



Geoprivacy & GIS: Avenues for Engagement

DARA SEIDL

**ASSOCIATE PROFESSOR OF GIS, COLORADO
MOUNTAIN COLLEGE**

GIS Day 2022 @ University of Idaho

SPYING WITH MAPS



SURVEILLANCE TECHNOLOGIES AND THE FUTURE OF PRIVACY

MARK MONMONIER

November 15, 2002

SPYING WITH MAPS



SURVEILLANCE TECHNOLOGIES AND THE FUTURE OF PRIVACY

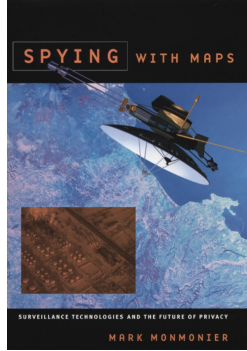
MARK MONMONIER

- 1** Maps That Watch
- 2** Overhead Assets
- 3** Eyes on the Farm
- 4** Tinder, Technology, and Tactics
- 5** Weather Eyes
- 6** Wire Loops and Traffic Cams
- 7** Crime Watch
- 8** Keeping Track
- 9** Addresses, Geocoding, and Dataveillance
- 10** Case Clusters and Terrorist Threats

Wariness grounded in understanding



Overview



- A. Geoprivacy Forecast (2002)
- B. Surprises in Location Collection
- C. Approaches to Engagement



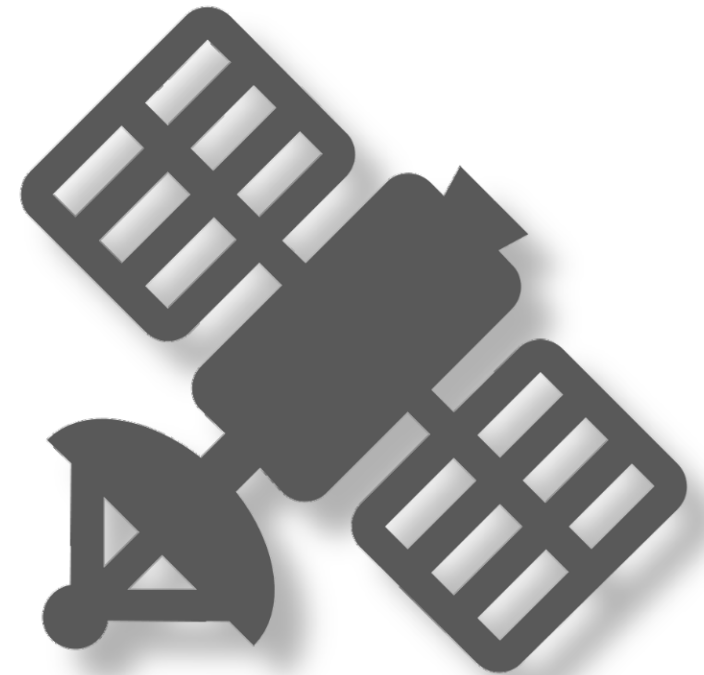
Satellites

SPYING WITH MAPS

DigitalGlobe Quirkbird 61 cm b/w
2001

SPOT Image 10-meter

Corona's most advanced successors
3 inches



Open Fields Doctrine

Dow Chemical Company v. United States (1986)

