

JOINT LEGISLATIVE COMMITTEE ON EMERGENCY MANAGEMENT AND
THE SENATE JUDICIARY COMMITTEE

OVERSIGHT HEARING

Drones and Emergencies: Are We Putting Public Safety at Risk?

August 18, 2015
1:30 p.m.
State Capitol, Room 444

BACKGROUND PAPER

I. INTRODUCTION

The development of small unmanned aircraft systems – known variously as “unmanned aerial vehicles,” “remote piloted aircraft,” or simply “drones” – promises to transform the way Californians interact with each other and their environment. Just a few decades ago, small aircraft of this type were the exclusive domain of hobbyists. Within the last decade or so, the public has become familiar with the military’s use of unmanned aircraft to accomplish certain mission objectives, ranging from clandestine intelligence gathering to aerial warfare. However, in December 2013 when Amazon.com, FedEx, and UPS announced their plans to integrate unmanned aircraft into their logistics and delivery services, the possibility of widespread civilian and commercial adoption of this technology became clear.

Drone technology holds great promise to transform the way California’s police, firefighters, and medics respond to emergencies, offering up new ways to rapidly reach injured people, or remotely assess a location too dangerous for humans to enter. However, the possibility of having potentially thousands of commercial and private drones take to California’s skies in the coming years raises significant questions about the effect these new aerial vehicles will have on emergency response activities. Indeed, as discussed below, California’s firefighters have already experienced substantial interference from private drone operators during this year’s fire season, grounding air tankers and other assets that could have been used to fight wildfires. This oversight hearing will examine ways to ensure drones do not undermine emergency response efforts, as well as steps for equipping California’s first responders with this new technology.

II. BENEFITS AND RISKS POSED BY DRONES DURING EMERGENCIES

As civilian and commercial drone technology becomes more widespread, both emergency managers in state and local government, and businesses in the public safety industry, are increasingly looking to see how drone technology can be adapted to disaster and emergency response activities. A recent report coauthored by the American Red Cross states:

Aerial drones are one of the most promising and powerful new technologies to improve disaster response and relief operations. Drones naturally complement traditional manned relief operations by helping to ensure that operations can be conducted safer, faster, and more efficiently. When a disaster occurs, drones may be used to provide relief workers with better situational awareness, locate survivors amidst the rubble, perform structural analysis of damaged infrastructure, deliver needed supplies and equipment, evacuate casualties, and help extinguish fires—among many other potential applications.

In advance of an emergency, drones are able to assist with risk assessment, mapping, and planning. When individuals, businesses, and communities are able to understand and manage risks and plan effectively, they reduce overall damage and losses. Rebuilding and recovery are then able to begin more [quickly,] ultimately strengthening the resiliency of communities.

Drones have long been described as optimally suited to perform the “3-D” missions, often described as dirty, dull, and dangerous. They can provide needed aerial data in areas considered too hazardous for people on the ground or for manned aircraft operation, such as sites with nuclear radiation contamination or in close proximity to wildfires. Drones can also deliver needed supplies and relay Wi-Fi and cellular phone service when communications are needed the most. (American Red Cross, *et al.*, *Drones for Disaster Response and Relief Operations* (Apr. 21, 2015) <<http://measure32.com/drones-for-disaster-response-and-relief-operations-executive-summary/>> [as of Aug. 14, 2015].)

For more routine emergency response activities, drones can add to a first responder’s “situational awareness,” allowing them to better understand the nature or dynamics of a particular emergency. “For firefighters and rescue personnel, a drone could be flown over a hard-to-reach area before rescuers can climb down embankments or through thick brush. With a special infrared camera, it could aid in search-and-rescue efforts or determine the hottest areas of a house fire [or] be flown overhead to assess fire damage.” (Sarah Hall, *First Responders Learn How Drones Can Save Lives*, Government Technology (Jan. 12, 2015) <<http://www.govtech.com/public-safety/First-Responders-Learn-How-Drones-Can-Save-Lives.html>> [as of Aug. 14, 2015].) Additionally, some

industry commenters have noted that drone technology may enable emergency responders to provide traditional services at lower costs. According to one commenter,

