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Robots, Regulation, and the Changing Nature of Public Space

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ROBOTS ARE AN increasingly common feature in North American public spaces. From regulations permitting broader drone use in public airspace and autonomous vehicle testing on public roads, to delivery robots roaming sidewalks in major US cities, to the announcement of Sidewalk Toronto — a plan to convert waterfront space in one of North America's largest cities into a robotics-filled smart community — the laws regulating North American public spaces are opening up to robots.

In many of these examples, the growing presence of robots in public space is associated with opportunities to improve human lives through intelligent urban design, environmental efficiency, and greater transportation accessibility. 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; or the potential marginalization or exclusion of some members of society in favour of those who can pay to access, use, or support the new technologies available in these spaces.

Laws that permit, regulate, or prohibit robotic systems in public spaces will in many ways determine how this new technology impacts public space and the people who inhabit that space. This begs the questions: how should regulators approach the task

LES ROBOTS SONT de plus en plus présents dans les espaces publics nord-américains. De la réglementation autorisant davantage de drones dans l'espace aérien public, aux essais de véhicules autonomes sur les routes publiques, aux robots livreurs qui parcourent les trottoirs des grandes villes aux États-Unis, à l'annonce de Sidewalk Toronto — un plan visant à convertir le secteur riverain d'une des plus grandes villes d'Amérique du Nord, en communauté intelligente remplie de robots — les lois régissant les espaces publics nord-américains s'ouvrent aux robots.

Dans plusieurs de ces exemples, la présence grandissante de robots dans l'espace public est associée aux possibilités d'amélioration de la vie humaine à travers un aménagement urbain intelligent, une efficacité environnementale et une meilleure accessibilité des transports. Cependant, l'introduction de robots dans les espaces publics a également suscité des inquiétudes. Par exemple, la commercialisation de ces espaces par les entreprises qui déploient les robots, l'augmentation de la surveillance ayant des répercussions négatives sur la vie privée et la confidentialité des données, ou encore, le risque de marginalisation ou d'exclusion de certains membres de la société en faveur de ceux et celles pouvant payer pour accéder, utiliser ou appuyer les nouvelles technologies disponibles dans ces espaces.

Les lois qui autorisent, réglementent ou interdisent les systèmes robotiques

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 argues that the laws that regulate robots deployed in public space will affect the public nature of that space, potentially to the benefit of some human inhabitants of the space over others. For these reasons, special considerations *should* apply to the regulation of robots that will operate in public space. In particular, the entry of a robotic system into a public space should never be prioritized over communal access to and use of that space by people. And, where a robotic system serves to make a space more accessible, lawmakers should avoid permitting differential access to that space through the regulation of that robotic system.

dans les espaces publics détermineront à bien des égards l'impact qu'aura cette nouvelle technologie sur l'espace public et les personnes qui y vivent. Cela soulève les questions suivantes : comment les autorités doivent-elles aborder la réglementation des robots dans les espaces publics ? Et, devrait-on appliquer des considérations particulières à la réglementation des robots *à cause* de la nature publique des espaces qu'ils occupent ? Cet article soutient que les lois qui régissent les robots déployés dans un espace public affecteront le caractère public de cet espace, potentiellement en faveur de certains humains plus que d'autres. Pour ces raisons, des considérations particulières *doivent* s'appliquer à la réglementation des robots qui circuleront dans l'espace public. Plus précisément, l'introduction d'un système robotique dans un espace public ne doit jamais être priorisée par rapport à l'accès commun à cet espace et à son utilisation par des êtres humains. Et lorsqu'un système robotique vise à rendre un espace plus accessible, les autorités législatives doivent éviter d›autoriser un accès différentiel à cet espace par l'entremise de la réglementation de ce système robotique.

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INTRODUCTION

It is increasingly common to find robots in North American public spaces.[1] Advances in technology are making complex interactions between robotic systems and humans possible in unpredictable urban settings. Meanwhile,

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1 This paper adopts a broad definition of "robot" as any embodied (*i.e.* physical) technology, that takes in information from its surrounding environment, processes that information, and acts upon that information (with varying degrees of automation and human input), roughly applying the "sense-think-act" paradigm. In terms of public space, this paper also adopts a broad definition as any space over which there is no private-property based legal right to exclude. 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. This analysis is limited to focusing on robots in Canadian public spaces in the backdrop of Canadian common and statutory law. Further thinking and discussion of the broader impacts of robots in and on other legal systems not considered here will complement and expand the discussion in this paper.

the laws regulating use and access to public spaces are opening up to robots.[2] This paper explores the impact that robots and robot regulation will have on the public nature of public spaces. It argues that lawmakers need to be careful and explicit about how they regulate robotic systems that operate in public spaces, because by regulating robots, lawmakers can render a space more or less public to individuals and communities.

Often, 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. Remoteness from a human operator might enable access to otherwise hard to reach places. For instance, drone technology has made access to public airspace practical for a range of stakeholders.[3] Automation can generate new ways of accessing and using space. For example, autonomous vehicles could allow persons with disabilities to access transit in new ways that can enhance personal autonomy and dignity.[4] Technologies can be designed to overcome barriers in the existing built environment. Research teams, for instance, have been working

2 Aviation regulations are permitting broader drone use in public airspace, and city bylaws allow delivery robots to roam the sidewalks of major United States (US) cities. New road regulations mean that autonomous shuttles and buses can transport people through urban downtowns. These changing road rules are turning cities into test-sites for autonomous car developers. Public-private partnerships are converting city neighbourhoods into robotics-filled smart communities, like Sidewalk Toronto, a partnership between Alphabet Inc., the Governments of Canada and Ontario, and the City of Toronto. Sidewalk Toronto proposes to convert waterfront space in one of North America's largest cities into an AI- and robotics-driven smart city. These are just a handful of the growing number of examples of robotic systems entering into public spaces. The sections below canvass some of the more common, more developed, 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.

3 See e.g. Kristen Thomasen, "Flying Between the Lines: Drone Laws and the (Re)Production of Public Spaces" in Eric Hilgendorf & Uwe Seidel, eds, *Robotics, Autonomics, and the Law: Legal Issues Arising From the AUTONOMICS for Industry 4.0 Technology Programme of the German Federal Ministry for Economic Affairs and Energy* (Baden-Baden: Nomos, 2017) 205 [Thomasen, "Flying Between"].

4 See Fahad Khan, Krzysztof Czarnecki, Kristen Thomasen & Laverne Jacobs, "Accessibility in Autonomous Vehicle Policy" (Panel delivered at the University of Windsor Faculty of Law, 14 February 2018)[Thomasen & Jacobs, "Accessibility"].

on using robots to improve the physical accessibility of public spaces.[5] To the extent that robotics can reduce some of the barriers created by the built environment of a public space, the technology would serve to make that space more public.[6]

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; militarization of public space through state adoption of robotic systems designed for war-time use; 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.[7] 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 visible minorities, women, and people experiencing homelessness.[8] In

5 See "Being There: Humans & Robots in Public Spaces" (21 November 2018), online: *Being There* <web.archive.org/web/20181121121521/http://being-there.org.uk/> (the *Being There* project explored how robots can enable participation in public); Michael Baker & Holly Yanco, "Automated Street Crossing for Assistive Robots" (Paper delivered at the Institute of Electrical and Electronics Engineers 9th International Conference on Rehabilitation Robotics, Chicago, 28 June 2005), online: <ieeexplore.ieee.org/document/1501081>. Researchers of the DALI Project are developing a robotic cognitive walker (c-Walker) that can be taken to, or picked up at, a destination. 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. See CORDIS, "Robot Walker for Elderly People in Public Spaces" (22 May 2015), online: *PhysOrg* <phys.org/news/2015-05-robot-walker-elderly-people-spaces.html>. See also Ruth Butler & Sophia Bowlby, "Bodies and Spaces: An Exploration of Disabled People's Experiences of Public Space" (1997) 15:4 Environment & Planning D: Society & Space 411 ("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 is often inaccessible or difficult for disabled people to enter and move easily and freely within" at 421).

6 To date, many of these robots are in the earlier phases of testing and development, and have not yet been deployed in public spaces.

7 See e.g. April Glaser, "San Francisco Is Considering Legislation That Would Ban Sidewalk Delivery Robots", *Recode* (16 May 2017), online: <vox.com/2017/5/16/15648324/san-francisco-legislation-ban-autonomous-delivery-robots-sidewalks>. More generally with regard to smart cities, see Shruti Ravindran, "Is India's 100 Smart Cities Project a Recipe for Social Apartheid?", *The Guardian* (7 May 2015), online: <theguardian.com/cities/2015/may/07/india-100-smart-cities-project-social-apartheid >; Eva Blum-Dumontet, "Smart Cities: Better for Whom?" (31 October 2017), online: *Privacy International* <medium.com/@privacyint/smart-cities-better-for-whom-b9abec9cec44>.

