Bridging Informational Divides: A Community-Centered Analysis of "Public Safety" Surveillance Technology

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Surveillance technologies are rapidly being introduced in the United States as a cure-all for legitimate concerns around gun safety and community violence. We present a concise three-part educational guide on one surveillance technology - Automated License Plate Readers (ALPRs). We profile one of the main distributing companies of ALPRs (Flock Safety, Inc.) in the United States and an analysis of 54 police instances of ALPR use in solving crime in the first nine months following their installation in Champaign, IL, U.S. We aim to distill complex information into digestible formats for diverse readerships both within and outside of conventionally-recognized research networks. The goal of sharing this guide, as well as its creation process, both with and beyond academic networks, is to mobilize academic research skills towards a community-focused need. The iterative process employed embodies a commitment to meaningful engagement, community empowerment, and the pursuit of epistemic justice.

CCS Concepts: • **Human-centered computing** → **Information visualization**; • **Information systems**;

Additional Key Words and Phrases: information access, community informatics, surveillance technologies, communication design, data visualization

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1 INTRODUCTION

Surveillance technologies are rapidly being introduced in the United States as a cure-all for legitimate concerns around gun safety and violence [4]. This approach assumes that increased mechanisms of data and control will reduce interpersonal harm. This is not the only way of conceiving of violence reduction, however. The public health model, for example, approaches the issue from the perspective of identifying and addressing root causes [5]. In collaboration with community partners, we investigated the first nine months of use of a specific surveillance technology in Champaign, Illinois, USA and used our findings to develop an educational guide that can be brought back to our community.

We present this document both as a testament and call to action stemming from the belief that as scholars and researchers, our strength lies not just in creation of new knowledge. Rather, it lies too in recognizing the value inherent in diverse forms of knowledge creation; facilitating the inclusion of voices from communities we are embedded in, particularly when considering the impacts of surveillance on minoritized communities [3, 6]. The document, employing

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accessibly designed graphic forms and interactive maps, is a concise three-part educational guide on one surveillance technology - Automated License Plate Readers (ALPRs) - increasingly deployed by law enforcement in the name of public safety. Our guide includes a profile of one of the main distributing companies of ALPRs (Flock Safety, Inc.) in the United States and a synthesis of our analyses of 54 police instances that claimed its use in solving crime in the nine months following the installation of ALPRs in Champaign, IL, U.S. Our aim with these educational graphics is to distill complex information into easily digestible formats, and broaden accessibility for diverse readerships both within and outside of conventionally-recognized research networks. Importantly, this work is grounded in the relationships of trust with community partners cultivated under the Community Data Clinic at UIUC (CDC), facilitated by the third author, a connection that predates the inception of the project by many years. The first two authors are affiliate scholars of the clinic, and we continue to nurture these relationships under the CDC ethos of creating "community archives, surveys, reports, [and] visualizations to activate and preserve memory," among other animating goals [2].

A document like this is just one way of engaging with our neighbors and community members. We humbly submit that while we have gathered the information, we do not presume to know by default what the best next steps are. A document like this is an opportunity to collaborate, to engage, to learn and to unlearn. By creating this guide, we hope to strengthen the bridge between the siloed worlds of academia and community engagement, as others have done before us, e.g., [5, 8, 28]. We are all members of multiple communities, and we reject the idea that these communities must be gate kept and held in isolation.

This is also a critical commentary on the way academia operates as a whole; a critique of the way certain types of knowledge are privileged above others and how disciplinary walls are drawn between researchers [16, 25, 36]. As interdisciplinary scholars, we join and honor a long legacy of cross-disciplinary academic work, including, but not limited to, human-computer interaction [21], decolonial data studies [11, 29], multiple lineages of feminist thought [9, 17, 19], and participatory design [32, 34]. We are committed to broadening access and bringing critical perspectives back to all of our communities, not only the academy. To realize a world liberated from hierarchical structures and false dichotomies, as envisioned by our critical predecessors, we find it imperative to challenge the rigid boundaries that determine which types of research are deemed of "value." We see this as a continuation of the rejection of false binaries between big and small [18, 27], global and local [7], visibility and invisibility [20]. Our goal in creating this document, and in insisting it be shared both with and beyond academic networks, is to mobilize traditional academic research skills for the creation of a community-focused educational guide based on local needs. The goal is not to tell people how to think or what to do with the information, but rather to share and democratize basic records for the community. Other cities besides our own have seen examples of healthy "town-gown relationships," such as a project in San Diego to work with local residents examining the implications and installation of "smart city" infrastructure [37]. The university is not an isolated entity but rather an integral part of the community we collectively inhabit. While not positioning ourselves as activists, we recognize our roles as engaged members of the community.