[t]his includes everything from traffic accident investigation; forensics; search and rescue; tactical operations; emergency and disaster response; crowd control; HAZMAT/CBRNE¹ management; fire investigation and damage assessment and fire management. These are all vital public safety matters that drones made for the domestic civilian market are well suited to handle. Cities, towns and municipalities facing strained budgets and dwindling resources may more easily be able to afford [drones] than traditional big ticket first response equipment and personnel. Consequently, for some local governments, it will give them a bigger bang for their buck as important force multipliers. (Anthony Kimery, *Drones: Force Multipliers for Law Enforcement, Other First Responders*, Homeland Security Today (Jul. 28, 2013) <<http://www.hstoday.us/columns/the-kimery-report/blog/drones-force-multipliers-for-law-enforcement-other-first-responders/06bfa4d1a8afea68ce724424cb7679f6.html>> [as of Aug. 14, 2015].)

Indeed, California has already witnessed the transformative impact unmanned aerial vehicles can have on emergency management. In 2013, the California Military Department provided firefighters with lifesaving aerial surveillance using unmanned vehicles while they battled the massive Rim Fire in the foothills of the Sierra Nevada Mountains. This aerial surveillance enabled firefighters to track the fire in real time, enabling commanders to move firefighters out of harm's way and reposition firefighting equipment as the fire actively shifted with the wind across the mountainside.

Other emergency-related drone products not quite ready for market hold similar promise. Graduate students in both Austria and the Netherlands have begun development of an automated "ambulance drone" capable of flying an on-board defibrillator to patients suffering from cardiac arrest. According to one student,

Some 800,000 people suffer a cardiac arrest in the [European Union] every year, and only 8 percent survive . . . The main reason for this is the relatively long response time of the emergency services, approx. 10 minutes, while brain death and fatalities occur within four to six minutes. The ambulance drone can get a defibrillator to a patient inside a 12 km sq (4.6 mi sq) zone within one minute. This response speed increases the chance of survival following a cardiac arrest from eight to 80 percent. (Nick Lavars, *In a Heartbeat: Ambulance Drone Designed to Cut Cardiac Arrest Response*

¹ CBRNE stands for "chemical, biological, radiological, nuclear, and explosives."

Times (Oct. 29, 2014) <<http://www.gizmag.com/ambulance-drone-response-time-cardiac-arrests/34504/>> [as of Aug. 14, 2015].)

Despite its promise, drone technology could also significantly hinder emergency response activities. Conflicts between unmanned drone and manned emergency response flights have been widely reported in California during this year's fire season. According to one recent story:

At least five times this summer . . . aerial firefighting operations in the West have had to be shut down because officials deemed nearby drones a threat to the planes and helicopters that drop water and retardant on fires . . . Flying over wildfires is considered the most dangerous type of flight there is, outside of aerial combat. Robert West, who's been doing this for 44 years, says that trying to spot tiny unmanned aircraft makes the job even more difficult. "We usually have visibility problems anyway, with the smoke and keeping track of our lead planes and helicopters on the fire, let alone look out for a drone," West says. "And by the time we probably saw something, if it was very small, we couldn't do anything about it. It'd just be there." (Scott Graf, *In The Heat Of The Moment, Drones Are Getting In The Way Of Firefighters*, National Public Radio (Jul. 24, 2015) <<http://www.npr.org/sections/alltechconsidered/2015/07/24/425652212/in-the-heat-of-the-moment-drones-are-getting-in-the-way-of-firefighters>> [as of Aug. 14, 2015].)

