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GEOSPATIAL INFORMATION: A PROGRESS REPORT ON IMPROVING OUR NATION'S MAP-RELATED DATA INFRASTRUCTURE

HEARING

BEFORE THE

SUBCOMMITTEE ON TECHNOLOGY, INFORMATION POLICY, INTERGOVERNMENTAL RELATIONS AND THE CENSUS

OF THE

COMMITTEE ON GOVERNMENT REFORM

HOUSE OF REPRESENTATIVES

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GEOSPATIAL INFORMATION: A PROGRESS REPORT ON IMPROVING OUR NATION'S MAP-RELATED DATA INFRASTRUCTURE

TUESDAY, JUNE 10, 2003

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON TECHNOLOGY, INFORMATION POLICY,
INTERGOVERNMENTAL RELATIONS AND THE CENSUS,
COMMITTEE ON GOVERNMENT REFORM,
Washington, DC.

The subcommittee met, pursuant to notice, at 10 a.m., in room 2154, Rayburn House Office Building, Hon. Adam Putnam (chairman of the subcommittee) presiding.

Present: Representatives Putnam, Miller, Clay, and Watson.

Staff present: Bob Dix, staff director; John Hambel, senior counsel; Scott Klein, Chip Walker, Lori Martin, and Casey Welch, professional staff members; Ursula Wojciechowski, clerk; Suzanne Lightman, fellow; Bill Vigen, intern; David McMillen, minority professional staff member; and Jean Gosa, minority assistant clerk.

Mr. PUTNAM. This hearing of the Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census will come to order.

Good morning and welcome to today's hearing on geospatial systems and improving our Nation's map-related data infrastructure.

As many of our witnesses today will likely convey, getting our arms around the array of geospatial systems issues and the technical minutiae surrounding geospatial data and geospatial technology is a monumental task. Geospatial not only provides the same challenges we have discussed in past IT information-sharing hearings, but it takes those challenges one step further in terms of adding a mapping component, location issues, data standards and intergovernmental interoperability issues. In other words, one-dimensional IT becomes three-dimensional geospatially.

Some of our witnesses and many in our audience here today have spent their entire careers working on geospatial issues, and yet emerging technology has created as many new geospatial management challenges as it has provided benefits and opportunities. But before we try to go too far down the path on technical details, it's important for the subcommittee to hold this hearing to get an overview and understanding of the geospatial issue and the role that key stakeholders play in meeting our long-term geospatial goals.

Today, we will examine the progress being made by the Federal Government to consolidate and improve utilization of the masses of data being collected by departments and agencies across the Fed-

eral Government and by State and local governments. We need to understand what programs exist across the government, how much we're spending on those programs, where we're spending that money, how efficiently, or perhaps inefficiently, we share data across traditional Federal agency boundaries, how we separate security-sensitive geospatial data from those open for public use, and how we efficiently, or perhaps inefficiently, coordinate with State and local governments and tribes.

We also need to evaluate the important role that the private sector plays to meet some of these difficult management and technological challenges. The first and most critical challenge involves data standards and interoperability. In most cases, information is collected in different formats and standards for one specific mission with little attention to subsequent intergovernmental data sharing. This is true across the Federal Government, as well as in States and localities across this Nation.

This results in wasteful redundancies and a reduced ability to perform critical intergovernmental functions. Within an atmosphere of an infinite amount of collectible data and tens of thousands of entities securing and utilizing data for individual goals and missions, not to mention emerging new uses of geospatial data, the development and use of common data standards and an organizational or management structure to coordinate these investments is more essential than ever toward reducing redundant expenditures, providing the most up-to-date information, and improving the utilization and variability of accurate data for public and private use.

As simple as it sounds, it is critical that we are all singing from the same sheet of music. Geospatial systems and our geospatial infrastructure worldwide cannot operate without resolving this standards issue, and it is my initial feeling that developing a unified game plan is generally not technology driven but rather management or personnel driven.

I'm especially pleased that we'll have an opportunity today to discuss progress being made on the Geospatial Information One-Stop Initiative, one of the President's key e-government reforms intended to simplify the process of locating, accessing, sharing and integrating geospatial information in a timely and efficient manner.

I'm equally interested, however, in the end result. It is important that taxpayers and those of us involved in deciding how to spend their hard-earned money understand the return on the investments being made, how we are using geospatial information to solve everyday problems, how we plan to better utilize that data, and how we plan to coordinate and share data across all levels of government to improve the quality of life for all citizens.

[The prepared statement of Hon. Adam H. Putnam follows:]

COMMITTEE ON GOVERNMENT REFORM

SUBCOMMITTEE ON TECHNOLOGY, INFORMATION POLICY, INTERGOVERNMENTAL RELATIONS AND THE CENSUS

CONGRESSMAN ADAM PUTNAM, CHAIRMAN

OVERSIGHT HEARING
STATEMENT BY ADAM PUTNAM, CHAIRMAN

Hearing topic: *"Geospatial Information: A Progress Report on Improving Our Nation's Map-Related Data Infrastructure."*

Tuesday, June 10, 2003
10:00 a.m.
Room 2154 Rayburn House Office Building

OPENING STATEMENT

Good morning and welcome to today's hearing on geospatial systems and improving our nation's map-related data infrastructure.

As many of our witnesses today will likely convey, getting our arms around the array of geospatial systems issues and the technical minutiae surrounding geospatial data and geospatial technology is a monumental task. Geospatial not only provides the same challenges we have discussed at past IT information sharing hearings, but geospatial takes those challenges one step further in terms of adding a mapping component, location issues, data standards, and intergovernmental interoperability issues. In other words, one dimensional IT becomes three dimensional.

Some of our witnesses, and many in our audience here today, have spent full careers on geospatial issues. And yet, emerging technology has perhaps created as many new geospatial management challenges as it has provided benefits or opportunities.

But before we try to go too far down the path on technical details, it is important for this Subcommittee to hold this hearing to get an overview and understanding of the geospatial issue and the role that key stakeholders play in meeting our long-term geospatial goals.

Today, we will be examining the progress being made by the federal government to consolidate and improve utilization of the masses of geospatial data being collected by departments and agencies across the federal government and by state and local governments.

We need to understand what programs exist across our federal government, how much we are spending on programs and where we are spending that money, how we efficiently (or perhaps inefficiently) share data across traditional federal agency boundaries, how we separate security-sensitive geospatial data from those open for public use, and how we efficiently (or perhaps inefficiently) coordinate with state and local governments.

We also need to evaluate the important role that the private sector plays to meet some of these difficult management and technological challenges.

The first and most critical challenge involves data standards and interoperability. In most cases, information is collected in different formats and standards for one specific mission, with little attention to subsequent intergovernmental data sharing. This is true across the federal government, as well as in states and towns across our country. This results in wasteful redundancies and a reduced ability to perform critical intergovernmental functions.

Within an atmosphere of an infinite amount of collectable data and tens of thousands of entities securing and utilizing data for individual goals and missions (not to mention emerging "new" uses of geospatial data), the development and use of common data standards and an organizational/management structure to coordinate these investments is more essential than ever towards reducing redundant expenditures, providing the most up-to-date information, and improving the utilization and availability of accurate data for public and private uses.

As simple as it sounds, it is absolutely critical that we are all singing from the same sheet of music. Geospatial systems and our geospatial infrastructure worldwide cannot operate without resolving this "standards" issue. And it is my initial feeling that developing a unified game-plan is generally not technology-driven, but rather management and people-driven.

I am especially pleased that we will have a chance today to discuss progress being made on the Geospatial Information One-Stop Initiative, one of the President's key E-Government initiatives intended to simplify the process of locating, accessing, sharing and integrating geospatial information in a timely and efficient manner.

I am equally interested, however, in the end result. It is important that taxpayers – and those of us involved in deciding how to spend their hard-earned money – understand the return on the investments being made; how we are using geospatial information to solve everyday problems; how we plan to better utilize geospatial data; and how we plan to coordinate and share data across all levels of government to improve the quality of life for all citizens.

Mr. PUTNAM. Hopefully we'll be joined later by additional members of the subcommittee, and we will insert their remarks at the appropriate place, but at this time we will move to the witnesses. Each has prepared written testimony which will be included in the record, and we ask that each of you summarize your thoughts and do a 5-minute presentation. That will allow us ample time for questions and dialog, although judging by the attendance, we will have no shortage of time for questions and dialog.

Witnesses will notice the time with the light on at the witness table. The green light is for you to begin your remarks; and red, we'll ask you to sum up rather quickly, because your time has expired. In order to be sensitive to everyone's schedule, we ask that you cooperate with adhering to our time schedule. We also, as is the policy of the Government Reform Committee, swear in witnesses, so if you would please rise and raise your right hands.

[Witnesses sworn.]

Mr. PUTNAM. Note for the record that the witnesses responded in the affirmative.

I'll also note for the record we are being Web cast on reform.house.gov.

I'd like to introduce our first witness, Mark Forman, who is a frequent guest of this committee, and we're always grateful for his insight. He has been appointed by President Bush to be the Administrator for the Office of E-Government and Information Technology. He is effectively our Nation's Chief Information Officer charged with managing more than $58 billion in Federal IT investments and is the chief architect of the President's e-government initiative.

Mr. Forman also oversees executive branch CIOs and directs the Federal activities of the CIO council.

Mr. Forman, you are recognized. Welcome to this subcommittee.

STATEMENTS OF MARK A. FORMAN, ADMINISTRATOR OF E-GOVERNMENT AND INFORMATION TECHNOLOGY, OFFICE OF MANAGEMENT AND BUDGET; SCOTT J. CAMERON, DEPUTY ASSISTANT SECRETARY, PERFORMANCE AND MANAGEMENT, DEPARTMENT OF INTERIOR, AND CHAIRMAN, GEOSPATIAL ONE-STOP BOARD OF DIRECTORS; AND LINDA D. KOONTZ, DIRECTOR, INFORMATION MANAGEMENT, U.S. GENERAL ACCOUNTING OFFICE

Mr. FORMAN. Thank you, Mr. Chairman. Thank you for the opportunity to appear before this subcommittee to discuss efforts by the Federal Government to consolidate and improve utilization of geospatial information. I also want to take this opportunity to thank Tony Freighter of my staff, who has done outstanding work, really leading, as the focal point, to improve the relations between State and local governments and the Federal Government in so many critical areas of applying e-government and information technology.

Geospatial data is critical to the business of government, and I think it's important that we take this opportunity to inform you of the administration's efforts. Delivering better results for the citizens is at the heart of the e-government vision.

As I've previously testified before this committee, this effort is designed to make better use of information technology investments

to eliminate billions of dollars of wasteful Federal spending, reduce government's paperwork burden on citizens and businesses and improve government responsiveness to citizens.

During the early stages of developing our e-government strategy, we set up focus groups with State and local officials. Repeatedly, State and local representatives told us that geospatial information supported their most critical functions. However, we were told that finding and obtaining Federal geospatial information was overly burdensome. State and local GIS users could spend months doing Internet searches at Federal Web sites, making phone calls, writing letters to Federal agencies in search of essential data that was necessary, often to deliver a Federal service or comply with a Federal regulation.

Our discussion has led to the selection of the geospatial one-stop as one of the 24 Presidential e-government initiatives. Because of its importance to State and local governments, the geospatial one-stop is one of five G2G, or government-to-government initiatives, and it is the focal point for Federal Government geospatial consolidation efforts.

Indeed, nearly every government agency uses geospatial tools in some capacity. However, not every agency needs to buy its own data and build its own systems. In fact, strategic coordination and Internet technologies enable organizations to share investments across agencies, even across levels of government.

The redundancies that we found trigger multiple problems and also opportunities.

Clearly, from a resource perspective, we cannot afford to buy the same data set over and over again. We have significant opportunities to buy data once and use it many times instead of buying the same data other and over, as you mentioned.

Second, redundant data sets in geospatial tools also result in confusion and excess spending by our partners. State and local governments do not have time or resources needed to integrate the data sets and serve multiple geospatial surveys and follow the various geospatial-related programs. By consolidating around the geospatial one-stop, we have an opportunity to fuse data from multiple organizations and streamline the various geospatial programs.

Third, overlapping and disparate geospatial data assets restrict multiagency or multijurisdiction collaboration, which is critical for homeland security.

Obviously, efforts to coordinate and rationalize assets across an organization will require significant coordination, planning and leadership. Our governance model and a set of guiding principles is described in the recently revised OMB Circular A–16. This circular describes the effective and economical use in management of geospatial data assets in a digital environment for the benefit of government and a nation.

In addition, OMB and the CIO Council will use the Federal Enterprise Architecture to implement and enforce these principles. The strategic management of geospatial assets will be accomplished through a robust and mature enterprise architecture. As you'll recall when we discussed this before, an enterprise architecture describes how an organization's business processes, its data, its technology and its organization work together.

OMB is nearly completed work on the first versions of the Data and Information Reference Model. The DRM will provide a consistent framework to characterize and describe the data that support Federal business lines. This will promote interoperability as well as horizontal and vertical sharing of information. Geospatial information has been targeted as one of the first data sets to be modeled.

I know that Mr. Cameron will go into much greater detail about the geospatial one-stop. I wanted to provide you with the framework we're using to manage and coordinate assets across the Federal enterprise. Finally, I would like to leave with you some of the performance targets that we will hit this year as a result of these efforts.

First, launching the geospatial one-stop portal with an initial 1,000 data sets and increase the amount of information on that portal by 20 percent each month thereafter.

Second, having 10 Federal partners who will provide resources to help run the portal.

Third, develop 10 geospatial data cost-sharing partnerships between Federal, State or local governments. Fourth, disseminate 5,000 data sets via the geospatial one-stop during the first quarter of operation and increase data sharing by 10 percent per month thereafter.

And, fifth, develop and deploy standards for 12 critical geospatial data layers.

Thank you.

Mr. PUTNAM. Thank you, Mr. Forman. We look forward to the opportunity to delve a little deeper into your testimony, but we'll continue with the other witnesses.

[The prepared statement of Mr. Forman follows:]

STATEMENT OF
THE HONORABLE MARK A. FORMAN
ADMINISTRATOR, OFFICE OF ELECTRONIC GOVERNMENT AND
AND INFORMATION TECHNOLOGY
OFFICE OF MANAGEMENT AND BUDGET
BEFORE THE
COMMITTEE ON GOVERNMENT REFORM
SUBCOMMITTEE ON TECHNOLOGY, INFORMATION POLICY,
INTERGOVERNMENTAL RELATIONS, AND THE CENSUS
U.S. HOUSE OF REPRESENTATIVES

Mr. Chairman and Members of the Subcommittee,

Thank you for the opportunity to appear before the Subcommittee to discuss efforts by the Federal government to consolidate and improve utilization of geospatial information. Because geospatial data is so critical to the business of government, I welcome the opportunity to inform you of the Administration's efforts on this very important issue.

Administration's Electronic Government Strategy

Delivering better results for the citizen is at the heart of the Administration's Electronic Government vision. As I have previously testified before this committee, Expanding Electronic Government, or "E-Government," is one of the five key elements of the President's Management Agenda. This effort is designed to make better use of information technology (IT) investments to eliminate billions of dollars of wasteful federal spending, reduce government's paperwork burden on citizens and businesses, and improve government responsiveness to citizens.

The President's 24 E-Government initiatives fall into four citizen centered groups: Government to Government (G2G), Government to Business (G2B), Government to Citizen (G2C), and Internal Effectiveness and Efficiency (IEE). The G2G segment is focused on making it easier for states and localities to meet reporting requirements, while promoting better

performance in integrated service delivery. During early stages of developing our E-Government strategy we set up focus groups with state and local officials. Repeatedly, state and local representatives told us that geospatial information supported their most critical functions.

However, we were told that finding and obtaining Federal geospatial data was overly burdensome. State and local GIS users could spend months doing Internet searches at Federal web sites, making phone calls, and writing letters to Federal agencies in search of essential geospatial data. Ironically, the data they desperately need is often necessary to deliver a Federal service or comply with a Federal regulation.

Our discussions led to the selection of the Geospatial One-Stop as one of the President's 24 E-Government initiatives. Because of its importance to state and local governments the Geospatial One-Stop is one of the five G2G initiatives, and it is our focal point for Federal geospatial consolidation efforts.

Consolidation of Geospatial Assets

Indeed, nearly every government program uses geospatial technology in some capacity. However not every program needs to buy its own data and build its own systems. In fact, strategic coordination and Internet technologies enable organizations to share and leverage these investments across agencies, and even across levels of government.

Redundancies trigger multiple problems and opportunities.

1. Clearly, from a resource perspective we cannot afford to buy the same data set over and over again. We have significant opportunities to buy data once, and use it many times instead of buying the same data over and over.

2. Redundant data sets and geospatial tools also result in confusion and excess spending by our partners. State and local governments do not have time or resources needed to integrate disparate data sets, answer multiple geospatial surveys and follow the various geospatial related programs. By consolidating around the Geospatial One-Stop we have an opportunity to fuse data from multiple organizations and streamline the various geospatial programs.
3. Finally, overlapping and disparate geospatial assets restrict multi-agency or multi-jurisdiction collaboration, which is critical for homeland security.

Obviously, efforts to consolidate and rationalize assets across organizations will require significant coordination, planning, and leadership. A governance model and set of guiding principles is described in the recently revised OMB Circular A-16 "Coordination of Geographic Information and Related Spatial Data Activities." This Circular describes the effective and economical use and management of geospatial data assets in the digital environment for the benefit of the government and the nation. In addition, OMB and the CIO Council will use the Federal Enterprise Architecture to implement and enforce these principles.

Enterprise Architectures

The strategic management of geospatial assets will be accomplished through a robust and mature Enterprise Architecture. An EA describes the organization's business processes, data, technology and how it performs its work. By aligning organizations, business processes, information flows, and technology, EA tools are used to build a blueprint for improving efficiency and effectiveness. OMB operates the Federal Enterprise Architecture Program

Management Office, created last year, to work with Federal agencies in developing a government-wide EA.

OMB has nearly completed work on the first versions of the Data and Information Reference Model (DRM). The DRM will provide a consistent framework to characterize and describe the data that supports Federal business lines. This will promote interoperability, as well as the horizontal and vertical sharing of information. Geospatial information has been targeted as one of the first data sets to be modeled.

Also, consistent with the FEA and new security guidelines, as we prepare to launch the Geospatial One Stop, we will ensure that appropriate access controls have been identified and implemented to safeguard the aggregation of geospatial data.

Conclusion and Next Steps

I know that Mr. Cameron will go into much greater detail about the Geospatial One-Stop project. I wanted to provide you with the framework we are using to manage and coordinate geospatial assets across the Federal enterprise. Finally, I would like to leave you with some of the performance targets we will hit this year as a result of these coordinated efforts. In the next year we will:

1. Launch the geospatial one-stop portal with an initial 1,000 data sets and increase the amount of information on the portal by twenty percent each month thereafter.
2. Have ten Federal partners who will provide resources to help run the portal.
3. Develop ten geospatial data cost sharing partnerships between Federal, state or local governments

4. Disseminate 5000 data sets via the Geospatial One Stop during the first quarter of operation, and increase data sharing by 10% each month thereafter.
5. Develop and deploy standards for twelve critical geospatial data layers.

Mr. PUTNAM. We'll call on Mr. Cameron next. Scott Cameron is Deputy Assistant Secretary for Performance and Management for the Department of Interior. Given Interior's extensive use of mapping and intrinsic staff talent, Mr. Cameron took on the important role as chairman of the President's Geospatial One-Stop E-Gov Initiative.

He previously served in California's Washington office, advising Governor Wilson on Federal environmental energy and natural resource issues. He also served under President George H.W. Bush as Deputy Chief of Interior Branch Issues at OMB.

Welcome to the subcommittee. You are recognized.

Mr. CAMERON. Thank you, Mr. Chairman. I'm very grateful for this opportunity to talk to you about some of the innovations that are going on in the geospatial world these days. Since you have my written testimony, I'm frankly not going to repeat much of that information. There are a few new pieces of information I'd like to share with the subcommittee this morning, so I'm going to try to hit half a dozen high points.

First of all, fundamentally what is the geospatial one-stop project all about? It's fundamentally about making it faster, cheaper and easier for all levels of the government and eventually the private sector to get access to the source of geospatial information they need to solve real-world problems on the ground, whether it's siting an industrial facility or land use planning or homeland security.

One of the specific tasks of the geospatial one-stop project, as has already been mentioned, is working on data standards for 11 thematic data layers, such as transportation, hydrography, elevation, geodata control and so on.

By getting the community around common data standards, we can ensure that data is collected to common standards, and therefore its interoperability or the opportunities for sharing it among a wide variety of partners would be much higher than if data were not collected to standards.

The second major element of the project is essentially putting together an electronic card catalog of who owns what data, what standards it was collected to, to what resolution, how old it is, so that one could go to the geospatial one-stop portal the same way one would go to a card catalog in a library, an electronic card catalog these days, and find out what the holdings are of the library, find out what level of government, Federal, State or local, owns what data and whether or not it would suit your purposes.

The third element of the project is what we call the geospatial marketplace. The notion here is that initially all Federal agencies and, by extension, eventually State and local government agencies as well would post information on the data they were planning to buy in the following fiscal year all in one location, so that everybody in the community across all levels of government, and indeed the private sector, would know what level of government was planning on buying what sort of data in what sort of location.

This is an opportunity to eliminate redundancy. This is an opportunity to create partnerships. This is an opportunity to collect data once and use it many times.

The fourth element of the project is actually creating a portal, having an online computer capability to actually get at the underly-

ing data and to be able to pull data from various sources, whether it's a data base that is owned by Polk County, FL, or the city of St. Louis or the U.S. Geological Survey or the State of Florida.

How are we organized to do this? We've taken a rather novel approach, frankly, Mr. Chairman. Approximately two-thirds of the government spending on geospatial data across the country is by State and local governments. They own around two-thirds of the data that's out there that would eventually end up on this card catalog, if you will, that I described earlier. And, frankly, the data that the local governments and the State governments own is more current, higher resolution, by most measures better than the Federal data.

So it was very obvious to us, as Mark alluded to earlier, that this project, as part of the government-to-government portfolio under the President's management agenda, really truly needed to engage State governments and local governments in meaningful fashion. We decided to do that by setting up essentially an intergovernmental board of directors for the geospatial one-stop project involving a wide variety of players from the State and local community, Western Governors Association, National Association of Counties, and so on.

So this project is truly being directed by the entire geospatial community, Federal, State and local governments all working together, all working in concert.

I'm happy to announce this morning, Mr. Chairman, that we have in fact taken the first major step toward realizing the fourth task, the portal task that I alluded to. Last week, the geospatial one-stop board of directors in fact selected a prototype, a version 1.0 for the geospatial one-stop portal that we'll be using for the next year or so. Frankly, we are pushing very hard to get this done quickly. I imagine there will be a separate procurement in about a year under a somewhat more luxurious pace than what we had until now.

The fifth item involves the private sector, and from a substantive standpoint, if we're thinking in terms of the citizen, one really has to wonder if it's not appropriate, in fact a really good idea, to make private-sector data accessible through the geospatial one-stop portal. If you are a farmer in Polk County, FL, and you're interested in elevation data because you're thinking of irrigating and you want to know where the water would flow if you brought it into your farm, you might have U.S. Geological Survey data that is 10 years old. You might have State of Florida data that is 5 years old. You might have Polk County data that is only a year old, but the resolution is only to the nearest 2 feet.

Well, if there's someone out there in the private sector who can tell you, I collected this data last week and I've got resolution to 1 foot, don't we owe it to that person to make that knowledge available to them so they can make their own decision about whether to use private or public data?

Now, speaking purely on my own in this regard, Mr. Chairman, and we'll be bringing this issue in front of the geospatial board over

the next several months, but I think if we're citizen-centric, the role of the private sector is something I'll have to consider, and I apologize for running over.

Mr. PUTNAM. None of the other members of the subcommittee object.

[The prepared statement of Mr. Cameron follows:]

STATEMENT OF
SCOTT J. CAMERON
DEPUTY ASSISTANT SECRETARY
FOR PERFORMANCE AND MANAGEMENT
U.S. DEPARTMENT OF THE INTERIOR
BEFORE THE
SUBCOMMITTEE ON TECHNOLOGY, INFORMATION POLICY,
INTERGOVERNEMNTAL RELATIONS AND THE CENSUS
COMMITTEE ON GOVERNMENT REFORM
U.S. HOUSE OF REPRESENTATIVES

June 10, 2003

Mr. Chairman and Members of the Subcommittee, I thank you for the opportunity to speak to you today about the Geospatial One Stop Initiative. With your permission, I will submit my testimony for the record.

As you know, the Geospatial One Stop Initiative is one of 24 e-government initiatives supported by the President's Management Council and included in the President's Management Agenda. These initiatives improve Internet-based technology to make it easier for citizens and businesses to interact with the federal government, save taxpayer dollars, and streamline communications between governments and citizens. Geospatial One Stop is one of these government-wide initiatives that will integrate agency operations and information technology investments to eliminate redundant systems and improve the government's quality of customer service for other levels of government, citizens and businesses.

Each of these initiatives recognizes that there is much room for improvement in the way the federal government manages and coordinates its activities and investments. Geospatial One Stop will address some of these concerns in the area of geospatial information technology, with its

emphasis on making it easier, faster and less expensive for all levels of government and the public to access geospatial information. Geospatial information and technologies provide critical tools and data for all levels of government in fulfilling their responsibilities to citizens. Federal, state, and local governments already collectively invest billions of dollars each year on the collection and management of geospatial data. Geospatial One Stop will help ensure that those investments assist governments in leveraging their individual resources so that they are more efficient, more cost effective, and better serve citizens.

Importance of geographic (geospatial) information to society

Geospatial information has proven enormously valuable to governments at all levels. It is an effective tool in support of management and decision making activities by providing credible, accurate, and timely geographic information to policy makers and the public; its availability offers greater opportunity to integrate, access, and share a wide range of information. Widespread use of geospatial technology provides crucial interoperability and sharing of information among the federal, state and local governments, particularly in response to emergency situations. Geospatial information allows first responders to quickly analyze an incident and coordinate their response, whether it is the tragedy of September 11 in New York City or responding to wildfires in Florida. Geospatial information provides the tools for governments to manage land and resources effectively and visualize alternative options for the future. Geospatial information helps both the public and governments protect the environment and predict the impact of changing demographics on demand for future government services. It provides important tools for government decision making, and it supports a wide range of economic activity. It can be a powerful foundation for integrating a wide range of seemingly

unconnected information. It allows information to be displayed in an easily understood format that can be used again and again and easily shared among different agencies. When managed properly, geospatial data can be built once and used many times.

Benefits of the Geospatial One Stop Initiative

The Geospatial One Stop project includes four specific elements that encourage greater collaboration to help avoid multiple investments and allow of sharing of information across jurisdictions and governmental boundaries:

- A Web based portal for one stop access to maps, data and geospatial information and services;
- A collaborative process to develop data content standards ensuring consistency among data sets and allowing governments to share data and integrate multiple sources of information;
- An easy-to-access inventory of currently available data collected by federal agencies; and
- A planned data investment marketplace that will allow state, tribal and local governments to combine resources with federal agencies on future data acquisitions and investments.

With billions of dollars invested each year in geospatial information and data, the federal government faces many challenges in taking better advantage of our investments in this valuable asset. Many organizations – both public and private – are investing in geospatial data, but these efforts are not coordinated. Information is often not accessible across organizations or integrated

to support decision making. This occurs not only with federal government agencies but across states and local governments as well. In support of the President's Management Agenda, Geospatial One Stop is intended to rectify this situation by making it faster, easier, and less expensive to access geospatial information, by facilitating the sharing of information, and by planning for future investments and expanding collaborative partnerships to help leverage investments and reduce duplication of data.

Geospatial One Stop represents an innovative approach to federal management issues in many different aspects. It is an interagency, intergovernmental, collaborative effect supported by a dozen federal agency partners that provide financial and in-kind resources. The Department of the Interior serves as the Managing Partner on behalf of the White House with the support of the following federal agency partners:

- Department of the Interior
- Department of Commerce
- Department of Transportation
- National Aeronautics and Space Administration
- U.S. Environmental Protection Agency
- Federal Emergency Management Agency
- Department of Agriculture
- Department of Defense

One of its greatest assets in an Intergovernmental Board of Directors, composed of state, local, tribal and federal representatives. This Board helps ensure dialogue among the levels of

government that are making major investments in geospatial information. Based on the substantial investment of state and local governments in the collection and management of geospatial data, formation of this Board is intended to facilitate the ability of governments to leverage their individual resources to become more efficient, more cost effective, and to better serve their citizens.

Currently, the Board includes representatives of :

- International City/County Management Association
- Intertribal GIS Council
- National Association of State Chief Information Officers
- National States Geographic Information Council
- National Association of Counties
- National League of Cities
- Western Governors Association
- Department of the Interior
- Department of Commerce
- Department of Transportation
- National Aeronautics and Space Administration

The Board meets regularly to discuss policy issues related to federal geospatial activities. Additionally, the existence of the Board has encouraged opportunities for partnerships among all levels of government, even among the federal agencies serving on the Board. Our State and

local partners on the Board have been very supportive of this effort to enhance an intergovernmental geospatial community.

The Board has asked us to help facilitate communications coming from the multiple federal agencies involved in geospatial activities and we are working to provide a single point of contact that can reduce the confusion of multiple federal activities and outreach to our intergovernmental partners. We see enhanced communications and the opportunity for Geospatial One Stop to provide a gateway to the multitude of federal initiatives as a key benefit to this innovative approach.

