Author(s): Gynnild, Astrid; Uskali, Turo

Title: The first wave of drone journalism : From activism tool to global game changer

Year: 2018

Version: Published version

Please cite the original version:

Gynnild, A., & Uskali, T. (2018). The first wave of drone journalism : From activism tool to global game changer. In A. Gynnild, & T. Uskali (Eds.), Responsible Drone Journalism (pp. 15-35). Routledge. https://doi.org/10.4324/9781315163659-2

2 The first wave of drone journalism

From activist tool to global game changer

Astrid Gynnild and Turo Uskali

Introduction

The story of Paris Hilton filmed by a drone on the French Riviera in 2010 has become a classic. The event marks the beginning of the drone era in visual journalism; possibly for the first time in history, paparazzi succeeded in securing aerial images of a world-class celebrity without using a helicopter. The disruptive technology was primitive but lightweight, inexpensive and met the needs of the photographer there and then (Gynnild 2013; Tremayne & Clark 2013). Combined with the options for rapid diffusion provided by the Internet and wireless networks, the paparazzi had gained a new competitive advantage.

From an activist perspective, though, we claim that the real gate opener for drones as a journalistic tool goes back to 2011, when Tim Pool and his friends managed what the world had not yet seen; they started live-streaming drone videos from inside the Occupy Wall Street camp in New York. First, they built their own small drones by simple means while sharing every step of the process with an increasing number of online followers. The drones were easily controlled by a smartphone; by utilizing the newly launched U-stream technology, the young innovators were able to provide visual live reports, from the air, of what was actually going on inside the activist camp. The counter-power approach was closely followed by thousands of people on the Internet; it prompted much buzz and hundreds of headlines as the drones documented activities that were quite different from those presented by the establishment and the police that were watching the camp (Gynnild 2013).

The event exemplifies a fact repeatedly stressed by Manuel Castells (2009, 2012): as power relations are embedded in the institutions of society, creative actions of counter-power are likely to pop up outside of the institutions. The more aggressively the police reported from the protests at the camp, the more the activists engaged in finding new ways to document realities from their perspective.

DOI: 10.4324/9781315163659-2

Within weeks, the disruptive breakthrough of the young innovators in New York evolved into a worldwide activist initiative; suddenly, small, homemade drones with limited flying capacity reached out to audiences on all continents, and clips were sold from activists to established news organizations such as CNN. In November, riots in Warsaw, Poland, were recorded by anonymous activists and circulated via YouTube (Goldberg et al. 2013; Corcoran 2014). In December, demonstrations in Moscow, Russia, were documented by ten aerial still images shot by a drone and published on the citizen news site ridus.ru (Christoprudov 2011; Goldberg et al. 2013). Self-made camera drones were still quite expensive – up to several thousand dollars each (Martinelli 2011).

At this point, though, it was still difficult to imagine that only a few years later, the term drone would be on everyone's lips, that drones would evolve into advanced sensor platforms (Pitt 2014) used by governments as well as by leading news organizations, that a new global multibillion-dollar industry was in the making and that opportunities for new ways for the surveillance of society from above would suddenly continue to grow exponentially.

Empirical data and case approach

In this chapter, we identify and discuss seminal cases of journalism innovation and pioneering actions in this evolution. In what ways was journalism a global test-bed for drones as a disruptive innovation tool? What dilemmas were identified, and how were such dilemmas and obstacles encountered in the first wave of drone journalism? The overview is grounded in an analysis of dozens of cases on drone journalism development across the globe from 2010 to 2018. Based on these data, we suggest that within less than a decade, camera drones have evolved to become a game changer in global news journalism. A game changer is a "newly introduced element or factor that changes an existing situation or activity in a significant way" (Merriam-Webster's Collegiate Dictionary, 11th ed.). In this context, a game changer is a new tool and new professional practice that changes the ways that journalism is produced – often more efficiently and more transparently than earlier.

Since we started collecting data for this study, the number of online sites in which drone journalism is disseminated and discussed has grown exponentially. Hobbyists, activists and professional journalists have from the outset shared incredible amounts of expert knowledge via social media, blogs and in other online communities. The field is marked by a speedy viral diffusion of imagery and a wealth of new ideas for anyone to use. So far,

though, surprisingly little *research* has been conducted on drones applied to journalism or on drones as a news beat.

In this study we are concerned primarily with the expansion of drones as a newsgathering tool. The issues that we address in this chapter therefore stem from multiple sets of empirical data: drone video clips, discussion forums, blogs, social media, conferences, hearings and legislative documents, in addition to extant research. Interestingly, the many posts on doing drone journalism far outweigh the posts on drones as a news beat. The learning processes of dronalism seems to have evoked a kind of collective connectivism (Siemens 2005) among enthusiasts that make online drone communities particularly interesting to study.

In this chapter we present a few main, recurring themes from a vast material mostly written by activists and journalists. As researchers investigating a multibillion-dollar technology and its practical implications for the global news industry, we are, of course, constantly faced with the challenge of data overload in an expansive virtual universe. Our aim, however, is not to provide a full descriptive overview of drone journalism incidents but to contextualize what surfaces when a disruptive technology changes established premises for visual news work. Based on the available data, we propose that within less than a decade camera drones have evolved from being a primitive tool for activists to becoming a game changer in visual journalism. At the same time, the fact that we have only accessed empirical data written in English and Nordic languages is a clear limitation of the study. The material is also biased in the sense that what makes the headlines is usually rare events, the unexpected and the surprising, or the otherwise exceptional moves that take place within a field such as drone journalism.

First controversies

In this study, it was tempting to turn again to seminal theories on innovation, diffusion and disruptive technologies, such as Rogers (1995) or Christensen (1997) for solid explanations of the drone evolution. As we worked and reworked the material, however, we were struck by the enthusiasm and playfulness of individuals that came out of the data. These game-like issues of exploring a new technology prompted reflections on lost opportunities of creative freedom in the business and the ability to carry out journalism in a state of mental surplus. Such vague but repeatedly surfacing data are partly explained by Castells (2012) who emphasized that social networking on the Internet provides new spaces of individual autonomy – beyond the control of governments and corporations that had previously monopolized channels of communication power. Actually, the many stories provided by reporters

were so thrilling that we decided to incorporate a relatively large amount of concrete examples in the analysis.

When new technologies are adopted and adapted in a new field, the lack of relevant rules and regulations leads to much confusion among its actors. Law professor and media historian Tim Wu (2011) points out that such anarchistic periods characterized the introduction of the telegraph, radio and television, as well as the Internet and mobile technologies. In terms of innovations, a certain legislative time lag is usually to be expected. Therefore, lawyers and law schools are often in the forefront of handling such issues case by case. Of course, international aviation regulations and crime laws were valid and operative from the beginning. But as we shall see, even if drones were regulated by international aviation rules, early adopters were constantly exploring invisible and visible boundaries of the new tool.

