

**Robots in the Public Square:
Regulation and the Changing Nature of Public Space**
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Early Draft – Comments/Feedback Welcome!

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Introduction

Robots are an increasingly common feature in North American public spaces. Advances in technology are permitting complex interactions between robotic systems and humans in unpredictable urban settings. Meanwhile, the laws regulating North American public spaces are opening up to robots. For example, regulations are permitting broader drone use in public airspace,² and allowing delivery robots to roam the sidewalks of major U.S. cities.³ New road regulations mean that autonomous shuttles and buses can transport people through urban downtowns.⁴ These changing road rules are also turning cities into test-sites for autonomous car developers.⁵ Public-private partnerships are converting city neighbourhoods into robotics-filled smart communities, like Sidewalk Toronto, a partnership between Alphabet Inc and the City of Toronto, which proposes to convert waterfront space in one of North America's largest cities into an AI- and robotics-driven smart city.⁶ These are just a handful of the growing number of examples of robotic systems entering into public space.⁷

In many of these examples, the presence of robots in public space is justified as an opportunity to improve human lives through intelligent urban design, environmental efficiency, and greater access to transportation and public space. There are many ways in which robots can increase the public's use of, and access to, public spaces. For example, drone technology has made access to public airspace actually practical for a range of stakeholders.⁸ Autonomous vehicles could allow a range of users to access transit in new ways that can enhance personal autonomy and dignity.⁹ Additionally, research teams have been working on using robots to improve the physical accessibility of public spaces.¹⁰ For example, robots have been proposed to assist with safe street crossing¹¹ and safe navigation of busy areas.¹² Telepresence robots can permit individuals to access spaces they

² E.g. Proposed Rules for Drones in Canada: <https://www.tc.gc.ca/eng/civilaviation/opssvs/proposed-rules-drones-canada.html>; Tony Romm, "A new Trump policy could let Amazon and Google test more drones in U.S. cities" <https://www.recoded.net/2017/10/25/16542940/amazon-google-drones-us-government-trump>

³ E.g. small delivery robots designed by Estonian robotics company Starship have been used in Washington, D.C. as well as San Francisco, where the robots have been met with some controversy and proposals for a ban. See: <https://www.starship.xyz/>

⁴ Jay Jones "Now you can ride a driverless shuttle in Las Vegas, for free" <http://www.latimes.com/travel/deals/la-tr-las-vegas-first-driverless-shuttle-to-loop-the-city-20171228-story.html>.

⁵ A situation that has recently come under scrutiny following a deadly collision between an autonomous car and a pedestrian: Alex Davies, "Arizona's Governor Suspends Uber's Self-Driving Cars After Fatal Crash" <https://www.wired.com/story/uber-self-driving-crash-arizona-suspend-testing-ducey-governor/>

⁶ See: "Sidewalk Toronto" <https://sidewalktoronto.ca/>

⁷ The robotic systems examined here as examples are just the tip of the iceberg when it comes to the potential for robotics to operate in public space. The sections below canvass some of the more common, more developed and/or more controversial examples of the many systems that are in development, testing or use. This is not intended as a comprehensive canvassing of all potentially relevant technologies. Each system will raise its own legal issues, along with some common issues related to the public space where it is operating – this paper focuses on the latter.

⁸ Kristen Thomasen, "Flying between the Lines: Drone Laws and the (Re)Production of Public Spaces"

⁹ "Accessibility in Autonomous Vehicle Policy Panel" Wed. February 14, 2018, University of Windsor Faculty of Law (video forthcoming): <http://www.uwindsor.ca/law/1215/accessibility-autonomous-vehicle-policy-panel>

¹⁰ E.g. The Being There project explored how robots can enable participation in public: <http://being-there.org.uk/>.

¹¹ <https://pdfs.semanticscholar.org/af20/70814658d0d0c3b9e63cae167a4c41c8da6c.pdf>

¹² <https://phys.org/news/2015-05-robot-walker-elderly-people-spaces.html> Researchers of the DALI Project are developing a robotic cognitive walker (c-Walker) that can be taken to, or picked up at, the place to be visited, gently guiding the person around the building safety. The device is meant to take corrective actions when the user comes across the type of busy area, obstacle, or incident they want to avoid. Users select a profile most suited to them on the walker's touch screen and then choose the locations they wish to best. The c-Walker then recommends the best course to the user and guides them using visual, acoustic, and tactile interfaces.

might not physically access on their own.¹³ And a spherical rolling robot assistant has been designed that can carry an individual's belongings (e.g. groceries) can make more public activities more physically accessible.¹⁴ To the extent that robotics can reduce some of the barriers to access created by the built environment of a public space, the technology would serve to make that space more public.¹⁵

However, the introduction of robots into public space has also raised concerns about, for example, the commercialization of these spaces by the companies that deploy robots; increasing surveillance that will negatively impact physical and data privacy; and the potential exclusion of vulnerable members of society in favour of those who can pay to access, use or support the new technologies available in these spaces.¹⁶ More specifically, the physical intrusiveness and data collection associated with robots can have differential impacts on individuals occupying these spaces, particularly for already privacy-vulnerable populations including women, visible minorities, and homeless individuals.¹⁷ In other words, the introduction of robotic systems in public space could alternatively (or simultaneously) render the space *less* public¹⁸ to some individuals or communities. This differential impact can arise from different reliance on public space as a place for socializing, political discourse, respite, relaxation and enjoyment by different groups; different legal, social, cultural or spiritual connections to the public space; from discriminatory surveillance; and/or from bias in the underlying programming of public-space robots.¹⁹ Further, restrictions on who can use or take advantage of robotic systems within public spaces can have the effect of making the space more accessible to some, and less accessible to others. An example of this arose recently, when the FAA instituted differential regulation of the use of drones over protests – protestors and some journalists were prohibited from using the technology to access information about police activities (including police brutality) on the public ground below, while police were permitted to use the technology for surveillance of the protestors.²⁰

In the examples referred to above, the presence and use of robotics in public space was precipitated and regulated through law – in some cases laws had to be changed or passed to allow operators to deploy robots in public spaces, and in others, law was used to prevent the use of robots in public space.²¹ The laws that permit, regulate or prohibit robotic systems in public spaces will in

¹³ E.g.

http://www.slate.com/articles/technology/future_tense/2014/07/telepresence_robots_make_museums_accessible_to_everyone.html.

¹⁴ <https://www.technologyreview.com/s/603558/this-robot-will-carry-your-stuff-and-follow-you-around/>

¹⁵ To date, many of these sorts of robots are in the earlier phases of testing and development, and have not yet been deployed in public spaces. “One element of the difficulties faced by many disabled people is the design of the built environment – the places and spaces in which social life occurs. [...] so called public space us often inaccessible or difficult for disabled people to enter and move easily and freely within.” Ruth Butler and Sophia Bowlby, “Bodies and Spaces: An Exploration of Disabled People’s Experiences of Public Space” (1997) 15 *Environment and Planning D: Society and Space* 411-433 at 421 (internal citations removed).

¹⁶ See e.g. April Glaser, “San Francisco is considering legislation that would ban sidewalk delivery robots” (May 16, 2017)

<https://www.recode.net/2017/5/16/15648324/san-francisco-legislation-ban-autonomous-delivery-robots-sidewalks>. More generally with regard to smart cities see e.g. Shruti Ravindran “Is India's 100 smart cities project a recipe for social apartheid?” https://www.theguardian.com/cities/2015/may/07/india-100-smart-cities-project-social-apartheid?CMP=share_btn_tw Eva Blum-Dumontet, “Smart Cities: better for whom?” (Privacy International) <https://medium.com/@privacyint/smart-cities-better-for-whom-b9abec9ccc44>

¹⁷ Thomasen, “Flying between the Lines”.

¹⁸ As in, open, accessible, usable. Section 1 below expands on this concept.

¹⁹ Ex.

²⁰ See Section III below.

²¹ This is not meant to overlook the likelihood that some companies will proceed to test or deploy robots in public without explicitly permissive regulations (as in past examples including Uber, AirBnB). But this does not change the

many ways determine how this new technology impacts the space and the people who inhabit that space.²² This begs the questions: how should regulators approach the task of regulating robots in public spaces? And should any special considerations apply to the regulation of robots because of the public nature of the spaces they occupy?

This paper focuses on answering these questions, arguing that the laws that regulate robots deployed in public space will affect the public nature of that space, potentially in ways that benefit some human inhabitants of the space over others.²³ For instance, rules designed to protect robots from damage, to create space for robots, or to purportedly protect individuals from potential harm caused by robots, can all impact how different individuals get to use and enjoy public space. The rules could have the effect of making the space more or less public for different users of that space. For these reasons, this paper also argues that special considerations *should* apply to the regulation of robots that will operate in public space, because of the very nature of the space where they operate as a space for members of the public.

The rest of the paper proceeds in three parts. The first section takes a deeper look at the intersection of law and public space – examining the concept of public space, and how robot regulation could have the effect of shaping the public nature of space. In other words, this section explains how laws have the effect of making public space more or less public for different individuals and communities. In doing this, the paper draws in particular from the interdisciplinary field of Law and Geography, which explores this intersection between law, society, and space in depth.

