GEOSPATIAL INFORMATION: ARE WE HEADED IN THE RIGHT DIRECTION, OR ARE WE LOST?

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: ARE WE HEADED IN THE RIGHT DIRECTION, OR ARE WE LOST?

WEDNESDAY, JUNE 23, 2004

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 2:07 p.m., in room 2154, Rayburn House Office Building, Hon. Adam Putnam (chairman of the subcommittee) presiding.

Present: Representatives Putnam and Clay.

Staff present: Bob Dix, staff director; John Hambel, senior counsel; Dan Daly, professional staff/deputy counsel; Shannon Weinberg, professional staff/deputy counsel; Juliana French, clerk; Colin Samples and Kaitlyn Jahrling, interns; Adam Bordes and Mark Stephenson, minority professional staff members; and Jean Gosa, minority assistant clerk.

Mr. PUTNAM. A quorum being present, this hearing of the Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census will come to order.

Good afternoon and welcome to the subcommittee's hearing entitled, "Geospatial Information: Are We Headed in the Right Direction, Or Are We Lost?" This oversight hearing is a followup to the hearing held on June 10, 2003, entitled, "Geospatial Information: A Progress Report on Improving Our Nation's Map-Related Data Infrastructure."

The purpose of today's hearing is to examine the progress made by the Federal Government since last year's hearing to consolidate and improve the utilization of the masses of geospatial data collected by departments and agencies across the Government and by State and local governments. This hearing focused on Government and industry efforts to develop standards for the collection and use of geospatial information to facilitate data sharing. In most cases, information is collected in different formats and standards designed for one specific mission, with inadequate consideration given to subsequent possible intergovernmental data sharing. This results in wasteful redundancies and a reduced ability to perform critical governmental operations.

The hearing will also focus attention 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 data in a timely manner. Furthermore, during this hearing we will evaluate the role that the

private sector plays in arriving at cost efficiencies and improving geospatial data quality for end users.

This hearing is a continuation of the series of oversight hearings conducted by this subcommittee during the 108th Congress to keep Federal Government agencies and decisionmakers aggressively focused on meeting the key goals of the E-Government Act of 2002, greater accessibility to Government by citizens and businesses, improving Government efficiency and productivity, enhancing customer service, facilitating cross-agency coordination, and tangible cost savings to taxpayers through the use of 21st century technology and proven best practices throughout the Federal Government.

Today's hearing is an opportunity to examine the progress of OMB's oversight of geospatial investments. This hearing also provides an opportunity to examine the cross-agency coordination in the collection, consolidation, maintenance, and sharing of that data and geospatial information systems, collectively referred to as GIS.

We need to determine what programs exist across the Federal Government, how much is being spent on GIS programs, where that money is being spent, if data is shared any more efficiently than since our last hearing, and how the Federal Government is progressing in its coordination efforts with State and local governments.

To achieve the goals of coordination across the Federal Government related to acquisition, use, sharing, and interoperability of GIS data, the continuing challenge of the development of data standards and interoperability must be addressed. In most cases, geospatial data is collected in a particular format for one specific mission, with insufficient consideration for subsequent data sharing. That data is useless to other agencies because the data was not collected in a standardized form and, thus, not interoperable with data sets other agencies may hold. This is true across the Government, as well as in States and local municipalities across our Nation. This results in wasteful redundancies and a reduced ability to perform critical intergovernmental functions. With the development of the Federal Enterprise Architecture Initiative and its corresponding reference models, an additional tool for identifying common business lines and opportunities for collaboration will be available.

I am eager to hear the progress made in this direction by the Geospatial One-Stop Initiative, as well as by other agencies and organizations. Not only is Geospatial One-Stop engaged in the standards development process, it is also intended to simplify the process of locating, accessing, sharing, and integrating geospatial information in a timely way. I am likewise eager to hear about the progress made in that effort.

While we expect to hear good news in the areas of standards development and in developing a portal for the collection and sharing of this data, I understand the news in the area of collaboration on the collection and sharing of this data is not as promising. Per my request, GAO prepared a report on the coordination and sharing of geospatial assets. The results are not good. GAO reports that a failure of coordination and oversight efforts have resulted in agencies continuing to independently acquire and maintain potentially du-

plicative and costly data sets and geospatial information systems. We have much work to do in this area to eliminate redundant spending. Perhaps we need to consider the creation of a central office responsible for the coordination of governmentwide geospatial efforts such as the Geospatial Information Office with OMB.

I eagerly look forward to the expert testimony our panel of leaders from throughout the Government and industry will provide today.

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

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: Are we headed in the right direction or are we lost?
How much are we spending? What are the standards? Are we sharing information? Who is operating the compass providing direction to a productive, efficient, and cost-effective destination?"

Wednesday, June 23, 2004
2:00 p.m.
Room 2154, Rayburn House Office Building

OPENING STATEMENT

Good afternoon and welcome to the Subcommittee's hearing on *"Geospatial Information: Are we really headed in the right direction or are we lost?"*

This oversight hearing is a follow up to the hearing held on June 10, 2003 entitled *"Geospatial Information: A Progress Report on Improving Our Nation's Map-Related Data Infrastructure."* The purpose of today's hearing is to examine the progress made by the federal government since last year's hearing to consolidate and improve utilization of the masses of geospatial data collected by departments and agencies across the federal government and by state and local governments. This hearing will focus on government and industry efforts to develop standards for the collection and use of geospatial

information to facilitate cross-agency data sharing. In most cases, information is collected in different formats and standards designed for one specific mission, with inadequate consideration given to subsequent possible intergovernmental data sharing. This results in wasteful redundancies and a reduced ability to perform critical intergovernmental operations.

The hearing will also focus attention 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. Further, during this hearing, we will evaluate the important role that the private sector plays in arriving at cost efficiencies and improving geospatial data quality for end users.

This hearing is a continuation of the series of oversight hearings conducted by the Subcommittee during the 108th Congress to keep federal government agencies and decision-makers aggressively focused on meeting the key goals of the E-Government Act of 2002: greater accessibility to government by citizens and businesses; improving government efficiency and productivity; enhancing customer service; facilitating cross-agency coordination; and tangible cost savings to taxpayers through use of 21st century technology and proven "best practices" throughout the federal government.

Today's hearing is an opportunity to examine the progress of OMB's oversight of geospatial investments. This hearing also provides an opportunity to examine the cross-agency and intergovernmental coordination and collaboration in the collection, consolidation, maintenance, and sharing of geospatial data and geospatial information systems, sometimes collectively referred to as "GIS".

We need to determine what programs exist across the federal government, how much is being spent on GIS programs, where that money is being spent, if data is shared across the federal government any more efficiently than since our hearing last year, and how the federal government is progressing in its coordination efforts with state and local governments.

To achieve the important goals of coordination and collaboration across the federal government related to the acquisition, use, sharing, and interoperability of geospatial data, the continuing challenge of the development and implementation of data standards and interoperability must be addressed. In most cases, geospatial data is collected in a particular format for one specific mission, with insufficient consideration for subsequent intergovernmental data sharing. That data is useless to other agencies because the data was not collected in a standardized format and is thus not interoperable with data sets other agencies may hold. 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. With the development and implementation of the Federal Enterprise Architecture initiative and its corresponding reference models, an additional tool for identifying common business lines and opportunities for collaboration will be available.

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While I expect to hear good news in the area of standards development and in developing a portal for the collection and sharing of geospatial data, I understand the news in the area of cross-agency collaboration on the collection and sharing of geospatial data is not so promising. Per my request, GAO prepared a report on the coordination and sharing of geospatial assets. The results are not good. GAO reports that a failure of coordination and oversight efforts have resulted in agencies continuing to independently acquire and maintain potentially duplicative and costly data sets and geospatial information systems. We have much work to do in this arena to eliminate costly redundant spending. Perhaps we need to consider the creation of a central office responsible for the coordination of government-wide geospatial efforts such as a Geospatial Information Office within OMB.

I eagerly look forward to the expert testimony our distinguished panel of leaders in various federal agencies and in industry will provide today.

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Mr. PUTNAM. Today's hearing can be viewed live via Webcast by going to reform.house.gov and clicking on the link under Live Committee Broadcast.

I would like to welcome the ranking member from Missouri to our subcommittee hearing and yield to him for his opening remarks.

Mr. Clay.

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

Although this is a complex topic, with many actors and agencies playing a role, the issues before us today are not new to us. From the Department of Health and Human Services, which utilizes GIS technology for national health surveys, to the Department of Housing and Urban Development's work in combining housing development and environmental data, our role in overseeing the investments made in GIS activities and technology cannot be understated.

As this committee knows from last year's hearing on GIS, I asked the Congressional Research Service to assess the extent of funding for geographic information systems across the Federal Government. Through that process we learned that many agencies either had a difficult time providing the necessary information, could not interpret their data on funding and activities, or outright ignored the request. One agency, FEMA, was found to be in the process of issuing a proposal to spend over $200 million on GIS projects, while being unable to substantiate their level of spending on such activities. In short, an agency that cannot quantify their spending cannot be trusted with an extensive procurement of that size. Thus, it is imperative that our agencies become more accountable in their budgeting and performance measurement activity if we are to develop a comprehensive, governmentwide GIS initiative.

In addition, I am aware that GIS is being used in St. Louis and across the State of Missouri for a wide variety of important purposes. I am also aware, however, that many public officials across the Nation do not believe the Federal Government provides the type of GIS data they need to meet their requirements.

That said, I am hopeful that today's hearing can categorize it for us exactly how much is being spent across the Government on GIS activities; if the programs are providing State and local agencies the information they need; and efforts being pursued to make our GIS activities more efficient.

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

Thank you, Mr. Chairman.

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

STATEMENT OF THE HONORABLE WM. LACY CLAY
AT THE HEARING ON GEOSPATIAL ACTIVITIES
June 23, 2004

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

Although this is a complex topic with many actors and agencies playing a role, the issues before us today are not new to us. From the Department of Health and Human Services, which utilizes GIS technology for national health surveys to the Department of Housing and Urban Development's work in combining housing development and environmental data, our role in overseeing the investments made in GIS activities and technology cannot be understated.

As this committee knows, for last year's hearing on GIS I asked the Congressional Research Service to assess the extent of funding for geographic information systems across the federal government. Through that process, we learned that many agencies either had a difficult time providing the necessary information, could not interpret their data on funding and activities, or outright ignored the request. One agency, the Federal Emergency Management Agency, was found to be in the process of issuing a proposal to spend over $200 million on GIS projects while being unable to substantiate their level of spending on such activities. In short, an agency that cannot quantify their spending cannot be trusted with an extensive procurement of that size. Thus, it is imperative that our agencies become more accountable in their budgeting and performance

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That said, I'm hopeful that today's hearing can categorize for us exactly how much is being spent across the government on GIS activities; if the programs are providing state and local agencies the information they need; and efforts being pursued to make our GIS activities more efficient.

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

Mr. PUTNAM. Without objection, your entire text of remarks will be included in the record.

At this time I would ask our first panel of witnesses and anyone accompanying you to please rise for the administration of the oath.

[Witnesses sworn.]

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

We will move directly to testimony.

Our first witness is Ms. Karen Evans. Karen Evans was appointed by President Bush to be Administrator of the Office of Electronic Government and Information Technology at the Office of Management and Budget. Prior to joining OMB, Ms. Evans was Chief Information Officer at the Department of Energy and served as vice chairman of the CIO Council, the principal forum for the agency CIOs to develop IT recommendations. Prior to that she served at the Department of Justice as Assistant and Division Director for Information System Management.

You know, if you are going to testify here every week, we really need to get you a new bio; you know, she is a Pisces, she likes long, slow walks on the beach; something. We have got to juice this up a little bit.

Well, having thrown you off track a little bit, you are recognized for your opening remarks.

