Re-use of Public Sector Information in the U.S:

An Incentive for Competition and a Potential Benefit to the Public

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It is wonderful to be here in your amazing city with so much history. I'm going to offer you a perspective from my view that is hopefully helpful to you for a broad understanding of how the United States has approached re-use of public-sector information, and Geographic Information Systems information in particular.

As I prepared Preparing for this symposium, creating an effective overview for you has truly been a challenge. It has been difficult to unify my presentation because the question of how the U.S. handles re-use of public information has many answers. There is so much material on this topic that I can only share a few examples with you today. I hope I can offer you some things to consider and some ideas that might be useful in your own operations.

I bring a unique perspective because I am a local government elected official —the Assessor in Boulder County, Colorado. I also served as president of URISA (Urban Regional Information Systems Association) last year.[1] I am a big believer in GIS, for data captured at the property ownership, parcel level. We have seen the power of geographic information at every level of our business, and we know its influence is limitless. There are both the positive and negative aspects of how the U.S. arrived at where it is today with GIS information. We'll focus this afternoon on the area of Geographic Information, as this is central to much of the discussion occurring around the globe today. It's a hot topic.

Our office has had the experience of offering pubic-sector information for sale for 30 years, and GIS information for the last 15 years. We provide ownership data, property characteristics and sales information about all properties in the county. Our work with land records is GIS-centric, having everything to do with location. Our GIS information, which consists of digital parcel maps, spatial references, a map description of the property—all kinds of data about the property—can be linked and displayed on the map. Digital parcel maps in GIS are "smart" maps. In other words, every parcel knows everything else about the parcels around it.
From a local perspective, we've seen the re-use of our data in many forms.

We currently sell our GIS parcel data for 120,000 properties for $5,000 US. I wish I could say that all local governments worked together to determine a unit of comparison and sold data for a similar price. But that would not be correct, and let me explain why.

In order to understand the economic dynamics within the U.S., I'd like to provide you a brief overview of the federal, state and local rules that govern policy decisions about making public information available for re-use. I will also share agency information, examples and respond to some of the Symposium questions you have posed.

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[1] www.urisa.org

There are three branches in the U.S. federal government—the Legislative branch enacts laws; the Executive branch executes laws; and the Judicial branch interprets laws.[2] Each branch is designed to check and balance the other. Similar checks and balances exist at the state and local levels. Availability of public information is regulated by policy at all of these levels.

First, the United States Constitution creates two different systems of government—federal and state—each with unique powers and duties concerning geospatial data.[3] A fundamental principle of open government under the Constitution is that public information is available for public use. Various federal statutes enable federal agencies to generate and disseminate public information. This information is further defined and regulated by federal laws, which govern public access and privacy. The Federal Freedom of Information Act requires that federal agencies disclose records requested in writing by any person. However, agencies may withhold information pursuant to nine exemptions and three exclusions contained in the statute.[4]

Two publicly available and widely used examples of public information at the federal level are the U.S. Department of Commerce Bureau of Census street centerline data and demographic statistics.[5] These data cover the entire country and are updated every 10 years. Over the last 30 years, the digital DIME and TIGER files moved geospatial data from the printed page into the electronic world of computers.[6] This led to the widespread private and public use of geographic information. Thirty years ago, the availability of the electronic DIME and TIGER files was the catalytic event creating a market for geographic information that, especially today, continues to expand. TeleAtlas and NAVTEQ are two global examples of the powerful economic incentives that results from making geospatial data accessible. [7] [8]

At the federal level, the Federal Geographic Data Committee (FGDC) works to coordinate geospatial information.[9] FGDC is an interagency committee that promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis. This

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[2] URISA Public Access Workshop, 2004, Ed Wells and Mary Tsui

[3] Colorado Revised Statutes 2006, U.S. Constitution, committee on Legal Services, Jennifer G. Gilroy, Reviser of Statutes, and the Office of Legislative Legal Services, p. 7.