8 These are of course not mutually exclusive identities. In many ways, particularly as a result of regulation, policing, and surveillance, access to and use of public space can, in practice, be, for example, gendered and racialized. See e.g. Kristen Thomasen, "Beyond Airspace

other words, the introduction of robotic systems in public space could alternatively (or simultaneously) render the space *less* public[9] to some individuals or communities. Restrictions on who can use robotic systems within public spaces can have the further effect of making the same space simultaneously accessible to some and not to others. An example of this arose recently when the US Federal Aviation Administration (FAA) instituted differential regulation of the use of drones over protests, where protestors and some journalists were prohibited from using the technology to access information about police activities on the ground below—including police brutality—while police were permitted to use the technology to surveil protestors.[10]

In the examples referred to above, the presence and use of robots in public space was precipitated and regulated through law. In some cases, laws had to be passed or changed to allow operators to deploy robots in public spaces, and in other cases, laws had to be adopted to prevent the use of robots in public space.[11] The laws that permit, regulate, or prohibit robotic systems in public spaces will in many ways determine how this new technology impacts the space and the people who inhabit that space.[12]

Safety: A Feminist Perspective on Drone Privacy Regulation" (2018) 16:2 CJLT 307, online: <papers.ssrn.com/sol3/papers.cfm?abstract_id=3143655&download=yes>.

9 As in, open, accessible, usable. Part I, *below*, expands on this concept.

10 This example is elaborated upon in Part II, *below*.

11 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 has happened in the past including, for example, with Uber. See Alex Davies, "Uber's Robo-Car Test in SF is a Middle Finger to Regulators", *Wired* (14 December 2016), online: <wired.com/2016/12/legal-loophole-lets-uber-test-self-driving-cars-california>; Drone Business Centre, "Proof that Autonomous Disobedience Pays" (30 November 2016), online: <dronebusiness.center/proving-that-autonomous-disobedience-pays-13104>. But this does not change the relevance of considering 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.

12 The regulation of robots is interesting especially because they are expected to become prolific. A prime example of another, similarly transformative technology that reconfigured cities and prompted a range of laws restricting or reorganizing what were once common public activities, was the automobile. It is not uncommon for developers and some regulators to compare the dramatic change that robotic systems will bring to public space to that of the car. This expected impact even more so encourages a critical evaluation of who will experience the benefits of such transformation, and at what expense. See generally Mark S Foster, *A Nation on Wheels: The Automobile Culture in America Since 1945* (Belmont, CA: Wadsworth/Thomson Learning, 2003); James J Flink, *The Car Culture* (Cambridge, MA: MIT Press, 1975); Clay McShane, *Down the Asphalt Path: The Automobile and the American City* (New York: Columbia University Press, 1994). For pedestrians, cyclists, and horse-riders, see generally James J Flink, *America Adopts the Automobile, 1895–1910*, (Cambridge,

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 these robots *because* of the public nature of the spaces they occupy?

This paper focuses on answering these questions. It argues that the laws that regulate robots deployed in public space will affect the public nature of that space, potentially to the benefit of some human inhabitants of the space over others.[13] 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 and communities get to use and enjoy public space. These rules could have the effect of making the space more or less public for different users of that space. For these reasons, this paper argues that special considerations *should* apply to the regulation of robots that will operate in public space. The paper ultimately proposes two basic principles that should inform the regulation of robots in public spaces: (a) the entry of a robotic system into a public space should never be prioritized over human access to and use of that space; and (b) where a robotic system serves to make a space more accessible, lawmakers must be cautious to avoid providing differential access to that space through the regulation of the robotic system. Foundationally, lawmakers should resist any arguments by users or manufacturers of robotic systems that public space—by virtue of its public nature—must be freely available for the use of robotics.

MA: MIT Press, 1970); Carol Sanger, "Girls and the Getaway: Cars, Culture, and the Predicament of Gendered Space" in Nicholas Blomley, David Delaney & Richard T Ford, eds, *The Legal Geographies Reader: Law, Power, and Space* (Oxford: Blackwell Publishers, 2001) 31.

13 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: <robots.law.miami.edu/2014/wp-content/uploads/2013/06/Asaro-Micro-Airspaces.pdf>. See also Oliver Bendel, "Service Robots in Public Spaces", *Telepolis* (25 June 2017), online: <heise.de/tp/features/Service-Robots-in-Public-Spaces-3754173.html?seite=all>; Guangda Zhang, Hai-Ning Liang & Yong Yue, "An Investigation of the Use of Robots in Public Spaces" (Paper delivered at the 2015 IEEE International Conference on Cyber Technology in Automation, Control and Intelligent Systems, Shenyang, 8 June 2015), online: <ieeexplore.ieee.org/abstract/document/7288055>; Mason Marks, "Robots in Space: Sharing Our World with Autonomous Delivery Vehicles" (Paper delivered at We Robot, University of Miami School of Law, Coral Gables, FL, 12 April 2019) [unpublished], online: <robots.law.miami.edu/2019/wp-content/uploads/2019/03/Mason-Marks-Robots-in-Space-WeRobot-2019-3-14.pdf>.

Such an approach threatens to privatize and commercialize public spaces in ways that would potentially exclude people and undermine many of the values associated with public space, including community, sociality, and democracy.

The rest of the paper proceeds in three parts. The first part takes a deeper look at the intersection of law, public space, and its inhabitants; examining the concept of public space and explaining how robot regulation will have the effect of shaping or changing the public nature of space. To do this, Part I introduces the interdisciplinary field of law and geography, which focuses on exposing the intersections between law, society, and space. In particular, this part explains how laws that regulate the use or protection of robotics could have the effect of making space more or less public for different people. Accordingly, this paper argues that when lawmakers and regulators are dealing with robotic systems that operate in public spaces, the public location of the system should inform how these systems are regulated.

However, there is no one common legal or policy vision of what public space is and how it should be regulated. Part II draws on the theory introduced in the first section to examine different legal visions of how a public space can be understood, and considers how these visions of public space influence lawmakers and courts to regulate access to, use of, and rights within that space. In other words, it considers the different ways in which the "public" designation of the space where robots operate might shape the laws regulating those systems. Part II also considers how these different visions might have the effect (intended or not) of excluding particular people or communities from public space, through different notions of the legitimate uses or purposes of that space.

The paper concludes in Part III by arguing that, if we want public spaces to serve communal, social, and democratic functions, then the introduction of robots into spaces that are legally designated as "public" should never prioritize robotic systems over the people who use or wish to use these spaces. Where the technology can enhance public access to, and use of, physical public spaces, lawmakers should avoid permitting differential access to, and use of, that space through robot regulation.

This paper has some necessary parameters.[14] The paper specifically considers *urban* robotic technologies; that is, robots that are being designed, at least for now, for deployment within urban areas (*e.g.* delivery and

14 Each of which is important—these are not listed in any order of significance.

security robots, people-moving robots, *etc*). While the same autonomous systems might be deployed in rural areas, wilderness, or ocean spaces, this paper considers how the technology is being developed and tested for use predominantly in cities.[15] Where robotic systems are first tested in urban spaces, both the benefits and the complications associated with these technologies will affect city-dwellers first. These technologies are also being deployed and tested in areas where many individuals have limited access to private spaces. This results in a different reliance on shared public spaces than may exist in rural areas.[16]

Additionally, this paper focuses on *robots* as opposed to exclusively computer-based automated 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.[17] 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 artificial intelligence (AI) systems. Of course, many of these considerations will also overlap; but this paper does not devote itself to figuring out when or how that overlap will take place.[18] Many of the considerations in this paper will also apply to non-robotic technologies. This paper focuses on robotic systems (and not other technologies) for two primary reasons: (a) some features of robots raise novel challenges to public space and regulation—*e.g.* robotic technologies can be used to access new spaces, and to access and use existing spaces in different ways by different people or companies;[19] and (b) robotic systems are expected to be prolific and are already entering into urban spaces, capturing the attention of lawmakers and the public alike. These systems prompt a need and an opportunity to consider the ways in which the regulations of things can have broader social implications. This conversation

15 It is beyond the scope of this paper to analyze specific distinctions between municipal public space, so called "Crown land", or other forms of public space "ownership".

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

17 See Ryan Calo, "Robotics and the Lessons of Cyberlaw" (2015) 103 Cal L Rev 513.

18 This paper also does not focus on spatial considerations associated with augmented reality, though some overlapping issues may arise.

19 There are examples of each throughout the paper. See also Calo, *supra* note 17.

is urgent with respect to robots, but not disconnected from other debates about urban public space and regulation; though these latter debates are beyond the scope of this paper.