STATEMENTS OF KAREN S. EVANS, ADMINISTRATOR OF E-GOVERNMENT AND INFORMATION TECHNOLOGY, OFFICE OF MANAGEMENT AND BUDGET; LINDA D. KOONTZ, DIRECTOR, INFORMATION MANAGEMENT, U.S. GENERAL ACCOUNTING OFFICE; SCOTT J. CAMERON, DEPUTY ASSISTANT SECRETARY FOR PERFORMANCE AND MANAGEMENT, U.S. DEPARTMENT OF THE INTERIOR; AND WILLIAM ALLDER, JR., DIRECTOR, OFFICE OF STRATEGIC TRANSFORMATION, NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY

Ms. EVANS. Good afternoon, Mr. Chairman and Ranking Member Clay. Thank you so much for the invitation to speak today. But I would tell you I am a Scorpio, not a Pisces, so that might explain some things.

The title of today's hearing asks the question "Are we headed in the right direction or are we lost?" I believe we are headed in the right direction based on both the progress achieved to date, along with our planned next steps. However, I would like to stress that while progress in the last year is commendable, it is just the start of the work ahead of us. There are significant opportunities across all levels of Government to better leverage our geospatial assets.

The problem is clear: although a wealth of geospatial information exists, it has been difficult to locate, access, share, and integrate in a timely and efficient manner. Many Federal, State, and local agencies collect and use geospatial data in different formats and standards based on their requirements. This results in wasteful spending, redundant data collection, and can hinder the ability of all governmental entities to effectively and efficiently provide information and services to each other, citizens, and businesses.

At the Federal level, we are working with State, local, and tribal governments to resolve these issues through the President's

Geospatial One-Stop E-Government Initiative and through implementation of governmentwide management and budget policies. As you know, the purpose of the Geospatial One-Stop Initiative is to provide all governmental agencies with a single point of access to map-related data, enabling consolidation of redundant data. Its goal is to improve the ability of public and government to use geospatial information to support the business of government and improve decisionmaking.

Within the last year, Geospatial One-Stop has successfully brought us closer to these goals by making it easier for government officials at all levels to share, coordinate the collection of, and gain access to geospatial data. In its first months of operation last year, the Geospatial One-Stop portal responded to support several national disaster events, including Hurricane Isabel and the California wildfires. From one location, users of the portal could access storm tracking, modeling, weather information, satellite images, and regional and local mapping services and links to disaster-planning Web sites.

On the management policy side, OMB continues to issue guidance to Federal agencies on coordination of geographic information and related spatial data activities through OMB's Circular A–16. This circular provides direction to Federal agencies to prepare, maintain, publish, and implement a strategy for advancing geographic information appropriate to their mission. The circular established the Federal Geographic Data Committee [FGDC], an interagency committee responsible for facilitating implementation of Circular A–16-related activities. The Geospatial One-Stop Initiative and the FGDC have a complimentary and mutually supportive relationship. They each have a role to play in coordinating Federal geospatial activities with State, local, and tribal governments.

On the budget policy side, we are working to promote and enforce Federal geospatial requirements. During the fiscal year 2005 budget process, OMB directed agencies to identify all grant programs related to geospatial information and post the grant announcements in grants.gov so that they are easily identifiable as geospatial-related grants, and report on all planned geospatial data acquisitions of more than $500,000 to the Geospatial One-Stop so it could be posted in the geodata.gov portal in accordance with OMB Circular A–16.

The accomplishments of the last year also clearly reveal more is needed to improve coordination, communication, and collaboration on geospatial investments. OMB is working with agencies on the following activities. The first is on consolidation of geospatial investments. The Geospatial One-Stop Initiative is currently developing a process to facilitate the sharing of existing and planned investments. Second, we are working to improve intra-agency geospatial coordination. Some agencies, such as EPA and DHS, have established a geospatial information officer. OMB is exploring options to solidify the role and responsibilities of geospatial information officers at the Federal agencies. And, third, we will continue to build partnerships with State, local, and tribal organizations and industry through FGDC and the Geospatial One-Stop.

The work and the accomplishments of the Geospatial One-Stop E-Gov Initiative and the FGDC are important strides forward in

our ability to leverage geospatial resources throughout the Federal Government. Integrating geospatial requirements into the budget process is another key step in promoting more effective use of geospatial resources. While we are headed in the right direction, there are significant opportunities ahead of us. The administration will continue to work with State and local governments, industry and Congress in pursuing these opportunities.

I would be glad to take any questions at this time.

[The prepared statement of Ms. Evans follows:]

STATEMENT OF
THE HONORABLE KAREN S. EVANS
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

June 23, 2004

Mr. Chairman and Members of the Committee, thank you for the invitation to speak at today's hearing on the subject of geospatial information. I appreciate the opportunity to discuss the Administration's efforts to both maximize Federal geospatial resources as well as partner with industry, state, local, and tribal governments to improve sharing and interoperability in this critical area.

The title of this hearing asks the question, "are we heading in the right direction or are we lost?" I believe we are heading in the right direction based on both the progress achieved to date along with our planned next steps. However, I would like to stress while the progress in the last year is commendable, it is just a start of the work ahead of us. There are significant opportunities across all levels of government to better leverage our geospatial assets.

For the purposes of today's hearing my testimony will highlight some of the progress achieved in the last year and provide additional information on next steps currently under development to more rapidly improve sharing of geospatial information.

Electronic Government and Geospatial Information

As you know, one of the President's E-Government initiatives under the Government-to-Government Portfolio is Geospatial One-Stop. The purpose of this initiative is to provide Federal, state, local, and tribal agencies with single-point of access to map-related data enabling consolidation of redundant data. Its goal is to improve the ability of the public and government to use geospatial information to support the business of government and improve decision-making. The Department of Interior is the managing partner for this initiative with seven other partner agencies (Department of Homeland Security, Department of Defense, Department of Commerce, Department of Transportation, Department of Agriculture, Environmental Protection Agency, and National Aeronautics and Space Administration).

Geospatial One-Stop was created due to overwhelming response from Federal, state, and local stakeholders on the importance of coordinating Federal geospatial resources and collaborating between Federal, state, and local governments. All

communities identified the wide-spread importance of geospatial data across a variety of their missions. Additionally, state and local input highlighted the great difficulty they encountered in trying to simply locate Federal geospatial data.

Within the last year Geospatial One-Stop has successfully addressed some of these goals and improved access to geospatial information. For example:

- Through the Geospatial One Stop portal (www.geodata.gov), anyone can access geospatial information from Federal agencies as well as state, local, and tribal agencies. Launched in June 2003, with over 5,000 data sets (e.g., geospatial data for a specific location, such as flood map data for eastern Maryland). As of 5/3/04, there were 5,885 data sets in the portal with over 4,000 waiting to be validated from the metadata harvesting.
- Through partnership with state and local organizations, Geospatial One-Stop developed thirteen standards to improve interoperability of geospatial data. For example, one draft standard focuses on common definitions for transportation data which will be used to model the geographic locations, interconnectedness, and characteristics of the transportation system within the United States. The transportation system includes both physical and non-physical components representing all modes of travel that allow the movement of goods and people between locations.

Geospatial Policy and Inter-agency Coordination

For many years, OMB has issued guidance to Federal agencies on coordination of geographic information and related spatial data activities through OMB Circular A-16. This Circular provides direction for Federal agencies that produce, maintain or use spatial data either directly or indirectly in the fulfillment of their mission. Some of the general responsibilities for Federal agencies include preparing, maintaining, publishing, and implementing a strategy for advancing geographic information and related spatial data activities appropriate to their mission, in support of the National Spatial Data Infrastructure (NSDI) Strategy discussed below. Additionally, agencies annually report to OMB on their achievements relative to their strategies, and must include spatial data assets within Exhibit 300 submissions (see OMB Circular A-11, sec. 300). Finally, Circular A-16 instructs agencies to use Federal Geographic Data Committee (FGDC) data standards documenting spatial data with the relevant metadata.

Circular A-16 also established:

- A coordinated approach to electronically develop the NSDI. The NSDI is the technology, policies, standards, human resources, and related activities necessary to acquire, process, distribute, use, maintain, and preserve spatial data (e.g., information and process discovery, publishing data, publishing symbol libraries, query filtering, data fusing, Earth imaging, photogrammetry, location processing, and spatial analysis.

- The Federal Geographic Data Committee. The FGDC is an interagency committee responsible for facilitating implementation of Circular A-16 related activities along with implementation of the NSDI. Steve Griles, Deputy Secretary at the Department of Interior is the chair of the Committee. I serve as the Vice-Chair of the FGDC. Members include USDA, DOC, DOD, DOE, HHS, HUD, DHS, DOI, DOJ, State, DOT, EPA, GSA, NARA, NASA, Library of Congress, NSF, and TVA. OMB relies on the strong leadership of this Committee in the development of standards to advance interoperability and information sharing between Federal agencies and among our state, local, and tribal partners.

The Geospatial One-Stop E-Gov initiative and the FGDC have a complimentary and mutually supportive relationship. The FGDC's primary role is leading the development of policies, standards, and training to support the NSDI. Geospatial One-Stop serves as the gateway to geospatial information for all levels of government and the public and it is responsible for harvesting geospatial data from existing sources to be published in the portal. They each have a role to play in coordinating Federal geospatial activities with state, local, and tribal governments. These efforts, along with those led by the Department of the Interior on developing a National Map – a map of our country's geospatial information – are working together to implement the NSDI. Through the National Map, a framework of integrated topographic content is being built and it is this base geospatial information that government and the public need to help support decision-making. The combined work of these three efforts is resulting in a more efficient use of resources at all levels of governments, making it easier and faster for customers to obtain geospatial information they need.

Enforcing Geospatial Coordination through the Budget Process

To promote and enforce Federal geospatial requirements, OMB directed agencies to take a number of additional steps through the FY 2005 budget process. One of these steps directed agencies to identify all grant programs that are related to geospatial information and post the grant announcements in Grants.gov such that they are easily identifiable as geospatial-related grants. Further, agencies are to coordinate the activities of all grant programs that are related to geospatial information through the Geospatial One-Stop team to leverage other agency grants in similar areas.

In the FY 2005 budget process, OMB directed agencies to report all planned geospatial data acquisitions of more than $500K to Geospatial One-Stop so it could be posted in the GeoData.gov portal in accordance with OMB Circular A-16. Agencies were requested to post metadata for all planned geospatial data acquisitions in the GeoData.gov portal conformant with the metadata standards.

Next Steps on Geospatial Information Coordination

There are a number of critical actions currently under development which will build from the initial progress. These actions include:

1. Consolidation of Geospatial Investments.

   The Geospatial One-Stop initiative is currently developing a process to facilitate the sharing of existing and planned investments. Formalization and institutionalization of this process will lead to wiser investments in geospatial data throughout all levels of government. It will also result in the creation of an inventory of existing investments from which redundant investments may be identified and eliminated. Guidance to agencies on identifying and reporting these investments is currently under development at OMB.

   Consolidation of geospatial procurement is needed and building from our existing interagency structure, and the processes Geospatial One-Stop is developing, we will have the structure in place to more effectively consolidate purchases in this area. In fact, through the Smart-Buy program led by GSA, we are working with the agencies to review information and software acquisitions for appropriateness for inclusion into this program in order to leverage government purchasing power and reduce redundant purchases.

2. Improving Intra-Agency Geospatial Coordination.

   Some agencies, such as EPA and DHS, have established a geospatial information officer. Other agencies do not have a separate position but rather assign the responsibility for geospatial coordination to one employee with other duties. To promote consistency and increase intra-agency coordination, OMB is exploring options to solidify the role and responsibilities of a geospatial information officer at Federal agencies.

