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Austin Choi-Fitzpatrick
University of San Diego

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DRONES FOR GOOD: TECHNOLOGICAL
INNOVATIONS, SOCIAL MOVEMENTS, AND THE
STATE
“ACCEPTED FOR PUBLICATION”

Austin Choi-Fitzpatrick

 <http://orcid.org/0000-0002-9044-5921>

Kroc School of Peace Studies
University of San Diego
achoifitz@gmail.com
@achoifitz

2014

Citation:

Austin Choi-Fitzpatrick (2014). Drones for Good: Technological Innovations, Social Movements, and the State, *Journal of International Affairs* 68, no.1, 19-36. <http://www.jstor.org/stable/24461704>.

Drones for Good: Technological Innovations, Social Movements, and the State

Austin Choi-Fitzpatrick

Abstract: *The increased use of and attention to drones, or Unmanned Aerial Vehicles (UAVs), have led to a widespread debate about their application. Much of this debate has centered on their use by governments, often for the purpose of surveillance and warfare. This focus on the state's use obscures the opportunity for civil society actors, including social movements, to make use of these technologies. This article briefly reviews the technological innovation before proceeding to a typology of civil society uses, ranging from art to digital disruption. This typology emphasizes the dual-use nature of this technology and, in the process, highlights the need for a best-practices framework to guide such use. Drone usage for the public good, it is argued, should prioritize 1) subsidiarity; 2) physical and material security; 3) the "do no harm" principle; 4) the public good; and respect for 5) privacy, and 6) data. These factors are introduced and discussed.*

Keywords: *religion, social movements, slavery, human trafficking, human rights, advocacy*

The recent wave of mobilization and contestation that has swept from Tunisia to Ukraine has run parallel to the emergence of an important technological innovation.¹ While the use of mobile phones and social media has received a large amount of attention, protests in Hong Kong, Ukraine, and even Ferguson, Missouri have seen the emergence of civil society's use of unmanned aerial vehicles (UAVs) or, more commonly, "drones."² This innovation represents a technological shift in scale for citizen journalists, human rights advocates, and social movement actors. As such, it requires a sophisticated assessment of the ethical issues and policy terrain surrounding its use.

To date, debates over the use of UAVs have focused on two areas. First, human rights groups have mobilized against the state's use of drone strikes and the killing of civilians in the "War on Terror." Second, policymakers in Europe and the United States have scrambled to regulate the commercial use of drones. However, a critical third segment of drone usage by and for civil society actors, especially social movements, deserves attention.

This article reviews the nascent literature on UAV use and situates it within the larger theory and debates over technology and innovation, ethics, legal rights (including privacy and the right to information), public policy, and human rights. It then applies these considerations to proposed guidelines for the use of UAVs by non-state and non-commercial actors.³ It concludes by noting the perils and promises of the use of drones for the purpose of investigative journalism, human rights monitoring, and state accountability.⁴ The dual interest in the technology by both the state and its challengers points to the promise and peril of innovation.

INNOVATION

The promise and peril of UAVs lie at the intersection of three interconnected technological innovations. The first involves a shift from analog to digital devices. This allows for more powerful onboard processors, longer battery life, and the ability to easily stream audio and video to digital consumer devices. Combined with more stable quadcopter designs, these have transferred UAVs from the hobbyist market to the general public. But this shift from analog to digital also covers the payloads these devices carry. While the carrying capacity within consumer devices is modest, they are sufficient to carry cameras, as well as sophisticated signal-jamming equipment, wireless routers, and similar electronic devices. UAVs are an ideal type of innovation, that is, they combine invention with exploitation (by marketing, integrating, and diffusing goods and ideas).⁵ Popular digital imaging devices represent a second technological scale shift, as they generate infinitely portable and reproducible images that can be shared, copied, distributed, and stored with increasing ease and decreasing cost. Combined with the emergence of online environs for storing and sharing images, digital imaging devices have fundamentally disrupted the status quo with regard to journalism, whether for entertainment, such as paparazzi photos of a Hollywood star, or accountability, such as YouTube footage from the Arab Spring.