Our Progress To Date

One of the first issues in providing easier access to geospatial information and greater coordination in the future was to understand exactly what geospatial investments the Federal Government already has made and what investments are budgeted for the future. We are essentially compiling "card catalogues" on both existing federal geospatial data holdings and data acquisition budgeted for FY04. We also have received data inventory information from many state governments, and we hope to capture information from local governments.

A "framework" geospatial data inventory of 256,000 federal data reports (records or "card catalogue entries"), served by 12 federal clearinghouses, has been completed and is currently available for searching through the Geospatial One Stop web site and is displayable through its future portal. These framework data are a subset of the millions of geospatial data records that are served up across 69 federal clearinghouses within the Federal Geographic Data Committee

Clearinghouse Network. In addition, in the next phase of Geospatial One Stop, over 79 existing state and local government clearinghouses will be encouraged to make their framework datasets "GOS" accessible. These framework data sets will then be more easily available as foundations for use with the full spectrum of other geospatial data.

Planned data investments for FY 04 of $1million and greater have been reported by 7 agencies, with 3 agencies still in the process of reporting. Three agencies report 11 projects at nearly $56 million in investments. These internet-accessible reports allow state and local governments the opportunity to leverage and extend their geospatial dollars.

The Geospatial Once Stop Portal provides an easily accessible and understandable way to share and access information. The portal will soon be on-line and available to all governments and the public. It is designed to facilitate communication and the sharing of geographic data and resources among federal, state, and local governments, organizations, and private individuals interested in geographic information. Once populated, the Geospatial One Stop Portal will fulfill the promise of the initiative to make access to geospatial information easier, faster, and less expensive.

Recovering geospatial data investments lies in the premise of re-using existing data: invest once, use many times. In order to ensure consistency and facilitate sharing of geospatial information, Geospatial One Stop has supported a collaborative effort to include a broad audience of data developers and users in developing base content standards. Content standards or common requirements ensure data consistency and facilitate data sharing by establishing minimum data

content specifications. A total of 7 teams have been developing a consensus standard on the framework layers:

Standards under development include:

- Elevation
- Orthoimagery
- Government Units
- Hydrography
- Geodetic Control
- Cadastral
- Transportation (*e.g.*, roads, rail, air transit, and waterways)

Draft standards are available for all of these information layers with the exception of Geodetic Control and Cadastral that are under revision based on comments received from the community of users, and Transportation, which is under review to ensure that all "modal" standards do not conflict with each other. Data users in State and local governments have been asked to review the standards to ensure that they will actually meet their needs. Many challenges in the development of these consensus standards still remain and we are working to overcome those problems and develop a set of standards that will allow the sharing and effective reuse of geospatial information.

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standards do not conflict with each other. Data users in state and local governments have also been asked to review the standards to ensure that they will meet their needs. Many challenges in the development of these consensus standards still remain, and we are working to overcome these challenges and develop a set of standards that will allow the productive sharing of geospatial information.

The Promise of Geospatial One Stop

Mr. Chairman, while we recognize that many barriers and challenges remain to a fully integrated system in which geospatial information collection and investment meets multiple needs and purposes across government boundaries, we are optimistic that Geospatial One Stop is making a difference.

In just a short time, we have collected 256,000 federal data sets of information which are available from both the federal and state governments and which can be used to support many government functions, such as Homeland Security, environmental planning, public health and emergency response, to name but a few.

We are close to launching a single federal portal that will provide for searching and publishing of geospatial information, encourage coordination and collaboration among different governmental agencies, and achieve tremendous cost savings through leveraging for future investment in data.

We are in the process of establishing a national network for data sharing and facilitating communications that will lead to future partnerships, collaborations and costs savings.

Conclusion

The Geospatial One Stop Project will support "one stop" access to federal government and other geospatial data assets and will provide the building blocks for the development and implementation of a national system for integrating spatial data. The availability of up-to-date and accessible information will help leverage resources and support programs such as economic development, environmental quality and homeland security. Greater collaboration, sharing of innovative approaches to data integration, and easier access to available information will help avoid duplicative investments and allow for sharing of information across jurisdictions to better support decision-making and emergency response.

Mr. Chairman, I thank you for the opportunity to testify today and look forward to providing you more information as the Geospatial One Stop project progresses. I will be pleased to answer any questions you may have.

Mr. PUTNAM. Oh, welcome to the subcommittee, Mrs. Miller. I apologize. Do you object?

Mrs. MILLER. Not a bit.

Mr. PUTNAM. We'll recognize the third witness, and then we'll go back to Mrs. Miller if she'd like to make an opening statement.

Our next witness is Ms. Koontz, who is from the GAO, and she is Director of Information Management issues at the GAO. She's responsible for issues concerning the collection, use and dissemination of government information in an era of rapidly changing technology, as well as a proliferation of e-gov issues.

Recently, she's been heavily involved in directing studies concerning e-government privacy, electronic records management and governmentwide information dissemination. In addition, she and her team have been preparing to support congressional oversight of the Paperwork Reduction Act and the reauthorization of OMB's Office of Information and Regulatory Affairs. She has a BA in accounting from Michigan State University.

Welcome.

Ms. KOONTZ. Thank you, Mr. Chairman. I appreciate the opportunity to participate in the subcommittee's hearing on the challenges of developing an integrated nationwide network of geographic information systems.

In my written statement, we discuss the many overlapping GIS activities under way in the Federal Government, the Federal Government's efforts since 1953 to coordinate these activities and the long-standing challenges of adopting and implementing GIS standards. In addition, we discuss the role of geospatial one-stop, one of 25 high-profile e-government initiatives sponsored by OMB. It is these latter two subjects that I'd like to focus on.

Developing common geospatial standards to support vital public services, while extremely important, has proven to be a complex and time-consuming effort. The number of types of geospatial data and the complexity of those data make developing standards a daunting task.

For example, 34 different broad categories of geospatial data, called "data themes," have been identified. These themes relate to all types of services provided by the Federal Government, including climate, flood hazards, Federal land ownership, public health and transportation.

The FGDC has been working to coordinate the development of some of these themes and related standards since it was established 13 years ago. Although a complete set has yet to be assembled, we understand that the geospatial one-stop officials have drafted versions of seven framework standards and an eighth base standard and plan to submit them for approval in September 2003. These framework standards define the simplest level of geographic data commonly used in geospatial data sets.

Once standards are agreed upon, the government still faces the challenge of gaining wide adoption of the standards. At the Federal level alone, this may prove to be difficult. Agencies may be unwilling to adopt framework data standards. Most Federal agencies including Energy, Justice and Health and Human Services have not been involved in the standards process, and as a result, these standards may not meet their needs.

In addition, agencies have already made substantial investments to independently develop systems using formatting standards to meet their own needs. Migrating to a new standard could be a potentially expensive effort. A similar challenge exists at State and local levels where existing commercial products are already meeting their needs.

In regard to geospatial one-stop, this initiative's plans to develop a portal, finalize the seven framework standards, create an inventory of Federal data holdings and provide greater coordination among all levels of government represent important near-term tasks. However, the geospatial one-stop initiative is not intended to address the longer-term challenges associated with developing and deploying standards. For example, while developing and implementing an Internet portal may offer additional functionality over existing mechanisms, unless the underlying geospatial data is standardized, this improved functionality is limited.

In summary, a coordinated nationwide network of geographic information systems offers many opportunities to better serve the public, make government more efficient and effective and reduce duplication and costs. While steps, including the ongoing geospatial one-stop, have been taken to improve the coordination of government GIS efforts, much more work remains to be done to round out a comprehensive set of standards and ensure they are broadly adopted.

Existing draft standards may need revision to accommodate the needs of Federal users and more extensive coordination may be needed to ensure broad adoption. Further, this will require a continuing effort over time due to the fact that significant investments have already been made in nonstandard systems and the task of replacing those systems and migrating their data cannot be accomplished overnight.

We believe until these challenges are addressed, a goal of a single, coordinated, nationwide system will remain out of reach.

[The prepared statement of Ms. Koontz follows:]

United States General Accounting Office

GAO

Testimony

Before the Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census, Committee on Government Reform, House of Representatives

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GEOGRAPHIC INFORMATION SYSTEMS

Challenges to Effective Data Sharing

Statement of Linda D. Koontz
Director, Information Management Issues

GAO-03-874T

June 10, 2003

GAO
Accountability·Integrity·Reliability
Highlights

Highlights of GAO-03-874T, a testimony before the Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census, Committee on Government Reform, House of Representatives

GEOGRAPHIC INFORMATION SYSTEMS

Challenges to Effective Data Sharing

Why GAO Did This Study

Geographic information systems (GIS) manipulate, analyze, and graphically present an array of information associated with geographic locations, have been invaluable to all levels of government. Their usefulness in disaster response was recently demonstrated during the Space Shuttle Columbia recovery effort. GIS provided precise maps and search grids to guide crews to the debris that was strewn across 41 counties in Texas and Louisiana.

The federal government has long been attempting to develop an integrated nationwide GIS network. The information available through such a network could significantly enhance decision-making in myriad public-service areas, including emergency response, national security, law enforcement, health care, and the environment.

Among GAO's objectives were to describe the federal government's efforts to coordinate GIS activities, the long-standing challenges of adopting and implementing federal GIS standards, and the role of Geospatial One-Stop.

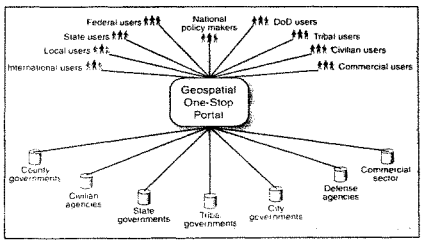
What GAO Found

For decades, the federal government has tried to reduce duplicative geospatial data collection by coordinating GIS activities within and outside the federal government. For example, in 1990, the Office of Management and Budget established the Federal Geographic Data Committee to promote the coordinated use, sharing, and dissemination of geospatial data nationwide. In 1994, the National Spatial Data Infrastructure (NSDI) program was established by executive order to address the problem of the redundancy and incompatibility of geospatial information on a national basis. More recently, Geospatial One-Stop, a component of NSDI, was initiated (see below).

Although efforts to build the NSDI are progressing, achieving the vision of a nationwide GIS network remains a formidable challenge. Developing standards that meet stakeholders' needs remains a challenging and time-consuming task, and achieving full participation across governments in their development has also been difficult.

Geospatial One-Stop is aimed at promoting coordinated geospatial data collection and maintenance across all levels of government. Among its objectives are (1) deploying an Internet portal for one-stop access to geospatial data; (2) developing data standards; and (3) encouraging greater coordination among federal, state, and local agencies. While these objectives are important, Geospatial One-Stop has focused on limited, near-term tasks and was not intended to fully address the longer-term challenges of implementing the NSDI. A much more substantial effort will be required to attain the broader vision of seamless integration of GIS data nationwide. Existing draft standards may need further revision, and more extensive coordination efforts may be required to ensure broad adoption at all levels of government. Further, the effort is likely to require a continuing effort over an extended period of time, due to the fact that significant investments have already been made in existing non-standard systems.

Geospatial One-Stop Portal Concept



Source: GAO analysis of FGDC information.

www.gao.gov/cgi-bin/getrpt?GAO-03-874T.

To view the full product, click on the link above.
For more information, contact Linda D. Koontz at (202) 512-6240 or Koontzl@gao.gov.

Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to participate in the Subcommittee's hearing regarding the challenges of developing an integrated nationwide network of geographic information systems (GIS). A GIS is a system of computer software, hardware, and data used to manipulate, analyze, and graphically present a potentially wide array of information associated with geographic locations. GIS's powerful ability to integrate different kinds of information about a physical location can lead to better-informed decisions about public investments in infrastructure and services—including national security, law enforcement, health care, and the environment—as well as a more effective and timely response in emergency situations. However, long-standing challenges to data sharing and integration need to be addressed before the benefits of geographic information systems can be fully realized.

As requested, in my remarks today, I will discuss the many GIS activities under way throughout the federal government, the federal government's efforts to coordinate these activities, and the long-standing challenges of adopting and implementing federal GIS standards. I will also discuss the role of Geospatial One-Stop, one of 25 high-profile e-government[1] initiatives sponsored by the Office of Management and Budget (OMB). To supplement my remarks, I have included an attachment that lists examples of the numerous GIS activities led by various federal agencies.

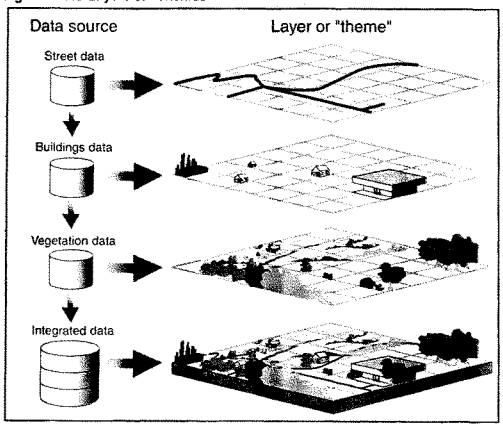
Background

The primary function of a GIS is to link multiple sets of geospatial data and graphically display that information as maps with potentially many different layers of information. Assuming that all the information is at the same scale and has been formatted according to the same standards, users can potentially overlay spatial information about any number of specific topics to examine how the layers interrelate. Each layer of a GIS map represents a particular "theme" or feature, and one layer could be derived from a data source completely different from the other layers. For example, one theme could represent all the streets in a specified area. Another theme could correspond to all the buildings in the same area, and others could show vegetation or water resources. As long

[1]E-Government or Electronic Government refers to the use of technology, particularly Web-based Internet applications, to enhance the access to and delivery of government information and services to citizens, business partners, employees, other agencies, and other entities.

as standard processes and formats have been arranged to facilitate integration, each of these themes could be based on data originally collected and maintained by a separate organization. Analyzing this layered information as an integrated whole can significantly aid decision makers in considering complex choices, such as where to locate a new Department of Motor Vehicles building to best serve the greatest number of citizens. Figure 1 portrays the concept of data themes in GIS.

Figure 1: GIS Layers or "Themes"



Source: GAO

The expansion of Internet connectivity in recent years has substantially enhanced the potential value of GIS because now it is possible to locate and harness data from many disparate GIS databases to develop very rich analytical information on almost any topic that is associated with physical locations. Data that were once collected and used only for a single purpose could now have much broader applications. Further, the community of GIS users has been broadened to include potentially anyone with an Internet connection. For example, citizens can now use home computers to obtain answers to specific questions about land use in their state or local jurisdiction. Commercial entrepreneurs can combine GIS data

about zoning and tax-incentive areas to determine what parts of a city are best suited for establishing a new business.

Federal, state, and local government agencies are using GIS today to provide vital services to their customers. For example, local fire departments can use geographic information systems to determine the quickest and most efficient route from a firehouse to a specific location, taking into account changing traffic patterns that occur at various times of day. Highway departments use GIS to identify intersections that have had a significant number of personal injury accidents to determine needs for improved traffic signaling or signage. GIS can also be an invaluable tool in ensuring homeland security by facilitating preparedness, prevention, detection, and recovery and response to terrorist attacks.

Many federal departments and agencies use GIS technology to help carry out their primary missions. For example, the Department of Housing and Urban Development (HUD) worked with the Environmental Protection Agency (EPA) to develop E-MAPS, which combines information on HUD's community development and housing programs with EPA's environmental data. The program provides homeowners and prospective homebuyers with ready access to detailed local information about environmental hazards that otherwise would likely have been very difficult to obtain. In another example, the Department of Health and Human Services uses GIS technology to analyze data on population and topography (including roads, streams, and land elevation), as well as information gathered from residents. These data are used to track the spread of environmental contamination through a community, to identify geographic areas of particular health concern, and to identify susceptible populations, such as children or the elderly.

The usefulness of GIS in disaster response was demonstrated recently in connection with the Space Shuttle Columbia recovery effort. After the loss of Columbia on February 1, 2003, debris was spread over at least 41 counties in Texas and Louisiana. Analysis of GIS data was critical to the efficient recovery and documentation of that debris. The Texas state GIS program provided authorities with precise maps and search grids to guide field reconnaissance and collection crews. Officials in charge of the effort used maps of debris fields combined with GIS data about the physical terrain to carefully track every piece of debris found. This information not only contributed to an efficient recovery effort but also may help experts to refine theories about why Columbia perished.

In developing this testimony, our objectives were to describe the many GIS activities under way throughout the federal government and the federal government's efforts to coordinate these activities, the long-standing challenges of adopting and implementing federal GIS standards, and the role of Geospatial One-Stop. To address these objectives, we obtained relevant documentation from the Department of the Interior and interviewed Geospatial One-Stop project officials as well as representatives from state agencies and private sector organizations involved in GIS activities with the federal government. We also analyzed the accomplishments and planned activities of the Geospatial One-Stop initiative in light of identified challenges to geospatial data sharing. We performed our work between May 2003 and June 2003, in accordance with generally accepted auditing standards.

Many Federal Government GIS Activities Overlap

According to the Department of the Interior, about 80 percent of all government information has a geospatial data component, such as an address or other reference to a physical location.[2] It is not surprising, then, that a wide variety of geospatial data collection efforts are ongoing throughout the federal government, each established for a different purpose but often collecting and maintaining the same or similar information. In fact, according to the 2001 initial business case for Geospatial One-Stop, about 50 percent of the federal government's geospatial data investment is redundant.

For every GIS application, federal agencies must manage the geospatial data that are at the heart of that application. In many cases, agencies maintain the same data that are referenced to the same geographic location. For example, both HUD and the Census Bureau maintain essentially the same geospatial data regarding congressional districts, city boundaries, railroads, interstate highways, and state highways. The two agencies maintain separate GIS systems for storing and analyzing this information.

In many cases, agencies independently collect data that, while not identical, is similar and potentially duplicative in many respects. For example, both the Department of Energy (DOE) and the Nuclear Regulatory Commission (NRC) collect and analyze information

[2] *Geospatial One-Stop, Office of Management and Budget Capital Asset Plan and Business Case (Exhibit 300)* (Jan. 27, 2003), p. 7.

regarding uranium-milling facilities, and they both cover the same geographic areas. DOE concentrates on tracking the status of former uranium processing sites, whereas NRC gathers and maintains information on current uranium milling facilities in the same mid-western locations. In cases such as this, significant efficiencies may be gained by coordinating the two collection efforts.

In other cases, data may be collected in different resolutions or with different degrees of accuracy but still essentially cover the same theme over the same geographic area. Local governments often possess the most recent and highest resolution geographic data; however, these data often are collected to serve specific missions and may be difficult to use for other purposes. For instance, when the Forest Service created a national-level GIS for the forest ecosystem, it was faced with reconciling data from a variety of incompatible locally developed systems. Local agencies had used a variety of standards for each forest and district. In assembling these data into a unified, coherent database, the Forest Service had to adopt the lowest-resolution format in order to maintain full coverage of all forests. As a result, much of the higher-resolution content of the local data could not be used. Much of the effort in building this system was spent reconciling data sets to make them usable in an integrated database.

The biggest problem with collecting this duplicative geospatial data is its cost. According to a recent study, up to 80 percent of GIS costs are related to the collection and management of geospatial data.[3] In 1993, OMB performed a data call in which it estimated that $4.1 billion was spent annually, at the federal level, on collection and management of geographically referenced data. In addition, state and local governments are estimated to spend twice that of the federal government on collection and management of geographic referenced data.[4]

[3] Center for Technology in Government. *Sharing the Costs, Sharing the Benefits: The New York State GIS Cooperative Project* (2001).

[4] Office of Management and Budget, *Geospatial One-Stop Capital Asset Plan and Business Case (Exhibit 300)* (Jan. 27, 2003).

Many Attempts Have Been Made to Coordinate GIS Activities

The federal government has tried for years to reduce duplicative geospatial data collection by coordinating GIS activities both within and outside the federal government. In 1953 the Bureau of the Budget first issued its Circular A-16, encouraging expeditious surveying and mapping activities across all levels of government and avoidance of duplicative efforts. More recently, the E-Government Act of 2002[5] directed the Office of Management and Budget to coordinate the development of standard protocols for sharing geographic information to reduce redundant data collection and promote collaboration and the use of standards. Although progress has been made over this 50-year span, much work still remains to be done.

Over the past several decades we and others, such as the National Research Council[6] and the National Academy of Public Administration,[7] have made a set of recommendations aimed at promoting the coordination of GIS efforts and data. In 1969, we recommended that mapping by state and local agencies under federal programs should be accomplished, where appropriate, in a manner enabling such work to contribute to the national mapping program.[8] In 1982, we issued another report recommending interagency coordination to prevent duplicative computer-mapping programs.[9] In response to this and other recommendations, OMB revised Circular A-16 in 1990, to, among other things, establish a Federal Geographic Data Committee (FGDC), chaired by the Department of the Interior, to promote the coordinated use, sharing, and dissemination of geospatial data nationwide. Building on that effort, a program was established by Executive Order 12906 in 1994 to develop a National Spatial Data Infrastructure (NSDI) to address the problem of the redundancy and incompatibility of geospatial information collected by many different organizations and stored and maintained at many different physical locations. Figure 2 provides a federal GIS coordination timeline.

[5] E-Government Act of 2002, P.L. 107-347 (Dec. 17, 2002).

[6] National Research Council, Mapping Science Committee, *Toward a Coordinated Spatial Data Infrastructure for the Nation* (Washington, D.C.: National Academy Press, 1993).

[7] National Academy of Public Administration, *Geographic Information for the 21st Century: Building a Strategy for the Nation* (Washington, D.C.: Jan. 1998).

[8] U.S. General Accounting Office, *Opportunity for Savings and Better Service to Map Users Through Improved Coordination of Federally Financed Mapping Activities*, 759 Un317o (Washington, D.C.: Dec. 17, 1969).

[9] U.S. General Accounting Office, *Duplicative Federal Computer-Mapping Programs: A Growing Problem*, GAO/IPE-83-10 (Washington, D.C.: Nov. 22, 1982).

Figure 2: Federal GIS Coordination Timeline

1953	1967	1990	1994	1997	2002	2002
A-16 issued to encourage coordinated mapping and surveying efforts.	A-16 revised to outline the responsibilities of Interior, Commerce, and State.	A-16 revised to include geographically referenced computer-readable (digital) data. FGDC created.	Executive Order 12906 established NSDI.	Strategy for NSDI published.	A-16 revised to reflect the changes in GIS, and to clearly define agency and FGDC responsibilities.	E-Gov Act of 2002 enacted. Geospatial One-Stop initiated.

Source: GAO

As a result of these federal geospatial coordination efforts, the federal government has begun to establish the NSDI through a number of component programs.[10] These include the Geospatial Data Clearinghouse to promote data sharing on a national level, a collection of voluntary "I-Teams" to foster community-level data collection and sharing, a Cooperative Agreements Program to provide seed money for initiatives aimed at better data integration and use, and—most recently—the Geospatial One-Stop initiative, aimed at promoting coordination and alignment of geospatial data collection and maintenance across all levels of government. Table 1 gives more details about the components of the NSDI. I will discuss the Geospatial One-Stop initiative at greater length later in my remarks.

[10] The FGDC is responsible for coordinating all of these components.

Table 1: Components of the National Spatial Data Infrastructure

Name	Description
National Spatial Data Infrastructure (NSDI)	A structure of practices and relationships among data producers and users that facilitates geospatial data sharing and use throughout government, the private and nonprofit sectors, and academia. As discussed below, key GIS initiatives within the NSDI, which are coordinated by the Federal Geographic Data Committee, include the Geospatial Data Clearinghouse, I-Teams, Cooperative Agreements Program, and Geospatial One-Stop.
Geospatial Data Clearinghouse	A decentralized system of Internet servers containing field-level descriptions or metadata of available digital geospatial data. The clearinghouse allows individual agencies, consortia, and geographically defined communities to coordinate and promote the use of their available geospatial data.
I-Teams	Voluntary bodies of leaders representing all sectors of the geospatial community that meet in open forums to plan, steward, and implement the production, maintenance, and exchange of community information resources. The I-Team Initiative helps to address the institutional and financial barriers to development of the NSDI.
Cooperative Agreements Program funds	Funds intended to provide seed money to engage organizations in building the NSDI through metadata implementation, training and outreach, and clearinghouse implementation of OpenGIS Web services.
Geospatial One-Stop	An initiative to promote coordination and alignment of geospatial data collection and maintenance among all levels of government by (1) developing a portal for seamless access to geospatial information, (2) providing standards and models for geospatial data, (3) creating an interactive index to geospatial data holdings at federal and nonfederal levels, and (4) encouraging greater coordination among federal, state, and local agencies about existing and planned geospatial data collections.

Source: GAO.

Although efforts to build the NSDI are progressing, achieving the vision of a nationwide GIS network remains a formidable challenge. Notwithstanding federal attempts to promote interagency and intergovernmental collaboration, the difficulty in developing and implementing effective standards remains a barrier to effective data sharing and to achieving the level of integration that would lead to full development of the NSDI.

Developing and Implementing GIS Standards Have Posed Long-Standing Challenges

Developing common geospatial standards to support vital public services has proven to be a complex and time-consuming effort. The number of types of geospatial data and the complexity of those data make developing geospatial standards a daunting task. For example, 34 different broad categories of geospatial data, called "data themes," were identified in OMB Circular A-16 as a necessary foundation for the NSDI. These basic themes relate to all types of services provided by the federal government—including climate, flood hazards, federal land ownership, public health, soils, and transportation. Each of these themes, in turn, may have any number of subthemes. The transportation theme, for example, includes such

divergent subthemes as road, railroad, air, transit, and waterway, each the domain of a different organization or group of organizations. For data associated with the NSDI's themes and subthemes to be effectively shared, standards must be developed that allow interoperability and integration of the many disparate formats of data that are currently collected for each theme and subtheme. Circular A-16 further identifies seven of the themes as the core set of most commonly used data, called "framework themes."[11] FGDC has been working to coordinate the development of these themes as well as other standards since it was established 13 years ago. Although FGDC has developed versions of several of these standards, it has not attempted to finalize a complete set of the seven framework standards. These framework standards would define the simplest level of geographic data commonly used in most geospatial data sets.

OMB Circular A-16 calls for a well-coordinated effort among federal, state, local, and tribal governments, academic institutions, and the private sector to build an effective NSDI.[12] Yet in the capital asset plan for the Geospatial One-Stop project published in January 2003, the Department of the Interior noted that the risk was high that agencies would be unwilling to adopt framework data standards. Given that most federal agencies—including large agencies such as DOE, Justice, and Health and Human Services—have not participated in the NSDI framework standards development process, the risk is substantial that the proposed standards will not meet their needs. In addition, agencies could be faced with a potentially expensive effort at "migrating" to the new standard. Substantial investments have already been made to independently develop geospatial systems using formats and standards that meet the specific needs of the agencies that developed them. The potential for agencies to continue to deploy agency-specific, noninteroperable geospatial systems was another high risk identified by Interior in its January 2003 Geospatial One-Stop plan.

Many states and localities have established Web sites that provide a variety of location-related information services, such as updated traffic and transportation information, land ownership and tax records, and information on housing for the elderly. Existing

[11] The seven framework themes are transportation, hydrography, government units, geodetic control, elevation, digital ortho imagery, and cadastral (relating to land ownership).

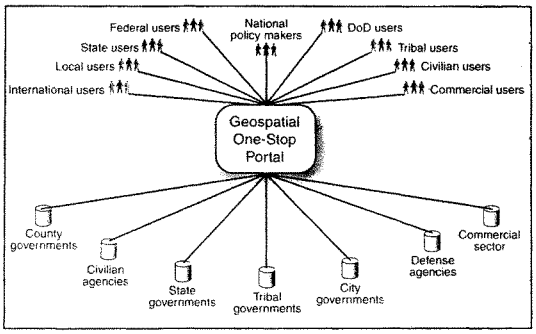
[12] OMB Circular A-16, *Coordination of Geographic Information and Related Spatial Data Activities*, Revised August 19, 2002. The Circular applies to any executive agency that collects, produces, acquires, maintains, distributes, uses, or preserves paper maps or digital spatial data to fulfill its mission.

commercial products using a variety of formats are already meeting the needs of the states and localities in providing this information. Hence these organizations are likely to have little incentive to adopt potentially incompatible federal standards that could require substantial new investments. According to Arizona's state cartographer, many local governments currently do not comply with existing FGDC standards because most of their GIS applications were created primarily to meet their internal needs, with little concern for data sharing with federal systems.

Geospatial One-Stop's Objectives Are Limited

Geospatial One-Stop is intended to accelerate the development and implementation of the NSDI by promoting coordination and alignment of geospatial data collection and maintenance across all levels of government. Specifically, its objectives include (1) deploying an Internet portal for one-stop access to geospatial data as an extension to the NSDI Clearinghouse network (see figure 3); (2) developing data standards for the seven NSDI framework data themes; (3) creating an inventory of federal data holdings related to the seven framework themes; and (4) encouraging greater coordination among federal, state, and local agencies about existing and planned geospatial data collection projects.

Figure 3: Geospatial One-Stop Portal Concept



Source: GAO based on FGDC information.

- *Deploying an Internet portal.* This task was to design and implement an Internet portal to serve as a one-stop interface for users seeking links to geospatial data that were already available and cataloged in the NSDI clearinghouse. A demonstration version of the portal has been developed, and the first publicly available version is expected to be implemented by the end of June 2003. Plans are to begin adding new data to the portal, now that it has been developed. Project officials are also considering future enhancements to the functionality of the portal; however, no milestones have been set for any specific enhancements.