3. Continuing to Build Partnerships with State, Local, and Tribal Organizations, and Industry.

   The partnerships established by the FGDC and Geospatial One-Stop are essential to our collective ability to improve the sharing and interoperability of geospatial data. We will continue to build on these valued relationships to identify additional opportunities for maximizing our geospatial assets.

Conclusion

The work and accomplishments of the Geospatial One-Stop E-Gov initiative and the FGDC are important strides forward in our ability to leverage geospatial resources throughout the Federal government. Integrating geospatial requirements into the budget process is another key step in promoting more effective use of geospatial resources. While we are heading in the right direction, there are significant opportunities ahead of us to maximize the purchase, use, and sharing of geospatial data to the mutual benefit of the nation. The Administration will continue to work with state and local governments, industry, and Congress in pursuing these opportunities.

Mr. PUTNAM. Thank you very much, Ms. Evans.

Our next witness is Linda Koontz. Ms. Koontz is Director of Information Management Issues for the U.S. General Accounting Office. She is responsible for issues concerning the collection, use, and dissemination of Government information in an era of rapidly changing technology, as well as E-Government issues. Recently, Ms. Koontz has been heavily involved in directing studies of interest to this subcommittee, including E-Government, privacy, electronic records management, and governmentwide information dissemination issues.

Another frequent flier to the subcommittee, you are recognized for 5 minutes, and welcome.

Ms. KOONTZ. Thank you, Mr. Chairman, Ranking Member Clay. I am pleased to participate in this hearing of the Federal Government's use and coordination of geospatial information.

As you know, the collection, maintenance, and use of geospatial information is essential to Federal agencies carrying out their missions. Geographic information systems are critical elements used in the areas of homeland security, natural disasters, disease outbreaks, and countless other applications.

Further, as shown in our graphic display, many entities, including Federal, State and local governments, and the private sector may be involved in geospatial data collection and processing relative to a single geographic location. In this environment, the possibility of duplication exists, and over the years many questions have been raised about how well the Nation's geospatial assets are coordinated.

Last year I testified before this subcommittee that realizing the vision of a nationwide network of geospatial information systems is a formidable task, and that achieving full participation across governments in its development has been difficult. Today's testimony focuses specifically on how the Federal Government is coordinating the effective sharing of geospatial assets. My testimony is based on a report you and Representative Sessions requested that is being released today.

Overall, OMB, Federal agencies, and various cross-government committees and initiatives have taken action to coordinate the Government's geospatial investments among agencies and with State and local governments. For example, the Federal Geographic Data Committee has established Web-based information sharing portals, led standards setting activities, and conducted outreach efforts. In addition, OMB has established processes intended to oversee and coordinate geospatial investments by collecting and analyzing relevant agency information.

However, these efforts have not been fully successful in reducing redundancies in geospatial investments for several reasons. First, a complete and up-to-date strategic plan is not in place. The Government's existing plan for a coordinated network of geospatial information is out of date and does not include specific measures for identifying and reducing redundancies. Federal agencies have not always complied with OMB direction to coordinate their investments. Many agency geospatial data holdings are not compliant with FGDC standards or have not been published through the central clearinghouse. OMB's oversight methods have not identified or

eliminated specific instances of duplication. This is largely resulted from OMB not collecting consistent key investment information from all agencies. As a result, agencies continue to independently acquire and maintain potentially duplicative sets of data and systems. This costly practice is likely to continue unless coordination is significantly improved.

In our report, we are making several recommendations to strength coordination. Specifically, we are recommending that the Director of OMB and the Secretary of the Interior direct the development of a national geospatial data strategy that includes goals, strategy, risk factors, and performance measures. We are also recommending that the Director of OMB encourage agency compliance with A–16 by developing criteria for assessing the extent of interagency coordination proposals for geospatial investments and to strength OMB's oversight of investments in geospatial data and systems.

OMB Interior officials agreed with these recommendations. However, until these issues are fully addressed, the vision of a fully coordinated geospatial data infrastructure may remain out of reach.

That concludes my statement. I would be happy to answer questions at the appropriate time.

[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, House Committee on Government Reform

For Release on Delivery
Expected at 2:00 p.m. EDT
Wednesday, June 23, 2004

GEOSPATIAL INFORMATION

Better Coordination and Oversight Could Help Reduce Duplicative Investments

Statement of Linda D. Koontz
Director, Information Management Issues

GAO-04-824T

GAO
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Highlights

Highlights of GAO-04-824T, testimony before the Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census, House Committee on Government Reform

Why GAO Did This Study

The collection, maintenance, and use of location-based (geospatial) information are essential to federal agencies carrying out their missions. Geographic information systems (GIS) are critical elements used in the areas of homeland security, healthcare, natural resources conservation, and countless other applications.

GAO was asked to review the extent to which the federal government is coordinating the efficient sharing of geospatial assets, including through Office of Management and Budget (OMB) oversight. GAO's report on this matter, *Geospatial Information: Better Coordination Needed to Identify and Reduce Duplicative Investments* (GAO-04-703), is being released today. GAO's testimony focuses on the extent to which the federal government is coordinating the sharing of geospatial assets, including through oversight measures in place at the Office of Management and Budget (OMB), in order to identify and reduce redundancies in geospatial data and systems.

What GAO Recommends

In its report, GAO recommends that the OMB Director and the Secretary of the Interior develop a current, comprehensive strategic plan for coordinating federal geospatial assets; and makes other recommendations to OMB. In their comments on a draft of the report, OMB and Interior agreed with GAO's recommendations.

www.gao.gov/cgi-bin/getrpt?GAO-04-824T

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

June 23, 2004

GEOSPATIAL INFORMATION

Better Coordination and Oversight Could Help Reduce Duplicative Investments

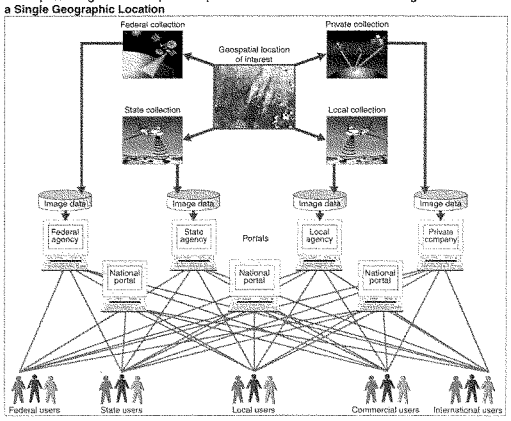
What GAO Found

OMB, cross-government committees, and individual federal agencies have taken actions to coordinate geospatial investments across agencies and with state and local governments. However, these efforts have not been fully successful for several reasons:

- A complete and up-to-date strategic plan is missing. The existing strategic plan for coordinating national geospatial resources and activities is out of date and lacks specific measures for identifying and reducing redundancies.
- Federal agencies are not consistently complying with OMB direction to coordinate their investments.
- OMB's oversight methods have not been effective in identifying or eliminating instances of duplication. This has resulted from OMB not collecting consistent, key investment information from all agencies.

Consequently, agencies continue to independently acquire and maintain potentially duplicative systems. This costly practice is likely to continue unless coordination is significantly improved.

Conceptual Diagram of Multiple Geospatial Data Collections and Processing Associated with a Single Geographic Location



Sources: GAO (analysis); U.S. Forest Service (Earth photo) and Nova Development (clip art).

Mr. Chairman and Members of the Subcommittee:

I am pleased to participate in the Subcommittee's hearing on the federal government's use and coordination of geospatial information. The federal government collects, maintains, and uses geospatial information—information linked to specific geographic locations—to help in decision making and to support many essential functions, including national security, law enforcement, health care, the environment, and natural resources conservation. States, counties, cities, tribal governments, and the private sector also use geospatial information to support critical functions. Federal agencies, states, and local governments may each provide services at the same geographic locations and may independently collect similar geospatial information about those locations, thus raising the question of how well the nation's geospatial assets[1] are coordinated.

To encourage greater coordination, in 1990, OMB established the Federal Geographic Data Committee (FGDC) within the Department of the Interior to be the lead federal executive body responsible for promoting and guiding coordination among federal, state, tribal, and local government entities, academia, and the private sector. One of the committee's responsibilities is to establish a National Geospatial Data Clearinghouse to provide Web-based access to descriptions of available geospatial data, allowing governments at all levels, academia, and the private sector to make their data widely available.[2] In addition to the clearinghouse, more recently, in 2002, OMB established the Geospatial One-Stop initiative to develop an Internet portal to provide easier, faster, and less expensive access to geospatial information for all levels of government and the public.[3] Both the clearinghouse and Geospatial One-Stop, along with many other coordination activities, contribute to the development of the National Spatial Data Infrastructure (NSDI).[4]

[1]Geospatial assets include geographic information systems (GIS), data, technology, and standards.

[2]The National Geospatial Data Clearinghouse is a decentralized system of Internet-based servers that contain descriptions of available geospatial data. It allows individual agencies, consortia, or others to promote their available geospatial data.

[3]Geospatial One-Stop is an e-Government initiative sponsored by OMB to enhance government efficiency and improve citizen service.

[4]The NSDI includes the technologies, policies, and people necessary to promote sharing of geospatial data throughout all levels of government, the private and non profit sectors, and the academic community.

My testimony today follows up on testimony provided to the Subcommittee in June 2003.[5] In my previous testimony, I noted that realizing the vision of a nationwide network of geospatial information systems is a formidable challenge and achieving full participation across governments in its development has been difficult. Today's testimony will highlight the extent to which the federal government is coordinating the sharing of geospatial assets, including through oversight measures in place at the Office of Management and Budget (OMB), in order to identify and reduce redundancies in geospatial data and systems.

My testimony today summarizes a report, prepared at your request, on federal coordination of geospatial investments.[6] This report is being released to you today. Our work in preparing the report was conducted from October 2003 through May 2004 in accordance with generally accepted government auditing standards.

Results in Brief

OMB, individual federal agencies, and cross-government committees have each taken action to coordinate the government's geospatial investments across agencies and with state and local governments. Such coordination could result in reducing redundancies in geospatial activities and investments, with concomitant reductions in the costs associated with these activities. However, these efforts have not been fully successful in reducing redundancies in geospatial investments for several reasons.

First, while the National Geospatial Data Clearinghouse and Geospatial One-Stop have been established to support the development of the NSDI and to address redundant and incompatible geospatial information, a complete and up-to-date strategic plan is not in place to help guide and effectively manage these activities. The government's existing strategic plan for the NSDI is out of date and does not include specific measures for identifying and reducing redundancies.

Second, while in certain cases federal agencies have taken steps to coordinate their specific geospatial activities, federal agencies have not

[5]U.S. General Accounting Office, *Geographic Information Systems: Challenges to Effective Data Sharing*, GAO-03-874T (Washington, D.C.: June 10, 2003).

[6]U.S. General Accounting Office, *Geospatial Information: Better Coordination Needed to Identify and Reduce Duplicative Investments*, GAO-04-703 (Washington, D.C.: June 23, 2004).

always fully complied with OMB direction to coordinate their investments. Specifically, many agency geospatial data holdings are not compliant with established standards or are not published through the clearinghouse, although both are required by OMB in order to help coordinate national geospatial activities and investments.

Finally, although OMB has processes in place that could help identify potentially redundant geospatial investments, these oversight methods have not identified or eliminated specific instances of duplication. The processes used by OMB to identify potentially redundant geospatial investments have not been effective because OMB has not been able to collect key investment information from all agencies in a consistent way so that it could be used to identify redundancies. As a result of these shortcomings, federal agencies are independently acquiring and maintaining potentially duplicative and costly data sets and systems. Without better coordination, such duplication is likely to continue.

