National (UK), regional (European Union), and international (United Nations) regulations and guidance are outlined, the incidence of airprox caused by drones is identified, and an analysis undertaken as to whether the civil and the criminal law are up to the challenge of effectively regulating drones. Having done so, the modest view is endorsed that the current regulatory environment is achieving an acceptable balance between ensuring safety, security and accountability of the drone industry, whilst also harnessing the benefits that drones can bring. Should that balance change, however, there are additional, potentially more effective options open to regulators that would incorporate the market, and architecture (coding) into the regulatory environment.

Introduction

After Britain's busiest airport grounded flights for almost an hour in response to a suspected drone sighting ("the Heathrow shutdown"), it was fairly reported that: "The latest incident will raise further concerns about why detection and blocking devices have not already been permanently deployed to prevent a repeat of the Gatwick shutdown."¹ During "the Gatwick shutdown", it was estimated that around 350,000 passengers suffered 'days of chaos at Gatwick after drones forced the closure of Britain's second-biggest airport', in which the army was called out 'as the police were left seemingly powerless to stop the drones'.²

It is unsurprising, then, that two days before the Heathrow shutdown, it was announced that: 'New legislation will give police officers the power to land drones, search premises and seize drones and will require users to produce the proper documentation.'³ At the time of writing, the Draft Drones (Regulation) Bill is expected to have its second reading on Friday, 15 February 2019. If passed, it will regulate the purchase and use of drones weighing five kilograms or more.⁴

¹ *The Times* (9 January 2019) 1.

² *The Times* (21 December 2018) 1.

³ Department for Transport, 'New police powers to tackle illegal use of drones' (7 January 2019).

⁴ Parliament, 'Drone (Regulation) Bill 2017-19'.

In light of the above, it is opportune to identify the regulatory environment around drones, and the proposed legislative response to the recent shutdowns at the UK's busiest airports, so as to offer an informed view as to whether an appropriate balance is being achieved 'to ensure safety, security and accountability of the drone industry, whilst harnessing the benefits that drones, used in a safe way, can bring to the UK economy.'⁵

Regulatory environment

A leading text on the regulation of novel technologies holistically encapsulates 'the idea of a regulatory environment' in these terms:⁶

When we say that emerging technologies should be understood as being situated in a particular regulatory environment, the essential idea is that, when we act – whether we act as developers and commercial exploiters, or as users and appliers, of particular technologies – we do so in a context that has a certain coding that signals whether various acts are permitted (even required) or prohibited, whether they will be viewed positively, negatively or neutrally, whether they are incentivized or disincentivised, whether they are likely to be praised or criticised, even whether they are possible or impossible and so on. Institutions acting in a regulatory capacity, likewise, do so in ways that reflect their own organisational culture and, more generally, the legal, political and social environment within which they are embedded.

This article uses the terms “regulatory environment” and “institutions” in this sense.

Institutions

The institutions that contribute to the regulatory environment surrounding drones can be separated on to three, distinct levels: national (UK), regional (European Union), and international (United Nations). This article focuses on the main institutions. There are, however, other, more specialised institutions that contribute to the regulatory environment, including:

⁵ Department for Transport, *Taking Flight: The Future of Drones in the UK: Government Response* (January 2019) 5 (“*Taking Flight*”).

⁶ Roger Brownsword & Morag Goodwin, ‘Law and the Technologies of the Twenty-First Century’ (Cambridge University Press, Cambridge, 2012) 27.

- 1) ARPAS-UK, the Association of Remotely Piloted Aircraft Systems, which is a non-profit organisation ‘to represent the small RPAS industry in the UK and to help promote best practice among its members’;⁷
- 2) Eurocontrol, an intergovernmental organisation ‘committed to building, together with our partners, a Single European Sky that will deliver the air traffic management (ATM) performance required for the twenty-first century and beyond’;⁸ and
- 3) The Joint Authorities for Rulemaking on Unmanned Systems, which ‘is a group of experts gathering regulatory expertise from all around the world [to] recommend a single set of technical, safety and operational requirements for all aspects linked to the safe operation of the Remotely Piloted Aircraft Systems’.⁹

Nationally, the Civil Aviation Authority is ‘the UK’s specialist aviation regulator’, with responsibility for overseeing that ‘the aviation industry manages security risks effectively’, and funded ‘entirely from charges to those we provide a service to regulate’.¹⁰ Most aviation regulation and policy is harmonised, so as to ensure consistency of safety and consumer protection around the world.

