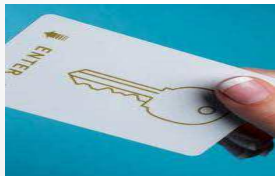


Emerging Trends That Will Impact Geospatial Information Management

Objectives of This Module

- Understand Emerging Trends That Will Impact Geospatial Information Management
- Understand How Laws and Policies Developed In Response to Emerging Technologies Could Impact Geospatial Information Management.

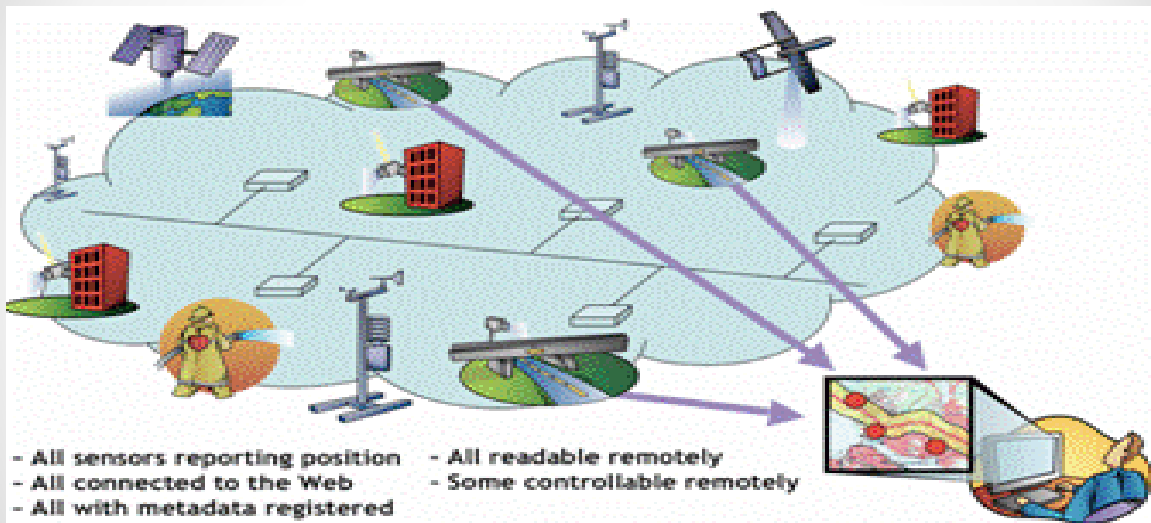
Technologies That Can Collect and Use Geospatial Information Are Growing



•

• 3

Internet of Things



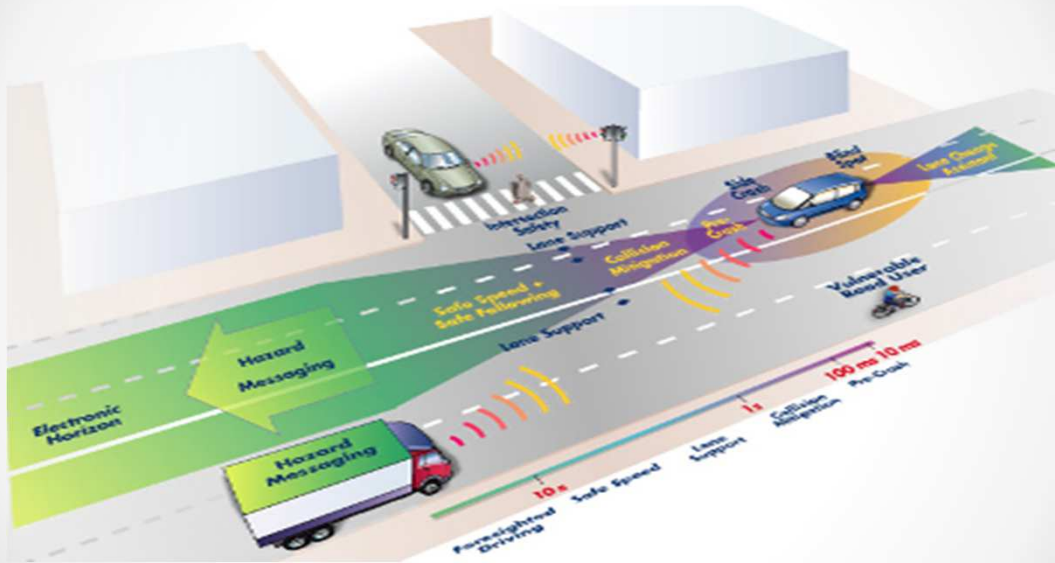
- All sensors reporting position
- All connected to the Web
- All with metadata registered