But, as will be made clear in Section II of the paper, there is not one consistent well-defined vision of what makes a space ‘public space.’ Section II explores different visions of how space can be public, and considers how these visions influence lawmakers and courts to regulate access to, use of, and rights within, that space. In other words, it considers how the public nature of the space where robots operate might shape the laws regulating those systems. Section II also examines how these different visions can have the effect of excluding particular people or communities from public space, or particular voices from conversations about how space should be regulated, through

relevance of considering of how to approach regulation because a) in many cases there is still regulation first; and b) often where companies go ahead without regulatory permission, regulation eventually follows.

²² Also, the regulation of robots is interesting especially because they are expected to become prolific. A prime example of another similarly transformative technology, which reconfigured cities and prompted a range of laws restricting or reorganizing what were once common public activities was the automobile. In fact, it is not uncommon for developers and some regulators to advocate for the dramatic change that robotic systems will bring to public space. This even more so encourages a critical evaluation of who will experience the benefits of such transformation, and at what expense. See e.g. Mark S. Foster, *A Nation on Wheels: The Automobile Culture in America Since 1945* (Denver: University of Colorado, 2003); James J. Flink, *The Car Culture* (U.S.: MIT Press, 1975); Clay McShane, *Down the Asphalt Path: The Automobile and the American City* (New York: Columbia University Press, 1994). E.g. for pedestrians, cyclists and horse-riders. James J. Flink, *America Adopts the Automobile, 1895-1910*, (Massachusetts: The MIT Press, 1970). Carol Sanger, “Girls and the Getaway: Cars, Culture, and the Predicament of Gendered Space” in Blomley et al. *Legal Geographies Reader*. See also, Thomasen “Driving Lessons” Presented at We Robot, UW Law, 2015.

²³ There has been prior academic consideration of what it means to put robots in public space, but by my research of English-language publications this is the first paper to suggest a framework for considering how the space in which the robots operate should affect their regulation and how those regulations affect the space within which these robots are operating. These are important considerations that the paper argues need to be more explicitly considered at the time of regulation. See e.g. the discussion of public space and drones presented at an earlier We Robot by Peter Asaro and Diana Cooper “Robots, Micro-Airspaces, and the Future of “Public Space””: <http://robots.law.miami.edu/2014/wp-content/uploads/2013/06/Asaro-Micro-Airspaces.pdf>; and see: “Service Robots in Public Spaces” <https://www.heise.de/tp/features/Service-Robots-in-Public-Spaces-3754173.html?seite=all>; “An investigation fo the use of robots in public spaces” <http://icceexplore.icce.org/abstract/document/7288055/?reload=true>

different notions of the legitimate uses/purposes of public space, and suggests ways of questioning this.

Section III applies these considerations in the context of public space robotics regulation, to consider how these different visions of public space will (and in some cases already do) inform robot regulation, which in turn, can shape the public nature of space. The section considers two examples – the first involving differential access to space through robotic technology; and the second involving the potential for differential impact of laws that regulate robots and human-robot interactions in public space, including privacy.

The paper concludes by making a normative argument for how lawmakers should approach the regulation of robotic technology in public space. It suggests that the introduction of robotics into spaces that are legally designated as ‘public’ should take place only where the technology can enhance equitable access to and use of physical public spaces, particularly by vulnerable populations. This approach is justified by the public nature of the space in which these robots are deployed. The conclusion includes some suggestions about what this framework might mean for lawmakers faced with regulating robots.

This paper has some necessary parameters. First, this paper considers *urban* robotic technologies (e.g. delivery and security robots, people-transporting robots, etc.). That is, robots which are being designed, at least for now, for deployment within urban areas. While the same autonomous systems might be deployed in rural areas or over wilderness spaces, early development and testing is occurring predominantly in cities. This means that both the benefits and the complications associated with these technologies will affect city-dwellers first. It also means the technologies are being deployed and tested in areas where many individuals have limited access to private spaces, if any at all. This results in a different reliance on shared public spaces than may exist in rural areas.²⁴

Second, this paper does not consider the property law issues that will also arise from the introduction of robots in public spaces. Though the paper does deal with space, the focus is on the regulation of robotics and how different regulations may be justified based on the (largely social) spaces in which the robots operate. In other words, this paper does not delve into property law or theory to analyze ownership of certain spaces (see Section I below for more on this).

Finally, the paper is particularly focused on *robots* as opposed to exclusively computer-based AI systems. Because of the embodied nature of robotic technology – the physical space the technology takes-up, the physical impact it can have on individuals who share that space, and the impact it can have on the infrastructure of the space where it is deployed – the physicality of robots can affect human experience in particular ways.²⁵ This physicality raises considerations for law and policy, urban design, and human-robot interaction that are relevant to the impact of the technology on public spaces, and may be distinct from the issues raised by computer-based AI systems. Of course, many of these considerations will overlap; but this paper does not devote itself to figuring out when or how that overlap will take place.

²⁴ Of course, cities are not the only places where people rely on shared/communal space. Many of the same considerations might apply in other communal spaces, though these are not explicitly considered in this paper.

²⁵ See Ryan Calo, “Robotics and the Lessons of Cyberlaw” (2015) 103 California Law Review 513-63.

SECTION I – Robot Regulations and Public Space

I. Introduction

This section considers how it is that the regulation of a robotic system can change the public nature of space.²⁶ This discussion lays the foundation for the consideration in Sections II and III of the how robotics regulations can affect access to, use of and experiences within public space, and why regulators must be mindful of these impacts when regulating robots in public space.

To inform this analysis, Section I draws from some of the scholarship of the interdisciplinary field of Law and Geography. The sub-sections below first introduce Law and Geography and some of what it says about the intersection between law and public space. In particular, the sub-section below identifies a nuanced understanding, from Law and Geography, about what public space *is* and how can it be defined by more than its legal property status. Building on that discussion, the following sub-section identifies the public spaces that shape the focus of this paper.

II. The Intersection of Law and Public Space

The interdisciplinary field of Law and Geography explores the reciprocal relationships between law, space, and society, guided by a central proposition that law co-creates space, and space co-creates law.²⁷ The field has specifically examined how public space is produced through law and regulation, and how the public nature of space influences law.²⁸ In particular, Law and Geography scholars have emphasized that simply designating a space as ‘public’ in law does not on its own render that space public for everyone, or in some cases for anyone.²⁹ For a space to be public, members of the public must be able to identify it as such, and must be able to access and use the space.³⁰ Similarly, the physical qualities of a space, such as being physically open and accessible to members of society, do not alone determine whether a space is a ‘public’ space. A shopping centre could feel public to those seeking to enter, but it is legally designated as private property and its

²⁶ Briefly, to narrow the concept of ‘space’, this paper looks at the impact of physical, embodied robotic technologies in physical, real-world (not online) spaces. While, again, it can be difficult to articulate any clear binary distinction between physical and online spaces, it makes sense in this context to focus on physical spaces, even if these simply exist on one end of a spectrum relative to online or other spaces. The paper is focused on physically embodied robots so it makes sense to look at physical spaces.

²⁷ Law and property scholar Antonia Layard’s personal website provides clear explanations of some central concepts: <http://antonialayard.com/what-is-legal-geography/>. See also the remaining footnotes in this sub-section for further academic writing.

²⁸ I have drawn parts of this discussion of Law and Geography from an earlier paper of mine, Thomasen, “Flying Between the Lines.” See e.g. Nicholas Blomley, “Law, Property and the Spaces of Violence: the Frontier, the Survey, and the Grid” (2003) 93 *Annals, Association of American Geographers* 121–141; David Delaney, “Beyond the Word: Law as a Thing of this World” in Jane Holder and Carolyn Harrison, *Law and Geography* (Oxford: Oxford University Press, 2003) pp. 67-83.

²⁹ Some public-owned government buildings for example are entirely off limits to members of the public.

³⁰ Antonia Layard, “Freedom of Expression and Spatial (Imaginations of) Justice” in Dimitry Kochenov, Grianne de Burca, Andrew Williams (eds), *Europe’s Justice Deficit?* (Oxford: Hart Publishing, 2015) at 7. The status of a space as public can be derived through reference to different qualities of the space: the features of the space, social norms associated with the space, etc. For more see e.g. Lefebvre, *The Production of Space*; S. Ruddick, “Constructing Difference in Public Spaces” (1996) 17 *Urban Geography* 132–151; Don Mitchell, *The Right to the City*; Evelyn Ruppert, “Rights to Public Space: Regulatory Reconfigurations of Liberty” (2006) 27 *Urban Geography* 271-292.

owners have a property-based right to exclude.³¹ To actually be a *public* space, the space also requires the legal designation of ‘public’ and the protections that flow from that.³²

Furthermore, beyond the legal designation of a space as public, the regulatory regimes that apply within that public space may also determine the public nature of the space.³³ Regulations that exclude particular people from the space, prohibit certain conduct or activities within the space, permit certain designs of space or objects within that space, or permit forms of policing and surveillance,³⁴ can all have the effect of rendering a public space *less* public to the extent that it is not as accessible or open to all members of a community in the same way.³⁵ This can mean that different individuals experience the same space as either public or private (exclusionary), despite a common legal designation of the space as ‘public.’