[4] US FOIA homepage www.state.gov/m/a/ips/

[5] www.census.gov

[6] *Dual Independent Map Encoding* (DIME) is an encoding scheme developed by the US Bureau of the Census for efficiently storing geographical data. The committee behind the case study that eventually resulted in DIME was established in 1965, although the term DIME itself was first coined by George Farnsworth in August of 1967. The file format developed for storing the DIME-encoded data was known as Geographic Base Files (GBF). The Census Bureau replaced the data format with Topologically Integrated Geographic Encoding and Referencing (TIGER) in 1990.

Topologically Integrated Geographic Encoding and Referencing, or TIGER, or TIGER/Line is a format used by the United States Census Bureau to describe land attributes such as roads, buildings, rivers, and lakes. The data can be used by GIS applications and is available without cost due to the requirement for U.S. Government publications to be released into the Public Domain. TIGER maps issued through February 2007 (2006 Second Edition) are in a custom format, while future editions will be issued in shapefile and web-compatible formats; see the US Census page on the future of TIGER data for more information. Wikipedia, 2007.

[7] www.teleatlas.com

[8] www.NAVTEQ.com

[9] www.fgdc.gov

nationwide data publishing effort is known as the National Spatial Database Infrastructure (NSDI).[10]

At the second level of government are the 50 individual states, each with their individual constitutions setting up their own structure of government. For example, the Constitution of the State of Colorado was established *"…in order to form a more independent and perfect government; establish justice; insure tranquility; provide for the common defense; promote the general welfare and secure the blessings of liberty…."* [11] Colorado defines processes for its own executive, legislative and judicial roles; establishes elections, and defines government powers such as taking property for public use, and uniform taxation [rework all verbs for parallel structure]. It the constitution provides for education, health and welfare of the citizens of the state. It creates counties, structures corporate law, provides regulations for mining and water use, and creates a state militia.

Every state is unique in its approach to collecting and disseminating geographic data. In Montana, for instance, a state program provides data to the counties and supports counties in gathering and maintaining these data. Colorado is different in that there are few resources at the state level to support this process. Indeed, every state is different in how they create, track, manage, sustain and distribute geographic data sets. And availability of the data sets varies, depending on individual state statutes on public access and privacy, and judicial decisions that result in state-specific case law. Open Records Acts in each state define what is public information, if there is cost recovery and how information will be provided. The Open Data Consortium offers a compendium of state statutes. [12] We have recently experienced a direct relationship of Pubic Sector Information to state level Open Records Acts in California. A group called the First Amendment Coalition, of which the Open Data Consortium is a member, won a legal battle against Santa Clara County, California, in Superior Court in May. The group successfully used the California Public Records Act that, in part, says "…records to be available for no more than the cost of duplication…" in the case.

A key organization at the state level is the National States Geographic Information Council (NSGIC) that works to coordinate state efforts to manage GIS data.[13] One of NSGIC's projects, "Imagery for the Nation," would provide aerial photography for the entire U.S.

States are empowered to create local governments and grant powers to these local jurisdictions. The state statutes delegate power and decision-making abilities to local and municipal governments. These powers include managing the business of local taxation for funding local government services. Sixteen states have some sort of central management of local assessment information, and 22 states simply compile information. The cost of conversion of parcels ranges from $4.25 per parcel to $15.[14] Within this framework, many local governments devise their own strategies for capturing, deploying and using the data. The data, then, most strongly reflects local influences.

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[10] www.fgdc.gov/nsdi/nsdi.html

[11] Colorado Revised Statutes 2006, p. 27

[12] Open Data Consortium, www.opendataconsortium.org

[13] www.nsgic.org

[14] Stage, David and Nancy von Meyer: An Assessment of Parcel Data in the United States, FGDC Subcommittee on Cadastral Data. March 2003, updated 2006.