- All readable remotely
- Some controllable remotely

•

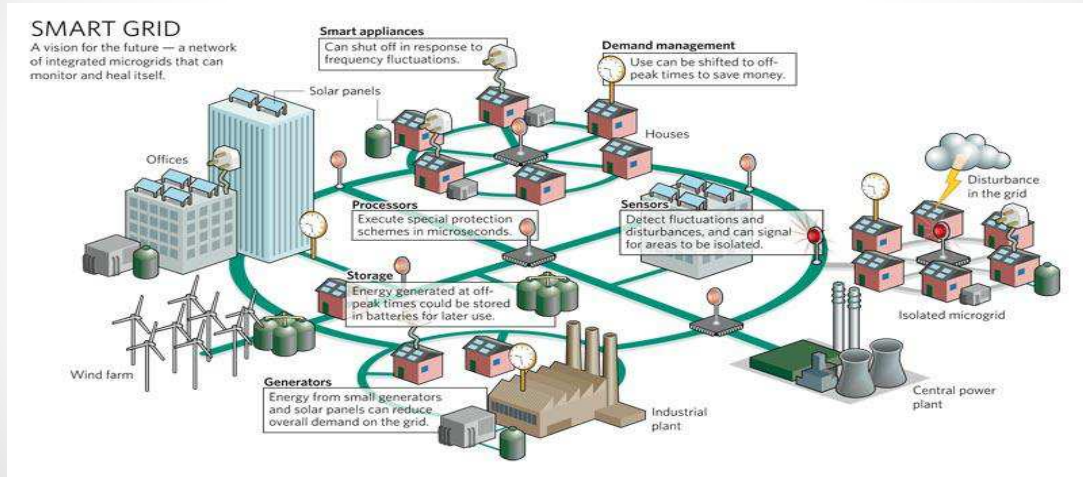
• 4

Autonomous Vehicles



• 5

Smart Grid



• 6

Unmanned Aircraft Systems



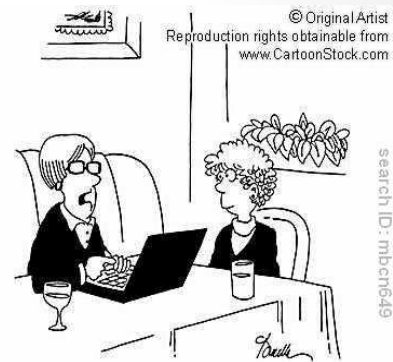
3D Visualization



Augmented/Virtual Reality



Tracking Devices



"I'm tracking my husband through his GPS unit. Right now, he's between a televised sporting event and the refrigerator."

Social Media



• 11

Crowdsourcing



• 12

Impact of New Technologies

- Increased concerns over location privacy
- New stakeholders
- New regulatory actors
- Open Data

•

•

Growth has Resulted in a Number of Media Reports On Geolocation Privacy

- Smart phone apps
- Drones
- Geotagging of on-line photos
- Law Enforcement's Use of Location Data
- Smart Grid
- Tracking Devices
- Autonomous Vehicles

•

• 14

PERCEPTIONS OF PRIVACY IN PUBLIC ARE CHANGING...