- *Developing data standards.* The specific objective was to draft the seven NSDI framework standards. Drafts of these seven framework standards, as well as five transportation subthemes and a base standard have now been completed. Project officials plan to submit these drafts to the American National Standards Institute by the end of September 2003.

- *Creating an inventory of federal data holdings.* To meet this objective, metadata[13] for all relevant federal data sets must first be collected and made available in the NSDI Clearinghouse. Users need metadata to determine whether a data set is useful for their purposes and to be aware of any special stipulations about processing and interpreting the data. Accordingly, OMB Circular A-11 required that all federal data sets with a replacement value exceeding $1 million be documented in FGDC metadata and the metadata be accessible and searchable in the NSDI Clearinghouse network by February 10, 2003.

- *Encouraging greater coordination among federal, state, and local agencies.* To support this objective, a process has been established to coordinate Geospatial One-Stop's activities across these various government levels. According to the project's cooperating states coordinator, eight federal agencies are participating in developing and implementing the initiative. In addition, an intergovernmental board of directors was established with two-thirds of the vote held by state, local and tribal representatives. The purpose of the board was to help ensure collaboration among potential stakeholders from all government sectors. According to the National States Geographic Information Council's (NSGIC) representative, state, county, and municipal levels of government are well represented and play a

[13] Metadata is information describing the content, quality, condition, and other characteristics of data.

useful role in providing alternative views about the direction of the initiative.[14]

While Geospatial One-Stop's objectives are important, they do not represent a significantly new or different approach to the GIS integration problem that the government has been struggling with for more than a decade. First, while developing and implementing an Internet portal may offer users additional functionality over the existing Clearinghouse, unless the underlying geospatial data offered through the portal are standardized across data providers, the additional functionality offered by the portal may be of limited value.

Second, the objective of finalizing the seven framework standards, while important, is limited. As I discussed earlier, a total of 34 data themes was identified in OMB Circular A-16 as a necessary foundation for the NSDI. Geospatial One-Stop's objectives do not include plans to address any of the remaining 27 themes. Before the broader vision of a unified nationwide network of geospatial data and systems can be achieved, standards for all of NSDI's foundation data themes will need to be established. Further, definition of the standards is only the first step in gaining their benefits; Geospatial One-Stop has not yet addressed the challenge of gaining consistent implementation of the standards across government, which I have already discussed. In order to attain the broader vision of seamless integration of GIS data on a nationwide basis, a longer-term effort will be required.

Third, creating a complete and useful inventory of federal data holdings will require much more substantial work than is planned through the Geospatial One-Stop initiative. For example, according to the FGDC Metadata Coordinator, the extent to which agencies have posted metadata about their geospatial data sets is unknown. In addition, obtaining complete metadata from all federal sources is likely to be very challenging. If the metadata were not created when the data were originally captured, they could be expensive and time-consuming to generate after the fact, and agencies may not have resources available for the effort. Accordingly, unless Geospatial One-Stop devotes more resources to working with agencies on

[14] The National States Geographic Information Council is an organization of states that promotes the adoption and use of geographic information technologies, including the NSDI and GOS. Members include state GIS coordinators, senior state GIS managers, and representatives from federal agencies, local government, the private sector, academia and other professional organizations.

generating and posting metadata, its objective of creating an inventory of federal data holdings may be delayed.

Finally, despite the creation of the Board of Directors, questions have been raised about the breadth of participation in Geospatial One-Stop. The chair of the board acknowledged that the small group of nonfederal representatives on the board may not be able to speak for all the states and thousands of local governments. It is also not known how well these representatives are disseminating information about the initiative and encouraging collaboration among the states and localities that are not directly represented. As with the initiative's other objectives, limited actions have been taken aimed at achieving near-term results that only partially address the broader objective of building the NSDI. To fully achieve that broader objective, Geospatial One-Stop will need to better ensure that it has coordinated with all relevant governmental entities and that they understand the initiative and their role in it.

In summary, a coordinated nationwide network of geographic information systems offers many opportunities to better serve the public, make government more efficient and effective, and reduce costs. As a sophisticated decision making tool, GIS provides the capability to strengthen national security, enhance law enforcement, increase public health, and protect the environment. However, to date, the potential of GIS has not been fully realized. While steps have been taken to improve the coordination of government GIS efforts, much more work still needs to be done to round out a comprehensive set of standards and to ensure that they are being broadly applied. Geospatial One-Stop, in particular, while addressing useful near-term tasks, has not focused on the need for a longer-term strategy for facing the challenges of implementing the NSDI.

While it may be appropriate for many systems, especially at the state and local level, to retain non-standard approaches to geospatial data collection and analysis, priority should now be given to ensuring that the federal government promotes common GIS standards wherever practicable, facilitates participation by all stakeholders, and as a result reduces redundant systems and data collection efforts. Adoption of a core set of framework standards by the GIS community should lay the groundwork for achieving the goals of the NSDI. However, additional work may be needed. Existing draft standards may need revision to accommodate the needs of major

federal agency users, and more extensive coordination efforts may be required to ensure broad adoption at all levels of government. Further, the effort is likely to require a continuing effort over an extended period of time, due to the fact that significant investments have already been made in existing non-standard systems, and the task of replacing those systems and migrating their data to new standards cannot be accomplished overnight. Nevertheless, we believe that until these challenges are addressed, the goal of a single, coordinated, nationwide system of geospatial data will remain out of reach.

Mr. Chairman, this concludes my statement. I would be pleased to answer any questions that you or other members of the subcommittee may have at this time.

Contact and Acknowledgements

If you should have any questions about this testimony, please contact me at (202) 512-6240 or via E-mail at *koontzl@gao.gov*. Other major contributors to this testimony included Shannin Addison, John de Ferrari, Sophia Harrison, and Elizabeth Roach.

Attachment I: Examples of Federal Geographic Information System (GIS) Activities

Agency	Description
Natural Resources Conservation Service (Department of Agriculture)	Geospatial Data Gateway provides easy and consistent access to natural resource data by geographic area such as county or state. Users can search for data by theme, such as digital ortho imagery, digital elevation models, or soils.
National Cartography and Geospatial Center (Department of Agriculture)	NCGC Internet Mapping offers Web access to view samples of hydrography, digital orthophotography, digital topographic data, and other integrated data layers.
Fort Sill (Department of the Army)	Integrated Training Area Management GIS program provides training area maps, contour maps, and environmental coordination maps at a desired scale to installation personnel for use in management and training activities.
National Oceanic and Atmospheric Administration (Department of Commerce)	NOAA makes extensive use of a GIS to store the large quantity of data it collects. For example, the Pacific Marine Environmental Laboratory and the Alaska Fisheries Science Center collect a wealth of data about the physical and biological characteristics of the Bering Sea and the Gulf of Alaska, which are then stored in a GIS.
U.S. Census Bureau (Department of Commerce)	Provides online maps based on Census data that can be manipulated in many different ways.
National Aeronautical and Space Administration & National Imagery and Mapping Agency (Department of Defense)	Shuttle Radar Topography Mission employs a specially modified radar system to capture the elevation data, synthetic aperture radar, and single-pass radar interferometry. The objective of this project is to produce digital topographic data for 80% of the Earth's land surface.
National Imagery and Mapping Agency (Department of Defense)	Provides timely, accurate, global aeronautical, topographical, and maritime, geospatial information in support of national security objectives.
National Renewable Energy Laboratory (Department of Energy)	GIS site provides dynamically generated maps of renewable energy resources that determine which energy technologies are viable solutions in the United States. These maps include GIS Clean Cities Map, Wind Map, Transportation Technologies Map, Map of Indian Lands, Solar Maps, and Federal Energy Management Program Maps.
Los Alamos National Laboratory (Department of Energy)	GISLab supplies geospatial information for internal and external users of geospatial data. Current projects include fire-related spatial data, floodplain mapping and hydrological modeling, field mapping for forest management, and mesoscale climate change modeling.
Centers for Disease Control and Prevention (Department of Health and Human Services)	Uses GIS to provide maps and data on public health issues in the United States.
Federal Emergency Management Agency (Department of Homeland Security)	Provides a full range of GIS services to all FEMA program offices which include storm tracking and damage prediction maps, remote sensing maps, maps of federally declared counties in an affected state, basic census demographics about an affected area by county and census block, street locations, and summaries of teleregistered and service center applicants, housing inspection numbers, Help-line calls, disaster unemployment claims, Small Business Administration applicants, etc.
Department of Housing and Urban Development & the Environmental Protection Agency	E- Maps combines information on HUD's community development and housing programs with EPA's environmental data to provide location, type, and performance of HUD-funded activities in every neighborhood across the country and select EPA information on brownfields, hazardous wastes, air pollution and waste water discharges.
US Geological Survey (USGS) (Department of the Interior)	Provides a site that serves as a node of the National Spatial Data Infrastructure for finding and accessing USGS spatial data related to hydrography.
Bureau of Land Management (Department of the Interior)	Uses GIS to store and analyze public land and administrative jurisdiction information.
U.S. Forest Service (Department of Agriculture)	Uses GIS to provide information on vegetation, water, fire, and soil for specified forests.
National Park Service (Department of the Interior)	Strives to have a comprehensive automated information system for each national park that will integrate spatial (geographic) and tabular data from a variety of sources to enable modeling of real and theoretical situations for managing all park resources.

Agency	Description
Justice Programs Office for Victims of Crime (Department of Justice)	Uses GIS to map crime victim services.
Volpe National Transportation Systems Center (Department of Transportation)	Uses GIS to identify data such as county boundaries, roadways, and railroads, measure ambient noise levels, search for locations such as historic beacon sites and environmental data.
The Environmental Protection Agency	The EPA provides a wide variety of spatial data such as information regarding air, water, land, deposition, emissions, climate, sensitive resources, and demographics to support environmental analysis and uses GIS to aid decision-making.
Tennessee Valley Authority	Provides an interactive map of the entire TVA power system, a network of reservoirs and power plants.

(310370)

Mr. PUTNAM. Thank you very much.

I'll now recognize the vice chairman of the subcommittee, the gentlelady from Michigan, for an opening statement if she has one.

Mrs. MILLER. Thank you, Mr. Chairman. I'll be brief here. I'm sorry I was a little bit late getting here this morning.

This issue of geospatial information could not be more appropriate, I don't think, for this subcommittee. Since the passage of the E-Government Act of 2002 and the creation of the Geospatial One-Stop Initiative, a new-found effort has been developed by the Federal agencies here to coordinate with State and with local, as well as private industry, to develop an effective Federal policy and to increase the effectiveness of government services. This subcommittee has jurisdiction, of course, over geospatial information policy and has a great opportunity, we all think, to ensure improved effectiveness and efficiency of this developing technology.

Geospatial information is utilized by all government entities—Federal, State, local—to effectively target resources, from the best placement for a senior health center to a rural district where the most effective allocation of funds for Federal programs targeting inner city youth, the amount of information available is abundant. However, Federal, State and local governments and private industry find themselves engaging in redundant tasks if information were better shared. The Department of the Interior, the Federal Emergency Management Agency, State governments and local farm groups should have access to the same public information to better allocate their resources.

In geospatial information many of the issues, such as concerns over privacy associated with information sharing, are avoided. A system simply needs to be developed so that accurate information is available to all interested parties working toward the public good.

Mr. Chairman, I want to thank you for holding this hearing today so that members of this subcommittee and the public as well can gain an understanding of actually what geospatial information involves and how it impacts their life.

I'm certainly sorry I missed Mr. Forman's testimony, but interested to hear the testimony of the other witnesses here today. I thank you all for coming. It's a fascinating subject.

Thank you, Mr. Chairman.

[The prepared statement of Hon. Candice S. Miller follows:]

Congresswoman Candice S. Miller

Opening Statement
Committee on Government Reform
Subcommittee on Technology, Information Policy, Intergovernmental Relations, and the Census
June 10, 2003

OPENING STATEMENT

Thank you, Mr. Chairman.

The issue of geospatial information could not be more appropriate for this subcommittee. Since the passage of the E-Government Act of 2002 and the creation of the Geospatial One-Stop initiative, a newfound effort has developed by Federal agencies to coordinate with state and local and private industry to develop an effective Federal policy and to increase the effectiveness of government services. This subcommittee has jurisdiction over geospatial information policy and has a great opportunity to ensure improved effectiveness and efficiency of this developing technology.

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The Department of the Interior, the Federal Emergency Management Agency, state governments and local farm groups should have access to the same public information to better allocate their resources. In geospatial information, many of the issues – such as concerns over privacy – associated with information sharing are avoided. A system simply needs to be developed so that accurate information is available to all interested parties working toward the public good.

Mr. Chairman, thank you for holding this hearing today so that the Members of this Subcommittee and the public can gain an understanding of what geospatial information involves. I look forward to the testimony of the witnesses so that it is clear as to what has been done in the past, what the current state of affairs is, and what needs to be done in order to create an effective policy.

Mr. PUTNAM. Thank you, Mrs. Miller.

I will begin with a few questions. I'll begin with Mr. Forman. How much does the Federal Government spend each year on the collection and dissemination and use of geospatial data?

Mr. FORMAN. Despite the importance of this data and as an asset for the management of the government, we do not have an accurate accounting. I can tell you that it's in the billions of dollars.

We have done a number of administrative approaches to collect that information. So we have insights into the largest IT investments. We have taken additional steps to gather data on the data acquisition, which in some agencies is not considered an IT investment because it's simply buying data.

We need to do more, and we need to be a little bit more rigorous in enforcing, which we intend to do as part of this next budget process.

Mr. PUTNAM. Is it fair to say that every agency has a geospatial component, or most every agency?

Mr. FORMAN. I would say that it would be accurate to say every agency buys the geospatial assets, the information or the tools or a combination thereof. As Congresswoman Miller pointed out, government at its core has to manage around geography, and so it is implicit or explicit in the management of so many programs that every agency has it.

Mr. PUTNAM. In order for us to find out how much we actually spend, what reporting systems are in place to track geospatial spending? And as it relates to the A–16 circular that you referred to in your testimony, the agencies are supposed to submit that on their collection activities. Could you discuss how that information is used to manage the geospatial issues at the Federal level?

Mr. FORMAN. There are three ways that we're collecting that information, some of which are fairly new. First, through OMB Circular A–11, as well as A–16, the agencies have to report, and that has to come in with their budget justification materials. So to the extent that agencies recognize that is actually being asked of them, that we get that data in for an IT investment with the business case, for program funding with the program justification, that's the primary.

In addition, the Federal Geographic Data Committee compiles an annual report that goes agency by agency and details the data activities. Again, that tends to use, I think, primarily the A–16 data.

And the third, as part of this year's fiscal 2005 budget, we'll be getting reporting on the Federal Enterprise Architecture components, as well, with the agencies; and geospatial data and the tools are part of some of the reference models.

So we hope to have it in those three forms—the OMB Circular A–11, the A–16 with the FGDC reporting, and then the Federal Enterprise Architecture reporting as part of the budget.

Mr. PUTNAM. So assuming that every agency complies with the requirements of A–11 and A–16 and their EA report, we should know by?

Mr. FORMAN. September.

Mr. PUTNAM. By September we'll know how much we're spending on geospatial?

Mr. FORMAN. I think it's fair to say we wouldn't need it in all three of those, that clearly what's happening here is, A–16 didn't work. So we supplemented that with A–11, and our check and balance is now this year.

We know if an agency is performing a mission or manages their program as it relates to geography, they have to be using some sort of geospatial or geographic information system; the check and balance for us is going to come down to the architecture. If they're not reporting yet, we see, that linkage in the data reference model or in the business reference model, we now have a basis to go back to them and say, obviously you forgot to give us some information, or you probably have a need here that we don't see being met. And I believe absent that architecture, we would have a difficult time identifying the gaps.

So I'm putting a lot of my bet this year on the fact that we'll have the discipline of the architecture process to ferret out people who haven't seen a need to report that before.

Mr. PUTNAM. We'll certainly be happy to help enforce some of the discipline to ensure that everyone is complying with your circulars.

In your testimony, you mentioned that in the next year you will launch the geospatial one-stop portal with an initial 1,000 data sets with a goal of increasing the amount of information on the portal by 20 percent each month thereafter. How are the initial 1,000 data sets selected? And could you give us some examples of what the public can see when you roll out your portal?

Mr. FORMAN. For that question, I'd like to defer to Scott as being the executive——

Mr. PUTNAM. Certainly.

Mr. FORMAN [continuing]. Director.

Mr. PUTNAM. Mr. Cameron.

Mr. CAMERON. OK. Mr. Chairman. This gives me a wonderful opportunity to introduce the executive director of the One-Stop project, my direct report—an individual who ran the New Jersey State GIS office, Hank Garie.

And, Hank, I'm going to allow—encourage you to come up here and field the question, because you're closer to the data here than I am.

Mr. PUTNAM. Does the buck stop with you?

Mr. GARIE. The buck stops right here, Mr. Chairman, and I'll be happy to try to answer the question for you.

I think there are two aspects of your question. No. 1 was which agencies are we working with on the initial deployment of the portal.

We have been coordinating with a number of Federal agencies, including the U.S. Geological Survey, as well as NASA, EPA and others, and also working with, initially, a handful of States who we've had good contacts with to initially populate the portal with geospatial information.

Data sets that we're focusing on include items of national significance such as topography and elevation, basic reference information, as well as improving the capability to reach out across multiple data platforms to pull information in to support decisionmaking, decisionmaking such as homeland security, environmental management, transportation planning, those types of things.

Mr. PUTNAM. Could you walk us through a scenario where a regional planner in New Jersey or in central Florida would be seeking a particular type of information and someone would refer them to this portal? And could you walk us through how this would improve their ability to make decisions?

Mr. GARIE. I'd be happy to take a shot at that.

Let's envision an incident was reported in Florida, a hazardous spill, for instance. One would go to the portal and be able to instantly, with one click of a mouse, bring up the national map, which is a digital set of coverages for the entire Nation that would help you zoom into Florida and get a sense of that general community. One then could type in an address and go directly to the area of the incident, perhaps go to the State of Florida and bring up information about emergency preparedness information that would be hosted data in State government.

And, finally, if one were interested in the effect that spill might have on natural resources, let's say a fishing area, one could visit another server, one that I'm aware of from the Marine Institute down in Florida and pull up a third server, overlaying all that data instantly on the fly and then be able to either save and print that as a map or e-mail the information to the first responders or to the Governor's office in the State of Florida.

So within a matter of minutes, we could pull information together through the portal, get that information consistently and quickly into the hands of relevant decisionmakers to try and support that response effort.

Mr. PUTNAM. To what degree would you be able to access private data on that portal?

Mr. GARIE. To the degree that the policy decision is made that we would encourage the private sector to report their existing information, we could access that information as well. It's really not a technical issue. It's a policy issue.

Mr. CAMERON. That's perhaps my cue.

Mr. PUTNAM. You need to come to the microphone.

Sir, you can stay at the table. We'll probably have some more questions for you.

Mr. CAMERON. As currently designed, Mr. Chairman, we're focusing initially on data sets that are owned by Federal agencies, State agencies and local government agencies. From a technical standpoint, there's no reason we couldn't provide access to private sector information. However, there's some policy issues.

Frankly, in addressing this question, we're going where no one has gone before. For instance, the Joint Committee on Printing here on the Hill has a policy guideline against advertising. To what extent does making private sector information accessible through a government site constitute advertising?

I've commissioned a study by the Interior Department's policy office to look at the statutory, the regulatory and whatever policy guidance may be extant right now on this topic. But from a citizen's perspective, as I indicated earlier, if you're interested in providing the best information for that person who's managing emergency response after an earthquake in Los Angeles or whatever, you want to make the best information available to them. You want to give them the opportunity to select the data that they

would need to best meet their needs. And that begs a question, why not provide access to private sector information?

But we don't know what our full regulatory and statutory constraints are yet, Mr. Chairman, and so we need to explore that.

Mr. PUTNAM. Are the utilities considered public or private?

Mr. CAMERON. Well——

Mr. PUTNAM. Would you be able to find out where to turn off the private company's gas line? Would you be able to find out where to shut off the power?

Mr. CAMERON. OK. Well, you're raising information that poses some security dimensions to it. For instance—you wouldn't want everyone in the country perhaps to have access to that sort of information. So even data sets that were available on-line, you might need to have some sort of security protection to limit the number of folks who could have access to that information, but in theory, yes, the portal would provide that capability to get that sort of information by the folks who have the right security clearances, who clearly had the need to have information that might otherwise be considered rather sensitive.

Mr. FORMAN. Mr. Chairman, I think there's another important aspect of that, that clearly there is some geospatial and geographic information that is collected by the Federal Government. There's an awful lot of the data that we buy from the private sector, and a big part of the issue here is, do we have to buy it so many times?

As you know, I'm a big fan of Web services and leveraging a transactions-based model where we don't actually have to buy complete data bases; but in this scenario, we're buying it from the private sector anyway. That doesn't mean we have to own and have huge data centers hosting that data. There clearly are commercial marketplace models that we need to be exploring, not just in geospatial, but in other data areas, and we are exploring, where we don't actually buy and copy the content and host it ourselves, but as Scott has said, get access to that on a different type of transaction model.

Mr. PUTNAM. We're going to return to this. My time has expired, but before I call on Ms. Watson, Mr. Garie, could you please state your name and title for the record?

Mr. GARIE. Yes. My name is Henry Garie and I'm the executive director of the geospatial one-stop program.

Mr. PUTNAM. Thank you very much.

At this time, I'll recognize for 5 minutes the gentlelady from California, Ms. Watson. Welcome.

Ms. WATSON. Thank you very much, Mr. Chairman. I'm sorry I'm late.

I probably missed much of what I'm going to ask, but when you talk about geospatial, are we talking about providing information to certain individuals in government or to the public? Let me give you a case in point.

I represent Los Angeles, CA. We have a whole lot of natural phenomena, natural disasters; and let's just say, homeland security, would there be capability in a geospatial system to let us go into it, as elected officials, to be able to let our constituencies know what transportation routes they could take to get out of town?

We had a case in 1992 where many of the post offices were closed down, and many of the drugstores. People called in and wanted to know where they could go and buy their prescription drugs. We went to the post office, picked up the welfare checks, took them to the—so that kind of information.

We just knew it because we were on the ground, but I'm wondering—you talk about business, commercial, and you talk about government, and I'm wondering if your system would be developed to be able to get into it and give them commercial, retail information, transportation information, roadways that are safe for evacuation. How extensive—how general will it be?

Mr. CAMERON. Certainly in terms of the emergency response, what-are-the-best-roads-to-get-out-of-town-type questions, I think the answer would be yes. We would want to have this sort of information available to the appropriate person, the city of Los Angeles, L.A. County government, whatever it might be, to feed information to the radio broadcasters, for instance, to give advice to the general public.

You raise some very good questions, essentially how far does one go? We don't want to duplicate services that are already out there in the private sector. We essentially don't want to become a service for retail companies to advertise the location of their stores, for instance. So there are some boundary issues that, frankly, we need to explore and we need to nail down; and to be honest, we're probably a year or 2 away from doing that. Our primary focus right now is getting the Federal agencies, the State agencies and the local government agencies to coordinate together to meet the needs of the persons in charge of, how do I handle an earthquake in L.A. County?

Ms. WATSON. May I just give you this scenario.

We had an earthquake, as you know, in 1992, and we were out on the streets. And when we got to the city hall, we asked for help, because I just went around the district, and there were collapsed buildings and homes everywhere. And they said, listen, you've got to help us. Find the guy in the street with the hard hat and direct him.

So we got out and we were a resource. I think whatever system is set up, there needs to be coordination across areas, and we need as elected officials, because we get the calls as well, the first responders are so occupied—I was out there directing traffic; you know, I mean, there were just fire engines going every which way and the police occupying and so on.

So I think as you look at a comprehensive system, you need to consider how we coordinate into the public-private sector, into the community base. There are many organizations out in the community that would be helpful. So I think we should—and it's not favoring a commercial establishment over—but there are some NGO's that are in operation, could be in operation, and there are commercial businesses that could be helpful, so I think we ought to look into that if we want a comprehensive system that can do the job.

Mr. CAMERON. A very good observation, Congresswoman. One of the more interesting features of this version 1.0 of our portal, if you will, is our ability to essentially make a map on the fly, as he had

referred to, take data from the county, from the Feds, take it from the city, lay them on top of one another; and then you could actually e-mail that composite map to some people that were on a distribution list that you thought would benefit from having that information.

So a couple of clicks of a mouse, you could send out a 1,000, 10,000 copies of that map to key players in the community who would benefit from that information.

Ms. WATSON. If I could just——

Mr. FORMAN. Also, if I may, the disaster management initiative is specifically focused on this; and in our written testimony, we did talk about the relationship between the geospatial information and those actual sets of tools for the first responders.

I think your point is right on target. It's a critical linkage that has to occur.

Ms. WATSON. Just one more thing. I think you can buy into a service called—what is it, Telstar or something-Star? And I am just fascinated by it, you know. You just push a button on your automobile and it tells you, hello, Ms. Watson, and you tell them where you want to go, and they direct you go to that light.

I'm saying, is somebody following me that knows where I am? But I'm thinking—what is it, Telstar? What is the name of that system? OnStar. Marvelous. Wonderful.

And so if we could, as you develop this, have the capability to do an OnStar kind of process to get a map, it would be very, very helpful. That's what they do, but as you develop it for more practical use, you might want to consider what they do.

Thank you, Mr. Chairman.

Mr. CAMERON. A quick response to that. The public launch of the portal will be at a conference here in Washington June 30th, but we'd be delighted to provide demonstrations to any members of the subcommittee between now and the 30th, who might be interested; and that will include staff of course.

Mr. PUTNAM. Is it on-line now?

Mr. CAMERON. Yes, I believe the answer is, it is on-line. We certainly saw an on-line demonstration last week. I'm not quite sure it's ready for prime time today, but it is certainly demonstrable.

Mr. PUTNAM. What is the address?

Mr. GARIE. We have the portal now running on a development server, and we would be more than happy to show you its capabilities at any time that would be convenient for the committee or individual members. The address will be www.geodata.gov.

Mr. PUTNAM. Very good.

I'll now recognize the gentlelady from Michigan, Mrs. Miller.

Mrs. MILLER. Thank you, Mr. Chairman. Just a couple of questions, and I think I'll followup on this whole coordination everybody is talking about, how you coordinate some of the different layers of government, I suppose. And I've been involved at the local, the county and the State and now here; and I remember at the local level of government where we were—GIS was sort of in its infancy in a former lifetime of mine when this all started, and how fascinating it was.

At a local level we started with the GIS and you start doing your mapping, your overlay with your infrastructure, and the fire hy-

drants and water mains and all of that; and at the county level you start putting on the park system and demographics; and then the State level is doing interstates and all these kinds of things.

But as you were outlining the possible scenario for a homeland security, a terrorism attack, what have you, you need to be able to access that. You would have to know what the PSI, for instance, would be at a particular fire hydrant, what kind of underground capacity you have and all of these kinds of things.

What percentage of municipalities or counties or States are even involved with GIS, and how much capacity is out there for you to even access, as you begin your construct to some of these overlays? Where are we? I mean, it is sort of a new thing. I mean, the Internet is relatively new, and GIS is quite a bit newer than even that.

Mr. CAMERON. All 50 States are certainly involved. Hank, in fact, is past-president of an organization called the National States Geographic Information Council, that has been around for quite a few years.

I think it's fair to say that virtually all the larger local governments across the country have GIS. For instance, New York City relied on GIS extensively after the September 11th attacks to figure out where the gas pipelines where, where the subway tunnels were, to try to figure out how to respond. So the medium-size and larger local governments across the country are involved in GIS right now to a varying extent.

As you might imagine, the more remote areas and poorer communities are probably less likely to have this sort of capability.

In terms of the numbers, Hank, would you want to hazard a guess on how many local governments have the GIS capability?

Mr. GARIE. Well, let me begin by saying geospatial one-stop is really all about partnerships. The information is on organizational partnerships, not so much technology; and the fact of the matter, as Scott described, that our intergovernmental board of directors relies on inputs from local associations is a testimony to our recognition of how much GIS activity is happening out there locally.

I can speak probably most directly from my New Jersey experience, where in New Jersey each of the 21 counties have GIS capabilities that's tied in with the State partnership. And so this partnering is happening across the country, where States are working with counties, who are working with municipal governments.

What geospatial one-stop is doing is putting in place this Internet library card catalog, if you will, that we will work through our associations on the board to encourage those State and local governments to join into this national network, and I think with the technological advances and the partnership potential, we can wrap our arms around a lot of the local digital data that you've alluded to.

Mr. CAMERON. In fact, if I could followup, one of the advantages that we hope will flow from the geospatial marketplace that I referred to earlier is, any market tends to create a situation where prices goes down, demand goes up and more people can take advantage of what is being bought or sold, so we're hoping that the geospatial marketplace will make it easier, less expensive for a wider variety of local governments, for instance, to afford and take full advantage of GIS technology.

Mrs. MILLER. And, you know, it would also seem to be a critical element that you would—all of you talked a lot about uniformity and having standards, and being able to access this information. Who is driving the standards, for instance, at the local level, the county level? Are there the different associations? The State Associations of Governors, for instance, does this drive the standards for the State? Is there uniformity?