Regionally, member states of the European Aviation Safety Agency (“EASA”) include those within the European Union (“EU”), Switzerland, Norway, Iceland and Lichtenstein. EASA’s ‘tasks’ include drafting ‘implementing rules in all fields pertinent to the EASA mission’, which in turn includes ensuring ‘the highest common level of safety protection for EU citizens’. Last year, 64 per cent of its budget was comprised of fees paid by the industry, and 23 per cent from EU subsidy.¹¹

Internationally, the International Civil Aviation Organization (“ICAO”) is ‘a UN specialized agency’ that

works with the [International Civil Aviation] Convention’s 192 Member States and industry groups to reach consensus on international civil aviation Standards and Recommended Practices (SARPs) and policies in support of a safe, efficient,

⁷ Association of Remotely Piloted Aircraft Systems, ‘About Us’.

⁸ Eurocontrol, ‘Who we are’.

⁹ Joint Authorities for Rulemaking on Unmanned Systems, ‘Who We Are’.

¹⁰ Civil Aviation Authority, ‘Our role’.

¹¹ European Aviation Safety Agency, ‘The Agency’.

secure, economically sustainable and environmentally responsible civil aviation sector.¹²

The ICAO manages over 12,000 SARPS, that ‘permits more than 100,000 daily flights in aviation’s global network to operate safely and reliably in every region of the world’, providing

the fundamental basis for harmonized global aviation safety and efficiency in the air and on the ground, the worldwide standardization of functional and performance requirements of air navigation facilities and services, and the orderly development of air transport.¹³

United Kingdom

Part III of the Civil Aviation Act 1982 makes provision for the regulation of civil aviation in the United Kingdom, including registration of aircraft, airworthiness, and licensing of pilots. Section 60 prescribes that “Orders in Council” – ‘an important method of giving the force of law to acts of the government, especially the more significant executive orders’¹⁴ ‘made by the Queen acting on the advice of the Privy Council’¹⁵ – may be promulgated to regulate air navigation. The statutory instrument providing the vehicle for this is the Air Navigation Order 2016 (“the ANO”), which ‘regulates such matters as aviation safety standards and aircraft navigation that fall outside the scope of EU regulation.’¹⁶ Last year, the 2016 Order was amended,¹⁷ so that:¹⁸

From 30th July 2018 [there are] restrictions on flights by any [small unmanned aircraft (“SUA”)] at a height of over 400 feet or within the flight restriction zone of a protected aerodrome, and from 30th November 2019 it will prohibit flights by SUA with a mass of 250 grams or more unless the person with management of the SUA (“the SUA operator”) has obtained a certificate of registration and the person with control over the flight controls (“the remote pilot”) has obtained an acknowledgement of competency from the Civil Aviation Authority (“the CAA”).

Article 23(3) of the ANO lists the articles that are applicable to SUA. Some of the more salient articles, and what they prescribe, are set out below. Schedule 1, paragraph 1 of the ANO defines “small unmanned aircraft” as

¹² International Civil Aviation Organization, ‘About ICAO’.

¹³ International Civil Aviation Organization, ‘How ICAO Develops Standards’.

¹⁴ A W Bradley, K D Ewing & C J S Knight, ‘Constitutional & Administrative Law’ (Pearson, UK, 2015) 249.

¹⁵ Parliament, ‘Orders in Council’.

¹⁶ *Explanatory Memorandum to The Air Navigation Order 2016/765* [4.1].

¹⁷ Air Navigation Order 2018/623.

¹⁸ *Explanatory Memorandum to The Air Navigation Order 2018/623* [2.1].

any unmanned aircraft, other than a balloon or a kite, having a mass of not more than 20kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight

It has been logically argued that, ‘according to this definition, the mass of the battery in a battery powered aircraft would not be included in the total mass calculation.’¹⁹ This is important for at least one very good reason. As discussed below, from 20 November 2019, an SUA with a mass of 250 grams or more without its fuel, but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight, *must* be registered.

Articles 94 and 95 of the ANO set out the responsibilities of, and prohibitions on a “remote pilot”, or “SUA operator”. Article 94G of the ANO defines both in these terms:

... (a) the “*remote pilot*”, in relation to a small unmanned aircraft, is an individual who—

(i) operates the flight controls of the small unmanned aircraft by manual use of remote controls, or

(ii) when the small unmanned aircraft is flying automatically, monitors its course and is able to intervene and change its course by operating its flight controls;

(b) the “*SUA operator*”, in relation to a small unmanned aircraft, is the person who has the management of the small unmanned aircraft.