The risk of mid-air collision between unmanned drones and manned emergency response aircraft is significant. According to firefighters, drones "can get sucked quite easily into the propeller of a helicopter or an engine of an airplane and cause the aircraft to go down quite quickly." (*Id.*) Additionally, response efforts at ground level are undermined when drones force manned aircraft away from the scene of an emergency, such as last month when the "sighting of five drones in a wildfire that closed Interstate 15 in Southern California and destroyed numerous vehicles grounded crews for 20 minutes as flames spread." (Elliot Spagat, *Drones Getting in the Way of Emergency Responders*, Associated Press (Aug. 10, 2015) <<http://abcnews.go.com/Technology/wireStory/drones-emergency-responders-32983940>> [as of Aug. 14, 2015].) Dangerous encounters between drones and manned emergency response aircraft are not limited to aerial firefighting tankers -- just last week in one of the latest such incidents, an emergency medical helicopter had to take evasive action to avoid collision with a drone flying at 1,000 feet near Fresno. (Alan Levin, *Drone-Plane Safety Incidents Seen Quadrupling, U.S. FAA Says*, Bloomberg (Aug. 12, 2015) <<http://www.bloomberg.com/news/articles/2015-08-12/drone-plane-safety-incidents-seen-quadrupling-in-u-s-faa-says>> [as of Aug. 14, 2015].)

As the price of consumer-grade drones continues to fall, the number of dangerous encounters between emergency response aircraft and unmanned aerial vehicles is likely

to increase. Already this year, the U.S. Forest Service has counted 13 wildfires in which suspected drones interfered with firefighting aircraft, up from four fires last year and only isolated incidents before that. More generally, data from the Federal Aviation Administration (FAA) indicates that “[p]ilot encounters with drones are on pace to at least quadruple to more than 1,000 this year, highlighting a growing threat to U.S. aviation by unmanned aircraft.” (*Id.*) There were 650 such cases reported to the FAA through August 9th of this year, compared with 238 in 2014, suggesting that the number of safety incidents will exceed last year’s figures by more than four times if these encounters continue at current rates.

This oversight hearing will feature testimony from police, fire, medical, and emergency management leaders from across the state who will describe some of the benefits and risks drones pose to California’s first responders.

III. MEDIA USE OF DRONES DURING EMERGENCIES

In addition to the use of drones by first responders, many media and newsgathering organizations might soon begin using drones to report on breaking news from the scene of an emergency. This emerging field of “drone journalism” has yet to really take off in the United States, but at least a few organizations have used the technology as a newsgathering tool while emergency response activities are underway. For example, the Daily Dot used unmanned aerial vehicles (UAVs) to report on an explosion in Manhattan last year that caused two buildings to collapse.² Outside the United States, drone journalism was showcased just last week when the BBC used drone footage to report on a massive explosion in the port city of Tianjin in China that killed over 100 people and injured nearly 1,000.³

Drone journalism at the site of an emergency may offer the media safe and effective access to an area that is otherwise unsuitable for human entry. A 2011 article in the Washington Post noted how drones could potentially “provide much better coverage of natural disasters, such as the widespread fires in Texas, or in a nuclear disaster such as the Fukushima-Daachii plant.” (Melissa Bell, *Drone journalism? The idea could fly in the U.S.*, Washington Post (Dec. 4, 2011) <http://www.washingtonpost.com/blogs/blogpost/post/drone-journalism-the-idea-could-fly-in-the-ussoon/2011/12/04/gIQAhYfXSO_blog.html> [as of Aug. 14, 2015].) “Drones could also be put to use in media blackout zones, such as during the Occupy Wall Street eviction, when journalists

² See Miles Klee, *Watch a Phantom Drone in Action at the Harlem Explosion Site* (Mar. 12, 2014) <<http://www.dailydot.com/technology/harlem-explosion-drone-photographer/>> [as of Aug. 14, 2015].)

³ See *China Explosion: Drone Footage Shows Tianjin Blast Site* (Aug. 13, 2015) <<http://www.bbc.com/news/world-asia-33901950>> [as of Aug. 14, 2015].)

were barred from Zuccotti Park out of safety concerns,” and might prove to be cost effective alternatives to helicopters and other manned aircraft presently used for newsgathering. (*Id.*) Additionally, the use of media drones to gather information and footage during an emergency could, itself, aid in emergency response efforts by both giving response personnel access to real-time data directly from an emergency site, and by helping to inform the public on ways to protect themselves from the effects of an ongoing or recent emergency.