EPA hired aerial survey firms to inspect plant for violations of Clean Air Act

No reasonable expectation of privacy in open field between structures



Data Warehouses

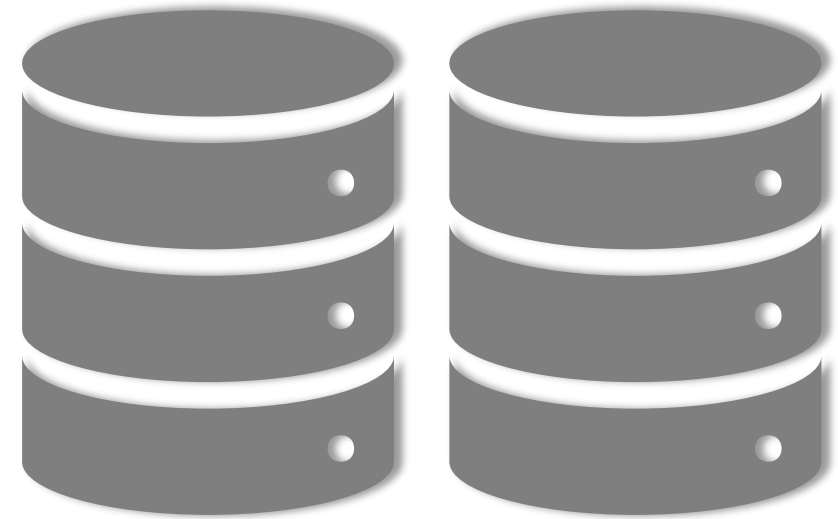


"If you think the federal government is Big Brother, guess again. p. 151

Marketers thirsting for finer details

Acxiom

DoubleClick



If you don't see the danger, think
integration...the imminent ease of linking a
large number of databases rapidly and
reliably...

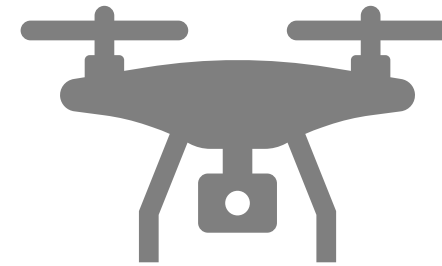


UAVs

SPYING WITH MAPS

Used by Pima County, AZ Sheriff's department to scan for drugs

Characterized as not necessary to investigations



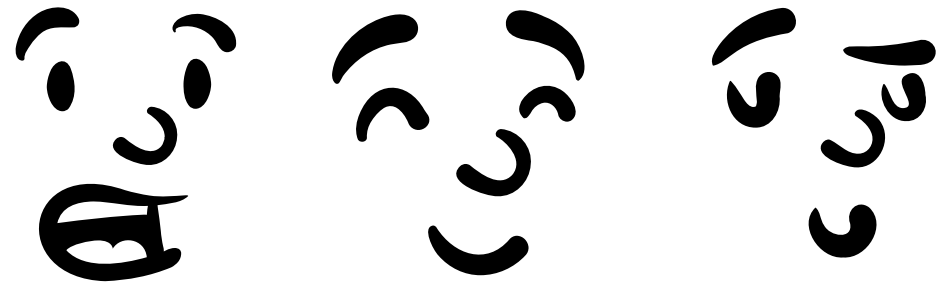
Facial Recognition

SPYING WITH MAPS

Hinge on accuracy

Problem of misidentification

Cost-effective for airports



GPS/LBS

SPYING WITH MAPS

Recent removal of Selective Availability

Digital fencing/leash

LBS industry eager to sell location at high resolution



The background of the slide is a light gray color, overlaid with several thin, dark brown lines that intersect at various angles, creating a geometric, abstract pattern.

