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LAW ENFORCEMENT USE OF ELECTROMAGNETIC PULSE EQUIPPED DRONES TO MAINTAIN THE ELEMENT OF SURPRISE DURING WARRANT SERVICES

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ABSTRACT

The preemptive deployment of electromagnetic pulse-equipped drones should be accepted by policymakers as valid and adopted as routine practice by law enforcement as a lifesaving tool deployed before serving dynamic search warrants on known to be violent suspect's residence to disrupt and neutralize that suspect's use of commercial electronics in a technologically advanced home. Such deployment may preserve law enforcement's element of surprise and mitigate a violent encounter with an aggressive suspect, increasing the likelihood of a safe warrant service for all parties involved. A suspect can equip their home with various sensors, cameras, alarms, remote locks and remote lights controlled by the user through their smartphone, tablet or personal computer. Electronic devices affixed to the home can alert a suspect to law enforcement's arrival, deployment of assets and tactical maneuvers around the property. Early warnings provided to the suspect can eliminate law enforcement's element of surprise and allow a suspect to posture themselves defensively and potentially prepare a counter-offensive against law enforcement personnel, posing a risk of harm and danger to first responders. An electromagnetic pulse-equipped drone deployed to the location to disrupt the electronics inside a suspect's home before law enforcement arrival could be the difference between an alert, hardened suspect or a surprised suspect, resulting in a safe warrant service.

“We desire the police officers who want to work in Mayberry but are prepared for Mogadishu.”¹

- Aaron Pierce, CEO of Pierce Aerospace

I. DEFINITIONS

Tactical Team: a team of law enforcement and support personnel, that may include, Emergency Medical Services (EMS or medics), hostage negotiators, communications, canine (K9), and bomb technicians, specially trained to provide planned tactical responses to high-risk situations requiring the deployment of lifesaving tools, tactics and capabilities that exceed the subject matter expertise available to traditional first responders.²

Barricaded Suspect: a criminal suspect who has taken a position inside a potentially fortified physical location – likely a structure or vehicle – refusing surrender and impeding law enforcement access or apprehension.³

Dynamic Entry: the rapid entry into, and rapid movement through, a target location.⁴ In dynamic entry tactics, speed and the element of surprise are critical components to minimize the threat level and apprehend a suspect.⁵

Surrounding Call-Out / Deliberate Entry: This is a slower, methodical technique used to clear the structure from the outside; hence, the suspect is surrounded, and law enforcement calls for the suspect to exit the property.⁶

Uncrewed Aircraft: commonly referred to as a drone, an aircraft operated without the possibility of direct physical human intervention from within or on board the aircraft.⁷

¹ Zoom Interview with Aaron Pierce, CEO and Co-Founder, Pierce Aerospace (Oct. 6, 2023).

² NAT'L L. ENFT POL'Y CTR., *Special Weapons and Tactics (SWAT): Concepts and Issues Paper*, INT'L ASS'N OF CHIEFS OF POLICE (Mar. 2011), <https://www.theiacp.org/sites/default/files/all/s/SWATPaper.pdf>.

³ *Id.* at 3.

⁴ Lee Chesire, *Dynamic Entry Versus Surround and Call-Out* at 2 (unpublished manuscript) (on file at the Fla. Dept. L. Enft) (last visited Oct. 12, 2025), <https://www.fdle.state.fl.us/FCJEL/Programs/SLP/Documents/Full-Text/Cheshire,-Lee-paper>.

⁵ *Id.*

⁶ *Id.* at 3.

⁷ 14 C.F.R. § 107.3 (2021).

Uncrewed Aircraft System (UAS or UAV): an uncrewed aircraft and the equipment necessary to operate the aircraft safely and efficiently.⁸

II. INTRODUCTION

Although electromagnetic pulse (EMP) equipped drones are not yet available to federal, state, local, and tribal law enforcement agencies, the technology and opportunity may be near. In 2012, Boeing successfully tested an EMP missile capable of disabling electronics without affecting the building's structure.⁹ The device, manufactured by Raytheon, is named the Counter-electronics High-Powered Advanced Missile Project (CHAMP).¹⁰ CHAMP is a high-powered microwave (HPM) instrument designed to deliver microwave bursts at structures to disable electronics.¹¹ HPMs deliver high-power, short-duration pulses of microwave energy capable of precision targeting.¹²

The United States is not the only State with EMP-equipped drone capabilities. Russia's Moscow Institute reportedly claimed the development of a drone with an onboard EMP generator capable of both counter-drone operations and targeting enemy electronic systems.¹³ In addition to the EMP, Russia's EMP-equipped drones come furnished with an infrared (IR) camera, solar panels located on the folding wings, a communication and control system, GLONASS navigation [Global'naya Navigatsionnaya Sputnikovaya Sistema in Russia, the equivalent to the United States' Global

⁸ FED. AVIATION ADMIN., *What is an Unmanned Aircraft System (UAS)?*, <https://www.faa.gov/faq/what-unmanned-aircraft-system-uas> (last visited Oct. 17, 2025).

⁹ Brandon Lewis, *Raytheon EMP Weapon Tested by Boeing, USAF Research Lab*, MIL. EMBEDDED SYS. (Nov. 2, 2012), <https://militaryembedded.com/radar-ew/sensors/raytheon-emp-missile-tested-by-boeing-usaf-research-lab>.

¹⁰ *Id.*

¹¹ *Id.*

¹² Major Jack McGonegal, USAF, *High Power Microwave Weapons: Disruptive Technology for the Future*, (Spring 2020) (unpublished manuscript) (on file with Air Command and Staff College, Maxwell Air Force Base, AL).

¹³ *Russia Claims Development of Drone-Based EMP System*, IN COMPLIANCE MAG., (Jan. 26, 2023), <https://incompliancemag.com/russia-claims-development-of-drone-based-emp-system/>.