Our report includes recommendations to the Director of OMB and to the Secretary of the Interior to direct the development of an improved strategic plan for coordinating federal geospatial assets. It also makes recommendations to the Director of OMB to encourage better agency compliance with Circular A-16 by developing and implementing criteria for assessing the extent of interagency coordination on planned geospatial investments and to strengthen OMB's oversight actions to better ensure that agencies do not invest in potentially redundant geospatial systems or data gathering efforts. In their comments on a draft of the report, representatives of OMB's Offices of Information and Regulatory Affairs and Resource Management and the Assistant Secretary of the Interior—Policy, Management, and Budget generally agreed with these recommendations.

Background

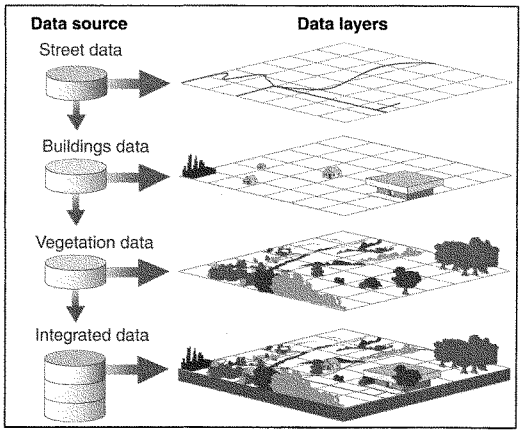
Geospatial information describes entities or phenomena that can be referenced to specific locations relative to the Earth's surface. For example, entities such as houses, rivers, road intersections, power plants, and national parks can all be identified by their locations. In addition, phenomena such as wildfires, the spread of the West Nile virus, and the thinning of trees due to acid rain can also be identified by their geographic locations.

A geographic information system (GIS) is a system of computer software, hardware, and data used to capture, store, manipulate, analyze, and graphically present a potentially wide array of geospatial information. The

primary function of a GIS is to link multiple sets of geospatial data and display the combined information as maps with many different layers of information.

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 others. Typical geospatial data layers (themes) include cadastral—describing location, ownership, and other information about real property; digital orthoimagery—containing images of the Earth's surface that have the geometric characteristics of a map and image qualities of a photograph; and hydrography—describing water features such as lakes, ponds, streams and rivers, canals, oceans, and coastlines. As long as standard processes and formats have been used 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 a GIS.

Figure 1: GIS Layers or Themes



Source: GAO.

Geographic Information Systems and Data Are Used and Produced by Federal, State, and Local Governments, and the Private Sector

Federal, state, and local governments and the private sector rely on geographic information systems to provide vital services to their customers. These various entities independently provide information and services, including maintaining land records for federal and nonfederal lands, property taxation, local planning, subdivision control and zoning, and direct delivery of many other public services. These entities also use geographic information and geographic information systems to facilitate and support delivery of these services.

Many federal departments and agencies use GIS technology to help carry out their primary missions. For example, the Department of Health and Human Services uses GIS technology for a variety of public health functions, such as reporting the results of national health surveys; the Census Bureau maintains the Topologically Integrated Geographic Encoding and Referencing (TIGER) database to support its mission to

conduct the decennial census and other censuses and surveys; and the Environmental Protection Agency maintains a variety of databases with information about the quality of air, water, and land in the United States.

State governments also rely on geospatial information to provide information and services to their citizens. For example, the state of New York hosts a Web site to provide citizens with a gateway to state government services at http://www.nysegov.com/map-NY.cfm. Using this Web site, citizens can access information about state agencies and their services, locate county boundaries and services, and locate major state highways. Many other states, such as Oregon (http://www.gis.state.or.us/), Virginia (http://www.vgin.virginia.gov/index.html), and Alaska (http://www.asgdc.state.ak.us/), provide similar Web sites and services.

Local governments use GISs for a variety of activities. 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. Additionally, according to a March 2002 Gartner report,[7] New York City's GIS was pivotal in the rescue, response, and recovery efforts after the September 11, 2001, terrorist attacks. The city's GIS provided real-time data on the area around the World Trade Center so that the mayor, governor, federal officials, and emergency response agencies could implement critical rescue, response, and recovery activities. Local governments often possess more recent and higher resolution geospatial data than the federal government, and in many cases private-sector companies collect these data under contract to local government agencies.

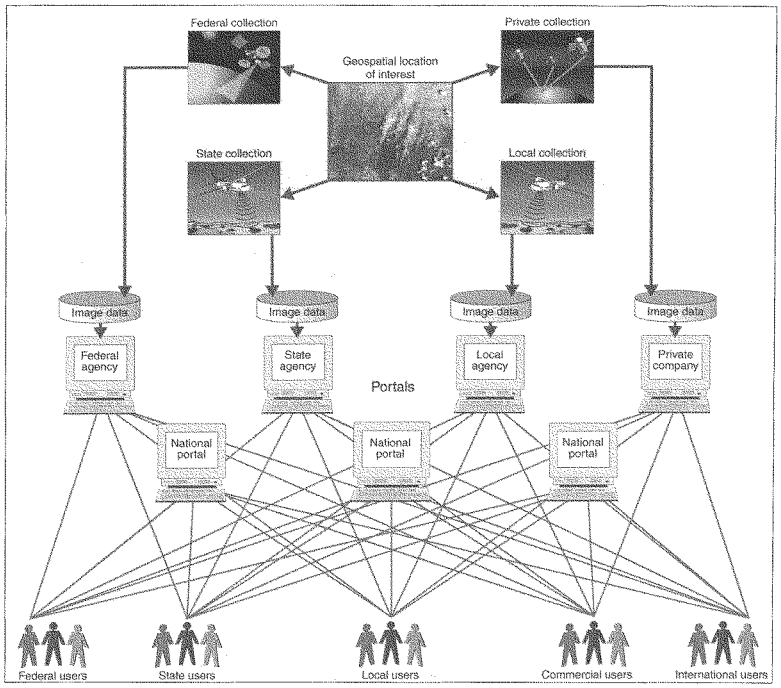
The private sector plays an important role in support of government GIS activities because it captures and maintains a wealth of geospatial data and develops GIS software. Private companies provide services such as aerial photography, digital topographic mapping, digital orthophotography, and digital elevation modeling to produce geospatial data sets that are designed to meet the needs of governmental organizations.

Figure 2 provides a conceptual summary of the many entities—including federal, state, and local governments and the private sector—that may be involved in geospatial data collection and processing relative to a single

[7]B. Keller and G. Kreizman, *To The Rescue: GIS in New York City on Sept. 11* (Gartner Inc., March 2002), http://www.gartner.com (downloaded March 10, 2004).

geographic location or event. Figure 3 shows the multiple data sets that have been collected by different agencies at federal, state, and local levels to capture the location of a segment of roadway in Texas.

Figure 2: Conceptual Diagram of Multiple Geospatial Data Collections and Processing Associated with a Single Geographic Location



Sources: GAO (analysis); U.S. Forest Service (Earth photo) and Nova Development (clip art).

Figure 3: Multiple Street Centerline Data Sets Covering the Same Location in Texas

Texas Councils of Government Road Centerline Data
Texas Strategic Mapping Program Transportation Layer
Texas Department of Transportation (TxDOT) County Road Inventory
TxDOT Digital County/Urban Map Files
U.S. Census Bureau 2000 TIGER Line Data

Source: County Information Project, Texas Association of Counties.

Coordination of Federal Geospatial Activities

As we testified last year, the federal government has for many years taken steps to coordinate geospatial activities, both within and outside of the federal government.[8] These include the issuance of OMB Circular A-16 and Executive Order 12906, and the E-Government Act of 2002. In addition to its responsibilities for geospatial information under the E-Government Act, OMB has specific oversight responsibilities regarding federal information technology (IT) systems and acquisition activities—including GIS—to help ensure their efficient and effective use. These responsibilities are outlined in the Clinger-Cohen Act of 1996,[9] the Paperwork Reduction Act of 1995,[10] and OMB Circular A-11. Table 1 provides a brief summary of federal guidance related to information technology and geospatial information.

[8]GAO-03-874T.

[9]40 U.S.C. § 11302(b).

[10]44 U.S.C. § 3504(a)(1).

Table 1: Federal Guidance Related to Information Technology and Geospatial Information

Guidance	Description
OMB Circular A-11	The circular establishes policy for planning, budgeting, acquisition, and management of federal capital assets. Specifically, it requires agencies to submit business cases to OMB for planned or ongoing major IT investments.[a]
OMB Circular A-16	Originally issued in 1953, and last revised in 2002, this circular, among other things, establishes FGDC within the Department of the Interior to promote the coordinated use, sharing, and dissemination of geospatial data nationwide.
Executive Order 12906	Issued in 1994, this order assigns to FGDC the responsibility to coordinate the development of the National Spatial Data Infrastructure (NSDI).
Paperwork Reduction Act of 1995	Includes a general requirement that the Director of OMB oversee the use of information resources to improve the efficiency and effectiveness of governmental operations to serve agency missions.
Clinger-Cohen Act of 1996	Requires the Director of OMB to promote and be responsible for improving the acquisition, use, and disposal of information technology by the federal government to improve the productivity, efficiency, and effectiveness of federal programs.
E-Government Act of 2002	Requires OMB to oversee coordination with state, local, and tribal governments as well as public-private partnerships and other interested persons on the development of standard protocols for sharing geographic information to reduce redundant data collection and promote collaboration and the use of standards.[b]

Source: GAO.

[a]According to OMB Circular A-11, a major IT investment means a system or investment that requires special management attention because of its importance to an agency's mission; the investment was a major investment in the fiscal year 2004 submission and is continuing; the investment is for financial management and spends more than $500,000; the investment is directly tied to the top two layers of the Federal Enterprise Architecture; the investment is an integral part of the agency's modernization blueprint (EA); the investment has significant program or policy implications; the investment has high executive visibility; or the investment is defined as major by the agency's capital planning and investment control process. Investments that are e-government in nature or use e-business technologies must be identified as major investments regardless of their costs.

[b]P.L. 107-347, Section 216.

In addition to activities associated with federal legislation and guidance, OMB's Administrator, Office of Electronic Government and Information Technology, testified before the Subcommittee last June that the strategic management of geospatial assets would be accomplished, in part, through development of a robust and mature federal enterprise architecture. In 2001, the lack of a federal enterprise architecture was cited by OMB's E-Government Task Force as a barrier to the success of the administration's e-government initiatives.[11] In response, OMB began developing the Federal Enterprise Architecture (FEA), and over the last 2 years it has released

[11]OMB's E-Government Task Force identified 23 initiatives (two additional initiatives were subsequently added) aimed at improving service to individuals, service to businesses, intergovernmental affairs, and federal agency-to-agency efficiency and effectiveness.

various versions of all but one of the five FEA reference models.[12] According to OMB, the purpose of the FEA, among other things, is to provide a common frame of reference or taxonomy for agencies' individual enterprise architecture efforts and their planned and ongoing investment activities.[13]

Costs Associated with Gathering, Maintaining, and Using Geospatial Data Are Significant

Costs associated with collecting and maintaining geographically referenced data and systems for the federal government are significant. Specific examples[14] of the costs of collecting and maintaining federal geospatial data and information systems include

- FEMA's Multi-Hazard Flood Map Modernization Program—estimated to cost $1 billion over the next 5 years;
- Census's TIGER database—modernization is estimated to have cost over $170 million between 2001 and 2004;
- Agriculture's Geospatial Database—acquisition and development reportedly cost over $130 million;
- Interior's National Map—development is estimated to cost about $88 million through 2008;[15]
- The Department of the Navy's Primary Oceanographic Prediction, and Oceanographic Information systems—development, modernization, and operation were estimated to cost about $32 million in fiscal year 2003; and

[12]These reference models include the Business Reference Model, the Service Component Reference Model, the Technical Reference Model, the Performance Reference Model, and the Data and Information Reference Model.