The third technological innovation, and arguably the most disruptive, is the fundamental break between the camera and the street level. Photography has had a symbiotic connection with the street for more than a century, as far back as Eugene Atget's street photography in Paris in the 1890s and Jacob Riis's documentary photography in New York at the same time.⁶ The most memorable photographs of violent conflict, social protest, and natural disaster have almost all been taken by a person present on the ground.

The horizontal plane has been the most important space for both the perambulating human and the observant photojournalist. The same can be said of most state surveillance, as well as the increasingly common use of surveillance cameras in commercial centers. The journalist's camera is positioned at eye level. The state and commercial market have placed their devices just out of arm's reach, but both point nearly horizontally.

UAVs relocate the boundary between what is public and what is private, because camera-equipped UAVs move the line of sight from the street to the air. This simple shift effectively pushes public space from the sidewalk to the stairwell, courtyard, rooftop, and so forth. Once private, these spaces are now subject to surveillance. Or have they now become public spaces? Should technologists, ethicists, and public policy professionals simply increase the number and type of locations that are now considered public, or must a more profound conversation occur?

Technology has redrawn the lines between private and public space. Work on the Internet of Things and Internet privacy suggests that much of what happens in seemingly private spaces is not actually private.⁷ This increasingly applies to our browsing habits as well as less recognized data passively generated from devices—for instance, my iPhone's accelerometer telling my mobile carrier or insurance provider that I have not jogged in days. UAVs represent a relatively new technology, or rather, a newly applied technology, that is disrupting our understanding of which spaces are private.

Ubiquitous closed-circuit televisions (CCTVs) represented the vanguard of this change, since they opened sidewalks, parks, and other public spaces to sustained and archived monitoring by commercial interests and law enforcement. When the feed from CCTVs went to tape, the question essentially involved privacy. When the feed now goes to digital archives, subject to hacking and scanning, the privacy issue has grown immeasurably. Digital archives of street surveillance footage, combined with facial recognition and behavioral software, push the privacy issue even further.

While these observations seem pedestrian at first blush, their implications are profound. Security and privacy policies address the prying eyes of the standing observer, not the roving airborne eye of a small UAV that is flying according to Global Positioning System (GPS) waypoints while streaming video over secure Wi-Fi to an operator sitting behind a laptop in a nearby cafe, library, or office complex. "Open air" and "free space" are no longer as "open" or "free" as they once were. They are instead now occupied or vulnerable to occupation. Cyberspace scholars suggest that new technologies are pivotal in "radically restructuring the materiality and spatiality of space."⁸ Whether this space is used for the public good or as a means of state and commercial surveillance is just the sort of dilemma regulators

face. Cyber-skeptics fear the panopticon, believing “[a] society biased toward hierarchy and capitalism generates the entirely rational impetus for... surveillance.”⁹ Others argue for a contrast between libertarian and authoritarian technologies where the former is egalitarian, and the latter is “fundamentally hegemonic.”¹⁰ If Predator drone strikes in Pakistan and Yemen represent challenges to notions of sovereignty, camera-equipped civilian UAVs in London and New York represent fundamental challenges to the notion of public space.

For some time, radical geographers have thought about space as it relates to power, politics, and change while technologists focus on the promise and peril of new technology. These two have met in the literature about the Internet.¹¹ Scholars of online worlds focus on the Internet as a disruptive new space, but UAVs disrupt the actually occurring material and physical space we inhabit every day. This applies to hard security as well as privacy. The walls and barricades around terrorist training camps, Occupy gatherings, and Davos meetings belong to a world of line-of-sight threats from paparazzi and pipe bombs. The United States has reinforced many embassies over the past decade with moats, ramparts, walls, and bulletproof glass.¹² Industry standard protection from an explosives-laden truck, however, is generally useless against a commercially available drone carrying toxic chemicals with an aerosol dispersant flying too close to an air intake inside a military compound. Innovation of this sort is a hallmark of asymmetrical warfare.¹³