As with other civilian uses of drones near active emergency sites, media drones could also potentially conflict with manned aircraft operations or interfere with rescue activities taking place on the ground. However, unlike the general civilian use of drones, constitutional protections afforded to the media and the public good provided by a free press in a democratic society suggest that the media’s use of drones at or near the scene of an emergency warrants unique consideration. Regulating the media’s use of this technology at the site of an emergency presents the unique challenge of reconciling the state’s duty to provide for the health, safety, and welfare of its citizens (including its first responders), and the First Amendment’s protection of the right to create and disseminate information, including the right to take photographs and videos, and the right to publish matters of public concern.

The First Amendment to the U.S. Constitution provides that Congress shall make no law abridging the freedom of speech, or of the press, or the right of the people peaceably to assemble, and to petition the government for a redress of grievances. (U.S. Const., 1st Amend., as applied to the states through the 14th Amendment’s Due Process Clause; see *Gitlow v. New York* (1925) 268 U.S. 652; see also Cal. Const. art. 1, Sec. 2, which protects the right of every person to “freely speak, write and publish his or her sentiments on all subjects, being responsible for the abuse of this right.”) The freedom of speech, however, is not limited solely to the spoken word or to that which is published using a printing press. Rather, the scope of protection afforded by the First Amendment extends to other mediums of expression such as music, dancing, visual art, films, and photographs. Indeed, as recently as 2011, the U.S. Supreme Court reaffirmed its prior decisions holding that “the creation and dissemination of information are speech within the meaning of the First Amendment.” (*Sorrell v. IMS Health Inc.* (2011) 131 S. Ct. 2653, 2667 [internal citations omitted].) In that regard, drones could feasibly facilitate a person’s ability to engage in protected First Amendment activity by helping capture images, videos or other information, especially where such aircraft could be used to gather otherwise inaccessible information. In the public sphere, drones could enable the press to monitor community activities, police activities, activities of public officials, and so forth – much of which arguably constitutes matters of public concern.

If the activities facilitated by drones were deemed to be protected activities under the First Amendment, then any regulation of those protected activities would likely be subjected to strict scrutiny. Under a strict scrutiny analysis, any regulation of activities

protected under the First Amendment must further a “compelling governmental interest,” and must be narrowly tailored to achieve that interest.⁴

This oversight hearing will feature testimony from representatives of the press and newsgathering organizations who will help draw out the connection between drone technology and newsgathering during emergencies. These representatives will describe how unmanned aerial vehicles are used to enable the free exercise of speech and press, and will discuss how to conduct newsgathering at the scene of an emergency in a way that does not undermine response efforts.

IV. KEEPING THE PUBLIC AND FIRST RESPONDERS SAFE – EXISTING REGULATION, BEST PRACTICES, AND NEXT STEPS

At present, the use of unmanned aerial vehicles in the skies over California is fairly restricted. Congress effectively closed the national airspace to commercial drone flights in the Federal Aviation Administration (FAA) Modernization and Reform Act of 2012.⁵ That Act established a framework for safely integrating unmanned aircraft into the national airspace⁶ no later than September 30, 2015. Until these vehicles can be safely integrated into our airspace, federal law generally prohibits the commercial use of drones.

The federal Modernization and Reform Act does, however, permit certain commercial unmanned aircraft operations to take place before the integration framework is implemented. Section 333 of the Act authorizes the Secretary of Transportation to establish special interim requirements for the operation of these aircraft by designated operators, provided the aircraft and their operators meet certain minimum standards

⁴ Any restriction of drone use that is deemed to be a prior restraint would arguably face a “heavy presumption” of unconstitutionality. (See e.g. *Bantam Books, Inc. v. Sullivan* (1963) 372 U.S. 58, 70; *New York Times v. U.S.* (1971) 403 U.S. 713, 714; see also *Nebraska Press Assn. v. Stuart* (1976) 427 U.S. 539, 559 [“prior restraints on speech and publication are the most serious and least tolerable infringement on First Amendment rights.”].) The Court has very clearly stated that a prior restraint cannot be justified based on “the insistence that the statute is designed to prevent” speech that “tends to disturb the public peace and to provoke assaults and the commission of crime.” (*Near v. Minnesota* (1931) 283 U.S. 697, 721-722.)