The City of Champaign (henceforth referred to as "the city"), Champaign County (hence referred to as "the county") and the University of Illinois Urbana-Champaign (henceforth referred to as "the university) are all clients of a company called Flock Safety, Inc (henceforth referred to as "Flock"). This company has come under scrutiny from organizations like the American Civil Liberties Union [26, 35], who label the company as the architect of "a form of mass surveillance unlike any seen before in American life," employing a business model "that effectively enlists its customers into a giant centralized government surveillance network," amplifying the surveillance capabilities of both government and private entities and posing an increasing threat to civil liberties.

2 MOTIVATION AND INFORMATIONAL BACKGROUND

Education is a fundamental part of community work, for we cannot mobilize against that which is unknown to us [24]. We are engaged in an act of translation; we believe that each of us has the right to self-determination and honor that right through the democratization of information access [31]. Inclusive community-building requires radical imagination. For example, Angela Davis encourages us to "envision an array of alternatives [to existing systems of incarceration] that will require radical transformations of many aspects of our society" [13]. It would be hubris to imagine that academics alone, or that the authors of this paper alone, contain all of the humanity and imagination required to build alternative visions. As such, rather than declare that this document is the solution to carceral technologies, we gently offer our work as an example of the types of knowledge production in which academics can participate in collaboration with their local communities. We share this offering in the hopes that others will question, learn, critique, build upon, reflect, reject, embrace, and, otherwise engage with, our work and this idea.

We specifically pose that open access is an antidote to obfuscation. We are inspired by the idea that transparency alone acts to consolidate power, rather than acting to challenge or democratize power [15]. As Patricia Hill Collins notes, a transformative act at the individual level possesses the potential to ripple through institutional levels of power [10]. Confronting the institutional matrix of domination therefore necessitates a plurality of thoughtful responses at the individual level. We recognize that this approach may be one of many approaches that hold such potential.

While diverse perspectives and approaches create stronger ideas, we do recognize that homogeneity may offer stability and minimize conflict. By recognizing these contradictions, we underscore that such participatory approaches often fall short of promoting justice and equitable power distribution. While including all voices may not align with dominant notions of efficiency, our aim is not efficiency for its own sake. Instead, we invite all of our readers into a reimagining of our expectations surrounding efficiency, participation, and democracy. We are challenging the conventional notion that intricate problems admit a single, simplistic solution.

Adhering to binary perspectives that label things as either good or bad is, in the context of addressing wicked problems (as explained by Rittel and Webber [30]), counterproductive. Wicked problems, by their nature, resist straightforward solutions. By resisting the temptation to categorize issues into binary judgments, we open ourselves to more nuanced, context-specific, and adaptive approaches that better align with the complexities inherent in the challenges that we ourselves are a part of. If we acknowledge that we are all part of the problem, we can all be part of the solution [22, 33]. While we do not benefit from these systems equally, none of us, as academics, should see ourselves as wholly outside of the issues we study.

3 RESEARCH APPROACHES

The educational guide consists predominantly of three interwoven and generative research phases: the first being the acquisition of information via FOIA requests, the second the qualitative coding process used to analyze the uses of the technology, and the third being the design of an accessible informational guide to share broadly. All three of these processes were interspersed with feedback from our community partners. The main animating question of the educational guide, "What is meant by 54 crimes having been 'solved?'" was specifically suggested by Julie Pryde. The educational guide would simply not exist without each of our contributions. As such, community collaboration is put forward here not as a specific method, but rather as an inquiry worldview and a general paradigm in which we approach our work [14]. Rather than seeing community members as research subjects from whom we extract knowledge, we see ourselves as equal stakeholders in the work of knowledge production [23].