Positioning System (GPS)], a battery, parachute, and electric motor.¹⁴

Dynamic warrant services are inherently dangerous duties practiced by law enforcement personnel. According to the Federal Bureau of Investigation law enforcement officers killed in the line of duty (LEOKA) statistics report, 73 officers were feloniously killed, and six of those killed were involved in tactical situations (barricade / hostage situations, arrest warrants) in 2021.¹⁵ In many cases, law enforcement officers seek to arrest someone at locations inherently familiar to the suspect, likely the suspect's residence, place of employment, or while the suspect is traveling inside their vehicle.

A suspect's familiarity with the location is only a portion of the problem. Adding to the issue is the suspect's situational awareness of law enforcement officers' movements using technology, a new complication that tactical teams must mitigate. Modern technology has hastened the adaptation of smart homes equipped with cameras, sensors, motion lights, and microphones designed to alert residents of potential threats to their privacy and security. The global number of households equipped with security cameras will increase to 180.7 million by 2027.¹⁶ Suspects with security cameras can access the cameras remotely via cellphone or laptop to view the perimeter of their property. Equally, the suspect can deploy a drone equipped with a first-person view (FPV), having a bird's eye observation of the situation surrounding their property. A suspect's use of home surveillance equipment to gather critical intelligence of law enforcement's whereabouts will shift the tactical advantage in favor

¹⁴ Parth Satam, *Ukraine War: Russia Claims Developing 'Revolutionary' Electro-Magnetic Pulse UAV that can Down Drone Swarms*, EURASIAN TIMES (Jan. 21, 2023), <https://www.eurasiantimes.com/russia-develops-a-revolutionary-electro-magnetic-pulse-uav/>.

¹⁵ Federal Bureau of Investigation, *Crime Data: Law Enforcement Officers Killed in the Line of Duty Statistics for 2021* (Nov. 9, 2022), <https://leb.fbi.gov/bulletin-highlights/additional-highlights/crime-data-law-enforcement-officers-killed-in-the-line-of-duty-statistics-for-2021>.

Law enforcement officers killed in the line of duty statistics for 2021. Six were involved in tactical situations (e.g., barricades/ hostage situations, arrest warrants), and nine died because of investigative / enforcement activities (e.g., surveillance, traffic violation stops, active shooter responses, undercover situations, wanted person investigations).

¹⁶ *Number of Households with Smart Security Cameras Worldwide from 2016 to 2027*, STATISTA RSCH. DEPT. (Jul. 18, 2025), <https://www.statista.com/forecasts/1301193/worldwide-smart-security-camera-homes>.

of the suspect. It could prove hazardous for law enforcement personnel tasked with the apprehension.

Law enforcement must minimize their exposure to the suspect and maximize the element of surprise, maintaining low visibility throughout the warrant service by avoiding detection from a suspect's surveillance equipment. An EMP-equipped drone deployed by law enforcement against a known hostile threat to disable a suspect's home electronics can neutralize adversarial visibility, limiting a suspect's situational awareness and allowing law enforcement to maintain the tactical advantage.

Part III of this paper discusses the history of EMP weapons, their development, classifications of EMP systems, and how law enforcement may come to deploy an EMP-equipped drone in the future to neutralize the home electronics of a known violent suspect. Part V addresses Fourth Amendment concerns that may arise from law enforcement's use of an EMP-equipped drone. The final part examines potential legal concerns of EMP-equipped drones and Fourth Amendment considerations the government may analyze before adopting or authorizing law enforcement with the latitude to utilize the system.

III. ELECTROMAGNETIC-PULSE SYSTEMS

A. *Electromagnetic-Pulse System History*

In this section, we will discuss the history of EMP weapon systems and the role they play[ed] in national defense applications, weaponry terminology, and the consequences of an electromagnetic discharge. An electromagnetic pulse, condensed to the acronym "EMP," is a burst of electromagnetic radiation produced by a sudden, swift explosion in the atmosphere.¹⁷ An EMP is fundamentally an electromagnetic shockwave that produces an electromagnetic field, disseminating intensity from the originating source.¹⁸ The electromagnetic field can be sufficiently strong to make short

¹⁷ Dingwei Wang *et al.*, *Power Grid Resilience to Electromagnetic Pulse (EMP) Disturbances: A Literature Review*, 2019 N. AM. POWER SYMP. (2019), <https://ieeexplore.ieee.org/document/9000227>.

¹⁸ Carlo Kopp, *The Electromagnetic Bomb – A Weapon of Electrical Mass Destruction*, AIRPOWER J. (Mar. 1996), <https://www.airuniversity.af.edu/Portals/10/ASPJ/journals/Chronicles/apjemp.pdf>.

transient voltages of thousands of volts on exposed electrical conductors, wires, or conductive tracks on printed circuit boards.¹⁹

The first observation of EMP discharge effects was in the late 1940s or early 1950s during the United States military tests of nuclear weapon systems.²⁰ In July 1962, the United States conducted a nuclear test 250 miles above the mid-Pacific Ocean – in the Earth’s ionosphere – code-named Starfish Prime.²¹ The effects of the explosion were witnessed 900 miles away in Kauai, Hawai’i, where street lights went dark and inlet-island communications were disconnected.²² Australia also suffered similar consequences from the detonation.²³

The electrical outage in Hawai’i was caused by a phenomenon known as the Compton Effect or Compton Scattering (CS).²⁴ The Compton Effect, named after American physicist and author Holly Compton.²⁵ The Compton Effect describes the scattering of a photon by a charged particle, resulting in a decrease in energy (increase in wavelength) of the photon and related recoil of the scattering particle.²⁶ During the Compton Effect, protons collide with individual electrons that are free or loosely bound in atoms of matter.²⁷ The collision between the protons with higher energy and protons of less

¹⁹ *Id.*; Wang, *supra* note 17.; C.N. Ghosh, *EMP Weapons*, 24 STRATEGIC ANALYSIS 7, 4 (2000), https://ciaotest.cc.columbia.edu/olj/sa/sa_oct00ghc01.html.

²⁰ Robert Norris & Thomas Cochran, *Nuclear Electromagnetic Pulse*, BRITANNICA (last updated Aug. 23, 2025), <https://www.britannica.com/science/nuclear-electromagnetic-pulse>.