For this very reason, Professor Evelyn Ruppert argues that what is really at issue when one tries to establish if a space is public, are the “regulatory practices that configure liberty – that is, rights to public space and who and what belong as part of the public.”³⁶ In order to understand public space as a collective good, she adds, “we must examine how it is constituted by regulatory practices.”³⁷

In other words, public space can lose its configuration as a space for the public though regimes with a limited view of who constitutes the ‘public’, or of who and what (including robots) belong in that space.³⁸ For example, while a space like a public park might be legally designated as public, and physically open to the public, regulation of particular conduct within the park can have the effect of excluding specific people from that space. Professor Don Mitchell has, for example, looked at how restrictions on activities in public spaces, like sleeping and loitering, can particularly target homeless individuals who have less access to private spaces to carry out these activities.³⁹ These regulations can result in surveillance, criminalization, and eviction from the space. Professor Nicholas Blomley has also examined how the regulation of public sidewalks can exclude individuals from that public space. When regulators focus on the flow and efficiency of the sidewalk, anyone or anything that stands in the way of smooth circulation might be regulated away. A panhandler, Blomley points out, may be treated in law the same way as a physical obstruction like a newspaper box – regulated

³¹ Such spaces can be regulated at least largely if not fully by the private owner. See Layard, “Freedom of Expression”, *supra* at 5; see also *Harrison v Carswell* [1976] 2 SCR 200; Evelyn S. Ruppert, “Rights to Public Space: Regulatory Reconfigurations of Liberty” (2006) 27 *Urban Geography* 271-292; M. Sorkin (ed), *Variations on a Theme Park: The New American City and the End of Public Space* (New York, Hill and Wang: 1992); Koops and Galić discuss the growing privatization and securitization of public space in “Conceptualizing Space and Place: Lessons from Geography for the Debate on Public Privacy” in Tjerk Timan, Bryce Newell, & Bert-Jaap Koops (Eds.), *Privacy in public space: Conceptual and regulatory challenges* (2017, Edward Elgar Publishing) pp. 19-46.

³² Layard, *supra* at 6.

³³ Mitchell, *The Right to the City*, *supra* at 35

³⁴ Hille Koskela, “‘The gaze without eyes’: video-surveillance and the changing nature of urban space” (2000) 24 *Progress in Human Geography* 243-265.

³⁵ Evelyn Ruppert, “Rights to Public Space: Regulatory Reconfigurations of Liberty” (2006) 27 *Urban Geography* 271-292. Nicholas Blomley, “Public Space: Introduction” in Blomley et al, *Legal Geographies Reader* at 3.

³⁶ Evelyn S. Ruppert, “Rights to Public Space: Regulatory Reconfigurations of Liberty” (2006) 27 *Urban Geography* 271-292 at 271.

³⁷ Ruppert, “Rights to Public Space” at 272-273. “While many social and political activities that make up public life occur in public spaces, these are enabled and constrained by a variety of practices (laws, regulations, urban design, surveillance, and policing). Collectively these constitute a regulatory regime. [...] in order to understand public space as a collective good we must examine how it is constituted by regulatory practices.” Ruppert in fact defines public space as “that object which is constituted not by ownership but by a regime made up of regulatory practices” at 273.

³⁸ Ruppert, “Rights to Public Space” at 273. “What is at issue in assertions about the decline of public space is that this regulatory regime is reconfiguring liberty – that is, rights to public space – through a change in the conception of the public, of who and what belong as part of that public.”

³⁹ Mitchell, in *Right to the City* suggests that “anti-homelessness laws” serve to constrain behavior and space with the result that homeless people cannot carry out necessary life and survival activities without breaking the law.

against and removed to enhance the use of the sidewalk for efficient public transit.⁴⁰ An analysis of the ‘public’ nature of space must accordingly focus on the role of lawmakers and courts in regulating that space, rather than narrowly focusing on the property-ownership status of the space.⁴¹

Public space can simultaneously have the effect of shaping law. For example, lawmakers can allow their particular vision of what makes a public space *public* to guide their approach to regulation, and to influence who and what should be prioritized in that space. These considerations will in turn determine if a legally public space is accessible to different members of the public for different activities and conduct. These different approaches, and what they might mean for robotics regulation, are discussed at greater length in Section II.

Accordingly, a public space emerges from the relationship between: (i) the physical characteristics of the space (which may include the presence or absence of robotic technology); (ii) the legal designation of the space as public, permitting members of the public to be in that space; (iii) and the rules that regulate conduct, activities and infrastructure within the space (including laws that regulate the presence, use of, and human-interaction with robotic systems). Through this lens, a public space will simultaneously embody legal, spatial and social significance.⁴² All three of these factors should feed into an analysis of the impact of robots on the spaces where they operate.

This approach to understanding public space encourages thinking about space as mechanism of social relations, rather than as a “fixed, natural and objective” thing.⁴³ It avoids an oversimplified definition of public space as based solely on legal property status. This view encourages a focus on how the laws that regulate robots, that regulate human interactions with robots, and the robots themselves might change the open and accessible nature of public spaces. Sections II and III take this approach further, reflecting on what public space means for the regulation of robotics, and subsequently, what robot regulations mean for public space.

III. Legal Designation of a Space as Public

As the above discussion makes clear, defining a space (or anything for that matter) as ‘public’ is not a straightforward task.⁴⁴ For example, the notion of any simple binary distinction between the legal designation of a space as ‘public’ on the one hand or ‘private’ on the other has been critiqued by a range of disciplines⁴⁵ even though this property-based binary continues to be used by courts and lawmakers, and has significant legal import.⁴⁶ But, as discussed above, a more nuanced view of public space looks at how it is constituted through a combination of the legal designation of the space, actual access to that space by members of the public, and the absence of restrictive regulation

⁴⁰ Nicholas Blomley, *Rights of Passage: Sidewalks and the Regulation of Public Flow* (New York, Routledge, 2010).

⁴¹ Ruppert, “Rights to Public Space” at 273. Ruppert concludes we may need to “turn our attention away from resources, spaces and goods as constituting public space to that of regulatory regimes and in this way bring to the fore the state’s role in regulation rather than in the direct provision and ownership of public space.”

⁴² See e.g. Mitchell, *The Right to the City*, *supra*.

⁴³ Blomely 2004; Koops and Galič at 38 explain that geographers have shown that “the division of the social world into public and private is not a natural division; rather it is an expression of power.”

⁴⁴ See e.g. Woodrow Hartzog, “The Public Information Fallacy” (2018) 98 Boston University Law Review (forthcoming).

⁴⁵ E.g. philosophers, privacy scholars, feminist legal scholars, geographers, and so on. [detailed citation list forthcoming] Professor Woodrow Hartzog (*ibid*) has recently emphasized that it is unclear what “public” even means, despite the term carrying important social and legal implications. See also Nicholas Blomley, “Flowers in the Bathtub: Boundary Crossings at the Public-Private Divide” (2005) 36 Geoforum 281 for empirical research into public views of public vs private space and property.

⁴⁶ Hartzog, “Public Information Fallacy”

of conduct or infrastructure within that space that excludes members of the public. The remainder of this paper will focus on robots that are deployed within spaces that are legally designated as public, and will consider how physical access and regulatory constraints affect the purported public nature of that space.

The legal designation of a space as public can be informed by different legal orders, including common law, statutes, civil law and/or Indigenous legal orders. Legal designations can be, to different degrees, contradictory, supplementary or reinforcing of one another, and even when fully considered, can leave the public or private legal designation of a space somewhat unclear.⁴⁷ For example, privately-owned spaces can take on a ‘public’ legal status at least in relation to certain (usually expressive) activities.⁴⁸ Meanwhile, publically operated spaces can be subject to private law protections like trespass that allow the state to exclude members of the public.⁴⁹ Furthermore, far too often, the focus on the property status of a space excludes existing legal orders, including Indigenous legal orders that predate the common law system and bring a different legal understanding to that space. This, at a minimum, has the effect of silencing different ways of designating or understanding a space, and reaffirms presumptions of the colonial legal system’s control over the space. It also means giving only a partial consideration to the values attributed by the public to a space and the laws that come from and regulate within that space.⁵⁰ Because public space is often considered to be a public good, and a space for everyone (though we will see below that this is not always its reality), the legal designation of a space as public space might also serve to silence legal claims to the land, perpetuating settler control of the space in a manner that can be made harder to resist. In this vein, the impact of robotics, robot-regulation, and legal designations of space as ‘public’ all require more detailed examination, to effect a full consideration of the appropriate status and regulation of public space, and also the lawful regulation of robotics within these public spaces.

Ultimately, this paper focuses in the Sections below on robotic systems in urban spaces that are not privately-owned or operated. Quasi-public private spaces, like private malls, grocery stores or promenades, might raise some of the same concerns discussed throughout this paper but are often subject to different sets of rules and values based on their private-ownership, and so these are excluded.