Current Location Collection

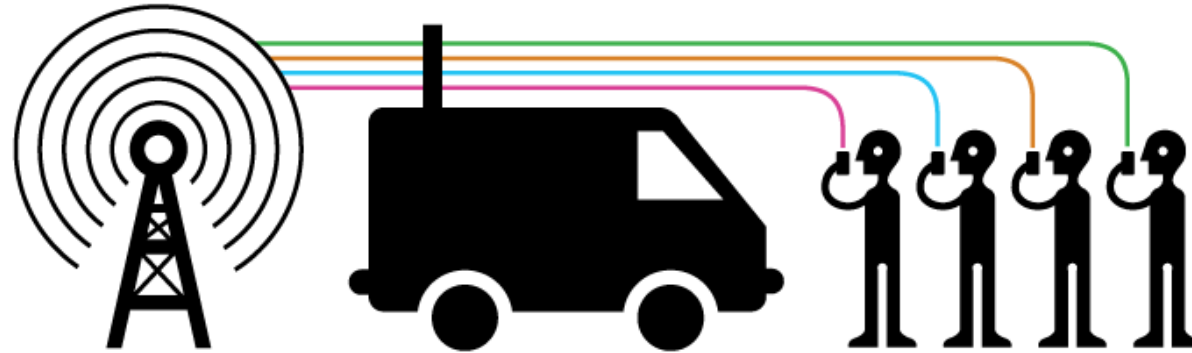
EVENT SURVEILLANCE



Stingrays

CELL-SITE SIMULATOR SURVEILLANCE

Cell-site simulators trick your phone into thinking they are base stations.



Depending on the type of cell-site simulator in use, they can collect the following information:

- 1. identifying information about the device like International Mobile Subscriber Identity (IMSI) number
- 2. metadata about calls like who you are dialing and duration of call
- 3. intercept the content of SMS and voice calls
- 4. intercept data usage, such as websites visited.

Historical Location Data

Mobile Location Data

GPS Location Data

SDK Location Data

Global Location Data

Location Senti

Connected De

Deterministic I

Places Data

Point of Interest

Map Data

Satellite Data

Cell Tower Data

GIS Data

Geographic Data

Mobility Data

Geodemographic Data

Related Searches

- Q US Location Data
- Q location dataset
- Q location apis
- Q location datasets
- Q location databases
- Q mobility databases
- Q mobility datasets
- Q mobile dataset



Scanbuy US mobile consumer GPS lat/long location data hourly updates 35M DAUs from US mobile phones (Privacy-compliant, iOS and Android via app/SDK)

by Scanlife by Scanbuy

Scanbuy gathers and collects US GPS lat/long location data hourly updates from ~ 35M US mobile phones ... Scanbuy gathers and collects US mobile consumer GPS lat/long location data hourly updates from ~ 35M

Available for 1 countries

2 years of historical data

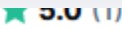
Pricing available upon request

Show all →

Request Sample

View Product →

ng available upon est



devices worldwide.

Available for 51 countries

4 years of historical data

Request Sample

View Product →

POI/Location Data APAC - GPS and IP Based (52M records) - 1st Party Data

by AI Keyboard

Available Pricing:

✓ One-off purchase

✓ Monthly Licence

The Alqami logo, featuring the word "Alqami" in a bold, black, sans-serif font.

Alqami Mobile Device Location Data USA & LATAM (GPS) | 5M geo-tagged POI, millions of users