Our business at the local level is taxation, which requires that we maintain a comprehensive geographic database of all properties. The statutory charge to us in county assessors' offices in Colorado is to list, value and map properties. In Boulder County, we have built a Geographic Information System that includes all parcel data, street centerlines, aerial photography, property ownership and physical attributes for the more than 120,000 properties within the county boundaries. The primary funding for the project occurred at the local level.

I would like to give you some perspective to illustrate why there is so much emphasis on local power, control and autonomy in the United States. Underpinning the formation of the United States was a unique economic force that is best described in the following paragraphs. It started in the 1700s with the war that led to the formation of our country. I have not seen it better stated than in a book, "Measuring of America," by Andro Linklater: [15]

> "The most urgent problem facing the newly independent United States was how to pay for the war that won the country its freedom; America's debt was enormous. The nation's greatest asset was the land west of the Ohio River, but in order to sell this huge territory, it first had to be surveyed—that is, measured out and mapped. The book, *Measuring America,* tells the fascinating story of how this unique system was achieved and how it has profoundly shaped our country and culture over more than two centuries."
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> "What began on the banks of the Ohio River in September 1785, was not just a survey. It was where the most potent idea in economic history—that land might be owned like a horse or a house—was first released into the Western wilderness."

From there sprang the concept of local ownership of property by any citizen. In the U.S., the ownership of property is primarily at the local level, and the tracking of the information about that property is documented at the local level. William Howard, in his article, "The Rush to Oklahoma," tells of one extraordinary set of events. [16]

> "In 1889 the opening to white settlement of a choice portion of Indian Territory in Oklahoma set off one of the most bizarre and chaotic episodes of town founding in world history. A railroad line crossed the territory, and water towers and other requirements for steam rail operation were located at intervals along the tracks that connected Arkansas and Texas. Two places—Oklahoma Station and Guthrie Station—seemed particularly well located for eventual urban development. In the months before the territory was opened, individuals and groups representing town site companies scouted these locations and prepared town plans for these sites.
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> "Congress had failed to provide for any form of civil government. Although the area had been surveyed into the standard system of 6-mile square townships and mile-square sections of 640 acres each, no sites for towns had been designated let alone laid out in streets and lots. The rules simply provided that at noon on April

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[15] www.measuringamerica.com

[16] William Willard Howard, "The Rush to Oklahoma," Harper's Weekly 33 (May 18, 1889): 391-94.

> 22 persons gathered at the Arkansas or Texas borders would be permitted to enter, seek a parcel of unclaimed land, and file a claim of ownership in accordance with the applicable Federal laws governing the disposal of the public domain. Federal marshals, railroad personnel, and other persons lawfully in the territory before the opening ("legal sooners") were prohibited from filing land claims—a provision that was more violated than observed.
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> "In some respects the recent settlement of Oklahoma was the most remarkable thing of the present century. Unlike Rome, the city of Guthrie was built in a day. To be strictly accurate in the matter, it might be said that it was built in an afternoon. At twelve o'clock on Monday, April 22d, the resident population of Guthrie was nothing; before sundown it was at least ten thousand. In that time streets had been laid out, town lots staked off, and steps taken toward the formation of a municipal government. At twilight the campfires of ten thousand people gleamed on the grassy slopes of the Cimarron Valley, where, the night before, the coyote, the gray wolf, and the deer had roamed undisturbed. Never before in the history of the West has so large a number of people been concentrated in one place in so short a time. To the conservative Eastern man, who is wont to see cities grow by decades, the settlement of Guthrie was magical beyond belief; to the quick-acting resident of the West, it was merely a particularly lively town-site speculation."

This phenomenon of local and individual ownership of the land is a fundamental difference in the United States, in contrast with many other parts of the world. This is indeed a double-edged sword because a multitude of local government units manage the country's data.