St. Peter's Square - 2005



Luca Bruno/AP

...CREATING A LOCATION PRIVACY PARADOX

St. Peter's Square - 2013



Michael Sohn/AP

White House “Big Data” Report

- White House released two “Big Data” reports in May 2014.
- President’s Council of Advisors on Science and Technology (PCAST) report:
 - Describes various types of geospatial technologies that collect born-analog data that contain “personal information”
 - Many of these relate to data collected from small sats, including:
 - video from . . . overhead drones
 - imaging infrared video
 - synthetic aperture radar (SAR)
 - LiDAR,
 - “precise geolocation in imagery from satellites and drones”

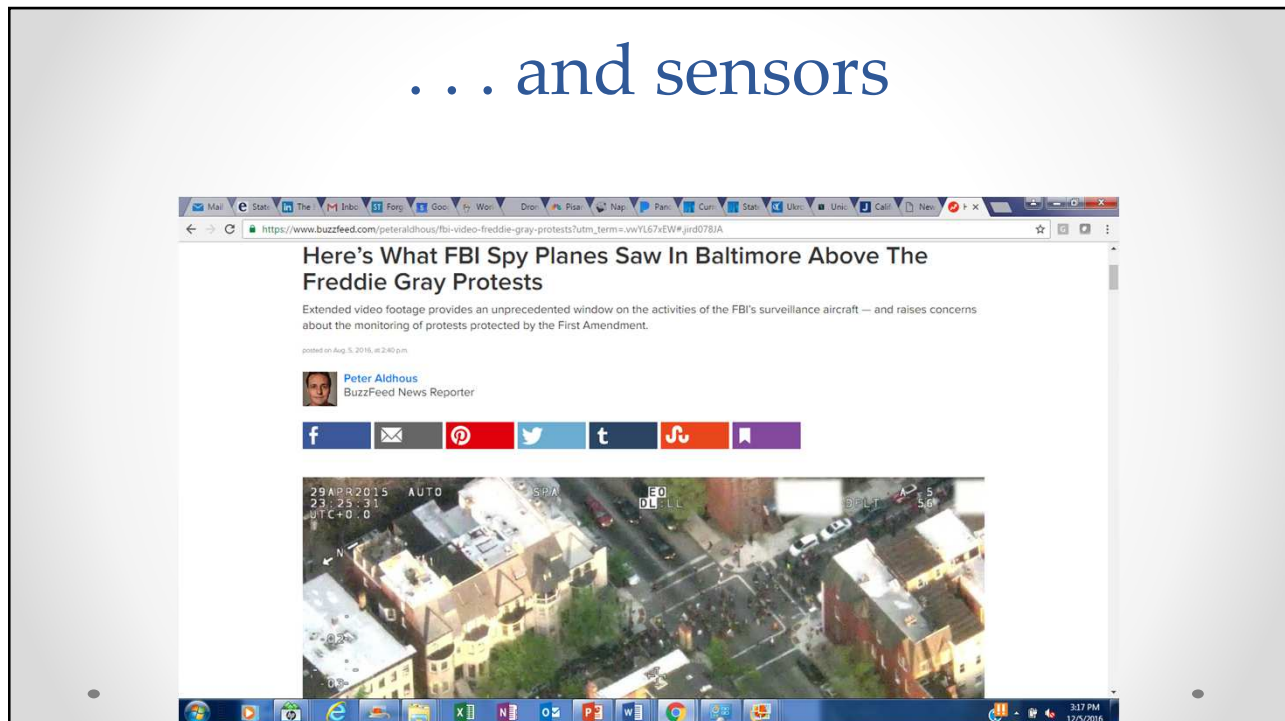
Concerns Over Geolocation Privacy are Growing .

The screenshot shows a web browser displaying an NPR article. The browser's address bar shows the URL: www.npr.org/sections/alltechconsidered/2016/12/01/503985473/uber-now-tracks-passengers-locations-even-after-theyre-dropped-off. The page features the NPR logo and navigation links for 'news', 'arts & life', 'music', and 'programs'. The main article is titled 'Uber Now Tracks Passengers' Locations Even After They're Dropped Off' by Laura Roman, dated December 1, 2016. The article's image shows the Uber logo and the text 'The Times' and 'ITV Hub'. On the right side, there is a yellow banner for Marquette University with the text 'SPEND A YEAR DOING JOURNALISM THAT MATTERS. APPLY BY JAN. 27, 2017.' The Windows taskbar at the bottom shows the time as 9:30 PM on 12/6/2016.