by Alqami

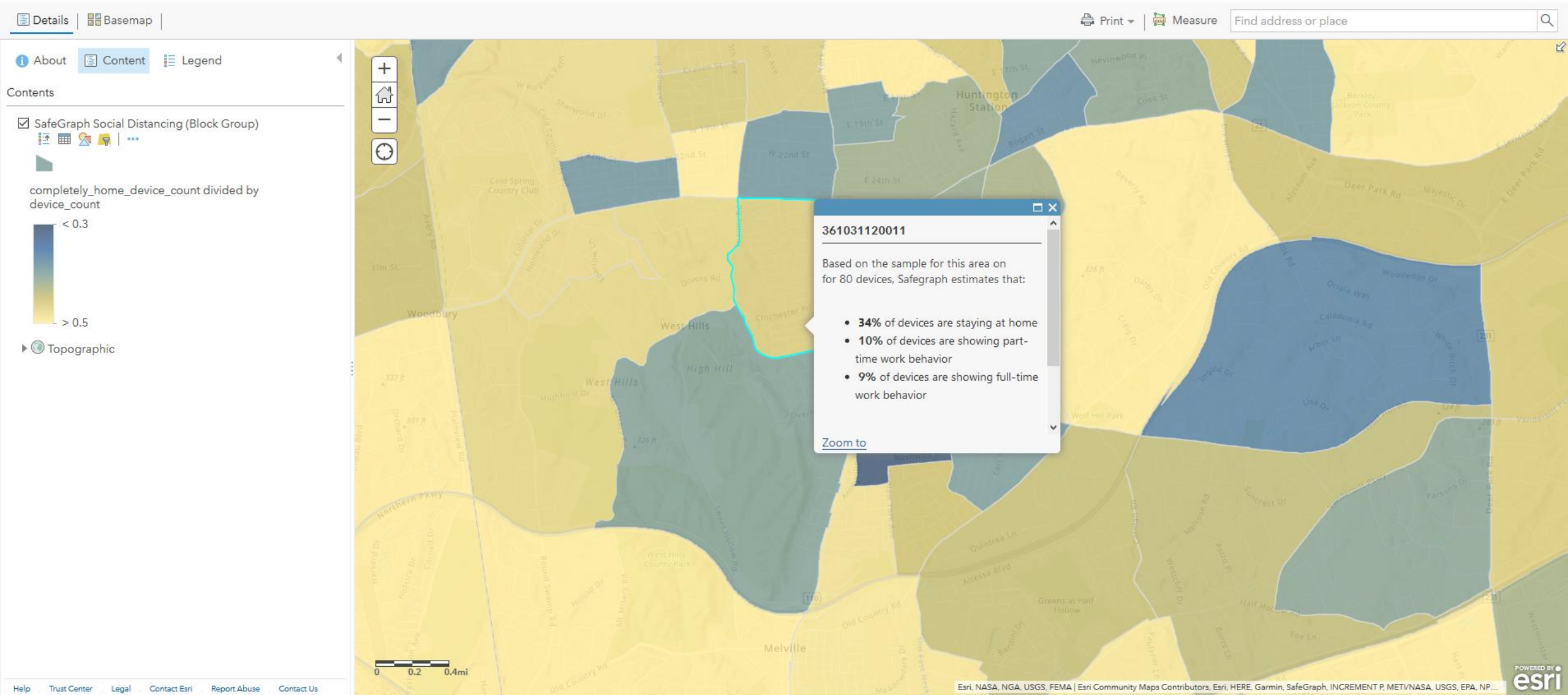
Mobile **GPS location data** on several million consumers in the US. ... Anonymised **location** information as Latitude and Longitude to 5 decimal point precision Covers millions

📄 Available for 13 countries

Pricing available upon request

[Request Sample](#)

[View Product →](#)



Opt-In Requirements

SPYING WITH MAPS

Monmonier's recommendation

Dread of data vendors



Geoprivacy

.....

the right of individuals to determine
the extent to which their location is
shared with others

.....


Duckham and Kulik 2006; Elwood and Leszczynski 2011; Kar, Crowsey, and Zale 2012

California Consumer Privacy Act (CCPA)

[Home](#) / [Privacy](#) / [California Consumer Privacy Act \(CCPA\)](#)

The [California Consumer Privacy Act of 2018](#) (CCPA) gives consumers more control over the personal information that businesses collect about them and the [CCPA regulations](#) provide guidance on how to implement the law. This landmark law secures new privacy rights for California consumers, including:

- The [right to know](#) about the personal information a business collects about them and how it is used and shared;
- The [right to delete](#) personal information collected from them (with some exceptions);
- The [right to opt-out](#) of the sale of their personal information; and
- The [right to non-discrimination](#) for exercising their CCPA rights.