Debates between technophiles and techno-skeptics, and the scale shifts indicated above, resonate in a complex thicket of ethical and legal considerations. In the United States, the Federal Aviation Administration (FAA) has attempted to restrict all commercial use of drones, despite questions about their authority to do so.¹⁴ Clearly, UAVs equipped with imaging devices also operate in a cultural, political, and technological environment charged with debates over citizen rights in an age of mobile telephony, citizen journalism, and ubiquitous surveillance. The debates over emerging big data capabilities to harness the data generated by these sources are only now emerging.¹⁵ As societies grapple with the social and ethical implications of these technical innovations, policymakers find themselves in the unenviable position of regulating a technology in its infancy.

CIVIL SOCIETY USES

Like any technology in its early stages of growth, drone use is flourishing. The discussion of the legal terrain surrounding UAVs suggests the challenges posed to the development and implementation of a single policy framework for regulating civilian use. Notably, there are multiple competing analogies for what sort of regulatory puzzle UAVs represent. Are they small airplanes, weapon platforms, flying cameras, or a new hobbyist device? Variation in the answer will shape policy

responses. In what follows, I provide a brief overview of some of the public uses for these devices, the diversity of which suggests the complexity of any policy intervention.

ART

Cinematographers wishing to deploy the technology in the United States have recently petitioned the FAA to allow for their use in commercial artistic production prior to the release of the FAA's decision on drone use in civil airspace. The entertainment industry petition joins three others (agriculture, line inspection, and oil and gas) in seeking a waiver for drone use in "narrowly defined, controlled, low-risk situations."¹⁶ Less conventionally, graffiti artists have begun experimenting with UAVs, the beginning of many efforts to integrate this technology into the arts.¹⁷

MAPPING

Mapping represents an important cross-cutting utility that UAVs bring to all of the uses that follow. Maps that are already widely available from commercial enterprises (e.g., Google Maps) can be augmented with UAV-based data on conflicts, disasters, protests, environmental degradation, labor exploitation, and so forth. This usage is not limited to UAV-based equipment, however, as recent innovations include higher quality and lower cost satellite imagery. Human rights groups are beginning to make use of space-based remote sensing equipment for monitoring crises, and it is reasonable to expect an increase in such use as prices fall.¹⁸

PUBLIC SAFETY

There is increased experimentation with UAVs in a number of public safety related areas, including firefighting and search-and-rescue operations.¹⁹ UAVs are also deployed to augment the support of traditional ambulance or rescue services, as in the case of an accident in which a small UAV, equipped with a thermal imaging device, was able to locate a wrecked vehicle in Canada, and another in which a camera-equipped drone located a man whom rescue workers had been unable to find for days.²⁰ Yet such efforts fall into a regulatory gray zone, a fact further complicated by the commercial availability of a weaponized "riot control copter" for use against protesters.²¹

ENVIRONMENT

UAVs are increasingly used in a number of environmental areas, including change mapping (i.e., river erosion, deforestation, and urban expansion); disaster risk management and mitigation (assessing natural disaster risk and monitoring fires, volcanoes, and landslides); monitoring illegal activity, including banned hunting, fishing, and trade; and monitoring other natural factors like migration, levels of endangered species, and foliation.²² The World Wildlife Fund recently received a \$5 million grant from Google's Global Impact Awards program to monitor poaching and the illegal trade in wildlife with UAVs.²³ Large-scale environmental change can also be monitored using UAVs. China is using the technology to monitor polluting industries, and Brazil is considering using drones to monitor illegal logging.²⁴ Kenya had plans to deploy drones to spy on poachers in fifty-two of its national parks after a pilot program found that their presence reduced poaching by up to 96 percent.²⁵