SECTION II – Public Space and Robot Regulation

I. Introduction

When operators⁵¹ propose to deploy a robotic system into public space, how should the location of this deployment affect its regulation?⁵² The above section discussed how law and regulation can

⁴⁷ e.g. The *Trespass Act* applies in public parks.

⁴⁸ *Harrison v Carswell* dissent; also see e.g. Kate Klonick, “The New Governors: The People, Rules, and Processes Governing Online Speech” 131 *Harvard Law Rev* (forthcoming) at 15

⁴⁹ *Harrison v Carswell*; *Batty v City of Toronto*, 2011 ONSC 6862

⁵⁰ See John Borrows, “Aboriginal Title and Private Property” (2015) 71 *Supreme Court Law Review* 91; Jeffrey Hewitt, “Decolonizing & Indigenizing: Some Approaches for Law Schools” (2016) 33 *Windsor Yearbook of Access to Justice* 64-84; Val Napoleon, “Thinking about Indigenous Legal Orders” in R Provost & C Sheppard, eds, *Dialogues on Human Rights and Legal Pluralism* (Dordrecht: Springer, 2013).

⁵¹ Commercial, government or private individuals.

⁵² Not unlike how values and expectations in the home should/can influence the regulation of home robots, either directly or through laws of general application. See e.g. Margot Kaminski, “Robots in the Home: What Will We Have Agreed To?” (2015) 51 *Idaho Law Rev* 661; Margot Kaminski, et al “Averting Robot Eyes” (2017) 76 *Maryland Law Rev* 983.

shape the public nature of space through its legal designation, and by regulating the space in a way that renders it more or less accessible to members of the public. However, the above Section also alluded to the idea that the public nature of a space can reciprocally influence how that space is regulated. In other words, the fact that a space is ‘public’ in law can affect how lawmakers decide to regulate conduct and things within that space, e.g. by dictating *who* is responsible for regulating within that space, and by informing the objectives of regulation. In legally private spaces, the influence of state regulation is generally lower (though certainly not absent) and private owners have greater control over the permissible uses of and access to the space. Laws in public space by contrast are developed through public authorities, and broadly speaking, are adopted in the public interest.⁵³ However a range of ideas about what the public interest is in public space can influence how regulations eventually shape the use of, access to and conduct within a space; and can have the effect of prioritizing some uses and users and marginalizing others. More specifically, a regulator’s vision for public space can have different consequences for operators who wish to deploy robotic systems in that space, and for other people who use or rely on that space.

This section canvasses three non-exhaustive examples of how visions of public space held by common law courts and lawmakers impact the types of regulations applicable to the occupants, design, and experience of these spaces. These visions are not mutually exclusive and in practice some combination of considerations will often be at play in the regulation of public spaces. Nevertheless, a clearer understanding of the different values attributed to public spaces, and how these values shape regulation, can help to reveal some of the broader impacts of seemingly specific robotics regulations – which is the focus of Section III.

II. Different Visions of Public Space

A. Public Space as the Public Square

A common vision of public space considers that space to be a communal site for interaction, expression and sharing; it is a physical location for the public square.⁵⁴ In other words, public spaces are where diverse members of the public can co-exist, where individuals of distinct backgrounds and views can come together.⁵⁵ Public space is where individuals encounter difference, and accordingly must be structured in a way that permits difference to be expressed.⁵⁶ This view of public space calls

⁵³ The authority for this can become complicated in Canada – where cities only have authority to adopt laws when it is granted by the province; statutes will set out the purpose and aim, typically referring to regulation on behalf of the public; and the constitutional division of powers will restrain the extent to which local vs federal authorities can regulate a given space.

⁵⁴ Despite the above note, it is worth pointing out that this vision of public space is many ways driven by Habermasian ideals. Habermas’ view of the public sphere as a discursive space/community was of course not tied to specific property or spaces. But the ideals underlying the discursive public sphere have been echoed in visions of public space and have informed judicial and academic perspectives on what public spaces are meant to be *like*. Jürgen Habermas, *The Structural Transformation of the Public Sphere* (Cambridge 1962).

⁵⁵ This view reflects that public spaces are public “not simply because they are “publicly owned.” Rather, they are spaces within which the “public sphere” is formed, policed and contested.” Ruppert.

⁵⁶ Ruppert, “Rights to Public Space” at 280. “If public space is where difference is encountered then it must be structured in a manner that enables difference to be expressed and where particular conducts and uses are not privileged above and beyond those of others.” Blomley citing Marshall Berman: “the glory of the modern public space is that it can pull together all the different sorts of people who are there. It can compel and empower all these people to see each other, not through a glass darkly, but face to face.” (Blomley, “Begging to Differ” at 407). Public space is a site where strangers can come together, encounter other people, meanings, ideas, crucial to politics (Blomley, “Begging to Differ” 408).

for access to and use of space by any/all members of the public, even where the differences between individuals might create discomfort.⁵⁷ Such discomfort from the exposure to difference is, in fact, one of the core values of public space according to this view.⁵⁸

This vision of public space discourages regulations that limit the potential for human interaction. As legal geographer Nicholas Blomley puts it, “the potential of public space can only be realized if it allows for spontaneous and unprogrammed encounters with others.”⁵⁹ Regulations that explicitly or implicitly exclude certain members of the public or expressive uses of the space are to be avoided. Implicit exclusions might include restrictions on conduct that are applicable predominantly to one group of individuals, especially when accompanied by surveillance and policing to enforce these regulations and justify the removal of these members of the public. A number of authors, particularly in Law and Geography, have highlighted how public space regulations like these can serve to specifically exclude homeless populations from public spaces.⁶⁰ Conduct regulations can target other minority or vulnerable communities in a similar way.⁶¹ Ultimately, this view of public space encourages a largely unregulated, open, accessible space for all members of the community. This view arises in judicial reasoning as well, often in relation to constitutional challenges to limits on free expression in public space.⁶²

This vision of public space would accordingly encourage robot regulations that look permissively upon any technology that improves access to public space by members of the public, particularly those who might not otherwise have access. It would encourage use of technology for expressive purposes. It would also take a restrictive approach to any robotic systems or uses of robots that have the effect of excluding or blocking members of the public from a space, or any use of the technology that negatively impacts the communal nature of the space. A recent example includes the municipal response to the use of surveillance robots to exclude homeless individuals from particular public spaces in San Francisco. This use was met with public opposition and subsequently prohibited by City regulators.⁶³

Ultimately, by regulating (or not) the robots that operate in public space, regulators are also implementing a particular vision of public space, regardless of whether this is an explicit consideration in regulatory deliberations. Section I has already explained the reciprocal relationship between law and space. A ‘public sphere’ view of public space can encourage a relatively unregulated space. But, to ensure this vision actually takes shape in public space, it is necessary to also consider what this regulatory landscape means for public use of and access to the space. If, for example, lack of regulation leads to conduct that intentionally excludes particular communities from the space (e.g., individuals do not use a public beach because of prolific drone harassment), some better regulatory balancing might be necessary, because the space has returned to one that is exclusionary to some members of the public. This notion of balancing competing interests leads into the next view of public space.

⁵⁷ E.g. Don Mitchell, *Right to the City*; Jeremy Waldron, “Homelessness and Community” (2000) 50 *University of Toronto Law Journal* 371.

⁵⁸ Waldron (*ibid* at 380) argues that encountering realities and lived experiences that make the comfortable uncomfortable is what public space is all about, argues it is a social good to be challenged in our comfortable preconceptions.

⁵⁹ Blomley, “Public Space: Introduction” at 4.

⁶⁰ E.g. Blomley, Mitchell, Layard *supra*.

⁶¹ [detailed list forthcoming] Richard T. Ford “Local Racisms and the Law: Introduction” in Blomley et al. *Legal Geographies Reader* at 52. “Spatial segregation has long been a means of perpetuating social hierarchy.” And “law is implicated in the creation and perpetuation of racially segregated spaces” by requiring or prohibiting movement of individuals – to explicitly or implicitly segregate individuals.

⁶² [detailed citation list forthcoming; see cases in sub-section II as well].

⁶³ See Kightscope example below in Section III.

B. Public Space as a *Regulated and Orderly* Public Square

In practice, regulators do not usually adopt extreme versions of the first vision set out above, of highly deregulated public space. Generally some rules apply in public that dictate permissible conduct, things, and interactions in that space. For instance, it might seem relatively uncontroversial to say that people are prohibited from having sex in public, urinating in public, or dumping garbage in public.⁶⁴ Such restrictions are justified by the concern that if public space is left entirely unregulated, the chaos that will emerge in that space will consequently exclude members of the public from that space.⁶⁵ According to this second view, for space to serve its communal public purpose, it requires careful regulation to ensure that it is a desirable destination for members of the public.⁶⁶ Many North American public spaces are shaped by this vision.