To give an example from my area of the country, the state of Colorado ranks 24th in population and 7th in land area compared to the other 49 states. Within our state, 64 separate county governments manage public information for about 2.1 million parcels and more than 42 million acres of agricultural land and natural resources. Across the 50 states are 3,300 counties and local jurisdictions managing all properties for a national population of 330 million people, within a total U.S. land area of 3.5 million square miles. Each of these local jurisdictions manages its own parcel records, in accordance with state standards, and typically, each uses its own selected computing system to do it.

In most cases, the local governments have been responsible for the capture of local GIS data. The state and federal governments have generally little provided support over the years for this effort in regard to funding. Varying implementation of federal data standards and widely differing local conditions result in amazing variety within the geographic data. In Colorado, local officials don't rely on the state for the computing environment we use to hold our data. Likewise, the state has few resources to support the local data-collection efforts. This is part of the reason that fees charged for data the local level vary from state to state, and from county to county. The prevailing approach was "whatever the market will bear," with $1 per parcel often the starting point as counties looked for a return on investment. Early entry into the data sales business in the mid 1990's rewarded technologically advanced counties, some with $250,000 or more one time purchases. Over time, pricing has steadily decreased, as in Chester County, Pennsylvania, $6,000, Clark County, Nevada, $2,500, Gwinnett County, Georgia, $100 for each layer, Rapid City, South Dakota, $75, and a range across Colorado counties from no charge to $10,000 for GIS data.

There is difficulty is meeting state-level standards on property data. In Colorado's case, the existing standards lag behind the technological progress—and the public's expectations—for providing GIS data and property information. Many influences have led to what is by now an odd-looking blanket of coverage around the US. The quality and availability of data depends on the wealth of the jurisdiction, their ability to commit resources into the data-capture effort, and the strategic goals and political will of local officials. What we put on the web and what we keep in the office is discretionary within our state guidelines of public information. It depends on our internal strategic interests and our internal staff resources, as to how far we can go with it. Cindy Braddock, the GIS Deputy in my office, says, *"The funding dollars come up through the political system, and if the constituents don't see a return on the investment, the dollars go elsewhere."*[17]

If we look at the history of the country from paper maps to the digital age, America's land records have gone through the greatest evolution within the last 35 years. In the last three decades, we have experienced an unprecedented technological revolution that has outpaced and even overrun the policy-making capability of our governments at every level.

In the 1970s, which was an extraordinary time politically in the U.S., the U.S. Freedom of Information Act, first passed in the 1960's, was greatly strengthened. The goal was for open government as a sort of reaction coming out of the Watergate era.

In the 1970s a seminal event occurred that changed the scope and purpose of geographic information from that date forward. The federal government conducted a census in 1970, as it does every 10 years, using the rudimentary "DIME" (Dual Independent Map Encoding) file. The DIME method of street-map encoding resulted in coded street segments between intersections, identifying "right" and "left" blocks with address ranges on each side. The DIME files were very widely distributed throughout the U.S., and used as the basis for many applications. This key innovation in the history of GIS went from the spark of invention to academic publication in a period of three months.[18] GBF-DIME files were digitized for all U.S. cities during the 1970s and were a key component of the current TIGER (Topologically Integrated Geographic Encoding and Referencing) system that in turn is a critical part of the National Spatial Data Infrastructure (NSDI).[19]

In the 1980s, many unfunded mandates were passed down by the federal government to other levels of government. We saw an enormous increase in the adoption of GIS technology throughout the country, and with growing debates at that time, too, on public access law and cost recovery. Millions of dollars began to be invested in building GIS at the local level.

Also during the 1980s, the U.S. Census data, the TIGER files, were made available to everyone. TIGER gave the counties a huge boost toward developing and maintaining maps of their street centerlines. Topological ideas of DIME were refined in the TIGER model. Topology is a coding system to enable the data's own understanding of their relationship to other data. TIGER helped build urban atlases, which were computer-generated maps for selected census variables for selected cities. These centerline files stimulated development work on products that rely on street

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[17] Braddock, Cynthia L., GIS Deputy Assessor, Boulder County Assessor's Office, Boulder, Colorado, formerly with U.S. Department of Fish and Wildlife.