3.1 Approach 1: Information gathering via FOIA requests

One author filed 2 FOIA requests with the city, 1 with the county, and 1 with the university to request the installation location of ALPRs. The city, county, and university all rent devices from Flock. The map on the final page of the guide was made from data received from these requests. Each of the three entities had different FOIA submission processes. The city uses an easily accessible portal, the county uses a paper form that did not fit our needs well but that could be submitted electronically, and the University used a free-form, email system. Each of these processes likely reflects the frequency and type of requests for which they are optimized. For example, the County Sheriff's Office FOIA request form had spaces for the case number being requested, but no space for a description (Figure 1). The requests were fulfilled via Excel document, digitized letter, and screenshot, respectively (Figure 2). Each request was returned via email. Only some of the results included latitude and longitude, meaning the remaining ALPRs needed to be added by hand to a map. This map was created using Google Maps and is available as a digital, interactive, document. While the police claim that they used data-driven approaches to choose locations, the ALPRs are heavily concentrated in majority Black neighborhoods, while majority White neighborhoods have very few. Future work will add additional layers to this map, such as demographic and income data, to help better illustrate the relationships between installation location and minoritized communities.

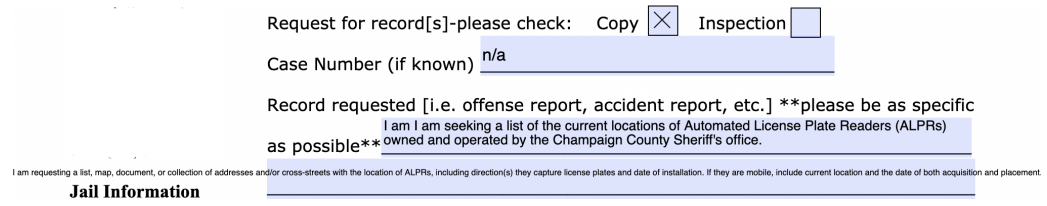


Fig. 1. A screenshot of the FOIA request submitted to the County Sheriff, where the authors struggled to physically fit the request into the constraints of the pre-formatted boxes, which were optimized for the request of specific case numbers rather than broad asks for information.

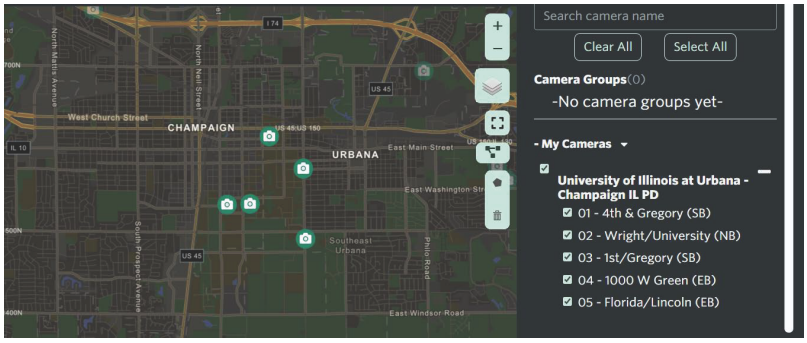


Fig. 2. The screenshot returned from the university detailing the location of ALPRs rented by the university police. This map appears to be a screenshot from a management portal for the cameras. SB and EB refer to Southbound and Eastbound, respectively, indicating which direction of the street the cameras are facing.

In addition, 1 FOIA request was filed with the city to request information about the "54 crimes" described as having been "solved" by the local CBS news affiliate, WCIA. These descriptions were in a PDF with varying amounts of

Table 1. The coding schema for classifying instances associated with ALPR usage in relation to the Illinois Criminal Legal Code.

Incident Type Code	Incident Type Description
U	Unknown. The incident could not be categorized with the information provided.
NaC	Not a Crime. The incident was not a criminal issue.
M	Misdemeanor. The incident would likely be considered a misdemeanor, such as theft under $500 or resisting a traffic stop.
F	Felony. The incident would likely be considered a felony, such as vehicular theft or assault with a deadly weapon.

detail per instance, ranging from entire paragraphs and the inclusion of case numbers to dates only with one to two sentences. Each of these instances was coded by one author, who developed a coding schema related to our research questions. Each ALPR usage was classified into an incident type (Table 1), as well as whether the crime included a gun, since the rationale for installing these devices was related to gun violence in our community. We also did our best to determine whether the incident had led to an arrest or charge. This included looking up details using Google to identify whether the case had been pursued by the police. This method was imperfect, but chosen for simplicity over submitting additional FOIA requests for each case. This information was used to create Page 3 in the booklet. We focus on guns in our analysis because the police rational for purchasing ALPRs, as well as the local discourse, was that it would reduce gun violence [12].