The challenging question here is; how much regulation (and of who/what) will strike the right balance to ensure communal use of and access to the space? Certain limits on conduct in public space are indeed necessary so that the conduct does not force the exclusion of other groups and individuals. For example, limits on harassment and intimidation might help to curb some of the negative experiences of public space that disproportionately affect some groups more than others, without requiring the exclusion of the individuals who might otherwise harass.⁶⁷ However, some of the more severe implications of this vision of public space are emphasized by property law scholar Richard Ellickson in his call for more extensive regulations to improve the public nature of public spaces. Ellickson argues that “to be truly public a space must be orderly enough to invite the entry of a large majority of those who come to it.”⁶⁸ As an example he specifies that, “just as disruptive forces at a town meeting may lower citizen attendance, chronic panhandlers, bench squatters and other disorderly people may deter some citizens from gathering in the agora.”⁶⁹ Ellickson’s argument suggests that regulators need to curate public space in ways that not only allow, but encourage the majority populations to use this space – otherwise, the majority of the population will migrate to suburbs and shopping centres, and the value of public space as a space for the public will be lost.⁷⁰ The notion of regulating public space to encourage more members of the public to spend time there also finds support in some of the famous literature regarding urban design and thriving cities.⁷¹

⁶⁴ Laws restricting private activities like sex and urination in public though have a discriminate effect on individuals with little or no access to private spaces in which to carry out these activities. See e.g. Waldron “Homelessness and Community.”

⁶⁵ Blomley, “Public Space: Introduction” at 4, summarizing the Ellickson/Waldron and Mitchell debate.

⁶⁶ The dichotomy between these two first two views is fleshed out in a scholarly debate between Robert Ellickson and Jeremy Waldron in relation to public space regulation. Ellickson is concerned about the “tragedy of the agora” wherein people avoid public spaces that contain the markers of poverty, e.g. squeegeeing, panhandling, graffiti. When people avoid public space, the space loses its potential to allow for “public” interaction – abandon public spaces for suburban malls. So Ellickson proposes greater regulation of activities in public spaces. Waldron raises a series of legal and ethical critiques of this vision in “Homelessness and Community.”

⁶⁷ E.g. Deirdre Davis, “The Harm that has No Name: Street Harassment, Embodiment and African American Women” (1994) 4 *UCLA Women’s Law Journal* 133; Deborah M. Thompson, “The Woman in the Street: Reclaiming the Public Space from Sexual Harassment” (1993) 2 *Yale Journal of Law and Feminism* 313; Thomasen, “Beyond Airspace Safety” https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3143655

⁶⁸ Robert C Ellickson, “Controlling Chronic Misconduct in City Spaces: Of Panhandlers, Skid Rows, and Public Space Zoning” (1996) 105 *Yale Law Journal* 1165 at 1176. Ellickson is particularly concerned with targeting chronic street nuisance (e.g. someone acting in a way that “violates prevailing community standards of behaviour to the significant cumulative annoyance of persons of ordinary sensibility who use the same spaces” at 1185).

⁶⁹ Ellickson at 1176.

⁷⁰ Ellickson.

⁷¹ Jane Jacobs.

Advocates of the first more open and deregulated view of public space, described above, have challenged Ellickson's vision, in particular with regard to the ethics of criminalizing the activities of one group in order to make another (already more politically powerful) group more comfortable.⁷² Nevertheless, this second view has been adopted by lawmakers as well as courts when negotiating competing claims for the use of public space.⁷³ For instance, in a Canadian case emerging out of the Occupy movement, *Batty v Toronto*⁷⁴, the court was asked to specifically consider who and what public space is for and what that means for permissible activities in public space.⁷⁵ The case involved an encampment in a public park owned jointly by the City of Toronto and a neighbouring church. The encampment was built as part of the protest, as a space to discuss and debate the values of the Occupy movement.⁷⁶ The case emerged from a constitutional challenge to a trespass notice preventing protesters from building shelters and remaining in the park overnight.

In his decision on the use of this space, Justice Brown determined that the protest was in essence anti-democratic because it excluded others from their use and enjoyment of that space.⁷⁷ It resulted in a loss of recreation for neighbours - dog walking, Ultimate Frisbee, strolling - and opposition from local business owners concerned about loss of sales due to members of the public avoiding the space.⁷⁸ Conduct by one group in public space that served to make others uncomfortable or unwilling to use that space could justifiably be regulated because it undermined the open nature of the space.⁷⁹

Each of these first two visions of public space share the basic notion that public space serves as public sphere, in which public sidewalks, roads, parks, beaches, and so on, belong to the community for communal uses. The visions differ, though, in terms of the role each sees for regulation in ensuring that the space is accessible for 'everyone'.⁸⁰ For proponents of this second vision, "law is a precondition for shared use" of public space. Whereas for proponents of the first, law is "potentially its undoing."⁸¹ Critics of this second view are particularly cautious about how laws in public space can act with greater force on vulnerable populations and minorities.⁸²

⁷² Blomley, "Public Space: Introduction" at 4; Waldron at 387; Mitchell in *Right to the City*, sees these laws as motivated "not by an attempt to restore civility to public space, but as driven by the "hellish logic" of globalization, which in the drive to attract global investment, compels cities to "clean up" their streets of the very people who are victims of the new economy." A difficulty in challenging these regulations though is that they activities and uses of public space, not explicitly whether people can enter those spaces or not – it can be difficult to see the connection between these regulations and the question of how public a space is, until we look more closely at law and geography: Blomley "Begging to Differ"

⁷³ A recent case where an individual's conduct in a public park led others to feel uncomfortable, and ultimately led to his eviction, arose recently in <http://www.ontariocourts.ca/decisions/2018/2018ONCA0261.htm>. The individual could legitimately be excluded from the space because he was detracting from it as a space for others to enjoy.

⁷⁴ 2011 ONSC 6862.

⁷⁵ Justice Brown asks "How do we live together in a community? How do we share public space?" *Batty v Toronto* para 1.

⁷⁶ Margaret Kohn "Privatization and Protest: Occupy Wall Street, Occupy Toronto, and the Occupation of Public Space in a Democracy" (2013) at 100.

⁷⁷ *Batty* at 3.

⁷⁸ E.g. *Batty* at para 25, and throughout witness statements, and at 91-93. Kohn at 100. See also: Dale Leorke, "The Struggle to Reclaim the City: An Interview with Michael Sorkin" (2015) 18 *Space and Culture* 98-105: recent social movements including Occupy and the "Arab Spring" have reinvigorated debate about the political significance of public space. Movements contradict those who've warned about the declining importance of public space.

⁷⁹ Importantly, the decision did not turn on the fact that the City owned the space and could do with it as it saw fit – this distinction is relevant in relation to the third vision below. But see para 18, the court does refer to it as City-owned space.

⁸⁰ Blomley explains this similarity and distinction in "Begging to Differ" at 405.

⁸¹ Blomley begging to differ 405 summarizing Ellickson and Mitchell respectively.

⁸² Waldron emphasizes how use regulations "act with particular force upon the homeless." Also, Blomley "Begging to Differ" at 405.

This second vision of public space, in contrast to the first, encourages uses of public space that, essentially, satisfy the majority of the local public. This might include regulations permitting the use of robots for entertainment, though perhaps in designated public spaces such that they do not interfere with those who choose to avoid them (designated drone parks, for example). It might also include the use of sidewalk delivery robots that make getting food and groceries easier for local residents and which support local businesses through their use of public space, or garbage collecting robots that make public space more physically appealing.⁸³ It might even include the use of robotic systems to police public spaces to ensure that conduct regulations are enforced, and that spaces remain attractive to many members of the local community.

Regulators adopting this second view of public space when regulating robots are – through their regulations - implementing a certain vision of public space. As suggested in the sub-section above, regulations that balance competing interests in public space might be necessary to make that space more accessible to all, but regulators and the public should be critical about whose interests are prioritized in implementing this vision. Given that these laws will shape access to and use of public space, this balancing should be explicit/transparent and involve community consultation.⁸⁴

C. Public Space as Government Administered Property

A third way in which lawmakers and courts have understood public space has been to view it not as the public's space, but as a government-owned and operated property to be efficiently managed by public officials. For regulators who adopt this vision, the expressive and communal values of the space are often secondary to the effective administration of the space for its particular goals or purposes.

For example, Blomley has explored how this vision of public space drives government regulation and judicial understandings of public sidewalks,⁸⁵ citing the Canadian case, *Federated Anti-Poverty Groups of B.C. v Vancouver (City)*⁸⁶ as an example of this vision of public space. *Federated* involved a constitutional challenge to bylaws prohibiting “obstructive solicitation” (panhandling) on sidewalks in Vancouver.⁸⁷ Blomley articulated the tension between the different possible visions of public space that arose in that challenge as follows:

For opponents and proponents of the bylaw beyond the state, the sidewalk is the material manifestation of the public sphere, a site for democratic dialogue, the production of citizenship, and the exercise of rights. The sidewalk, therefore is to be understood as a public space. Conversely, for the City (and, ultimately, the court), the sidewalk is municipal space,

⁸³ <https://www.theguardian.com/technology/2017/apr/12/delivery-robots-doordash-yelp-sidewalk-problems>

⁸⁴ The lack of transparency and consultation can prompt distrust and backlash – see e.g. the public responses to the implementation of Sidewalk Toronto. <https://www.thestar.com/opinion/contributors/2018/01/31/the-controversy-over-googles-futuristic-plans-for-toronto.html>

⁸⁵ Nicholas Blomley, “Begging to Differ: Panhandling, Public Space and Municipal Property” in Property on Trial” Canadian Cases in Context (Eric Tucker, Bruce Ziff, James Muir and Mary Jane Mossman eds) (Toronto, Irwin Law) at 393-424. Nicholas Blomley, *Rights of Passage*.