In the very early years, from 2010 to 2012, news about the first camera drone controversies were circulated widely via online groups, blogs and news outlets. Some incidents even started yearlong controversies and legal battles; typically, battles prompted by hobbyists and journalism activists immersed in the new activity. In early 2012, for instance, an American drone hobbyist detected possible environmental problems by watching his own drone footage. The clip displayed dangerous waste in a river near a meat packing plant in Dallas, Texas, in the United States. After contacting the local authorities, investigations started. Consequently, the meat packing plant was closed for a year and a half (Mortimer 2012a; Wilonsky 2013).

After this widely circulated incident, many other activists started using drones for similar actions, which often created headlines. Also in 2012, for example, in the United States, an animal rights group's drone was shot down while the activists witnessed and recorded a live pigeon shooting. The drone was shot down in an act of revenge by the pigeon hunters. One activist commented that it was a very short flight. The shooters had hidden themselves in the woods and as soon as the machine was up to about 150' they started shooting" (Schroyer 2012). The local sheriff's department filed a malicious damage to property incident report by the animal rights group. The incident also received international press coverage (Thetandd.com 2012; Keneally 2012). In July 2013, the Federal Aviation Administration (FAA) warned the public against shooting guns at drones, stating, "Shooting at an unmanned aircraft could result in criminal or civil liability, just as would firing at a manned airplane." The FAA released the statement after a town in Colorado started granting "hunting permits" to shoot drones (Lowy 2013).

A typical trait of these cases is the pioneering role of activists who used drones to document and report on political issues such as demonstrations, environmental crimes and animal rights issues. The disruptive technology provided extended opportunities for connecting large communities of people

with similar interests. Such citizen drone reporting has, nearly without exception, proved to be difficult to handle for governmental authorities. which have repeatedly called for stricter regulations. Identifying crowd size during riots and the scope of damage and devastation in the aftermath of natural catastrophes is not always wanted by the police and by governments.

The counter-strategy of governmental authorities is typically to issue temporary flight restrictions, TFL (Temporary Flight Limitations). This strategy is widespread at least in most Western countries. During the Ferguson unrest in the United States in August 2014, a TFL was issued by the FAA. The protests and riots began after a fatal shooting of an 18-year-old African-American youth by a white police officer, and continued for many months. The no-fly-zone restriction exemplified that whenever controversial events happen in the United States, the airspace might easily be blocked by authorities. In practice, this means that with drones available, the work of journalists is hindered by governmental authorities who impose temporary flight restrictions (Dronejournalismlab.org 2014; Perritt & Sprague 2017a, p. 195). In Norway and other Northern European countries, temporary flight restrictions are regularly issued during fires and accidents, with the argument being that safety work might be at risk if unmanned aerial vehicles fly into the area.

Technology evolution as infinite gaming

In his provocative book, *What Technology Wants* (2010), the technology philosopher Kevin Kelly claims that the main aim of technological evolution is to keep the game of possibilities open. After seven years of studying new technologies, Kelly suggests that the technium, as a whole, is a kind of living, natural system that has unconscious, long-term tendencies built into the system – tendencies that cannot be avoided or stopped. Subsequently, he suggests that for humans, adopting principles of proactivity and engagement are the only ways to steer or tame technology in wanted directions. Keeping the game of possibilities open, as Kelly suggested, implies that any technology will constantly move in directions that generate more options to humans: more opportunities, more connection, more diversity, more unity, more ubiquity and more thoughts. Additionally, and as a consequence, new technologies generate more problems, too.

According to Kelly, technologies constantly engage in changing roles in society. He sees them as physical manifestations of infinite gaming, in which individuals constantly seek the "minimum amount of technologies that will create the max amount of choices for oneself and others" (Kelly 2010, p. 352). Moreover, he points out that technology permanently engages science, innovation, education and pluralism that allow individual humans to generate and participate in a greater number of ideas. In that way, technology allows each

person to do better, he claims. The engagement in constant auto-creation of new ideas means that when playing the infinite technology game, humans "explore every way to play the game and include all possible games and players to widen what is meant by playing" (Kelly 2010, p. 354).

There is a big difference between playing finite and infinite games. When applied to human behavior, engaging in finite games means that individuals or groups of people engage in activities in which the frames for the game are known beforehand: time, place, number of players and rule, and where the goal is to end up with a winner of the game. In infinite gaming, by contrast, there are no winners or any end to the game. So the goal of the technium game, then, is to keep playing to constantly expand and continuously discover more opportunities; in that respect, to humans, engaging in online activities, no matter what content or which direction, in reality means to engage in infinite technological gaming.

Kelly clearly belongs to the large group of tech-optimists who are more invested in understanding the opportunities of new technologies than in the obstacles. His theorizing is liberating in the sense that conceptually he cuts across layers of wires and wireless connectivity; at the core of it all he sees technology development as a systematic force in which we can choose to immerse ourselves – for good or bad. But we can't choose to close new technologies out. We have to learn how to live with them and constantly develop our ability to make responsible choices.

Early coverage of disasters

In the perspective of droning as part of an infinite technological game, the first wave of drone journalism implied increased opportunities for activists to document and disseminate their actions. Moreover, the technical evolution provided paparazzi with new ways to achieve valuable shots through simpler means. A third step was the increasing efficiency and new visual freedom that journalists gained when covering disasters with camera drones. Floods, forest fires, erupting volcanoes in Vanuatu and Iceland and a damaged nuclear power plant in Chernobyl, Ukraine, are just a few examples. Many drones have been lost in these hazardous environments, but as far we know, no journalists have been hurt or killed (Mackley 2012; Lam 2014; Schroyer 2014). Areas that were once considered too dangerous, too remote or inaccessible in other ways now lay open for journalistic conquering. And they opened up new cultures for individual learning, as proposed by Thomas and Brown (2011).

As early as June 2011, the competitive advantage of camera drones was proved through the amazing coverage of floods in Alabama and North Dakota in the United States. Typically enough, the drone filming was initiated not

by established news media but by reporters in an entrepreneurial iPad publication called The Daily (Hill 2011). Among practitioners and scholars it seemed to be agreed that covering stories of disasters and other possible harmful environments from a distance was at the core of drone journalism tasks (Holton et al. 2015, p. 634; Gynnild 2013; Mullin 2016).