Significantly, this paper deals with laws and concepts, like public space and its regulation, that are colonial constructs, which also engage stolen and occupied lands in Canada and the US.[20] I recognize and struggle with the reality that this paper deals with the status quo—only addressing laws and robotic systems within the current Canadian legal system. Addressing the colonial impact of law on public space requires much more than a narrow discussion of robotics regulation, up to and including actual return of occupied lands, as well as greater self-reflective and reflexive practice amongst academics, law- and policy-makers, and manufacturers.[21] In this paper, I hope to at least reject the idea that public spaces—so designated according to the Canadian legal system—are "there for the taking" by those with the power and technology to do so, be it the state, commercial enterprise, or private individuals. I hope to reject the approach taken by some robotics companies that commercial enterprise is *entitled* to make profitable use of public spaces. I certainly do not intend to romanticize public space—to prioritize access to it over pre-existing claims to the lands at issue, or challenges to the construct of a space as public space. This paper only touches on a small part of a much larger conversation and research agenda about how to address emerging robotic systems, and about how to conceptualize and treat the spaces that these systems currently or might soon occupy.

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20 This paper focuses on Canadian urban spaces in regard to law and regulation, however it draws on many examples from the US. This is due, in large part, to the fact that more robotic systems have been deployed for testing and use in the US, though certainly many are being tested in Canada as well. The examples from the US also better highlight some of the issues discussed in this paper. Many of the robotic systems deployed in the US are apt to come to Canada, or already have, and therefore these examples are relevant as hypotheticals for the Canadian experience.

21 See Eve Tuck & K Wayne Yang, "Decolonization Is Not a Metaphor" (2012) 1:1 Decolonization: Indigeneity, Education & Society 1; Yellowhead Institute, "Land Back: A Yellowhead Institute Red Paper" (October 2019), online (pdf): <redpaper.yellowheadinstitute.org/wp-content/uploads/2019/10/red-paper-report-final.pdf>; Jeffery G Hewitt "Land Acknowledgement, Scripting and Julius Caesar" (2019) 88 SCLR 27; S Xavier, J Hewitt, A Alvez, A Bhatia, B Jacobs & V Waboose, *Decolonizing Law in the Global North and Global South* (Routledge, forthcoming). See specifically, S. Xavier and J Hewitt's "Introduction" for more regarding the process of reflectivity and reflexivity.

Finally, this paper deals with public space as a singular concept, but public spaces are not all the same.[22] People will have different reasons for accessing different spaces, and will use those spaces for different activities. For example, protests typically take place in city squares, streets, and on sidewalks in order to gain the attention of others, rather than in a quiet city park. Parks might be a place for respite away from busy public streets. Sidewalks are a safer place to congregate than a public road.[23] Eliminating conduct from one public space might have the effect of prohibiting that conduct altogether, if it cannot be logically carried out elsewhere. Public space is not a uniform concept—nevertheless, it is beyond the scope of this paper to carry out an analysis of various types of public spaces. Of course, closer consideration of a particular space will be needed when regulating robotic systems, but can be guided by the broad principles examined in this paper.

I. LAW & GEOGRAPHY, AND ROBOTS

A. Introduction

This section considers how the regulation of a robotic system can impact the public nature of a physical space. To ground this analysis, Part I turns to scholarship from the interdisciplinary field of law and geography. The sub-sections below introduce law and geography and some of what it says about the intersection between law and public space. In particular, law and geography's nuanced understanding of what public space is, and how it is defined by more than its legal property status, can generate a deeper understanding and assessment of the impact of robotics regulations on public spaces. These ideas from law and geography are then drawn upon in Part II to examine how lawmakers can affect public space through the regulation of robotic systems.

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22 Public-private partnerships to establish smart cities, like Sidewalk Toronto, will complicate this distinction even further. See also John Page, "Explainer: What Is Public Space and Why Does It Need Protecting" (31 December 2019), online: *The Conversation* <theconversation.com/explainer-what-is-public-space-and-why-does-it-need-protecting-121692>.

23 For a compelling discussion about the norms of particular places and spaces in relation to augmented reality, see Elizabeth F Judge & Tenille E Brown, "Pokémorials: Placing Norms in Augmented Reality" (2017) 50:4 UBC L Rev 971.

B. The Intersection of Law, Space, and Robots

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.[24] Specifically helpful to this analysis of robotics regulation, the field has examined how the notion of public space is produced through law and regulation, and how the public nature of space influences law.[25] In particular, law and geography scholars have emphasized that simply designating a space as "public" (or not private) in law does not, on its own, render that space public for everyone, or in some cases for anyone.[26] 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.[27] Similarly, the physical qualities of a space—such as being physically open and accessible to members of the public—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 owners have a private property-based right to exclude.[28] To actually be a "public" space, the space also

24 Law and property scholar Antonia Layard's personal website provides clear explanations of some central concepts. See Antonia Layard, "What is Legal Geography?", online: *Law, Property, Place* <antonialayard.com/what-is-legal-geography/> [Layard, "What is Legal Geography"]. See also the remaining footnotes in this sub-section for further academic writing.

25 Parts of this discussion of law and geography draw from an earlier paper of mine. See Thomasen, "Flying Between", *supra* note 3. See also Nicholas Blomley, "Law, Property and the Geography of Violence: The Frontier, the Survey, and the Grid" (2003) 93:1 Annals Assoc American Geographers 121; David Delaney, "Beyond the Word: Law As a Thing of This World" in Jane Holder & Carolyn Harrison, eds, *Law and Geography*, 5th ed (Oxford: Oxford University Press, 2003) 67.

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

27 Antonia Layard, "Freedom of Expression and Spatial (Imaginations of) Justice" in Dimitry Kochenov, Gráinne de Búrca & Andrew Williams, eds, *Europe's Justice Deficit?* (Oxford: Hart Publishing, 2015) 417 at 424 [Layard, "Freedom of Expression"]. 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*. See also Henri Lefebvre, *The Production of Space,* translated by Donald Nicholson-Smith (Oxford: Blackwell Publishers, 2000); Susan Ruddick, "Constructing Difference in Public Spaces" (1996) 17:2 Urban Geography 132; Don Mitchell, *The Right to the City: Social Justice and the Fight for Public Space,* (New York: Guilford Press, 2003); Evelyn S Ruppert, "Rights to Public Space: Regulatory Reconfigurations of Liberty" (2006) 27:3 Urban Geography 271.

28 Such spaces can be regulated at least largely—if not fully—by the private owner. See Layard, "Freedom of Expression", *supra* note 27 at 5. See also *Harrison v Carswell* [1976] 2 SCR 200, 62 DLR (3d) 68; Ruppert, *supra* note 27; Michael Sorkin, ed, *Variations on a Theme Park: The New American City and the End of Public Space* (New York: Hill and Wang, 1992).

requires a legal status that permits public use, and the protections that flow from that.[29]

Beyond the legal status of a space, as public or private for instance, the regulatory regimes that apply within that space may also determine the public nature of the space.[30] Regulations that exclude some 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,[31] 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.[32] 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."[33] In order to understand public space as a collective space, she adds, "we must examine how it is constituted by regulatory practices."[34]

Koops and Galič discuss the growing privatization and securitization of public space. See Bert-Jaap Koops & Maša Galič, "Conceptualizing Space and Place: Lessons From Geography for the Debate on Public Privacy" in Tjerk Timan, Bryce Clayton Newell & Bert-Jaap Koops, eds, *Privacy in Public Space: Conceptual and Regulatory Challenges* (Cheltenham, UK: Edward Elgar, 2017) 19 at 33–35; Anne Bottomley, "A Trip to the Mall: Revisiting the Public/Private Divide" in Hilary Lim & Anne Bottomley, eds, *Feminist Perspectives on Land Law,* (Abingdon, UK: Cavendish, 2007) 65.

29 Layard, "Freedom of Expression", *supra* note 27 at 6. See also Antonia Layard, "Public Space: Property, Lines, Interruptions" (2016) 2:1 JL Property & Society 1 [Layard, "Public Space"]. Drawing from Layard's compelling arguments in the latter piece, I am mindful that legal status alone does not make space "public" and often might just serve to determine who has the authority over the space, including the authority to regulate and to exclude.

30 Mitchell, *supra* note 27.

31 Hille Koskela, "'The Gaze Without Eyes': Video-Surveillance and the Changing Nature of Urban Space" (2000) 24:2 Progress in Human Geography 243.

32 Ruppert, *supra* note 27. Nicholas Blomley, "Public Space: Introduction" in Nicholas Blomley, David Delaney & Richard T Ford, eds, *The Legal Geographies Reader*: *Law, Power, and Space* (Oxford: Blackwell Publishers, 2001) 3 [Blomley, "Public Space"].

