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Threatening Drones

by
Joseph V. Vacek

HOW TO ANSWER WHEN YOUR CLIENT ASKS: “CAN I SHOOT DOWN THAT DRONE?”

There are now more than three times as many drones operating legally in the US as manned aircraft. Clearly, the drone industry has succeeded in entering the US airspace and is poised to continue to grow. With that explosive growth comes a particular problem: some uses of drones are nuisances, intrusions onto other legal rights, or even criminal acts. Currently, federal law under 18 USC 32 categorically prohibits destruction or interference with any aircraft, which includes a drone.³

SOME DRONE OPERATIONS HAVE EVOLVED INTO A THREAT

From delivery of contraband to corporate espionage, drones have been found to be useful tools in wrongdoing and crime. Even international terrorist groups such as ISIS have used drones to facilitate their activities. The threats posed by misanthropic or criminal use of drones can be categorized into physical hazards and cyber hazards.

Small drones may pose a small but potentially significant threat to

passenger carrying aircraft,⁴ and their mass (up to 55 lbs) combined with velocity (up to 100 mph) results in potentially lethal force in the event of a direct collision with a human, or at least significant injury from the impact or cuts from rotating blades. Even though the probability of a catastrophic collision between a drone and an occupied aircraft is thought to be quite low,⁵ the consequences of such a low probability event would be severe, potentially resulting in hundreds of deaths, both of passengers and people on the ground. Much more probable than a small drone collision with a jet is a small drone creating a safety hazard to those near or below it when it is operated recklessly at a low altitude. The author of this paper recalls being out for a walk through a public park when a highly modified racing drone “buzzed” him at less than 10 feet. The author observed the operator to be using First Person View goggles to control it, without an additional visual observer, and in a congested area below trees where several people were exposed to the threat.

Less immediately threatening but much more generally risky to the population as a whole are cyber intrusions facilitated by drone. An easily

1 The original long form heavily cited academic version of this article is published and copyrighted by the North Dakota Law Review, Issue 93:3. Available: <https://law.und.edu/law-review>. This article omits lengthy discussion of a proposed autonomous counter UAS system, for which the author has a patent pending.

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3 *Huerta v. Pirker*, NTSB Order No. EA-5730 (2014).

4 UAS Airborne Collision Severity Evaluation 2017 ASSURE <http://www.assureuas.org/projects/deliverables/sUASAirborneCollisionReport.php>

5 UAS Airborne Collision Severity Evaluation 2017 ASSURE <http://www.assureuas.org/projects/deliverables/sUASAirborneCollisionReport.php>



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grasped example of such a risk was the demonstration of a drone-enabled hack of a printer on the 30th floor of an office building. Researchers in Singapore in 2015 coupled a smartphone to a drone, tasked the phone with impersonating a wi-fi connection, flew the drone up to the 30th floor where the printer was located, and intercepted confidential documents being sent to the printer.⁶ Such use of drones as mobile electronic espionage units are alarmingly common, to such an extent that an entire cottage industry has developed detection and alerting systems to combat such espionage.

The incredibly accurate and detailed imagery and other remotely sensed data obtainable by small drones⁷ poses an additional risk to critical infrastructure. The unique perspective offered by a drone operating at up to several hundred feet coupled with very high resolution stabilized cameras allows anyone--knowingly or unknowingly--to obtain detailed data for critical infrastructure, such as dams, electrical transmission systems, power generation facilities, airports, public safety agencies and assets, and military hardware locations.⁸

6 Wired <https://www.wired.com/2015/10/drones-robot-vacuums-can-spy-office-printer/>

7 See Vacek, *Remote Sensing of Private Data By Drones Is Mostly Unregulated: Reasonable Expectations of Privacy Are At Risk Absent Comprehensive Federal Legislation*. 90:3 NDLR 463 (2014).

8 <https://www.techspot.com/news/72136-drone-manufacturer-dji-accused-spying-us-critical-infrastructure.html>

Clearly, the capability to easily obtain the tools that allow bad actors to gain access to or information about critical infrastructure or private data is potentially devastating. The risks posed to air traffic and people below from recklessly operated drones is also significant. People also generally dislike the idea of drones compromising their privacy.⁹ Together, threatening drone operations have raised the question of countering those threats, and at least one case of note responding to a perceived threat from a drone by use of force has already occurred.¹⁰

COUNTER UAS IS PROHIBITED UNDER 18 USC 32.