Is that a big problem?

Mr. GARIE. It is a big problem. One of the things geospatial one-stop is doing with respect to standards is making sure that our process is inclusive, that we've invited those State and local representatives to work with us. And again we're focusing through the associations. And the fact that NACO, the National Association of Counties, has an active GIS presence and the National States GIS Council are all involved helps us bring those locals to the table.

I do think there are leadership roles clearly at the State level that can help promote and encourage that type of consistency.

Mrs. MILLER. You know——

Mr. CAMERON. We have really gone out of our way to make sure that State and local governments are actively playing in standards developments.

I think one of the fair criticisms of first-round standards development at the Federal level that started in the middle 1990's was that it was very Federal-centric. Maybe, in essentially the 1990's, the Feds did have something of a monopoly on GIS, but the reality is that the State and local governments have more data, better data, right now and it only makes sense to get State and local governments as actively involved in standards development as they can stand; and we've made a very intense effort to do just that, because if this project does not meet the needs of State and local governments, it fails, and that is essentially our perspective.

Mrs. MILLER. Right. Well, not only the needs of State and local governments, as you mentioned—in this case, I think it's sort of the bottom up.

For instance, you're talking about a homeland security situation; again, you would need the information from the local fire department, who—their fire inspector has information about a hazardous material in a particular building. There's no way the Federal Government would have that. It all sort of emanates from the bottom up.

Just one other question: In regards to private data that was mentioned about private data and accessing private data, could you give—some of you, any of you give me an example of what kind of private data you would overlay? Is there a pool of private data out there that you would like to have that you're having difficulty getting?

Mr. CAMERON. Well, if a policy decision were made and we're not there yet—although we're awfully intrigued by the possibility—if the policy decision were made to incorporate—or make private data accessible through a portal, for instance, probably elevation data would come to mind. There are a lot of satellite companies—or companies involved in aerial photography that can give you much, much higher resolution on elevation, like to the nearest foot, or less

than that in some cases, that's better quality frankly than what's in the typical Federal card catalog, if you will.

So if you're worried about a flood issue in St. Louis or the Sacramento River Valley, for instance, you might need to know to the nearest 6 inches what the elevation of that levee was; and that is the sort of information that the private sector can readily provide, and it would be one of the cards in that card catalog. So the manager could make an informed decision about which data base could best serve their needs.

Mrs. MILLER. Thank you, Mr. Chairman.

Mr. PUTNAM. Thank you, Mrs. Miller.

There's a recurring theme that the State and local data and private data is superior to Federal data.

Is that because it is more current or it is a higher quality?

Mr. CAMERON. It is generally more current and to be fair here, there are a large number of Federal agencies and NASA for instance, that has satellites up there all of the time are taking data, obviously, getting current information. But if one were to look at the old standard, the U.S. Geological Survey quadrangle, a lot of those quadrangles are 10 years old, 20 years old, 30 years old. They are at a scale of 1 inch equals 20,000 inches as opposed to 1 inch equals 1,000 inches or 2,000 inches.

Mr. PUTNAM. So does the government not need to update those maps because the better map exists in the private sector, and we don't need to buy the same data again?

Mr. CAMERON. I think the way to look at it is as a society, we have needs. The agencies have needs, the private sector has needs, different levels of government have needs. Geospatial one-stop is a way for the community to get at the best data that's available in the community. So if a local government had better information in a particular geographic location, geospatial one-stop portal would allow a user to get that local government's information, again, with the cooperation of that local government. We are not in a position of dragooning anyone's data.

Mr. PUTNAM. If a locality could purchase private data, that is good to 1 foot on elevation, why would FEMA, as part of their recurring updates, go in and remap flood maps for an area if the data exists in the private sector?

Mr. FORMAN. That is exactly the issue. And FEMA is a perfect place to look for that because they did have a similar issue to that. Not just FEMA, but the Corps of Engineers, the Interior Department, the Agriculture Department, they were essentially buying that same data and then occasionally we would come across another agency that would go out and collect that data itself. So we had multiple people collecting the same data and multiple agencies buying sometimes the same data multiple times. We would like to see that money not go to buy the same data multiple times, but buy the data once and invest in the applications that allow us to get the value out of the data.

I think one other key element of this to understand the difference between urban areas or areas that might be regulated by State or local organizations like the State Agriculture Environmental Protection Department. Somebody's going to have to collect that data. There's a lot of overlap in those regulatory processes.

But each regulator doesn't need its own version of that data. And the portal allows us to start to manage the data investments a lot better because we already know something is there.

In an urban setting, there's no question that the local government is going to probably have the best data across that whole geospatial layer because they will have the permitting that went into building whether it's the gas lines or the power lines or the phone lines, they all basically go through a permitting process that requires the geospatial data. A lot of the local governments have made tremendous improvements in aggregating that geospatial data and really at the heart of governance to regulate how they manage that asset of that community.

So we know the best data is there. What we're trying to do is not have a Federal agency go then and survey that land again, buy another copy of that data and then give out money for government programs to the local government at the Federal data set as opposed to the local government data set. So we have to go through milestones to get to that nirvana of more effective management of those investments.

Mr. PUTNAM. Let me run through a couple of fairly quick questions, but they are important. This initiative is classified under the government to government umbrella. Is that because you primarily see your customers, your users, your Web browsers being State and local governments?

Mr. FORMAN. Correct.

Mr. PUTNAM. And not so much a citizen who would like to have a really great looking aerial photograph of Yellowstone or a nautical chart for fishing off the coast of Florida?

Mr. FORMAN. That's correct.

Mr. PUTNAM. There is a board that is mentioned in Mr. Cameron's testimony that includes representatives of tribes, State and local governments, western Governors and several Federal departments. How often does it meet?

Mr. CAMERON. It meets on an as needed basis. We have been doing conference calls as well as face-to-face meetings, I think, we have probably been averaging about once every 6 weeks for the last 4 or 5 months.

Mr. PUTNAM. Is there a representative from the private sector on the board?

Mr. CAMERON. There is not a representative from the private sector on the board. That is a reflection of the fact this was conceived as a government-to-government initiative from the very beginning.

Mr. PUTNAM. Do you envision expanding over time as the portal opens and the governments figure out how to get that information on? Is that a natural evolution?

Mr. CAMERON. I am not sure, because I think this will fundamentally stay a government-to-government initiative. I should say we are actively engaging the private sector in standards development. We have clearly been relying on private sector expertise for the portal for instance, and these board meetings are open to the public. We don't lock out someone just because they're not an employee of a Federal, State or local agency.

So we're engaging the private sector. But since this is a government-to-government project, I'm not sure it's appropriate to put the

private sector on the board, and besides, who would speak for the private sector?

Mr. PUTNAM. We resolve those issues on a regular basis with different boards in 100 different things in the government. But your testimony says formation of this board is intended to facilitate the ability of governments to leverage their individual resources to become more efficient, more cost effective, and to better serve. And your own answer to my question, you said that the private sector in a lot of cases has better information. How would the local governments know that there's something better out there if they are not exposed to something like this board?

Mr. CAMERON. The vendor community is very effective at marketing. And if a decision is made to make private sector information accessible through the portal to add it to the card catalog, if you will, then it would be very easy for anyone out there to get information on private sector services.

Mr. PUTNAM. You made reference to that a couple times if the policy decision is made to include the private sector. Where is that decisionmaking process. Is it your call, Forman's call? Who makes that call?

Mr. CAMERON. We'll be happy to have as wide a conversation on that topic as you like, Mr. Chairman. In fact, since we are paving new ground here, if the committee has any insights or any views on this, frankly, we would welcome the suggestion. The first step is to try to figure out what the current statutory, regulatory policy framework is. Once we get that settled, then we'll know what our options are or are not under current law. And if the prevailing views of the board, for instance, are that we ought to have private sector information available, then I'll need to consult with Mark, because our friends at OMB have a controlling influence on information policy administration-wide.

And as we move forward with it, then if there are any suggestions that the committee would care to make. At this point, the primary obvious issue, in fact, is a congressional one. This Joint Committee on Printing. Does making private sector information available through government portals, in fact, constitute advertising? I don't know. Maybe the committee can enlighten us on that.

Mr. PUTNAM. Who is ultimately responsible for implementing the vision of geospatial one-stop. Is it you, Mr. Forman?

Mr. FORMAN. That would be Hank.

Mr. CAMERON. I don't think we will put Hank there.

In consultation with the board, I make the decisions until Mark Forman or Gail Norton tell me I'm wrong is sort of the situation.

Mr. PUTNAM. So Interior?

Mr. FORMAN. Interior is the lead partner for this, the managing partner for this. And Hank is the program director, the executive director of the program. My view on this is we come to an agreement via the business case process and what are the milestones, the performance measures and program plan, and it's Hank's job to deliver on that.

Mr. PUTNAM. Historically, Interior is where all the maps were. We had all these tremendous natural resources, had these public lands mostly in the West. If you go back far enough, we had the whole settlement issues, homesteading and all of those kinds of

things that over time led to a lot of true pen-and-paper type maps being in Interior. Then we put a man on the moon and we started having satellites, and we're able to take aerial photographs.

Now most of the discussion we have had on geospatial really has focused, to a large degree, on first responders, homeland security, things that would be much more important to the city of New York than to the Bureau of Lands Management in the middle of Wyoming.

So Interior—is it still the appropriate foci of cartography, and now geospatial information for the Federal Government?

Mr. FORMAN. When we posed this question to the Deputy Secretary via the President's management council, that was the choice to make them the managing partner. So that represents an agreement among the COOs, chief operating officers of the government.

Mr. CAMERON. Your observation, I think suggests why it's so important that we actively involve other Federal agencies, that we actively involve State and local governments because of the broad community of needs out there, broad community of interests, broad capability of interests and it would be foolhardy for one particular entity to try to go this alone. It wouldn't make any sense and that's why we are making such a special effort at bringing in the States, the locals and other Federal agencies in the decisionmaking process on how this project evolves.

Mr. PUTNAM. This time I will recognize the distinguished ranking member of the subcommittee, Mr. Clay.

Mr. CLAY. Thank you, Mr. Chairman, for holding this hearing. I thank all the witnesses for taking the time to work with us today. Mr. Forman, good morning. Implicit in your one-stop proposal is collaboration between the Federal Government and State and local governments. Some have suggested that this is a one-way exchange. Has OMB considered a geospatial block grant program where a part of the $4 billion spent federally is sent to State and local governments to develop local infrastructure?

[The prepared statement of Hon. Wm. Lacy Clay follows:]

STATEMENT OF THE HONORABLE WM. LACY CLAY
AT THE HEARING ON THE
ELECTRONIC GOVERNMENT INITIATIVE
GEOSPATIAL ONE STOP

June 10, 2003

Thank you Mr. Chairman for holding this hearing, and I thank all of the witnesses for taking the time to work with us today.

This is a very complicated topic, and it doesn't take very long for the discussion to move into the world of technical jargon to a point where the public is left behind. It doesn't have to be that way, and I hope we can hold this public hearing at a level that is accessible to the public.

In fact, the issues that we are addressing today are issues of basic government oversight. The administration has proposed a project that will simplify access to government geospatial information. The administration will describe to us that project ant its goals.

In addition, we will examine the breadth of funding for geographic information across the federal government. Two months ago, I asked the Congressional Research Service to assess for me the extent of funding for geographic information systems across the federal government. In the process of fulfilling that request, we learned that many agencies had a difficult time providing the necessary information. Some, simply ignored the request, and others claimed that they couldn't make sense of their own information. Let me give you just one example. The Federal Emergency Management Administration recently issued a proposal to spend hundreds of millions of dollars on geographic information. At the same time, FEMA could not tell CRS how much would be spend by the agency on geographic information in 2003. If they don't know what they are spending this year, how can they be trusted with a procurement of that size? I hope the witness on our second panel will address this problem.

Our second panel will bring to the table some of the perspectives from the private sector. Much of what is being done to bring geographic information to the market place is being build by these companies. We have all seen adds for General Motor's On-Star and used MapQuest to find an address. Behind these applications are a wealth of geographic information, and elaborate systems of software. This panel can advise us on how the government can build upon what has already been done by the private sector without reinventing the wheel.

I hope that today we will learn how much is being spent across the government on geographic information systems; whether or not there is duplicate spending; and what is being done about it. I hope that we will learn how much of what the government is doing has already been done by the private sector. And I hope that we will learn what can be done to make this endeavor more efficient. If we don't learn these things today, I expect the chairman will call another hearing.

Again, I thank the witnesses for their efforts, and I ask that the full text of my remarks be included in the record.

Mr. FORMAN. I'm not aware of any and that could just be my lack of knowledge. So if I could get back to you on that, Mr. Clay, I would appreciate that opportunity.

Mr. CLAY. Sure, I would appreciate it. Ms. Koontz, as you point out in your testimony, the objectives of geospatial one-stop are not significantly different from those the government has been struggling with for over a decade. For example, one of the objectives is to finalize the seven framework standards that have been under development for most of the last decade. What has changed that would make us believe suddenly that these objectives are going to be met?

Ms. KOONTZ. Well, in terms of developing the standards, I think you have to remember that standards development is a consensus-based process, and under the best of circumstances, is going to take a long time. Whether, you know, eight standards over 13 years is the most efficient pace, I don't think I could tell you. The point about geospatial one-stop is that its goals are very similar to what's been going on in the past.

But I think what we saw as the task at hand is a near-term kind of strategy. And I think what I would like to see and what I think is lacking here is a longer-term strategy which is really going to get us where we want to go in terms of having a strategy for how are we going to address the other 26 standards that still need to be developed. I think there needs to be greater involvement with State and local governments. And in the geospatial one-stop, despite the board of directors and the involvement of many, many associations, I think there's some question as to what extent those associations are reaching out to their constituents and involving them.

The key thing here is, I think, to make the portal ultimately work, you have to have the standardized data behind it, and that will depend on getting enough involvement from all the key players to make sure they agree with the standards and will eventually adopt them. And that's what will populate the portal in the end.

Mr. CLAY. Ms. Koontz, I would like your reaction to a proposal that an agency that does not adequately report and document its geospatial holdings be fined a percentage of its budget to go toward a contractor to perform those functions. In other words, an agency can either do the work or be required to pay to have the work done. What's your reaction to that?

Ms. KOONTZ. I sense there's a legal question lurking in there somewhere, but I don't want to go too far with that. That's OMB's role to ensure the cross-agency coordination and also to work with agencies because they have the power of the budget to take steps to make sure that agencies are doing what they're supposed to do here.

Mr. CLAY. Mr. Forman, would you like to comment on the proposal?

Mr. FORMAN. I think there is room for many components. Ultimately the funding and financing does rest with the Congress. And I think that would be a very fruitful discussion to enjoin your involvement in this process.

Mr. CLAY. Has OMB considered this proposal?

Mr. FORMAN. Similar proposals, I wouldn't say one where we just take the money away and then would use it to hire contractors, because we generally don't get involved in the contracting process. But withholding funds until agencies close room gaps in business cases we have done frequently over the last 2 years in this area as well. Budget data requests is something else we have done in this area as well. And there is a need for better reporting, there's no question about that.

Mr. CLAY. Thank you very much. Thank you, Mr. Chairman.

Mr. PUTNAM. Mrs. Miller.

Mrs. MILLER. Thank you, Mr. Chairman. Just a quick question and not to keep going on about how important it is you have all said that about coordinating with State and local governments, but even when you use the example of FEMA, you know, another example, I think, within the last maybe 5 or 6 years, I think every county in the entire Nation has been required to remonument as well. For all of that survey data, I mean, it is all out there if you can access. And you know, just to followup on what Representative Clay had mentioned about whether or not it would be appropriate from a block granting standpoint.

We have a tremendous investment already at every level of government and we intend to continue this level of investment. Is there any thought at all, and I'm not sure whether it would be appropriate or not, but is there any thought about having a fee structure in place for accessing the data? Is there any way for the government to recoup some of this cost as people may utilize it particularly out in the private sector?

Mr. FORMAN. Personally, I think those are decent ideas. Generally we would like to see that evaluated as part of the business case. And when we originally evaluated this in the e-government strategy, there were estimates that as much as 50 percent of the investment was wasted. So we chose the portal approach and the Santos approach because it is the fastest way to get to a buy one and choose many or collect one, choose many paradigm.

And if we could save 50 percent of the spending across Federal State and locals, that would free up several billions dollars worth of resources. As we move to the next phases, clearly we should explore some of the other aspects of the business model. Those are fine avenues to take a look at.

Mr. GARIE. Perhaps I could offer one insight with respect to fees. A number of States and county governments as well have explored this aspect of trying to recoup costs for data development. The general consensus is that setting up fees for data often provides a larger disincentive for people to access and utilize the information than funds one can recoup.

Mr. PUTNAM. Would you yield for 1 second? There are some geospatial products that the government does charge for. How is that decision made about what products are free and which ones are not? And how is the decision made about the price?

Mr. CAMERON. The general policy, Mr. Chairman, and Mark can correct me, the general policy is that Federal geospatial data is provided at the cost of printing and reproduction. I think that is in the OMB circular 130, but I could be wrong. The general policy is you don't try to recapture the cost of collecting the data in the first

place. In some cases, the cost of reproduction could be a dollar, and some cases, it could be $10 depending on the product. Of course, if you are getting it off the Internet, it's basically zero.

Mr. PUTNAM. I yield back. Thank you, Mrs. Miller.

Mrs. MILLER. Do any of you have any advice for us on how the Federal Government could encourage the State and local governments to do even more with their GIS to really supplement what we're trying to do, even from an economic incentive standpoint? What could we be doing?

Mr. FORMAN. This gets to the genesis of this initiative coming out of our focus groups that we held. Local organizations or a city organization can buy or assemble geographic information. It's very unusual to have a county co-use that information. Moreover, a State typically works with a county and often wouldn't share information with the city. So what the group told us is that the Federal Government had to step up to a leadership role because we too share the data, although oftentimes, not to that level of detail that a local government needs. And hence, the focus on standards came out. The ability to standardize or—from the bottom—literally from the local government up to define what should be the content of the data within the themes. And then the other aspect was that creation of a portal, which, again, was seen as a central Federal responsibility that the local governments could then use to access that data.

Mr. CAMERON. To be fully responsive to your question, it's amazing how a very small investment in cash or a partnership grant can make a difference to a local government. $10,000, $20,000, can make a big difference. Without appearing to lobby, I think I need to inform the committee there's $1.5 million in the Presidents fiscal year 2004 budget that is part of the budget for the geospatial one-stop project. This $1.5 million, in fact, would be grant money to State and local governments to foster some of these partnerships. So the committee might want to be aware of that.

Mrs. MILLER. Thank you, Mr. Chairman.

Mr. PUTNAM. Ms. Koontz, GAO, in your testimony said, "unless the underlying geospatial data offered through the one State portal are standardized across data providers, the additional functionality offered by the portal may be of limited value." You also say while geospatial one-stop's objectives are important they do not represent a significantly new or different approach to the GIS integration problem that the government has been struggling with for more than a decade. Mr. Clay mentioned that as well. What's it going to take? What did your report find that it's going to take either from the Congress or from the OMB or the individual agencies to really get its arms around standardization to make this a meaningful customer service government-to-government tool?

Ms. KOONTZ. You're absolutely right. Standards are the key to this entire undertaking. I think that at the risk of repeating myself, I think there's a need for a longer-term strategy. While the geospatial one-stop represents some short-term goals, I think we need a longer-term strategy as to how to develop the standards. And in addition, I think we have some concerns about how extensive the involvement has been in both the standards making proc-

ess by all Federal agencies and we have some concerns about State and local involvement in the geospatial one-stop.

Mr. PUTNAM. The lack of?

Ms. KOONTZ. The lack of. I wouldn't say there's an entire lack, but we are concerned there is not as much involvement as is really needed here. Obviously geospatial one-stop has taken some steps to involve the State associations, but we still have questions about the extent of the involvement. And the key here is that unless State and local governments agree with these standards, it's—and they believe it will meet their needs, it's unlikely they are going to adopt these. It is the same with other Federal agencies.

Tremendous investments have already been made in geospatial information systems. I think that Federal agencies, State and local governments, need to have an incentive to change what they're doing to conform to what's needed for geospatial one-stop and the portal.

Mr. PUTNAM. Are you satisfied with the structure that's been put in place that the structure provides a framework for the right people to be making that long-term goal setting or developing that vision?

Ms. KOONTZ. I think that the structure we have in place could work. Having Interior as a lead, you know, makes some sense. The reason that we have Mark Forman's position as administrator for e-government is to ensure the coordination across the Federal agencies; that needs to happen in order to make this successful.

Mr. PUTNAM. In the old days, a lot of different agencies have been tasked with collecting an awful lot of data and mapping it. Do we have warehouses somewhere full of maps?

Ms. KOONTZ. Probably.

Mr. PUTNAM. Does anybody have a definitive answer? Mr. Forman, do you know?

Mr. FORMAN. I intuitively believe its warehouses and we should get back to you on that. It would be interesting to see how many there are. I have seen places even in the Capitol where we have—when I was on the Senate Governmental Affairs Committee staff, maps that had to be submitted to us and archived. So I know these places exist. I don't know where they are.

Mr. PUTNAM. We have a hearing coming up on preservation of records and electronic archiving and things like that which hopefully the results will lead us to a more efficient and streamlined archiving process that might allow us to reduce the number of warehouses under GSA's control that are storing maps that no one uses or even is aware of their existence.

Mr. CAMERON. With your indulgence, could I respond to a couple of the observations made by GAO?

Mr. PUTNAM. You may.

Mr. CAMERON. I guess I would fundamentally disagree with the premise that this round of standards exercises is essentially the same as what we have done in the past. There are a number of significant differences. For one thing, we are actively involving State and local governments in the front end in ways that the Federal Geographic Data Committee did not do in the 1990's when they were working on standards. And that's a very significant difference.

The earlier round of standards development was really standards by techies for techies by the Federal Government for the Federal Government. We established, as a matter of policy from the get-go here, that we are trying to develop standards that work for the local person on the ground, flood plain manager in St. Louis, the county extension agent in Polk County, the State Recreation Department in Michigan.

So that's a difference in outlook and perspective. As a point of fact, we are field testing these draft standards with State and local governments. Dozens of them signed up for the opportunity. That hasn't happened in the past. So I guess I would disagree with the premise that this round of standard making is the same as what we had back in the 1990's. I think it's fundamentally different, both in its philosophy and its practice.

Mr. PUTNAM. Mr. Forman.

Mr. FORMAN. My experience would say that to be successful in something like this, you are going to need processes, you're going to need a governance structure and we would need to bridge technology. I think there's something different in all three of those areas. First of all, we really didn't have standardization process, and that's one of the aspects that the geospatial wants to help us build. It is very much a bottoms-up from State and local government because that whole office was set up to respond to the needs of State and local governments.

Second, there is no organization. I don't think anybody could imagine that you could manage something like this by committee, like the Federal geographic data committee was set up. I know that was government as usual back then. This needs a program office and it needs somebody that comes from the customer or the user community. That's why Hank is here. He understands that from the perspective of our customers at State and local governments. That's a big difference. And third is in the area of technology. 10 years ago, we didn't have portals, Web services or shared services. The technology really did not allow you to take advantage of a standard in a collect one, choose many or buy one, choose many. That's new and that is another integral part of this program.

Mr. PUTNAM. Obviously there is an awful lot of pride in this program, and you guys are working hard to make it successful. It's revolutionary or has the potential to be. And we're certainly excited of being a part of helping to make it work and involving State and local, private, the Federal Government. But Mr. Forman, like we've heard so many times on other topics whether it's information security, cyber security a lot of this comes back to not being a process problem or not being a technology problem, but being a cultural or a personnel problem. Frankly, as long as these agencies are going to continue to ignore circulars and directives and the law, we will continue to have a problem. So the degree to which we can be helpful in highlighting inadequacies and failures to comply by the agencies who are given very specific missions, we would be happy to fill that role and will be doing so.

So I look forward to working with you all in the future as we review how much money the government's spending on this, what the status of our map supply is in warehouses or wherever and ways we can continue to make this portal a successful tool for customers,

citizens, taxpayers to use. With that, we will dismiss the first panel and bring in the second panel. Thank you very much for your testimony.

Second panel, if the witnesses are here, please come and take your seats at the table. The subcommittee will reconvene. We have our second panel seated. Did all of you take the oath when we swore in the first panel or do we need to do that again? Did any of you not take the oath? We are happy to do it again. All right. Very good, we will move forward. We will begin in one moment.

Again, under the "ladies first" principle, we will begin with Susan Kalweit, Chief of the Interagency Geospatial Preparedness Team, with the Office of National Preparedness with FEMA. Ms. Kalweit is currently detailed from the National Imagery and Mapping Agency to the Federal Emergency Management Agency. At FEMA she is leading the Interagency Geospatial Preparedness Team. The aim IGPT is to develop in 1 year's time a strategy for underpinning our Nation's preparedness for all hazardous emergencies through a geospatial information network.

She previously has been the deputy chief of the North America and Homeland Security Division at NIMA. That means she has officially taken all of our pictures a number of times in her career. We welcome you to the subcommittee and we recognize you for your testimony.

STATEMENTS OF SUSAN W. KALWEIT, CHAIRMAN, INTERAGENCY GEOSPATIAL PREPAREDNESS TEAM, FEMA (DHS), FORMER DEPUTY CHIEF, NIMA NORTH AMERICA AND HOMELAND SECURITY DIVISION; GENE TROBIA, PRESIDENT, NATIONAL STATES GEOGRAPHIC INFORMATION COUNCIL; JACK DANGERMOND, PRESIDENT AND FOUNDER, ESRI, INC.; AND MICHAEL RITCHIE, P.E., L.S., C.P., PRESIDENT, MANAGEMENT ASSOCIATION FOR PRIVATE PHOTOGRAMMETRIC SURVEYORS

Ms. KALWEIT. Chairman Putnam, Vice Chairwoman Miller, Ranking Member Clay, thank you very much for this opportunity to discuss the benefits that a map-related data infrastructure brings to homeland security. I will be summarizing my written statement here. During Operation Iraqi Freedom, we witnessed how mapping technology played an integral role in our war-fighting strategy. The global positioning system [GPS] and highly precise terrain data guided precision munitions to their targets. News correspondent used the combination of perspective scene visualization tools, geographic information systems [GIS] and commercial satellite remote sensing systems to show the American public where battles were being fought, what areas had been secured by the U.S.-led coalition, and the terrain challenges that our Marines and soldiers faced as they moved toward Baghdad.

These technologies used by our military can aid in detecting, preventing and deterring terrorist activity and saving lives and protecting property in all-hazard disasters. In short, these mapping technologies which I will refer to as geographic information technologies are as necessary to our defense on the war on terrorism as they are to our offense. Over the next few minutes, I will describe generally the state of our Nation's geographic information in-

frastructure within the context of how such an infrastructure supports homeland security.

The convergence of GPS, GIS, visualization tools and remote sensing technologies combined with advances in wireless communication, grid computing and Web services present us with the opportunity to leverage location as the common information component for homeland security. I am talking about underpinning our Nation's preparedness with an infrastructure of current and accurate location-based information that is available wherever, whenever and however it is needed. The stimulus for geospatial one-stop is the fact that geographic information is critical to many business areas in the public and private sector and there's a tremendous need to share information and eliminate redundant spending.

Data holdings and their stewards that comply with standards and emphasize policies to share information model what our Nation needs to build and maintain the geographic information capacity critical to homeland security. When using this model as a standard to measure the current state of our national geographic information infrastructure, you realize that across our Nation, the quality of the data, the use of standards and the ability to share data varies widely.

This is insufficient for a Nation that needs to detect, prevent and respond to all hazards anywhere. The graphics that I have provided, which I hope you have, demonstrate the significant advantage homeland security planners, managers and responders have when they incorporate geographic information technologies in their business processes. Graphic one shows the results of tying the above ground infrastructure to the below ground infrastructure in New York City during the weekend of the September 11 memorial services in 2002. This graphic depicts the proximity of the VIP riser to the Brooklyn Battery Tunnel, highlighting a potential physical vulnerability at the site.

While mitigation of the tunnel's general vulnerability was included in the event security operations plan, NIMA analysis of the area as depicted here resulted in additional security precautions being taken. Graphic 2 depicts the damage created by a tornado that swept through La Plata, Maryland in 2002. No one in that local jurisdiction expected such an event, which, in its aftermath, had a tremendous emotional as well as financial impact on the town. The imagery in this graphic, and others like it, were used by Maryland to assess the damage for transportation signals, general structures and forests.

In addition, it helped settle some insurance claims quickly. The imagery also was used as the best available map to plan the reconstruction of the town. Graphic 3 depicts how local responders use geographic information technologies for incident management. This example was taken directly from the E-government Initiative Disaster Management, which located and pulled the imagery into its system using the technical interfaces promoted by geospatial one-stop. These screen shots from the recently completed TopOff II exercise in Seattle show the enhanced value of the geospatial one-stop products, the imagery in this example, to the incident managers. They stated, "This is the interoperability picture we have been wanting for years," and "disaster management and geospatial

one-stop services will work together to save lives, property and businesses."

Graphics 4 and 5 depict the utility of geographic information technologies for keeping the public informed in the aftermath of September 11. These examples were taken from the New York City Web site. The information provided by that Web site and the interactive application of Emergency Management On-line Locator Service helped local citizens stay informed on the status of their working, commuting and living conditions in lower Manhattan. Information provided included geographic representations of water, gas, electric steam and the subway as well as the status of water crossings, building conditions and various access zones in lower Manhattan.