The Civil Aviation Authority has correctly concluded that there are ‘two key principles of small unmanned aircraft flying that must always be applied:’²⁰

Article 94(2) The remote pilot is directly responsible for ensuring that the aircraft is flown safely

Article 94(3) The remote pilot must not fly the aircraft out of his/her sight, in order to ensure that collisions can be avoided

Article 94(5) of the ANO requires SUA operators and remote pilots flying for the purpose of “commercial operations” to have the permission of the CAA. Article 7 of the ANO defines a “commercial operation” as

¹⁹ Rufus Ballaster, Andrew Firman & Eleanor Clot, ‘A Practical Guide to Drone Law’ (Law Brief Publishing, Somerset, 2017) 13 (“A Practical Guide to Drone Law”).

²⁰ *Air Navigation (Amendment) Order 2018 – Guidance for small unmanned aircraft users* (July 2018) 3.

any flight by a small unmanned aircraft except a flight for public transport, or any operation of any other aircraft except an operation for public transport—

(a) which is available to the public; or

(b) which, when not made available to the public—

(i) in the case of a flight by a small unmanned aircraft, is performed under a contract between the SUA operator and a customer, where the latter has no control over the remote pilot; or

(ii) in any other case, is performed under a contract between an operator and a customer, where the latter has no control over the operator,

in return for remuneration or other valuable consideration.

Article 94A(1) of the ANO provides that:

The SUA operator must not cause or permit a small unmanned aircraft to be flown at a height of more than 400 feet above the surface, and the remote pilot of a small unmanned aircraft must not fly it at a height of more than 400 feet above the surface, unless the permission of the CAA has been obtained.

Flying an SUA below 400 feet significantly reduces the likelihood of an encounter with a *manned* aircraft. This is because, other than take-off and landing, *manned* aircraft fly at much greater heights. This height restriction is in harmony with the forthcoming European Union Regulation for the operation of unmanned aircraft.²¹ It is to be noted that:²²

In aviation terms, 'height' means the vertical distance of an object (in this case the small unmanned aircraft) from a specified point of datum (in this case above the surface of the earth). To cater for the few occasions where a small unmanned aircraft is being flown over hilly/undulating terrain or close to a cliff edge, the 400 ft height above the surface requirement may be interpreted as being a requirement to remain within a 400 ft distance from the surface ... It does not automatically apply to heights/distances from tall buildings or other structures: in such cases, an additional permission from the CAA will be required, which will invariably also require permission to operate within a congested area.

Article 94B of the ANO provides that you cannot fly an SUA closer than one kilometre of the boundary of a "protected aerodrome" without permission. Airports, military airfields, and small, "general aviation" airfields, where the CAA has issued a licence to an airfield operator qualify as a "protected aerodrome". Subsection (2) provides that:

²¹ European Aviation Safety Agency, *Draft Commission Regulation (EU) ... / ... laying down rules and procedures for the operation of unmanned aircraft* Article 4; and *Draft Annex to Commission Regulation (EU) ... / ... laying down rules and procedures for the operation of unmanned aircraft*.

²² Civil Aviation Authority, *Air Navigation (Amendment) Order 2018 – Guidance for small unmanned aircraft users* (July 2018) 4 ("*Air Navigation (Amendment) Order 2018 – Guidance*").

The "flight restriction zone" of a protected aerodrome consists of the following two zones—

- (a) the "*Inner Zone*", which is the area within, and including, the boundary of the aerodrome;
- (b) the "*Outer Zone*", which is the area between—
 - (i) the boundary of the aerodrome, and
 - (ii) a line that is 1 km from the boundary of the aerodrome (the "1 km line").

Article 94B of the ANO 'does not automatically imply that it is "legal" to fly a small unmanned aircraft at a range of "just over" 1 km from an aerodrome boundary at a height of 400 ft'. The example given is 'in the approach path to a runway where manned aircraft will be at a similar height or even, perhaps, lower'.²³ The overarching obligation in Article 241 of the ANO still applies: 'A person must not recklessly or negligently cause or permit an aircraft to endanger any person or property.'

Article 94C(1) of the ANO establishes that, from 1 October 2019, the CAA must register a small unmanned aircraft operator, if that person:

- (a) has applied to the CAA, in such manner as the CAA may require, to be registered as an SUA operator,
- (b) has supplied such information and evidence as the CAA may require, and
- (c) has, in the case of an individual, attained the age (if any) that is prescribed.

Article 94D(1) of the ANO provides that, from 30 November 2019, a flight by a SUA with a mass of 250 grams or more without its fuel, but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight *must* be registered. Where this is the case, the article further provides that:

- (2) The SUA operator must not cause or permit the small unmanned aircraft to be flown unless—
 - (a) the CAA has issued the SUA operator with a certificate of registration which is valid for that flight at the time of the flight, and
 - (b) the SUA operator's registration number is displayed on the aircraft in the manner (if any) that is prescribed.
- (3) The remote pilot of the small unmanned aircraft must not fly it unless the remote pilot has reasonably formed the view that the SUA operator complies with the requirements in paragraph (2) in relation to that flight.