... Across Technology Platforms ...



... and sensors

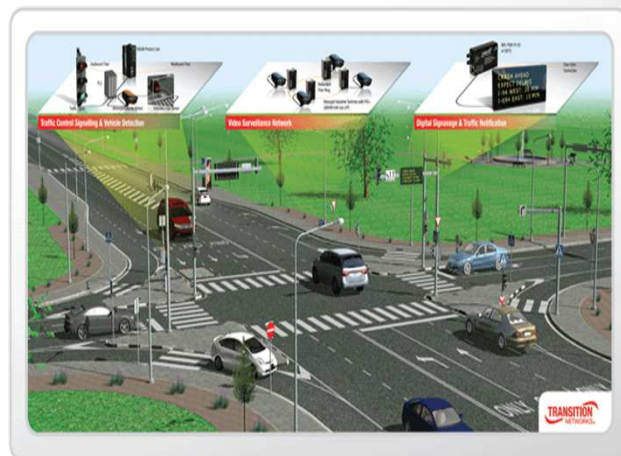


New Stakeholders

- Geospatial community will need to “share” geoinformation with new communities:
 - ❑ Smart Cities
 - ❑ Smart Grid
 - ❑ Autonomous Vehicles
 - ❑ Internet of Things
 - ❑ Open Data Communities
 - ❑ Business Intelligence
 - ❑ Internet of Things
- Each have their own motivations, concerns.
- Subject to their own regulations and legal framework.

Challenge Will Grow As New Technologies and Applications Develop

Laws/policies will developed concerning nontraditional geospatial technologies and stakeholders that will impact broader geospatial community.



Potential Impact

The screenshot shows a web browser window displaying the GovCon Insider website. The browser's address bar shows the URL: www.governmentcontractinsider.com/drones-to-satellites-should-commercial-aerial-data-collection-regulations-differ-by-altitude/#page=1. The website header features the title "GovCon Insider" in a large, stylized font. Below the header is a navigation menu with links for "HOME", "BLOG AUTHORS", and "GOVERNMENT CONTRACTS GROUP WEBSITE PAGE". The main content area displays an article dated "September 1, 2015" with the title "Drones to Satellites: Should Commercial Aerial Data Collection Regulations Differ by Altitude?" written by "Janna J. Lewis and Lauren R. Caplan". The article text begins with "The news and social media commentary of late reveals considerable discomfort with the idea that 'drones,' or Unmanned Aircraft Systems (UAS), could be used to collect images and data for commercial purposes. The idea that a flying machine —say, a 6-inch quadcopter equipped with tiny cameras —might track people or record images and data about their movements and habits strikes many as invasive." To the right of the article is a logo for "HOLLAND & HART" published by the "NATIONAL GOVERNMENT CONTRACTS GROUP". The browser's taskbar at the bottom shows various application icons and the system clock indicating "2:03 PM 12/5/2016".

Codes of Conduct

- New Stakeholders are Creating Codes of Conduct Around the Collection and Use of Geospatial Information
 - Internet Advertising – IAB
 - Mobile Devices – Mobile Marketing Association
 - Drones – Police Chief
- Will they conflict with geospatial community?
- What organizations should develop?

