Geoforum 49 (2013) 279–288

Contents lists available at SciVerse ScienceDirect

Geoforum

journal homepage: www.elsevier.com/locate/geoforum

Crowdsourcing urban surveillance: The development of homeland security markets for environmental sensor networks

Torin Monahan [a,*], Jennifer T. Mokos [b]

[a] Department of Communication Studies, The University of North Carolina at Chapel Hill, CB# 3285, 115 Bingham Hall, Chapel Hill, NC 27599-3285, USA
[b] Department of Human & Organizational Development, Vanderbilt University, Peabody #90, 230 Appleton Place, Nashville, TN 37203-5721, USA

ARTICLE INFO

Article history:
Available online 7 March 2013

Keywords:
Surveillance
Crowdsourcing
Mobile phones
Pollution
Outsourcing

ABSTRACT

Mobile systems for detecting environmental threats may radically restructure spatial imaginaries as people learn to see and engage with heretofore largely hidden dimensions of urban spaces. While the design of such technological systems is contingent and currently open to varied outcomes, powerful security and industry players are asserting their influence to set overriding protocols that will ensure widespread ambient data collection, especially for security and commercial applications. This paper critically explores the emergent power geographies of surveillance revealed by one such system: the Department of Homeland Security's Cell-All project. This project, which has been under development at the U.S. Department of Homeland Security (DHS) since 2007, equips mobile phones with chemical-agent detectors and links them to security networks so that threats to urban populations can be automatically detected and rapidly mitigated. In order to assess the politics of crowdsourced sensing systems, first we map the core characteristics of the Cell-All development model: creating a participatory system, building public–private partnerships, and outsourcing responsibility for privacy protections. Second, we describe some alternative designs for mobile, participatory environmental sensing and reflect on their potentials for correcting power inequalities or achieving environmental justice. Finally, we conclude by discussing the implications of these various systems and the conditions that could alter their outcomes.

1. Introduction

The securitization of urban spaces is a dynamic political process that mutates according to constructions of threat, need, and possibility. In some instances fear of terrorist attacks has motivated the hardening of potential targets, such as monuments or buildings, with video surveillance networks or concrete sacrificial facades intended to block would-be bombers (Boddy, 2007; Coaffee, 2004; Fussey et al., 2011). In other cases, unmanned aerial vehicles are deployed over cities and borders to watch for illegal or suspicious activities and direct authorities to investigate (Finn and Wright, 2012; Graham, 2010; Wall and Monahan, 2011; Weber, 2011). Other articulations come in the form of informatized passage points, such as building entrances, community guard stations, or airports, where biometric identifiers and identity documents can be checked to ascertain whether one should be granted access (Adey, 2006; Klauser, 2010; Lianos and Douglas, 2000; Magnet, 2011; Thrift and French, 2002). Such systems often act in overlapping and reinforcing ways, connecting with larger assemblages of regulation and control. As geographers and surveillance studies scholars have argued, the modalities of security systems are inflected by an anticipatory rationality that seeks to identify and control risks in advance (Coaffee et al., 2009; Graham and Wood, 2003; Haggerty and Ericson, 2006; Klauser et al., 2008; Lyon, 2003). Rather than being objective or deterministic, however, every step in the process—from risk construction to system implementation to altered practice—betrays a complex politics whereby resources are allocated, populations sorted, and institutions reconfigured.

An important dimension of the securitization process is the creation of compelling narratives to justify the surveillance systems under consideration. This mythical dimension relies on what Mike Crang and Stephen Graham (2007) have called "technological fantasies" that position emergent technological systems as necessary—and effective—responses to dire threats. Some of the genres at work are entertainment media and news reporting; police or government educational campaigns; and industry- and government-produced videos, presentations, and reports that typically describe scenarios of mass destruction, followed by proposed technological fixes to prevent or manage such crises (Altheide, 2006; Barnard-Wills, 2012; Graham, 2010). As has been argued elsewhere, technological fantasies are not simply instrumental narrative devices to achieve desired ends; in addition to this, they actively shape larger security cultures and afford them influence,

* Corresponding author.
E-mail addresses: torin.monahan@unc.edu (T. Monahan), jennifer.mokos@vanderbilt.edu (J.T. Mokos).

0016-7185/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.geoforum.2013.02.001

such that alternative motivations for personal or institutional action become filtered through a security lens (Monahan, 2010b).

The technological fantasy that is the backdrop for this paper is one where mobile phones are equipped with chemical-agent detectors and linked to security networks so that threats to urban populations can be automatically detected and rapidly dealt with. This project, which has been under development at the U.S. Department of Homeland Security (DHS) since 2007, operates under the name "Cell-All." It draws upon an existing ecology of related sensor networks woven throughout the built environment in many cities, such as Chicago's "Operation Virtual Shield," which includes smart CCTV cameras and hidden chemical and biological agent sensors (Bulkeley, 2009; Murakami Wood, 2009a). The name Cell-All references the ubiquity of mobile phones and perhaps unintentionally signals the data exchange made possible by the public–private partnerships that are at the heart of this enterprise. The DHS Cell-All project is also designed to exploit mobile-phone saturation to enroll everyday users as passive data collectors whose devices communicate silently to the DHS system and its private industry partners. As with U.S. border-control and military efforts to enlist citizens as participants in crowdsourced surveillance (Koskela, 2010; Murakami Wood, 2009b), the success of Cell-All depends upon a mass of participating individuals scanning public spaces.