Philip Grossman, the senior director for media technology and strategy at The Weather Channel, who focused on recording Chernobyl 30 years after the world's worst nuclear disaster, said in an interview that

> By providing images from a different perspective, one is able to tell a more complete story. Each perspective (ground, tripod, slider, drone) provides a different way to tell a story. It's sort of like "triangulation" by providing various reference points one can figure out where they are.
> (Schroyer 2014)

In April 2015, after the devastating earthquakes of 7.8 magnitude in Nepal, a local drone user posted aerial videos of damaged buildings in the capital, Kathmandu, through social media platforms. After the videos went viral, international news media republished the footage when reporting on the aftermath of the earthquakes (Shammas 2015; Sky.com 2015). This incident alone was followed by a number of international news organizations that wanted to use their own drone journalism teams on the spot. The Associated Press was the first news agency to provide extensive self-shot material from Kathmandu (Imregi 2015).

Moreover, in 2016, the European migrant crisis, in the category of a major conflict's aftermath, offered considerable emotional drone footage starting from life jacket "graveyards" in Greek islands to long queues at Hungarian borders. Often, no voice-overs were needed to tell the story effectively (BBC.com 2016).

Dilemmas of drone war reporting

Mark Corcoran (2014, p. 1) identified military conflict as the first major category of what he called "hazardous news gathering assignments," whereas the two other categories were civil unrest and disaster coverage. In the following section we discuss recurring dilemmas of camera drones used for journalism coverage of military conflicts.

Eastern Ukraine and Syria as major military conflict areas became the first test beds for drone journalism in war zones. For the first time in history, two wars, in parallel, were documented with camera drones. The journalistic flipside of the coin was that the drone footage stemmed mainly from military organizations and was meant for propaganda purposes.

Nevertheless, these drone clips, mostly showing the vast destruction of the conflict areas, were widely published by international news media like CNN and the Guardian, and were also circulated via social media platforms like YouTube (Theguardian.com 2015; Walsh 2015; Vaux 2015; Postema 2015; Theguardian.com 2016). The footage served the role of robot eyewitnesses (Gynnild 2013) from above, albeit manipulated, which was a clear technological extension of human opportunities (Kelly 2010) for documenting the cruelties of war.

Journalistically, one can argue that war-related footage should always be examined critically because of its potential propagandistic aims (Postema 2015; Uskali & Lauk 2018). Prominent news organizations such as the BBC and the *New York Times* have systematically avoided the use of propagandistic drone footage from wars. Instead, they have deployed their own drone journalism teams to produce original footage from conflict zones, especially in Eastern Ukraine. According to Postema (2015), drone reporting is evidently an important competitive asset for leading news media when it comes to hunting for the best possible visuals:

> The BBC reporters got closer to the frontline than The New York Times photographer, and they had the visual evidence of the devastation. But sending a war reporter with a drone to the frontline means taking a huge risk. – The drone seems not to be used to substitute risky war reporting operations, but to match the competition, to obtain their own drone report.

The particular value of drones in war reporting is an argument frequently used by drone researchers (Gynnild 2013; Lauk et al. 2016; Uskali & Lauk 2018). Experts like BBC's Thomas Hannen have warned that "using them in conflict situations would be dangerous, both to journalists and troops," and added that there is "certainly no way that you could do it safely, because as soon as you fly one of these things above your head, you're immediately identifying where you are, both visibly and audibly, because they're very loud" (Collins 2014). Corcoran (2014, p. 23) also cautiously mentioned that radio links needed for controlling the drones would be "relatively easy to intercept and locate using basic military signals intelligence equipment." The world's smallest drone developed for military purposes, the Black Hornet, weighs 16 grams (half an ounce) and is equipped with night vision capabilities and infrared sensors that can live-stream video still images within a 1.6 km range. This micro unmanned aerial vehicle was first used by Western troops in Afghanistan but is now freely available for anyone to buy and illustrates some of the emergent options available to journalism as well.

Indeed using drones does not necessarily reduce all the risks of war reporting. The journalist is still often close to the front lines. Perhaps only the satellites could really improve the situation. For example, 3D models about the destroyed Donetsk airport in Eastern Ukraine could be constructed based on drone and satellite images (Schroyer 2015).

But as Corcoran (2014, p. 26) points out:

> Conflict reporting is not just about military embeds. Equally important is the civil story: aid distribution, medical treatment, refugees, investigation of human rights abuses. In this environment media drones should only be deployed with great sensitivity.

Toward ubiquitous use in large corporations

When categorizing the data material of this study, we started out with a relatively detailed timeline of drone journalism approaches. It quickly emerged from the data that similar to the evolution of other disruptive technologies, the drone tool was first tested out by individuals at a decent distance from established newsrooms – not so much by entrepreneurs as by devoted hobbyists and actionists. The patterns of diffusion identified by Rogers (1995) were evident: the spread of drone journalism went from the ground up, from small to large, from periphery to center, and from online news sites to mainstream television. The BBC News was among the first TV stations. They debuted with their first "flying camera" in October 2013, but actually more than three years after the first successful uses of drones by paparazzi.

The first short BBC clip was related to a news story about a new high-speed rail line. The BBC called the self-made "flying camera" a "hexacopter" (Westcot 2013). The same tendency to avoid the term drone was noticeable in experiments by other TV stations during the same period of time. Among them was Norwegian Broadcasting, as they, too, wanted to avoid using the term drone because of its military connotations. The short history of drone journalism, though, proved that the power of the term drone has outweighed all other attempts to establish unmanned aerial vehicles as a technology easily distinguishable from the term drones used in a military context.

In this first news story, the flying camera was used "to surprise the viewer." It first acted like "a person walking along with a camera on their shoulder," and then, suddenly, it flew away, showing aerial images of a train station. It took four hours to get the first 20-second drone piece "telly right." Also, the loud noise of the rotors caused some problems, and the team had to reduce the sound in post-production. The BBC marketed that "This machine is going to transform the way TV news looks in the future"

(BBC.news.com 2013; Westcott 2013). The next use of the BBC's fleet of three hexacopters was at Stonehenge (Collins 2014).

Before shooting the first clip with a drone, the BBC, as a huge film actor in society, demonstrated professional responsibility by establishing filming rules based on the British Civil Aviation Authority regulations. In practice this meant that they were not able to fly within 50 meters of a road or building, fly over crowds, fly 500 meters horizontally or 120 meters vertically from the pilot. They also agreed to have a flight plan before every takeoff. In addition, they built an extra safety layer, a GPS-based system on board that ensured that if the radio link broke down, the drone automatically would fly back from where it took off and land (Westcott 2013). Camera drones were mainly used for outdoor reporting, but of course they could also be used indoors. For example, BBC shot indoor footage of their new broadcasting house while it was still under construction (Schroyer 2013a). Interestingly, ABC News used drones for live broadcasting in 2014 in Canberra during the Australia Day ceremonies. Within one hour of broadcast, the drone went "live" 25 times.