[18] www.ncgia.buffalo.edu/gishist/DIME_story.html

[19] www.fgdc.gov/nsdi/nsdi.html

network databases. The TIGER street centerline layer was the beginning point for GIS data capture in Boulder County and across the nation.

At the same time this was happening for local governments, the TIGER files helped the private sector to understand the possibilities of new capabilities such as automobile navigation systems, driver guides to any destination, emergency vehicle dispatch, UPS (United Parcel Service) and Federal Express parcel delivery, and aids for the U.S. Postal Service mail delivery. TIGER demonstrated the enormous value of simple computer maps for marketing and retail applications—this had huge economic implications for the future.

During the 1990s, the U.S. embarked on a "reinventing government" strategy—the idea that government should be entrepreneurial and privatized. There were amendments to public record laws to allow for cost recovery. The debates began about legal issues of access, copyrights and formal policies that needed to be created around public records.

In the early 1990s, the United States Geological Survey (USGS) made their topographic maps of the U.S. available on-line.[20] USGS map products were available for the cost of copying. Public- and private sector companies quickly took advantage of these data sets. The USGS Library, the largest earth science library in the world, provides access to more than 300,000 books, maps and serial records in the U.S. Geological Survey Library on-line catalog. Their data are in the public domain and include topographic maps, digital elevation models and aerial orthographic quad maps.

In the late 1990s, the world experienced an explosion of the Internet and GIS information on the web. Access to public information had become more desirable to the public and private sector. Local governments struggled to meet the expectation of an increasingly knowledgeable and web-savvy public.

At that time, NAVTEQ and TeleAtlas both provided mapping data to GPS manufacturers, on-line mapping services and, generally, to any other application that might need street-level mapping data. NAVTEQ and TeleAtlas both started with DIME/TIGER files and acquired local-level parcel information to help build their products.

Pre-2001, the push in the U.S. was to "get the data out there" on-line. There was emphasis on data sharing. In fact, we were developing all our data-sharing agreements with sister governments during that time. And there were privacy concerns and liability worries coming into focus. There were multi-county GIS consortia, which formed to cost-share and exchange information. A good example is the Metro GIS in Minnesota.[21]

Then, September 2001 occurred. While GIS capabilities had been continually expanding, in the aftermath of 9/11, there was a sudden worry about security and privacy. There was a general redaction of geographic information on the web—pulling data back in, in an attempt to protect and safeguard the nation from terrorism. Although many concerns continue about privacy and security in the post-9/11 era, the data are already out there.

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[20] United States Geological Survey, http://www.usgs.gov
[21] MetroGIS DataFinder, Minnesota, www.datafinder.org

In recent years, the information giants Google Earth and Microsoft have literally put the world on people's laps—onto their laptops and computers at home and in their offices.[22] [23] They brought aerial and satellite imagery to the people—data that was so expensive it had previously been out of reach for the average citizen. Now it is freely available to everyone. Google Earth and Microsoft can paint the picture beautifully—and the power is in the picture. Google Earth and Microsoft take you anyplace on the globe, as long as they have the data. Think about it. A map of the world and your area is the perfect carpet on which to pin your data. With the tools available now to anyone, you can create your own map of the world. Jack Dangermond, president of ESRI, says each of us can create our own "globe" to share our own data and publish it out there on the web.[24]

The economic setup for widely available geographic information was initially accomplished by a lot of federal data being released freely or at minimal cost. The big private providers, however, still come to local government for local data to build their applications, some of which are open source. Local data help them draw people to their websites.

At the local level, we share property data with Google Earth and Microsoft. And let's look at a significant value-added piece to this equation. Google Earth and Microsoft, in turn, provide back to local governments a broad-based, very user-friendly interface that local jurisdictions use for their own internal research, and as a template to present their data to the public. In my office, mountain property appraisal staff uses these views every day in their work. We also believe that data resellers provide an economic benefit for our community as the global marketplace looks at our location for properties that are available for commercial businesses.