HUMANITARIAN AND DEVELOPMENT AID

One of the most significant areas of opportunity for civil society actors is in humanitarian aid, as organizations respond to natural disasters, conflict and post-conflict situations, and more general development and poverty-related needs. Former U.S. ambassador Jack Chow has suggested that UAVs could “deliver a peaceful ‘first strike’ capacity of food and medicines to disaster areas.”²⁶ UAVs have served just this role in the wake of natural disasters in Haiti and the Philippines.²⁷ While there is more of a precedent for UAV use in humanitarian and post-conflict settings, they may also prove useful in helping health and development organizations access hard-to-reach beneficiaries.

JOURNALISM

Journalists are increasingly experimenting with the incorporation of drones into their work.²⁸ Drones allow journalists to get much closer to the action. This applies equally when covering sports, reporting on conflicts, capturing imagery, and generally reporting on stories in ways that had not previously been possible. Citizen journalism could also benefit greatly from the use of UAVs documenting public events and providing alternative avenues for reporting, especially during periods of media censorship.²⁹

CORPORATE ACCOUNTABILITY

This use is in its infancy, though it shows promise. Recent drone footage revealed that a meatpacking plant in Texas was illegally dumping pigs'

blood from a slaughterhouse into a nearby stream. While this triggered a federal investigation that shut the plant down, it also led to legislation in Texas forbidding the use of drones over private property.³⁰ A recent Kickstarter project to monitor factory farms (and challenge so-called “ag-gag” laws passed against whistleblowers and activists) was fully funded in less than a week.³¹ It is likely such uses will expand in the near future, especially considering increasing concerns with corporate social responsibility, supply chain ethics, labor rights violations, corruption, and environmental impact.

STATE ACCOUNTABILITY AND CONFLICT

There appears to be a consistent interest in the use of UAVs to monitor low-intensity conflict and peacekeeping.³² They have recently been deployed by the United Nations (UN) to the Democratic Republic of the Congo, Chad, and the Central African Republic.³³ Rebels in Syria, beyond the definition of civil society advanced here, have deployed relatively affordable and commercially available UAVs to monitor loyalist forces.³⁴

HUMAN RIGHTS MONITORING

While this usage, like the others listed here, is still in its infancy, it too shows signs of rapid growth. A prominent anti-slavery advocate recently suggested deploying drones in the struggle to end slavery and human trafficking, in much the same way the technology has been used to protect endangered rhinos.³⁵ In cases such as Syria, there was brief discussion about whether the international community should invoke the Responsibility to Protect doctrine (R2P) and effectively vitiate Syria’s rights over its airspace.³⁶ The Satellite Sentinel Project has advocated a similar intervention in the use of UAVs to monitor crisis situations and human rights violations. In the words of its founders, “A drone would let us count demonstrators, gun barrels, and pools of blood.”³⁷ Sniderman and Hanis argue that, while this approach has implications for sovereignty rights and “may be illegal in the Syrian government’s eyes... supporting Nelson Mandela in South Africa was deemed illegal during the apartheid era.”³⁸ This observation emphasizes the tension between bearing witness and the legal status quo.³⁹

SOCIAL MOVEMENTS AND PROTESTS

There is some overlap between UAV-based state accountability monitoring and their use in social movements and protests. Clashes between anti-government

protesters and pro-government forces in Bangkok were captured by drones and uploaded to YouTube in an attempt to draw attention to the protestors' cause.⁴⁰ They have also been used for similar purposes in Turkey, Estonia, Poland, Hong Kong, and Ferguson, Missouri.⁴¹ This overlap occurs in the area of policing, where social movement scholars and scholars of policing have spent the past decade teasing out the changing dynamics surrounding police-protestor interaction.⁴² UAVs can indeed serve as another set of eyes monitoring police action, holding the state to account in potentially violent protests. Yet social movements can put UAVs to a much broader range of uses, the most innovative of which remain to be seen. Whatever the case, civil society actors must be prepared for an aggressive response by the state and its agents, such as when police in Istanbul shot down a camera-equipped UAV while it was monitoring large anti-government protests in the Turkish capital.⁴³