We were fortunate that all of our requests were fulfilled in accordance with standing legal protocol, and we did not require legal assistance or additional requests. This is not guaranteed to be the case for all requests, particularly those of a sensitive nature. Our initial request to the city for the location of the ALPRs did receive an extension, because "the requested records require examination and evaluation by personnel having the necessary competence and discretion to determine if they are exempt from disclosure under Section 7 of this Act or should be revealed only with appropriate deletions" (quotation from email correspondence). The records were ultimately deemed shareable and released without additional action.

Of note is that not all of the co-authors were in a position of safety from which to file these requests. The authors include both United States citizens and non-citizens, graduate students and faculty. All of us contend with precarity and privilege in different ways. We are racialized differently, have differing levels of access to academic institutional power, different relationships to the state(s) in which we reside. We provide this information in order to allow the reader to understand whether this process will work for them, as it is not equally accessible to all people.

3.2 Approach 2: Labeling Police Uses of Automated License Plate Reader Technology

One specific FOIA request pertained to usage of the technology. We received a PDF with varying amounts of detail for each of these 54 instances across the first 9 months of their use. After logging the 54 instances in a spreadsheet, each instance was tagged qualitatively with additional information, including whether it was related to another instance in the group, the level of "crime" (Table 1), and whether it involved guns, since the rationale for the purchase of ALPRs had been to reduce gun violence in our community. The qualitative coder utilized the Illinois Criminal Code with the information in the document to categorize each incident under its most likely charge. Some incidents came with specific descriptions and charges, while others required extrapolation via Google search and penal code lookups. In addition, we tracked how the ALPRs were used (alerts vs search; vehicle tracking; evidence building; etc), which ALPR was used if it

was mentioned, and the outcome of the usage, if known. In this way, we were able to sort, group, and filter the instances, to the best of our ability, into different categories for our analysis. A second author acted as a confirmatory rater, going through the document again with the developed schema and labeling each instance independently. Differences were resolved via discussion until an agreement was reached. For example, the entry: "03/04/2022 Note: Agg Assault related to firearm display. Were able to locate the suspect's vehicle after tracking it w/ ALPRs. No arrested due to lack of PC." was tagged as aggravated assault, a felony, involving guns, no arrest, related to another instance (the next two entries in the spreadsheet as well as an entry from 5/24/2022). Additionally, the ALPR usage was categorized as "vehicle tracking via Search." Of note is the use of jargon, acronyms, and shorthand. Translating each of these entries took labor from the researchers. The long form version of the above would read, with changes italicized, "03/04/2022 Note: Agg*ravated* Assault related to firearm display. *We* were able to locate the suspect's vehicle after tracking it w*ith* A*utomated* L*icense* P*late* R*eaders*. No arrest *was made* due to lack of P*robable* C*ause*." After labeling each entry, they were sorted into additional categories, as demonstrated in the document on Page 3.

3.3 Approach 3: Designing an accessible informational guide

Having compiled information from FOIA requests and distilled the analysis of the 54 police incidents, the primary challenge lay in effectively presenting the findings and incorporating contextual scaffolds to anchor the information within the guide. Two key features emerged from our analysis as necessitating further contextualization: the ALPR technology and its distributor, Flock. The authors deliberated on the level of detail to include, carefully considering what information about ALPR technology and Flock was essential for comprehensive understanding. This was also spurred by questions from our collaborators, who reminded us that a novel viewer would likely not be familiar with the technology in question.

The educational guide was designed as a three-part document, focusing on ALPRs in general, Flock specifically, and Champaign's utilization of Flock's ALPRs. The intention was for each section to function as a standalone guide while complementing one another cohesively, ensuring flexibility for multimodal dissemination—whether in print, digital formats, posters, zines, social media posts, or other future uses. After establishing the structure and content of each part, the next step involved distilling the relevant information.

The first section concentrated on ALPR technology, covering its definition, functionality, and considerations. The authors employed simplified three-tone images of ALPR components to act as visual proxies to the explanatory text adapted from the Electronic Frontier Foundation's extensive report on ALPRs [1]. The second section centered on Flock, emphasizing key issues highlighted by the ACLU [26, 35]. This included discussion of its mass private-public surveillance system and the provision of relevant numbers, like cost per camera and number of scans per day, to guide our readership in comprehending its sheer scale. The third and final section, featuring extensive analysis and codes, aimed to showcase our breakdown of how, and to what extent, ALPRs contributed to solving gun-related or violent crimes. The authors brainstormed multiple visual metaphors to illustrate and make visible the reduction of numbers. One such metaphor, depicted in Figure 3, initially represented a water filtration system, though further iterations led to a more fitting representation for the data.