<input type="checkbox"/>	☆	[Acxiom]	Inbox	Your single-use access code - Your single-use access code Your requested cod...	8/14/20
<input type="checkbox"/>	☆	[Acxiom]	Inbox	You have new content regarding your Access request - You have new content re...	8/14/20
<input type="checkbox"/>	☆	[Acxiom]	Inbox	Your single-use access code - Your single-use access code Your requested cod...	7/29/20
<input type="checkbox"/>	☆	[Acxiom]	Inbox	You have received a new message regarding your Access request - You have rec...	7/29/20
<input type="checkbox"/>	☆	[Acxiom]	Inbox	Subject Request Started - 5f20b42d9ece160011aed96c - Subject Request Start...	7/28/20
<input type="checkbox"/>	☆	[Acxiom]	Inbox	Affidavit Confirmation - Affidavit Confirmation You have successfully submitted t...	7/28/20
<input type="checkbox"/>	☆	[Acxiom]	Inbox	Subject Request Started - Subject Request Started You have started an Access ...	7/28/20
<input type="checkbox"/>	☆	consumeradvo - Cons.	Inbox	RE: CCPA Personal Information Request - Acxiom - CCPA California Consumer I... 	7/27/20
<input type="checkbox"/>	☆	consumeradvo - Cons.	Inbox	Automatic reply: CCPA Personal Information Request - consumeradvo@acxiom....	7/23/20
<input type="checkbox"/>	☆	me		CCPA Personal Information Request - information that Acxiom has collected about me. ...	7/23/20



Data Sold

To companies in following category: Government

The following types of data:

- Personal Identifiers
- Personal Characteristics
- Personal Property
- Buying Activity / Interest
- Internet Activity
- Geo Location
- Employment Information
- Education Information
- Inferences

To companies in following category: Healthcare

The following types of data:

- Personal Identifiers
- Personal Characteristics
- Personal Property
- Buying Activity / Interest
- Internet Activity
- Geo Location
- Employment Information
- Education Information
- Inferences

To companies in following category: Insurance

The following types of data:

- Personal Identifiers
- Personal Characteristics
- Personal Property
- Buying Activity / Interest
- Internet Activity
- Geo Location
- Employment Information
- Education Information
- Inferences

To companies in following category: Security Contractors

The following types of data:

- Personal Identifiers
- Personal Characteristics
- Personal Property
- Buying Activity / Interest
- Internet Activity
- Geo Location
- Employment Information
- Education Information
- Inferences

Inferences - Buying Activity Behavior

Affinity Rank - Internet Buyer: 7 (1=Lowest to 9=Highest) (Received 2020)

Household - Green Living: 68

Household - Green Living: 93

Household Dollars Spent - Apparel: 1214

Household Dollars Spent - Apparel: 2053

Household Dollars Spent - Charitable Donations: 1196

Household Dollars Spent - Charitable Donations: 2024

Household Dollars Spent - Dining Out: 1909

Household Dollars Spent - Dining Out: 3229

Household Dollars Spent - Education: 1030

Household Dollars Spent - Education: 609

Household Dollars Spent - Entertainment: 2608

Household Dollars Spent - Entertainment: 411

Household Dollars Spent - Home Furnishings General: 1117

Household Dollars Spent - Home Furnishings General: 1890

Buying Activity Behavior - General

Average Days Between Orders - Offline: 232 (4 year history; Received 2020)

Average Days Between Orders: 232 (4 year history; Received 2020)

Dollars Spent - Average Per Order - Offline: 000053.00 (4 year history; Received 2020)

Dollars Spent - Average Per Order: 000053.00 (4 year history; Received 2020)

Dollars Spent - Retail: 000040.00 (4 year history; Received 2020)

Mail Order - Buyer: Yes

Months Since - Last Activity: 13 (Received 2020)

Months Since - Last Activity: 20 (Received 2020)

Months Since - Last Purchase: 13 (Received 2020)

Months Since - Last Purchase: 20 (Received 2020)

Number of Orders - Total - January: 0001 (4 year history; Received 2020)

Number of Orders - Total - March: 0001 (4 year history; Received 2020)

Number of Orders - Total - November: 0001 (4 year history; Received 2020)

Number of Orders - Total - October: 0001 (4 year history; Received 2020)