⁵ H.R.658, 112th Congress (2011-2012). In general, the FAA is tasked with regulating aircraft operations conducted in the national airspace under 49 U.S.C. Sec. 40103. This authority extends to unmanned aircraft operations, which, by definition, are considered to be “aircraft.” (See 49 U.S.C. Sec. 40102(a)(6), which defines an “aircraft” as “any contrivance invented, used, or designed to navigate, or fly in, the air.”)

⁶ The Federal Aviation Act of 1958 delegated regulatory authority over navigable airspace within the United States to the FAA. (See 49 U.S.C. Sec. 40101 et seq.). Though not precisely defined, “navigable airspace” means “airspace above the minimum altitudes of flight prescribed by regulations under [the Act], including airspace needed to ensure safety in the takeoff and landing of aircraft.” (49 U.S.C. Sec. 40102(a)(32).)

and have applied for a commercial use exemption. The FAA has promulgated rules allowing for these exempted commercial uses in Part 11 of Title 14 of the Code of Federal Regulations. To date, a handful of commercial operators have applied for, and received, permission to fly commercial drones, including several film production companies, construction, surveying, and inspection companies, and a number of real estate firms.

The Act also sets out a separate interim operation exemption for “public unmanned aircraft,” allowing public agencies like police departments to operate drones upon application, provided the aircraft and their operators meet certain minimum standards.⁷ Generally speaking, public agencies must receive a Certificate of Waiver or Authorization (COA) from the FAA before they may operate unmanned aircraft. COAs authorize recipient public agencies to operate specified unmanned aircraft for particular purposes in specified areas. They typically include operational restrictions, such as limiting the use of drones to unpopulated areas or requiring operators to maintain visual line-of-sight with their aircraft, in order to ensure that public agency drone flights do not jeopardize the safety of other aviation operations. Public unmanned aircraft operating under a COA must be registered with the FAA and visibly marked with U.S. nationality and registration marks (N-numbers) in accordance with federal regulations. To date, a small number of public agencies in California have received COAs to operate drones within the state, including the California Department of Forestry and Fire Protection (Cal Fire) and the Ventura County Sheriff’s Office.

Unlike commercial and public agency drone operations, flying an unmanned aircraft “strictly for hobby or recreational use” is allowed without the need for prior FAA approval so long as the operator pilots the craft in accordance with specific safety rules.⁸ As a result, private citizens are piloting most of the drones one sees in California today. The Modernization and Reform Act limits hobbyist drones to a weight of 55 pounds or less, specifies that operation of these drones must give way to and not interfere with manned aircraft, and requires hobbyists to notify airport operators whenever these drones are flown within five miles of an airport. The Modernization and Reform Act’s safety rules include a requirement to operate these recreational aircraft “in accordance with a community-based set of safety guidelines,” but the lack of more comprehensive rules establishing clear boundaries for when, where, and how these craft are to be operated has raised concerns. A recent poll shows just how far this concern has permeated into the general public. According to Reuters, “[s]ome 73 percent of respondents to [an online poll] said they want regulations for the lightweight, remote-control planes,” and “forty-two percent went as far as to oppose private ownership of

⁷ See Section 334 of the FAA Modernization and Reform Act of 2012.

⁸ See Section 336 of the FAA Modernization and Reform Act of 2012.

drones, suggesting they prefer restricting them to officials or experts trained in safe operation.” (Alwyn Scott, *Americans OK with Police Drones - Private Ownership, Not So Much: Poll* <<http://news.yahoo.com/americans-ok-police-drones-private-ownership-not-much-120553042.html>> [as of Feb. 12, 2015].)