²¹ See NOAA Space Weather Prediction Center, *Ionosphere* (last visited Oct. 12, 2025), <https://www.swpc.noaa.gov/phenomena/ionosphere>.

The Ionosphere is part of the Earth’s upper atmosphere, between 50 and 373 miles from the ground. The ionosphere is important because it reflects and modifies radio waves used for communication and navigation. The particles carried in the ionosphere can disrupt communication signals and possibly cause satellites in low-Earth orbit (LEO) to malfunction; Kopp, *supra* note 18.

²² Liz Boatman, *Sixty Years After, Physicists Model Electromagnetic Pulse of a Once-Secret Nuclear Test*, APS NEWS (Nov. 10, 2022), <https://www.aps.org/ap-snews/2022/11/electromagnetic-pulse>.

²³ Tom Harris, *How Electromagnetic Pulse Attacks Work*, HOWSTUFFWORKS, (last visited Apr. 24, 2023), <https://science.howstuffworks.com/e-bomb1.htm>.

²⁴ Artem Oppermann, *What is an EMP?*, BUILT IN (Feb. 9, 2023), <https://builtin.com/hardware/emp>.

²⁵ *Compton Effect*, BRITANNICA (last visited Oct. 12, 2025), <https://www.britannica.com/science/Compton-effect>.

²⁶ Oppermann, *supra* note 24.

²⁷ *Compton Effect*, *supra* note 25.

energy scatter at angles depending on the amount of energy lost at recoil.²⁸ In short, EMPs work by discharging a high-energy source of electrons toward or in a target area; the high-energy source of electrons impacts a source of low-energy electrons, causing retardation or disrepair of the target electronics.²⁹

B. EMP Nomenclature

EMPs are delivered in three distinctive waveforms.³⁰ The waves are classified as E1, E2, and E3.³¹ The differences between the waveforms are classified by the speed and onset times of early, intermediate, and late onsets.³²

- E1 is a nearly instantaneous power pulse, a wave possessing a rise time of approximately five nanoseconds.³³
- E2 is a slower, lower-amplitude pulse that occurs a few microseconds after an E1.³⁴
- E3 is produced at a slower rise time and lower amplitude, considerably less devastating.³⁵

There are two main types of EMPs: those that are EMPs which are produced naturally by nature and those manufactured by humans. Natural EMPs include lightning strikes, commonly known as Lightning Electromagnetic Pulse (LEMP), which are discharges created from the Earth's atmosphere.³⁶ Electrostatic Discharge (ESD) is another naturally produced EMP. An ESD occurs when two electrically charged objects contact one another – recall in elementary science class when someone walks across the carpet and

²⁸ *Id.*; Oppermann, *supra* note 24.

²⁹ How Theory, *How an EMP Works*, YOUTUBE (last visited Oct. 20, 2025), <https://www.youtube.com/watch?v=X5X1oMw7KDY>.

³⁰ Alexander Matthee *et al.*, *Lightning Strike EMP Effect on Local Grids*, 2021 ASIA PAC. INT'L SYMP. ON ELECTROMAGNETIC COMPATIBILITY (2021), <https://resource-center.emc.ieee.org/conferences/apemc-2021/emcapemc20211120>.

³¹ *Id.*

³² *Id.*

³³ George Friedman & Phillip Orchard, *The EMP Threat: How it Works and What it Means for the Korean Crisis*, GEOPOLITICAL FUTURES (Feb. 26, 2018), <https://geopoliticalfutures.com/emp-threat-works-means-korean-crisis/>; see Matthee, *supra* note 30.

³⁴ *Id.*

³⁵ Matthee, *supra* note 30.

³⁶ Oppermann, *supra* note 24.

touches a metallic surface, creating a spark.³⁷ The magnitude of the charge made by an ESD depends on the size, shape, composition, and electrical properties of the mechanisms involved.³⁸ The last example of a natural EMP is a coronal mass ejection (CME) or “solar flare.”³⁹ The blast originates from the magnetically disturbed regions of the corona located in the Sun’s upper atmosphere and can replicate damage similar to artificially manufactured EMPs.⁴⁰

Human-made EMPs are another form of electromagnetic pulse. Human-made EMPs include powerline surges, nuclear electromagnetic pulses (NEMP), and non-nuclear electromagnetic pulses. (NNEMP).⁴¹

C. EMP Effects on Electronics

As noted, an EMP produces a powerful wave of energy that can cause detrimental voltage surges in electrical systems.⁴² Voltage surges produced by such a powerful wave of energy can shut down electric grids, systems, and devices by significantly overheating, degrading, or destroying internal components.⁴³ Commercial computer equipment is particularly vulnerable to the effects of EMPs because many commercial electronics are built upon high-density metal oxide semiconductor (MOS) platforms, which are vastly sensitive to exposure to temporary high transients.⁴⁴ Once the pulse of the transient voltage reaches an electronic device, the voltage has

³⁷ Emily Parker, *Electro-Static Discharge*, GWP GROUP (last updated Sep. 23, 2025), <https://www.gwp.co.uk/guides/what-is-esd/>.

³⁸ *Id.*

³⁹ KEYSTONE COMPLIANCE, *EMP Testing* (last visited Oct. 12, 2025), <https://keystonecompliance.com/emp/>.

⁴⁰ Space Weather Prediction Center, *Coronal Mass Ejections*, NAT’L OCEANIC & ATMOSPHERIC ADMIN. (last visited Oct. 23, 2025), <https://www.swpc.noaa.gov/phenomena/coronal-mass-ejections>; George Lane, *Effects of and Responses to Electromagnetic Pulses (EMP)* at 4-8, NPS CHDS 10TH ANNIVERSARY HOMELAND DEF. & SEC. EDUC. SUMMIT (Mar. 23, 2017), https://www.chds.us/ed/resources/uploads/2010/05/2017_HS_Summit_Lane_Electromagnetic_Pulses.pdf.