The BBC News crew tested the limits of using their "flying cameras" abroad. During the World Economic Forum in Davos in January 2015, three BBC journalists were briefly detained and questioned by the Swiss police after they used a drone in Davos's no-fly zone (Halliday 2015). In similar vein, Qatar-based satellite news network Al-Jazeera's three journalists were arrested in Paris, France, in February 2015 because of illegally flying a camera drone near city landmarks during the night. Flying drones over Paris without a license is banned by law. Also operating drones during the night is illegal (BBC.com 2015b; WAN/Ifra 2015).

The first wave of drone journalism is evidently characterized by an explorative vulnerability to controversies and accidents. Journalists were mostly very careful user-testers even in a period when aerial or other regulations were nearly nonexistent in many countries. Journalists apparently knew that there was little space for mistakes. The World Association for Newspapers (WAN/Ifra), started to pay attention to drone journalism and emphasized free press rights and free speech rights when the first country-wide bans of drones for journalism emerged 2013–2014 (Pead 2014; Corcoran 2014, 28).

Sometimes a single drone incident could trigger a total ban, such as in Kenya: a drone was seen a few minutes before the president was to arrive at a stadium to celebrate Kenya's national day (Flanagan 2015; Jakarta Post 2015; Johnson 2015). In Thailand, the new drone regulations set by the military junta in 2015 prohibited citizens from using camera drones; authorities also had the final say over what was allowed – and what was not – for the news media (Greenwood 2015). Indeed, other authoritarian regimes such as Nepal, Indonesia and Kenya followed suit. The government in Nepal

prohibited the use of drones within a week after the earthquakes in 2015. The drone pioneer, Professor Matt Waite commented on the trend:

> This Nepal earthquake was one of the first [news events in which] media were truly aware of drones and their power. And they came, and it immediately triggered a ban. And I'm worried that that's going to happen again.
>
> (Flanagan 2015)

Perhaps most surprisingly of all, the otherwise liberal Nordic country of Sweden prohibited all use of camera drones for more than a year. In October 2016, the Supreme Administrative Court of Sweden targeted all recreational and commercial users alike, with no exception for journalists (Teirstein 2016). Media companies and several trade associations in Sweden criticized the new rules; the Swedish government's representatives assured them that the rules would be reversed later in 2017 (Thelocal.se 2016). Finally, in August 2017 new, less prohibitive drone rules were introduced in Sweden. According to these new regulations, hobbyists no longer needed a license from the authorities. But anyone who uses camera drones professionally, for instance, journalists, needs to apply for a license, pay fees and insurance, and also report about their flights (Eriksson 2017).

In general, the first pieces of drone footage started to emerge regularly in mainstream arenas of journalism during 2012–2013. In Italy, for example, the case of the wrecked cruise ship Costa Concordia in January 2012 offered a good showpiece for local drone operators to enter foreign newscasts (Caputo 2013; Zavrsnik 2016, p. 223).

In Latin America, the early adopters of drones for journalism were the Brazilian *Folha de São Paulo* and Globo, which used drones to record protests against government spending and rising public transportation prices. The Peruvian *La Prensa de Peru* covered roadwork and road closures from the air; Salvadoran *La Prensa Gráfica* applied drones for election coverage; in Mexico, the Grupo Reforma documented the construction of Latin America's tallest skyscraper (Diep 2014; DronesSkycam 2013).

Cable News Network (CNN) used a drone for recording the devastation of Typhoon Hayian in the Philippines in November 2013. It was one of the most intense tropical storms on record, and the aerial coverage got much attention in social media. In the story, the reporter, Karl Penhaul, made a stand-up in the middle of rubbish while the drone flew over him into the sky to show the magnitude of the devastation (Penhaul 2013).

Major news organizations in the United States started to explore the capabilities of drones in 2014–2015. First, NBC News used drones abroad for foreign news reporting from Vanuatu after a cyclone hit the island

(NBCnews.com 2015). The *New York Times* used drone footage for an environmental story about melting Greenland (Haner 2015). In addition, in 2015, the Federal Aviation Administration (FAA) granted some exemptions for the news media to allow them to fly drones inside the United States. For example, the Associated Press (AP) trained its first licensed drone pilots and started "experimenting with drones across videos and photos, but not yet on a regular basis" (Imregi 2015). Also TV stations in Cox Media Group incorporated drones into their coverage (Mullin 2016).

According to the interviews conducted by Belair-Gagnon et al. (2017, p. 5) among early adopters of drone journalism in the US, the main reasons for using flying cameras were "low cost," "more precise visualization for storytelling," and "safe access to uncharted reporting terrains."

However, for three years, the development of American drone journalism was, to a large extent, put to rest due to flying restrictions by the government. The grip was loosened when the new FAA rules, more than 600 pages in length, came into effect in August 2016. The new national rules legalized drone journalism across the states. According to these drone regulations, users must be 16 years old, be able to understand English, and have an operator's certificate. In order to get the certificate one has to pass a knowledge test. Drones were not allowed to fly above 120 meters (FAA 2016; Belair-Gagnon et al. 2017). These simple rules align with international aviation regulations and are similar to the rules set forth in Europe.

In 2017, the American consensus emphasized that drones were already just another tool available to journalists. The newest models of camera drones, DJI Phantom 4s and Inspires of DJI Mavic were frequently used. Many TV stations were putting their drone operations in-house and wanted to focus on real-time broadcasting in breaking news situations. Interestingly, many stations were branding their drones. In Chicago, one TV station even named one of its drones and dedicated a webpage to it. Many restrictions still hindered the smooth use of drones in urban settings. Bad weather conditions were still enough to ground many drones (Perritt & Sprague 2017b).

Even after the new rules came into effect in the United States, authorities were able to limit the use of drones, especially during protest events, such as the case of the Dakota Access Pipeline demonstration in the fall of 2016. After the dramatic drone footage from Standing Rock (riot police blasting crowds with water cannons, rubber bullets and tear gas) went viral via social media platforms, the FAA banned all civilian use of drones within a four-mile radius of the area (Koebler 2016; Glaser 2016; Ahtone 2016; Kopstein 2016).

The Standing Rock case was, in reality, an imitation of the Ferguson case. As Joshua Kopstein (2016) writes: "Aerial images and video are often key to knowing crowd size and holding the police accountable for abuses

against activists." The only difference was the media coverage by drones. Only after drone footage was repeatedly screened on television did mainstream media pour into Standing Rock. Also, according to Ahtone (2016):

> It's been entertaining to watch the press crowd come out to Indian Country. They didn't want to, of course, but after a few months of United States security forces using tear gas, rubber bullets, mace, water cannon and concussion grenades on hundreds of indigenous protesters intent on stopping an oil pipeline, they had to.