Mr. Chairman and members of the committee, I appreciate you giving me this opportunity to testify on this very important issue.

Mr. PUTNAM. Thank you very much.

[The prepared statement of Ms. Kalweit follows:]

Testimony of
Susan Kalweit
On a Map-related Data Infrastructure for Homeland Security

Before the House Government Reform Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census

Chairman Putnam, Ranking Member Clay and Members of the Subcommittee, thank you for your interest and this opportunity to share with you the benefits that a map-related data infrastructure brings to homeland security.

Throughout history, the military has used map information as a key component to fighting and winning battles on land, on and under the sea and in the air. During Operation Iraqi Freedom we witnessed how mapping technology played an integral role in our war-fighting strategy. For example, the Global Positioning System (GPS) and highly precise terrain data guided precision munitions and unmanned strike aircraft to their targets. We also saw news correspondents use mapping technologies to communicate to the public on our progress during the war. Perspective scene visualization tools, Geographic Information Systems (GIS) and commercial satellite remote sensing systems combined to show the American public where battles were being fought, what areas had been secured by the US-led coalition and the terrain challenges that our marines and soldiers faced as they moved toward Baghdad. These technologies used by our military—GPS, visualization and GIS tools, and Remote Sensing—are the same technologies that can be used to aid in our ability to detect, prevent and deter terrorist activity; and to save lives and protect property in the event of all-hazards disasters. In short, geographic information technologies are as necessary to our *defense* in the War on Terrorism as they have been to our offense. In the following pages I will describe generally the state of our nation's geographic information infrastructure within the context of how such an infrastructure supports homeland security.

For background, I am Susan Kalweit. I am a 17-year employee of the National Imagery and Mapping Agency, and am currently serving as the Chief of the Interagency Geospatial Preparedness Team (IGPT), which is sponsored by the Department of Homeland Security. In this role, I have been at the Federal Emergency Management Agency since October of last year. My team and I are working on developing a National Strategy for Geospatial Preparedness. My remarks are based on my experiences as a NIMA employee and what I have learned these last eight months working as part of an interagency team in the civil community.

Introduction

The convergence of GPS, GIS, visualization tools and remote sensing technologies, combined with advances in wireless communication, grid computing, and web services present us with the opportunity to leverage "location" as *the common information*

component for homeland security. I am referring to underpinning our nation's preparedness to detect, prevent, warn against, respond to and recover from terrorist and all-hazard events with a geographic information infrastructure. This infrastructure includes the data, the hardware and software, the networking and web services infrastructure, the analytic expertise, and the policies and practices necessary to assure that current and accurate "location-based information" is available wherever, whenever and however it is needed.

The current state of the national geographic information infrastructure

The stimulus for Geospatial One-Stop is the fact that geographic information technologies are critical to many business areas in the public and private sector, and there is a tremendous need to share these information resources and eliminate redundant spending. However, each business area to be successful needs to have the best available data with the associated technology infrastructure. But, in only a few areas of our country are the best available data and the associated technology truly *the best*. That is, to be the "best" the

(1) Data holdings are of high quality, recent currency, well-documented according to federal standards, and geographically- referenced to national standards, and

(2) Geographic information systems implement commercially-accepted, open interfaces and standards to facilitate sharing and interoperability.

Data holdings and their stewards that comply with standards and emphasize policies to share information model what our nation needs to build and maintain the geographic information capacity critical to homeland security. When using this model as a standard to measure the current state of our national geographic information infrastructure, you will realize that across our nation the quality of the data, the use of standards and the ability to share data varies widely. Generally, jurisdictions with higher revenue have more robust geographic information holdings and systems than jurisdiction with lower revenue. States that have strong state geographic information coordination councils also tend to have fairly robust state-wide data and systems or have a plan in place to establish this capability. Unfortunately, terrorists and hazards don't look for places to strike where the geographic information capability is strong or weak—they just strike. Therefore, it is essential that the model described above be implemented nation-wide, and at all levels of government.

Finally, regardless of how much money is invested in establishing a national geographic information infrastructure, money will not overcome policy or structural barriers that inhibit information sharing. The reasons behind these barriers must be understood and appropriately addressed so we enable the most effective use of the geospatial infrastructure for homeland security. As examples, the IGPT has come across the following issues with regard to challenges in information sharing:

- The need for greater protection of certain information from public access laws when the information that needs to be shared is proprietary or provides a competitive advantage to the private sector owner;

- The need for flexible licensing agreements that protects industry's right to sell to multiple public market segments, but also quickly and easily adapts to unanticipated needs for the information to be shared;

- The need for a template Memorandum of Understanding or other legal document giving permission to use geographic data between agreeing parties; and

- The need for coordinated approaches to geographic data acquisition and management that overcomes the natural tendency toward stovepipe solutions within institutional walls.

Establishing the geographic information infrastructure for homeland security

What will it take to establish a robust and reliable national geographic information infrastructure for homeland security? This is the key question that the IGPT is tackling by developing a *National Strategy for Geospatial Preparedness*. The Federal Emergency Management Agency established the IGPT. The IGPT is now working with both FEMA and the Office of the Chief Information Officer in the Department of Homeland Security to ensure that it is an enterprise-wide approach. The inter-agency aspect of the IGPT includes personnel from The National Imagery and Mapping Agency (NIMA), the US Geological Survey, the US Department of Agriculture Forest Service, the National Oceanic and Atmospheric Administration, and FEMA. In addition, FEMA has provided funding toward conducting an emergency management needs assessment for geospatial information technologies. The IGPT also is working in close partnership with Geospatial One-Stop and the efforts of the Federal Geographic Data Committee; the National States Geographic Information Council (NSGIC); and the Spatial Technologies Industry Association (STIA) to leverage partnerships, knowledge and expertise in those organizations' activities. The IGPT is open to other mutually beneficial partnerships in the public sector, academia and the private sector. Partnerships—next to technical interoperability—are the most important ingredient for making the best use of limited resources to build the geographic information capacity necessary for our nation's homeland security preparedness.

It is significant to note that the *National Strategy for Geospatial Preparedness* under development is not a blank slate. Data being acquired and provided through the many federal programs participating in Geospatial One-Stop, and state and local initiatives spurred by the NSGIC and the Office of Management and Budget Implementation Teams represent some of the ways and means of contributing to the needed geographic information capacity. Fundamental to this capacity, however, are partnerships and commitments to implementing open interoperability standards as Geospatial One-Stop promotes.

All that being said, efforts in the geospatial community alone are not enough to sustain a national geographic information capacity. Robust state and local systems that are spatially-enabled for local fire, police, health, first responders and day-to-day operations not only contribute to building our national capacity, but also to sustaining it. The users of geographic data and systems drive the demand for those of us responsible to acquire and maintain the data and systems. In the end, it is the business practitioners and their dependence on spatially enabled business practices that will make our vision a reality.

Extended benefits of a geographic information infrastructure for homeland security

The graphics I have provided demonstrate the significant advantage homeland security planners, managers and emergency responders have when they incorporate "the best" geographic information technologies in their business processes.

Graphic 1 shows the results of tying the above ground infrastructure to the below ground infrastructure in New York City during the weekend of the September 11th memorial services in 2002. This graphic depicts the proximity of the VIP riser to the Brooklyn Battery Tunnel passing beneath the park, highlighting a potential physical vulnerability at the site. While mitigation of the tunnel's general vulnerability was included in the event security operations plan, NIMA analysis of the area as depicted here resulted in additional security precautions being taken to ensure the safety of attendees.

Graphic 2 depicts the damage created by a tornado that swept through La Plata Maryland in 2002. No one in that local jurisdiction expected such an event, which in its aftermath had a tremendous emotional as well as financial impact on the city. The imagery in this graphic and others like it were used by the State of Maryland to assess the damage for transportation signals, general structures, and forests. In addition, it helped to settle some insurance claims quickly. The imagery also was used as the best available base map to plan the reconstruction of the town.

Graphic 3 depicts how local responders use geographic information technologies as part of their incident management capability. This example was taken directly from the E-Government initiative, Disaster Management, which located and pulled the imagery into its system using the technical interface standards promoted by Geospatial One-Stop. These screenshots are from the recently completed TopOff II exercise in Seattle. They show the enhanced value of the use of Geospatial One-Stop products (in this example, imagery from the US Geological Survey's *The National Map* server) interoperating with incident management applications. The incident managers found the image background more informative and useful than the sparse map background of the area. The users of the Disaster Management system have stated "this is the interoperability picture we have been wanting for years," and "Disaster Management/Geospatial One-Stop services will work together to save lives, property, and businesses."[1]

Graphics 4 and 5 depict the utility of geographic information technologies for keeping the public informed in the aftermath of a national disaster. These examples were taken from

[1] See webcast discussion at www.emforum.org for more information.

the web site, NYC.gov established by the city of New York in the aftermath of 9-11. The information provided by the web site and the interactive application, Emergency Management Online Locator Service (EMOLS) helped local citizens stay informed on the status of their working, commuting and living conditions in lower Manhattan. Information provided included geographic representations of water, gas, electric, steam and subway outages, as well as the status of river crossings, building condition and various access zones in lower Manhattan.

There also are many examples of how government is using geographic information to provide improved service to citizens outside the homeland security and emergency management business areas. In an article from last month's CIO magazine, Information Technology experts in the city of New York explain how the city's use of geographic information technologies has reduced crime, as well as enabling city managers to analyze how well they are providing services (to include garbage collection) and make improved resource allocation decisions.[2]

However, it is not only the public sector that sees the benefits of employing geographic information technologies in its business processes. In the same article from CIO magazine, Roto Rooter is highlighted as a company that incorporated geographic information technologies into its business processes to create a competitive advantage. To Roto Rooter what is most important is arriving to a customer's home or business in a timely manner, followed by the ability to fix the problem. GPS-enabled phones tied to a map-based dispatch system assure the timeliest arrival of help to customers in need of Roto Rooter's services. This may be useful for our emergency service dispatch systems.

Summary

In summary, it takes a nation to be prepared to detect, defend against, respond to and recover from all hazards that are natural or man-made and threaten our lives and way of life. The urgent need to underpin that preparedness with a geographic information infrastructure is what building the capacity to support geospatial preparedness is all about. It is also about all of us contributing to building and sustaining our nation's geographic information capacity through partnerships and through the use of open standards to ensure interoperability, and information and services reuse.

Mr. Chairman, Ranking Member Clay and members of the Subcommittee, I thank you for allowing me to testify on this very important issue.

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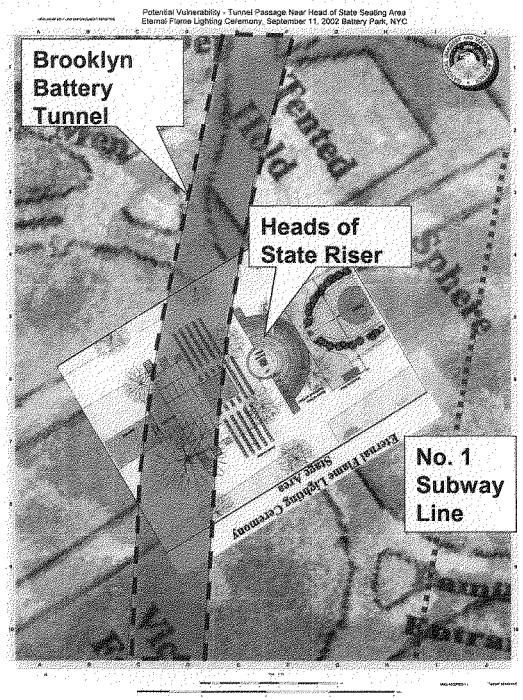
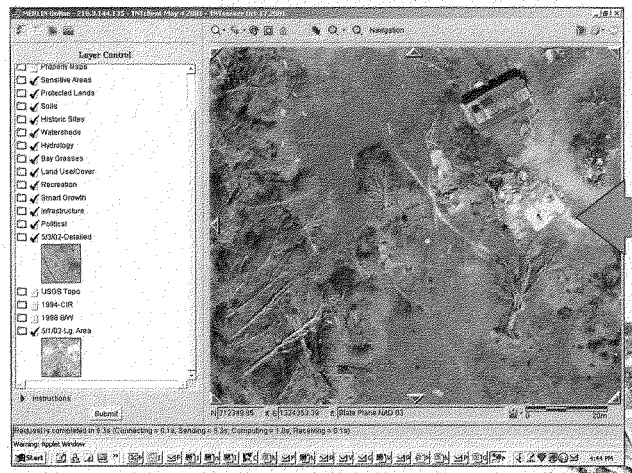
[2] "Putting IT on the Map," Alice Dragoon. CIO, May 15, 2003.

Graphic 1: Underground vulnerabilities recognized through the use of geographic information

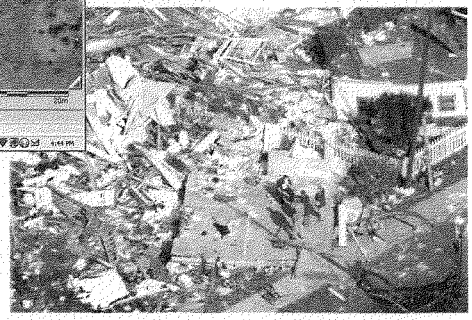
NIMA identified a concern regarding the disposition of the Brooklyn Battery Tunnel relative to the location of VIP risers at Battery Park for the Eternal Flame Lighting Ceremony on September 11, 2002



Graphic 2: Disaster recovery services improved through the use of geographic information

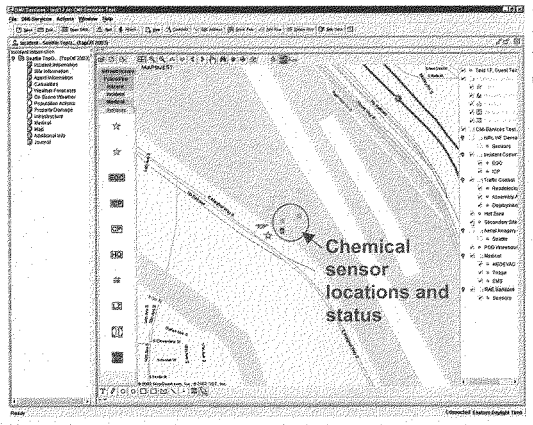


The state of Maryland flew six inch resolution imagery over the entire tornado area to support recovery operations



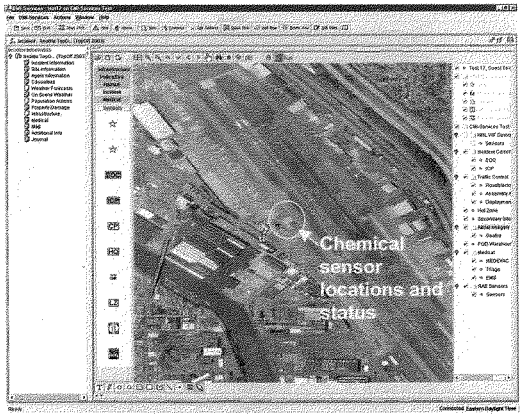
People stand on the second floor deck of an addition to a home destroyed by a tornado in La Plata, Md. in this aerial view taken Monday, April 29, 2002. The tornado touched wn Sunday night.(AP Photo/Roberto Borea)

Graphic 3: Incident management improved with the use of geographic information interoperable with disaster management systems

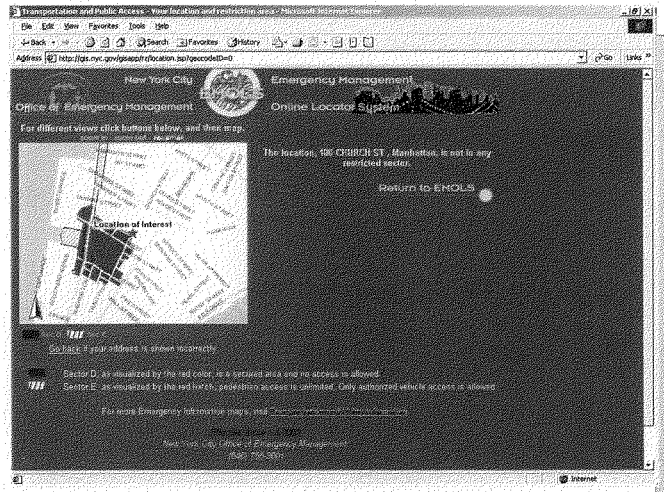


Information on chemical incident without Geospatial One-Stop products

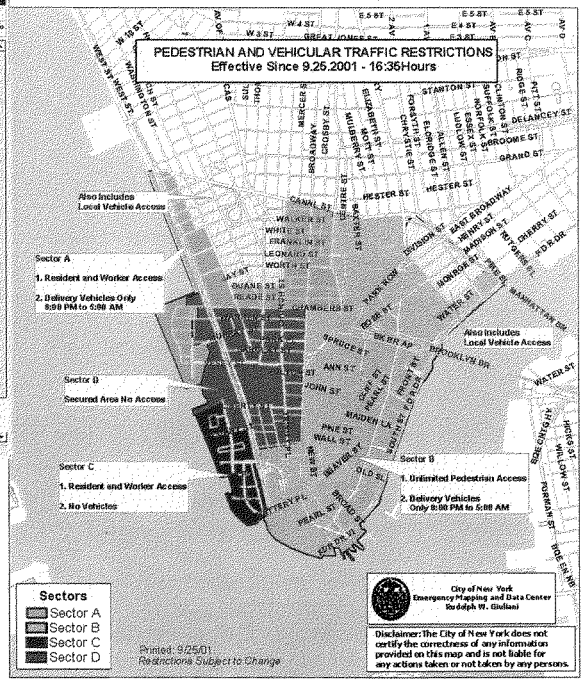
Significantly enhanced information on chemical incident with Geospatial One-Stop products



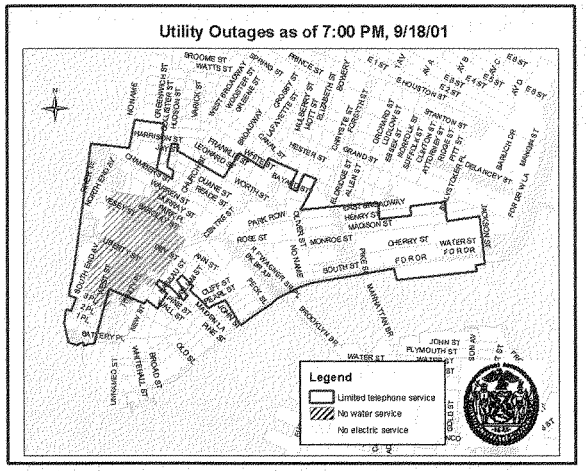
Graphic 4: Keeping citizens informed with geographic information via the web in the aftermath of 9-11



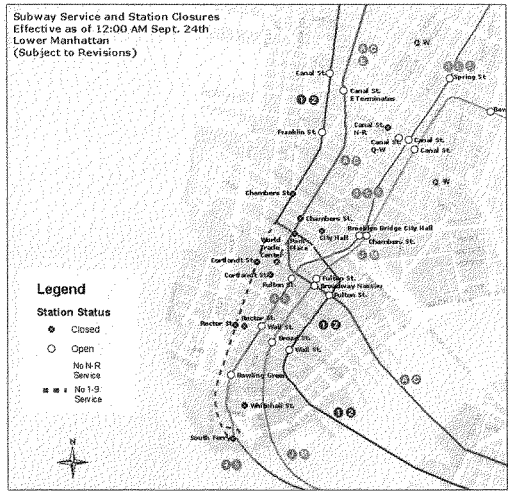
What areas can I get to?



Graphic 5: Keeping citizens informed with geographic information via the web in the aftermath of 9-11



What services are available?



Mr. PUTNAM. At this time we will recognize Gene Trobia, who serves as the Arizona State cartographer which staffs the Arizona Geographic Information Council.

Through his work with the SCO and AGIC, Mr. Trobia establishes State GIS standards, coordinates multi agency projects and improves access to data bases. He has worked in the geographic information field for over 20 years. He previously worked for the Utah-automated Geographic Reference Center, and was the director of the Pima County Engineering Geographic Information Services in Tucson, AZ. He holds a BLA and MLA in landscape architecture from the University of Arizona and is past president of AGIC. The Arizona Geographic Information Council has received a FEMA grant for $50,000 through the Arizona division of emergency management to conduct both an inventory of geospatial data resources and contacts and a series of workshops in providing data to first responders. Welcome to the committee.

Mr. TROBIA. Thank you, Mr. Chairman. Chairman Putnam and members of the subcommittee, thank you for inviting the National States Geographic Information Council [NSGIC], to participate in this important hearing examining geospatial technology as a national asset and a tool that can transform the way government operates and connects to its citizens. NSGIC is a nonprofit organization that promotes effective government through the widespread adoption of Geospatial Information Technologies [GIT]. NSGIC provides a national forum for State GIT leaders and advocates for development of the National Spacial Data Infrastructure [NSDI]. Members of NSGIC include State government managers, coordinators and representatives from lead State GIT offices and statewide groups involved in the daily coordination and application of geospatial technologies.

Nearly all information managed by government is locationally based. Using location-based data with GIT allows government decisionmakers to better understand and clearly visualize the impacts of their decisions. Our members support such functional areas of civilian government as public safety, health, transportation, agriculture, land management and many others. I offer three key issues for consideration by the subcommittee.

They each represent a major focus area for our members. One, effective statewide coordination is required between State and local efforts. Two, the NSDI must be completed in a timely fashion to support public safety applications. And three, geospatial data is a public resource for effective governance. On effective statewide coordination, I want to say NSGIC is ready, willing, and able to help build capacity and coordinate State geospatial activities. NSGIC believes that effective statewide coordination bodies must be active in working between local and Federal Governments. States can provide 50 points of contact for the Federal Government instead of the Federal Government working with 3,141 counties or 18,000-plus municipalities across the Nation.

Many of our coordinating bodies and especially in Arizona, I would say the coordination councils are made up of Federal, State, local, tribal and private sector partners already. So you are getting to the people. With proper incentives from Federal Government, States can provide area integration and create portals that can

push data to Federal Government. Federal field office staff should improve their communications by working with State coordination groups and become involved with those local, State GIS communities and completion of the NSDI.

Implications of geographic information technology are profound. Location is the single threat common to all data. A fully implemented and robust NSDI will empower public and private decision-makers. For example, fire and police departments can review locations and frequencies of fires and crimes and redeploy their assets. This results in reduced crimes, faster response and safer communities. NSGIC believes the benefits of NSDI can only be realized through intergovernmental and private sector coordination, collaboration and partnerships. As a public resource, the daily work of all agencies must be organized and made available in unprecedented ways to feed emergency managers and others the information they need to do their jobs effectively. Congress should direct the FGDC and the Department of Homeland Security to develop a sound national policy for data access in consultation with State, tribal and local government, and the private sector. These policies should provide for reasonable access by all entities for their business purposes.

Restrictions and redistribution or disclosure of the data may be appropriate, but access must be provided to all but the most sensitive data. Changes we would like to see in Federal Government, the FGDC, geospatial one-stop and national map are good examples of collaborative efforts that State and local government partners as equals. However, State and local governments are constantly receiving multiple Federal surveys about their geospatial data assets and policies. These surveys are burdensome and are not coordinated between individual Federal agencies. NSGIC will seek Federal assistance to implement a more coordinated Web-enabled approach to develop and maintain statewide geospatial data assets in real-time. These State portals will lead to existing clearinghouse sites and into the geospatial one-stop portal. NSGIC requests Congress develop and implement a national strategy and policy for a business plan and funding mechanisms which support the coordinated implementation of the NSDI to support public safety agencies.

Mr. Chairman and members of the subcommittee, I thank you for allowing me to testify on this very important issue and represent the views of State and, to some extent local government.

Mr. PUTNAM. Thank you, sir, and thank you very much for being respectful of our time restrictions.

[The prepared statement of Mr. Trobia follows:]

Statement of
Eugene Trobia, President
National States Geographic Information Council (NSGIC)

Before the
Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census
House Government Reform Committee
June 10, 2003
Oversight Hearing on Geospatial Information: A Progress Report on Improving Our Nation's Map-Related Data Infrastructure

Thank you, Chairman Putnam, and members of the Subcommittee, for inviting the National States Geographic Information Council (NSGIC) to participate in this important hearing. We thank you for your leadership in promoting geospatial information technology as a tool to transform the way government provides services to its citizens.

The National States Geographic Information Council (NSGIC) is a non-profit organization that promotes effective government through the widespread adoption of geospatial information technologies (GIT). NSGIC provides a national forum for state GIT leaders to identify issues, debate policies, seek common solutions, and advocate for development of the National Spatial Data Infrastructure (NSDI). Members of NSGIC include state government executives, managers, coordinators from lead state GIT offices, and representatives of statewide policy boards involved in the daily coordination and application of geospatial technologies.

USES OF GEOSPATIAL DATA IN GOVERNMENT

Nearly all of the information managed by government agencies is location-based. Using location-based data with geographic information systems (GIS) allows government managers to better understand and clearly visualize the impacts of their decisions. GIS is a powerful information tool that has been available for desktop use since the mid 1980's and has been used by planning, transportation and natural resource agencies. The military and intelligence communities were also early adopters. Since the majority of the GIT costs are associated with data production, management and maintenance of the data, it is difficult to gain support for the major investment that would be required to map the nation. Many senior officials, decision makers and the general public are not familiar with the value of these technologies.

GIS applications are used to assist in a wide array of government functions such as:

- Emergency management/response
- Law Enforcement
- Economic Development
- Budget and Management
- Agriculture
- Health and Human Services
- Environmental Protection and Management
- Facilities Management

- Parcel Appraisal and Assessment
- Planning
- Education
- Transportation
- Natural Resource Management

KEY ISSUES

Our members see three issues as key to taking advantage of this important national asset.

- ***Effective statewide coordination and integration mechanisms are required between national and local efforts***
- ***Completion of the National Spatial Data Infrastructure (NSDI) will help support public safety applications***
- ***Geospatial data must remain a public resource***

Effective Statewide Coordination and Integration is Required - Federal, state and local government efforts to coordinate the development of the National Spatial Data Infrastructure have been both a success and a failure. The successes include recognition that coordination will prevent wasteful duplication and the development of unnecessary products. The failures come from the lack of a single well-conceived national model that works for Federal, state and local agencies. Without coordination tools such as standards, funding and uniform data sharing policies, government agencies continue to develop their GIT initiatives as "stovepipes" for specific missions that will not integrate into a seamless national program. A cohesive national program can help end these wasteful practices.

NSGIC believes that effective statewide coordination bodies can foster greater collaboration between local government and the Federal government to foster completion of the NSDI. Coordination should be accomplished through the States, because they provide 50 points of contact for the Federal government instead of having to deal with the 3,141 county and 18,000+ municipal governments across the nation. Many states already have effective statewide coordination mechanisms in place, and good working relationships with local and municipal government. For the remaining states, NSIGC developed its *"Guidelines for Statewide Coordination of Geospatial Information Technologies"* (Attachment A).

The Federal government could support statewide coordination by establishing an official relationship with these state organizations. Federal agencies should work through state coordinating bodies to avoid duplication of effort and to help ensure that local, state and Federal agencies maintain open communications and work on consensus solutions to our problems. States frequently see significant Federal grants being awarded for production of geospatial applications and data that do not fit the business needs of state and local government. We can also point to instances where two or more Federal grants have paid for the same, or substantially similar, work within individual states. States should be acting as area coordinators and working closely with local governments on plans to build the NSDI in ways that meet the unique requirements of each partner.

Federal field office staff should participate in statewide coordination meetings to become involved in the local GIT "community" and improve communications. Also, Federal agencies should use the statewide coordination groups as a "clearinghouse" to review Federal grant programs that will be used to produce geospatial data or applications.

Completion of the NSDI - NSGIC advocates improved public and private decision-making through readily accessible information, maps, geospatial data and technologies. Well-documented, high quality geospatial data are critical assets that are required to assist decision-makers on strict timelines. To meet these information requirements, NSGIC supports the development of the NSDI that includes complementary technologies, policies, criteria, standards and the people needed to organize and promote data sharing.

A fully implemented and robust NSDI will empower public and private decision-makers, and benefit society as a whole. Elected officials, administrators, resource managers, scientists, entrepreneurs, land- owners, planners, business executives, teachers, and the public all reap tremendous benefit from improved access to geospatial data and GIT. The following sample applications rely on many of the same data to do entirely different jobs.

- Fire and police departments review the locations and frequencies of crimes to re-deploy their assets. This results in higher arrest rates, reduced crime, efficient use of resources, and safer communities.
- Emergency managers and transportation officials monitor the movement of their equipment and personnel during natural disasters such as wildfires to ensure efficient operations. The same systems can also be used during snowstorms to remotely monitor the flow of traffic and the environmental conditions of the roads to provide for automatic safety alerts.
- Health agencies can monitor environmental conditions to predict and prepare for outbreaks of naturally occurring hazards such as Lymes disease and West Nile virus.
- Transportation agencies can model the impacts of flooding in a watershed to properly design bridges and culverts that ensure the safety of our citizens.
- School systems improve route efficiencies to drastically reduce the miles driven and gallons of gasoline consumed. This retains needed dollars, cleans the environment and reduces risk to our children.
- Planning agencies can model the impacts of urban sprawl to gain support for appropriate controls on development. At the same time, they can account for the needs of people to provide more livable communities.
- Natural resource agencies plan land acquisitions that integrate the requirements for living resources and people to protect the environment and provide recreational opportunities.