In Boulder County, our job is to maintain the most accurate land and property data possible. We have been educating our public for many years, and we consider our citizens to be partners in maintaining our property database. We have implemented modern tools for easy web interfaces that contribute to the transparency of our processes. Our goal is to demystify the process of property valuation and taxation. We believe the more information we share, the better our product. And with better information, our relationship with our community only becomes stronger.

Right now we're witnessing an interesting phenomenon. The real estate market data has suddenly been discovered on-line. With recently appearing services like Zillow, an Internet-based real estate marketing service, the entire world is now right in the middle of our local world of local property data.[25] You can shop for homes on-line. You can sell your home on-line. You can get an estimate of value for any property on-line. You can virtually walk down the street in any neighborhood in most of the U.S. on-line. You can see any number of estimates of value, depending on where you look and whose tool you use on-line. Since February of 2006 private real estate data providers have exploded into the market on the web.

How are Zillow and the other real estate marketing companies compiling all this property data? They are using public data from local governments and local real estate sales information. They

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[22] www. Google.Earth.GooglePages.com/Earth

[23] www.Microsoft.com

[24] Jack Dangermond, president, Environmental Systems Research Institute, Inc. www.esri.com

[25] www.zillow.com

get the information from us or from a third-party reseller, to whom we sold our data a long time ago. The individual details of individual properties are only as good as the data sets from which they come.

Zillow wants to bring you to their website for advertising purposes. Other companies, such as Prudential, Remax, and First American Title use that same look and feel of real estate information to bring you to their websites so you can acquire their services, for a fee.[26] [27] [28] These companies are reselling public information with an added value of some kind on their websites. At least eight new companies have launched websites within the last 15 months since Zillow came out, offering similar on-line services to attract consumers. The economic opportunities are tremendous.

Another private company, Pictometry, provides services to local governments.[29] Pictometry offers the power of the oblique images. You can measure land and structures, you can collect data, you can see ingress-egress. You can tie Pictometry's images to your GIS services. However, Pictometry owns the data and licenses their images and information back to local governments. And they sell it to other companies. When Pictometry sold their images to Microsoft, that data included sensitive images, which were then available to the whole world . . . images such as the U.S. government buildings in Washington D.C., and an Ohio county's nuclear power plant. These images have since been redacted from Pictometry's data. Every positive aspect of competition brings with it a mirror image challenge, that "double-edged sword" I spoke of earlier. One competitor for Pictometry, MultiVision USA, provides a similar solution with a different licensing structure.[30] MultiVision doesn't own the data, the local jurisdiction does. We are in the process of completing a contract with Pictometry right now.

Many retail companies have acquired geographic coverages of the U.S. To their marketing research they add the census demographics and traffic patterns from transportation layers available in the public GIS. As a result, they can see where the next new shopping mall should be located. This is just one example.

These examples of private companies placing public data on-line illustrates the gap between accuracy of the data and the power of the visual. Zillow.com provides street-level images of real estate data to anyone with access to the Internet. Their concern is not necessarily accuracy. Today, Zillow's home page offers photos, maps, real estate guides, market data and estimates of value on more than 70 million homes. Their data reflect GIS point locations captured for 70 million homes, and whatever data comes with these points, from whatever source Zillow can find.

Zillow, First American, Google Earth and Microsoft have discovered what we have always known— that people really care about where they are. Former U.S. Senator Bob Kerrey said last year that, *"Knowing where you are geographically matters. Your chances of making the best*

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[26] www.prudential.com

[27] www.remax.com

[28] www.firstam.com

[29] www.pictometry.com

[30] www.mv-usa.com

decision. . . improve dramatically if you know exactly where you are when you choose."[31] These big companies have banked on this fact. Indeed, 80 percent of the questions that come in to local government are about location. There is tremendous economic potential in knowing where you are.