[13]An enterprise architecture is a blueprint, defined largely by interrelated models, that describes (in both business and technology terms) an entity's "as is" or current environment, its "to be" or future environment, and its investment plan for transitioning from the current to the future environment.

[14]The scope of these cost estimates varies and may include development, operation, or both. The examples are for illustrative purposes and are not intended to be compared.

[15]This figure does not include costs for data acquisition. Some National Map data are acquired from Landsat satellites, which are estimated to cost about $95 million to operate through 2008.

- NOAA's Coastal Survey—expenditures for geospatial data are estimated to cost about $30 million annually.

In addition to the costs for individual agency GISs and data, the aggregated annual cost of collecting and maintaining geospatial data for all NSDI-related data themes and systems is estimated to be substantial. According to a recent estimate by the National States Geographic Information Council (NSGIC), the cost to collect detailed data for five key data layers of the NSDI—parcel, critical infrastructure, orthoimagery, elevation, and roads—is about $6.6 billion. The estimate assumes that the data development will be coordinated among federal, state, and local government agencies, and the council cautions that without effective coordination, the costs could be far higher.

FGDC and Others Have Taken Steps to Coordinate GIS Activities, but Lack a Complete and Up-to-Date Strategic Plan to Guide Them

Both Executive Order 12906 and OMB Circular A-16 charge FGDC with responsibilities that support coordination of federal GIS investments. Specifically, the committee is designated the lead federal executive body with responsibilities including (1) promoting and guiding coordination among federal, state, tribal, and local government agencies, academia, and the private sector in the collection, production, sharing, and use of spatial information and the implementation of the NSDI; and (2) preparing and maintaining a strategic plan for developing and implementing the NSDI.

Regarding coordination with federal and other entities and development of the NSDI, FGDC has taken a variety of actions. It established a committee structure with participation from federal agencies and key nonfederal organizations such as NSGIC, and the National Association of Counties, and established several programs to help ensure greater participation from federal agencies as well as other government entities. In addition, key actions taken by FGDC to develop the NSDI include implementing the National Geospatial Data Clearinghouse and establishing a framework of data themes.[16] In addition to FGDC's programs, two other efforts are under way that aim to coordinate and consolidate geospatial information and resources across the federal government—the Geospatial One-Stop initiative and The National Map project.

[16]The framework of data themes is a collaborative effort in which commonly used data "layers" are developed, maintained, and integrated by public and private organizations within a geographic area. Local, regional, state, and federal organizations and private companies can use the framework as a way to share resources, improve communications, and increase efficiency.

- Geospatial One-Stop is intended to accelerate the development and implementation of the NSDI to provide federal and state agencies with a single point of access to map-related data, which in turn will enable consolidation of redundant geospatial data. OMB selected Geospatial One-Stop as one of its e-government initiatives, in part to support development of an inventory of national geospatial assets, and also to support reducing redundancies in federal geospatial assets. In addition, the portal includes a "marketplace" that provides information on planned and ongoing geospatial acquisitions for use by agencies that are considering acquiring new data to facilitate coordination of existing and planned acquisitions.

- The National Map is being developed and implemented by the U.S. Geological Survey (USGS) as a database to provide core geospatial data about the United States and its territories, similar to the data traditionally provided on USGS paper topographic maps. USGS relies heavily on partnerships with other federal agencies as well as states, localities, and the private sector to maintain the accuracy and currency of the national core geospatial data set as represented in The National Map.

According to Interior's Assistant Secretary—Policy, Management, and Budget, FGDC, Geospatial One-Stop, and The National Map are coordinating their activities in several areas, including developing standards and framework data layers for the NSDI, increasing the effectiveness of the clearinghouse, and making information about existing and planned data acquisitions available through the Geospatial One-Stop Web site.

Regarding preparing and maintaining a strategic plan for developing and implementing the NSDI, in 1994, FGDC issued a strategic plan that described actions federal agencies and others could take to develop the NSDI, such as establishing data themes and standards, training programs, and partnerships to promote coordination and data sharing. In April 1997, FGDC published an updated plan—with input from many organizations and individuals having a stake in developing the NSDI—that defined strategic goals and objectives to support the vision of the NSDI as defined in the 1994 plan. No further updates have been made.

As the current national geospatial strategy document, FGDC's 1997 plan is out of date. First, it does not reflect the recent broadened use of geospatial data and systems by many government agencies. Second, it does not take into account the increased importance that has been placed on homeland security in the wake of the September 11, 2001, attacks. Geospatial data and systems have an essential role to play in supporting decision makers

and emergency responders in protecting critical infrastructure and responding to threats. Finally, significant governmentwide geospatial efforts—including the Geospatial One-Stop and National Map projects—did not exist in 1997, and are therefore not reflected in the strategic plan.

In addition to being out of date, the 1997 document lacks important elements that should be included in an effective strategic plan. According to the Government Performance and Results Act of 1993,[17] such plans should include a set of outcome-related strategic goals, a description of how those goals are to be achieved, and an identification of risk factors that could significantly affect their achievement. The plans should also include performance goals and measures, with resources needed to achieve them, as well as a description of the processes to be used to measure progress.

While the 1997 NSDI plan contains a vision statement and goals and objectives, it does not include other essential elements. These missing elements include (1) a set of outcome-related goals, with actions to achieve those goals, that would bring together the various actions being taken to coordinate geospatial assets and achieve the vision of the NSDI; (2) key risk factors that could significantly affect the achievement of the goals and objectives; and (3) performance goals and measures to help ensure that the steps being taken result in the development of the National Spatial Data Infrastructure.

FGDC officials, in consultation with the executive director of Geospatial One-Stop, USGS, and participating FGDC member agencies, have initiated a "future directions" effort to begin the process of updating their existing plan. However, this activity is just beginning, and there is no time frame as to when a new strategy will be in place. Until a comprehensive national strategy is in place, the current state of ineffective coordination is likely to remain, and the vision of the NSDI will likely not be fully realized.

[17]P.L. 103-62, section 3.

Individual Agencies Have Coordinated Specific Geospatial Investments, but Have Not Fully Complied with OMB Guidance

OMB Circular A-16 directs federal agencies to coordinate their investments to facilitate building the NSDI. The circular lists 11 specific responsibilities for federal agencies, including (1) preparing, maintaining, publishing, and implementing a strategy for advancing geographic information and related spatial data activities appropriate to their mission, in support of the NSDI; (2) using FGDC standards, including metadata[18] and other appropriate standards, documenting spatial data with relevant metadata; and (3) making metadata available online through a registered NSDI-compatible clearinghouse site.

In certain cases, federal agencies have taken steps to coordinate their specific geospatial activities. For example, the Forest Service and Bureau of Land Management collaborated to develop the National Integrated Land System (NILS), which is intended to provide land managers with software tools for the collection, management, and sharing of survey data, cadastral data, and land records information. At an estimated cost of about $34 million, a single GIS—NILS—was developed that can accommodate the shared geospatial needs of both agencies, eliminating the need for each agency to develop a separate system.

However, despite specific examples of coordination such as this, agencies have not consistently complied with OMB's broader geospatial coordination requirements. For example, only 10 of 17 agencies that provided reports to FGDC reported having published geospatial strategies as required by Circular A-16. In addition, agencies' spatial data holdings are generally not compliant with FGDC standards. Specifically, the annual report shows that, of the 17 agencies that provided reports to FGDC, only 4 reported that their spatial data holdings were compliant with FGDC standards. Ten agencies reported being partially compliant, and 3 agencies provided answers that were unclear as to whether they were compliant. Finally, regarding the requirement for agencies to post their data to the National Geospatial Data Clearinghouse,[19] only 6 of the 17 agencies indicated that their data or metadata were published through the clearinghouse, 10 indicated that their data were not published, 1 indicated that some data were available through the clearinghouse.

[18]Metadata refers to data that contain or define other data. For geospatial information, metadata provides information about, among other things, sources used, collection methods, and the date the data were collected.

[19]According to Circular A-16, agencies are required to publish only data that they are able to share with the public.

According to comments provided by agencies to FGDC in the annual report submissions, there are several reasons why agencies have not complied with their responsibilities under Circular A-16, including the lack of performance measures that link funding to coordination efforts. According to the Natural Resources Conservation Service, few incentives exist for cross-agency cooperation because budget allocations are linked to individual agency performance rather than to cooperative efforts. In addition, according to USGS, agencies' activities and funding are driven primarily by individual agency missions and do not address interagency geospatial coordination. In addition to the information provided in the annual report, Department of Agriculture officials said that no clear performance measures exist linking funding to interagency coordination.

OMB's Oversight of Federal Geospatial Assets and Activities Has Not Yet Identified Redundancies

OMB has recognized that potentially redundant geospatial assets need to be identified and that federal geospatial systems and information activities need to be coordinated. To help identify potential redundancies, OMB's Administrator of E-Government and Information Technology testified in June 2003 that the agency uses three key sources of information: (1) business cases for planned or ongoing IT investments, submitted by agencies as part of the annual budget process; (2) comparisons of agency lines of business with the Federal Enterprise Architecture (FEA); and (3) annual reports compiled by FGDC and submitted to OMB. However, none of these major oversight processes have been effective tools to help OMB identify major redundancies in federal GIS investments.

Agency IT Business Cases Do Not Completely Describe Geospatial Data Assets

In their IT business cases, agencies must report the types of data that will be used, including geospatial data. According to OMB's branch chief for information policy and technology, OMB reviews these business cases to determine whether any redundant geospatial investments are being funded. Specifically, the process for reviewing a business case includes comparing proposed investments, IT management and strategic plans, and other business cases, in an attempt to determine whether a proposed investment duplicates another agency's existing or already-approved investment.

However, business cases submitted to OMB under Circular A-11 do not always include enough information to effectively identify potential geospatial data and systems redundancies because OMB does not require such information in agency business cases. For example, OMB does not require that agencies clearly link information about their proposed or existing geospatial investments to the spatial data categories (themes)

established by Circular A-16. Geospatial systems and data are ubiquitous throughout federal agencies and are frequently integrated into agencies' mission-related systems and business processes. Business cases that focus on mission-related aspects of agency systems and data may not provide the information necessary to compare specific geospatial investments with other, potentially similar investments unless the data identified in the business cases are categorized to allow OMB to more readily compare data sets and identify potential redundancies.

For example, FEMA's fiscal year 2004 business case for its Multi-Hazard Flood Map Modernization project indicates that topographic and base data are used to perform engineering analyses for estimating flood discharge, developing floodplain mapping, and locating areas of interest related to hazards. However, FEMA does not categorize these data according to standardized spatial data themes specified in Circular A-16, such as elevation (bathymetric or terrestrial), transportation, and hydrography. As a result, it is difficult to determine whether the data overlap with other federal data sets. Without categorizing the data using the standard data themes as an important step toward coordinating that data, information about agencies' planned or ongoing use of geospatial data in their business cases cannot be effectively assessed to determine whether it could be integrated with other existing or planned federal geospatial assets.

The Federal Enterprise Architecture Has Not Yet Effectively Identified Potentially Redundant Geospatial Investments

An FEA is being constructed that, once it is further developed, may help identify potentially redundant geospatial investments. According to OMB, the FEA will comprise a collection of five interrelated reference models designed to facilitate cross-agency analysis and the identification of duplicative investments, gaps, and opportunities for collaboration within and across federal agencies. According to recent GAO testimony on the status of the FEA, although OMB has made progress on the FEA, it remains a work in process and is still maturing.[20]

OMB has identified multiple purposes for the FEA. One purpose cited is to inform agencies' individual enterprise architectures and to facilitate their development by providing a common classification structure and vocabulary. Another stated purpose is to provide a governmentwide

[20]U.S. General Accounting Office, *Information Technology: The Federal Enterprise Architecture and Agencies' Enterprise Architectures Are Still Maturing*, GAO-04-798T (Washington, D.C.: May 19, 2004).

framework that can increase agencies' awareness of IT capabilities that other agencies have or plan to acquire, so that agencies can explore opportunities for reuse. Still another stated purpose is to help OMB decision makers identify opportunities for collaboration among agencies through the implementation of common, reusable, and interoperable solutions. We support the FEA as a framework for achieving these ends.