Federal law currently prohibits any counter UAS (CUAS) activity beyond detection, tracking, and notification of the intrusion. The 3 relevant sections of 18 USC 32 to CUAS state that “Whoever willfully sets fire to, damages, destroys, disables, or wrecks any aircraft in the special aircraft jurisdiction of the United States or any civil aircraft used, operated, or employed in interstate, overseas, or foreign air commerce¹¹...interferes with or disables, with intent to endanger the safety of any person or with a reckless disregard for the safety of human life¹²,...communicates information, knowing the information to be false and under circumstances in which

9 <https://www.marketwatch.com/story/surprising-drone-study-shows-how-people-really-feel-about-drones-2015-11-11>

10 *Boggs v. Meredith* <https://regmedia.co.uk/2017/03/24/drone.pdf>

11 18 USC 32(a)(1)

12 18 USC 32(a)(5)

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such information may reasonably be believed, thereby endangering the safety of any such aircraft in flight¹³... shall be fined under this title or imprisoned not more than twenty years or both.¹⁴

As a preliminary matter, the question of whether a UAS is actually an aircraft subject to 18 USC 32 and other federal laws and regulations governing the use, operation, and responsibility for the operation of aircraft, as well as federal jurisdiction over such aircraft, has been answered in the affirmative.¹⁵ Since *Pirker*, regulations as to the operating rules for small UAS have been promulgated¹⁶ and a registration scheme has been attempted. With the definitional status of UAS, specifically small UAS (less than 55 lbs) settled, enforcement of regulation and policing and enforcement of rulebreakers becomes pressing, especially so considering the rapid growth of small UAS operations. The relevant question is what defenses are available to property owners or people against UAS intruders when UAS operators violate their property rights or threaten their physical safety. At first glance, 18 USC 32 appears to prevent any such self-help measures, but at least three potential exceptions exist due to the special nature of UAS operations.

While the relevant language of 18 USC 32 appears to categorically prohibit destruction or interference with

an aircraft, the specific prohibitions were drafted to apply to manned aircraft and arguably leave open the possibility of some exceptions for CUAS as currently written, as long as the CUAS process and actions are reasonable. The possible exceptions for CUAS are related to actions that are simply impossible to execute upon manned aircraft. They are (1) partial temporary disablement by electronic means; (2) interference or disablement unrelated to safety of human lives; and (3) communicating false information to a UAS that does not endanger the safety of the aircraft.

Partial temporary disablement by electronic means

18 USC 32(a)(1) criminalizes a number of actions directed towards aircraft; the list includes fire, damage, destruction, disablement, or wrecking. Words are known by the company they keep,¹⁷ and all of the listed statutory actions result in significant harm to an aircraft and would put it to some degree in a state of emergency or at least urgency. An intruding drone subject to a CUAS system that triggers the drone's "return to base" function, for example, has indeed been disabled as to its original planned flight, but is not damaged, destroyed, or even disabled. Such a command is similar to an air traffic control clearance to an airliner that directs the pilots to a different destination (to avoid bad weather, for example) and is not equivalent to the category of harm intended by the statute. The intruder drone simply

¹³ 18 USC 32(a)(7)

¹⁴ 18 USC 32(a)(8)

¹⁵ Huerta v. Pirker <https://www.nts.gov/legal/alj/OnODocuments/Aviation/5730.pdf>

¹⁶ 14 CFR 107 et seq

¹⁷ "noscitur a sociis"

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follows the new command and returns to its base, which it would also do automatically if it lost its communication link with its operator or the operator could command if the operator lost awareness of the drone's location. But a CUAS system's interference by commanding a return to base function is still an interference, which implicates 18 USC 32(a)(5).

Interference or disablement unrelated to safety of human lives

18 USC 32(a)(5) prohibits interference or disablement of an aircraft with intent to endanger the safety of any person or with a reckless disregard for the safety of human life. The disablement issue has been treated above, and a CUAS system command to return to base is clearly interference. However, as long as the safety of any person on the ground (since UAS are not piloted and carry no passengers) is not endangered or recklessly disregarded, it appears that interference such as that described would not be proscribed by the statute. What CUAS actions do not endanger safety or recklessly disregard human lives is a question of fact and of reasonableness.

Communicating false information to a UAS that does not endanger the safety of the aircraft.

18 USC 32(a)(7) prohibits "communicating false information to an aircraft knowing the information to be false and under circumstances in which such information may reasonably be

believed, thereby endangering the safety of any such aircraft in flight."¹⁸ A return to base command given by a CUAS system is an intrusion into the communication channels between the drone and the operator, and would be a false command under the statute, because the operator did not give the command. Since the drone obeyed the CUAS "false" command and returned to base, such an action violates the first part of 18 USC 32(a)(7). Similar to the analysis above, however, endangerment is also a required element. Here, endangerment is tied to the aircraft's safety rather than human safety. As long as the CUAS command does not override the drone's normal safety-compliance software,¹⁹ if installed, or cause an accident, this part of the statute is probably not violated, either.