MATERIAL AND TECHNICAL DISRUPTION

With art and public safety at one end of the usage spectrum, more disruptive and "hacktivist"-inspired uses lie at the other end. UAVs can be used as lookout posts for graffiti artists or protesters needing a second pair of eyes. Camera-equipped devices can loiter or land and then feed imagery back to a clandestine location. This article has focused on the camera as a particular payload, but UAVs can just as easily carry Wi-Fi hardware that can perform wireless penetration testing, conduct 3D mapping of buildings or urban environments, conduct thermal mapping exercises of indoor and outdoor spaces, and conduct video and audio surveillance through cameras and directional microphones.

This list is meant to be illustrative of broad categories of use, but in reality, there are multiple configurations for a myriad of uses. It is not difficult to devise a modular system that would allow a user to quickly attach just the necessary components and then run multiple passes to update additional layers of data onto a map. For example, a designated area could receive a five-sweep treatment in which the first pass captures video and establishes GPS coordinates, the second captures thermal imagery, the third scans for Wi-Fi data, the fourth scans for radiation levels, and the last captures more specific surveillance footage.⁴⁴ The range of uses and the ramifications of various configurations suggest that a sophisticated framework is necessary to guide this innovation.

FRAMEWORKS

This broad and growing rowing list of public uses requires a framework that differs significantly from the guidelines currently being developed around the

commercial and military/police use of drones. While these guidelines revolve around security and profit, the organizing principle for civil society use must emphasize the public good. Current frameworks have broken new ground, but remain sector specific. As seen in Table 1, the Humanitarian UAV Network framework emphasizes safety and suitability with the goal of providing humanitarian support.⁴⁵ The Drone Journalism Lab emphasizes transparency and accountability in pursuit of the public good.⁴⁶ For its part, the American Civil Liberties Union (ACLU) is focused on privacy, with a focus on preventing police abuse.⁴⁷

Table 1

Existing Guidelines for Drone Usage.⁴⁸

Group	Themes	Target	Focal Point (on balance)
ACLU	<ol style="list-style-type: none"> 1. Usage Limits—police use with warrant only 2. Data Retention 3. Policies decided by public representative 4. Abuse Prevention and Accountability 5. Weapons forbidden 	Law Enforcement	Restricted Use
Professional Society of Drone Journalists	<ol style="list-style-type: none"> 1. Newsworthiness 2. Safety 3. Sanctity of the law and public spaces 4. Privacy 5. Traditional journalistic ethics 	Journalists	Newsworthiness
UAViators.com	<p><i>Pre-flight</i></p> <ol style="list-style-type: none"> 1. Do no harm 2. Ensure flight safety (failsafe, flight plan, weather) 3. Ensure humanitarian value 4. Obey all laws 5. Respect individual privacy and engage community 6. Avoid use where retraumatization is possible <p><i>In-flight</i></p> <ol style="list-style-type: none"> 1. Select safe sites 2. Use a spotter 3. Respect relevant airspace regulations 4. Use allowed radio-control frequencies <p><i>Post-flight</i></p> <ol style="list-style-type: none"> 1. Keep a logbook 2. Request permission for image usage 3. Respect personal privacy and remove identifiable information 4. Freely share imagery with local communities whenever possible 	Humanitarian Aid	Harm Reduction

Each contribution listed in the table above advances the factor of the greatest importance to the institutional environment that produced it. A comprehensive framework for civil society drone use must balance many interests: safety, suitability, transparency, accountability, privacy, and the rights of residents (citizen

and non-citizen alike), while also maintaining a commitment to the public good. Striking this balance is no easy task. In what follows, I propose a broad framework to guide a range of non-state and non-commercial actor uses of drones. In this light, the guidelines listed above are specific configurations of the broader considerations emphasized in the following six principles:

Subsidiarity — The concept of subsidiarity suggests that decision making and problem solving should occur at the lowest and least sophisticated level possible. The implication here is that a drone should only be used to address situations for which there is not a less sophisticated, invasive, or novel use. Steve Coll, dean of the Journalism School at Columbia University, has argued that drone operators should ask themselves, “What can you use a drone for, that you can’t achieve by other means [...]?”⁴⁹ Such an approach would ensure that drones are used in areas where they are actually appropriate, thus spurring innovation and possibly reducing resistance to their usage.

Physical and material security — This principle focuses on physical integrity issues related to the use of UAVs. Put bluntly, care must be taken so that these devices do not collide with people or with one another. Furthermore, they must not be weaponized in such a way that could cause physical harm to the public. How exactly this security is ensured is a matter of skill, which is determined by the operator, and situation, which is determined by weather and other environmental conditions. How it is defined is a matter of perspective: It is likely that both governments and corporations will consider the use of UAVs by investigative and citizen journalists to be a violation of their security. This use should nevertheless be protected by the rights to freedom of the press, expression, and information.

Do no harm — This principle draws inspiration from the UAViators’ emphasis on a rights-based approach as found in the development and humanitarian aid communities. The focus is not on reducing physical and material security, but is instead on ensuring the public good (i.e., the harm in question is related to the public good rather than physical integrity). The principle is one of proportionality, in which the question to be answered is, “Are the risks of using UAVs in a given humanitarian setting outweighed by the expected benefits?”⁵⁰ Here again there is room for debate. It is conceivable that social movements will incorporate UAVs into disruptive tactical repertoires, thereby reducing the likelihood of a policy compromise between movement actors and the centers of power and authority they are challenging. New uses must strike their own balance.

Public interest — This principle draws original inspiration from the concepts of newsworthiness and the public good, while recognizing that some seemingly insignificant or unpopular issues may be in the public’s interest and for a public good without being considered newsworthy. This approach is especially sensitive to the importance of investigative journalism that holds to account the powerful and wellresourced, despite attempts by established interests to discredit these efforts.⁵¹ This expansive conceptualization of public accountability is journalism’s cornerstone. The preamble to the Society of Professional Journalists’ Code of Ethics argues that “public enlightenment is the forerunner of justice and the foundation of democracy.”⁵² At a time when corporations and the state capture an ever-larger share of private space, every effort must be made to maintain and expand civil society’s technological capacity for accountability and resistance. There is no better precedent—as both herald and cautionary tale—for this commitment than the free press.

Privacy — Each principle must be held in balance with the others, and none more so than with respect to privacy. Citizens and non-citizens should be protected from the prying eyes of the state and commerce, yet there is a need for a larger conversation about what level of privacy is to be expected when civil society actors have deployed drones for their own purposes.⁵³ There is reason to believe, however, that current legislation prohibiting “peeking while loitering”—for example, California Penal Code 647(i) prohibits “loitering, prowling, or wandering upon the private property of another, at any time, peeks in the door or window of any inhabited building or structure, without visible or lawful business with the owner or occupant”—would render such spying illegal, regardless of whether the camera was mounted to a tripod or a drone.⁵⁴ Yet this framework is more sanguine and ambivalent when it comes to the privacy of powerful rights violators. Camera-or sensor-equipped drones have the ability to violate the privacy and private property rights of corporate persons involved in malfeasance. However, the difference between the privacy of a bedroom and a boardroom is not insignificant. Likewise, creating a framework that applies in all circumstances is nearly impossible in an era in which digital privacy appears to be mirage, and the possibility that a new wave of technological innovation will force a fundamental reimagining of both public space and expectations of privacy.