The final page, as previously described, featured an interactive map in the digital version and a static map in print. The document was created on an online collaborative graphic design platform, Canva, facilitating the easy generation of infographics, visuals, and booklets with a low entry barrier for users. This platform was chosen not only for its accessibility but also for its ability to allow community partners to make edits, fostering continuous iterations without the need for constant upkeep associated with professional graphic software.

A conscious decision was made to ensure visual language consistency across all three sections, signaling their interconnectedness while allowing each layout to stand alone visually and in terms of content. The booklet underwent a couple of rounds of initial feedback from community partners and now represents the first publicly forward and dissemination-ready draft.

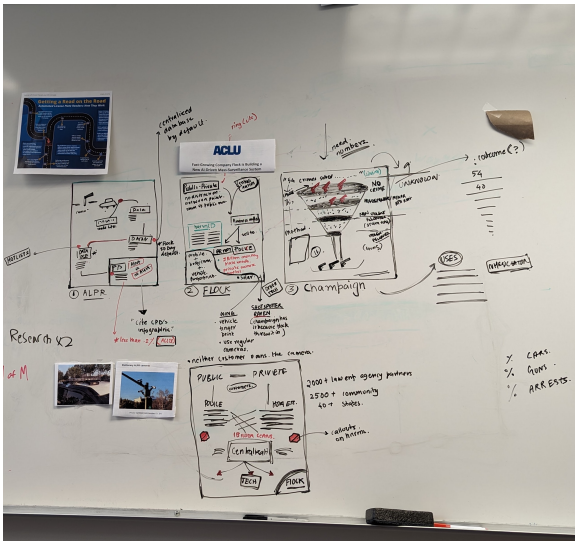


Fig. 3. A photo of an early brainstorming session between the first two authors. This was the initial stages of designing the guide and includes a mix of references, sources, and new ideas.

4 CONCLUSION

This guide is the product of community-informed fact-finding and challenging established norms by reimagining methods of engagement with our collaborators. We hope it inspires a critical examination of what qualifies as research, the types of data deemed significant, and the belief in "rigor" in dominant research methodologies [29]. While the true impact of this document is yet to be realized, as we stand on the brink of sharing the first draft with the community, we plan to co-design next iterations with the very community members for whom this resource is intended [6].The iterative nature of our work embodies an ongoing commitment to meaningful engagement, community empowerment, and the pursuit of epistemic justice. Future work with this educational guide will involve further engagement with our local community to continue to develop both the guide itself and our next steps.

ACKNOWLEDGMENTS

This guide was the extension of work initiated during the Community Data course in Spring 2022, led by Dr. Chamee Yang, inspired by the ethos of the community data clinic in general, and pursued by graduate student interest. The whitepapers generated by this course, centered on alternative approaches to violence reduction in four different cities around the United States, are available online. We thank both Dr. Yang and our classmates for the generative experience. This document is the collaboration of not only those in academia, but also invested community members,as well as advocates of a public health approach to gun violence in local communities such as CUPHD director Julie Pryde. The

entirety of the project can also be traced back to a series of public forums, held by the city of Urbana in the winter of 2021/2022, in relation to whether they should choose to follow Champaign in purchasing this technology. At this forum, dozens of residents, including one of the authors, showed up to publicly discuss the value of such a purchase. Due to a lack of consensus, the Urbana City Council voted not to purchase the technology at that time and has stood behind this decision even as our surrounding towns increase usage. These public forums ensured that community members had the opportunity to engage with their local elected representatives and each other in discussing the best use of the city's budget. The topic of surveillance in our own community would not necessarily have been pursued by us if it had not been brought to our attention by our neighbors.