Article 94E of the ANO establishes that, by 1 October 2019, the CAA must create a scheme for the competence testing of remote pilots. Subsection (2) provides that:

²³ *Air Navigation (Amendment) Order 2018 – Guidance 7.*

That training or those tests may relate to matters which include—

- (a) the practical operation of small unmanned aircraft;
- (b) matters connected with the operation of small unmanned aircraft (such as respect for privacy, data protection, safety, security and environmental protection).

Subsection (4) qualifies the scope of this competency test, so that it is confined to SUA with a mass of less than 250 grams without their fuel, but including any articles or equipment installed in or attached to the aircraft at the commencement of their flight, or flights by aircraft of that description.

Article 94F of the ANO sets out the requirements that will be in place for remote pilot competency testing from 30 November 2019. Only remote pilots flying SUA with a mass of 250 grams or more are required to undertake a competency test. At the time of flying, the remote pilot must have an acknowledgement of competency. And an SUA operator must not allow his aircraft to be flown unless he is satisfied that the remote pilot has passed the appropriate competency test.

Article 95 of the ANO applies to ‘a small unmanned aircraft which is equipped to undertake any form of surveillance or data acquisition.’ Where any of the following circumstances in subsection (2) apply, an SUA operator must not cause or permit such an aircraft to be flown, and a remote pilot must not fly it, except in accordance with a permission by the CAA:

- (a) over or within 150 metres of any congested area;
- (b) over or within 150 metres of an organised open-air assembly of more than 1,000 persons;
- (c) within 50 metres of any vessel, vehicle or structure which is not under the control of [the SUA operator or the remote pilot] of the aircraft; or
- (d) subject to paragraphs (3) and (4), within 50 metres of any person.

Article 239 of the ANO prescribes that the Secretary of State may pass regulations that prohibit, restrict, or impose conditions on flights by aircraft, where:

The aircraft and circumstances are—

- (a) aircraft, whether or not they are registered in the United Kingdom, in any airspace over the United Kingdom or in the neighbourhood of an offshore installation; and
- (b) aircraft which are registered in the United Kingdom, in any other airspace, being airspace for which the United Kingdom has, under

international arrangements, undertaken to provide navigation services for aircraft.

Subsection (4) creates a criminal offence 'to contravene, permit the contravention of or fail to comply with any regulations made under this article'.

Article 257 of the ANO provides that, in three circumstances, the CAA, or an authorised person

may direct the operator or the pilot in command of the aircraft not to permit the aircraft to make the particular flight or any other flight of such description as may be specified in the direction, until the direction has been revoked by the CAA or by an authorised person.

If so, the operator or the pilot in command of the aircraft may be directed not to permit the aircraft to make the particular flight, or any other flight of such description as may be specified in the direction, until the direction has been revoked by the CAA or by an authorised person. In summary, the two circumstances are where: 1) any relevant regulations made under the ANO, by the EASA, or European Union are engaged, and it there is danger to any person or property; and 2) the aircraft is in a condition unfit for the flight.

Article 241 of the ANO prescribes that: 'A person must not recklessly or negligently cause or permit an aircraft to endanger any person or property.'

Article 265(1) of the ANO provides for an offence

if any provision of this Order, any regulations made under this Order, an EASA Regulation or [EU Regulation] is contravened in relation to an aircraft, the operator of that aircraft and the pilot in command ... is (without prejudice to the liability of any other person for that contravention) deemed for the purposes of the following provisions of this article to have contravened that provision.

Subsection (2) provides that 'a person will not be deemed to have contravened' this article, 'if the person proves that the contravention occurred without that person's consent or connivance and that that person exercised all due diligence to prevent the contravention.' Subsection (3) provides a *force majeure* defence, where the contravention 'was due to any cause not avoidable by the exercise of reasonable care by that person'.

Article 265(8) of the ANO proscribes endangering the safety of an aircraft – defined in Article 240 of the ANO in these terms: ‘A person must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft’ – which is punishable on summary conviction by a fine, or on conviction on indictment by a fine, imprisonment for a term not exceeding five years, or both. Were someone responsible for the Gatwick or Heathrow shutdown identified, it is likely that they would be prosecuted under this article.