In Europe there were 14 illegal drone flights over French nuclear plants reported in 2014 alone. French authorities did not have any leads on who was behind the flights, but the police officers were under orders to shoot down any aircraft that could threaten the plants (Bilefskynov 2014). Also, a freelancer working for the BBC was arrested in 2014 while gathering footage related to a fatal fire near Gatwick airport in London (Quinn 2014).

Tension between journalists and authorities appears to be a common feature of the first wave of drone journalism. Simultaneously, it might be claimed that the first news imagery that came out of these tensions, controversies and even accidents helped to spread the word and increase awareness of the new flying cameras, and paved the way for the next cohort of drone journalists; these events actually catalyzed drone journalism to go mainstream.

Other seminal incidents

The first person the Federal Aviation Administration (FAA) tried to fine was someone who used a drone to film a commercial at the University of Virginia. The agency demanded a $10,000 fine for reckless flight of an aircraft. In the end, however, a federal judge ruled that it was legal to operate drones commercially (Koebler 2014). Later, in October 2015, the FAA fined a drone-photography company $1.9 million for allegedly conducting 65 drone flights in New York City and Chicago between March 2012 and December 2014 without the required authorization (Vanian 2015). In 2017, the drone-photography company agreed to pay a $200,000 penalty to settle allegations without acknowledging violating federal regulations (Jansen 2017).

The first Australian drone journalism controversy occurred when Channel Nine's 60 Minutes program used a drone to capture an aerial video and images of the Christmas Island immigration detention center after being denied entry to the facilities. At the end of its flying mission, the drone crashed into the Indian Ocean. No laws were broken, but the spokesman for the detention center blamed the drone journalists for causing fear and jeopardizing safety. Interestingly, Australia had already introduced the world's

first drone legislation in 2002, but the speed of technological advances promptly made the old regulations obsolete (Corcoran 2012; Goldberg et al. 2013, p. 22).

In Australia, drones were used early for recording forest and bush fires. Such action caused some controversy. The Civil Aviation Safety Authority (CASA) detected two incidents where drone flights put firefighting responses at risk. The CASA warned that "flying a remotely piloted aircraft in the same airspace as helicopters and planes fighting fires 'creates a real risk of a mid-air collision.'" The authorities said that if they received evidence of drones being used in an unsafe manner, they would issue fines, probably amounting to many thousands of dollars (ABC.net.au 2013a; ABC.net.au 2013b). This controversy between hobbyists/journalists and fire fighters erupted later also in the US in 2015 (Fessenden 2015).

Drones made their first headlines in New Zealand when they crashed into buildings, such as a skyscraper in Auckland (Mortimer 2012b). In Finland, the first camera drone-related controversy started when local police threatened to shoot down all flying cameras used by journalists in a small plane's crash site in 2013. A freelancer took aerial images and videos of the crash scene and broadcast them during the national TV news. During the public debate, the freedom of the press advocates backed the use of drones for journalism and warned that shooting down any drones would be a crime (Lauk et al. 2016).

Sports, especially major leagues in various countries, have attracted drone journalists to test their skills. In Australia, National Rugby League and Twenty20 Big Bash League (cricket) were among the first leagues to use drone shots as promotional material (Corcoran 2013). In the US, hobbyists were the first people to use drones during sporting events. For example, according to the National Football League in 2014 at least 12 drones landed around stadiums on game days (Schmidt & Shearjan 2015). In the UK, a drone hobbyist was fined £1,800 by a court because of nine breaches of taking video over football grounds and tourist attractions in 2014 (BBC.com 2015a). In Finland, the biggest social media video hit in 2015 included drone footage. In the video, a Finnish world champion in orienteering runs up 426 stairs in a landfill trying to beat the one-minute record (Facebook 2015).

Later, in a World Cup slalom race at Madonna di Campiglio in Italy, a remotely controlled drone slammed down just inches behind a skier. After the incident, the International Ski Federation (FIS) stated that "an accident such as the drone crash cannot happen again" (Grez 2015). In Australia, a drone collided with an athlete during a triathlon competition, injuring the athlete (Grubb 2014); another crashed into a bridge and ended on train tracks (Cosier 2013). In addition, in the US, the FAA recorded hundreds of near-collisions between airplanes and drones (Whitlock 2015).

Many new safety features have already been developed because of these early incidents: geofencing offers one example. Geofencing is based on software, which automatically limits how high and how far you can fly your drone, and no-fly zones could also be programmed (CBS News/AP 2014; Grush 2016). In China, the first no-fly zone was set in 2013 at Tiananmen Square, Beijing. DJI, the Chinese manufacturer of small consumer and professional drones for aerial photography, placed a virtual fence around the city center in Beijing (Schroyer 2013b). Virtual fencing was also set for airports – the first places in China, and elsewhere – where hobbyists started to cause dangerous incidents with airplanes (Luo 2013).

Observers like Perritt and Sprague (2017b, p. 2) have argued that the barriers to the wider use of drones "are almost entirely political and regulatory, not technological." In our January 2017 interview with Ben Kreimer, one of the world's leading civilian drone consultants, Kreimer criticized countrywide bans on using drones:

> Bans, it is like you are saying we are not going to do anything about it. So it is not a way to move forward in terms of adopting technology into the society.

In conclusion, in spite of numerous controversies and even total bans in some countries, we propose that the first wave of drone journalism served as a creative outlet for the entrepreneurial potential of true news enthusiasm. While media managers hesitated because no short-term market advantages were in sight, drone journalist pioneers were driven by the weak ties of Internet networks and the new cultures of learning and risk taking by doing and sharing. And, we argue, the connected networks of the early camera drone pilots were what actually changed the games.

Our data indicate that it took less than a decade for camera drones to become a ubiquitous journalism tool in larger newsrooms of pioneering countries. As media users, we watch drone clips on most platforms without even noticing. Individuals who invested in the new flying robot are now in the competitive forefront. During the same period, drones used for journalism purposes have become advanced sensor platforms that challenge journalism in even new ways, legally as well as ethically. The infinite game of the technium is moving on.

References

ABC.net.au. 2013a. CASA warns bushfire drone operators of potential fines, www.abc.net.au/news/2013-10-27/casa-warns-bushfire-drone-operators-of-potential-fines/5048122 [Accessed 24 March 2017].

ABC.net.au. 2013b. Drone footage of fire damage at Lithgow, www.abc.net.au/news/2013-10-24/lithgow-drone-footage/5043670 [Accessed 24 March 2017].

Ahtone, Tristan. 2016. How media did and did not report on Standing Rock. *Vice.com*, https://news.vice.com/story/standing-rock-protests-what-comes-after [Accessed 2 April 2017].

BBC.news.com. 2013. "Hexacopter" flying camera makes BBC News debut, www.bbc.com/news/technology-24709180 [Accessed 24 March 2017].