33 Ruppert, *supra* note 27 at 271.

34 *Ibid* at 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…[I]n order to understand public space as a collective good we must examine how it is constituted by regulatory practices" (*ibid* at 272–73). Ruppert in fact defines public space as "that object which is constituted not by ownership but by a regime made up of regulatory practices" (*ibid* at 273).

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. [35] 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. For example, Professor Don Mitchell has looked at how restrictions on activities like sleeping and loitering in public spaces can particularly target individuals experiencing homelessness, who have less access to private spaces in which to carry out these activities.[36] 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. For example, Blomley points out that in law, an individual who is panhandling on a public sidewalk may be treated the same way as a physical obstruction like a newspaper box—regulated against and removed to enhance the use of the sidewalk for efficient public transit.[37] An analysis of the "public" nature of space must accordingly focus on the role of lawmakers and courts in regulating that space, rather than solely focusing on the property-ownership status of the space.[38]

Legal geographers also highlight ways that public space can simultaneously have the effect of shaping law. For example, lawmakers might base

35 *Ibid* 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" (*ibid* at 273).

36 Mitchell 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 (Mitchell, *supra* note 27). Laws targeting individuals experiencing homelessness will have disproportionate impacts on already marginalized people, including Indigenous people who are overrepresented among people experiencing homelessness in Canada. See Stephen Gaetz et al, "The State of Homelessness in Canada" (2016), online (pdf): *The Homeless Hub* <homelesshub.ca/sites/default/files/SOHC16_final_20Oct2016.pdf>.

37 Nicholas Blomley, *Rights of Passage: Sidewalks and the Regulation of Public Flow* (New York: Taylor & Francis, 2010) [Blomley, *Rights of Passage*].

38 Ruppert, *supra* note 27 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" (*ibid* at 273).

their approach to regulation—and who, and what, should be prioritized in public space—on their particular vision of what makes a public space *public*. These considerations will in turn determine if a legally public space is accessible to different members of the public for different activities and conduct. Several different visions of public space, and what these legal visions mean for robotics regulation and the public spaces where robots operate, are discussed at greater length in Part II.

Accordingly, a public space emerges from the relationship between: (a) the physical characteristics of the space (which may include the presence or absence of robotic technology); (b) the legal status of the space, determining who has the authority to use, or to permit members of the public to use, that space; and (c) 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.[39] Consequently, all three of these factors must feed into an analysis of the impact of robots on the spaces where they operate—a crucial lesson from law and geography that will be carried into the next Part.

This approach to understanding public space encourages thinking about space as a mechanism of social relations, rather than as a "fixed, natural and objective" thing.[40] 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 robotic systems themselves, might change the open and accessible nature of public spaces, and what this means for the public, especially those members of the public who could be excluded from these spaces.

A recent example to flesh out the above discussion of how robots and robot regulations can change the public nature of a space involves the use and regulation of drones in airspace. Airspace, at a certain height over private lands, has been legally designated by courts and lawmakers as a public space since the advent of commercial aviation.[41] Changes to

39 See e.g. Mitchell, *supra* note 27.

40 Nicholas Blomley, *Unsettling the City: Urban Land and the Politics of Property*, (New York: Routledge, 2004) at 5. Koops and Galič 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" (Koops & Galič, *supra* note 28 at 20).

41 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) 50:2 Cambridge LJ 252; *United States v Causby*, 328 US 256 at 260–61 (1946)

airspace property laws at that time—in response to the new transformative technology of piloted aviation—created a new public space. However, this "public space" was not actually physically accessible by the majority of the public for most of aviation history. On-board piloted aircrafts are expensive and complicated to operate, typically requiring significant training and infrastructure. Relatively few individuals own or have easy access to a personal aircraft. Commercial aviation is also expensive to access, and access is typically mediated through private companies.[42] 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. This access comes as a result of advances in drone technology that have made aerial technology smaller, cheaper, and easier to operate, especially relative to piloted aircrafts.[43] Accordingly, airspace above a certain height[44] is now both legally treated as a public space and is actually accessible to the public. Drone technology has 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 effect on actual public access to and use of that public airspace. Paradoxically, as drone 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 that space. Parts II and III, below, draw on the insights from law and geography set out above, to reflect on what the public location of a robot should mean for the regulation of robotic systems, and subsequently, what robot regulations mean for the public nature of a space. The parts below also expand on this example of drone regulation to illustrate how a regulator's vision of public space can affect the public's experience of that space.

[*Causby*]; *Bernstein of Leigh (Baron) v Skyviews & General Ltd*, [1978] 1 QB 479 at 488B [*Bernstein*], followed in *Didow v Alberta Power Ltd*, [1988] 88 AR 250, 5 WWR 606 (ABCA) [*Didow*]; *Civil Aeronautics Act of 1938*, c 601, 52 Stat 973.

42 Thomasen, "Flying Between", *supra* note 3 .

43 *Ibid*.

44 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* note 41 at 264; *Didow*, *supra* note 41 at paras 38–40 (adopting *Causby* and *Bernstein*). See also Gray, *supra* note 41.

II. PUBLIC SPACE AND ROBOT REGULATION

A. Introduction

When commercial, government, or private operators propose to use a robotic system in public space, how should location affect regulation?[45] Laws that regulate or apply in public space are typically developed through public authorities, and broadly speaking, are adopted in the public interest. 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 examples of constructs of public space held by common law courts and lawmakers—three different visions of what public space is and why it matters. Drawing on law and geography's co-production of law and space theory, this section considers how these different visions impact the occupants, design, and experience of these spaces. 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. Ultimately, by regulating (or not) the robots that operate in public space, regulators are implementing a vision of public space, regardless of whether this was an explicit consideration in regulatory deliberations. The lawmaker's vision of public space, and the values they prioritize, should be made explicit when debating new robotics regulations.

B. Different Visions of Public Space

1. Public Space as the Communal Public Square

A common vision of public space considers space to be a communal site for interaction, expression, and sharing—a physical location of the

45 This is not unlike the question of how values and expectations of the private home can, or should, influence the regulation of home robots; either directly or through laws of general application. See Margot Kaminski, "Robots in the Home: What Will We Have Agreed To?" (2015) 51:3 Idaho L Rev 661; Margot Kaminski et al, "Averting Robot Eyes" (2017) 76:4 Md L Rev 983.

public sphere.[46] Public spaces are where diverse members of the public can co-exist; where individuals of distinct backgrounds and views can come together.[47] Public space is where individuals encounter difference, and it accordingly must be structured in a way that permits difference to be expressed.[48] This view of public space calls for access to (and use of) space by any and all members of the public, even where the differences between individuals might create discomfort.[49] In fact, such discomfort from the exposure to difference is one of the core values of public space according to this view.[50]

This vision of public space discourages regulations that limit the potential for human interaction—especially those that undermine the space as one where individuals and communities encounter difference. As Blomley explains, "the potential of public space can only be realized if it allows for spontaneous and unprogrammed encounters with others."[51] Regulations that explicitly or implicitly exclude specific 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

46 This vision of public space is many ways driven by Habermasian ideals. Habermas' view of the public sphere as a discursive space/community was not tied to specific property or spaces. However, 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. See Jürgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*, translated by Thomas Burger & Frederick Lawrence (Cambridge: MIT Press 1989).

47 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, *supra* note 27 at 273).

48 *Ibid* 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" (*ibid* at 280). Blomley cites 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". See Nicholas Blomley, "Begging to Differ: Panhandling, Public Space, and Municipal Property" in Eric Tucker, James Muir & Bruce Ziff, eds, *Property On Trial: Canadian Cases in Context* (Toronto: Irwin Law for the Osgoode Society of Legal History, 2012) 393 at 407 [Blomley, "Begging to Differ"]. Public space is a site where strangers can come together and encounter other people, meanings, and ideas crucial to politics (*ibid* at 408).

49 See e.g. Mitchell, *supra* note 27; Jeremy Waldron, "Homelessness and Community" (2000) 50:4 UTLJ 371.

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

51 Blomley, "Public Spaces", *supra* note 32 at 4.

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, especially in law and geography, have highlighted how public space regulations like these can serve to specifically exclude individuals experiencing homelessness from public spaces.[52] Conduct regulations can target other minority or vulnerable communities in a similar way.[53] Ultimately, approaching this view of public space through law and geography theory encourages a largely unregulated, open, and accessible space for all members of the community. A version of this view arises in some judicial reasoning, though often tempered, in relation to constitutional challenges to limits on free expression in public space.[54]

A "public sphere" view of public space—encouraging relatively unregulated space—would probably not restrict users of robotic systems from public, especially if those systems are used for expressive purposes or permit physical access that would not otherwise be possible. But where robots interfere with human interaction and spontaneity, one might expect regulation or prohibition. An example of a rejection of a robotic system that had the effect of marginalizing human occupants of public space occurred recently in San Francisco. The Society for the Prevention of Cruelty to Animals (SPCA) utilized a 400-pound Knightscope robot surveillance system to discourage an encampment on public property near its private property. The robot was used for, among other things,

52 *Ibid*; Mitchell, *supra* note 27; Layard, "Public Space", *supra* note 29.