European Union

In December 2015, the European Commission published a proposal to update aviation safety rules.²⁴ In December 2017, the European Parliament and the Council reached a provisional agreement on the new rules,²⁵ which have been in force since 11 September 2018,²⁶ including the first-ever EU rules for civil drones. Recital 31 of the Regulation that implements these new rules gives the following introduction:

In view of the risks that unmanned aircraft can present for safety, privacy, protection of personal data, security or the environment, requirements should be laid down concerning the registration of unmanned aircraft and of operators of unmanned aircraft. It is also necessary to establish digital, harmonised and interoperable national registration systems in which information, including the same basic data, about unmanned aircraft and operators of unmanned aircraft registered in accordance with this Regulation and the implementing acts adopted on the basis thereof should be stored.

Annex IX provides for ‘essential requirement for unmanned aircraft’, that is, that the EU is now competent to regulate the design, production, maintenance and operation of unmanned aircraft, including unmanned aircraft with operating mass below 150kg. The UK Government recognise that, until the UK leaves the EU, these requirements are not merely of academic interest:²⁷

²⁴ 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.

²⁵ European Council, ‘Updated aviation safety rules and new rules on drones approved by the Council’ (22 December 2017).

²⁶ Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91.

²⁷ *Taking Flight* 15.

Until exit negotiations are concluded, the UK remains a full member of the European Union and all the rights and obligations of EU membership remain in force. During this period the Government will continue to negotiate, implement and apply EU legislation. The outcome of these negotiations will determine what arrangements apply in relation to EU legislation in future once the UK has left the EU.

United Nations

In 2007, the ICAO became involved with – what it previously termed – “unmanned aerial vehicles”, when the Air Navigation Commission requested the Secretary General to consult with selected states, and international organisations, in relation to unmanned aerial vehicle activities, procedures, and operating authorisations.²⁸ As a result, the Unmanned Aircraft Systems Study Group (“UASSG”) was established.

In 2008, the UASSG held its first meeting.²⁹ It was tasked ‘to support the Secretariat in developing guidance material and expedite the development of provisions to be used by States to regulate unmanned aircraft systems’.³⁰ In 2014, it was superseded:³¹

The Remotely Piloted Aircraft Systems Panel (RPASP) [now] coordinates and develops ICAO Standards and Recommended Practices (SARPs), Procedures and Guidance material for remotely piloted aircraft systems (RPAS), to facilitate a safe, secure and efficient integration of remotely piloted aircraft (RPA) into non-segregated airspace and aerodromes.

In 2015, the RPASP published a document, aspiring ‘to provide guidance on technical and operational issues applicable to the integration of [remotely piloted aircraft] in non-segregated airspace and at aerodromes.’³² Such guidance is an important part of the regulatory environment, informing states, other (governmental and non-governmental) institutions, and individuals of best practice.

²⁸ International Civil Aviation Organization, ‘Global Aviation Safety Plan 2017-2019’ (Doc 10004, 2016) 3-5.

²⁹ Unmanned Aircraft Systems Study Group, ‘First Meeting: Montréal, 7 to 10 April 2008: Summary of Discussions’ (UASSG/1-SD, 25 April 2008).

³⁰ International Civil Aviation Organization, ‘Unmanned Aircraft Systems Advisory Group (UAS-AG)’.

³¹ International Civil Aviation Organization, ‘Remotely Piloted Aircraft Systems Panel (RPSAP)’.

³² International Civil Aviation Organization, ‘Manual on Remotely Piloted Aircraft Systems’ (Doc 10019, 2015) 1-7.

Cause for concern?

The CEO of Gatwick Airport sensibly summed up the challenge facing the regulatory environment after the Gatwick shutdown:³³

Although not for today, these events obviously highlight a wider strategic challenge for aviation in this country which we need to address together with speed – the aviation industry, Government and all the other relevant authorities. It cannot be right that drones can close a vital part of our national infrastructure in this way. This is obviously a relatively new technology and we need to think through together the right solutions to make sure it cannot happen again.

Having set out the main institutions, regulations, and guidance that comprises the regulatory environment surrounding drones, analysis is required to identify whether the Gatwick and Heathrow shutdowns highlight cause for concern. The most alarming cause for concern is that a drone is capable of compromising the safety of manned aircraft. How often has this happened? Is it increasing in frequency? Where drones compromise the safety, or interfere with other rights enjoyed by persons (such as privacy) or property (such as absence of nuisance, is the law capable of grappling with the challenges that drones present, and are those that enforce the law resourced to give effect real effect to that law? What more could be done?

Airprox

Up to November 2018, there were 120 drone airproxes.³⁴ An “airprox” is

a situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised.³⁵

This figure does not take into account the Gatwick shutdown in December 2018, or the Heathrow shutdown in January 2019. It is also concerning that there were 93 drone airproxes caused by drones in 2017, 71 in 2016, and 29 in 2015: that is, a strong positive correlation.