Number of Orders - Total - Offline: 0004 (4 year history; Received 2020)

Number of Orders - Total - Retail: 0001 (4 year history; Received 2020)

Number of Orders - Total - September: 0001 (4 year history; Received 2020)

Number of Orders - Total: 0002 (Received 2020)

Number of Orders - Total: 0004 (4 year history; Received 2020)

- Income Modeled
- Income Producing Assets
- Income Ratio
- Liquid Assets
- Net Worth Household
- Charitable Contributions
- Discretionary Spending
- Education
- Voter Status
- Children
- Marital Status

Premier Cluster Code - Household: Connected Bohemians

Premier Cluster Code - Household: Fast-Track Families

Premier Cluster Code - Household: Pools & Patios

Premier Cluster Code - Household: The Cosmopolitans

Premier Lifestage Group Assignment Level Code - Household: Household Match

Premier Lifestage Group Code - Household: Metro Mainstream

Premier Lifestage Group Code - Household: Upwardly Mobile

Google



Trader Joe's

Website

Directions

Save

4.6 ★★★★★ 853 Google reviews

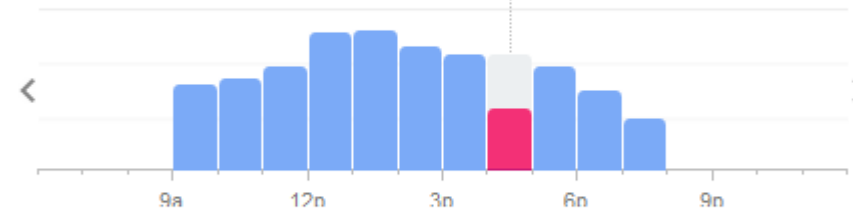
\$\$ · Grocery store

Grocery chain with a variety of signature items, plus produce, dairy & more (most sell wine & beer).

Popular times ?

Wednesdays

👤 Live: Less busy than usual



Plan your visit

People typically spend **25 min** here

Professional Ethics

Corpus ID: 127253007

Protecting personal privacy in using geographic information systems

[H. Onsrud](#), [Jeffrey Johnson](#), [Xavier Lopez](#) • Published 1994 • Computer Science •
Photogrammetric Engineering and Remote Sensing

Personal privacy is a social issue of increasing relevance to the geographic information system (GIS) community. The power of GIS processing and the crossmatching of geographic datasets with other datasets are raising strong privacy concerns. This article discusses current practices and trends in the collection, maintenance, and dissemination of personal information by government and industry through the use of GIS and related technologies. It reviews the development of legal rights in privacy, discusses the societal importance of personal privacy, argues that self regulation of the use of personal information is a necessary goal for the GIS community, and describes privacy protection guidelines currently being proposed by various parties for adoption by the commercial sector and government [Collapse](#)

Avoiding restrictive legislation

URISA GIS Code of Ethics

A positive tone is taken throughout the text of this code. GIS professionals commit themselves to ethical behavior rather than merely seeking to avoid specific acts.

1. Respect Privacy

- Protect individual privacy, especially about sensitive information.
- Be especially careful with new information discovered about an individual through GIS-based manipulations (such as geocoding) or the combination of two or more databases.

2. Respect Individuals

- Encourage individual autonomy. For example, allow individuals to withhold consent from being added to a database, correct information about themselves in a database, and remove themselves from a database.
- Avoid undue intrusions into the lives of individuals.



LOCUS CHARTER

FOUNDING PRINCIPLES

#1

REALIZE OPPORTUNITIES:

Location data offers many social and economic benefits, and these opportunities should be realized responsibly.

#2

UNDERSTAND IMPACTS:

Users of location data have responsibility to understand the potential effects of their uses of data, including knowing who (individuals and groups) and what could be affected, and how. That understanding should be used to make informed and proportionate decisions, and to minimize negative impacts.