Data protection - Finally, data protection is paramount. Civil society actors using camera-equipped drones are likely to generate sensitive data. Filming a protest event, for example, creates a digital record of protesting participants. In the hands of social movement actors, this footage can be used to mobilize communities or challenge official records of events. In the hands of the authorities, however, digital footage can easily be scanned using facial recognition technology in order to create a database of known activists. As more UAVs gather more data, questions about how to handle big aerial data will emerge. Drones themselves will be easier to hijack as anti-drone technology evolves, and the wireless links that connect them to base stations will also be vulnerable to hacking. Context-specific protocols must ensure the security of data, thereby protecting against physical or digital theft or corruption.

Tensions emerge across these central principles. The first tension lies between individual privacy and the public interest. At the time of writing, it seems clear that privacy is undergoing a substantial overhaul in terms of the level of anonymity that can be reasonably expected in an age of constant surveillance and ubiquitous digitization. While it is difficult to comment on a process that is in flux and is subject to starkly different national regulatory regimes and cultural norms, it is clear that citizens and non-citizens alike will need to accept significantly less-robust guarantees to privacy in the future. This reality brings new tradeoffs, and it is important that those actors using UAVs work within the general bounds of emerging norms about privacy.

The second tension lies between insider and outsider tactics in the use of UAVs. While humanitarian drone use may be integrated into a state's military apparatus, social movements often choose tactics based on their values and goals.⁵⁵ Since social movements frequently reject formal political channels, or may be blocked from them altogether, there should be little surprise when they turn to social media in the face of authoritarian oppression.⁵⁶ Indeed, this is the recent history of social movements. In Rhodes's vivid description of the New Left in the 1960s, he documents a wide range of tactics:

“Petitioning, rock throwing, canvassing, letter writing, vigils, sit-ins, freedom rides, lobbying, arson, draft resistance, assault, hair growing, nonviolent civil disobedience, operating a free store, rioting, confrontations with cops, consciousness raising, screaming obscenities, singing, hurling shit, marching, raising a clenched fist, bodily assault, tax refusal, guerilla theater, campaigning,

looting, sniping, living theater, rallies, smoking pot, destroying draft records, blowing up ROTC buildings, court trials, murder, immolation, strikes, and writing various manifestoes or platforms.”⁵⁷

While a good number of these fail the "do no harm" threshold, their creative breadth in a pre-digital age suggests that any framework for new technology must work hard to strike a balance between freedom of expression and assembly and the security of capital and the state. Policymakers and innovators alike should engage in a broad and inclusive discussion about how these principles might be best balanced.

CONCLUSION

In this article, I have attempted to briefly emphasize a relatively unfamiliar origins story for drones. Commercially available devices challenge the notion that drones are cousins to strike fighters laden with laser-guided bombs; they are also part of the same family as cameras. The technological family metaphors need not stop there. Indeed, the second section of this article is dedicated to detailing ten clear civilian and civil society uses for UAVs. The drone’s payload can be beneficial and benign, or disruptive and deadly. My focus here has been on the drone’s range of uses. The article’s third section provides a tentative framework that I believe will help policymakers and the public differentiate between beneficial and harmful uses, with the “public good” as the benchmark. What exactly constitutes the public good is a matter of debate. Protecting privacy is important, but so is shedding light on important issues and holding responsible parties accountable. Protecting property is important, but so is speaking truth to power through graffiti and protest art.⁵⁸

Talking about these tensions is not easy. Innovation is a moving target. The host of uses described earlier was harvested from online reports of innovation within roughly a twelve-month period. This innovation has occurred despite a lack of sustained scholarly inquiry or stable and consistent governmental oversight. Indeed, it was only recently that the FAA licensed three university campuses to conduct research on drone use.⁵⁹ Even without this licensing, others are using money from the U.S. Army Research Laboratory’s Army Research Office to incorporate drones into campus-based, Wi-Fi-based mesh network systems.⁶⁰ At the risk of severely belaboring the point, innovation has completely outstripped legislation, and much of this innovation is by and for the public good. This will continue into the foreseeable future as additional uses emerge. At present, it is not clear what the relationship will be between “drones for the public good” and satellites gathering information about humanitarian crises and human rights