⁸⁶ 2002 BCSC 105. This was one in a string of similar cases. (*Federated* deals with anti-panhandling law; *Banks* deals with panhandling and squeegeeing; *Adams* deals with camping on public property).

⁸⁷ The parties challenging the bylaws took the first view described above. Some of the arguments in support of the bylaw, for instance from local businesses, took the second vision of public space above – that it is a site for public activities, and panhandling should only be regulated when it discourages members of the public from using the streets. Arguments against the bylaw in *Federated* included that public space is a political site for expression (including panhandling), that the sidewalk “not only provided a site where the public sphere can be found. It was itself the site where the potential of the public sphere was realized.” Blomley “Begging to Differ” 407-408.

to be governed according to a narrowly defined public interest, that being understood as circulation.⁸⁸

At its heart *Federated* addressed important questions about public space regulation. In particular, the court had to determine whether public streets and sidewalks are a form of public property held by the people for civic uses, or a form of municipal property held by the City and subject to its administration.⁸⁹ The court answered the question in the City's favour, holding that sidewalks do not belong to the public communally, but instead to the City to regulate on behalf of the public.⁹⁰ The City made the case that the "paramount" purpose of the sidewalk is orderly circulation,⁹¹ and panhandling is one example of an obstruction of that purpose. The court agreed and the conduct could therefore be legitimately regulated; even though it has expressive value.⁹² The Supreme Court of Canada has similarly held that picketing a highway is not compatible with the "principal function of the place, which is to provide smooth flow of pedestrian traffic."⁹³ It has also held that expression will be constitutionally protected in public space where it *does not interfere* with the function of that space.⁹⁴ In making these assessments the Supreme Court also affirmed the view that public property is a government-owned property to be administered by government authorities in accordance with its public function.⁹⁵ In other words, roads are for driving, sidewalks are for circulation between private properties, and neither is primarily designed for communal socializing, discussion, or protest.

This view of public space can justify permissive regulation of technologies that enhance the municipal goals for different public spaces. Autonomous vehicles on roadways are an example of a robotic system expected to enhance the efficiency of roads as a space for travel. An administrative view of public roadways would justify expanding the use of roads by AV, even if this might affect the use of roads for other non-transit related purposes, or if it might prioritize the use of the vehicle over other forms of pedestrianism – like cycling or crossing unexpectedly.⁹⁶ Similarly, drones that make use of airspace or sidewalk robots that use public sidewalks to deliver items (already accepted functions of those spaces) and reduce congestion on the roads, facilitating improved traffic flow, would fit well within this vision, so long as these technologies do not otherwise interfere with the

⁸⁸ Blomley "Begging to Differ" 394.

⁸⁹ Blomley "Begging to Differ" 404.

⁹⁰ How the City characterizes the "public interest" guiding its regulation becomes a central concern, at 417.

⁹¹ *Federated* at para 85. Municipal laws conceptualized as neutrally regulating things, uses and space, not people – people are rights bearing, things are not, so municipal laws are not engaging rights but instead dealing with administration of things and spaces Blomley at 415.

⁹² "Activities, whether or not they engage forms of expression, are subordinate to the purpose of safe and efficient movement of pedestrians" at para 158.

⁹³ Lamer in *Committee for the Commonwealth of Canada*: need to balance the interest of the individual in expression with the interests of the state and society as a whole "the individual will only be free to communicate in a place owned by the state if the form of expression he uses is compatible with the principal function or intended purpose of that place" (para 17)

⁹⁴ SCC in *Montréal (City) v. 2952-1366 Québec Inc*, 2005 SCC 62 (CJ McLachlin and Deschamps J; Binnie J dissenting): "Property may be private or public. Public property is government-owned. ... The question here is whether [constitutional freedom of expression] protects not only what the appellants were doing, but their right to do it *in the place where they were doing it*, namely a public street." (para 61); "Some government owned property is private in its use and other government-owned property has been recognized as public space, in which the public has expression rights." (para 64); "Streets provide means of passing and accessing adjoining buildings. They also serve as venues of public communication. However one defines their function, emitting noise produced by sound equipment onto public streets seems not in itself to interfere with it." See also *Abbotsford v Shantz*, 2015 BCSC 1909.

⁹⁵ E.g. *Montreal* at para 64

⁹⁶ The prompt public and regulatory reaction to the Uber collision, cited above, suggest that more explicit and transparent consideration of the competing values at issue when regulators permit vehicle testing on public roads could be both necessary and forthcoming.

smooth administration of the spaces where they operate.⁹⁷ Concerns about physical safety should fit within the ambit of efficient circulation – reducing accidents increases circulation. Concerns about privacy though, particularly for privacy-vulnerable minority populations, would likely be secondary to the overarching goal. As would the opportunity to use these spaces for other purposes, e.g. protests on a street, use of airspace for personal entertainment, or sleeping on a sidewalk.

This third vision of public might perhaps be best exemplified through laws that permit the incorporation of robotic systems into Smart City designs aimed at improving the overall efficiency of urban space. For instance, Sidewalk Toronto⁹⁸ has involved this sort of planning⁹⁹ and will require zoning and other regulatory changes to permit the project to move forward. This, at least to date, seems likely to occur despite public concerns over lack of transparency in the process, privacy, etc.¹⁰⁰

Regulators adopting this view of public space will ultimately shape that space – its potential uses, experiences within that space – through law, in accordance with a view that can lead to substantially different consequences for the space, and for robot regulation, than the two visions described above. There is a possibility, under this view, that the goals of efficiency can be prioritized over public access and communal use of public space. A critical assessment of the reciprocal relationship between public space and regulation can reveal that, what might seem like narrowly-targeted regulation of one thing in that space (e.g. permitting autonomous vehicle testing), actually undermines public nature of a legally designated public space (see Section I). This could consequently reduce the amount of public space actually available for public use within an urban environment. A loss of urban public space should not be easily justified on the grounds that the impugned law is simply ensuring the smooth functioning of that ‘public’ space – such circular reasoning could conceal significant spatial impacts of the law.

⁹⁷ Amazon and Google have made public proposals outlining a vision of horizontally stratified public airspace that could permit a variety of drone operations to occur simultaneously at different altitudes, facilitating much wider use of drones. Amazon Prime Air, “Determining Safe Access with a Best Equipped, Best-Served Model for Small Unmanned Aircraft Systems” at https://images-na.ssl-images-amazon.com/images/G/01/112715/download/Amazon_Determining_Safe_Access_with_a_Best-Equipped_Best-Served_Model_for_sUAS.pdf; Amazon Prime Air, “Revising the Airspace Model for the Safe Integration of Small Unmanned Aircraft Systems” at https://images-na.ssl-images-amazon.com/images/G/01/112715/download/Amazon_Revising_the_Airspace_Model_for_the_Safe_Integration_of_sUAS.pdf; Google “Project Wing” at <https://x.company/wing/>. Municipal or local drone ordinances have also been suggested to permit greater local control over where and when drones can fly. See e.g. Troy Rule, “Drone Zoning” (2016) 95 North Carolina Law Review 133; Rule, “Airspace in an Age of Drones”. But see: Bradley L. Garrett and Adam Fish, “Attack on the Drones: The Creeping Privatisation of our Urban Airspace” (December 12, 2016) The Guardian, <https://www.theguardian.com/cities/2016/dec/12/attack-drones-privatisation-urban-airspace>.

⁹⁸ Google’s proposal: <https://sidewalktoronto.ca/wp-content/uploads/2017/10/Sidewalk-Labs-Vision-Sections-of-RFP-Submission.pdf>; Summary of agreement with Waterfront Toronto: <http://www.waterfronttoronto.ca/nbe/wcm/connect/waterfront/458233c9-da47-4628-95af-b3c983a035f6/Innovation+and+Funding+Partner+Framework+Agreement+Summary+%28November+1%2C+2017%29.pdf?MOD=AJPERES&CACHEID=458233c9-da47-4628-95af-b3c983a035f6>

⁹⁹ “Pellet shaped robots” would make deliveries, and taxi-bots will combine ride-share with self-driving vehicles. Robots would also be able to move waste underground off the street. The neighbourhood would also “immediately be open for controlled pilots of self-driving cars, including a shuttle between Quayside and Cherry Beach.”: <http://www.metronews.ca/news/canada/2017/10/23/from-garbage-robots-to-gondolas-inside-sidewalk-labs-vision-for-toronto-s-eastern-waterfront.html>; and see <https://www.theglobeandmail.com/news/toronto/google-sidewalk-toronto-waterfront/article36612387/>

¹⁰⁰ Sidewalk Toronto will involve a \$50-million USD investment by Sidewalk in a year-long planning process to develop a 12-acre section of Toronto’s waterfront into an elaborate Smart City, with indication that Sidewalk intends to pursue a larger area in the future. <https://www.theglobeandmail.com/news/toronto/google-sidewalk-toronto-waterfront/article36612387/>; on some of the public controversy: <https://www.thestar.com/opinion/contributors/2018/01/31/the-controversy-over-googles-futuristic-plans-for-toronto.html>

III. Conclusion

The public nature of space shapes how lawmakers approach regulation, though not in one consistent manner. Different visions of what public space is, and who and what it is for, can be called upon to justify different forms of robotic regulation – either by law and policy-makers, companies lobbying for permissive regulations, and/or the public who will be impacted by robotics in public space. Importantly, the resulting regulations can then have the effect of rendering a public space more, or less, public for the individuals who access and use that space. Each of the examples above have been reflected by lawmakers and/or courts, resulting in different outcomes for the experience of the impugned space. These are by no means exhaustive.