#3

DO NO HARM:

Physical proximity amplifies the potential harms that can befall people, flora and fauna. Data users should ensure that the individual or collective location data pertaining to all species should not be used to discriminate, exploit or harm. Rights established in the physical world must be protected in digital contexts and interactions.

#4

PROTECT THE VULNERABLE:

Vulnerable people and places can be disproportionately harmed by the misuses of location data, and may lack the capacity to protect themselves. In these contexts, data users should take additional care, act proportionately, and positively avoid causing harm.

#5

ADDRESS BIAS:

Bias in the collection, use, and combination of location datasets can either remove affected groups from mapping that conveys rights or services, or amplify negative impacts of inclusion in a dataset. Therefore care should be taken to understand bias in the datasets and avoid discriminatory outcomes.

#6

MINIMIZE INTRUSION:

Given the intimate and personal nature of location data, users should avoid unnecessary and intrusive examination of people's lives and the places they live in, that would undermine human dignity.

#7

MINIMIZE DATA:

Most business and mission applications do not require the most invasive scale of location tracking available in order to provide the intended level of service. Users should comply with practices that adhere to the data minimization principle of using only the necessary personal data that is adequate, relevant and limited to the objective, including abstracting location data to the least invasive scale feasible for the application.

#8

PROTECT PRIVACY:

Tracking the movement of individuals through space and time gives insights into the most intimate aspects of their lives. In the rare cases when aggregated and anonymized location data will not meet the specific business or mission need, location data that identifies individuals should be respected, protected, and used with informed consent where possible and proportionate.

#9

PREVENT IDENTIFICATION OF INDIVIDUALS:

As an individual's mobile location data is situated within more and more geospatial context data, its anonymity erodes, measures should be put in place to prevent subsequent use of the data resulting in identification of individuals or their location.

#10

PROVIDE ACCOUNTABILITY:

People who are represented in location data collected, combined and, used by organizations should be able to interrogate how it is collected and used in relation to them and their interests, and appeal those uses proportionate to levels of detail and potential for harms.

Scare Tactics

ACTIVITIES

Hold a debate, splitting the class into *for* and *against* location tracking of job applicants. How would LocCheck assist in risk management for a company? How would it lead to discrimination against job candidates?

Have students make a list of potential "false ids" of risky behavior that might take place just by relying on location data. What impact does GPS data accuracy have? What happens if messy data is taken as accurate?

DISCUSSION POINTS

- If you read that LocCheck was a requirement to interview for a position you were interested in, would you still apply for the job? Why or why not?
- Imagine you had a job as a bartender, and LocCheck flagged you as a risk for spending time in a bar every night. What would you do?
- What do you make of the final scene, where an applicant is passed over for visiting a medical center most days. Is this ethical or legal?
- Would you participate if you were notified of the start and end times of the location tracking, or if you were paid?

Privacy and *mapping* are two words that rarely share the same sentence. After all, what do most of us have **to hide** that anyone would want to map?



Personal Location Masking

.....

the practice of obscuring one's personal location
data

.....

Seidl, Jankowski, Clarke, & Nara (2020)

Section 1. Location

Please enter your home location.

Street	<input type="text"/>
Cross Street	<input type="text"/>
City	<input type="text"/>
State	<input type="text" value="CA"/>
Zip	<input type="text"/>

[Adjust my location on a map!](#)