⁴¹ Keystone, *supra* note 39.

⁴² Ariel Cohen, *Protecting America’s Power Grids from EMP Attacks*, FORBES (Mar. 20, 2023), <https://www.forbes.com/sites/arielcohen/2023/03/20/deflating-the-emp-danger-to-americas-power-grids/>.

⁴³ *Id.*

⁴⁴ Kopp, *supra* note 18.

the potential to disable, damage, or permanently destroy electronics over widespread areas.⁴⁵

Automobiles are also vulnerable to EMP discharges. Researchers examined the vulnerability of automobile functionality following an EMP exposure. The researchers tested a sample of car models ranging from 1986 to 2002.⁴⁶ Researchers found that the sample of cars exposed to EMP environments with their engines turned off suffered no significant effects.⁴⁷ However, the sample cars with the engine turned on suffered extensive damage to the dashboard electronics.⁴⁸

D. EMP Effects on Living Organisms

Although EMPs can cause a range of damage to electronics, EMPs are not known to be hazardous to humans or other living organisms.⁴⁹ Humans and living organisms are not great conductors of electricity; thus, injury caused by EMP exposure is extremely rare but possible.⁵⁰ The greatest likelihood of an EMP causing injury to a human would be exposure to a sustained, increased magnetic field causing current flow for at least a few milliseconds.⁵¹ Because sustained energy flow is improbable, EMPs are far less dangerous to humans than an extensive solar storm from the Sun.⁵² Therefore, law enforcement deployment of an EMP will not affect human health. It will help ensure the safety of law enforcement and civilians involved or near the target location.

⁴⁵ Richard Weitz, *Better Homeland Defenses Needed Against EMP Threat*, SLDINFO.COM (Sept. 4, 2011), <https://sldinfo.com/2011/09/better-air-and-navy-homeland-defenses-needed-against-emp-threat/>.

⁴⁶ Jerry Emanuelson, *EMP Effects on Vehicles*, FUTURE SCI. (last visited Oct. 17, 2025), <https://www.futurescience.com/emp/vehicles.html>.

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ DIV. ENV'T HEALTH., *Fact Sheet 320-090: Electromagnetic Pulse (EMP)* at 2, WASH. ST. DEPT. HEALTH (Sep. 2003), https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/320-090_elecpuls_fs.pdf.

⁵⁰ Krishna Dubey, *Effect of EMP on Human Neural Network*, PHYSICS MINDBOGGLER (Jun. 25, 2021), <https://physicsmindboggler.co/effect-of-emp-on-human-neural-network/>.

⁵¹ *Id.*

⁵² *Id.*

E. EMP Not Considered a Weapon System

Non-nuclear EMP systems, even those deployed by law enforcement for domestic offensive operations, would likely not be considered a weapon system but a non-lethal tool to resolve complex electronic problems. The United States Criminal Code does not include electromagnetic devices, per their scientific classification or usage as a weapon.

The United States Criminal Code defines a firearm as (a) any weapon (including a starter gun) which will or is designed to or may readily be converted to expel a projectile by the action or explosive; (b) the frame or receiver of any such weapon; (c) any firearm muffler or firearm silencer; or (d) any destructive device.⁵³ The United States Criminal Code defines a “destructive device” as (a) any explosive, incendiary or poison gas (i) bomb, (ii) grenade, (iii) a rocket having a propellant charge or more than four ounces, (iv) missile having an explosive or incendiary charge of more than one-quarter ounce, (v) mine or (vi) device similar to any of the devices described in the preceding clauses.⁵⁴

The term “destructive device” does not include any device that is neither designed nor redesigned for use as a weapon; any device, although initially intended for use as a weapon, which is redesigned for use as a signaling, pyrotechnic, line throwing, safety or similar device; surplus ordnance sold, loaned or given by the Secretary of the Army in certain conditions.⁵⁵

⁵³ 18 C.F.R. § 921 (2024).

⁵⁴ *Id.*

⁵⁵ *Id.*; See 10 U.S.C. § 7684 (2024).

“Subject to regulations under section 121 of title 40, any branch, office or officer designated by the Secretary of the Army may sell, without advertisement and at prices that he considers reasonable— (1) surplus obsolete small arms and ammunition and equipment for them, to any patriotic organization for military purposes; and (2) surplus obsolete brass or bronze cannons, carriages and cannon balls, for public parks, public buildings and soldiers’ monuments. *Id.*

See also, Title 10 § 7685, Obsolete Ordnance: Loan to Educational Institutions and State Soldiers’ and Sailors’ Orphans’ Homes. (a) Upon the recommendation of the governor of the State concerned or Guam or the Virgin Islands, the Secretary of the Army, under regulations to be prescribed by him and without cost to the United States for transportation, may lend obsolete ordnance and ordnance stores to State, Guam and the Virgin Islands educational institutions and to State soldiers’ and sailors’ orphans’ homes, for drill and instruction. However, no loan may be made under this subsection to an institution to which ordnance or ordnance stores may be issued under any law that was in effect on June 30, 1906, and is still in effect. (b) The Secretary shall require a bond from

According to Title 18 of the United States Criminal Code, an electromagnetic pulse system does not meet the defined classification of a weapon, outlined in section 921, subsections (a)-(c), which classify firearms as weapons. An EMP does not eject any projectile following an explosion when deployed. Furthermore, although an EMP system, by design, can cause significant damage to electronics, the system does not meet the defined classes of a destructive device because an EMP is neither of the items outlined in subsections (i)-(vi), nor will a domestic law enforcement EMP-equipped drone be designed or intended to serve as a weapon system. Law enforcement's preemptive use of the EMP-equipped drone during the service of a search warrant will only aid a tactical team by disturbing home and personal electronics to maintain the element of surprise and help ensure all parties involved, including bystanders, are safe. Therefore, there should be no controversy regarding EMPs used as weapons or destructive devices.