53 See Richard T Ford "Local Racisms and the Law: Introduction" in Blomley, Delaney & Ford, *supra* note 12. "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 implicity segregate individuals (*ibid* at 52). See Legal Aid Ontario, "Racialization of Carding and Street Checks" (2016), online (pdf): <legalaid.on.ca/strategic/wp-content/uploads/sites/4/2016/06/infographic-RCS-carding-2016-05-EN.pdf> (statistics on the over-policing of Black Canadians through random street checks and carding); Ontario Human Rights Commission, "Under Suspicion: Research and Consultation Report on Racial Profiling in Ontario" (2017), online: <ohrc.on.ca/en/under-suspicion-research-and-consultation-report-racial-profiling-ontario> (Ontario Human Rights Commission's massive report on racial profiling by police in Ontario).

54 See e.g. *Abbotsford (City) v Shantz*, 2015 BCSC 1909 [*Shantz*]; *Victoria City v Adams*, 2008 BCSC 1363 [*Adams*, BCSC]; *Victoria City v Adams,* 2009 BCCA 563 [*Adams*, BCCA] (each decided on section 7 grounds—the right to life, liberty, and security of the person); *Committee for the Commonwealth of Canada v Canada*, [1991] 1 SCR 139, 77 DLR (4th) 385 [*Commonwealth*]. But see *Calgary Airport Authority v Canadian Centre for Bio-Ethical Reform*, 2019 ABQB 29; *Montréal (City) v 2952-1366 Québec Inc*, 2005 SCC 62 (expression that is compatible with the public space may be protected) [*Montréal (City)*].

targeted exclusion of individuals experiencing homelessness from that space. However, public protest against this use of the device ultimately led the Department of Public Works in San Francisco to order the SPCA to stop using the robot on public sidewalks, with threat of a $1000 fine for every day the device operated on the sidewalk.[55] A vision of public space as a space for human occupants was maintained through regulation of the use and presence of a robotic system.

2. Public Space as a Regulated and Orderly Public Square

Another vision of public space also views it as a communal space, but in contrast to the first—which values difference and spontaneity—this view values regulation to make the space appealing and enjoyable to the majority of potential users. According to this second view, for a space to serve its communal public purpose, it requires careful regulation to ensure that it is a desirable destination for members of the public.[56] In practice, regulators do not usually adopt extreme versions of the first vision set out above; that is, of a highly deregulated public space. Generally, some rules apply in public space that dictate permissible conduct, things, and interactions in that space. This vision of public space perceives that if public space is left entirely unregulated, the chaos that will emerge will consequently exclude members of the public from that space due to fear or concern about the activities in that space.[57] Many North American public spaces are shaped by this vision.

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55 See Sarah Buhr, "Security Robots Are Being Used to Ward Off San Francisco's Homeless Population" (13 December 2017), online: *TechCrunch* <techcrunch.com/2017/12/13/security-robots-are-being-used-to-ward-off-san-franciscos-homeless-population>; CBC Radio, "As It Happens: San Francisco SPCA Deployed This Security Robot to Chase Off Homeless People" (14 December 2017), online: <cbc.ca/radio/asithappens/as-it-happens-thursday-edition-1.4448373/san-francisco-spca-deployed-this-security-robot-to-chase-off-homeless-people-1.4448376>.

56 The dichotomy between these 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, or 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. See Robert C Ellickson, "Controlling Chronic Misconduct in City Spaces: Of Panhandlers, Skid Rows, and Public-Space Zoning" (1996) 105 Yale LJ 1165 at 1174. Waldron raises a series of legal and ethical critiques of this vision (Waldron, *supra* note 49).

57 Blomley, "Public Space", *supra* note 32 at 4 (summarizing the Ellickson, Waldron, and Mitchell debate).

A more extreme example of this approach is laid out by property law scholar Robert 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."[58] As an example, he specifies that "[j]ust 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."[59] 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 argument suggests, 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. 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.[60]

Advocates for a more open and egalitarian view of public space (e.g. closer to the first vision, outlined above) have challenged Ellickson's approach—particularly with regard to the ethics of criminalizing the activities of one group in order to make another, already more politically powerful group, more comfortable.[61] Nevertheless, this second view has been adopted by lawmakers as well as courts when negotiating competing claims for the use of public space.[62] For instance, in Batty v Toronto

58 Ellickson, *supra* note 56 at 1174 [emphasis in original]. 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" (*ibid* at 1185).

59 *Ibid* at 1174.

60 See e.g. Jane Jacobs, *The Death and Life of Great American Cities* (New York: Vintage Books, 1992).

61 Blomley, "Public Space", *supra* note 32 at 4; Waldron, *supra* note 49 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 that, 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 (Mitchell, *supra* note 27 at 175). A difficulty in challenging these regulations is that though they regulate activities and uses of public space, they do not explicitly dictate 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", *supra* note 48).

62 In a recent case, an individual's conduct in a public park led others to feel uncomfortable, and ultimately led to his eviction. See *Bracken v Niagara Parks Police*, 2018 ONCA 261. The individual could legitimately be excluded from the space because he was detracting from its use as a space for others to enjoy.

(City),[63] a Canadian case arising in the context of the Occupy movement, the court was asked to specifically consider who and what public space is for, and what that means for permissible activities in public space.[64] The case involved an encampment in a public park run jointly by the City of Toronto and a neighbouring church. The encampment was built as part of the Occupy protest as a space to discuss and debate the values of the Occupy movement—very much reflecting the values of public space as set out by the "public square" vision of public space above.[65] This 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-communal because it excluded others from their use and enjoyment of that space.[66] It resulted in a loss of recreation for neighbouring residents (e.g. 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.[67] 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.[68] This is an approach to balancing competing interests in public space that specifically prioritizes the comfort and interests of the majority of people who would access the space.

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63 2011 ONSC 6862 [*Batty*].

64 Justice Brown asks "How do we live together in a community? How do we share public space?" (*ibid* at para 1).

65 See Margaret Kohn, "Privatization and Protest: Occupy Wall Street, Occupy Toronto, and the Occupation of Public Space in a Democracy" (2013) 11:1 Perspectives on Politics 99 at 100.

66 *Batty*, *supra* note 63 at paras 12–15.

67 See e.g. *ibid* at para 41 (and throughout witness statements at paras 42–44); Kohn, *supra* note 65 at 100. Recent social movements, including Occupy and the "Arab Spring", have reinvigorated debate about the political significance of public space. These movements contradict those who have warned about the declining importance of public space. See Dale Leorke, "The Struggle to Reclaim the City: An Interview with Michael Sorkin" (2015) 18:1 Space & Culture 98. Law professor Sarah E Hamill has argued that the focus in *Batty* on residents and adjacent properties "gave those with adjacent property rights extra rights in the park and thus added an element of inequality into the analysis". See Sarah E Hamill, "Private Rights to Public Property: The Evolution of Common Property in Canada" (2012) 58:2 McGill LJ 365 at 382. Namely, Brown J was concerned with the interests of private property owners both as neighbours and as park users. This analysis goes beyond what was necessary to assess the trespass claim, which should just be about Occupy's use of the park.

68 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, the Court does refer to it as City-owned space (*Batty*, *supra* note 63 at para 18).

Surveillance robots, like those in the San Francisco example, would be permissible by this view if these systems are used to ensure that spaces are safe and orderly from the perspective of the majority of people who wish to use those spaces. By contrast, noisy drones or obstructive sidewalk robots may be banned if they interfere with residents' desires for the space as, for instance, a place of respite or a place of expedient transport. This view could potentially justify the exclusion of robots that make spaces more accessible, like telepresence robots, if these are perceived to interfere with human enjoyment of the space.

Thus, while similar to the first vision above, this viewpoint of what public space is—and who and what it is for—can result in different regulations of robots, robot users, and the individuals who encounter robots, to the effect of making the space more or less accessible for some humans than others. Critically, under the rubric of regulating robots this viewpoint could be used to justify racist, classist, gendered, or ableist exclusions from public space. Lawmakers should be explicit about the public space values they prioritize in regulating robotic systems, to permit scrutiny of the impacts of what might be seemingly "neutral" robotics laws (i.e. not framed as targeting specific communities, etc). 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."[69] Critics of this second view are particularly cautious about how laws in public space can act with greater force on vulnerable populations.

3. Public Space as State-Owned Property

A third way in which lawmakers and courts have understood public space has been to view it not as a common space "owned" by the public, 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, which are determined by the government, not necessarily the public.