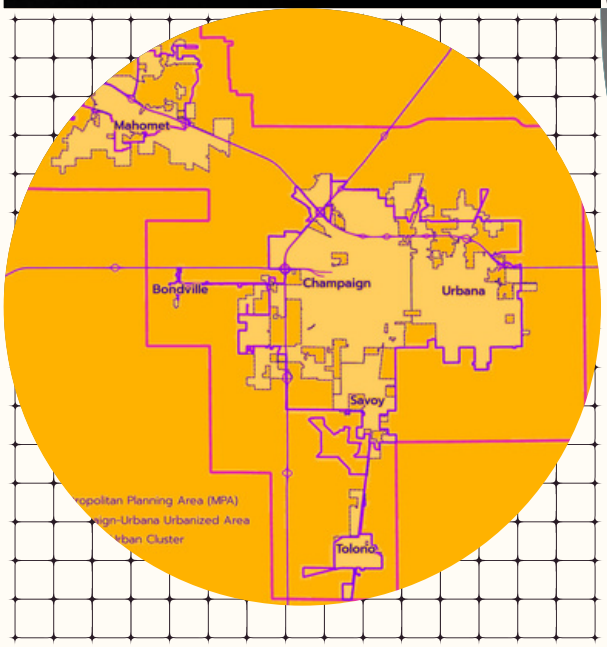
University of Illinois Urbana Champaign
Community Data Clinic | School of Information Sciences

Fall 2023

Automated License Plate Readers (ALPRs): Surveillance & Policing

ALPRs in Champaign Urbana

Overview, Effectiveness, and Ethical Concerns



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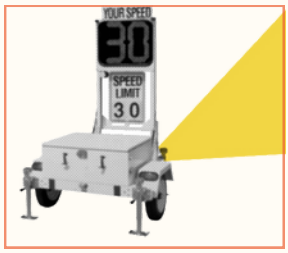
01 / Automated License Plate Readers

WHAT ARE ALPRS?

ALPRs, or Automatic License Plate Recognition Systems, are designed to automatically capture, process, and interpret license plate information from vehicles employing a combination of hardware and software components that compare the plate numbers to local and national databases containing vehicles of interest.

HOW DO ALPRS COLLECT DATA?

Stationary ALPR Cameras



Semi-Mobile ALPR Cameras

Mobile ALPR Cameras

Centralized Database

A centralized database that stores and manages the captured license plate data for further analysis.

WHAT TYPES OF DATA DO ALPRS COLLECT?

- **License Plate Numbers:** The alphanumeric characters on license plates.
- **Timestamps:** The date and time when each license plate is captured.
- **Location Information:** The specific location where the license plate was detected.
- **Vehicle Images:** Images of the vehicles associated with the captured license plates.

HOW IS ALPR DATA USED FOR POLICING?

- **Identifying "suspicious" vehicles:** ALPR systems are used to compare license plate data against watchlists to send alerts when a vehicle of interest is detected.
- **Investigations:** ALPR data is used to provide leads and evidence in criminal investigations by tracking the movements of vehicles linked to activity deemed suspicious.
- **Traffic enforcement:** ALPRs are used to enforce traffic regulations, such as identifying vehicles with expired registrations or outstanding fines.

WHAT IS ALPR DATA USED FOR BY CHAMPAIGN CITY POLICE?

Under Department Policy 41.18, ALPR units may be used to investigate license plate information related to:

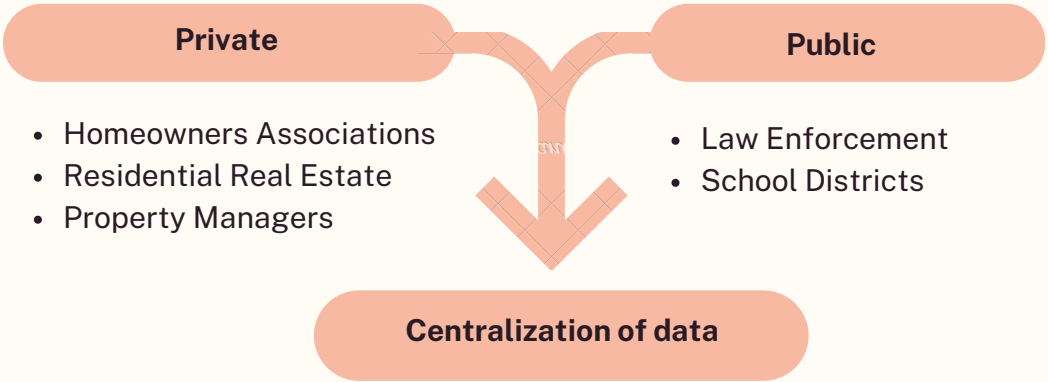
- Identifying the license plate numbers of or associated with **stolen vehicles, wanted subjects, missing persons, AMBER Alerts**, or other criteria as determined by a Deputy Chief of Police.
- ALPRs may also be used to gather information related to **active warrants, homeland security, electronic surveillance, suspect interdiction, stolen property recovery**, or other legitimate law enforcement purposes.