F. Arming and Weaponizing Drones

Critics of the EMP-equipped drone concept will likely make the following arguments: (1) outfitting an EMP system to a drone will constitute arming a drone with a dangerous weapon, and (2) dangerous weapons are prohibited from attachment to drones.

Section 363 of the Federal Aviation Administration (FAA) Reauthorization Act states that, unless authorized by the Administrator of the FAA, a person may not operate a UA or UAS equipped or armed with a dangerous weapon.⁵⁶ The Reauthorization Act utilized section 930(g)(2) of the Criminal Code to define dangerous weapons as a weapon, device, instrument, material, or substance, animate or inanimate, that is used for or is readily capable of causing death or serious bodily injury.⁵⁷

The FAA provides guidance that indicates dangerous weapons placed on drones are prohibited without proper authorization. Thus, a drone can deploy with dangerous weapons attached if the operator, owner, or parent organization obtains proper approval.

each institution or home to which property is lent under subsection (a), in double the value of the property lent, for the care and safekeeping of that property and, except for property properly expended, for its return when required.”

⁵⁶ *FAA Reauthorization Act of 2018*, H.R. 302, 115th Cong. (2018).

⁵⁷ 18 U.S.C. § 930 (2008).

Secondly, the FAA would likely not classify an EMP as a dangerous weapon because EMPs do not meet the dangerous weapons classifications outlined in the United States Criminal Code. An EMP is not a weapon, instrument, substance, or object used to or capable of causing death or serious bodily injury to a living organism; therefore, EMP-equipped drones, as a tool, do not qualify as dangerous weapons.

The state of North Dakota became the first state to permit law enforcement with the opportunity to equip non-lethal devices onboard drones, such as tasers, rubber batons, and chemical agent canisters, by publishing discretionary language in the North Dakota House Bill 1328.⁵⁸ The North Dakota House Bill states that a law enforcement agency may not authorize the use of, including granting a permit to use, an uncrewed aerial vehicle armed with lethal weapons.⁵⁹ The original intent of the North Dakota House Bill 1328 was to require law enforcement to obtain a search warrant before using the drone to acquire evidence and to prohibit weapons onboard drones.⁶⁰ However, law enforcement lobbyists persuaded legislators to amend the language from “weapons” to “lethal weapons.” The discrete alteration in literature by adding “lethal” to the document opened the door for law enforcement’s future application to attach non-lethal munitions and devices to drones. Therefore, North Dakota’s House Bill and the advent of the FAA Reauthorization Act of 2018 provide a green light in place of a legal bright-line rule for less-than-lethal drone attachments.

IV. LEGAL APPLICABILITY TO DEPLOY

Before continuing the conversation on law enforcement’s use of EMP-equipped drones, we must determine what type of suspect would qualify to have their devices rendered inoperable by the system and determine when it is lawful for law enforcement to deploy an EMP system.

⁵⁸ Marco della Cava, *Police Taser Drones Authorized in N.D.*, USA TODAY (Aug. 29, 2015), <https://www.usatoday.com/story/tech/2015/08/28/police-taser-drones-authorized—north-dakota/71319668/>.

⁵⁹ N.D.C.C. § 29-29.4-05.

⁶⁰ Laura Wagner, *North Dakota Legalizes Armed Police Drones*, NPR (Aug. 27, 2015), <https://www.npr.org/sections/thetwo-way/2015/08/27/435301160/north-dakota-legalizes-armed-police-drones>.

A. Suspects Eligible for EMP-equipped Drone Use

The primary purpose of an EMP-equipped drone should be to mitigate a suspect's ability to gather intelligence, gain situational awareness and a tactical advantage, spoil law enforcement's element of surprise and limit the opportunity to prepare the execution of an ambush or counter-offensive against an approaching tactical team. There are two determining factors which should be involved in law enforcement's decision to deploy an EMP-equipped drone practically and legally. First, the deployment must be reserved for a known violent offender who law enforcement reasonably believes poses a significant, life-threatening risk to public safety and law enforcement. Second, the subject is confined in a dwelling coupled with, or which law enforcement reasonably believes is couple with electronic technology capable of viewing, recording, sensing, or monitoring the movements of law enforcement personnel on or near the suspect's property during the service of a dynamic search warrant or employing tactics consistent with a "surrounding call out" of a barricaded suspect.

Two historically violent criminals are described to illustrate the type of scenario offensive enough to merit the deployment of an EMP-equipped drone.

John Allen Muhammed and Lee Boyd Malvo, also known to many as the Beltway (Washington, D.C.) Snipers became infamous for terrorizing the District of Columbia, Maryland, and Virginia area in 2002. The duo was responsible for the shooting deaths of 10 innocent people and critically injuring three others.⁶¹ Following a two-week nationwide manhunt, the two shooters were apprehended inside their sniper hide, a Chevrolet Caprice, while sleeping at a rest stop.⁶² For argument's sake, let us imagine the duo's apprehension was not the result of a vehicle takedown, but instead, intelligence analysts learned that both suspects were located inside a single-family home, and law enforcement obtained a search warrant for their arrest.⁶³

⁶¹ FEDERAL BUREAU OF INVESTIGATION, *Beltway Snipers*, FBI HISTORY (last visited Oct. 12, 2025), <https://www.fbi.gov/history/famous-cases/beltway-snipers>.

⁶² *Id.*

⁶³ This is a fictional scenario based on historically known violent suspects. Except for placing safety at the forefront of tactical decision-making, there are no absolutes to

Law enforcement personnel were aware that Muhammed and Malvo possessed at least one Bushmaster .223 M4-styled rifle.⁶⁴ A Bushmaster .223 has a maximum effective range of 400 to 600 yards, depending on a shooter's experience level.⁶⁵ Maximum effective range is defined as the distance at which a weapon may be expected to be accurate and achieve the desired effect.⁶⁶

A threat analyst of the suspects would reveal (1) extremely violent behavior, responsible for 13 shootings, including 10 deaths; (2) a reasonable law enforcement officer would believe the suspects would physically and violently resist arrest; and (3) the suspects are a likely formidable threat and tactically trained with a long gun. Therefore, it would be prudent for law enforcement to maintain the tactical advantage to ensure the safety and welfare of the public and law enforcement once they initiate a dynamic search warrant on the property.