While we, as data stewards, have a legal obligation to generate accurate data, we also deal with the misconceptions that come to us as the public's concerns about what is appearing on the Internet. For example, one of our staff members found three very different estimates of value for her own home on-line. What seems to matter on the web is which website grabs your attention first. Companies doing business on-line put their resources into the most dazzling website. Accuracy can be of secondary importance to availability.

So where do we find ourselves now?

I recently received a Global Response Technologies advertisement in my e-mail. It was sent to me because I hold a realtor's license. The ad stated *"Let us help you make money by setting up your website. You have properties to sell, we have ways to put your properties out there on the Internet. We have ways to draw people into your website with content-rich information that clients are begging for."* This company is offering services to me because they found out, via publicly available information on the Internet, that I am a realtor. I mention this because it illustrates the full circle of our own data being offered back to us for a fee, within the open marketplace.

Meanwhile at the federal level, a presidential initiative, the White House OMB Geospatial Line of Business, has been underway for a year. The U.S. federal government is examining the resources it now spends on capturing and maintaining geospatial data at the federal level. The federal Office of Management and Budget is working to recognize and collaborate with partners at tribal, state, local and private sectors to share resources and data. The Geospatial Line of Business was begun in 2006, and calls for committee members have been released nationwide on May 14 this year.

Companies such as Microsoft and Google Earth have immense resources that local jurisdictions do not. If local data aren't readily available, the big players on the Internet will go get it. For example, Google Earth purchased time on an Earth-pointing satellite to geo-reference all rooftops in King County, Washington—Seattle. As a result, there is likely to be overlap in the marketplace, with competing companies spending twice the effort and dollars to over-collect the same data. From a local government perspective, we wonder if there is there a way for the big private companies to share back their data with local governments who traditionally cannot afford the costs of collecting these data? We hope so, but we don't know the outcome.

The bar of public expectation is rising quickly! Google and Microsoft have learned the lesson: The public will use data that are easily accessible and easy to understand. As a local official, it is my duty and my passion to provide accurate data to my constituents and for the greater good of the public. In an ideal world, I would love to have Google and Microsoft, with their worldwide customer bases, publishing the best products my office generates. In 2005, my office published a Notice of Value to homeowners that showed property details, photos of similar properties and a

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[31] Former U.S. Senator Bob Kerrey, "Why Have We Made It So Far and Done So Well," ESRI 2006 Plenary address, San Diego, California.

map. Our property owners expressed great appreciation for the clear understanding the visual images provided. Perhaps the future of our data sales will be this kind of product.

A rapid movement is going on right now to provide the missing infrastructure component in the U.S.—a coordinated parcel coverage for the 3.5 million square miles of publicly and privately owned properties. Nationwide private providers of insurance and other services have already recognized the value of parcel-level data. What is more, these providers are duplicating their efforts, and all of them could benefit from a "standard" nationwide coverage. The federal government for many reasons also recognizes this need, and its National Academy of Sciences Mapping Science Committee has formed the Land Parcel Database Study Committee to explore possibilities. Our study will be released in June, by the National Academy of Sciences.[32]

We are asking these questions and many others:

- How "public" should public data be?
- How do we better deliver information, balanced with protecting privacy?
- What do we do about the balance of data accuracy against data availability?
- Where are the points of vulnerability and exposure within the public data domain?
- Do we meet the public good by providing information on the Internet by opening our community to potential new business and economic interests?
- Are we limiting our potential for economic growth and revitalization if we are not on the web?
- Is the Internet becoming the best way to attract commercial interests?
- What do we do about identity theft?

The data-privacy-security-accuracy-availability debates continue today. It is a world-changing topic with global impact, and each of us carries our own view into the discussion. All I can offer you is my own perspective and hope that you find it useful in your discussions. These are exciting times in which to live and change the world. Thank you for inviting me to share my little corner of that world.

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[32] "Land Parcel Databases: A National Vision," report of the Mapping Committee of the National Academy of Sciences, June 2007, www8.nationalacademies.org