DEFENSIVE MEASURES ARE AVAILABLE

CUAS includes a range of technological defenses, either passive or active. Passive detection and tracking of intruding drones, as well as alerting the property owner or the police, do not violate 18 USC 32 as such actions fall outside the scope of the statute. Active countermeasures may implicate 18 USC 32 but fall into a defensible exception from the statute as discussed above or may clearly violate the statute. Should an active CUAS action such as an electromagnetic pulse, frequency jam,

¹⁸ 18 USC 32(a)(7)

¹⁹ such as geofenced areas or optical detection and avoidance of obstacles

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or physical incapacitation or destruction of the drone occur, it more than likely violates 18 USC 32, as well as FCC regulations. However, the justifications of defense of property, self-defense, or necessity may cover such CUAS action if the actions were objectively reasonable.

The justification defenses of Defense of Property, Self Defense, and Necessity are justifications of conduct that, while violative of law on their own, are allowable because the wrongfulness of the original act outweighs the wrongfulness of the defensive act. Justification of Defense of Property exists when a person uses “reasonable force to protect his property from trespass or theft, when he reasonably believes that his property is in immediate danger of such an unlawful interference and that the use of such force is necessary to avoid that danger.”²⁰ The amount of force used to defend property must be reasonable, i.e. “It is not reasonable to use any force at all if the threatened danger to property can be avoided by a request to the other to desist from interfering with the property.”²¹ The Model Penal Code requires a person to make a request to desist before using force, unless that would be useless or dangerous.²²

Justification of Self Defense exists when a person who is not an

²⁰ 2 LaFave Substantive Criminal Law 2d, Sec. 10.6 (2003).

²¹ Id. at 10.6(a) citing *State v. Cessna*, 153 N.W. 194 (1915), *State v. Woodward*, 50 N.H. 527 (1871).

²² 3.06(3)(a)

aggressor uses “a reasonable amount of force against his adversary when he reasonably believes (a) that he is in immediate danger of unlawful bodily harm from his adversary and (b) that the use of such force is necessary to avoid this danger.”²³ While there is much nuance in the law regarding the duty to retreat,²⁴ imminence of attack,²⁵ or injuries to 3rd persons,²⁶ those considerations apply to other persons, not to objects like drones. While defending oneself against a drone might conceivably result in injury to a 3rd person, this analysis is focused solely on the question of the applicability of justification defenses to CUAS under 18 USC 32.

Justification of Necessity exists when “the defendant chooses the lesser of two evils and thus, by bringing about the lesser harm, avoids the greater harm.”²⁷ A balancing of the harm avoided with the harm done must be performed²⁸ and the defendant must intend to avoid harm.²⁹ Objectively, the value of the harm avoided must be greater than the harm done,³⁰ there must be no reasonable alternatives³¹ and the defendant must not have brought about the situation.³² Depending on the circumstances of

²³ 2 LaFave Substantive Criminal Law 2d, Sec. 10.4 (2017).

²⁴ Id at 10.4(f)

²⁵ Id at 10.4(d)

²⁶ Id at 10.4(g)

²⁷ Id at 10.1(d)

²⁸ Id at 10.1(d)1-(d)2.

²⁹ Id at 10.1(d)3

³⁰ Id at 10.1(d)4

³¹ Id at 10.1(d)5

³² Id at 10.1(d)6

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an intruding drone, any one of the enumerated justifications may apply.

ADVICE FOR YOUR CLIENTS

Any of the above justifications may apply in a given context, and the nexus of a client's question and an analysis of which justification is defensible is purely academic without a plan of action. From earlier in this article, the three exceptions identified in 18 USC 32 are (1) partial temporary disablement by electronic means; (2) interference or disablement unrelated to safety of human lives; and (3) communicating false information to a UAS that does not endanger the safety of the aircraft. Currently, FCC regulations prohibit the use of electronic frequency jamming.³³ Some electronic CUAS technology manufacturers distinguish their products from prohibited broadband jammers by employing "software defined radio," the operation of which, arguably, does not violate FCC jamming rules because of its specific function.³⁴

The best plan of action for your client would be to first advise them to deploy some kind of passive drone sensor system to determine the extent of the problem. Once they have data, their next step would be to decide whether to incorporate some kind of CUAS system on top of the sensor system. Depending on your clients'

choice of system, use the above analysis to advise them whether their plan would be defensible under 18 USC 32 and whether it runs afoul of FCC's jamming rules. Finally, advise them to keep meticulous records, and archive any data from the sensor or CUAS system in case the need to raise one of the affirmative defenses discussed above arises.

CONCLUSION

Explosive growth of UAS use by companies small and large and general consumers brings problems of nuisances, intrusions onto legal rights, or even criminal acts. While 18 USC 32 prohibits destruction or interference with any aircraft, including drones, this article provides explanation of how countermeasures may be justified using the defenses of defense of property, self-defense, or necessity. Any such counter UAS actions must be reasonable in response to the threat level for a justification to be reasonably defensible, and a client's particular choice of CUAS system may implicate FCC jamming regulations, depending on how it operates.

³³ <https://www.fcc.gov/general/jammer-enforcement>

³⁴ <https://www.defensenews.com/digital-show-dailies/navy-league/2018/04/10/this-gun-shoots-drones-out-of-the-sky/>