It should be mentioned that there is no single bright-line rule to determine or define who is or may be violent during an encounter with police. The Beltway Sniper anecdote preamble of this is, by all accounts, a sure bet in terms of forecasting a violent encounter with a suspect during an arrest because of the nature of the duo's offenses. There are other criminal offenses commissioned absent the use of a firearm that arguably should be considered.⁶⁷

tactics. Threat assessments, value systems and tactical decision-making vary from jurisdiction to jurisdiction.

⁶⁴ FBI, *supra* note 61.

⁶⁵ *450 Bushmaster vs. 223*, AMMO.COM (last visited Oct. 12, 2025), <https://ammo.com/comparison/450-bushmaster-vs-223>.

⁶⁶ *Maximum Effective Range (U.S. DoD Definition)*, MILITARY FACTORY (last visited Oct. 21, 2025), https://www.militaryfactory.com/dictionary/military-terms-defined.php?term_id=3284.

⁶⁷ Sexual assault perpetrators, including those suspected of child pornography, are violent offenders. In 2021, two FBI Agents were killed and three were wounded serving a search warrant during a child pornography investigation. The suspect was alerted to the Agent's approach by the doorbell camera. The suspect ambushed the agents, firing a rifle through an unopened door. See David J. Neal *et al.*, *Gunman Ambushed Slain FBI Agents with Doorbell Camera, Police Say*, MIAMI HERALD, <https://www.police1.com/federal-law-enforcement/articles/gunman-ambushed-slain-fbi-agents-with-doorbell-camera-police-say>.

B. Law Enforcement Use of Aircraft and Technology

The U.S. Supreme Court has ruled and set a precedent in cases involving law enforcement, aircraft, technology, and the expectation of privacy in the past. In *California v. Ciraolo*, the Court ruled that law enforcement observation from an aircraft in public airspace was not a violation of the Fourth Amendment because any ordinary citizen flying in an aircraft at that altitude was free to view the defendant's marijuana grow.⁶⁸

In *Florida v. Riley*, the Court held that law enforcement flying in an aircraft at an altitude of 400 feet viewing a marijuana grow inside a home is not a violation of the Fourth Amendment.⁶⁹ The Court opined that there is no physical invasion when a person knowingly exposes contents to the public, even in their own home or office.⁷⁰

In *Kyllo v. United States*, the Court ruled that when the government uses a device that is not generally used by the public to explore details of a home that would previously have been unknown without physical intrusion, the surveillance is a "search" and is presumptively unreasonable without a warrant.⁷¹ In *Kyllo*, government agents used a thermal imaging device to detect abnormal, gross usage of heat inside a home to confirm the existence of a marijuana grow operation. Agents oriented the thermal imaging device toward the home and, within seconds, could discern the location where the marijuana grew inside the home.⁷²

Kyllo is the most significant legal test countering law enforcement's use of EMP-equipped drones for two reasons. First, like the thermal imaging devices during the late 1990s, an EMP is not generally accessible to the public. Second, using the EMP device in the event of exigent circumstances may shock the Court's conscience based on the tool's sophistication. However, three critical factors separate an EMP-equipped drone from the thermal imaging device in *Kyllo*.

First, during exigent circumstances, the EMP-equipped drone will not be deployed to collect evidence inside the home; the EMP-

⁶⁸ *California v. Ciraolo*, 476 U.S. 207, 214 (1986).

⁶⁹ *Florida v. Riley*, 488 U.S. 445, 449 (1989).

⁷⁰ *Id.*

⁷¹ *Kyllo v. United States*, 533 U.S. 27, 34 (2001).

⁷² *Id.* at 30.

equipped drone will be deployed to disrupt electronics inside the house. Second, the disruption of electronics is arguably protected by section 3109 of the United States Criminal Code, which is detailed in Part V (B). Finally, the EMP-equipped drone is a tool deployed to save the lives of all parties involved, whereas the thermal imaging device was deployed to collect evidence. Therefore, the distinct differences in device occupations may help EMP-equipped drones survive Fourth Amendment scrutiny.

V. FOURTH AMENDMENT

It can easily be argued that drones operated by law enforcement – or rogue civilians, for that matter – can become one of the most intrusive, hostile, and abused tools at the government’s disposal. Drones operated by the government serve a very distinct and practical purpose: remote sensing.⁷³ Remote sensing is the science of obtaining information about objects or areas from a distance, typically from aircraft or satellites.⁷⁴

Sensors furnished on drones play a vital role in data acquisition.⁷⁵ A drone acquires information by two primary methods: (1) flying over the airspace of the target location and (2) recording data or evidence of the target location. In some circumstances, acquiring information or drone reconnoitering can constitute a warrantless search.

Long Lake Township v. Maxon addresses the issue of drone surveillance, evidence, and a homeowner’s expectation of privacy. The court suppressed photographs taken of the defendant’s property from a drone.⁷⁶ Long Lake Township alleged that the defendant violated the Township’s local ordinance regarding noncompliant salvage yards.⁷⁷ The Township supported their allegations with

⁷³ Zhengxin Zhang & Lixue Zhu, *A Review on Unmanned Aerial Vehicle Remote Sensing: Platforms, Sensors, Data Processing Methods, and Applications*, MULTIDISCIPLINARY DIGIT. PUBL’G INST. (Jun. 15, 2023), <https://www.mdpi.com/2504-446X/7/6/398>.

⁷⁴ *What is Remote Sensing?*, NAT’L OCEANIC AND ATMOSPHERIC ADMIN. (last visited Jun. 16, 2024), <https://oceanservice.noaa.gov/facts/remotesensing.html>.

⁷⁵ *Id.*

⁷⁶ *Long Lake Twp. v. Maxon*, 336 Mich. App. 521, 525–526 (2021).