violations, though organizations such as UAViators are actively integrating social media, aerial imagery, and satellite imagery for humanitarian relief efforts.⁶¹ A broader range of actors is working to make geographic information systems (GIS) and satellite data valuable for advocacy groups and policy practitioners alike.⁶² This use predates the current wave of drone use by several years, and it is likely that more effective combinations of these technologies will be developed for civil society use. The Satellite Sentinel Project has the tagline, “The world is watching because you are watching,” effectively shifting surveillance from an invasive enterprise to bearing witness.⁶³ This clever blending of traditional movement concepts (bearing witness) with new means (satellite technology) is echoed by Patrick Meier, who suggests that classic civil resistance tactics can be extended to drones.⁶⁴ This can be done, he argues, through the display of flags and symbolic colors, the “haunting” or taunting of officials, nonviolent air raids, defiance of blockades, and the disclosure of the identities of state agents.⁶⁵

This wave of innovation and welter of uses raises a larger question: Does any of it matter? This is the subsidiarity principle writ large: Is there not another, less dramatic, way to meet these same objectives? What do drones add to the existing citizen monitoring mechanisms, through which information is captured on smartphones and disseminated by social media? These are important questions that I hope ongoing use and subsequent scholarship will begin to clarify. My sense is that an initial wave of enthusiasm will subside, leaving behind a solid body of innovation on the way civil society actors perform a number of tasks, especially related to social movements.

A final complication takes the form of public opinion, which seems hostile to this occupation of airspace. A recent study by the Pew Research Center’s Internet & American Life Project found, “Sixty-three percent [of respondents] think it would be a change for the worse if personal and commercial drones are given permission to fly through most U.S. airspace.”⁶⁶ Likewise, while it is legal in the United States to take pictures of individuals in public places, recent recreational uses have led to complaints of sexual harassment, as well as violence against drone operators.⁶⁷ The Kenyan government recently announced that it would ban the use of drones for monitoring poachers in the Ol Pejeta Conservancy, home to the endangered white rhino.⁶⁸ South Africa, too, has grounded camera-equipped UAVs, citing regulatory uncertainty at the global level.⁶⁹ Grappling with innovation is no easy task. This article suggests the same can be said of technology’s relationship to civil society. Regulators must take care, lest they pass legislation and regulations that enable the state while crippling its citizens.

Notes

¹ This article benefitted from the research assistantship of M. Boby Sabur, Tautvydas Juskauskas, Luis Cano, and Justin De Los Santos; substantive and technical input from Phil Howard, Patrick Meier, John Holland, Sejal Parmer, Bernhard Knoll-Tudor, Thorsten Benner, Dean Starkman, Colleen Sharkey, Lars Almquist, and Edward Branagan; and financial support from Wolfgang H. Reinicke and the Central European University's School of Public Policy.

² This language is fraught. The U.S. military is committed to avoiding the terms "drone" and "unmanned aerial vehicle," preferring instead to use the term "remotely piloted aircraft." This term avoids the implication that these devices fly themselves, as well as the gendered notion that they are flown by men. I prefer the term "remotely piloted aerial platform" to reflect the diversity of payloads and the presence of a pilot, however remote and regardless of gender. I would be pleased if this usage proves popular but will not be using these pages to advance this argument. For present purposes, the common terms "drone" and "UAV" prevail. Jim Garamone, "Military Uses Remotely Piloted Aircraft Ethically," *American Forces Press Service*, 22 May 2014, <http://www.defense.gov/news/newsarticle.aspx?id=122308>; Joe Trevithick, "Learn to Speak Air Force: A Public Service Announcement Regarding Drones," *War is Boring* (blog), 27 May 2014, <https://medium.com/war-is-boring/learn-to-speak-air-force-e6ebc5614b25>.

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