Despite specific requirements not to interfere with manned aircraft operations, California’s first responders have reported several incidents where the use of drones in the vicinity of emergency response aircraft or near the scene of an emergency either put the safety of first responders in jeopardy or prevented them from carrying out their missions.⁹ The growing frequency of these incidents has drawn the FAA’s attention, with Administrator Michael Huerta describing drone interference with firefighting efforts during this year’s fire season as a “game changer.” (Kris Van Cleave, *Rise in Drone Hazards Irritates Pilots, Concerns Officials* (CBS News) <<http://www.cbsnews.com/news/rise-in-drone-hazards-irritates-pilots-concerns-officials/>> [as of Aug. 14, 2015].) Existing law provides state and federal law enforcement agencies with some authority to prosecute individuals who endanger others through the negligent operation of a drone. For example, under FAA regulations, civil penalties may be assessed against those who operate aircraft, including drones, in a careless or reckless manner that endangers the life or property of another. (See 14 C.F.R. Sec. 91.13.) Under California law, drone operators who interfere with the lawful efforts of firefighters to extinguish a forest fire are subject to fines up to \$1,000 and, in some cases, imprisonment. (See Pub. Res. Code Sec. 4165.) However, even with these authorities, locating and prosecuting violators has proven difficult due to the fact that drones rarely display identifiable markings and are typically not registered in aircraft databases.

In an effort to prevent interference with manned aircraft, including those operated by emergency responders, the FAA, other public agencies, and industry stakeholders have launched public education campaigns aimed to equip drone operators with information and guidance needed to fly safely and responsibly. The “Know Before You Fly” campaign, coordinated by the Association for Unmanned Vehicle Systems International (AUVSI), the Academy of Model Aeronautics (AMA), the Small UAV Coalition, and the FAA, provides private drone operators with basic safety guidelines and best practices to ensure that they do not put themselves or others at risk when flying (see <http://knowbeforeyoufly.org>). The “If You Fly, We Can’t” campaign, coordinated by the U.S. Forest Service, is aimed to educate drone operators about the specific dangers presented by flying drones near wildfires, including potential risks to aircraft and aircrews, and the effect drone operations have on aerial firefighting (see <http://www.fs.fed.us/science-technology/fire/unmanned-aircraft-systems>).

⁹ These incidents are described in Section II of this Background Paper.

The question remains, however, whether more should be done to educate the public about the risks of flying drones near the site of an emergency, or whether technological solutions should be explored to prevent drones from interfering with emergency response activities. Some commenters have suggested that “companies need to take more responsibility for educating their customers by adding warning labels, devising software fixes to limit where drones can fly and taking other steps.” (Craig Whitlock, *Rogue Drones a Growing Nuisance across the U.S.*, Washington Post (Aug. 10, 2015) <https://www.washingtonpost.com/world/national-security/how-rogue-drones-are-rapidly-becoming-a-national-nuisance/2015/08/10/9c05d63c-3f61-11e5-8d45-d815146f81fa_story.html> [as of Aug. 14, 2015].) Some manufacturers are already implementing technological solutions to restrict where their drones can be operated. DJI Technologies, for example, issued updates to the on-board software of its UAV product line earlier this year to preclude its drones from being flown in specified no-fly zones -- a feature known as geo-fencing. (Frank Bi, *Grounded: Drone Manufacturer DJI to Prevent Its Drones from Flying over Washington D.C.*, Forbes (Jan. 28, 2015) <<http://www.forbes.com/sites/frankbi/2015/01/28/grounded-dji-to-prevent-drones-from-flying-in-washington-d-c/>> [as of Aug. 14, 2015].)

This oversight hearing will feature testimony from manufacturers, industry groups, public agencies, and aviation community stakeholders from across the country who will describe their efforts to use educational, technological, and regulatory tools to keep the public and first responders safe as drones become more commonplace in our skies.

V. CONCLUSION

Drone technology is poised to revolutionize many aspects of California’s economy and holds the promise to create entirely new industries in this state. With these potential economic benefits comes the risk that, like any technology, unmanned aerial vehicles could be used in ways that undermine the safety and security of California residents. Already, first responders have witnessed repeated incidents where irresponsible drone use has undermined their ability to quickly and effectively respond to an emergency. As this technology becomes more widely adopted, policymakers will have to assess existing technological, educational, and regulatory efforts to keep drones from interfering with emergency response activities, and consider whether more needs to be done. This oversight hearing will help illuminate some of the policy questions likely to arise as California embraces this exciting new technology.