02 / Flock Safety: ALPR Vendor Overview

The Champaign Police Department contracted with **Flock Safety, Inc.** to install Automated License Plate Reader (ALPR) units for use throughout the community; in total, **46 ALPR units were installed by Flock Safety by the City of Champaign in the Spring and Summer of 2022**. The ALPR units were initially authorized for two years of use. This is in addition to the **12 ALPRs** installed by Champaign County and **5 ALPRs** installed by the University of Illinois Urbana-Champaign.

Business Model: A public/private license-scanning network

- Fixed cameras have been installed in **1,400** cities across the United States.
- **1,000,000,000** monthly plate reads. On average, this is **23,000+ scans/minute**.
- Access to Hotlists: Private, state police watchlists and the FBI's primary criminal database, the National Crime Information Center (NCIC)
- Each camera costs Champaign **$2,500/year** in addition to a one time installation fee of $250



AI-Driven Mass-Surveillance System

By consolidating all the data collected from its customers, including law enforcement agencies, into its centralized servers, Flock establishes a **highly influential public-private apparatus** that gathers information about Americans' activities. While **mass surveillance** by law enforcement alone is already concerning, the involvement of a private company introduces **potentials for misuse**.

03/ Champaign City Police Department & ALPRs

ANALYSING 54 "SOLVED" CRIMES USING ALPRS

Champaign's local CBS affiliate station, WCIA, reported that Champaign Police had used Automated License Plate Readers (ALPRs) to help "solve" 54 crimes from May 2022 through February 2023.
We used **Freedom of Information Act (FOIA) requests** to find out how and when CPD used ALPRs in the first nine months after installation. After our FOIA request was fulfilled in April 2023, each individual usage of the ALPRs was tagged with additional information, including whether it was related to another instance in the group, the type of crime, if the crime involved guns, and what the outcome of the case was, if known. In this way, we were able to sort, group, and filter the instances into different categories for our analysis.

54 Total number of ALPR uses

Total number of ALPR uses: 54 unique uses of the ALPR system logged between installation of first camera May 1, 2022 through the publication date of the WCIA article Feb 17, 2023

43 Incidents involving a “crime”

11 records were removed for being unclear, related to another usage, or that were explicitly not related to a crime, such as wellness checks.

31 Felonies

12 records were removed for being associated with misdemeanors, such as theft under $500, fleeing and eluding an officer, and battery.

14 Gun-related felonies

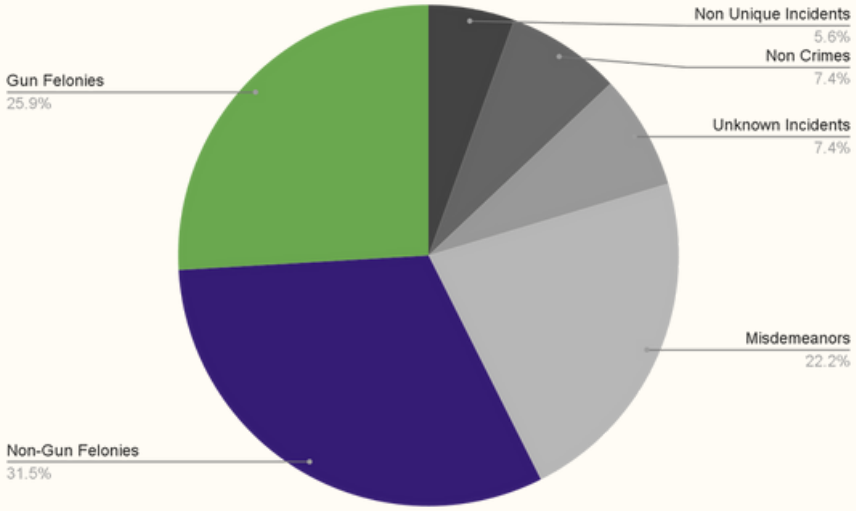
17 records were removed for being associated with felonies that did not involve a gun, such as vehicle theft and arson.