⁷⁷ *Id.*

aerial photos taken in 2010, 2016, 2017 and 2018 to illustrate the increase in “junk” stored on the defendant’s property.⁷⁸

Long Lake quoted Justice Scalia in *Kyllo*, stating,

The Fourth Amendment provides that “the right of the people to be secure in their persons, houses, papers and effects, against unreasonable searches and seizures, shall not be violated.” “At every core of the Fourth Amendment stands the right of [a person] to retreat into his own home and there be free from unreasonable governmental intrusion.”⁷⁹

Further, the Fourth Amendment examination will highlight potential areas where a drone and, more specifically, an EMP-equipped drone could potentially violate the Fourth Amendment.

The United States Criminal Code recognizes two pre-entry methods: “knock-and-announce” and “no-knock and announce.”

A. Knock-and-Announce

The English authorities are the historical context for the United States Fourth Amendment. The English law stated, “the house of everyone is to him as his castle and fortress,” and home is privileged for the homeowner, “his family,” and “his own proper good.”⁸⁰ The common law courts have held for decades that “when the King is party, the sheriff (if the doors not be open) may break the party’s house, either to arrest them or to do other execution of the King’s process, if otherwise, they cannot enter.”⁸¹ “But before they break the door, they ought to signify the cause of their coming and to make a request to open doors.”⁸²

Briefly, the Fourth Amendment illustrates citizen protections against search and seizure. The Fourth Amendment states:

“The right of the people to be secure in their persons, houses, papers, and effects against unreasonable searches and seizures shall not be violated. No Warrants shall be issued, but

⁷⁸ *Id.*

⁷⁹ *Id.* at 531.

⁸⁰ *Minnesota v. Carter*, 525 U.S. 83, 100 (1998). See *Semayne’s Case*, 5 Co. Rep. 91a, 77 Eng. Rep. 194 (K.B. 1603).

⁸¹ *Wilson v. Arkansas*, 514 U.S. 927, 931 (1995); see *Semayne’s Case*, 5 Co. Rep. 91a, 91b, 77 Eng. Rep. 194, 195 (K.B. 1603).

⁸² *Id.*

upon probable cause, supported by Oath or affirmation and particularly describing the place to be searched and the persons or things to be seized.”

Requirements for a search warrant involve the following elements: (a) a showing of probable cause, law enforcement shall provide reasonable information to support the possibility that evidence of illegality will be found at the location proscribed within the four corners of the document. Such information may be provided from an officer’s personal observations;⁸³ (b), A specific description of a place to be searched; and (c) scribed with the signature of a “neutral and detached” magistrate or judge.⁸⁴

Using drones and electronic surveillance of real property is considered a search. Using drones to record or obtain information from real property without a search warrant is regarded as an unlawful search.

We will consider the drone surveillance statutes of two states to provide context. First, Florida prohibits a law enforcement agency from using drones to gather evidence or other information, barring specific exceptions.⁸⁵ Florida’s exception list includes: (a) terrorist attacks, (b) law enforcement obtained a warrant signed by a judge authorizing the use of a drone, (c) if the law enforcement agency possesses reasonable suspicion that, under particular circumstances, swift action is needed to prevent imminent danger to life or severe damage to property, destruction of evidence and facilitate the search of a missing person.⁸⁶

The state of Texas statute declares that capturing an image of an individual or privately owned real property in the state, intending to conduct surveillance, is unlawful using uncrewed aircraft systems.⁸⁷ Texas exceptions include (a) a valid search warrant, (b) for the purpose of conducting a high-risk tactical operation that poses a threat to human life, and (c) a search for a missing person.⁸⁸

Here, each state installed language that appropriates the requirement of a knock-and-announce search warrant if law

⁸³ *Search Warrant*, CORNELL L. SCH. (last visited Oct. 12, 2025), https://www.law.cornell.edu/wex/search_warrant.

⁸⁴ *Id.*

⁸⁵ FLA. STAT. § 934.50 (2025).

⁸⁶ *Id.*

⁸⁷ TEX. GOV’T CODE § 423.003 (2013).

⁸⁸ *Id.*

enforcement wishes to utilize a drone to enter the airspace of the target residence and collect data. Law enforcement's best course of action is to obtain a search warrant to conduct drone operations over a target location. A declaration of drone operations to a magistrate or a judge while providing a statement of probable cause essentially removes the opportunity for a Fourth Amendment violation.

In the condition that a wanted suspect fails to adhere to law enforcement's presence and makes a concerted effort to open the property to law enforcement within a reasonable time, the United States Supreme Court has ruled on the reasonableness of the time lapse between the knock-and-announce and the initiation of a physical breach into the property. *United States v. Banks* held that (1) a period of 15 to 20 seconds from the officers' knock-and-announce to forcing entry inside a property to execute a search warrant was reasonable, given exigency because of the likelihood of destruction of evidence, and (2) entry did not violate "refusal admittance" governed by federal statute of breaking doors or windows in the execution of a search warrant.⁸⁹

In *Banks*, federal and local law enforcement descended upon the suspect's apartment to serve a search warrant for cocaine. The officers and agents rapped on the door and announced their presence.⁹⁰ The knock was described as loud enough that officers in the rear of the residence heard the noises.⁹¹ Law enforcement waited 15 to 20 seconds before breaching the door.⁹² The suspect argued they were in the shower and did not hear the door.⁹³ The suspect petitioned that the breach by law enforcement was unreasonable and violated 18 USCA, section 3109, discussion detailed below, the knock-and-announce statute; the Court disagreed, stating that "the obligation to knock and announce when law enforcement has reasonable grounds to expect futility or to suspect that an exigency, such as evidence destruction, will arise upon knocking."⁹⁴

In the scenario where law enforcement obtains a search warrant for a residence to apprehend a suspect, law enforcement would

⁸⁹ *United States v. Banks*, 540 U.S. 31, 40 (2003).

⁹⁰ *Id.* at 33.