It is important to note that the definition requires the opinion of a pilot or air traffic services personnel. Someone who does not fit this definition – such as a passenger on a

³³ Gatwick Airport, ‘A Message from our CEO’ (undated).

³⁴ UK Airprox Board, ‘Current Drone Airprox Count and Information’.

³⁵ UK Airprox Board, ‘Frequently asked questions’.

commercial flight – may feel that they have witnessed a drone compromising the safety of an aircraft, but, because they are not a pilot, or air traffic services personnel, their opinion does not satisfy the definition. Accordingly, the official figures may be misleading, and not an accurate reflection of the incidence of drones compromising the safety of safety of aircraft, thereby masking the reality that there *is* cause for concern.

Civil

Negligence and nuisance

One specialist text on the regulation of drones in the UK has cogently argued that:³⁶

The laws of contract and tort are perfectly able to be successfully applied to this innovative industry without being interfered with by statutes creating or amending civil liabilities which specifically concern drones, as opposed to for example, manned piloted flight.

Take the law of tort, in particular an action for negligence:³⁷

The flying of a drone is no more negligent act than walking or cycling or driving or playing a sport, which involves an object projected along the ground or in the air. Flying a drone, however, can lead to negligence in much the same way as any of those activities can.

I have not found a reported case in the UK involving an action for negligent use of a drone, however, in principle, there is no reason why the civil law would be incapable of providing a remedy where a person or property sustained damage as a result of negligent use of a drone.

Data protection and privacy

The same specialist text on the regulation of drones argues that there is no cause for concern in relation to third party, data protection and privacy rights:³⁸

Whilst drones certainly do provide new ways in which data protection and privacy breaches can occur, they are by no means so unique that the existing legislative framework cannot cope with the potential issues.

³⁶ A Practical Guide to Drone Law 53.

³⁷ A Practical Guide to Drone Law 44.

³⁸ A Practical Guide to Drone Law 36.

There is support for the view that ‘the current approach to privacy in English law has surprisingly evolved with allowance of an appropriate level of flexibility,’ so that ‘the underlying legal principle of the current legal framework on privacy is sufficient’.³⁹

Another commentator, however, writing in a New York law journal about United States law has sounded the alarm:⁴⁰

The capabilities of this technology undermine the privacy of civilians in private and public settings. The need for *specific privacy regulations* is critical; drone technology forces us to reconsider the nature of privacy in the modern world of drones.

The concern about drones and privacy has also been framed in the context of balancing evidence collected by drones and used in legal proceedings, against privacy rights:⁴¹

A better approach than restricting drone evidence unduly would be to apply the same evidentiary standards to drone forensics as now applies to data and information gained or produced by aerial surveillance generally and other technologies such as cameras, smart phones, and computer-generated visual evidence. Courts could continue to exclude from admission information obtained by drone-deployed technologies deemed violative of common law tort and property rights sounding in privacy and trespass, respectively, as well as [constitutional] protections against state searches, *e.g.*, thermal imaging or facial recognition or biometric matching technology. Such an approach would achieve the goal of excluding impermissible drone-acquired evidence from the adjudicative process while otherwise allowing accepted technologies to continue to perform.

This is no longer a theoretical, foreign concern. In the UK, a local authority used a drone to collect evidence, which was then successfully deployed in court.⁴² The Surveillance Camera Code of Practice (“the Code”) governs the use of surveillance cameras by, among others, the police and local authorities in England and Wales.⁴³ Although not legally binding, it is admissible in evidence (in civil or criminal proceedings), and provides guidance on how local authorities can protect the public, and privacy, whilst achieving

³⁹ Hiroko Onishi, ‘Regulating technology – private misuse of drones and protection of privacy’ (2016) 27(5) *Entertainment Law Review* 175, 178.

⁴⁰ Alexandra Tomanelli, ‘A Drone’s Eye View: Why and How the Federal Aviation Administration Should Regulate Hobbyist Drone Use’ (2018) 34 *Touro Law Review* 867, 870 with emphasis added.

⁴¹ Timothy M Ravich, ‘Courts in the Drone Age’ (2015) 42(2) *Northern Kentucky Law Review* 161, 190.

⁴² *Runnymede Borough Council v Doig & Ors* [2017] EWHC 1873 (Ch) [3].