Blomely has explored how this vision of public space drives government regulation and judicial understandings of public sidewalks,[70] citing

69 Blomley, "Begging to Differ", *supra* note 48 at 405 (summarizing Ellickson and Mitchell, respectively).

70 Blomley, "Begging to Differ", *supra* note 48; Blomley, *Rights of Passage*, *supra* note 37.

a Canadian case, *Federated Anti-Poverty Groups of BC v Vancouver (City)*,[71] as an example of this vision of public space. *Federated* involved a constitutional challenge to bylaws prohibiting "obstructive solicitation" (panhandling) on sidewalks in Vancouver.[72] 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, to be governed according to a narrowly defined public interest, that being understood as circulation.[73]

Federated addressed important questions about public space regulation. The City made the case that the "paramount" purpose of the sidewalk is orderly circulation,[74] and panhandling is one example of an obstruction of that purpose. The court agreed, and found that the conduct could therefore be legitimately regulated, even though it has expressive value.[75] 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 automobile traffic."[76] The Court has also held that expression will be constitutionally protected in public space where it *does not interfere* with the

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71 2002 BCSC 105 [*Federated*] (by-laws that prohibit panhandling at para 1). This was one in a string of similar cases. See *R v Banks*, 2007 ONCA 19 (laws that prohibit panhandling and squeegeeing); *Adams*, BCCA, *supra* note 54 (deals with camping on public property).

72 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), and that the sidewalk "not only provided a site where the public sphere can be found… [i]t was itself the site where the potential of the public sphere was realized". Blomley, "Begging to Differ", *supra* note 48 at 407–408.

73 Blomley, "Begging to Differ", *supra* note 48 at 394.

74 *Federated*, *supra* note 71 at para 141; Blomley, "Begging to Differ", *supra* note 48 at 415.

75 *Federated*, *supra* note 71. Taylor J: "Activities, whether or not they engage forms of expression, are subordinate to the purpose of safe and efficient movement of pedestrians" (*ibid* at para 158).

76 *Commonwealth*, *supra* note 54 at 157–58. Justice Lamer made clear the 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

function of that space.[77] In making these assessments, the Court affirmed the view that public space is a government-owned or operated property to be administered by government authorities in accordance with its perceived public function.[78] In other words, roads are for driving, sidewalks are for circulation of pedestrians between private properties, and neither is primarily designed for communal socializing, discussion, or protest.

This view of public space can justify permissive regulation of robotic 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 autonomous vehicles, 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, crossing unexpectedly, or obstructive protest.[79] In other words, it is justified even if such regulation and use of the roads might make the space less usable by the public for other communal, social, or expressive purposes. 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 smooth administration of the spaces where they operate.[80] This third

the form of expression he uses is compatible with the principal function or intended purpose of that place" (*ibid* at 156).

77 *Montréal* (*City*), *supra* note 54. McLachlin CJ and Deschamps J: "[p]roperty 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" [emphasis in original] (*ibid* at para 61); "[s]ome areas of government-owned property have become recognized as public spaces in which the public has a right to express itself" (*ibid* at para 64); "[s]treets 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" (*ibid* at para 69). See also *Shantz*, *supra* note 54.

78 See e.g. *Montréal* (*City*), *supra* note 54 at para 64.

79 The prompt public and regulatory reaction to the Uber collision, cited above, suggests 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.

80 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. See Amazon Prime Air, "Determining Safe Access with a Best Equipped, Best-Served Model for Small Unmanned Aircraft Systems" (July 2015), online (pdf): <images-na.ssl-images-amazon.com/images/G/

vision of public space might 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.[81] Regulators adopting this third view of public space will ultimately shape that space—its potential uses, and permissible social 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.

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" (July 2015), online (pdf): <images-na.ssl-images-amazon.com/images/G/01/112715/download/Amazon_Revising_the_Airspace_Model_for_the_Safe_Integration_of_sUAS.pdf>; Wing, "Transforming the Way Goods Are Transported", online: <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 Troy A Rule, "Drone Zoning" (2016) 95:1 North Carolina LR 133; Troy A Rule, "Airspace in an Age of Drones" (2015) 95:1 BUL Rev 155. But see Bradley L Garrett and Adam Fish, "Attack on the Drones: The Creeping Privatisation of Our Urban Airspace", *The Guardian* (12 December 2016), online: <theguardian.com/cities/2016/dec/12/attack-drones-privatisation-urban-airspace>.

81 For instance, Sidewalk Toronto has involved this sort of planning. The project plan dubbed the "Master Innovation and Development Plan (MIDP)" was submitted on June 17, 2019, and later unveiled to the public. It involves mapping out the physical infrastructure (volume 1), integrating innovation with mobility and sustainable practices (volume 2), and a final volume on building partnerships. See Daniel L Doctoroff, *Sidewalk Labs* (17 October 2017), online (pdf): < storage.googleapis.com/sidewalk-toronto-ca/wp-content/uploads/2017/10/13210553/Sidewalk-Labs-Vision-Sections-of-RFP-Submission.pdf >. See also Waterfront Toronto, "Innovation and Funding Partner Framework Agreement: Summary of Key Terms for Public Disclosure" (1 November 2017), online (pdf): <torage.googleapis.com/sidewalk-toronto-ca/wp-content/uploads/2019/06/13214325/Waterfront-Toronto-Agreement-Summary.pdf>; Quayside, "Sidewalk Lab's Proposal: Master Innovation and Development Plan", online: <quaysideto.ca/sidewalk-labs-proposal-master-innovation-and-development-plan>. This implementation process, at least to date, has occurred despite public concerns over lack of transparency in the process. Critics who have reviewed the MIDP have raised concerns about its data privacy policies and corporate overreach. See Mariana Valverde, "The Controversy Over Google's Futuristic Plans for Toronto", *The Toronto Star* (31 January 2018), online: <www.thestar.com/opinion/contributors/2018/01/31/the-controversy-over-googles-futuristic-plans-for-toronto.html>; Kirsten Fenn, "Sidewalk Lab's $1.3B Plan for Toronto's Waterfront is Bad for Democracy, Critic Says", *CBC* (25 June 2019), online: <cbc.ca/radio/thecurrent/the-current-for-june-25-2019-1.5188733/sidewalk-labs-1-3b-plan-for-toronto-s-waterfront-is-bad-for-democracy-critic-says-1.5188753>; Geoff Zochodne and James McLeod, "Five Potential Sticking Points in Sidewalk Labs' Masterplan for the Toronto Waterfront", *Financial Post* (24 June 2019), online: <business.financialpost.com/technology/embargo-2pm-five-sticking-points-in-sidewalk-labs-masterplan-for-the-toronto-waterfront>.

The impact of the lawmaker's vision of public space on regulation in that space, and the resulting impact on the public nature of that space, can be illustrated again with the drone regulation example introduced in Part I. If one is interested in the role of public airspace as a public space, law and geography tells us that it is necessary to consider not only the legal designation of the space (which has been public since the emergence of commercial aviation) and public access to that space (which is increasingly feasible due to remotely operated robotic technologies), but also the effects of laws that regulate conduct within that space. Airspace is heavily regulated to ensure its safety and efficiency. 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.[82]

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 FAA imposed flight restrictions following the use of a drone over a Black Lives Matter protest in Ferguson, Missouri;[83] and again in 2016, following a drone flight over No Dakota Access Pipeline (NoDAPL) protests at the Standing Rock Sioux Tribe lands.[84] In the latter example, the operator of the drone—Aaron Turgeon, an Indigenous citizen journalist—used the technology to capture video evidence of police brutality against protesters.[85] Police shot at the drone, and

82 For example, commercial operators in Canada and the US had long been subject to stricter regulation than recreational operators, though this has recently changed in Canada where regulation now primarily depends on the size of the drone and where it is being flown.

83 See American Civil Liberties Union, "Letter From Anthony E Rothert and Lee Rowland to Reggie Govan" (4 November 2014), online (pdf): <aclu.org/other/aclu-letter-faa-protesting-no-fly-zone-media-ferguson>.

84 See Vera Eidelman, "FAA Helps Police Suppress Reporting From Dakota Pipeline Protests" (19 December 2016), online: <aclu.org/blog/free-future/faa-helps-police-suppress-reporting-dakota-pipeline-protests>. Notably, this example at the NoDAPL protests is not over an urban space, which is the focus of this paper. Nevertheless, this example demonstrates some of the challenges with the regulation of robotic systems in public spaces, which affect or undermine the public nature of that space—which could and likely will extend to urban spaces too, especially as the technology becomes safer and more acceptable to fly in cities and over crowds.