BBC.com. 2015a. Man fined after flying drones over Premier League stadiums, www.bbc.com/news/uk-england-nottinghamshire-34256680, [Accessed 11 April 2017].

BBC.com. 2015b. Paris police arrest Al-Jazeera journalists over drone, www.bbc.com/news/world-europe-31632253 [Accessed 2 April 2017].

BBC.com. 2016. Migrant crisis: Drone captures life jacket "graveyard," www.bbc.com/news/world-europe-35867695 [Accessed 13 April 2017].

Belair-Gagnon, V., Owen, T., and Holton, A. E. 2017. Unmanned aerial vehicles and journalistic disruption. *Digital Journalism*. Published online 27 January. DOI:10.1080/21670811.2017.1279019.

Bilefskynov, D. 2014. France arrests 3 with drones by power plant. *Nytimes.com*, www.nytimes.com/2014/11/07/world/europe/3-found-with-drones-near-nuclear-plant-are-questioned-in-france.html [Accessed 11 April 2017].

Caputo, L. 2013. Drone Journalism, uno sguardo inedito sugli eventi. *Corrieredellasera.it*, http://piazzadigitale.corriere.it/2013/03/04/drone-journalism-uno-sguardo-inedito-sugli-eventi/ [Accessed 19 March 2017].

Castells, M. 2009. *Communication Power*. Oxford: Oxford University Press.

Castells, M. 2012. *Networks of Outrage and Hope: Social Movements in the Internet Age*. Chichester, UK: Wiley.

CBS News/AP. 2014. Drones' dangers confronted by Chris Anderson 3D robotics. *CBSnews.com*, www.cbsnews.com/news/drones-dangers-confronted-by-chris-anderson-of-3d-robotics/ [Accessed 28 March 2017].

Christensen, C. M. 1997. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Boston, MA: Harvard Business School Press.

Christoprudov, D. 2011. Kak mi nad Bolotnoi plosadju letali. [How we flew over Bolotnoi market place], http://chistoprudov.livejournal.com/87764.html.

Collins, K. 2014. Behind the mind-boggling shots captured by BBC drones. *Wired.co.uk*. www.wired.co.uk/article/bbc-drone-journalism [Accessed 9 January 2018].

Corcoran, M. 2012. Drone journalism takes off. *ABC.net.au*, www.abc.net.au/news/2012-02-21/drone-journalism-takes-off/3840616 [Accessed 18 March 2017].

Corcoran, M. 2013. Drones set for commercial takeoff. *ABC.net.au*, www.abc.net.au/news/2013-03-01/drones-set-for-large-scale-commercial-take-off/4546556 [Accessed 19 March 2017].

Corcoran, M. 2014. Drone journalism: Newsgathering applications on Unmanned Aerial Vehicles (UAVs) in covering conflict, civil unrest and disaster. *Cryptome.org*, https://cryptome.org/2014/03/drone-journalism.pdf [Accessed 10 May 2017].

Cosier, C. 2013. "I don't know whether it's a bomb or not": Train driver flummoxed after drone hits Sydney Harbour Bridge. *Smc.com.au*, www.smh.com.

au/technology/sci-tech/i-dont-know-whether-its-a-bomb-or-not-train-driver-flummoxed-after-drone-hits-sydney-harbour-bridge-20131126-2y76m.html [Accessed 26 March 2017].

Diep, F. 2014. Salvadoran newspaper sends drone to cover presidential election: *El drone* took photos and video of voters. *Popsci.com*, www.popsci.com/article/technology/salvadoran-newspaper-sends-drone-cover-presidential-election [Accessed 25 March 2017].

Dronejournalismlab.org. 2014. www.dronejournalismlab.org/page/7 [Accessed 25 March 2017].

DronesSkycam. 2013. *Youtube.com*, www.youtube.com/watch?time_continue=6&v=DLlD0tiA-80 [Accessed 9 January 2018].

Eriksson, K. 2017. Nu flyger det drönare i Sverige igen. *Dronesweden.se*, www.dronesweden.se/nyheter/nu-flyger-det-dronare-i-sverige-igen/ [Accessed 16 April 2017].

FAA. 2016. Operation and certification of small unmanned aircraft systems, www.faa.gov/uas/media/RIN_2120-AJ60_Clean_Signed.pdf, 2.4.2017.

Facebook. 2015. www.is.fi/muutlajit/art-2000000995577.html [Accessed 13 April 2017].

Fessenden, M. 2015. Drones are getting in the way of firefighters combating wilderness blazes. *Smithsonian.com*, www.smithsonianmag.com/smart-news/drones-are-preventing-firefighters-combating-wilderness-blazes-180956064/ [Accessed 11 April 2017].

Flanagan, B. 2015. Nepal quake: Media drone swarm shows "need for standards." *Alarabiya.net*, http://english.alarabiya.net/en/media/television-and-radio/2015/05/14/Nepal-quake-Media-drone-swarm-shows-need-for-standards-.html [Accessed 11 April 2017].

Glaser, A. 2016. The FAA banned drones from flying at the Standing Rock oil pipeline protest: Drone footage of clashes with police at the campsite have gone viral. *Recode.net*, www.recode.net/2016/11/28/13767216/faa-bans-drones-standing-rock-dakota-access-pipeline-video [Accessed 2 April 2017].

Goldberg, D., Corcoran, M., and Picard, R. G. 2013. Remotely Piloted Aircraft Systems and Journalism: Opportunities and challenges of drones in news gathering. https://ora.ox.ac.uk/objects/uuid:a868f952-814d-4bf3-8cfa-9d58da904ee3.

Greenwood, F. 2015. Thailand is cracking down on drones. *Slate.com*, www.slate.com/articles/technology/future_tense/2015/02/thailand_drone_regulations_why_you_should_care.html [Accessed 9 January 2018].

Grez, M. 2015. Drone crashes onto piste, misses champion skier by inches. *CNN.com*, http://edition.cnn.com/2015/12/23/sport/marcel-hirscher-drone-crash/ [Accessed 2 April 2017].

Grubb, B. 2014. "River of blood" after drone "hits" Australian athlete. *Smc.com.au*, www.smh.com.au/technology/technology-news/river-of-blood-after-drone-hits-australian-athlete-20140407-zqruh.html [Accessed 26 March 2017].

Grush, L. 2016. DJI just launched new software to stop its drones from flying in restricted airspace. *Theverge.com*, www.theverge.com/2016/1/1/10699078/dii-drones-geofencing-software-restrictions-flying [Accessed 13 April 2017].

Gynnild, A. 2013. The robot eye witness: Extending visual journalism through drone surveillance. *Digital Journalism*, Published online 20 February 2014, 334–343. http://dx.doi.org/10.1080/21670811.2014.883184.