Location is the single thread that is common to all data. The technology can enhance the usefulness of data and the return on investment in public information. NSGIC believes that the benefits of geospatial technologies and data that can only be realized

through intergovernmental and private sector cooperation, coordination, collaboration and partnerships.

Geospatial Data Must Remain a Public Resource - The daily work of all agencies must be organized and made available in unprecedented ways to "feed" other agencies and emergency managers the information they need to do their jobs effectively. Open access to data is imperative to prevent waste and duplication of effort. Data and applications should be created once and then be able to be discovered and used by everyone.

There is a disturbing trend toward reducing the availability of geospatial data due to heightened concerns over terrorism. As increasing numbers of data sets are restricted from public access, we are reducing the ability of government agencies to conduct their routine business.

We urge Congress to ask the FGDC and the Department of Homeland Security to jointly develop a sound national policy for data access in consultation with state and local government, academia, and the private sector. This policy should provide for reasonable access by all entities for their business purposes. Restrictions on redistribution or disclosure of the data may be appropriate, but access must be provided to all but the most sensitive data.

WHAT THE FEDERAL GOVERNMENT CAN DO

The Federal Geographic Data Committee (FGDC), and the Geospatial One Stop and National Map Programs bode well for future collaborative efforts. They are among the first programs to view state and local government partners as equals. We acknowledge that Federal "stove-pipe" programs have their own needs, but state and local governments receive constant requests about their geospatial data assets and police for these single purpose initiatives. Many states have taken the initiative to conduct routine surveys and work with Federal agencies to prevent them from conducting multiple surveys. NSGIC will seek Federal assistance to implement a more coordinated and sustained approach to provide access to data and applications. This approach would support the Geospatial One Stop portal and provide consistent goals and objectives, rather than reactions to individual agency initiatives. This system will build the geospatial data asset inventory in real-time and relate it to the existing Clearinghouse sites. States are ready and willing to assist in developing the NSDI, however, incentives and resources must be provided by the Federal government to enable their efforts.

In the event of manmade or natural catastrophes, local police, fire and emergency crews are the first responders. Therefore, it is important for local government to produce and maintain geospatial data that allow them to do their jobs well. Incentives for them to share their data are good for the nation because they reduce waste, eliminate redundant effort and keep our nation prepared to deal with threats to our security. NSGIC requests Congress to implement national policy, business plans and funding mechanisms that support coordinated implementation of a spatial data infrastructure for public safety agencies as requested in "Saving Lives and Saving Money An Urgent Call for a National Spatial Data Infrastructure for Public Safety - *A Declaration of Interdependence*" (Attachment B). To date, this document has been signed by the statewide GIS coordination councils of thirty-seven (37) states and several other national organizations including the National Association of State Chief Information Officers (NASCIO), the

University Consortium for Geographic Information Science (UCGIS), and the Mid-America Geographic Information Council (MAGIC). The National Association of County Officials (NACo) has adopted a similar resolution.

Mr. Chairman, and members of the Subcommittee, I thank you for allowing me to testify on this very important issue to represent the views of state and local governments.

Attachment A
Guidelines for Coordination of Geographic Information Technologies

National States Geographic Information Council
May 6, 2003

ABOUT NSGIC

The National States Geographic Information Council (NSGIC) is an organization of States committed to efficient and effective government through the prudent adoption of geographic information technology (GIT). Members of NSGIC include delegations of state GIS coordinators and senior state GIS managers from across the United States. Other members include representatives from Federal agencies, local government, the private sector, academia and other professional organizations. A rich and diverse group, the NSGIC membership includes nationally and internationally recognized experts in GIS, geospatial data production and information technology policy.

GEOGRAPHIC INFORMATION TECHNOLOGIES

NSGIC is an advocate for the development of a National Spatial Data Infrastructure (NSDI), which includes the technology, policies, standards, human resources and related activities necessary to acquire process, distribute, use, maintain and preserve geospatial data. Geospatial data is information that identifies the geographic location and characteristics of natural or constructed features and boundaries on the Earth. This information may be derived from, among other things, satellites, remote sensing, mapping, charting, GPS and surveying technologies. The level of overall capability and capacity enables all levels of government and the private sector to perform essential business functions. Today, there is an additional emphasis on the value of the NSDI for emergency preparedness functions including planning, mitigation, response and recovery activities to effectively minimize loss of life and property from natural and man-made disasters.

SUCCESS MEASURES and COORDINATION CRITERIA

The following are lists of critical factors for measuring performance objectives and the criteria needed for an effective statewide coordination program. Items featured in the lists are intended as guidelines to be considered in the development and administration of a GIT coordination program. The list will be evaluated on a continuing basis and modified as appropriate in the future.

SUCCESS MEASURES

- Geospatial data will be available in a form that is usable to the public, private sector and government.
- The business requirements of all participants are met through coordination activities.
- Efficiencies can be demonstrated from coordination activities.
- All levels of governments are engaged.

- The statewide coordinating authority is a first point of contact for Federal grants, programs and initiatives.
- There is good coordination and communication between neighboring states.
- Duplication of effort and waste are eliminated.

COORDINATION CRITERIA

- A full-time, paid coordinator position is designated and has the authority to implement the state's business and strategic plans.
- A clearly defined authority exists for statewide coordination of geospatial information technologies and data production.
- The statewide coordination office has a formal relationship with the state's Chief Information Officer (or similar office).
- A champion (politician or executive decision-maker) is aware and involved in the process of coordination.
- Responsibilities for developing the National Spatial Data Infrastructure and a State Clearinghouse[1] are assigned.
- The ability exists to work and coordinate with local governments, academia, and the private sector.
- Sustainable funding sources exist to meet projected needs.
- Coordinators have the authority to enter into contracts and become capable of receiving and expending funds.
- The Federal government works through the statewide coordinating authority.

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[1] The Clearinghouse is an electronic service providing access to documented spatial data and metadata from distributed data sources. These sources include a network of data producers, managers and users, linked through the Internet and other communications means, and accessible through a common interface. Metadata is information about data or geospatial services, such as content, source, vintage, spatial scale, accuracy, projection, responsible party, contact phone number, method of collection, and other descriptions. Metadata are critical to document, preserve and protect agencies' spatial data assets. Reliable metadata, structured in a standardized manner, are essential to ensure that geospatial data are used appropriately, and that any resulting analysis is credible. Metadata also can be used to facilitate the search and access of data sets or geospatial services within a Clearinghouse.

Attachment B
Saving Lives and Saving Money
An Urgent Call to Build the National Spatial Data Infrastructure
in Support of Public Safety

A Declaration of Interdependence

On a daily basis **state and local governments** are engaged in activities that save lives, protect property and guarantee the safety of more than 284 million Americans. But they do so without the benefit of key data, tools and standards that can ensure improved safety for first responders and citizens alike. Spatial data (information linked to an electronic map) and associated technologies significantly increase emergency response effectiveness and efficiency. They also enhance hazard mitigation, and provide for non-emergency applications that will pay for themselves many times over. At all levels of government, for a multitude of reasons, this country must have a comprehensive National Spatial Data Infrastructure to support Public Safety and many other purposes.

National development of timely, accurate and consistent spatial data will significantly enhance government lifesaving operations and countless other government services. While a large number of local governments already use spatial technologies, many cannot reap the full benefits, because there are gaps and inconsistencies in available data, or they rely on partners that cannot afford the technology. Spatial data must be created through national initiatives to ensure that they are available to all who require their use for lifesaving and public safety applications.

Every day, police officers are dispatched countless times to stop crimes in progress and to assist citizens in need of help. Spatial data applications such as "Comstat" in New York City allow police managers to analyze crime patterns and the tactics of their departments. These tools are effective in reducing violent crime and have contributed to a 68% reduction in New York City's annual murder rate from more than 2,000 ten years ago, to less than 650 today. Firefighters and Emergency Medical Service personnel work around the clock to put out fires and to respond to the health emergencies of individual citizens. State and local Departments of Health are engaged in daily operations to identify, track and mitigate life-threatening diseases. Departments of Transportation respond to accidents, keep roads safe, and analyze accident patterns to develop strategies that reduce injury and death.

All of these operations have two things in common. They are responsible for saving lives each and every day, and they rely upon information resources that have a spatial or geographic context that is critical to their success. The most critical National Spatial Data Infrastructure elements for Public Safety are:

- Digital orthoimagery (map-accurate aerial photography) at resolutions that are appropriate for every location to clearly show significant features.
- Accurate and consistent street and highway centerlines with street names and addresses affixed to them.
- Parcel boundaries, and for urban areas, building footprints with unique identifiers and basic characteristics.
- Significant natural features, including topography and vulnerable areas.

- Critical infrastructure elements such as aquifers, water distribution systems, wastewater treatment plants, bridges, tunnels, gas mains, power plants, geodetic control, telecommunication hubs, electric transmission lines, and places of public assembly.
- Locations of hazardous materials storage and other dangerous conditions or facilities.

When combined with such existing technologies as Geographic Information Systems, computer-aided dispatch systems, routing software, the Global Positioning System, Automated Vehicle Location, remote sensing and others, these data create the foundation for a modern public safety information infrastructure. During major emergencies such as terrorist attack, flood, fire, earthquake or hurricane, they can immediately be used to support the efforts of first responders. They also support hazard mitigation operations such as the tracking of potential terrorists and environmental monitoring to prevent emergencies from happening in the first place.

Lifesaving operations extend beyond the borders of local jurisdictions and also beyond state and regional boundaries. Therefore, it is essential that spatial data be built to comprehensive, consistent and nationally agreed upon standards. Because of the detailed and local nature of the data, and because they will be used every single day by local public safety personnel, they need to be built and maintained in cooperation with state and local jurisdictions.

Emergencies strike urban centers and remote locations alike, without regard for the local residents who are injured or killed, and suffer financial losses. The first responders in these communities put their lives on the line while serving others. By the time significant state and Federal relief arrives, most of the fatalities and serious injuries have already been sustained at the local level. It is therefore essential that local public safety personnel have routine access to these public safety data and be thoroughly familiar with their uses. National Homeland Security and emergency management operations must use these same data so that Federal support and response efforts can be quickly and easily integrated with efforts at local and State levels.

Creation and deployment of the Public Safety components of the National Spatial Data Infrastructure will have many additional benefits. Local and state governments can use the same data to provide a foundation for countless non-emergency operations and applications, including e-government initiatives, economic development, waste removal, street cleaning, code enforcement, environmental protection, growth planning, construction permitting, inspections, capital construction and human services. These applications of spatial data are known to increase workforce productivity, streamline business processes, save money and improve services delivered to the public. Nationally, the aggregations of standards-based spatial data can lead to the creation of a National Map that gives America's citizens vital information for their businesses and day-to-day lives. The investment criteria for spatial data are routinely satisfied for non-emergency applications. Given the more urgent need to be better prepared for protecting our citizens in the post 9/11 world, the benefit of investments in spatial data created for public safety will extend to non-emergency applications and will pay for themselves many times over.

To take advantage of this life-saving and money-saving technology, which is currently available and should already be in the hands of every government agency across the nation, we must complete the job of comprehensively building a public safety oriented and spatially enabled data network. The creation of the Public Safety components of the National Spatial Data Infrastructure is essential now, before it is required to respond to a catastrophe, and before someone asks why it wasn't available when it was truly needed.

For these reasons the following undersigned organizations ask the Congress of the United States to create and enact omnibus legislation that will direct a coordinated national effort to fund production, maintenance and appropriate access of these data at State and local levels.

Alan Leidner, Director
New York City GIS Utility

Rick Miller, President
National States Geographic Information Council

STATE GIS COUNCILS

Lieutenant Governor Fran Ulmer, Chair — 9/24/02 Date
Alaska Geographic Information Advisory Committee
Telecommunications Advisory Council

Jami Garrison, President — 11/14/02 Date
Arizona Geographic Information Council

Susan Cromwell, Chair — 9/17/02 Date
Arkansas State Land Information Board

Constance C. Holland, Chairperson — 10/4/02 Date
Delaware Spatial Data I-Team

Royce A. Jones, President — 9/20/02 Date
Hawaii Geographic Information Coordinating Council

Jonathan Perry, Chairman
Idaho Geospatial Committee

2/6/03
Date

Representative Tom Berns, Co-chair
Illinois Geographic Information Council (ILGIC)

10/7/02
Date

Jill Saligoe-Simmel, Chair
Indiana Geographic Information Council

3/31/03
Date

Kevin Kane, Chair
Iowa Geographic Information Council (IGIC)

10/18/02
Date

Clark Duffy, Chairperson
Kansas Geographic Information Systems Policy Board

11/22/02
Date

John Penfield, Chair
Kentucky Geographic Information Advisory Council

9/19/02
Date

Marty L. Beasley, LGISC Chair
Louisiana Geographic Information Systems Council

11/21/02
Date

Douglas Reedy, Chair
Maryland State Geographic Information Committee

9/18/02
Date

Larry Charboneau, Chair
Minnesota Governor's Council on Geographic Information

9/18/02
Date

Jim Steil, Chair
Mississippi Automated Resource Information System (MARIS)

10/23/02
Date

Anthony A. Spicci, Chair
Missouri GIS Advisory Committee

9/19/02
Date

Anthony J. Herbert, Chair
Montana Geographic Information Council

12/19/02
Date

James L. Brown, State Surveyor and Chair
Nebraska GIS Steering Committee

11/7/02
Date

Jonathan G. Price, Chairman
Nevada State Mapping Advisory Committee

1/22/03
Date

Kenneth R. Gallager, Chair
New Hampshire GIS Advisory Committee

3/19/03
Date

Henry L. Garie, Director, New Jersey Office of GIS;
State Representative, New Jersey Geographic Information Council

11/8/02
Date

Bart Matthews, President
New Mexico Geographic Information Council

3/12/03
Date

Dempsey Benton, chair
North Carolina Geographic Information Coordinating Council

11/22/02
Date

Bob Nutsch, GIS Coordinator
North Dakota GIS Technical Committee

2/26/03
Date

Stuart R. Davis, Chair
Ohio Geographically Referenced Information Program (OGRIP) Council

9/18/02
Date

Mike Sharp, Director Information Technology
Oklahoma Conservation Commission

4/15/03
Date

John Lattimer, CIO
Chair, Oregon Geographic Information Council (OGIC)

9/18/02
Date

Jay Parrish, Chairperson
Pennsylvania Geographic Information Council (PAGIC)

10/24/02
Date

John D. Stachelhaus, Executive Secretary
Rhode Island GIS Executive Committee

11/12/02
Date

John L. Cooper, Secretary,
South Dakota Department of Game, Fish and Parks
Chairman, South Dakota GIS Steering Committee

11/22/02
Date

Kristi Turman
Chairperson, South Dakota Technical Advisory Group

11/22/02
Date

David Speight, President
Tennessee Geographic Information Council

1/9/03
Date

A. Kim Ludeke, Ph.D. Chairman
Texas Geographic Information Council

3/5/03
Date

Dennis Goreham
Utah GIS Advisory Committee

10/17/02
Date

George Spencer, Chair
Washington Geographic Information Council

11/6/02
Date

Craig A. Neidig, WV GIS Coordinator
Chair, WV GIS Steering Committee

3/17/03
Date

Ted W. Koch, Chair
Wisconsin Land Information Board

11/21/03
Date

Cheryl Corbin, Chairperson
Wyoming Geographic Information Advisory Council

12/16/02
Date

OTHER INDIVIDUALS AND ORGANIZATIONS

Steven Cunningham, Chair
Central Iowa Geographic Information Systems

11/14/02
Date

Timothy L. Haithcoat, Consortium Chair
MidAmerica Geographic Information Systems Consortium, Ltd.

9/26/02
Date

Victoria A. Reinhardt, Chair
Minnesota MetroGIS Policy Board Chair

2/3/03
Date

Allan Cox, Chair
Montana Interagency GIS Technical Working Group

12/19/02
Date

R. J. Zimmer, Chair
Montana Local Government GIS Coalition

12/19/02
Date

Gerry Wethington, President — 10/29/02 Date
National Association of State Chief Information Officers (NASCIO)

Carolyn J. Merry, President — 02/20/03 Date
University Consortium for Geographic Information Science

James Geringer, Governor — 12/31/02 Date
State of Wyoming

Bill Campbell, Chief Information Officer — 12/24/02 Date
State of Wyoming

Richard C. Memmel, GIS Coordinator — 12/13/02 Date
State of Wyoming, Department of Administration and Information
Information Technology Division

Mr. PUTNAM. I will next recognize Jack Dangermond. He is the founder and president of ESRI, the world's fourth largest privately held software company. Founded in 1969 and headquartered in Redlands, CA, ESRI is widely recognized as the technical and market leader in geographic information systems software pioneering innovative solutions for working with spatial data on the desk top across the enterprise, in the field and on the Web.

ESRI has the largest GIS software install base in the world with more than 1,000,000 users and more than 100,000 organizations representing government, NGO's, academia and industry such as utilities, health care, transportation, telecom, homeland security, retail and agriculture. He fostered the growth of ESRI from a small research group to an organization of 2,700 employees known internationally for GIS software development training and services. They now have 16 subsidiaries and more than 72 distributors worldwide. He also has 11 regional offices throughout the United States and continues to grow.

He is the recipient of a number of awards, honorary degrees, lectureships and medals. He graduated with a bachelor of science in environmental science from Cal Polytech U in Pomona, CA. He holds a master of science degree in urban planning from the Institute of Technology at the University of Minnesota, and a Masters of Science degree in landscape architecture from the Graduate School of Design, Harvard where he worked in the laboratory for computer graphics and spatial design. Welcome to the subcommittee.

Mr. DANGERMOND. Thank you, Mr. Chairman, members and staff. I want to compliment you and acknowledge you for making geospatial information an issue to look into geospatial and focus on. I think this is an important hearing and an important meeting in time in GIS history. GIS is about to emerge in a new way. Historically, people in the early years used GIS for small projects such as picking a site or doing a focused environmental study. More recently, GIS has been considered an information system. It is also moving to the Internet.

Mr. Chairman, I think that the concept of data bases and warehouses of maps is an obsolete idea. Just like information systems technology is used for managing financial information or for personnel recordkeeping, we now see the need for using them to maintain information about geographic things. These are living GISs that are transactionally maintained and can view spatial information dynamically in the form of maps and images about the way things are. They can view the status of our environment, the status of our crops, the status of homeland security, the status of defense and so on.

My organization serves many customers in the public, private and the educational areas. These users are learning a new way about looking at their world, a way that's not beholden to just the map but involves technology to look at dynamic geographic changes that are occurring in our world. This new vision, the notion of dynamically changing maps in a data base is important because it affects not only productivity in government and we have seen a lot of that, but when connected to the Internet facilitates involvement

and participation by citizens and outside organizations in our government.

A new kind of civil society is possible through the connection of all of these individual GISs to the Internet, letting people and schools, citizens, NGO's as well as multi tiers of government have access to the information. GIS can be used for simple mapping, making maps of where SARS is or where AIDS is spreading. GIS can be used for more sophisticated things like forecasting crop production, forecasting threats to security, forecasting drought, where will I find oil if I drill, all private sector sorts of activities and thousands of government applications as well.

In the government, GIS systems create and maintain geographic information and then these data sets are used in other applications by other agencies or organizations.

For example, the Federal Government creates, produces, as Mark Forman suggested, billions of dollars of data, and States, local governments and many of my private sector customers use these data sets for very profitable and effective applications. The power of a GIS is that it can integrate different layers of information from different sources. With the Internet, these sources can be in distributed locations. A Federal layer with a local layer dynamically overlaid on top of each other can give us a whole new view of geographic reality. Public policies that affect this new infrastructure vision of GIS on the Internet are in several domains, the data domain as you mentioned, Mr. Chairman, the management domain and finally the technology domain. Organizations like the OGC have been working on standards for interoperability of the technology part of the infrastructure. This includes getting the vendors together to work on interoperability standards. This is a process that is working.

In the area of data, the most expensive part of a GIS, there are still some activities to do. The public policies that have worked in the data domain are: No. 1, keeping government data in the public domain and free. This has promoted widespread use and access. No. 2, developing procedures for quick and widespread dissemination of this data. This sort of works but has some problems. The Internet offers some opportunities here. No. 3, working with the private sector to create and maintain data in partnerships. That's not working very well, but has great potential. Finally, selective licensing from the private sector of data for government use. The policies that have not worked so well deal with lack of coordination of GIS data content specifications. I think these are being worked on by the geospatial one-stop group, and I am looking forward to lots of success there.

I also would like to advocate a new notion, a new program office, a new planning function, which would actually bring all individual data collection and GIS efforts together. This is not just another FGDC, but it calls for an architectural plan for the infrastructure, the national spatial data infrastructure, GIS on the Internet. This would take some time, it will take some thinking, it will take some work, but the results will be very fruitful. This plan would target nationwide data that needs to be collected to organize specifications that are interoperable at the data content level, develop a contract agreement mechanism that would allow participation of States and

locals and Federal agencies, as well as the private sector, in building and maintaining pieces of this infrastructure.

The conditions must, however, remain that the data, the infrastructure be maintained in the public domain. Why? A concluding remark. I see geospatial data as social capital. It's one of the capital assets of our taxpayers. Geospatial is a kind of language that describes the world that we live in. This should not be for a fee. Spatial data represents one of the most important components of public access to government. It characterizes opportunities and constraints, challenges and risks. It often allows businesses to search out and discover these opportunities and promotes a rich and important civil society, citizen participation, education and the like. Thank you, Mr. Chairman, and committee members. I'm sorry I spoke a little longer than I was supposed to.

Mr. PUTNAM. No problem.

[The prepared statement of Mr. Dangermond follows:]

Testimony of Jack Dangermond

President, ESRI

Before the U.S. House Committee on Government Reform

Subcommittee on Technology, Information Policy, Intergovernmental Relations, and the Census

June 10, 2003

Chairman Putnam, Ranking Member Clay, distinguished members of the subcommittee, it is my privilege to share my thoughts on the mission-critical nature of the use of geographic information system GIS (technology) and digital geographic data in creating a safe, secure, and sustainable nation; in improving federal government effectiveness; and in facilitating vertical government information integration between local, state, tribal, and federal agencies.

I commend Chairman Putnam for demonstrating insightful leadership in holding this hearing at such a critical juncture in the evolution of GIS usage in the United States.

Government is inherently geographic. The relationship between government and geography is so strong that much of the business of government is often described as geopolitical.

From the beginnings of the Republic, geographic intelligence was acknowledged by the Constitution itself.

Through the evolution, for example, of our nation's geodetic control, public land survey system, and authoritative nautical charts that were the responsibility of the "big four" civilian mapping agencies (Bureau of Land Management, National Ocean Service, U.S. Forest Service and U.S. Geological Survey) to the adoption of geographic information systems in the day-to-day work of practically every federal department and agency in the last decade of the 20th century, the American people and economy have been well-served by sound geographic knowledge.

For example

- The U.S. Census Bureau has relied increasingly on mailed questionnaires in recent decades. Therefore, it had a need for an accurate address list for every household in the United States. These address lists were automated and tied to digitized street maps for the 1980 and 1990

censuses. The 1990 census TIGER files (containing all the streets and address ranges associated with them) were made readily available on CD–ROM. The full economic impact of this *one* program has not been fully studied. Local governments, planners, insurance companies, the U.S. Postal Service, and first responders use this fundamental geographic data. It is critical to the electric and gas utilities, overnight delivery, and the logistics industries. It also gave birth to private sector, value-added data businesses, which improve on this government-created data.

- The Department of Defense's global information infrastructure utilizes GIS as a key component in providing timely and accurate coordination between the war fighter and command. GIS use has been an important part of the wars in Afghanistan and Iraq as well as the continuing war on terrorism.

- The $600 billion construction, home building, and public works sectors rely on accurate demographic, land use, infrastructure, and property ownership records that are created and managed by GIS.

- The $300 billion per year timber, recreation, and agriculture sectors rely on geological maps, public land survey, ecosystem management data sets, and soil maps.

In the 1960s and 1970s, private sector software companies, such as my own, brought to market GIS tools, which along with sister technologies of GPS and remote sensing, are an estimated $5 billion a year business. Innovations in GIS have been led primarily by US based technology companies. Today thousands of GIS implementation companies are found in every state. Universities and colleges have successful GIS programs training a new generation for this emerging technology sector.

At the same time, the integrating nature of GIS impelled the federal government to begin to improve coordination between itself and other government entities. Hence, the Federal Geographic Data Committee was authorized by Executive Order 12906 in 1994. Today, GeoSpatial One-Stop is one of a handful of e-government initiatives of the president's Management Council.

With the continued technical innovation of commercial GIS companies, coupled with the increasing use of the Internet to deliver both geographic data and services, the federal geospatial community has reached a critical juncture.

The major challenges now facing the federal government in effectively using GIS include

- Building enterprise-wide GISs stems within agencies.

- Building interdepartmental data-sharing architecture.
- Building the National Spatial Data Infrastructure, via GeoSpatial One-Stop, to knit together a national GIS for vertical integration of state, local, and federal assets.
- Protecting citizen access to data, which they have paid to create, while at the same time keeping the most sensitive geographic data out of the hands of those who would do us harm; in other words, instituting a homeland security GIS.
- Recognizing the value of GIS assets and implementing the role of geographic information officers who work with department and agency CIOs.
- Taking the next step in the evolution of the Federal Geographic Data Committee through increased participation and oversight by the Office of Management and Budget.
- Coordinating data buys between agencies, where feasible.
- Continued reliance on the private sector to deliver interoperable and modern geographic information systems.
- Recognizing that spending efficiencies can be had through coordination, but that fundamentally, the use of GIS has begun to enter the work flow processes of government agencies. As with word processing or e-mail, one cannot simply "centralize" the use of GIS—it is increasingly integrated into the day-to-day operations of effective governance.

Thank you for the opportunity to participate in this hearing, and on behalf of the more than one million users of commercially off-the-shelf (COTS) GIS, we wish you well in your deliberations on this important topic.

I will be happy to answer any questions now or in the future.

(Relationship between geographic information and economic sectors: National Academy of Public Administration, *"Geographic Information for the 21st Century"*, p. 13)

Mr. PUTNAM. Mr. Ritchie, we will now recognize you for your testimony. Michael Ritchie was elected in July 2001 as the president and chairman of the Board of Directors of the Management Association for Private Photogrammetric Surveyors [MAPPS], the Nation's oldest and largest trade association of private sector geospatial firms. In his professional practice, he is president of Photo Science Inc., a full service aerial photography surveying mapping and GIS services firm. And he graduated from the University of Kentucky 1972 with a B.S. in civil engineering. He has more than 25 years of experience in his field, and currently holds professional engineering registrations in 15 States.

He is past president of the Kentucky Society of Professional Engineers and the Kentucky Consulting Engineers Council. In addition, he is a former chairman of the professional engineers in private practice a national director of the National Society of Professional Engineers. Welcome to the subcommittee. You are recognized.

Mr. RITCHIE. Thank you Mr. Chairman and members of the subcommittee. We appreciate this opportunity to discuss Federal geospatial activities. I will focus on two major topics, geospatial one-stop and the organization of mapping in Federal agencies. We support geospatial one-stop as a single access point for geographic information and believe it could create opportunities for the private sector to help government meet its geospatial needs, but by omitting access to commercial data, geospatial one-stop, as it is currently designed, falls short of a goal of one-stop shopping and reduces the ability to make informed choices on data needs. We deeply appreciate Mr. Cameron's announcement this morning. Allow me to illustrate why it is important. Imagine that same Polk County planning director in Florida is looking for mapping data for a new highway. He goes to geospatial one-stop.gov. Up pops this menu that includes a 7 year old USGS digital ortho photo, a 5-year-old, a 30-meter land site image and a 23-year-old U.S. Geological Survey quad map. At present, geospatial one-stop will not let that planning director know that more accurate and more current commercial data is also available.

We have heard geospatial one-stop compared to a library card catalog or a satellite TV system. Presently it is a card catalog that only includes books published by GPO or a TV system that only gets PBS. We believe geospatial one-stop can help to better organize the government's geospatial activities.

We commend the Bush administration for this initiative. However, it is only a first step. Bold action is needed to eliminate waste, duplication and inefficiency in the government's geospatial programs. Revising OMB circular A16, restructuring the FGDC and creating the NSDI all have one thing in common. They treat the symptom rather than the disease. Let me explain. MAPPS requests a comprehensive review of Federal geospatial activities that is needed to eliminate the waste of dollars and inefficiency in government operations. As we have already heard in earlier testimony, it is estimated that more than 40 Federal agencies have geospatial activities. There is no line item for mapping in most agency budgets and appropriations. But also, there is no record of how many Federal employees work in this area.

There is no accounting of the capital investment made in plant or equipment. There is no accurate data on the amount of mapping performed in-house or by contract.

Interagency and intergovernmental coordination needs improvement. There is considerable duplication, little sharing of data and more to be done in standards for interoperability. Most Federal agency performance of in-house mapping is more expensive and less efficient than that in the private sector, and there is no uniform application of government's longstanding policy that it will not compete with the private sector. The Federal Government has warehouses, some the size of football fields, full of these paper maps as alluded to earlier. They are out of date. Too many were printed. While the world has moved to digital mapping, and print on demand, the government is still spending money warehousing maps it will never use, sell or even give away.