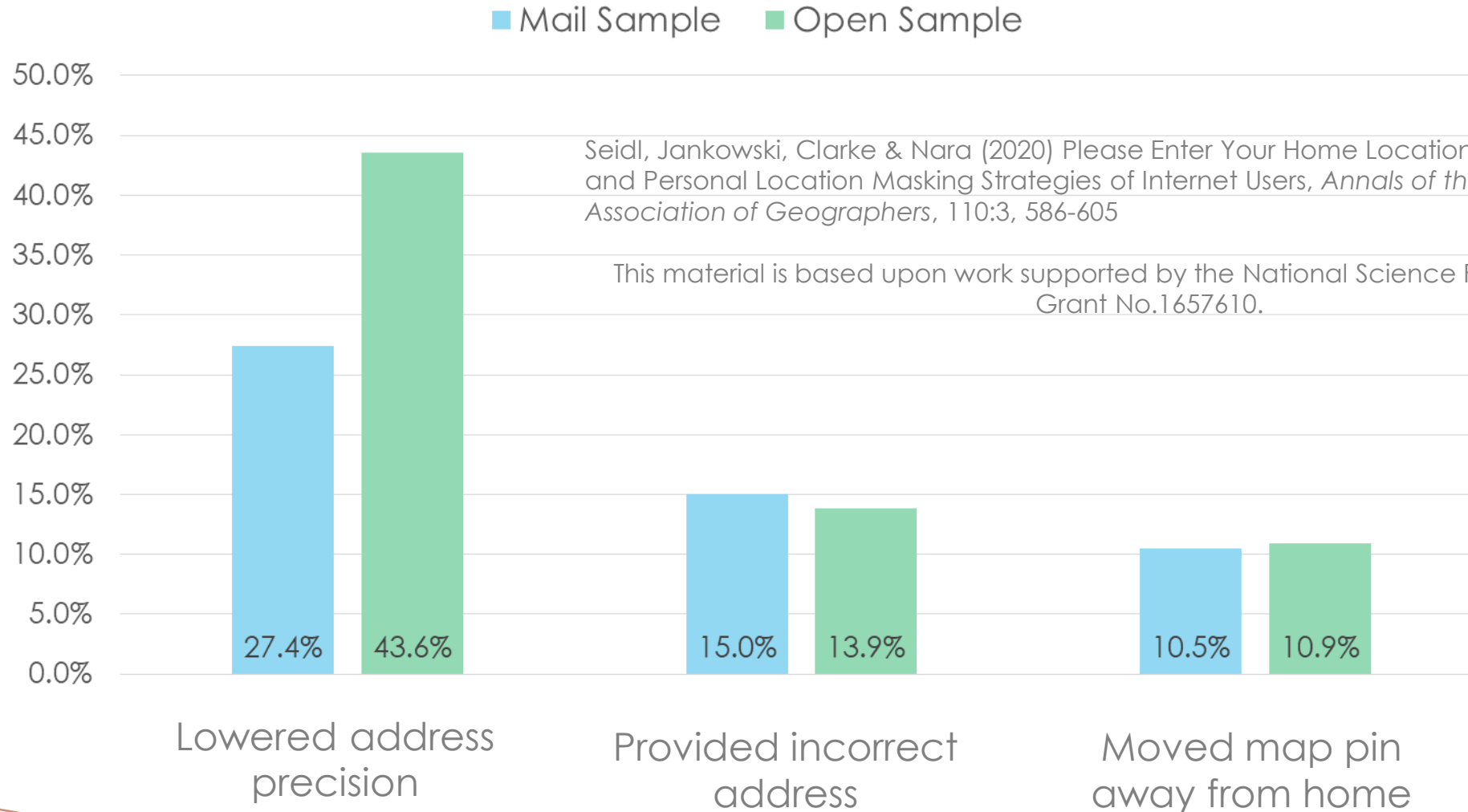
This will fill in the fields below.

Latitude	<input type="text" value="36.690446"/>
Longitude	<input type="text" value="-119.635620"/>



Click on the map or drag the pin to adjust your location.

Location Masking by Sample Group



Conclusions

- Mobile Phone Data: change since '02
- Approaches to Geoprivacy
 - Legislation
 - Self-regulation / Codes of Ethics
 - Personal Location Masking
- Adopt a “measured wariness” as we celebrate

Thank You!

deseidl@coloradomtn.edu



Geoprivacy Videos

<https://ethicalgeo.org/dara-seidl/>