⁴³ Home Office (June 2013).

overt surveillance. The Code, together with its guidance,⁴⁴ has rightly been credited with providing ‘a useful starting point for UK drone operators ... on operational requirements, technical standards and appropriate systems to prevent privacy infringement.’⁴⁵

With data protection and privacy concerns in mind, then, what are the key risks? Helpfully, the Opinion of an independent European advisory body on data protection and privacy sets them out.⁴⁶ That Opinion made a number of recommendations, including manufacturers taking steps through design to minimise the impact of drone technology on privacy, helpfully summarised in these terms:⁴⁷

1. Embed privacy-friendly design choices and privacy-friendly defaults as part of a privacy by design approach.
2. Involve a suitably qualified Data Protection Officer (where available) in the design and implementation of policies related to the use of drones.
3. Promote and adopt codes of conduct that can help the industry and different categories of operators prevent infringements and enhance the social acceptability of drones.
4. Make the drone as far as possible visible and identifiable (using emitted wireless signal, flashing lights or buzzers, bright colours).

Another commentator, writing in the South African Journal of Contemporary Roman-Dutch Law, has made two, robust recommendations. First, drones should only be sold to individuals who are in possession of a valid licence, having passed the same stringent requirements that commercial-use operators are subject to. Second, a drone should have a specific vehicle registration number, as motor vehicles do, and the owner of the drone should be given a registration certificate, directly linking the owner of the drone to the specific drone.⁴⁸

⁴⁴ Surveillance Camera Commissioner, *A guide to the 12 principles* (undated).

⁴⁵ Matt Harris & Peter Given, ‘Privacy issues and drones: preparing for take-off’ (2014) 15(2) *Privacy & Data Protection* 7, 7.

⁴⁶ Article 29 Working Party, ‘Opinion 01/2015 on Privacy and Data Protection Issues relating to the Utilisation of Drones’ (16 June 2015).

⁴⁷ Matt Harris & Peter Given, ‘New Working Party Opinion on drones – a flight plan for data controllers?’ (2015) 15(8) *Privacy & Data Protection* 6, 7-8.

⁴⁸ Samantha Huneberg, ‘The Rise of the Drone: Privacy Concerns’ (2018) 81 *Tydskrif vir hedendaagse Romeins-Hollandse Reg* 263, 278-9 (“The Rise of the Drone: Privacy Concerns”).

While crediting the UK with coming up with 'laudable measures aimed at educating drone operators on the correct use of such systems as well as implementing a compulsory registration system for all drones weighing 250 grams and above,' it was lamented that 'only commercial operators need to register their drones, which means that a huge part of the drone market is exempt from registering their systems.' Accordingly, 'private operators are capable of infringing a person's privacy more easily than commercial operators.'⁴⁹ Registration of all drones – irrespective of the weight of the drone, and whether or not the flight is for a commercial purpose – and competency testing anyone who flies a drone, then, provide the regulatory environment with additional, robust options, should regulators deem them necessary.

Criminal

The Aviation Minister has announced proposals to extend the powers of the police to enforce the criminal law, thereby conceding that the existing regulatory environment is not fit for the purpose of *enforcing* criminal prohibitions relating to drones:⁵⁰

The new measures proposed in the consultation, such as giving the police the power to request evidence from drone users where there is reasonable suspicion of an offence being committed, were met with strong support from respondents. These new powers will also include giving the police the option to issue fixed penalty notices for minor drone offences, to ensure effective enforcement and an immediate deterrent to those who may misuse drones or attempt to break the law.

A recent consultation – of individuals and institutions, including model aircraft flyers, businesses that use drones, airports, airlines, and manufacturers⁵¹ – established that 'there was strong support for new police powers specific to drone misuse. Respondents felt that specific police powers would lead to more successful prosecutions.'⁵²

This accords with the recent experiences of the Heathrow and Gatwick shutdowns. It was not that there was an absence of relevant criminal provisions: 'Flying a drone close to an airport was already illegal, under legislation passed last year. *The problem there was actually finding those responsible.*'⁵³ The arguments that, as airprox, and other

⁴⁹ The Rise of the Drone: Privacy Concerns 279.

⁵⁰ *Taking Flight* 5.

⁵¹ *Taking Flight* 7-8.

⁵² *Taking Flight* 43.

⁵³ *BBC News*, 'Police to get new powers to tackle illegal drone use' (7 January 2019) with emphasis added.

incidents of drone use contrary to civil and criminal law increase, so should the number of specific offences, or sentences, has been confidently dismissed:⁵⁴

The fact that drones can be used by individuals or institutions to commit crimes does not mean that drones are the instruments of such crimes to the point of needing new crimes or “aggravated” versions of them to be created or defined: each innovative device which becomes common place can be used for crime. More crime is committed using kitchen knives than using drones but there remain very few articles calling for the regulation of kitchen knife use or ownership by adults, nor has there been any suggestion of a compulsory insurance requirement for those who own them.