Federal agencies provide grants to State, local and foreign governments to perform mapping that could be performed by the private sector, as well as grants to universities for work that is commercially available or for research on methods already implemented in the marketplace. We're encouraged by two recent developments, the Tenet memo and the White House Policy on Commercial Remote Sensing. We support expanding the Remote Sensing Policy to include airborne as well as space borne data and imagery.

There are also two ominous clouds looming on the horizon that deserve attention. First is the dislocation being created by States with regard to licensing of photogrammetrists and other geospatial practitioners. The current policy of the State licensing board in Florida, and the manner in which several States are enacting policy or legislation, threatens true interstate commerce in our field, thus making it an issue of Federal interest.

Additionally, offshore subcontracting of geospatial work harms U.S. workers and impacts domestic firms, especially small business. Given that mapping is location information about our critical infrastructure, sending this work offshore is also a threat to homeland security. We urge Congress to close the loophole in the Service Contract Act that permits this on Federal contracts and review offshore subcontracting of nonFederal work.

Mr. Chairman, studies on coordination of Federal activities and government competition in mapping date back to 1933. The time for action is long overdue. We sincerely hope this hearing will prompt that action.

We commend you for your interest and leadership, and we stand ready to work with Congress and the administration to better serve the Nation's geospatial needs and economic development resource management, environmental protection, infrastructure and homeland security.

Thank you, Mr. Chairman and members of the committee.

Mr. PUTNAM. Thank you, Mr. Ritchie. You really tipped around the big issues, didn't you?

Mr. RITCHIE. The emperor finally has on clothes, sir.

[The prepared statement of Mr. Ritchie follows:]

Management Association
for Private
Photogrammetric Surveyors

Testimony of G. Michael Ritchie, PE, LS, CP
President
Management Association for Private Photogrammetric Surveyors (MAPPS)
Before the
Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census
of the
Committee on Government Reform
U.S. House of Representatives
Hearing on
"Geospatial Information: A Progress Report on Improving Our Nation's Map-Related Data Infrastructure"
June 10, 2003

Mr. Chairman, members of the subcommittee, I'm Mike Ritchie, President of Photo Science, Incorporated in Lexington, KY and I have the honor of being President of the Management Association for Private Photogrammetric Surveyors (MAPPS) the nation's oldest and largest national association of private sector firms in the surveying, spatial data and geographic information systems field. The more than 170 member firms of MAPPS are engaged in surveying, photogrammetry, satellite and airborne remote sensing, aerial photography, hydrography, aerial and satellite image processing, GPS and GIS data collection, integration and conversion services.

We appreciate this opportunity to testify today on the Federal Government's geospatial information activities. My testimony will focus on two major topics – the Administration's Geospatial One Stop initiative and the general structure and organization of geospatial activities in Federal agencies.

Geospatial One Stop

According to the Federal Geographic Data Committee (FGDC), "the long-term vision for the Geospatial One Stop is to revolutionize e-Government by providing a geographic component for use in all e-Government activities across local, state, tribal, and Federal government." FGDC describes a number of long-term structural and institutional components for Geospatial One Stop, and states the objective that the Geospatial One Stop is to "provide an online access point to geospatial data" for the complete spectrum of public sector users. The emphasis on "one-stop shopping" makes it clear that Geospatial One Stop wants to be the only place its users ever need to look to find the geospatial information they need. At present, Geospatial One Stop intends to provide access to geospatial data that is gathered and maintained by the public sector.

Having a single (or at least primary) access point for government agencies to secure geospatial data is, in principle, an excellent idea. We support the use of an open system approach, with standards to assure interoperability, that are not dependent on a single or particular provider. We support the use of full and open competition, via the qualifications based selection process, for contracts for geospatial services.

By omitting access to private sector data, Geospatial One Stop falls far short of offering one-stop shopping, drastically reduces customers' ability to make informed choices for meeting their geospatial data requirements, and sets Geospatial One Stop up as a competitor to private sector data sources. Rather than competing with business, Geospatial One Stop *should* serve as a vehicle to create opportunities for the private sector to meet public sector geospatial data needs.

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Broader participation by private sector interests in setting policy and strategy for Geospatial One Stop, including representation on the Board of Directors, will result in a stronger offering that better represents the interests of the American public and American business

The interests of government at all levels can be well served by having a primary access point for geospatial data of all kinds. By providing appropriate mechanisms for characterizing and comparing various data offerings – content, breadth, depth, detail, accuracy, currency, format, cost, etc. – such an access point can help users efficiently select and acquire the geospatial data that best meets their needs. The key to meeting user needs is to provide access to a wide range of data sources. Many government geospatial databases are built to respond to the demands of particular applications (e.g., TIGER files for Census applications, FEMA flood hazard maps, etc.). Often these databases are useful in other application areas as well, but they will not be useful to all applications. For example, the level of detail may be greater or smaller than the application requires. The problem with insufficient detail is obvious. However, excess detail is not always an advantage, since it may be more expensive to process, and it can create "forest-for-the-trees" problems. Matching data to requirements is often complicated but always necessary. Having a single access point that makes many choices available and which facilitates the process of accurately matching data to requirements can greatly lower both the time and expense of locating the right data for the right application.

The single greatest risk of Geospatial One Stop is that it will provide access only to the geospatial databases created and maintained by the public sector. While public sector databases can be a valuable asset, they represent only a small fraction of the total universe of geospatial databases, and by excluding private sector data, Geospatial One Stop fails to fulfill its objective of providing one-stop shopping. In addition, because public sector geospatial databases are developed for particular timeframes (decennial census, comparison of 1960s vs 1990s land use, etc.), many public sector databases contain information that is not current.

The government recognizes on many fronts that the private sector is far better equipped to develop and maintain timely products, especially where the products are driven by rapidly evolving technology. Firms that specialize in geospatial technologies and applications can be far more responsive to high priority needs for accurate, timely data, for example, to support Homeland Security.

An advantage of publicly developed geospatial databases is that they are available free (or for the cost of reproduction) to the requesting agency. (However, they are clearly *not* free to taxpayers, for it is the taxpayer that paid for the data in the first place!) Nonetheless, despite not being free to requesting agencies, private sector geospatial databases are often more up to date than public sector databases and better meet user requirements. Purchasing better and more current data is often more cost-effective than acquiring a free database that is out of date or that doesn't correspond to other requirements. Such data will either not meet the agency needs at all, or it will require extensive and expensive analysis and post-processing to transform the "free" data into a useable form.

Public agencies and other geospatial data users need to be encouraged to make *informed choices* and to pay for existing private sector geospatial data when the cost is justified by their requirements. These users should also be able to use Geospatial One Stop to determine when their needs cannot be met by existing data from either the public or private sector, so they can consider contracting for geospatial services (such as aerial photography and satellite imagery, and their derivatives) that do meet their particular requirements for time, scale, currency, resolution, standards, and specifications. Geospatial One Stop could also provide a platform for public agencies to work together to purchase commercial data or services for which there is a common need, to share the cost and eliminate duplicated effort.

By putting itself forward as a one-stop shopping environment while omitting access to private sector geospatial data, Geospatial One Stop is not merely incomplete; it is misleading. One-stop shopping strongly suggests that all relevant alternatives are available at the one-stop shop and that there is no particular benefit in looking elsewhere. Geospatial One Stop, as currently constituted, clearly does not offer the full range of geospatial choices and public agencies may well be misled into thinking that there are no other alternatives for geospatial data that meet their needs. This is akin to a card catalog in a government-funded library only including references to government publications. Potentially, this discourages public sector users from seeking private sector geospatial data solutions. The effect would be both anti-business and would constitute unfair government competition.

Geospatial One Stop is a component of the E-Government initiative in the President's Management Agenda. It should be noted that another key component of the same Agenda is an initiative on Competitive Sourcing. Since 1955, it has been the policy of the U.S. Government that it will not start or carry on any commercial activity to

provide a service or product for its own use if such product or service can be procured from private enterprise through ordinary business channels. If it continues on its current path, there is a significant risk that Geospatial One Stop would compete with private offerings.

Geospatial One Stop could deliver on its promise of being a single point of online access to geospatial data by incorporating links to and descriptions of private sector geospatial data sources. This would not be unlike the placement of USGS business partners on the EROS Data Center web site (http://rockyweb.cr.usgs.gov/acis-bin/querypartner.cgi). It is appropriate for Geospatial One Stop to disclaim that any endorsement is made by the presence of a link and to make clear that the user is still responsible for evaluating the appropriateness of various geospatial databases for particular purposes and applications. But by making agencies aware of the existence of the full spectrum of private sector geospatial databases, Geospatial One Stop could substantially advance the interests of E-Government, help agencies at all levels make informed choices, and create valuable market opportunities for private sector data providers.

One reason for Geospatial One Stop's unnecessarily narrow viewpoint is the lopsided makeup of the advisory team that provided guidance to the FGDC and the Administration for the creation of Geospatial One Stop. Most notably, the entire private sector representation was from the ranks of system integrators. This is an important constituency, but not the only one. Not a single commercial data supplier was included on the advisory team.

One consequence of this makeup was poor research. A notable example is that the advisory team held up the British Ordnance Survey as a model for Geospatial One Stop to emulate. This demonstrates a significant misunderstanding of how both business and government work in the U.S. vis-à-vis the U.K. In its own comparison of institutional arrangements for geospatial data (http://www.ordnancesurvey.co.uk/literatu/external/geospat/hsecv.html), the Ordnance Survey summarized the differences between the U.S. and the U.K. as follows:

	United States	**Great Britain**
Freedom of Information	Yes	No
Copyright protection	No	Yes
National coverage of detailed digital data	Limited	Yes
Participation in value added services	No	Yes

The point is not merely that the U.S. and the U.K. are different, but that their approaches to public sector geospatial data gathering, management, and distribution are based on a totally different set of premises and assumptions regarding the role of the public sector in the national economy. We do not believe that the interests of the U.S. are well served, for example, by creating American versions of Crown Copyrights or by waiving our Freedom of Information Act rights. The advisory team's calling out the Ordnance Survey as a model for the U.S. raises fundamental questions about the depth of the research the advisory team conducted, its understanding of the implications of its advice, and its potential inherent bias. It is also distressing to find no mention of the harm done to the U.K. private sector by the anti-competitive tactics of the Ordnance Survey, nor of the active work being done by private sector groups to reform U.K. policy in this area. Moreover, the Ordnance Survey Model differs dramatically from the U.S. model with regard to cost recovery and limits on distribution, wherein the Ordnance Survey's authority and practices are not only significantly more stringent than any U.S. federal agency, but in many respects more restrictive that commercial U.S. licensing agreements. This is *not* a model that should be adopted in the U.S.

As I indicated earlier, we acknowledge and support the value, both to private sector geospatial data providers and to public sector geospatial data users, of making the complete spectrum of available public and private geospatial data resources accessible via Geospatial One Stop. To put some order on this wide range of candidate data sources, a potentially valuable initiative for FGDC and private sector data providers jointly to pursue is the creation of a standard mechanism for characterizing the content, quality, currency, and cost of various geospatial databases. Inadequate quality and currency are never the right choice. However, higher-than-needed quality and currency are also not necessarily the right choice if unneeded detail or precision results in too high a cost. The objective to is to locate geospatial data that *fits* the user's applications and requirements. Such a mechanism could assist users in identifying and securing the geospatial data that best meets their requirements.

Structure and Organization of Federal Geospatial Activities

Mr. Chairman, Geospatial One Stop is a welcome and necessary first step in better organizing, managing and carrying out the Federal Government's geospatial activities. We commend the Bush Administration for this initiative. However, it is only a first step. Bold, decisive action is needed to eliminate the extraordinary waste, duplication and inefficiency in the Federal government's geospatial activities, the lack of a strong partnership in Federal agencies' relationship with State and local government, and the insidious extent to which there continues to be unfair government competition with the private sector.

Efforts by the Bush Administration to revise OMB Circular A-16 and create Geospatial One-Stop, the Clinton Administration's restructuring of the Federal Geographic Data Committee (FGDC) and creation of the National Spatial Data Infrastructure (NSDI), and Congress's attempt to review the Federal mapping structure through the recent National Academy of Public Administration study all have one thing in common: they attempted to treat the symptoms, rather than the decease.

It is our strong belief that a comprehensive investigation is needed to uncover the waste of tax dollars and ineffective government operations. This study will provide an opportunity for Congress and the Administration to implement a reform initiative to better serve the Nation.

Consider the following:

- There are more than 40 Federal agencies engaged in geospatial activities. Neither the agencies, nor OMB, has a comprehensive understanding of what agencies are involved in geospatial activities. No one in the Federal government has a current, accurate accounting of the annual geospatial expenditures. It is virtually impossible to determine how many Federal employees are involved in these activities. There is no balance sheet, performed to accepted cost accounting standards, of the capital investment made in equipment and plant (office space, etc.). There is no accurate data base on the amount of geospatial work performed in-house and by contract.

- The relationship of each agency with other Federal agencies and with State, local and foreign government agencies, is poor. There is considerable duplication and redundancy, little sharing of data, poor performance on developing standards for "interoperability" of data. Even in the post 9/11 homeland security environment, turf battles among agencies are breaking out. No agency has any official status of "lead agency" on homeland security geospatial activities.

- There are Federal agencies that operate mapping capabilities in high-priced office space that is expensive, inefficient, and far more luxurious and costly than firms in the private sector. While private mapping firms tend to be located in industrial/flex campuses, Federal agencies have mapping shops in urban, downtown or high priced suburban buildings that the government owns or leases at prices the private sector cannot afford. Moreover, these agencies almost exclusively operate with one work shift. Even with lower overhead of less luxurious office space, due to the cost of equipment, private mapping firms operate a second or, in some cases, a third shift. The Federal government owns or leases numerous warehouses, some the size of football fields, full of paper maps that the government has printed at taxpayers' expense. These maps will never be used. They are out of date, too many were printed, the warehouses duplicate each other, and due to poor planning, the government is left with millions of paper maps, when the world has moved to digital mapping and the government is still spending hundreds of thousands of dollars each year warehousing maps it will never use, sell or even give away.

- There is in the geospatial structure, no uniform application of the Federal policy that the government will not compete with the private sector. There is no accurate record of the extent to which the Federal government utilizes (or duplicates or competes with) the private sector (including the dollar amount and percentage contracted to the private sector and whether than has increased in the recent past and can increase in the future). Although mapping-related activities are considered "commercial" in nature, agency compliance with the Federal Activities Inventory Reform (FAIR) Act (Public Law 105-270), Office of Management Budget Circular A-76 and Executive Order 12615 has been minimal. The relevant provisions of the Economy Act and the Intergovernmental Cooperation Act, intended to prevent unfair government competition with the private sector, are routinely ignored.

- Federal agencies provide grants or other Federal financial assistance to non-Federal entities (including but not limited to State, local and foreign government) to perform surveying and mapping activities. Many of these activities could be

performed by the private sector. Moreover, Federal agencies provide grants and other Federal financial assistance to universities to perform surveying and mapping activities or research. In fact, these activities could be performed by the private sector and the "research" is on activities already commercially available.

- With the advent of new airborne and space-based remote sensing and imaging technologies, there are new business models under which government agencies can now buy licenses to commercial off the shelf maps and images, rather than the government owning data. However, civilian Federal agencies are very slow to embrace this concept. We are encouraged by recent developments, including the "Tenet memo" and the recently released White House Policy on Commercial Remote Sensing, and believe they can help stimulate new thinking and new ways of doing business in the government, as well as a new paradigm for government utilization of the private sector. As noted earlier with regard to Geospatial One Stop, the Federal Government's utilization of private sector data is minimal and results in wasteful duplication. We would urge the Subcommittee to undertake a review of OMB Circular A-130 to review government information policy generally and its impact on geospatial data in particular. We also support expanding the White House Policy on Commercial Remote Sensing to include airborne, as well as space borne, data collection platforms and the data generated therefrom.

- Surveying, mapping and related geographic information can play a critical role in government at all levels in homeland security, for emergency preparedness, critical infrastructure inventory, and emergency response. There is serious question as to whether the post 9/11 period has enhanced agency coordination or caused a proliferation of effort. Many States and local units of government need current, accurate maps and geographic information for homeland security applications, but the Federal government is not efficiently assisting, due to the lack of coordination and leadership in the government, and turf battles among agencies are emerging. The Department of Homeland Security Act failed to address this issue.

Other Issues

Mr. Chairman, let me state for the record that MAPPS strongly supports the provision Chairman Davis included in H.R. 1837, the Services Acquisition Reform Act (SARA), in section 214 of the bill as introduced, to bring the definition of geospatial services in the government's procurement laws up to date with state of the art technology and the realities of the changes in technology and professional practice. Enactment of this definition will provide the government with high quality geospatial data at a price that is fair and reasonable to the government, while permitting private firms to produce at the highest standards based on their competence and qualifications.

Finally, we would be remiss if we did not put on the record two ominous clouds looming on the horizon. The geospatial community, both in government and private practice, and the clients and public we serve, will be seriously damaged by these two impending issues if they are not adequately addressed. The first is the dislocation that is being created by the states with regard to licensing of photogrammetrists and other geospatial practitioners. The current policy of the state licensing board in Florida, and the manner in which states are enacting policies or legislation, is threatening true interstate commerce in our field. Additionally, the advent of offshore subcontracting of geospatial work is not only damaging to U.S. workers and harmful to the long term interests of domestic businesses, but given that geospatial data provides location information about our nation's critical infrastructure, sending mapping work offshore, particularly to countries where there are known to be terrorist cells, is extremely harmful to our homeland security. We urge Congress' attention to the loophole in the Service Contract Act that permits this practice on Federal contracts and the desirability of this practice on non-Federal work.

Mr. Chairman, numerous studies have been conducted which detail the lack of coordination of Federal mapping and geospatial activities, and the government's duplication of and competition with the private sector. These studies date back to 1933. The time for action is long overdue. We hope this hearing will help stimulate that action. We commend you for your interest and leadership and we stand ready to work with Congress and the Executive Branch to better serve the geospatial needs of the American people in economic development, resource management, environmental protection, infrastructure construction and maintenance and homeland security.

Mr. PUTNAM. Before we get into questions, all of you had an opportunity to hear the first Panel, and I would like to open by recognizing each of you to take a minute if you wish, and offer your observations on the key themes that came up in the first panel, and we begin with you, Ms. Kalweit.

Ms. KALWEIT. Thank you, sir, for this opportunity.

I think it was stressed in the last panel the importance of partnerships—State, local, Federal partnerships to building capacity. And, from a standpoint of the Interagency Geospatial Preparedness Team with its focus of underpinning our Nation's preparedness with a geospatial framework, I also can't emphasize enough how important the issue of partnership and interoperability and access to the data are.

As I've described, both in my written and oral testimony, all hazards happen everywhere and anywhere. We can't necessarily expect or anticipate them, but those who have to respond, and those who have to plan to mitigate against, need the data wherever they may be, and the way to get it is through partnerships.

Thank you.

Mr. PUTNAM. Mr. Trobia.

Mr. TROBIA. Thank you, Mr. Chairman.

I guess one thing I'd really like to focus on is having a lot of experience in county government and setting up a county GIS. What you have is a situation where counties and cities, larger counties and cities that could afford it, have set up these GIS systems all over the place, and they're doing it all the time, and Mr. Dangermond said the data is very transactionally based. Paper maps just don't do it. Parcels are changing hands all the time. Permits are being issued, etc. It needs to be electronic, so this transactual basis is forcing local government to really utilize BIS technology. It's happening in Tucson. It's happening in Minneapolis. It's happening in Tallahassee.

Well, the trouble is that you've got all these folks doing it for their own business needs. Now, what we're saying is with homeland security, first responders, etc., that there's more than ever a need to standardize data and get it to flow within a network. If this is going to happen, it needs to be a win-win situation for Federal and local government, and there needs to be incentives that would encourage that data to flow upward.

Thank you.

Mr. PUTNAM. Mr. Dangermond.

Mr. DANGERMOND. Yes. I'm very fond of the work that is going on in the geospatial portal activity. I think it's the right thing. I'd like to share with you a vision or a metaphor for what I think is the underpinning of what will happen in the next 5 to 10 years. I see the fusion of GIS and the Internet as developing into a kind of nervous system, like you have in your body. The nervous system sends information to our brain, our consciousness, and is constantly measuring change in temperature and how we feel. Our Nation needs such a system. It will not be done holistically by the Federal Government. It will be multiparticipant, where little pieces of things are measured, that will be measuring the change, the changes in land records or vegetation or water or in the environment, and those changes will be served into the Internet and

viewed, analyzed, reported on like an accounting system, except this kind of accounting system will measure and account for all the things that most people really care about, a kind of geographic accounting system. And this will demand—this national spatial data infrastructure system will require or demand multiparticipant formulas. This is a big piece that is missing, the management vision of building that infrastructure. No one really had the management vision to build the Internet. It just sort of evolved into place. We didn't vote for it, but in this case we do need to take a little bit more caution, because it's more than just technology. It's the base way that organizing the science of measurement and serving it up and integrating it in the form of applications that can serve people from homeland security to farming.

So I like what they are doing, but I think it needs a larger context and a larger vision and a larger leadership position. Because our government agencies are so fractured and while they collaborate, it is almost like an unnatural act at all levels of government, we need something that can tie them together, and I think geography is a logical metaphor for that, and geographic information, which reflects the actual practices of what governing people do, how they organize their thinking, how they organize their policies. It is a very natural way to bring our Nation together at all levels, and also to connect our citizens through its visualization and framework.

So I liked what they are working on, but I just think that you and your committee should begin to think about how we accelerate that into a kind of societal GIS, a GIS which is open for everyone, that brings conscious to all of us, like our nervous system does. Thank you.

Mr. PUTNAM. Thank you. Mr. Ritchie.

Mr. RITCHIE. Jack, I think you hit on a number of the good points of the committee in earlier testimony. I think one big difference is the emphasis that Gene alluded to, and others, of emphasis on local coordination. I think that it is paramount, promoting partnerships of this data and really involves changing the committee structure to be heavily favored toward local are all very, very good items. Stepping up and putting a framework in place for some leadership, trying to develop some standards, those are all the right things to do, but quite honestly, we're falling a little bit short, because where is the stick? In my years of practice—and let's talk about recent events—if you look at 43 of our 50 States are running deficits right now, but yet local government, as tight as the economy is, are finding a way to buy and procure GIS data and GIS systems. They find a way, even in the toughest of times, because they are highly motivated to cooperate. They go to church together. They see each other in the grocery line. They're on the softball field in the schools, the PTA, etc. They already have a common goal that breaks down a lot of the barriers that sometimes protrudes when we get into the State and Federal Government.

For example, when the Federal Government creates geospatial one-stop, and once a local county that is involved, millions of dollars over the recent 10 or 15 years, what's their incentive to hand over that data, particularly when, in a lot of cases, they've copyrighted that data and charged for it? What is the incentive for

them to turn that over to the Federal Government? To be nice guys? To be cooperative? Where is the carrot? Where is the stick? You really have to have a larger leadership role, and I think also because of the evolving changing technology, which some other testimony has supported, we've got to get a longer-term, bigger vision.

The Federal Government is spending billions, not millions, in this industry on GIS, on information and on data. Ms. Watson referred to this morning about the On-Star System. I assure you that is not backed by a government map system. Private enterprise finds a way to make it happen.

A recent example, in our own community, we update a utility map annually in a very growth-oriented community. We had one of the technicians working on that map that actually had bought a house and moved into it. On the date we took the photography that wasn't even on the imagery, and yet she could order a pizza and get it delivered using the GIS.

So private enterprise is there. We need incentive to marry these up, because the private enterprise is thinking, as Jack said in his case, coming from the private sector, is thinking of the next turn of the wheel and the vision of where we're going. But quite honestly, we need to get a handle on how much money is being spent. We probably don't even need additional money. We just need it to be harnessed and redirected with a better focus and vision, because we're spending billions, and we see it as private procurers of Federal services. We work for agencies. In the event of a flood, we get calls from five or six agencies that we have contracts with wanting us to go fly it, and it takes 4 or 5 days, and sometimes we just have to make a decision to go fly it and then have it in the can when the dust settles down a week later and the water is receded, we just happen to have the data, otherwise we couldn't wait for a decision.

So although a lot of what is said has been very, very good and very, very favorable, we need a super-charged leader with a bigger vision to really pull this off, and we need incentive. I think Mrs. Miller hit it, and it probably comes from her own background experience in working with the local government. I think this very definitely has to be from the bottom up rather than the top down. If it's from a top-down decision, the Federal Government is going to have to show up with, here's your incentive to do it our way according to our standards if we're going to pay for it. Anything short of that, they're not going to do it, because they barely have money to do it through their own standards. They're not going to invest the extra 20 or 30 percent to put it in a dataset or standard or even pay for the metadata to put it on geospatial one-stop.

Thank you.

Mr. PUTNAM. That is an interesting set of observations, and we appreciate that, and I'll recognize Mrs. Miller to begin our questions.

Mrs. MILLER. I suppose that we talk about incentivizing, particularly local governments as you're well aware I'm sure with a civil engineering background you do a lot of that. Perhaps there's a mix to incentivize them properly of money and legislation, I think perhaps as well. I guess that might be my question to all of you. I think cooperation, obviously, is the operative phrase. I mean, we've

got to cooperate. Mr. Trobia mentioned that it would be optimal, of course, to have 50 points of contact nationwide as opposed to—and I forget the number you used. I think it was 30-some thousand. I don't know how many local municipalities there are nationwide, but as you look at how you—again, how you construct the—all of these different mapping systems, are all of you and even Mr. Dangermond, who is sort of advocating a new structure for cooperation and coordination, when you're advocating that kind of a structure, are you all advocating legislation? What is really the proper role of the Federal Government? What do we need to do? And perhaps some of it is monetary, but is there legislation that is really required for us as we try to get ahead of the curve of this whole thing of making sure that we are setting standards, that we do have a point of contact that makes sense, that we're not having a lot of redundancy with all the different layers and all the municipalities, in the private sector as well all trying to grab the same information and then we're not really sharing it to the best benefit of the citizens of our Nation? Sort of an open-ended question but where do we go with this? This is a fascinating subject. It still, as much as all of you—much of you live it, so you're much more familiar with it than I am, but you can see how fantastic the opportunity is here, and it is still sort of a new concept, how do we get ahead of it?

Mr. DANGERMOND. If I could, Mr. Chairman, I have two views. One is the library view. There are perhaps hundreds of thousands of digital map layers that exist in the United States. They need to be cataloged and put into a library catalog for searching, and they need to be mounted on the Internet so that people can get them or get the services that they offer. That's one view.

The other view is something called framework that the FGDC conceived of and has been working on, the idea that there would be a kind of standard map for the entire Nation. It isn't this scale for this and that scale for that. And the concept of a national map of framework layers that covered the whole Nation is what I want to address in response to your question.

To carry that out, we need a couple of things. One, we need the content standards. It has taken us 10 years to get just draft standards which are to be published in September. This took too long. This should have been done in 10 weeks, not 10 years, and has irritated the entire community about the Federal Government's initiative here.

Under this administration, things are going much faster, and I like that.

The second thing that is necessary is some kind of partnership program that says, I can do that map sheet—let's use it from a mapping perspective. I'll capture and maintain the map sheet of Redlands, CA. That will be my contribution to the national NSDI, and by the way, I'll do it, but could you give me 10 cents on the dollar to do it? Why am I saying this? Because for me in Redlands, I really need that map sheet done to run my government, and by the way, the reason why GIS is still growing, even in the context of a down economy, is because GIS really saves money. It helps local governments make better decisions, and it allows people to communicate better.

So I'm willing to put in the 90 cents on the dollar to build my tile of the mosaic because it helps me locally. If you just give me a little incentive, I'll do it according to your standards. So I will standardize and by the way, give you the data, put it into the public domain so that the freedom of information laws and so forth are protected, citizen right to know, access to government records, all of that is maintained, for just a little bit of financial incentives.

This kind of leverage was done very successfully in the Surface Mine Act of 1977, where a grant was given to the States to build GIS data bases. This is one of the origins of GIS, and in fact, with just a little bit of match money. And then the States took it on themselves to build these magnificent systems.

So this framework is necessary, and I think block grants are very valuable. In the Surface Mine Act, the block grants were a lot of money up front. We will subsidize you a 100 percent year 1, 60 percent year 2, 40 percent year 3, and the feds worked their way up. Meanwhile, this huge information infrastructure was left in place and the States took over the responsibility of maintaining it and publishing it, and it was done according to the standards of the Federal Government, a perfect example of what I'm talking about.

If we thought about such a program for the NSDI, with the national, State, and local government cooperation, perfect, and how does the private sector fit into it? They are contractors to build it, or perhaps they could be participants building some of the tiles where they could actually build it and resell it to some of their other customers. I'm not sure how that would work. I know how the first model works, but the second one is a little bit unclear and need to be worked out.

Mr. RITCHIE. I'd like to hitchhike on a couple of things that Jack said there. One, on this idea of a national map, I know we in private enterprise have debated that substantially. We had our USGS quad sheets. We have our national digital ortho photo quarter quads. Setting those to a single scale and standard, we think, is a little bit naive.