⁹¹ *Id.*

⁹² *Id.*

⁹³ *Id.*

⁹⁴ *Id.* at 31.

have stood before a magistrate or judge and provided a statement of probable cause with particularity that a dangerous suspect was located at an exact location and a search warrant for their arrest was required. Therefore, law enforcement passed the constitutional bar and complied with the expectations set forth by the Fourth Amendment.

There are, however, constitutionally permitted exceptions to the Fourth Amendment because some scenarios are fluid and time-sensitive enough to excuse law enforcement from leaving a scene to swear out a warrant; such circumstances include a search incident to arrest, consent, or plain view doctrine.

B. Exigency Exception

Section 3109 of the United States Criminal Code permits law enforcement to:

Break open any outer or inner door or window of a house, or any part of a house or anything therein, to execute a search warrant if, after notice of their authority and purpose, they are refused admittance or when necessary to liberate themselves or a person aiding them in the execution of the warrant.⁹⁵

In *King v. Marmon*, the Court described the procedural application for executing Section 3109, the knock-and-announce search warrant. The statute requires law enforcement to (1) announce their authority and purpose of presence and (2) be denied admittance to the property before they breach the door.⁹⁶ The purpose of the statute is to protect officers, as well as the occupants, from physical harm, to protect the occupant's rights to privacy in their home, and to protect against needless disruption of private property.⁹⁷ However, such courtesy is not always the safest way to mitigate and may place law enforcement and innocent bystanders at risk of severe bodily harm.

In *United States v. McConney*, law enforcement serving a dynamic search warrant on a property were excused from awaiting refusal of entry because their movements were compromised upon

⁹⁵ 18 U.S.C. § 3109 (1948).

⁹⁶ *King v. Marmon*, 793 F. Supp. 1030, 1033 (D. Kan. 1992).

⁹⁷ *Id.*

approaching an open door.⁹⁸ Law enforcement observed a figure inside the home, standing less than two feet from a loaded firearm.⁹⁹ The District Court found that the agents had first knocked and announced and that their simultaneous entry (without waiting for a refusal or admittance) was justified because of exigent circumstances.¹⁰⁰

The Court defined exigent circumstances as those circumstances that would cause a reasonable person to believe that entry (or other relevant prompt action) was necessary to prevent physical harm to the officers or other persons, the destruction of relevant evidence, the escape of the suspect, or some other consequence improperly frustrating legitimate law enforcement efforts.¹⁰¹

The court outlined a two-prong test to determine the exigency exception. First, the government must prove that the wanted person's criminal history or actions satisfy the legal standard for exigency. In *McConney*, the accused was identified as a Hells Angels Motorcycle Club member, had prior felony convictions for narcotics distribution, and was wanted for interstate commerce of firearms.¹⁰² Revisiting the Beltway Sniper hypothetical, considering *McConney's* first prong, the sniper duo was alleged to have shot and killed several victims over a multiple-day span. Therefore, the use of a firearm in the commission of homicides and other shootings would qualify our hypothetical offenders within the first prong of exigency.

The court takes a strong stance against exigency abuse; in *United States v. Rubio*, the Court stated a person's affiliation with a group without a known criminal history is insufficient evidence of illegal activity.¹⁰³

The second prong illustrated in *McConney* is to decide how much weight to give to the witness officer's knowledge that a suspect was a convicted felon or has committed a violent felony.¹⁰⁴ In *McConney*, the agents clearly articulated the suspect's active membership in a violent Motorcycle Club; the suspect had previous

⁹⁸ *United States v. McConney*, 728 F.2d 1195, 1199 (9th Cir. 1984).

⁹⁹ *Id.* at 1196.

¹⁰⁰ *Id.* at 1199.

¹⁰¹ *Id.*

¹⁰² *Id.*

¹⁰³ *United States v. Rubio*, 727 F.2d 786 (9th Cir. 1983).

¹⁰⁴ *McConney*, *supra* note 99.

convictions of narcotics trafficking, made perceived threatening comments about “protecting club members,” and had an active warrant for interstate commerce of firearms. The information was collected by an undercover agent who developed a close relationship with the suspect.¹⁰⁵ Again, applying the *McConney* test, our hypothetical snipers’ criminal actions were verified through detective interviews and forensic science, which established links between the suspects’ behaviors and physical evidence of the homicides.¹⁰⁶

VI. CONCLUSION

The preemptive deployment of EMP-equipped drones should be accepted as valid and adopted as a routine practice by law enforcement as a lifesaving tool deployed before serving a dynamic search warrant on a known to be violent suspect’s residence to disrupt and neutralize that suspect’s use of commercial electronics in a technologically advanced home. The EMP-equipped drone will only be an added tool for safely resolving scenarios, whereas law enforcement has a solid reason to believe exigent circumstances exist, and the suspect’s home and personal electronics must be neutralized as those electronics pose a substantial risk to approaching law enforcement.

The law currently favors law enforcement to deploy EMP-equipped drones as a mechanism to disrupt a suspect’s electronics that may threaten the safety of law enforcement. The FAA does not classify EMPs as a weapon or destructive device. The current custom and legal framework regarding the government’s deployment of EMPs requires law enforcement to secure a search warrant except when exigent circumstances exist. Additionally, law enforcement agencies are not prohibited from attaching devices to drones; munitions can be attached with the approval of the FAA Administrator, and less-lethal devices are free to be added at the discretion of local policymakers.

Finally, the recommendation is that deployment of the EMP-equipped drone should be exclusively reserved for circumstances that can cause harm to law enforcement due to a suspect’s ability to monitor law enforcement movement electronically. Secondly, law

¹⁰⁵ *Id.*

¹⁰⁶ FBI, *supra* note 61.

enforcement must declare their intent to use the EMP-equipped drone as part of their probable cause statement when swearing out a warrant to a judge or magistrate.

EMP-equipped drones should be considered a vital tool to ensure the safety of law enforcement during the service of high-risk, dynamic search warrants in a location where a suspect may be technologically advanced. The deployment of an EMP will likely not cause any physical harm to any involved parties. Still, it will probably prevent the loss of life or prevent terminal injury to law enforcement, suspects, or bystanders.