New Regulators

- Consumer Protection
- Telecommunications
- Privacy
- Law Enforcement
- Energy
- Transportation
 - Ground
 - Air

Drones: Voluntary Best Practices

- National Telecommunications and Information Administration convened multi-stakeholder group at direction of White House
- “In the absence of a compelling need to do otherwise, or consent of the data subjects, UAS operators should avoid using UAS for the specific purpose of intentionally collecting covered data where the operator knows the data subject has a reasonable expectation of privacy.” (Section 2a)

Drones: Restricting collection by government agencies

- “No state or local government department, agency, or instrumentality having jurisdiction over criminal law enforcement or regulatory violations, including but not limited to the Department of State Police, and no department of law enforcement as defined in § [15.2-836](#) of any county, city, or town shall utilize an unmanned aircraft system except during the execution of a search warrant issued pursuant to this chapter or an administrative or inspection warrant issued pursuant to law.” [Virginia Code Section 19.2-60.1](#)

Drones: Evolving State Laws

- “ a person . . . may not use a drone equipped with an imaging device to record an image of privately owned real property or of the owner, tenant, occupant, invitee, or licensee of such property with the intent to conduct surveillance on the individual or property captured in the image in violation of such person's reasonable expectation of privacy without his or her written consent.” [Section 934.50, Florida Statutes](#)
- “[a] law enforcement agency may not authorize the use of, including granting a permit to use, an unmanned aerial vehicle to permit any private person to conduct surveillance on any other private person without the express, informed consent of that other person or the owner of any real property on which that other private person is present.” [North Dakota Century Code t29c29.4](#)

Drones: States Redefining privacy

- Reasonable Expectation of Privacy - "a person is presumed to have a reasonable expectation of privacy on his or her privately owned real property if he or she is not observable by persons located at ground level in a place where they have a legal right to be, regardless of whether he or she is observable from the air with the use of a drone." Section 934.50, Florida Statutes.
- Surveillance - "1. With respect to an owner, tenant, occupant, invitee, or licensee of privately owned real property, the observation of such persons with sufficient clarity to be able to obtain information about their identify, habits, conduct, movements or whereabouts, or 2. With respect to privately owned real property, the observation of such property's physical improvements with sufficient visual clarity to be able to determine unique identifying features or its occupancy by one or more persons." Section 934.50, Florida Statutes.

• 29

Challenges: Unique Aspects of Geoinformation

- ▶ Much more difficult to define
 - Compared to other protected information - social security number, health records, credit information
- ▶ Temporal component
 - Present vs. historical?
- ▶ Cultural, gender, age, religious, social components
- ▶ **Location information is collected in many more ways**
- ▶ Privacy challenges are much more varied.
- ▶ We regularly provide our location to others.

• 30

Who is in best position to decide?

- Legislatures
- Regulators
- Court cases
- Industry
 - Codes of Conduct

• 31

Open Data

- Now with all different types of data available, increased calls for Open Data.
- Being driven by policy/technology folks, not geospatial community.
- But much of the data is geo-enabled.
- Some unique aspects of geospatial information not being considered.
- Geospatial community has been using Open Data for years

Open Data Licenses

- Most Open Data is published under some sort of licensing arrangement
 - Very little data released into Public Domain
- Open Data Licenses are not necessarily compatible
- OpenStreetMap
 - Began using a CC-type license
 - Switching to a database license (ODbLI)
 - “Users can copy, distribute and use the database ... to produce works from the database and ...to modify, transform and build upon the database”
 - “share-alike”
 - “proper attribution”

• 33

Other Open Data Licenses

- Creative Commons licenses - <https://creativecommons.org/licenses/>
- Database Contents License - <http://opendatacommons.org/licenses/dbcl/1.0/>
- Open Data Factual Information License - <http://www.opencontentlawyer.com/open-data/open-data-commons-factual-info-licence/>
- Open Data Use License – India - https://data.gov.in/sites/default/files/Government_Open_Data_Use_Licence_India.pdf
- Open Government License - Canada - <http://open.canada.ca/en/open-government-licence-canada>
- Germany GeoLicenses - <http://www.bmwi.de/Redaktion/DE/Artikel/Digitale-Welt/geolizenz.html>

Aggregating Open Data

- It can be difficult to combine data sets under different Open Data license.
- For example, some users can't use OSM geospatial information because of "share-alike" provisions and attribution requirements
- Making data open is a policy issue, but using open data is a legal/licensing one.

•

•