For example, you need more resolution near the World Trade Center on September 11, 2001 than you do in the corn fields of Kansas. Setting the same scale with the same resolution is two different needs. They're two different situations. Why not rely on what the local community has determined is their needs? I assure you there is much better data and much more need and much more revenue-generating tax bases in lower Manhattan to pay for higher quality data than you do in the urban or rural areas of central Kansas. So my point being, one size fits all doesn't necessarily work in our environment, particularly in the bottom up series. We need certain information. Why not get it at the best available resolution? We go on the Internet, to search engines, for information. Why shouldn't we be able to go out there and find any type of data, wherever it is? It's not necessarily endorsing it. It's just saying it is there. It's let the buyer beware. Go find it, research it. Look at the metadata, and yes, at cost. We'll determine if it costs too much for your need or if you now need a partner to go share it with. So you do it together, but it is an engine. It is running. It helps fuel our economy.

The coordination can probably be achieved on this greater vision we're talking about administratively rather than legislatively. If we look at geographic information as being like any other part of our infrastructure, you can almost set it up like a Federal highway program, and through the gas tax you fuel it, you regenerate it. It is a renewable resource. We create this information, this network, this nervous system that Jack referred to, and it's going to be continuous, and it's going to evolve. And if we become better doctors, we're going to learn how to interpret the data better so that we become a better society, a more informed society, and we can respond before rather than after.

Ms. KALWEIT. And I'd like to comment on the issue of incentives. First the three premises that are coming across, particularly from the first panel, and also here in the discussion, are the issue of interoperability through standards; the need for partnerships to create capacity; and the idea of buy once, use many.

In the May issue of Harvard Business Review, there was an article on IT—on the IT infrastructure. In many respects, you can read that article and see a commonality with the geospatial infrastructure. The premise of that article had to do with looking at the power grid as it first evolved, and the rail transportation system as it first evolved. What it said was what made these a public good, what made those things able to be plug-in, ride was interoperability, through standards. And what that has driven is for the cost of those infrastructures to go down. It went on to talk about IT and the IT infrastructure that we have today and the fact that information technology, quite frankly, today is a commodity item. It's not something that businesses use to get that extra advantage as they did in the early 1990's. Because it is a commodity item, costs have been driven down.

If we liken that to geospatial where geospatial information, geospatial data becomes ubiquitous, it becomes a commodity item. What happens then is the private sector is able to leverage that and build the kinds of value-added services and provide value-added products that in the public sector we're looking for in terms of government support to citizens and government to government operations.

I gave some examples in public safety and homeland security. Those are all about value-added services using the data. You've got to have the data. So, again, I would encourage interoperability through standards, partnerships, buy once and use many to build the infrastructure as a commodity item so that we can get and leverage what is really valuable about this infrastructure, and that is the value-added services.

Thank you.

Mr. TROBIA. Thank you. I'd just like to add a couple of other things to what I'm hearing, and I would say from the State perspective. I like the idea of block grants. NSGIC has put together a coordination model for State organizations, identifying the roles of States in geospatial coordination? That paper states that if States are going to coordinate with the Federal Government and with locals, then these are the things that would make us successful and these are the things you can expect from State. That's No. 1. That's part of the written testimony I submitted. No. 2, NSGIC

also got involved with Al Leidner, who was the GIS manager for New York City after September 11, regarding some of the lessons learned there. We put a white paper together and it's been signed off by a number of States and other professional associations. The concept of the white paper really gets at homeland security issues.

If cops on the beat can find bad guys, that's good for homeland security. It's a local issue. If fire departments can get the route to a fire and know where the hazardous materials are quickly, that's good for them at local level, and it's good for homeland security. If health departments can track incidences of disease, that's good locally and for homeland security, etc.

There needs to be robust GIS at the local level, because the data is highly transactual. America is moving too quickly to rely on paper products. We need to bring good data together through the network. Block grants and developing standards are a way to do that.

The other question that was asked was what are the incentives: legislation or funding? I'm not just talking about funding. I agree with the comment that was said earlier. If you look at the amount of money that is being spent on geospatial activities, if some of that money is redirected, it would probably go a long ways toward accomplishing the things that we're talking about. So it becomes a leadership issue. That gets at my last point, regarding legislation versus not legislation. I commend the FGDC for doing the things it's done. I do think that they have involved local communities for the long run in a consensual way. So what is it going to take for the FGDC or geospatial one-stop, or whatever this migrates into, to have the longevity so that geospatial data turns into a national asset? Because it is really an infrastructure that helps America in a lot of ways. That may require legislation, but so far I don't see that Congress has been involved that much. So whatever Congress can do to support these initiatives, whether it's new legislation, or finding a home for where this can happen, or providing a significant carrot and stick, those are the leadership things that Congress may be able to provide. Thank you.

Mrs. MILLER. I have no further questions, Mr. Chairman.

Mr. PUTNAM. Thank you, Mrs. Miller, for your insightful questions, and let me followup on the funding question. Mr. Forman, indicated that there may be up to 50 percent of the funds spent on geospatial wasted, and so there's clearly room for some savings.

What's your recommendation for improving our return on investment on the Federal money being spent on the systems and the data? We'll begin with Mr. Ritchie.

Mr. RITCHIE. Thank you, Mr. Chairman. I think one of the best pieces of advice I would say is that technology is ever changing, and I would highly encourage the government to do some of the things that the FGDC has done, and that is setting some data standards, that data is what it's all about. You create the data. It evolves, changes and lasts a lifetime. That's your point of reference. You're going to get new PCs. You're going to get new hardware. You're going to get new versions of software. You're going to get increased capability, but once you start out with a base map, a base set of data base in a GIS, that evolves years and years and years over time. The local community has transactions every time there's

a property transfer, every time there is a building demolished, every time there is a new subdivision added. The data is where I would highly encourage you to put your money so that it isn't wasted, and, ironically, most of that data is generated locally, not federally. The Federal Government has issues with the built infrastructure, our Defense Department, etc. But generally speaking in our 50 States, it is the State and local governments that are producing this data.

Mr. PUTNAM. Let me followup on that. Everyone is in agreement, and the data backs up the fact that State and local governments are generating the vast majority—two-thirds, I believe, is what the first panel said. Are they the leaders on this, because the needs and the uses and applications of that data are inherently local? Or are they doing it because the Federal Government is just not any good at it?

Mr. RITCHIE. I think they're doing it out of a need. It's sort of like, why did we eventually stop using our typewriters and go to word processing? Why did we go to scanning systems? As some of the others have said, it is a tool. We find that it really in the long haul doesn't cost. It pays. It's a valuable decisionmaker. In fact, it's probably one of the more open, trusted open records processes. People will trust the data that they get out of a computer, out of a system. And it's open, and it's open to public scrutiny and public view, public information, so to speak, and open records.

I think one of the biggest issues is that local communities have been doing it out of necessity. Generally, they have been doing it not just to create a GIS, but they had a storm-water problem. They had a neighborhood sewer problem. They had a school bus routing problem, they had some other issue, and the GIS was an ad hoc tool that helped them achieve that goal. And that helped them—or you have, as we said many times, consortiums where local agencies, city, county governments working together with airport boards, with water utilities. In some cases, these are privately run utilities that invest into that base layer, that base mapping set of data.

I think what's happened is the Federal Government hasn't had the money and hasn't had the standards and hasn't had the engine behind the motivation for the cities and counties and the States. The technology is there, so they have all been solving their own problems when they didn't have the governance and the money behind the Federal Government. If the Federal Government had shown up with the standards and the money to, say, start a series of block grants, if you go back 10, 15, 20 years ago, the State of North Carolina envisioned a statewide land records modernization program, land information system. It was good economic development. They had tax roll problems. They couldn't fund doing the whole State in 1 year. So they put up $5 million. Every city there had to then compete for that pool of $5 million. Well, guess what happens? The larger cities with the biggest problems won it first. Then they got their city's maps. Well, then they're off the rolls. Guess what happened? The second greatest needs competed for that pot the next year and pretty soon the whole State is mapped and they're mapped to a set of standards all across the State and North Carolina is probably one of the premiere States of doing

that. That mold could be followed by the Federal Government like we're talking about, putting some money to the State and locals, but you have to get them some incentive to adopt your standards and your data, and it's the data that is imperative, as Sue mentioned, in the event of emergencies and September 11-type disasters, you need immediate access. So you need some standards for that data, so you can get it in the hands of the first responders and those who have a need to know.

Mr. PUTNAM. Mr. Dangermond.

Mr. DANGERMOND. Mr. Chairman, I disagree with Mark's assessment that we have 50 percent wasted data collection. I have seen some mistakes made that were poor mistakes, and yes, those things happen. But, first, I'd like you to understand that data collected at a local level for a mandated activity at the local level and a local government GIS is often not useful to serve the national government's need, or vise versa.

Take, for example, a very detailed engineering topographic map. It may not be the data set in its current form that is necessary to build a topographic map of 24,000 scale, and it's not simply a matter of changing the scale. The data grain is not appropriate for that.

So I imagine that there's going to be many scales of geographic information systems. These different information systems will respond to different needs, and utilities and local government and State government and in response to Federal mandates. The Federal Government has a GIS in just about every department. BLM uses it for the public land survey. It's a different system and a different level of grain of detail than what is maintained in a local government. USGS for the topo, census for geographics, and so on. Some of these data sets that are collected at the Federal level are useful at the State level and useful at the local level. Some. Especially when you apply the overlay method, but one does not redundantly do the others data collection. OK, there are some examples between States and Feds, particularly where there is more redundancy activity going on.

So I don't entirely agree that there's huge wasting going on, but I do believe that more collaboration could occur.

My second point here is the big waste is not leveraging what we have. You know, there's stove pipes of data that are separated and not involved, and those will help here, the geospatial one-stop, because it will let people know that there's a big library out there. There's a whole library out there that you can go and see and view and use information about, and the vision also starts to allow for publishing, I need this data, anybody else need any data, like that? Or is there any data like this for my little location? That's it, portal responsibility of searching and also I need this, and then other people will say, I also need it. By the way, I have 50 cents, you have 50 cents. Let's get together, that kind of Internet bartering, I think, will naturally emerge as an institution, but it does require, I think, more investment in that and more coordination.

Mr. PUTNAM. Ms. Kalweit, the NIMA by definition is focused on national security issues. You have, as a detailee to FEMA, been made aware of civilian uses of data and the needs on the geospatial side. Obviously, if we had this hearing 3 or 4 years ago, prior to

September 11th, we'd be spending a whole lot more time talking about earthquakes and forest fires and floods than we have about homeland security. Do you believe that there is an adequate process in place to bring appropriate data into the civilian realm on a timely basis?

Ms. KALWEIT. Sir, the short answer to that is the civilian community has been using the national capabilities for a long time to support what you described we would be talking about had September 11th not happened, and that's through the Civil Applications Committee. So there is and are processes in place for the civil community to leverage the national assets, and there are specific policies that need to be followed in order to protect the citizens of the United States period.

The other thing that I would also like to mention is again to show that the civil community for a number of years has been able to leverage the national capabilities, for example the support that NIMA has provided to FEMA since Hurricane Andrew in support of disaster response.

So, again, I would say that the processes are in place.

Mr. PUTNAM. Well, for example, in your handout, these maps, some of them are generated by NIMA. For example, the lighting ceremony on September 11th, the Maryland tornado damage, was that a NIMA map?

Ms. KALWEIT. No, sir. The Maryland tornado damage was commercial imagery that the State of Maryland collected for that particular incident.

I would also like to just say that the data that you see here, for the lighting ceremony, is also a combination of State data—or city data and data that the Secret Service had for that particular ceremony.

In this case, the national assets that are being used are the analytic assets for a national security objective, which is the mission of NIMA to support national security objectives. We've been able to use our skills and expertise that we apply in the foreign arena to support Federal agencies in the national homeland security mission.

Mr. PUTNAM. Well, the map, for example, of lower Manhattan has a seal on the bottom of it, city of New York emergency mapping and data center, Rudy Giuliani, mayor. So presumably that data was generated by the local government; is that correct?

Ms. KALWEIT. Absolutely. And in fact the city of New York prior to September 11th—for years prior to September 11th, had been involved in a very robust mapping program to establish the New York City base map. Al Leidner, who has been responsible for that New York City base map, has publicly stated that although the tragedy in New York City on September 11th was horrendous, in some ways, thank God it happened in New York City, because they had the base map information to support the response and recovery efforts. So, in fact, to a large extent, their data is very robust for many purposes, although, there is still work left to be done.

Mr. PUTNAM. So is it fair to say that in general the major cities of this country are ahead of the Federal Government in their GIS systems or States? We've heard about the North Carolina system. We've seen the New York system. Then we go on the Internet and

look at a NOAA map, and it's 9 years old. So is it fair to say that State and local governments are way ahead of the Feds on this, or is that not the case?

Ms. KALWEIT. Sir, I'd like to emphasize that, in some cases, you're comparing apples to oranges. While the data in New York City, for instance, is very robust for New York City, it's really only the USGS that has coast to coast border coverage for any kind of mapping data across the United States. So if you really wanted to create a map of large regions or of the entire United States, you'd have to go to Federal sources, because you couldn't do a patchwork quilt of all the State and local governments. Quite frankly, this is a patchwork quilt, where some States are very robust, some cities are very robust, some counties as well, but there are vast—what we've discovered in the IGPT, there are vast inequalities.

So, again, I'd just emphasize it depends on what resolution you're interested in viewing the data, and in many cases, some data, no matter how old, is better to have than no data at all.

Mr. PUTNAM. For instance, there's a disaster in Maryland—a tornado. The State of Maryland gets a commercial person to fly over and give them the aerial photography they need. There's a disaster in New York City, the city of New York goes to their own system to retrieve the information they need. So what category of information is uniquely Federal? What would occur that you would need border to border maps of the United States that we could then categorize as being a unique Federal geospatial responsibility versus State, versus municipal?

Ms. KALWEIT. Sir, I haven't really studied that problem to any large extent, but I would state this, that the reason why USGS has the border-to-border, coast-to-coast coverage of the United States has a lot to do with the environmental issues that they are addressing, where you're following watersheds that cross regional boundaries and things like that, and so you really need the full expanse of that data.

Mr. PUTNAM. Mr. Trobia.

Mr. TROBIA. Thank you, Mr. Chairman.

It really depends on the business case of the problem that you're addressing. For instance, during the World Series when we wanted to find out where all the manhole covers were when the game was held in Phoenix, the best source of information was the city of Phoenix. I could look at detailed digital aerial photography that the city of Phoenix had. That is by far the best data that I could get.

Last year, however, Arizona suffered the Rodeo and Chedeski fires. I happened to be flying east and I saw the plume from that fire. I could see a distinct plume come across Arizona, New Mexico, the Panhandle of Texas and dissipate in Missouri. It was such a large fire. There we were using USGS geospatial products. We, at the State, had put together the digital ortho quarter quads. They aren't 6-inch pixels. They're 1-meter pixels of imagery for the whole State. They can be a couple of years old, but if we can take the DOQQS as a base, we can overlay county data, where that existed or other Federal, Forest Service, USGS or BLM data or State data. That's where you can start—that's where the Federal Government can help with the standards in putting these things together over

larger areas that cover multiple municipalities or multiple counties, especially in large-scale natural disasters.

Mr. PUTNAM. Does that create a basis for beginning to develop some guidelines for what the priorities of Federal geospatial information gathering would be versus State and local?

Mr. TROBIA. I hear Jack wanting to jump in, but, yes, in my opinion, yes. The Federal Government should develop the guidelines. The traditional way of the Federal Government making the paper maps and doing everything themselves is just not cost-effective and doesn't meet the business need of what is on the ground. Develop the standard, but then let the data be developed where the events are happening, locally where those business needs are really happening.

Mr. PUTNAM. Mr. Dangermond.

Mr. DANGERMOND. Mr. Chairman, I think it's fair to say that there are many GISs at the Federal level that respond to various mandates. One such system is the Public Land Survey GIS at BLM. It has a layer of information that it maintains, and so when somebody wants to lease or buy or sell Federal lands, a transaction is done on that information system, and it updates the map of Federal land ownership and status. And then there is another one which is the USGS topo map, and when they do a new survey, a new map sheet is created. Think of it as a transaction on the data base of the national map. The same is done with the census that happens every 10 years. There's a transaction on the census. The oceans by NOAA, FEMA with hazards, and EPA has a mandate to collect and maintain environmental data on every pollution site, and Housing and health with CDC. Each of these are separate GISs.

So, Mr. Chairman, there's many GISs at the Federal level, and then there's many GISs at the State and local level. And what the connections are, it's not all one system, because each of these separate systems has its own business needs and information reports that are necessary to get from it. Take EPA. The Congress mandates that they generate certain reports out of this GIS system about the environment. So it's not just about maps. It's not just about local maps. It's about geographic information, and maps are a kind of way to view that changing information that's happening all the time.

We need, actually, Mr. Chairman, a design for a "national GIS" which would bring together all of these individual systems. In business computing, they call this enterprise systems. You know, instead of having every department have their own accounting system, they say let's have one business accounting system for the whole corporation, enterprise computing or enterprise approaches.

We need, actually, for our Nation at the national level, a kind of enterprise vision for realizing such a system rather than the kind of bottom-up approach everybody does their own thing with some tools and data. We need a top-down architectural vision.

The Internet allows us some of the technical components to bring it into being. The policies for data sharing that we've been talking about are ways to implement some of the pieces of this enterprise vision, the nervous system, and certainly such a system should involve State and local transactions, as well as the national trans-

actions, and certainly the private sector, where appropriate, to realize that. But that kind of visioning work needs to be done by an architect. Architects designed this magnificent building that we're in. That required a blueprint. Somebody just didn't show up with some 2 X 4s and panels and throw it together. No. They thought about it. And this is something I think, at this particular moment in our history, what we need to do is sit back and say, what is the overall architecture? And it will change. It will evolve.

Mr. PUTNAM. Is it your sense then that the plan outlined by panel one, while it lays out steps, does not lay out a vision?

Mr. DANGERMOND. It has a major building block in the overall vision, and that was, and is, a significant one. The card catalog in a library was the kind of key that brought the whole concept of a library together. What they've done at GOS is similar and very significant. I think it will drive other parts of the architecture. But I would like, if I were in charge, I would certainly want an overall architecture to realize this national GIS in all of its parts. That will require leadership in many things will. But I would not go as far as to say that GOS is out of context, because I think it envisions a larger architecture. It's a key building block that can go forth on its own, but we need also to fill the other parts, and those show up in little statements that all of us have been talking about. We need the standard data classifications. We need the partnerships for who's going to play. We need the various protocols and so on. Those are all pieces of the overall vision, but it would be nice to have that overall architecture so we wouldn't have to explain it in the bits and pieces bottom up every time somebody asks a question.

Thank you, Mr. Chairman.

Mr. PUTNAM. Thank you.

Mr. RITCHIE. Mr. Chairman, I think hitchhiking on some of the things that Jack referred to, this bigger vision, if you really look—and going back to Mark's statement that maybe 50 percent is wasted, I guess that is a number that could be debated, because in my own testimony I said I know our organization has been trying to figure out how much the Federal Government spends, and we can't do it. It's just not cataloged or coded that way. So therein is one of the problems.

But I think, legislatively, if you look at the stove pipes that we've referred to organizationally, the Federal Government is built around stove pipes. We've legislated them. FEMA responds to disasters. That's their mission. They map. They create the GIS that supports that mission, and only if they're locally involved with some other agency—and it's getting better, but what I'm getting at is legislatively FEMA is out doing their job. The Corps of Engineers is out supporting the Air Force to build a new dining hall. They are only going to do topo and map just that area to those standards to get the mission done, which is get the dining hall built on a base.

The Navy is looking at the naval shipyards, etc. So we've got all of our entities, our Federal agencies, the BLM, NOAA. They've all got their needs for GIS, and they are focusing on their needs. The spirit of cooperation is getting better, but I think what Jack is say-

ing is, we don't have a head coach here, we don't have someone—we don't have the master architect. We've got a lot of——

Mr. PUTNAM. The Department of Interior doesn't do it for you?

Mr. RITCHIE. Well, the Department of Interior has its mission, and what is the stick for the Department of Interior, Mr. Chairman?

Mr. PUTNAM. So who should be the coach? Where should that position reside?

Mr. RITCHIE. OMB probably has the money, as Office of Management and Budget, it's a management issue, and it's a layer above all of these other agencies. And it's the one that can set the issue, the standards and mandate it. You know, what is the stick today if someone—and I would dare say there's not even intentional violations. There's nonintentional violations of OMB circulars, because it's sort of secondary, and participating in geospatial one-stop is sort of voluntary. Where is the stick if I don't make my data available? Where is the stick if I don't exactly follow the FGDC standards?

Mr. PUTNAM. I don't think your business ought to ignore some IRS circular. There could be a stick there.

Mr. RITCHIE. Yeah. But I guess my point being, like Jack said, having the master architect to look at the process, because the technology is going to change over time. You know, we talked about the national map. Going back to that, when we talk about, say, homeland security, let me give—you know, we talk about our biggest cities, and I would dare say our larger cities are better mapped. They've been at it longer. That's where the greatest need is. But what happens with our space shuttle disaster that spread debris all over the western part of the United States in a lot of remote areas, as well as urbanized areas? What would have happened? Can you just envision for one moment, all of a sudden a need was created for information. What if there had been a Federal program in place, a master architect, a block grant, however you want to say it, that over a period of time stood up and created the definition of standards to ensure data operability? That doesn't mean that city X doesn't put blue water lines on a map and city Y puts brown. It doesn't matter. If I can get to water line, I want to come up, I want to see them in green. They will come up that way. That is the kind of data inoperability. But had we had those standards, just imagine. The Federal Government couldn't stop and all of a sudden go to the BLM map or the USGS map, which is going to be tile by tile. This one is 23 years old. The next one to it is 26 years old. Imagine if we had State and local government that the closing on a house was yesterday, and you knew to call the new owner today and not last week's owner, moment by moment in time? What the Federal Government needs is to have access to that data. They don't need to build these football size warehouses. They need an interagency operating agreement that when the Federal Government needs it, and whether it be NIMA or other in a lead role that jumped in to support NASA, they should have access online to bring up all of that data to mobilize whether it was National Guard, FEMA or wherever, even local citizens, even to put out information, not just CNN or Fox News. I think that is the kind of thing that we're talking about, because the Federal Govern-

ment can't change all the transactual analysis that is going on in our State and local communities. It is happening day in and day out. Let them do that, but let the Federal Government have access to it when they need it, and let them have access to it to work "what if" exercises.

Mr. PUTNAM. If the shuttle disaster had not occurred until after the agencies had successfully implemented the steps they laid out in the first panel, they had this online card catalog through the portal, they had an enterprise architecture, they had interoperability, what would have been different about that operation?

Mr. RITCHIE. I can't speak for the data that would have been in there, but what data would have been available, they'd have had a one-stop shop to go look at and then determine if it met their needs, and perhaps in places it did and other places it didn't, but then they could immediately assess the situation as to where are we adequate, where are we inadequate.

Mr. DANGERMOND. I have an answer to that, Mr. Chairman.

My staff actually did support, for 6 weeks, all of the mapping and data, assembly and management for that project. They spent weeks of time calling local government agencies for their data. It was all done through a kind of a friends' network. "Oh, you know, Joe has this." And, finally, they were able to assemble into a data base all the datasets that were necessary to do the analysis, which were quite profound. If they had it before, they could sit, find what was available, assuming that all the local governments are participating with their metadata published in the card catalog, and then download the data in minutes to hours. In reality it took many weeks of time calling on relationships to be able to accomplish.

So, again, I think geospatial one-stop is enormously—just enormously valuable.

Going back to your other question, if I may, we do need a cross-cutting national organization which would bring the different stove pipes together. People have advocated creating a new organization for this. This scares me. I wouldn't recommend it. But there should be a GIO someplace in the Federal Government, like a CIO, somebody that really is in charge of managing and protecting our $20 or $30 billion of government geographic information assets, the Chief or the Chief Geographic Information Officer. I like that notion a lot.

Mr. PUTNAM. But you don't have any suggestions on where that should be?

Mr. DANGERMOND. My second thought is probably just because of the bulk of ownership of geospatial data, it belongs in Department of Interior, and oddly enough, that is where it has evolved. The USGS, the manager of the national map is certainly one of the participants there, and they have lots of experience in it. They were certainly one of the first ones to use GIS at the national level in the government. So I feel no discomfort with leaving it exactly within the management structure, but getting executive management involved at the policy level and giving it some teeth and set it on some tighter timeframes, which again is beginning as both Mark and Scott mentioned earlier.

Mr. PUTNAM. So, I mean, I'll grant that the Interior has the technical expertise and history, but if you're the Secretary of HUD or

the Secretary of Agriculture, why do you care what the Secretary of Interior is telling you to do?

Mr. DANGERMOND. I don't know. You could do it like in computing. In computing, they always pull computing out of each of the departments, and they have a CIO and an IT department. There are some dangers with that, because it sort of sets up a "single czar that is in charge" culture. GIS is becoming pervasive like word processing. There isn't any longer a word processing department. It's pervasive, and I think geospatial data will be pervasive. There will be nodes that publish data all over the nervous system of the country, and we just need to give it—my view as a manager is the "light touch." The light touch would be to help coordinate standards, particularly data content standards. The technology will take care of itself and is, but the data content standards, like how a soil map relates to something else, a geologic map, this kind of integration at the science level is really where we need help. We're at risk here.

I am a very strong believer in something called the national map. This is actually a program that is in search of funding right now. It is the base map for the Nation, the wall to wall, end to end digital framework on which all the other layers of data gets organized. And, yes, you can have data at many other scales like the notion of books in a library. All of that is valuable. But in addition for science purposes and for national kinds of problem solving purposes, a complement to all of that must be a national framework that guides the Nation.

Mr. PUTNAM. There's a reference in the GAO report to the global map that the shuttle had undertaken to map. What's the status of that?

Mr. DANGERMOND. The mission was carried out several years ago. It was done through the sponsorship of NIMA and is being processed rather slowly, by my view, by various contractors.

Mr. PUTNAM. And who decided the resolution of the scale for that? What standard was that?

Mr. DANGERMOND. In part the technology did. So it's a sensing device that measures. There are policies associated with how much of the resolution scale will be released for the public as opposed to NIMA, which basically holds that data. But it is gradually coming out. My own perhaps radical belief is that it should all be published as soon as possible because it will provide a base map for global science.

Mr. PUTNAM. Mr. Trobia, final thoughts?

Mr. TROBIA. Thank you, Mr. Chairman. Just coming back to your question about where should the leadership for this be. NSGIC has been involved with FGDC and the FGDC steering committee for years. If it wasn't for Secretary Babbitt driving the FGDC at Interior, I don't know that the FGDC would have happened. But there were issues of non-DOI departments and why should they comply? I would say that it wasn't until OMB got involved that FGDC got more of a cross-cutting nature. I have been a director for a non-GIS department and GIS departments. And I would say as a director for a non-GIS department I got kudos for protecting my department, for making it stronger, and for getting resources. As a GIS manager I have to go after multiple departments because the data,

the most expensive part of making a GIS work, is in different departments. So organizationally, I'm the odd guy out. I have to go across the barriers of different departments.

And that's the nature of what I believe Mr. Dangermond is talking about with creating the enterprise. The cost savings of connecting the stovepipes are incredible. I don't see how that's going to happen if, at the OMB level, there isn't a GIO, or somebody that can really get the department's attention. This is especially true regarding budget and performance measures for departments and to say, "you all need to play in the same sandbox."

Mr. DANGERMOND. You would argue that it would come out of DOI and be a special organization.

Mr. TROBIA. Actually I would say that the leadership should because I do agree that in Interior, NOAA, and a number of the agencies, GIS is pervasive and there's business cases in all the departments. But what we're talking about here is creating the enterprise and getting the players to work together and connecting the stovepipes. And if that doesn't happen at OMB or with legislative support, I don't see how it's going to happen.

Mr. DANGERMOND. I would agree with him.

Mr. RITCHIE. I would agree also. You have the Office of Federal Procurement Policy within OMB which could be a good place to start to look at a model for how to create this champion that has some authority in lines above all the stovepipes to sort of set the ground rules for operating in a sandbox.

Ms. KALWEIT. Mr. Chairman, just a couple of observations that are relevant to this discussion. First of all, I want to call your attention to a comment that Mark Foreman made regarding the Federal Enterprise Architecture. He was talking about how we in the Federal Government are going to be using that for our framework, if you will, for our business cases. And, among the priorities in terms of what is to be mapped into the Federal Enterprise Architecture is the geospatial component. OMB has made that among the priorities. And so we will start to look at or we will start to be able to frame what that overarching architecture looks like as the piece of the FEA starts to come to fruition.

In addition, I would like to make an observation as a program manager in the Federal Government that moneys are appropriated by programs and agencies, and this makes it very difficult to coordinate programmatically on cross-cutting issues. And so as much as individually program managers may shake hands and say we want to partner, buy once, use many, again the programmatic appropriations sometimes can make that challenging.

Mr. PUTNAM. Congress shares some of the blame. I would agree with that. I want to thank all of you for your testimony, and I want to thank the audience for their patience in staying with us. I don't think we ever carried an audience quite this long before, so it certainly demonstrates the interest in this issue which, as I said earlier, is revolutionary in its potential to transform the way the Federal Government provides information to other governments and interacts with its citizens. So your insight has been very helpful, and we look forward to additional hearings and comments on this.

In the event that there may be additional questions for panelists or statements that we do not have time for today, the record shall

remain open for 2 weeks for such submissions. And without objection we will include additional testimony that was submitted for the record in the appropriate place. Thank you all very much, and we stand adjourned.

[Whereupon, at 1:05 p.m., the subcommittee was adjourned.]

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