Halliday, J. 2015. Three BBC journalists questioned for using drone in Davos no fly zone. *Theguardian.com*, www.theguardian.com/media/2015/feb/02/three-bbc-journalists-questioned-drone-no-fly-zone-davos [Accessed 2 April 2017].

Haner, J. 2015. A drone's vantage point of a melting Greenland. *Nytimes.com*, www.nytimes.com/2015/10/28/insider/a-drones-vantage-point-of-a-melting-greenland.html?_r=0 [Accessed 12 April 2017].

Hill, K. 2011. FAA looks into news corp's daily drone, raising questions about who gets to fly drones in the U.S. *Forbes.com*, www.forbes.com/sites/kashmirhill/2011/08/02/faa-looks-into-news-corps-daily-drone-raising-questions-about-who-gets-to-fly-drones-in-the-u-s/#3e32492533b1 [Accessed 12 March 2017].

Holton, A. E., Lawson, S., and Love, C. 2015. Unmanned aerial vehicles: Opportunities, barriers, and the future of "drone journalism." *Journalism Practice*, Vol. 9, No. 5, 634–650.

Imregi, L. 2015. Drones: A unique view on storytelling. *Ap.org*, https://insights.ap.org/whats-new/drones-a-unique-view-on-storytelling [Accessed 12 April 2017].

Jakarta P. 2015. Govt rule limits drone use in journalism. *Thejakartapost.com*, www.thejakartapost.com/news/2015/09/22/govt-rule-limits-drone-use-journalism.html [Accessed 11 April 2017].

Jansen, B. 2017. Drone-photography company fined $200,000 by FAA. *Usatoday.com*, www.usatoday.com/story/news/2017/01/17/faa-drone-skypan/96671342/ [Accessed 16 May 2017].

Johnson, E. 2015. Kenya basically bans all drone use: Despite potential benefits they may yield. *Pri.org*, www.pri.org/stories/2015-12-15/kenya-basically-bans-all-drone-use-despite-potential-benefits-they-may-yield [Accessed 12 April 2017].

Kelly, K. 2010. *What Technology Wants*. New York: Viking.

Keneally, M. 2012. Hunters take aim at an animal rights group's video drone. *Dailymail.co.uk*, www.dailymail.co.uk/news/article-2103803/Hunters-aim-animal-rights-groups-video-drone.html [Accessed 18 March 2017].

Koebler, J. 2014. Commercial drones are completely legal, a federal judge ruled. *Vice.com*, https://motherboard.vice.com/en_us/article/commercial-drones-are-completely-legal-a-federal-judge-ruled [Accessed 26 March 2017].

Koebler, J. 2016. The government is using a no fly zone to suppress journalism at Standing Rock. *Vice.com*, http://motherboard.vice.com/read/the-government-is-using-a-no-fly-zone-to-suppress-journalism-at-standing-rock [Accessed 2 April 2017].

Kopstein, J. 2016. Police are making it impossible to use drones to document protests, www.vocativ.com/396662/police-drone-journalists-protests/ [Accessed 2 April 2017].

Lam, B. 2014. Incredible close-up drone video of an erupting volcano in Iceland. *Wired.com*, www.wired.com/2014/10/drone-video-iceland-eruption-bardarbunga-volcano [Accessed 28 March 2017].

Lauk, E., Uskali, T., Kuutti, H., and Hirvinen, H. 2016. Drone journalism: The newest global test of press freedom. In Carlsson, Ulla (Ed.), *Freedom of Expression and Media in Transition: Studies and Reflections in the Digital Age*, pp. 117–125. Gothenburg: Nordicom.

Lowy, J. 2013. FAA warns public against shooting guns at drones. *AP.org*, www.denverpost.com/2013/07/19/faa-warns-public-against-shooting-guns-at-drones/ [Accessed 19 March 2017].

Luo, C. 2013. Police arrest four in Beijing after mysterious drone forces diversion of civilian planes. *South China Morning Post, Scmp.com*, www.scmp.com/news/china-insider/article/1393833/police-arrest-four-after-mysterious-drone-forces-diversion [Accessed 8 April 2017].

Mackley, G. 2012. Most incredible volcano expedition ever 2012: The full version. *Youtube.com*, www.youtube.com/watch?v=VuQrUwFn6bU [Accessed 8 April 2017].

Martinelli, N. 2011. Five things you need to know about drone journalism. *Ijnet.org*, http://ijnet.org/en/blog/five-things-you-need-know-about-drone-journalism [Accessed 12 March 2017].

Mortimer, G. 2012a. Dallas meat packing plant investigated after drone images reveal pollution. *Suasnews.com*, www.suasnews.com/2012/01/dallas-meat-packing-plant-investigated-after-drone-images-reveal-pollution/ [Accessed 18 March 2017].

Mortimer, G. 2012b. Multirotor hits skyscraper and burns, Auckland, NZ. *Suasnews.com*, www.suasnews.com/2012/10/multirotor-hits-skyscraper-and-burns-downtown-auckland-nz/ [Accessed 5 April 2017].

Mullin, B. 2016. Why 2016 could be a break out year for drone journalism. www.poynter.org/news/why-2016-could-be-breakout-year-drone-journalism [Accessed 9 January 2018].

NBCnews.com. 2015. Vanuatu locals describe "hell on earth" after cyclone pam, www.nbcnews.com/nightly-news/video/vanuatu-locals-describe–hell-on-earth–after-cyclone-pam-413998659736 [Accessed 2 April 2017].

Pead, S. 2014. Crucial time for drone reporting laws: Industry needs to act. *Wan/Ifra.org*, https://blog.wan-ifra.org/2014/06/27/crucial-time-for-drone-reporting-laws-industry-needs-to-act [Accessed 26 March 2017].

Penhaul, K. 2013. A bird's eye view of Haiyan devastation. *CNN.com*, http://edition.cnn.com/videos/world/2013/11/18/philippines-drone-camera-penhaul.cnn [Accessed 25 March 2017].

Perritt, H. H. Junior, and Sprague, E. O. 2017a. *Domesticating Drones: The Technology, Law, and Economics of Unmanned Aircraft*. London: Routledge.

Perritt, H. H. Junior, and Sprague, E. O. 2017b. Navigating cautiously: Tentative drone journalism. *Rtdna.org*, www.rtdna.org/article/navigating_cautiously_tentative_drone_journalism [Accessed 8 May 2017].

Pitt, F. 2014. *Sensors and Journalism: Tow Center for Digital Journalism*. New York: Columbia Journalism School.

Postema, S. 2015. News drones: An auxillary perspective: Promising applications of the news drone as a supplementary tool for news gathering, analyzing and publishing. MA thesis. Edinburgh Napier University, Edinburgh Napier.