85 See Saba Hamedy, "Drone Footage Shows Recent Clashes At #NoDAPL Protest in Standing Rock", *Mashable* (27 November 2016), online: <mashable.com/2016/11/27/standing-rock-no-dapl-protest-drone-footage/#gbqROX.UuSqs>. See also "Drone Footage Captures Scene at Standing Rock", *NBC News* (25 November 2016), online (video): <nbcnews.com/video/drone-footage-captures-scene-at-standing-rock-817789507848> (showing the size of the gathering despite freezing weather). Aaron Turgeon, "Biography: If We Don't Stand, Who Will?", online (blog): *Prolific the Rapper* <prolifictherapper.com/bio>.

charged Turgeon with reckless endangerment.[86] These charges were later dismissed in court.[87] 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.[88] However, police-operated drones were still permitted at the site of the protests.[89] The FAA did permit journalists to apply for exceptions to the ban. Only one exemption was granted, to a non-Indigenous non-local journalist.[90]

The framework set out in Parts 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 status as a public space and its physical accessibility, was tightly restricted through technology-specific drone regulation. The no-fly regulation had the effect of rendering the space less (or not) public, despite the space being legally designated as a public space. The FAA clearly was not operating from either of the first two visions of public space. Drone regulations in Canada and the US are not aimed at making public airspace accessible or more appealing to potential users of that space—at least not predominantly. Rather, drone regulations

86 See Jason Koebler, "Drone Journalist Faces 7 Years in Prison for Filming Dakota Pipeline Protests", *Motherboard/VICE Media* (25 May 2017), online: <motherboard.vice.com/en_us/article/zmbdy5/drone-journalist-faces-7-years-in-prison-for-filming-north-dakota-access-pipeline-protests>.

87 The court found that video evidence demonstrated that Turgeon had not flown the drone in a dangerous manner. See Caroline Grueskin, "Charges Dismissed Against Drone Operator Who Documented Protests", *Bismarck Tribune* (10 July 2017), online : <bismarcktribune.com/news/local/crime-and-courts/charges-dismissed-against-drone-operator-who-documented-protests/article_d130c5d3-4fbe-5892-bc3e-b38de4717dfb.html; Caroline Grueskin, "Drone and Cell Phone Footage Lead to Acquittal in Protest Case", *Bismarck Tribune* (25 May 2017), online: <bismarcktribune.com/drone-and-cell-phone-footage-lead-to-acquittal-in-protest/article_6716eb9b-64e9-5cc3-a453-3b5bf517ae89.html>.

88 See Jason Koebler, "The Government is Using a No Fly Zone to Suppress Journalism at Standing Rock", *Motherboard/VICE Media* (30 November 2016), online: <motherboard.vice.com/read/the-government-is-using-a-no-fly-zone-to-suppress-journalism-at-standing-rock>.

89 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.

90 Koebler, *supra* note 88.

are designed to ensure the efficiency and safety of airspace, particularly in relation to commercial aviation.[91]

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 also does not align well with the administrative view of public airspace.[92] 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 the 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 proved to be significant to the public's later reaction to the events at Standing Rock—sits squarely within the notion of public space as a democratic space.

In this case, instead of being informed by the public nature of the airspace over the protests, the regulations can be said to at least implicitly portray the exertion of power to permit differential access to (and use of) space. Problematically, this approach had the effect of altogether undermining the public nature of this space for some members of the public who relied on it. Drawing on the discussions in Parts 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; rather than solely as a safety measure as they were portrayed.

This example presents some further lessons. First, it demonstrates how the regulation of a thing in public space might have broader implications for the public's 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 a remotely operated robotic device stands in as a member of the public making use of a public space, regulators should give special consideration to how regulation of that device affects access. Second, this example reminds us that

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91 See e.g. Transport Canada, "About Transport Canada—Corporate Information" (8 August 2019), online: <tc.gc.ca/eng/aboutus-department-overview.htm>.

92 The FAA statement is reproduced in John Goglia, "Flight Restrictions Over Standing Rock: Is the FAA Effectively Taking Sides in Pipeline Dispute?", *Forbes* (27 November 2016), online: <forbes.com/sites/johngoglia/2016/11/27/flight-restrictions-over-standing-rock-is-the-faa-effectively-taking-sides-in-pipeline-dispute/#3e481a0e734c>.

even where a regulation amounts to administering a public space, that administration might have the effect of undermining the public nature of that space. This might arguably, and paradoxically, undermine the very justification for the public authority to be administering that space in the first place. Regulators should explicitly consider the impact of a regulation on access to and use of the space where it applies. Transparency about this assessment may encourage the adoption of different or better regulations, and would at least give the public an opportunity to question and challenge the legitimacy of the regulation, whether through consultation, court, or public complaint. Furthermore, this example in particular highlights the ongoing colonial impact of US law, which can of course be replicated in robot-specific regulation and should be forefront in decisions like this one by the FAA.

C. Conclusion

Law and geography helps to show how the public nature of space shapes how lawmakers approach regulation of robots in that space. Different visions of what public space is, and who and what it is for, can be called upon to justify different forms of robot regulation—either by law- and policy-makers, companies lobbying for permissive regulations, or the public who will be impacted by robotic systems 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. These three examples above are by no means exhaustive, but are predominant both in law and academia.[93]

III. HOW SHOULD PUBLIC SPACE ROBOTS BE REGULATED?

A. Introduction

The preceding two Parts have: (a) discussed how robots and the laws that regulate them can shape the public nature of a public space;[94] and (b) examined how different legal visions of a space as "public" can result

93 This conversation can be expanded through exploration of what other visions of public space, including Indigenous legal orders, tell us about robots, regulation, and shared spaces.

94 Recall, 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.

in different regulation of things, conduct, and people in that space, which in turn co-constitutes how public that space will be for different members of the public.[95] Revealing this process can help to make some of the trade-offs and priorities embedded in robot regulations more visible, and more debateable. The above sections already cited some examples of how robots and regulation will be affected by the relationships between law and public space. This Part takes this analysis a step further, examining how regulators should approach the task of regulating public space robots.

If we accept that robots, and the laws that regulate them, their operators, and the people who encounter them, can change the public nature of public space—making it potentially less or more public to people in that space—then it should be crucial that lawmakers consider this impact when regulating. Different visions of legal space are based on different reasons for why that space matters, including to cultivate community, sociality, equality, expression, efficiency, movement between private spaces, commerce, *etc*. If we envision public space as playing an important function in community building, social lives, and expression, then regulators and regulations need to prioritize these values. If we believe that public space must be equitable in order to attain its social function, as many of the authors cited above have argued, then we must expose and critique the inequitable impacts of robot regulation that will affect people in this space. A lawmaker guided solely by the fact that a system is operating in public could develop various approaches to regulating, depending on which vision of public space guides them. Drawing from the above discussion and examples of robots in public spaces, the next two sub-sections outline two basic principles that I argue should inform the regulation of robots in public spaces, in order to prioritize and maintain values like community, sociality, and equitable access.[96]

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95 Part II specifically explored how regulations that apply within a public space can, and should, be influenced by the public nature of that space (its 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 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.

96 Layard, "Public Space", *supra* note 29 at 2–3 (discusses these values as some examples for why public space matters). See also Hamill, *supra* note 67.

B. Robots and Regulations That Exclude People or Conduct From Public Spaces

The first two visions of public space share in common a viewpoint that public space is a communal space; with divergence over how this communal space should be regulated to appease the interests of the majority, or to preserve the inclusion of difference.[97] These are not inherently mutually exclusive objectives, but as explained in the examples above, sometimes they are and when in conflict will lead to different approaches to regulation. Problematically, as emphasized by several law and geography scholars, the second view can be used to justify the exclusion or further marginalization of already vulnerable users of public space. When regulators are considering the addition of a robotic system into a space, this application of the second view must be explicitly avoided to preserve, to the extent possible, values like community, sociality, and expression. Robotic systems should never be prioritized over human access to public spaces. Where the introduction of robotic systems in public space requires targeted legislation that excludes, or more likely has the *effect* of excluding people from that space, the system should not be introduced.

As anthropologists Sally Applin and Michael Fischer have argued, regulators (and societies more generally) cannot simply assume that robots will be smoothly introduced into the socio-technical landscape of public spaces.[98] In fact, robots that operate in complex urban settings will demand much cooperation and labour from individuals who interact with the technology; whether that individual benefits in any way from the presence of the robotic system or not. In an article drawing from this research, Applin discusses the example of sidewalk delivery robots, designed to carry food and small items to customers by driving along public sidewalks. These robots will have to navigate around other users of the sidewalks: they may have to stop suddenly; become immobilised; or require the assistance

97 This is, of course, an oversimplification of how regulators actually assess policy decisions, but it is helpful to make this distinction clear to reveal the impact of different regulatory and policy decisions.