The ideological underpinning for the Cell-All project is one of neoliberal public–private partnerships, by which industry profits from privileged government contracts and access to data without accepting many financial or symbolic risks. A core component of this arrangement, as will be shown, is in the persuasion of everyday mobile phone users to act as data collectors and distributors. In this sense, to achieve initial success a certain type of participatory surveillance must be cultivated through discursive appeals to individuals—whether patriotic duty to avert mass-casualty disasters, personal interest to save oneself or one's loved ones from carbon monoxide poisoning, or individual desire to be a part of an innovative technological research project. Regardless of the nature of the appeal, the intended outcome is for the responsibilization of individuals to undertake what Mark Andrejevic has referred to as the "work of being watched," an eager involvement in data collection and restricted forms of interactivity that may give one pleasure while simultaneously serving the interests of institutions (Andrejevic, 2002, 2007).

While the Cell-All project may rely upon a technological fantasy, it is certainly not fictional. Prototypes have already been developed, major telecommunications companies have become partners, and mass-marketing strategies are being fine-tuned. Drawing upon insights from the field of science and technology studies, one could say that the "black box" of this technology is rapidly closing and its politics are solidifying; as a result, alternative, perhaps more democratic and empowering possibilities are being foreclosed (Akrich, 1992; Winner, 1986; Woodhouse et al., 2002). Once mobile phone manufacturers routinely include chemical and other sensors in their devices, users can be compelled or coerced to communicate environmental data as such sharing becomes normalized in technical protocol. There is precedent in place to require geolocational data sharing as an "always on" feature of mobile phones for purposes of public safety under the E911 initiative in the U.S. and similar requirements in other countries (Curry et al., 2004), so one can easily envision similar policies mandating the constant relay of environmental readings. This predictable development makes sense in part because of the widespread normalization of surveillance through commonplace media and organizational encounters. As David Murakami Wood and William Webster explain: "Interactions become structured around surveillance relationships and the new forms of social negotiation that emerge are no longer about what information one chooses to give but how that information is to be given (or taken)" (Murakami Wood and Webster, 2011: 157).

In keeping with the goals of this special issue, this paper will critically explore the emergent power geographies of surveillance revealed by DHS's Cell-All project. Environmental sensing with mobile devices represents, on one hand, the possibility for crafting new spatial imaginaries and modes of public engagement that bring about collective empowerment. On the other hand, technological systems must be situated within their current political and ideological contexts, which in the case of Cell-All signifies a tightly constrained trajectory for technology development that promises coerced participation and asymmetrical relationships of visibility. First, we will provide an overview of our methods and sources. Second, we will draw upon DHS documents and presentations to analyze the Cell-All project, paying particular attention to the core characteristics of its development model: creating a participatory system, building public–private partnerships, and outsourcing responsibility for privacy protections. Third, we will describe some alternative designs for mobile, participatory environmental sensing and reflect on their potentials for correcting power inequalities or achieving environmental justice. Finally, we will conclude by discussing the implications of these various systems and the conditions that could alter their outcomes.

2. Methods and sources

The primary case study analyzed here—that of the Cell-All system—is based on a review of official and public documents, including press releases, media reports, DHS documents and training materials, and commercial partner marketing products and websites. We conducted a LexisNexis news search to identify news, media, and publicly available materials referencing Cell-All. All articles returned by the search were examined for relevance, and those not directly discussing the Cell-All program were discarded, with 31 documents remaining. These relevant documents were read and coded to identify initial thematic concepts in accordance with grounded theory approaches to data analysis (Charmaz, 2006).

In response to initial thematic coding, additional targeted data collection was focused on DHS and commercial partner documents and websites in order to identify the current development status, the operation and functionality of the system, and marketing strategies. This secondary investigation included a thorough search for pertinent documents on DHS's website, as well as searches on commercial partner websites, to locate original agency and company texts. A 2-hour video webcast of the DHS's live demonstration and training of the Cell-All project held at the Los Angeles Fire Department's Frank Hotchkin Memorial Training Center on September 28, 2011 (U.S. Department of Homeland Security, 2011a) was also transcribed and coded. Analysis of primary DHS and commercial partner documents yielded key information on the design of the Cell-All system, from the environmental sensors to the broader support and data communication infrastructures developed to store, analyze, and send alerts.

Many of the media and news articles identified were printed in security trade publications, such as Aviation Today's *Air Safety Week* and the *Terror Response Technology Report* (*TR2*), and they were often published in response to press releases from DHS or other Cell-All partners, such as NASA's Ames Research Center. This dynamic tended to produce clusters of articles with similar headlines and content that often closely reproduced the phrasing and content of the agency press releases. Similarly, the few articles that did appear in the mainstream media seemed to echo statements made in press releases with little or no analysis. This relationship between press releases and media reports suggests that there