The next section considers how these different visions of public space have shaped the regulation of robots in public space, and what these regulations subsequently mean for the public nature of that public space, through reference to recent examples. It also considers what affect this has on the public nature of the spaces where these technologies operate.¹⁰¹

SECTION III – Regulating Robots in Public Spaces

I. Introduction

The preceding two sections have: (i) discussed the notion of public space and the ways in which laws can shape the public nature of that space¹⁰² and (ii) examined how the legal designation of a space as public can lead to different approaches to the regulation of things, conduct and people in that space.¹⁰³ The resulting regulations will subsequently apply to activities in that space and may shape the public nature of that space for different people. Revealing this process can help to make some of the trade-offs and priorities embedded in regulation more visible, and therefore more debateable. The above sections already cited some brief examples of how robots and robotic regulation will be affected by the relationships between law and public space. This Section takes this analysis a step further, examining how robots, law and public space have intersected in recent examples, and considering what lessons these examples impart for future approaches to robotics regulation.

¹⁰¹ Note: A key take-away from this discussion ought to be that the fact that laws will apply in a public space should not be used to justify regulations that actually have the effect of making that space less public. To avoid this possibility, the balancing of different interests in the use and enjoyment of space should take place in a context of transparency and consultation.

¹⁰² A public space is created through a legal designation as public, signalling the public's right to be in that space, through the public's ability to actually access that space, and through the laws that regulate the public's use of that space.

¹⁰³ Section II specifically explored how regulations that apply within a public space can and should be influenced by the public nature of that space (it's legal designation). Since these regulations will shape the public nature of the space, only regulations that align with the public nature of space should be justifiable. This can, of course, mean different things depending on how one understands the public nature of a space, and does not mean that one kind of regulation is necessary. Developing the most appropriate regulations will require consultation and consideration of the impact of the regulation to ensure that space remains accessible and usable by the public in an equitable way. In cases where the law has undermined the public nature of the space then one might question the appropriateness/legitimacy of that regulation for that space.

II. Regulating Robots that Facilitate Access to Public Space

Section I set out a nuanced definition of public space, drawn from Law and Geography, that includes actual public access to a space as a necessary consideration. Robotic technologies can be used to improve physical access to public space by members of the public. A number of examples in the Introduction cited above look at how robotic systems can improve the physical accessibility of, and remove barriers to, public spaces. The use of such technologies can mean that a space that is legally designated as public can actually become public through access, and subsequent use of that space. While these examples of technologies cited above are still largely in testing phases (and so have not yet been subject to extensive permissive or restrictive regulation), one might imagine that their potential to improve the public nature of a public space should justify their use, balanced with competing interests in that space. What the applicable regulations eventually look like should, ideally, be determined through genuine consultation with affected stakeholders (e.g. see the Conclusion below).

Drone technology has also recently rendered public airspace physically accessible to members of the public in new and practical ways. This new reality has had an effect in shaping that space, and maybe moreso, in shaping the laws that regulate that space. These laws in turn have had a reciprocal affect on actual public access to and use of that public airspace. Paradoxically, as this technology has made a public space newly accessible to the public, regulations have had the effect of excluding members of the public from that space in a number of ways, at least some of which are especially problematic in light of the public status of this space.

Airspace, at a certain height over private lands, has been legally designated by courts and lawmakers as public space since the advent of commercial aviation.¹⁰⁴ Changes to airspace property laws at that time, in response to a new transformative technology, created a new public space. However, this ‘public space’ was for most of aviation history not actually physically accessible by the majority of the public. Manned aircraft are expensive and complicated to operate, typically requiring significant training and infrastructure. Relatively few individuals own or have easy access to personal aircraft. Commercial aviation is also expensive to access, and access is mediated through private companies.¹⁰⁵ It has only recently become physically possible for members of the public to have practical access to and the ability to use public airspace for a variety of purposes - as a result of advances in drone technology that have made aerial technology smaller, cheaper, and easier to operate, especially relative to manned aircraft. Accordingly, airspace above a certain height¹⁰⁶ is now both legally designated as a public space, and actually accessible by the public.

When assessing the public nature of this airspace through the nuanced understanding of public space described in Section I, it is also necessary to consider the effects of laws that regulate that space. Airspace is heavily regulated to ensure its safety and efficiency (reflecting the third view of public space set out in Section II). A range of drone laws control access to and use of this space, and have made the space easier to access for some members of the public compared to others. For example, commercial operators in Canada and the US are generally subject to stricter regulation than

¹⁰⁴ See e.g. Stuart Banner, *Who Owns the Sky? The Struggle to Control Airspace from the Wright Brothers On* (Cambridge: Harvard University Press, 2008); Kevin Gray, “Property in Thin Air” (1991) 50 Cambridge Law Journal 252-307; *United States v Causby*, 328 US 256, 260-61 (1946); *Bernstein of Leigh (Baron) v Skyviews & General Ltd.* [1978] Q.B. 479 at 488B, followed in *Didow v Alberta Power Ltd.*, [1988] 5 WWR 606 (ABCA); *Civil Aeronautics Act of 1938*, ch. 601, 52 Stat. 973.

¹⁰⁵ Thomasen, “Flying between the Lines”

¹⁰⁶ Landowners maintain a property interest in the airspace above their land, up to an uncertain height, “at least as much of the space above the ground as he can occupy or use in connection with the land.” See: *Causby*, *supra* at 266. *Didow*, *supra* at paras 38-40 (adopting *Causby* and *Bernstein*). See also Gray, “Property in Thin Air”, *supra*.

recreational operators. Different restrictions might also apply to different operations depending on the size of the drone and where it is being flown.

Generally, drone regulations appear to be predominantly guided by the government-administration view of the public airspace. Regulations are premised on ensuring airspace safety, and the safety of individuals on the ground below. Regulators specifically cite safety and efficiency of airspace as their primary objectives.¹⁰⁷ When drone restrictions are relaxed, this is often done in the name of opening up new commercial opportunities, in line with the broad notion that airspace regulation facilitates efficient airspace use.¹⁰⁸ Members of the public who access airspace for entertainment and expressive purposes (non-commercial uses) are somewhat or significantly less regulated relative to commercial operators.¹⁰⁹ However, regulators do not claim that this is the case because public airspace is the new public square; instead it is based on a perceived reduced need to administer recreational use, or on jurisdictional limits to the regulator's power to oversee these operations.

Again, drawing on the understanding of public space set out in Section I, if one is interested in the role of public airspace as a public space - it is necessary to consider not only the legal designation of airspace and its physical accessibility, but also the impact that these regulations have on the public's access to, use of, and conduct within that space. Whether or not a space is actually public has important legal and social implications, for example for jurisdiction, expression, privacy, and liberty in that space.¹¹⁰ Even laws designed around a particular view of administering a *public* space might have the effect of undermining the 'publicness' of that space. Arguably, such laws may justifiably be questioned and challenged by the members of the public who ultimately lose access to this purported public space.

Recent examples of the regulation of public airspace, in ways that deeply engage its public status, have centered around drone use in the context of protest. In 2014, the Federal Aviation Administration imposed flight restrictions following the use of a drone over a #BlackLivesMatter protest in Ferguson, Missouri,¹¹¹ and again in 2016, following a drone flight over #NoDAPL protests against the North Dakota Access Pipeline at Standing Rock Sioux Tribe lands.¹¹² In the latter example, the operator of the drone – Aaron Turgeon, an Indigenous citizen journalist (and hip-hop artist under the name Prolific the Rapper) – used the technology to capture video evidence of police brutality against protesters.¹¹³ Police shot at the drone, and charged Turgeon with reckless

¹⁰⁷ Transport Canada and FAA mission statements.

¹⁰⁸ E.g. Transport Canada Statement.

¹⁰⁹ In the US recreational users are very loosely regulated: https://www.faa.gov/uas/getting_started/model_aircraft/; in Canada recreational users have been subject to some additional regulation, but overall are still less regulated than commercial users: Trans. Canada Rules.