Quinn, B. 2014. Photojournalist arrested after filming with drone near Gatwick airport. *Theguardian.com*, www.theguardian.com/uk-news/2014/dec/31/drone-photojournalist-arrested-gatwick-aiport-near [Accessed 2 April 2017].

Rogers, E. M. 1995. *Diffusion of Innovations*. Third Edition. New York: The Free Press.

Schmidt, M. S., and Shearjan, M. D. 2015. Drones spotted, but not halted, raise concerns. *Nytimes.com*, www.nytimes.com/2015/01/30/us/for-super-bowl-and-big-games-drone-flyovers-are-rising-concern.html [Accessed 11 April 2017].

Schroyer, M. 2012. Update on hunters shooting down activist drone: On-board footage, lawsuits and more. *Mentalmunition.com*, www.mentalmunition.com/2012/02/update-on-hunters-shooting-down.html [Accessed 18 March 2017].

Schroyer, M. 2013a. BBC touts benefits of its new hexacopter drone. *Dronejournalism.org*, www.dronejournalism.org/news/2013/10/bbc-touts-benefits-of-its-new-hexacopter-drone [Accessed 8 April 2017].

Schroyer, M. 2013b. DJI blocks flying above Tiananmen Square with software update. *Dronejournalism.org*, www.dronejournalism.org/news/2013/8/dji-blocks-flying-above-tiananmen-square-with-software-update [Accessed 5 April 2017].

Schroyer, M. 2014. Q&A with the photographer who explored Chernobyl with a drone. *Dronejournalism.org*, www.dronejournalism.org/news/2014/8/qa-with-the-photographer-who-explored-chernobyl-with-a-drone [Accessed 8 April 2017].

Schroyer, M. 2015. PSDJ creates 3D models and maps of war-ravaged Donetsk Airport, using citizen groups' drone video. *Dronejournalism.org*, www.dronejournalism.org/news/2015/1/psdj-creates-3d-models-and-maps-of-war-ravaged-donetsk-airport-using-citizen-groups-drone-video [Accessed 8 April 2017].

Shammas, J. 2015. Nepal earthquake: Drone captures incredible footage over Kathmandu showing aftermath of disaster. *Mirror.co.uk*, www.mirror.co.uk/news/world-news/nepal-earthquake-drone-captures-incredible-5592151 [Accessed 11 April 2017].

Siemens, G. 2005. Connectivism: A learning theory for the digital age. www.itdl.org/journal/jan_05/article01.htm.

Sky.com. 2015. Aerial footage shows devastation of Nepal earthquake, http://news.sky.com/video/aerial-footage-shows-devastation-of-nepal-earthquake-10361825 [Accessed 11 April 2017].

Teirstein, Z. 2016. Sweden places ban on flying camera drones without surveillance permits. *Theverge.com*, www.theverge.com/2016/10/24/13381050/sweden-bans-surveillance-camera-drones-permits [Accessed 16 April 2017].

Theguardian.com. 2015. Drone footage shows scale of destruction in Donetsk, Ukraine: Video, www.theguardian.com/world/video/2015/jan/17/drone-destruction-donetsk-ukraine-airport-video [Accessed 11 April 2017].

Theguardian.com. 2016. Drone footage of homes in Syria shows utter devastation: Video, www.theguardian.com/world/video/2016/feb/04/drone-footage-homs-syria-utter-devastation-video [Accessed 13 April 2017].

Thelocal.se. 2016. Sweden set to reverse controversial "drone ban," www.thelocal.se/20161220/sweden-set-to-reverse-controversial-drone-ban [Accessed 16 April 2017].

Thetandd.com. 2012. Animal rights group says drone shot down, http://thetandd.com/animal-rights-group-says-drone-shot-down/article_017a720a-56ce-11e1-afc4-001871e3ce6c.html [Accessed 18 March 2017].

Thomas, D. and Brown, J. S. 2011. *A New Culture of Learning: Cultivating the Imagination for a World of Constant Change*. Toronto: Podium Publishing.

Tremayne, M., and Clark, A. 2013. New perspectives from the sky: Unmanned aerial vehicles and journalism. *Digital Journalism*, Vol. 2, No. 2, 232–246.

Uskali, T., and Lauk, E. 2018. Keeping reporters safe: Ethics of drone journalism in a humanitarian crisis. In Andersen, Robin, and de Silva, Purnaka L. (Eds.), *Routledge Companion to Media and Humanitarian Action*. London: Routledge.

Vanian, J. 2015. Drone startup issued biggest fine ever for flying without permission. *Fortune.com*, http://fortune.com/2015/10/06/faa-drone-fine-skypan/ [Accessed 12 April 2017].

Vaux, P. 2015. Drones find Russian base inside Ukraine. *Thedailybeast.com*, www.thedailybeast.com/articles/2015/06/30/apparent-russian-base-found-in-ukraine.html?source=TDB&via=FB_Page [Accessed 11 April 2017].

Walsh, N. P. 2015. Syrian town tries to rise from ashes after ISIS defeat. *Cnn.com*, http://edition.cnn.com/2015/05/05/middleeast/syria-kobani-rising-from-ashes/ [Accessed 11 April 2017].

WAN/Ifra. 2015. Al Jazeera arrests in Paris a reminder to drone responsibly. *Blog.wan-ifra.org*, https://blog.wan-ifra.org/2015/02/26/al-jazeera-arrests-in-paris-a-reminder-to-drone-responsibly [Accessed 2 April 2017].

Westcott, R. 2013. "Hexacopter" changes the way TV reporters work. *BBC.com*, www.bbc.com/news/business-24712136 [Accessed 29 October 2017].

Whitlock, C. 2015. FAA records detail hundreds of close calls between airplanes and drones. *Washingtonpost.com*, www.washingtonpost.com/world/national-security/faa-records-detail-hundreds-of-close-calls-between-airplanes-and-drones/2015/08/20/5ef812ae-4737-11e5-846d-02792f854297_story.html?utm_term=.084b0b599a25 [Accessed 11 April 2017].

Wilonsky, R. 2013. Columbia Packing Company, known for dumping pig blood into Trinity River, gets OK from city of Dallas to reopen. *Dallasnews.com*, www.dallasnews.com/news/dallas-city-hall/2013/06/28/columbia-packing-company-gets-ok-from-city-of-dallas-to-reopen-as-meatpacker-not-slaughterhouse [Accessed 18 March 2017].

Wu, T. 2011. *The Master Switch: The Rise and Fall of Information Empires*. New York: Vintage Books.

Zavrsnik, A. (ed.). 2016. *Drones and Unmanned Aerial Systems: Legal and Social Implications for Security and Surveillance*. Berlin: Springer.