According to OMB's branch chief for information policy and technology, OMB reviews all new investment proposals against the federal government's lines of business in its Business Reference Model to identify those investments that appear to have some commonality. Many of the model's lines of business include areas in which geospatial information is of critical importance, including disaster management (the cleanup and restoration activities that take place after a disaster); environmental management (functions required to monitor the environment and weather, determine proper environmental standards, and address environmental hazards and contamination); and transportation (federally supported activities related to the safe passage, conveyance, or transportation of goods and people).

The Service Component Reference Model includes specific references to geospatial data and systems. It is intended to identify and classify IT service components (i.e., applications) that support federal agencies and promote the reuse of components across agencies. The model includes 29 types of services—including customer relationship management and the visualization service, which defines capabilities that support the conversion of data into graphical or picture form. One component of the visualization service is associated with mapping, geospatial, elevation, and global positioning system services. Identification of redundant investments under the visualization service could provide OMB with information that would be useful in identifying redundant geospatial systems investments.

Finally, the Data and Information Reference Model would likely be the most critical FEA element in identifying potentially redundant geospatial investments. According to OMB, this model will categorize the government's information along general content areas and describe data components that are common to many business processes or activities.

Although the FEA includes elements that could be used to help identify redundant investments, it is not yet sufficiently developed to be useful in identifying redundant geospatial investments. While the Business and Service Component reference models have aspects related to geospatial investments, the Data and Information Reference Model may be the

Mr. PUTNAM. Thank you very much.

Our next witness is Scott Cameron. Mr. Cameron is Deputy Assistant Secretary for Performance and Management at 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-Government Initiative. Mr. Cameron previously served in California's Washington, DC office advising Governor Wilson on Federal environmental energy and natural resources 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 for 5 minutes.

Mr. CAMERON. Thank you very much, Mr. Chairman. I am a Pisces. I have two cats and a barely in control second grader. And I appreciate the opportunity to testify before you today, Mr. Chairman, and all the members of the subcommittee who may join us to talk about Geospatial One-Stop.

Geospatial One-Stop has made substantial progress during the year since my last appearance before this subcommittee, although we believe much work remains to be done. Geospatial One-Stop continues to work with partners at the Federal, State, tribal, and local level to assist them in leveraging individual resources so that they are, together, more efficient, more cost-effective, and better serve all of our citizens. When managed properly, geospatial data can be acquired once and used many times. The portal has already demonstrated this principle. As Ms. Evans described earlier, it was used for the California wildfire responses, for some of the preparation for Hurricane Isabel, and so on.

We are hopeful that as the use of Geospatial One-Stop's portal continues to grow, we can stimulate innovative partnerships, such as the National Hydrography Dataset, which involves 7 Federal agencies and consortia, 27 States, 2 regional organizations, 5 universities.

Another creative example includes an MOU that was just signed with the State of Utah for cooperative creation and sharing of digital spatial information. Eleven Federal agencies, three State agencies, and Geospatial One-Stop are signatories to that.

The project is focused on four specific tasks: a Web-based portal; a collaborative process to develop data exchange standards promoting greater consistency among data sets; an easy-to-access inventory, a card catalog, if you will, of currently available data; and what we call a marketplace of planned data investments that will allow State, tribal, and local governments to combine resources with Federal agencies on future data acquisition.

The project's Intergovernmental Board of Directors, composed of State, local, tribal, and Federal representatives, serves as one of the strengths of the project. The Board, whose meetings are open to the public, guarantees dialog among these various levels of government that have significant investments or interest in geospatial information. In light of the fact that State and local governments, quite frankly, own more data, buy more data, have better quality data than the Feds typically do, 7 of the 11 votes on this Intergovernmental Board, in fact, we have given to non-Federal members.

To facilitate the sharing of information, Geospatial One-Stop led a collaborative effort over 2 years that included a broad group of people from all sectors of the geospatial community—local governments, State agencies, private sector, academics—in the development of data exchange standards. All 13 draft standards for key data layers have now been submitted to a committee of the American National Standards Institute [ANSI] for their adoption as national standards. A notice announcing the formal public review on these standards, in fact, shows up in today's Federal Register.

The seven major geospatial data layers associated with these standards are geodetic control, elevation, ortho imagery, hydrography, transportation—which actually has several sub-themes—cadastral, and government unit boundaries. We are hopeful that the ANSI process, which is run by volunteers from various levels of society, will lead to formal endorsement of these standards in 2005.

Since we launched geodata.gov, the portal for Geospatial One-Stop, on June 30th of last year, we have seen tremendous progress in the participation of State and local governments. The portal currently includes 1,100 live mapping services; over 11,000 records or data sets owned by Federal, State, local, tribal governments or private companies; and 155 postings of planned data acquisition in our marketplace. Thousands more data sets will be added, we are certain, over the next several months. The portal receives about 4,000 home page hits each day and almost 7,000 unique visitors each month. We are also moving forward with the procurement for version 2.0 of the portal, if you will. There will be a request for comments going out in mid-July, a request for proposal in August, and we hope to have a new portal emerging from a highly competitive procurement process on line in late fall or in the early winter of next year.

After my last appearance before this subcommittee, we took your advice and listened to our private sector partners. Subsequent to the hearing, when our board got together for its next regularly scheduled meeting, the board voted to include access to private sector data through the portal. So since the late summer of 2003 we have been encouraging private sector data holders to in fact register their data, fill out the metadata form and let the world know about their private data holdings as well as governmental data holdings.

Mr. Chairman, in closing, I really appreciate the opportunity to testify before you today. I appreciate your and Mr. Clay's and the rest of the subcommittee's continuing interest in this project. Frankly, it helps us a great deal to be successful knowing that you are up here and you care.

I would be pleased to answer any questions you might have.

[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 23, 2004

Mr. Chairman and Members of the Subcommittee, 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.

We believe that Geospatial One Stop has made substantial progress in many areas during the year since my last appearance before the Subcommittee, although we believe much work remains to be done. As you know, the Geospatial One Stop Initiative is one of 25 e-government initiatives supported by the President's Management Council and included in the President's Management Agenda. These initiatives leverage technology to better serve our customers, save taxpayer dollars, and make more efficient use of resources at all levels of government.

The e-government initiatives were established to improve the way the federal government manages and coordinates activities and investments. The historically inadequate coordination and duplicative investments in federal geospatial information technology have received much attention over the past year. Geospatial One Stop continues to work with partners at the federal, state, tribal and local level to help improve the way we collectively manage and coordinate geospatial information, activities and investments. Geospatial information and technologies provide critical tools and data for all levels of government in fulfilling their responsibilities to citizens. Federal, state, tribal, and local governments

already collectively invest billions of dollars each year on the collection and management of geospatial data. Geospatial One Stop continues to work with its partners to provide the tools to assist all levels of government in leveraging individual resources so that they are more efficient, more cost effective, and better serve all of our citizens.

Collect once, use many times

Geospatial information now supports an ever expanding range of management and decision making activities by providing credible, accurate, and timely geographic information to policy makers and the public. 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 acquired once and used many times. Over the past year – the initial year of operation – the Geospatial One Stop Portal has demonstrated this principle to support a variety of government decisions. Public health, wild fires, hurricane preparedness and other missions have been supported by data organized and accessed through the Internet portal known as "geodata.gov."

Advances in technology and interoperability standards offer increasing opportunities to integrate, access, share, and visualize a wide range of information from multiple sources. Geospatial technology provides crucial interoperability and sharing of information among the federal, state and local governments in response to emergency situations and planning for the future. 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, more recently, following real time information in order to respond to hurricanes along the Atlantic Coast or wildfires in the West. Geospatial information provides the tools for governments to manage land and resources effectively, and to visualize alternative options for the future. It helps government, and the public, protect the environment and predict the impact of changing demographics on the future demand for government

services. Geospatial information allows governments to track patterns of crime, disease or even the fraudulent use of government benefits, and assists in the development of appropriate responses. The challenge for all of us is to provide the right incentives and tools to encourage collaboration and partnerships for the most effective and efficient use of geospatial technology.

We are hopeful that as Geospatial One Stop's portal (geodata.gov) continues to grow, we can stimulate innovative partnerships, such as the National Hydrography Dataset (NHD), a consortium of the U.S. Geological Survey, the Environmental Protection Agency (EPA) and the U.S. Department of Agriculture, that include a shared approach to data development in which each participant shares the cost for a given area. Currently, seven federal agencies and consortia, 27 states, two regional organizations, and five universities participate in this program. The program saves money by sharing in the creation of the data and by using it multiple times to meet specific but diverse mission needs.

Other creative examples include a Memorandum of Understanding (MOU) initiated by the State of Utah for the cooperative creation and sharing of digital spatial information. This MOU includes 11 federal agencies, three state agencies and now, Geospatial One Stop.

Goals of the Geospatial One Stop Initiative

Geospatial One Stop has focused on four specific elements that encourage greater coordination and effective partnerships that help avoid multiple investments and allow the sharing of information across jurisdictions and governmental boundaries:

- A Web based portal for one stop discovery of available resources and access to maps, data, and geospatial information and services;

- A collaborative process to develop data transfer standards, promoting greater consistency among data sets and allowing governments to more easily and confidently share data and integrate multiple sources of information;
- An easy-to-access inventory of currently available data collected by federal agencies; and
- A marketplace of planned data investments that will allow state, tribal, and local governments to combine resources with federal agencies on future data acquisitions and investments.

Although governments invest billions of dollars each year in geospatial information and data, the lack of coordinated investment in this valuable asset limits the value of that investment and, in the event of an emergency, wastes valuable response time. Geospatial One Stop has focused on providing a gateway to these existing and planned future investments – at the federal, state, tribal and local levels – accelerating the timeline for developing the consensus standards that facilitate sharing of information, and expanding the collaborative partnerships that help leverage investments and reduce duplication of data.

Geospatial One Stop's novel Intergovernmental Board of Directors, composed of state, local, tribal and federal representatives, continues to serve as one of its greatest assets. This Board, whose meetings are open to the public, guarantees dialogue among the levels of government that have a major stake in and who are making major investments in geospatial information. In recognition of the substantial investment of state and local governments in the collection and management of geospatial data and the importance of the data they control, this Board is dominated by nonfederal members, although it is chaired by the Department of the Interior.

Currently, the Board includes representatives of the International City/County Management Association; the Intertribal GIS Council; the National Association of State Chief Information Officers; the National States Geographic Information Council; the National Association of Counties; the National League of Cities; and the Western Governors Association, as well as the Departments of Interior, Commerce, Transportation, and the National Aeronautics and Space Agency (NASA).

The Board's role includes deciding every major policy issue in the evolution of Geospatial One Stop. Additionally, the existence of the Board has also encouraged opportunities for partnerships among all levels of government, even among the federal agencies that serve on it. The Board has asked us to help facilitate communications from the multiple federal agencies involved in geospatial activities, and we are working to provide a single point of contact that can coordinate multiple federal activities and outreach to our intergovernmental partners. We see enhanced communications and the role for Geospatial One Stop as a gateway and facilitator for the many federal initiatives as a key benefit to this innovative approach. Over the past year, Geospatial One Stop has participated in several events and partnership programs to fulfill this facilitator role and that will provides even more opportunities for further collaboration.

Geospatial One Stop represents an innovative approach to federal management. It is an intergovernmental, interagency, collaborative effort, 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 federal partners such as the Departments of Commerce, Transportation, Agriculture, and Defense, NASA, EPA, and the Department of Homeland Security's Federal Emergency Management Agency.