¹¹⁰ See also Hartzog "Public Information Fallacy"

¹¹¹ "ACLU Letter to FAA Protesting No-Fly Zone for Media in Ferguson" (November 4, 2014) written by Anthony E. Rothert and Lee Rowland, ACLU at: <https://www.aclu.org/other/aclu-letter-faa-protesting-no-fly-zone-media-ferguson>.

¹¹² Vera Eidelman, "FAA Helps Police Suppress Reporting From Dakota Pipeline Protests" (December 19, 2016) ACLU at: <https://www.aclu.org/blog/free-future/faa-helps-police-suppress-reporting-dakota-pipeline-protests>

¹¹³ Saba Hamedy, "Drone Footage Shows Recent Clashes at #NoDAPL Protest in Standing Rock" (November 27, 2016) Mashable at: <http://mashable.com/2016/11/27/standing-rock-no-dapl-protest-drone-footage/#gbqROX.UuSqs>; see also: "Drone Footage Captures Scene at Standing Rock" (November 26, 2016) NBC News at: <http://www.nbcnews.com/video/drone-footage-captures-scene-at-standing-rock-817789507848> (showing the size of the gathering despite freezing weather).

endangerment.¹¹⁴ The charges were later dismissed at court.¹¹⁵ The FAA also imposed a temporary no-fly zone over the area, preventing members of the public from making further use of the airspace above the protests.¹¹⁶ However, police-operated drones were still permitted at the site of the protests.¹¹⁷ The FAA did permit journalists to apply for exceptions to the ban. Only one exemption was granted, to a non-Indigenous non-local journalist.¹¹⁸

The framework set out in Sections I and II above can help unpack some of the legal and spatial implications of this drone regulation. First, the public use of airspace, despite its legal designation as a public space, and despite its physical accessibility, was tightly restricted through regulation.¹¹⁹ The no-fly regulation had the effect of rendering the space less (or not) public, despite the space being legally a public space.

Furthermore, while the no-fly regulation was adopted out of a concern for the safety of airspace users (e.g. police operated planes) and people on the ground below, this regulation did not align well with the administrative view of public airspace.¹²⁰ The FAA was not opposed to the use of drones in that particular airspace. It specifically prohibited access by particular individuals. Meanwhile others (police and one journalist) could carry out the same activity – suggesting that activity itself did not inherently interfere with the efficient administration of airspace. This example also undermines the first two visions of public space as a communal, democratic space. Using technology in public space to gather information of public interest (and which notably later proved to be significant to the public’s reaction to the events at Standing Rock) sits squarely within the notion of public space as a democratic space.

Instead of being informed by the public nature of the airspace over the protests, the regulations in this case can be said to at least implicitly portray the exertion of power to permit differential access to and use of space. This approach, problematically, had the effect of all-together undermining the public nature of this space for some members of the public who relied on it.

¹¹⁴ https://motherboard.vice.com/en_us/article/zmbdy5/drone-journalist-faces-7-years-in-prison-for-filming-north-dakota-access-pipeline-protests;

¹¹⁵ the court found that video evidence demonstrated that Turgeon had not flown the drone in a dangerous manner http://bismarcktribune.com/news/local/crime-and-courts/charges-dismissed-against-drone-operator-who-documented-protests/article_d130c5d3-4fbc-5892-bc3e-b38de4717dfb.html;
http://bismarcktribune.com/drone-and-cell-phone-footage-lead-to-acquittal-in-protest/article_6716eb9b-64e9-5cc3-a453-3b5bf517ac89.html

¹¹⁶ Thomasen, “Flying between the Lines”. Jason Koebler, “The Government is Using a No Fly Zone to Suppress Journalism at Standing Rock” (November 20, 2016), Motherboard, accessed January 2017:
<http://motherboard.vice.com/read/the-government-is-using-a-no-fly-zone-to-suppress-journalism-at-standing-rock>

¹¹⁷ Police are often permitted to carry and use tools and weapons in ways that civilians are not, so it may seem uncontroversial that the same distinction would apply in this case with drones. However, there are at least two relevant distinctions here: first, drone technology is the *means* of accessing this public space, so by permitting police access but denying citizen access the flight restriction has the effect of excluding one group of individuals all-together. This is also not in itself unique to this situation. However building on this first point, the exclusion of public use of the airspace here arose specifically after that use of airspace had the effect of making alleged police abuse of power transparent to the public. The power imbalance in this case between the protesters and law enforcement, and the manner in which it was reinforced through the flight ban (whether intentional or not), is to put it lightly, troubling.

¹¹⁸ Jason Koebler, “The Government is Using a No Fly Zone to Suppress Journalism at Standing Rock” (November 20, 2016), Motherboard, accessed January 2017: <http://motherboard.vice.com/read/the-government-is-using-a-no-fly-zone-to-suppress-journalism-at-standing-rock>

¹¹⁹ “This federal government restriction of access to and use of airspace over Indigenous land by individuals protesting to protect the land, is considerably more problematic when appropriately placed within the colonial context and history of this space. This is an issue meriting deeper analysis beyond the scope of this short paper.” Thomasen, “Flying between the Lines”

¹²⁰ See FAA statement, reproduced in: <https://www.forbes.com/sites/johngoglia/2016/11/27/flight-restrictions-over-standing-rock-is-the-faa-effectively-taking-sides-in-pipeline-dispute/#3e481a0e734c>

Drawing on the discussion in Sections I and II, the legitimacy or justification of the temporary flight restrictions may be challenged as an illegitimate reshaping of a space that is legally meant for the public.

Moving forward, this example presents some lessons. First, it demonstrates how the regulation of a thing in public space might have broader implications for the public access to and use of that space. Understanding this effect will be particularly relevant in contexts where robotic technologies – particularly by virtue of their dislocation from the human operator – make public spaces newly accessible to members of the public. If the robotic device stands in as a member of the public in a public space, regulators should give special consideration to how regulation of that device affects access. Second, this example reminds us that even where a regulation amounts to administering a public space, that administration might have the effect of undermining the very public nature of that space (which means paradoxically undermining the very justification for the public authority to be administering that space in the first place). Explicit consideration of the impact of a regulation on access to and use of the space where it applies, and transparency about this assessment, may encourage the adoption of different/better regulations, and would give the public an opportunity to question and challenge the legitimacy of the regulation (whether through court or public complaint).

III. Robots that Enforce Regulations in Public Space

[Under construction]

- In addition to permitting access to public space (above) robotic regulation might also serve the goal of enforcing regulation in public space (e.g. the second view of public space discussed in Section II). Consider, for example, the types of regulations meant to make a public space *more* public by making it open, accessible and desirable to the public – robotic systems may be used to ‘enhance’ the public nature of the space (at least according to the second view) through enforcement of the rules.
- Recent examples include:
- Knightscope example - use of robot to enforce law or policy public space.
 - o Effectiveness is premised on video surveillance, data collection, physical intrusiveness.
 - o San Francisco city ordinance prevented targeted use of the tech by a private actor (SPCA) to discourage an encampment on public property near its private property (targeted use against homeless individuals; city ordinance to prevent this)
 - Reflects first view over second view.
- Starship example – sidewalk delivery robot; new laws permit its use on sidewalks in a number of US states; permitted to take pictures, voice communicate, e.g. when someone is interfering with or vandalizing the robot, or if the device is ‘lost’ (enforcing its own right to be there)
 - o Data collection, physical intrusiveness
- Application of the Section I and II framework → possible to identify important considerations/concerns that are not consistently made explicit in regulatory decision-making:
 - o Legitimacy of the regulations being enforced?

- And, legitimacy of enforcing these regulations in this manner? (potential for bias, disproportionate impact, dehumanization)
- And, potential legal consequences of being in a public space
 - E.g. Privacy – intrusion/collection/interference in a space legally designated as public might have reduced or limited legal protection *because* the intrusion takes place in an open/accessible/public space
 - When regulation permits enforcement to take place, especially where it engages data or physical privacy, need to consider the impact of the privacy invasion on the public nature of the space (via applying a full Section I understanding of ‘public’ space)
 - Regulations permitting surveillance/enforcement on the basis of this action taking place in public need to more closely consider the impact this has on the public nature of the space (e.g. will it have an exclusionary and/or discriminatory impact; if so, then this impact undermines the purported regulatory goal)
 - It will be especially important not to consider how private ownership of the device and any real/perceived need to protect that device might act to justify invasions of privacy that undermine the public experiences of space (openness, access, use) that would otherwise be unjustified

Conclusion

[Under construction]

- How can regulation be more equitable and create a more equitable space?
 - Particularly given
 - Robotic tech expected to be pervasive
 - Robotic tech will be powerful – in terms of winners and losers, decision-making about people, etc.
 - Regulators/stakeholders/policymakers must:
 - Identify when/how robot regulation will have spatial impact;
 - Be explicit and transparent about the vision of public space that informs regulation – especially the vision of who and what the space is for;
 - Genuine consultation with affected communities
 - Etc...
- Take-away: lawmakers need to be careful about how they regulate robots in public, because by regulating robots they may also be implementing a particular vision of public space.