The problem is one of *enforcement*: technology to identify illegal use of drones, personnel to utilise this technology, and resources to set it up, sustain, and modernise it. That is not to say that there has been complete failure to enforce the criminal law: in October 2018, seven members of a gang that used drones to fly more than half a million pounds worth of drugs into prisons were jailed;⁵⁵ and, in January 2019, a man was charged with flying a drone near the UK’s busiest airport just days after the Gatwick shutdown.⁵⁶

Enforcement

There are four methods of regulation: 1) law; 2) social norms; 3) the market; and 4) architecture (or “code”).⁵⁷ This article has touched upon the first two, for example, national law (the ANO), and international attempts to create social norms (ICAO SARPs). They are not necessarily the most effective. There are alternatives. For example:⁵⁸

The government may want citizens to wear seatbelts more often. It could pass a law to require the wearing of seatbelts (law regulating behavior directly). Or it could fund public education campaigns to stigma those who do not wear seatbelts (law regulating social norms as a means to regulating behavior). Or it could subsidize insurance companies to offer reduced rates to seatbelt wearers (law regulating the market as a way of regulating behavior). Finally, the law could mandate automatic seatbelts, or ignition-locking systems (changing the code of the automobile as a means of regulating behavior). Each action might be said to have some effect on seatbelt use; each has some cost. The question for the government is how to get the most seatbelt use for the least cost.

⁵⁴ A Practical Guide to Drone Law 78.

⁵⁵ *BBC News*, ‘Gang who flew drones carrying drugs into prison jailed’ (26 October 2018).

⁵⁶ *BBC News*, ‘Heathrow: Man charged with flying drone near airport’ (20 January 2019).

⁵⁷ Lawrence Lessig, *Code and Other Laws of Cyberspace* (Basic Books, New York, 1999) Ch 7 (“*Code and Other Laws of Cyberspace*”).

⁵⁸ *Code and Other Laws of Cyberspace* 93-4.

In relation to the market, the regulatory environment could subsidise insurance companies to offer reduced rates to *registered* drone users, those who have passed a *test of competency*, or have signed up to *codes of practice*, in circumstances where registration, competency, and signing up to codes of practice are not (yet) mandatory. In the context of architecture, manufacturers could design, or vendors only be permitted to sell drones that: are coded to ascend only to a certain height; and utilise “geo-fencing”, ‘which uses the drones’ GPS and mapping systems to prevent them from flying into prohibited airspace’.⁵⁹ This would include protected aerodromes, such as airports.

Conclusions

The regulatory environment surrounding drones, and institutions that contribute to it have been identified; specific national, regional and international norms regulating drones via hard, civil prescription, criminal proscription, and soft, best practice guidance have been set out; and the modest view offered that there is not (yet) cause for concern. In principle, a fair balance is being struck between ensuring safety, security and accountability of the drone industry, whilst harnessing the benefits that drones can bring. In practice, however, *resources are needed to maintain balance*.

There is good reason to be confident that there is now enough political appetite to allocate sufficient resources to ensuring that this balance is maintained:⁶⁰

The UK is where technology companies want to build their businesses, invest in innovation and use science and engineering to bring immense benefits to this country. Drones are at the forefront of these technological advances and are already being used in the UK to great effect. Our emergency search and rescue services use drones on a regular basis. Drones can also reduce risks for workers in hazardous sectors such as the oil and gas industries, and this technology is also driving more efficient ways of working in many other sectors, from delivering medicines to assisting with building work.

However, the Gatwick incident has reinforced the fact that it is crucial that our regulatory *and enforcement regime* keeps pace with rapid technological change. We have already taken some big steps towards building a regulatory system for this new sector. It is already an offence to endanger aircraft. Drones must not be flown near people or property and have to be kept within visual line of sight. Commercial users are able to operate drones outside of these rules, but only when granted CAA permission after meeting strict safety conditions.

⁵⁹ Daisy Jones & Mark Taylor, ‘Drones’ (2016) 22(1) *Computer and Telecommunication Law Review* 12, 13.

⁶⁰ Chris Grayling MP, Secretary of State for Transport, Oral Statement to Parliament, ‘Drones: consultation response, 7 January 2019’ (8 January 2019) with emphasis added.

Should the balance of the regulatory environment significantly change, so that the safety, security and accountability of the drone industry is compromised, there are more effective methods of regulation that can be utilised. In particular, the market to encourage, and architecture (code) to enforce compliance, thereby once again achieving balance. Also, further soft guidance, and awareness campaigns would assist to communicate the many rules, regulations, and codes of practice that apply to drones, and those that are forthcoming in the Drone (Regulation) Bill 2017-19. But I am conscious not to drone on ...