What We Have Learned

Standards: One of the major challenges to realizing the full value of geospatial information is the lack of technical consistency necessary for sharing and using another's information. To facilitate the sharing of information and reinvigorate the work done over many years by the Federal Geographic Data Committee (FGDC), Geospatial One Stop led a collaborative effort over two years that included a broad group of people from all sectors of the geospatial community in the development of data exchange standards for commonly needed geospatial data layers (known as framework layers). We are pleased to report that a suite of 13 draft standards, covering these framework layers, has been submitted to a committee of the American National Standards Institute (ANSI) for their review and eventual adoption as national standards.

These standards are the product of a consensus review process. A notice announcing the availability of these standards for formal public review should be published in the Federal Register soon. The seven major geospatial data themes for which these standards apply are: geodetic control, elevation, orthoimagery, hydrography, transportation (including several sub-themes), and cadastral and governmental unit boundaries. These standards specify the minimal level of consistent data content that data producers, consumers and vendors can use to ensure the smooth interchange of data across organizations. FGDC will solicit comments on the draft standards from the geospatial community in both the public and private sectors to ensure the broadest set of needs are met. At the end of the formal public review period, comments received will be evaluated and any necessary revisions made to the draft standards so they can be again submitted to ANSI. After ANSI approval and formal endorsement, expected in 2005, the published framework data standards and a summary analysis of the changes will be made available to the public.

This is a slow and deliberative process, with ANSI trying to facilitate the opportunity for broad community participation to ensure that the widest possible variety of organizations will adopt the standards.

Over the past 10 years, FGDC has endorsed twenty geospatial data standards developed by FGDC Subcommittees and Working Groups, including: Content Standard for Digital Geospatial Metadata and two Metadata Profiles, Spatial Data Transfer Standard (SDTS) and three SDTS profiles, Geospatial Positioning Accuracy Standards, Digital Orthoimagery Content Standard, Cadastral Data Content Standard, and Utilities Data Content Standard. An additional eighteen standards are in various stages of development.

Geodata.gov, the Geospatial One Stop portal

Since the launching of geodata.gov on June 30 of last year, we have seen tremendous progress in the participation of federal agencies and a growing number of state and local governments who have registered the availability of their geospatial information to the portal. The portal currently includes 1,100 live mapping services, over 11,000 records, and 155 marketplace postings. We believe that geodata.gov's role in making information easily accessible will facilitate sharing by allowing prospective data users to learn about others in the public and private sector that are interested in the same data.

What do these measures mean? Through geodata.gov, officials and citizens can now easily search and find over 11,000 geospatial data resources with thousands more to be added over the next several months. Each of these data sets is documented following the FGDC metadata standards. Ten percent of these geospatial resources are accessible as mapping services that can be integrated in real time. In other words, services from multiple organizations or different levels of government can be

brought together instantaneously to support decisions. This is possible because data providers are adopting interoperability standards and the Geospatial One Stop Portal supports those published industry accepted standards.

Internet-accessible reports allow state and local governments the opportunity to leverage and extend their geospatial dollars through the portal's Marketplace postings of planned investments. The portal currently includes 155 Marketplace postings from federal and state governments.

Geodata.gov receives about 3,800 home page hits per day and 6,600 unique visitors per month. Several innovations to promote the use of the portal include tools that allow for easy registration, automatic updating of metadata published to the portal, to ensure currency of information, and the work of "channel stewards" to seek out and highlight the best available information in each of seventeen topical categories highlighted on geodata.gov. We also have been working with the U.S. Geological Survey's *National Map* to simplify what is asked of state and local governments desiring to partner with either geodata.gov or *The National Map*.

As promised at the launch of geodata.gov, we are moving forward with the procurement for Version 2 of the portal. On June 14, we met with a group of state representatives from the National States Geographic Information Council (NSGIC), and have solicited all of the states to get their input on state requirements for Version 2. This meeting was a follow up to an earlier workshop that included federal, state and local participation on portal requirements. We will issue a Request for Comments to solicit additional comments in mid July 2004, and a Request for Proposal, targeted for August 2004. We hope to have version 2.0 up and running in the late Fall of 2004 or Winter of 2005.

The Geospatial One Stop Portal provides an easily accessible and understandable way to share and access information. The portal is 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, private sector and non-profit organizations, and private individuals interested in geographic information. As the portal continues to grow, the Geospatial One Stop Portal will fulfill the promise of the initiative to make access to geospatial information easier, faster, and less expensive. Subsequent to my last appearance before this subcommittee, we took your advice and listened to the request of our private sector partners. The Board voted to include access to private sector data through the portal beginning in the summer of 2003.

The Promise of Geospatial One Stop

While we recognize that many barriers and challenges remain until we have a fully integrated system in which geospatial information collection and investment simply and easily meets multiple needs and purposes across all levels of government, we believe that Geospatial One Stop will play an important and continuing role in helping us collectively realize that vision.

In just a short time, we have collected, organized, and are making available over 11,000 records from federal, state and local governments that are currently available to anyone and which can be used to support a wide range of government functions, such as Homeland Security, environmental planning, public safety and health and emergency response. Geodata.gov will continue to grow and add new records, facilitate searching and publishing of geospatial information, encourage coordination and collaboration among different governmental agencies, and we hope will ultimately achieve tremendous cost savings through leveraging of future investment in data. We do not envision Geospatial One Stop as a new federal geospatial program but, instead, as a societal focal point for the multitude of geospatial activities and investments currently taking place at all levels of government

and in the private sector. We are hopeful that this national gateway to data sharing and facilitating communications can lead to future partnerships, collaborations and costs savings.

Conclusion

The Geospatial One Stop Project will support "one stop" access to government and other geospatial data assets and will provide some of the critical 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 identify geospatial assets, help leverage resources to support a broad range of government 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, 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. Thank you very much, Mr. Cameron.

Our final witness for this panel is William Allder, Jr. Mr. Allder is Director of the Strategic Transformation Office at the National Geospatial-Intelligence Agency in Bethesda, MD. He is responsible for NGA's strategic planning, including enterprise architecture and engineering, program analysis, evaluation and integration to align the agency's investments with the director's transformational objectives in response to emerging geospatial intelligence challenges. Prior to his current position, Mr. Allder served for 4½ years as NGA's Director of Acquisition, leading the development of the national system for geospatial intelligence to national and defense customers.

Welcome to the subcommittee. You are recognized.

Mr. ALLDER. Mr. Chairman, thank you very much for the opportunity to appear here on behalf of the National Geospatial-Intelligence Agency [NGA]. I have a set of view graphs that I will step through here briefly, and I want to tailor my remarks to what is there.

The NGA is both a combat support agency in the Department of Defense and a member of the U.S. intelligence community, and that really defines our primary missions and our primary customer sets. The vast majority of the services that we provide and the information that we collect and provide for our customers is outside of the United States. So we are really here in a support role, and I want to talk to what that role is, but I want to assure the committee that we and the Department of Defense strongly support the objectives of what you are addressing here.

I want to talk through how we are supporting the E-Government initiative of Geospatial One-Stop, what we are doing philosophically in the related standards initiatives, and then leave a few words in response to the question that the committee posed about whether we are on the right path.

If you go to chart 3, that shows a top level context, just to show that of the 25 E-Gov initiatives, the Department of Defense participates in 17. Of those, highlighted in red is the Geospatial One-Stop Initiative, where NGA is the lead agency for the Department, working back with DOI as the managing partner to support the objectives of that initiative.

On the next chart we indicate that we have an MOA between DOD, NGA, and the managing partner that formalizes the roles and responsibilities and what we are doing in support of Geospatial One-Stop, and those are listed here. First, we intend to provide access, discovery capability for all of the domestic releasable information that we hold through Geospatial One-Stop. Some of the information is there today on geodata.gov.; more will be coming, and I will show you what that is in just a minute.

Second, we participate in the establishment of the content standards for the foundation data themes. We participated directly in four of the working groups. We are hoping to move that definition through the standardization process in American National Standards Institute [ANSI] and hopefully onto International Standards Organization [ISO]. We also have an implementation strategy that says while we will always have unique requirements inside the defense and intelligence community for how we attribute and even

look at common features like roads, we will be common and consistent at a core level with the foundation specifications that are laid out here.

Third, we are working with DOI on the acquisition of the Geospatial One-Stop portal; we provide people and some direct funding to that process. And then, fourth, we are standing up our own Web presence to help facilitate interaction with GOS, which I will show you on chart 5, a very notional cartoon for how that will work.

If you look at the upper right, you will see an NGA Geospatial One-Stop portal that we are putting in place to provide support to the metadata harvesting activity down in the Geospatial One-Stop itself. Therefore, whatever customer I am sitting in that cloud on the left, I can come into Geospatial One-Stop and just like I can find out about information held by the U.S. Geological Survey, we can find out by looking at metadata expressed consistent with the FGDC standards what we hold inside of NGA.

Similarly, it is important to note on the left that we are representing our analysts, our employees in the Department of Defense as being customers of Geospatial One-Stop. We want to use the information that is there. We do not want to replicate or copy it over into our environment; we intend to access through the Geospatial One-Stop portal.

We are in a security certification accreditation of our server today. We are also going through a releasibility review of the data that we will be making available, and we expect to have this capability operational in the fall of 2004.

On the next chart there is a top level depiction of the information content that we expect to make available initially from very small-scale terrain information down to a very detailed representation of the terrain that was created as a result of the Shuttle radar topography mission flown in the year 2000. We expect to make all of that information available through the geospatial one stop.

Transitioning briefly to the standards development area, standards, of course, are a major enabler of everything Geospatial One-Stop is trying to do. I want to point out that my boss, Lieutenant General Jim Clapper, wears two hats in our community; he is the Director of NGA, but he is also what we in the DOD community call the functional manager for our discipline of geospatial intelligence. That says that across the elements of the IC and the DOD, General Clapper sets the vision, he sets the future direction, he orchestrates investments without controlling them.

A key part of that is prescribing and mandating the set of standards that will be used for geospatial applications. We have in place a national center for geospatial intelligence standards to help us step up to that role. We work closely with the FGDC, and I will not belabor it, but we, as the FGDC does, work on an open consensus-based process leveraging industry standards versus building our own.

Last, sir, in terms of take-away, you asked the question here whether we are on the right path or not, and I would like to give you my personal perspective from having worked 30+ years in six Federal agencies, always associated with geospatial information. From a time in the early 1980's when I served on some working

groups in the American Congress on Surveying and Mapping, working on digital cardiographic standards, to today, we have made significant improvements. And, yes, we can do more; yes, there is a lot more to do, but particularly in the last several years there have been very dramatic strides forward. Technology, of course, is a key enabler of that, and I will not belabor that, but it lets us step up to that process.

What I would cite as perhaps more important is the focusing effect of the disasters of September 11. We found in our community that during a time of crisis, it is very easy to break through the ossifying bureaucracies we sometimes deal with and get right to the heart of what do I need to do together to better support the customers. I think that atmosphere and that climate permeates the Government today. I think it will for some time, and I think that has helped us in addition to the direction that we have gotten to move forward in these areas to support what we need to do to share and collaborate.

Second, I think we have a much better understanding today of what drives the technology market in today's environment and where the Government should and should not become intrusive in specifying standards. I think you have heard a lot of discussion about consensus-based industry processes. We strongly endorse that as what we must do. If standards are the area where industry has agreed not to compete, we need to let industry come to what those areas are on their own. We can encourage them, we can set the policies, we can provide subject matter expertise, but we cannot direct that to happen; we have to let it evolve as it goes forward. I think that has been extremely successful today.