10

Gun related felonies with an arrest/arrest warrant

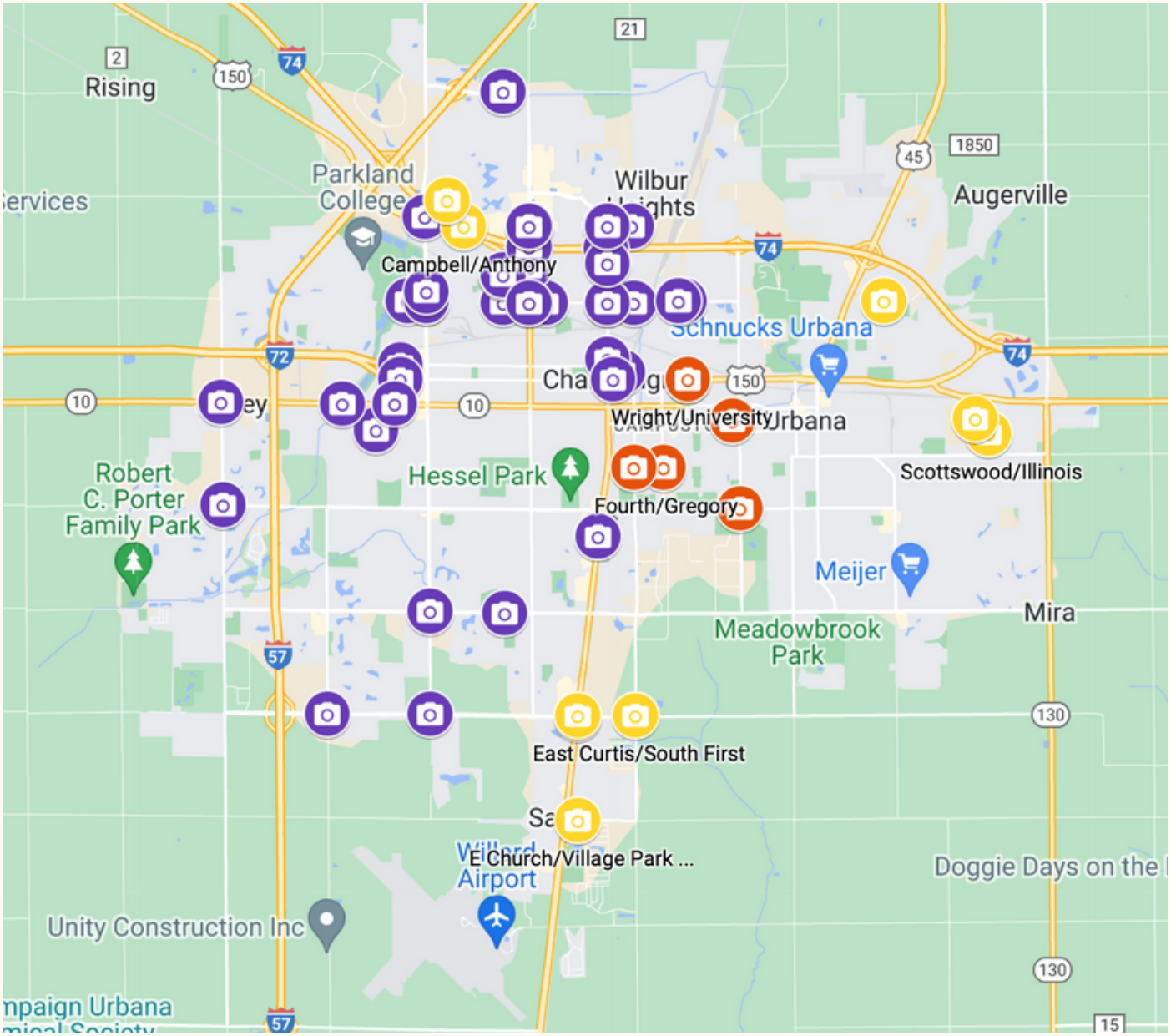
2

Only 2 of those 10 arrests were attached to formal charges at time of information retrieval.



54 Crimes: breakdown by level of crime

04 / Champaign City ALPR Map



External organizations with access to data

Bloomington IL PD, Bradley IL PD, Champaign County IL SO, Charleston IL PD, Chatham IL PD, Chesterfield County VA PD, Danville IL PD, Decatur IL PD, Dewitt County IL SO, Elk Grove IL PD, Illinois State Police, LeRoy IL PD, Mahomet IL PD, Normal IL PD , Parkland College IL PD , Rantoul IL PD, Springfield IL PD, University of Illinois at Urbana - Champaign IL PD.

Acknowledgements and Author Information

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