98 Sally A Applin & Michael D Fischer, "New Technologies and Mixed-Use Convergence: How Humans and Algorithms Are Adapting to Each Other" (Paper delivered at IEEE International Symposium on Technology & Society, Dublin, 11 November 2015), (2016) IEEE ISTAS 1 at 1–6; Sally A Applin, "Delivery Robots Will Rely on Human Kindness and Labour", *Motherboard/VICE Media* (8 May 2018), online: <vice.com/en_us/article/ne98x7/delivery-robots-will-rely-on-human-kindness-and-labor> (where the author applies the lessons from her paper specifically to the case of sidewalk delivery robots).

of a passerby to become dislodged from an obstacle. The existing built environment is not designed for these devices. For example, they cannot open doors and may have to rely on the labour of passersby to do so. The devices are also not inherently designed for a human accessible environment. Recent examples emphasize the ways in which these devices become a sometimes dangerous barrier to human users of the sidewalk.[99] Accordingly, all of these challenges demand cooperation, accommodation, or concession from the human users of city sidewalks. These demands detract from the experience of public space and in some cases from the safety of public space.[100] But even more concerningly, these demands may pressure lawmakers to regulate sidewalks in order to accommodate the technology. Activities like loitering on sidewalks could foreseeably be prohibited in the interest of preventing a robotic mishap. Such a regulatory approach would have the effect, if not intention, of targeting individuals who engage in these activities for surveillance, policing, and removal — effectively undermining the public nature of that sidewalk for them, in favour a robotic system and the corporate interests behind that system.

Sidewalk robots have been permitted in a number of US cities. A notable contrast occurred in San Francisco, where the city imposed limitations on the use of sidewalk robots. In part, the limitation was justified on the basis of protecting public space from encroachment by private companies.[101] All sidewalk delivery robots now require prior permission in the form of a permit before utilizing public sidewalks. San Francisco recently approved the first delivery robot permit.[102]

As discussed above, another example of a rejection of a robotic system is, of course, the San Francisco SPCA's use of a surveillance robot to discourage an encampment on public property near its private property. The second vision of public space, as iterated in *Batty*, might suggest that this would be a permissible use of the system. For instance, in this view, local

99 See Emily Ackerman, "My Fight with a Sidewalk Robot: A Life-Threatening Encounter with AI Technology Convinced Me That the Needs of People with Disabilities Need to be Engineered into our Autonomous Future" (19 November 2019), online: *CityLab* <citylab.com/perspective/2019/11/autonomous-technology-ai-robot-delivery-disability-rights/602209/>.

100 *Ibid*.

101 Adam Brinklow, "San Francisco Bans Robots From Most Sidewalks" (6 December 2017), online: *Curbed San Francisco* <sf.curbed.com/2017/12/6/16743326/san-francisco-delivery-robot-ban>.

102 Kate Clark, "Postmates Lands First-Ever Permit to Test Sidewalk Delivery Robots in San Francisco" (7 August 2019), online: *TechCrunch* <techcrunch.com/2019/08/07/postmates-lands-first-ever-permit-to-test-sidewalk-delivery-robots-in-san-francisco>.

residents would have an interest in keeping the sidewalks and spaces near their private places clear and comfortable for patrons. However, such an approach would again have the effect of prioritizing the use of a robotic system over the access and use of a public space by members of the public. Such an approach should be, and as was in this case, rejected.[103]

C. Regulating Robots That Facilitate Access to Public Space

The third vision of public space approaches regulation from the perspective of the goals and interests of the government as "owner" of the public space. Again, this viewpoint is not inherently in conflict with the first two. But where a government goal overrides the public's interest in a use of the space, that public interest might be regulated against (where holders of the first and second viewpoint might not regulate in such a way).

Law Professor Sarah Hamill has argued that this government-ownership approach to public spaces is problematic.[104] It reflects an assumption that all spaces fit within a private-property model, with the government serving as the property owner. This model emphasizes the rights of owners over all other rights and interests in that space, prioritizing the government's management of the space "rather than the public's benefit from common property."[105] She argues the key feature of public space is the public's relationship with that space.[106] She helpfully frames why public space is unique, compared to privately-owned property, and should not simply be treated as a state-owned property:

> It is important that [common] property is recognized as a distinct form of property because it provides a contrast to private property's vision of property. Common property necessarily requires us to pay attention to how others might need to use such property and it forces us to pay attention to others in ways that private property does not.[107]

103 Buhr, *supra* note 55; CBC Radio, *supra* note 55.

104 *Supra* note 67.

105 "The question of ownership of common property is much more complex than ownership of private property because whatever rights there are to common property, they are shared among the population and between the public and the government. Rather than struggle with the complexity of common property, Canadian courts have sought to simplify the issue and force all forms of property into a private property model" (Hamill, *supra* note 67 at 368).

106 "It is not the owner of the property that is the key differentiation of property, but the public's relationship with that property" (Hamill, *supra* note 67 at 399).

107 Hamill, *supra* note 67 at 403 [emphasis added].

Robotic technologies can be used to improve physical access to public space by members of the public, enlivening Hamill's description of public space as a communal space. Several examples in the Introduction describe how robotic systems can improve the physical accessibility of and remove barriers to public spaces. Some particular features of robotic systems, like remote operability and automation of decision-making, allow access to otherwise hard to reach spaces (*e.g.* airspace) and allow new ways of accessing space (*e.g.* automated driving that does not require certain human inputs). The use of such technologies can mean that a space that is legally designated as public can become more public through access and subsequent use of that space. Where a robotic system makes a space more accessible, *differential* regulation of the access and use of the space through that technology should be avoided.[108] The drone regulation example cited above highlights this concern. It is one thing to regulate a public space for government goals, but as discussed in the critiques cited above, this approach becomes particularly problematic when regulators explicitly exclude certain members of the public through differential regulation of the technology—especially when individuals seek to use the space for expressive purposes. The inequitable impact of this approach to regulation could be hidden behind laws that appear to only relate to objects in a given space.

Canadian constitutional law requires that a regulation that impedes expression have a lawful justification. Precedent in Canada cited throughout this paper suggests that regulating a space for efficiency or safety could fulfill that justification. However, regulators and courts should be particularly cautious where the use of a robotic system to access a space is permitted for some individuals and not others—particularly where those others

108 Where a robotic system permits remote access to a public space, but in doing so might have the effect of excluding human access to that same space, there may be a perceived conflict between these principles. However, this second principle relates in particular to cases where regulation leads to differential access or use of the space: some people gain access through a robotic system that others cannot benefit from (like the drone example in Part II). So, it is possible that a perceived conflict would not amount to a real conflict between these two principles. Nevertheless, sometimes they will be in conflict. In such a case, broader social questions need to be raised. Why is the space so differentially physically inaccessible that some, though not all, people need to rely on a robotic system just to access it? Is there a broader systemic issue here that must be addressed, where the use of a robotic system is simply a stop-gap measure? In such cases, some compromise might need to be struck between these two principles. However, even in such a situation, permissive regulation of a robotic system should not be used as a mechanism to avoid dealing with broader systemic problems, and should be at most temporary, if even necessary.

seek to exert their constitutional rights, including to free expression. The constitutional arguments against such a restriction are beyond the scope of this paper, but should include a consideration of how the robotic system serves to make a space public (or not), whether the regulation of that system results in inequality, and how regulation of that system amounts to a regulation of public space, and potentially, expression. Beyond expression, public space values like community and sociality might not benefit from the same constitutional protection. However, if these values are to be protected in public space, then lawmakers must *at least* avoid legislating differential access to and use of technology that makes space accessible, and must be explicit about the values and ends that are being prioritized (and those that are not) in order to permit public scrutiny and debate.

CONCLUSION

Public space is a complicated socio-legal concept. As legal geographers have demonstrated, a legal definition is only one of several factors that combine to render a space public or not. Whether members of the public can access this space, and how conduct within that space is regulated, also contribute to its public nature. This paper has considered the impact that robots and robot regulation will have on the public nature of public spaces. This paper has emphasized why lawmakers need to be careful and explicit about how they regulate robotic systems that operate in public spaces. By regulating robots, lawmakers may also be implementing a particular vision of public space that renders that space more or less public to different individuals and communities. This paper has identified two principles that can help guide the regulation of public space robotics. First, the entry of a robotic system into a public space should never be prioritized over human access to (and use of) that space. Second, where a robotic system serves to make a space more accessible, lawmakers should be cautious to avoid providing differential access to that space through the regulation of that robotic system. Foundationally, lawmakers should resist any arguments by users or manufacturers of robotic systems that public space, by virtue of its public nature, should be freely available for the use and training of robots. Such an approach threatens to privatize and commercialize public spaces in ways that would exclude people, and would entirely overlook the already exclusionary impact of the colonial laws and systems operating in these spaces.