And, last, I think we have found a good way to balance long and short-term investments that says simply I believe we need to resist the temptation to try to push things faster in the areas of information technology standards by becoming overly prescriptive on industry. We need to let the consensus process play out so that we can follow it. That genie is out of the bottle, and it is not going back in. There was a recent June 7th issue of Newsweek that paraphrased a CEO of one of the leading GIS corporations as saying that once geospatial information became pervasively available on the Internet and could be rapidly integrated into applications, the business model of a closed proprietary system to sell, to make profit was gone, was dead; and he and others needed to step up to the open consensus standards process. I think that is something, sir, that I would commend. We need to be willing to follow; let the free market drive where this goes and find the right places for Government intervention.

Thank you very much, and I would be glad to take your questions as well.

[The prepared statement of Mr. Allder follows:]

Statement for the Record

Submitted by

Mr. William R. Allder, Jr.

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National Geospatial-Intelligence Agency

Before the House Government Reform Subcommittee on Technology,

Information, Policy, and the Census

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I. Introduction.

Chairman Putnam, Ranking Member Clay, and distinguished Members of the Subcommittee, thank you for your continued interest in and support of geospatial information. On behalf of National Geospatial-Intelligence Agency (NGA) Director James R. Clapper, Lieutenant General, USAF (Ret.), and Deputy Director Joanne Isham, we appreciate this opportunity to share with you our efforts to streamline collection and storage of geospatial information, implement geospatial standards, and reduce redundancy in government through our role in the e-Government (e-gov) Initiative, Geospatial One-Stop (GOS), and standards development.

We live in a country that is rich in geospatial data -- from the nightly news displaying situational awareness in Iraq and Afghanistan, to automobiles and cell phones equipped with Global Positioning System (GPS) receivers, to commercial imaging satellites orbiting overhead. The abundance of geospatial data affords us great opportunities but also creates significant challenges. In the post-9/11 world, government entities – Defense, Civil, State, and local – must improve our ability to work collaboratively, readily sharing appropriate information in support of our Nation's needs. As a result, government and industry must work to forge new partnerships and build stronger relationships to overcome the significant challenges of this Herculean task. In the public sector alone, there are billions of individual bits of geospatial data independently collected to meet diverse requirements that are often difficult to discover or to utilize outside of the "owning" organization. The e-gov GOS and related standardization initiatives are making significant progress in reducing redundancies and costs, while improving information sharing by:

1) Building information technology architectures that facilitate efficient population, discovery, and retrieval of a wide variety of data; and
2) Standardizing the content of foundational Geospatial data themes.

Through the implementation of the e-gov GOS program our country is taking vital steps to ensure our first responders, warfighters, intelligence officials, and policy makers readily receive the most accurate and timely information available without duplication of effort. Data content standardization is one of the keys to successfully and efficiently providing this information to the wide variety of consumers both inside and outside of the federal government. When customers receive data in non-compatible forms, its utility is greatly reduced. NGA is leading the way for DoD's standardization efforts and supports this process across the all levels of government (Federal, State, and local), industry and academia.

The ability to access geospatial data in a timely fashion is just as important as data content standardization. The Geospatial One-Stop initiative is building a web-based portal using open, commercial interface standards to allow for interoperability among users and efficient discovery of and access to these data regardless of the specific customer, thereby eliminating the need for numerous agencies to hold the same information in their systems. The federal government is a vast storehouse of publicly available geospatial data. Once efficiently cataloged and standardized, GOS will grant federated access by the public and private sectors. The long-term benefits of streamlining geospatial data collection and archiving, coupled with the implementation of geospatial data standards, will increase efficiency to save time, money, and human resources.

As both a member of the Intelligence Community and as a Department of Defense (DoD) combat support agency, NGA provides geospatial intelligence (GEOINT) – traditionally categorized as imagery, imagery intelligence, and geospatial information – to support protecting national security, combating the threat of terrorism, implementing national policy, responding to natural disasters, and securing the homeland. Each of these missions, unique in purpose, require timely, relevant, and accurate GEOINT, which must be shared with our customers and partners. Inside the Defense and Intelligence Communities, we face the same issues that this Subcommittee is addressing. We are committed to supporting the larger e-gov initiatives by aligning to common standards, exposing all releasable domestic geospatial information through the GOS portal, and utilizing – not duplicating – the information available from other government entities through the GOS.

This Statement for the Record will address NGA's role in the Geospatial One-Stop initiative, standards development, and the combined impact of these initiatives to increase efficiency while reducing the costs and redundancy of geospatial information in government.

II. E-Government Initiative: NGA's Role in Geospatial One-Stop

Established as the US Government's official Information Technology (IT) transformation initiative, the e-gov projects consist of 25 individual web-based projects sponsored by the Office of Management and Budget (OMB). E-gov is designed to enhance government efficiency and to improve citizen services by making it easier, faster, and less expensive for all levels of government and the public to access data and conduct government IT business. NGA serves as the DoD lead for the GOS initiative. The goals of the GOS initiative are threefold: First, provide

Federal, State, local, and Tribal Governments with efficient access to a diverse collection of US domestic geospatial information and data holdings. Second, reduce the cost expenditures due to duplicative data purchases, lessen overhead costs associated with locating and integrating data across disparate geospatial stovepipes, and spread costs among agencies with common geospatial needs. Third, and perhaps most importantly, the GOS portal, www.geodata.gov, creates a "one stop shopping" environment and serves as a repository for access to all publicly available geospatial holdings and access to shared services.

The Department of the Interior (DOI) serves as the Managing Partner of the GOS initiative and is supported by federal agency partners, including the DoD. As the functional manager for geospatial intelligence information within the DoD and IC, NGA is positioned to utilize the GOS and maximize DoD and IC access to this information source as indicated by specific mission requirements. In August 2003, DoD/NGA and DOI entered into a Memorandum of Agreement (MOA) establishing NGA as the lead DoD agency for GOS activities. The MOA mandates that each service/agency within DoD will participate in GOS activities by contributing resources (geospatial data and metadata, current and planned) and will create an implementation strategy for compliance in accordance with the GOS guiding documents.

As the DoD GOS lead, NGA is charged with developing, maintaining, and sustaining the department's efforts by:

- Develop a portal and interface for NGA assets;
- Make available other DoD portals;
- Prescribe standards and monitor implementation; and
- Maintain a list of all current GOS appropriate data sets, information, and portals throughout DoD services/agencies.

In this capacity as functional manager, NGA works to ensure that all DoD agencies contribute to, and abide by, GOS established data content standards and comply with emerging versions of geospatial standards as they are vetted through national and international standards governing bodies. NGA is developing and maintaining a list of DoD-wide GOS geospatial data holdings in order to preserve adequate records of geospatial data submitted into the GOS by DoD services and agencies. This inventory facilitates resource sharing and promotes the elimination of redundant information populating the GOS.

As part of the GOS initiative process, NGA submits a monthly report to Office of the Secretary of Defense CIO charting progress and accounting for resources expended and projected. To execute these functions, NGA is authorized to allocate financial resources to support the GOS initiative. NGA, through an interagency agreement, directly invested into the GOS $475k in Fiscal Year (FY) 2002; $525k in FY 2003, and $525k in FY 2004, and we expect to continue our support into the future. NGA designates how the direct funding is allocated to GOS tasks. The GOS Managing Partner is tasked with reporting to NGA on the actual spending. In addition to the funding contributed directly to GOS, NGA provides contractor personnel for the execution of GOS tasks both internal and external to NGA, bringing the total NGA annual support to $1.4m. NGA government personnel provide support across GOS activities drawing from the full breadth of NGA resources.

NGA provides domestic, unclassified metadata (approved for release by NGA's Office of International Policy) into the GOS through the US Geological Survey, the DOI lead agency for the e-gov GOS initiative. The initial data sets NGA will provide to GOS include Digital Terrain Elevation Data (Level 0), Digital Orthoimagery (Imagery-10), Vector MAP (Levels 0/1), and

Shuttle Radar Topography Mission (SRTM). NGA's Homeland Security Division and Enterprise Operations Directorate have geospatial information and metadata, (*e.g.*, portions of the 133 Urban Areas project that was jointly developed with USGS) that will be available through GOS. NGA submitted test metadata to GOS in Spring 2003.

As a member of the Intelligence Community, NGA is governed by statute and regulation, and thus, is limited in its authority to provide geospatial intelligence support to State, county, Tribal and other political subdivisions. NGA's mission is primarily focused on foreign intelligence; thus, NGA's data contributions to GOS are somewhat limited since the majority of our geospatial data holdings are of foreign territory and may also be restricted by terms of bilateral agreements. For our domestic data, NGA uses discretion to make data available to the public, subject to security concerns and proprietary licensing.

In order to interface with the GOS, NGA developed the NGA GOS (NGOS), a prototype web-based service funded by NGA that allows for the bi-directional direct transfer of geospatial metadata between NGA and GOS. The NGOS portal will allow NGA to populate and employ GOS geospatial metadata holdings supporting our homeland security mission. The NGOS portal is in the security and IT accreditation process; we anticipate that xpect it will become operational in Fall 2004.

III. Establishing Geospatial Intelligence Standards

Establishing geospatial data standards across the nation and, ultimately, internationally is paramount if we are to guarantee global geospatial information dominance. Standards make an enormous contribution to most aspects or our lives — although very often, that contribution is invisible. It is when there is an absence of standards that their importance is

recognized. One only needs to look to history to reinforce the need for standards across specialized disciplines. Take for example, the Great Baltimore Fire in 1904:

The Great Baltimore Fire
On the morning of February 7, 1904, fire spread quickly through the Hurst building in Baltimore, Maryland. An alarm sounded, activating all the fire companies in the Baltimore and Washington, DC areas. The DC fire departments discovered that their hoses did not fit the hydrants in Baltimore. Firefighters finally extinguished the fire by the following evening; the fire destroyed 140 acres, more than seventy blocks, and 1,526 buildings. This disaster, highlighting the need for interoperability, led to the formation of the American National Standards Institute, which published standards for pipes and threads about ten years later. Once again, tragedy led to technological innovation and standards implementation.
(Source: http://www.federalhillonline.com/history.htm#6)

Today's hyper-paced information society cannot wait 10 years for data standardization of the geospatial intelligence discipline. The United States no longer exclusively faces threats with known capabilities and forces. Our enemies are unpredictable, numerous, and with elusive bases of operations not necessarily sponsored by any nation, thereby making our mission more challenging both on the home front and overseas. Every day our nation's emergency responders, warfighters, intelligence officials, and policy makers rely on geospatial data to save lives and property.

NGA is the GEOINT functional manager. In this capacity, the NGA Director prescribes and mandates standards for imagery, imagery intelligence, and geospatial information for all DoD components and the IC, including, where appropriate, NGA's civil and coalition partners.

In September 2002, NGA Director Clapper authorized the establishment of the National Center for Geospatial Intelligence Standards (NCGIS), which became operational October 1, 2003.

The NCGIS is charged with advocating GEOINT standards by developing, implementing, and sustaining a comprehensive, enterprise-wide Geospatial Intelligence Standards Program for the National System for Geospatial-Intelligence (NSG) community. The primary role of the NCGIS is to ensure a coordinated standards-based approach to implementation of enterprise-wide architectures and to data sharing. This will allow us to achieve geospatial intelligence information interoperability within the context of transformational activities taking place within NGA and the NSG. In this capacity, the NCGIS selects the common geospatial intelligence standards that enable the NSG Community to:

- Share geospatial information across the defense, intelligence, and homeland security communities;
- Eliminate proprietary, costly, and fragile "stovepipe" interfaces;
- Quickly and effectively respond to the needs of the warfighter in all modes of operation, including low intensity conflicts and Military-Operations-Other-Than-War (MOOTW);
- Maximize the use of tested and formally approved standards-based commercial-off-the-shelf (SCOTS) components; and
- Efficiently meet system requirements and reduce risks associated with acquisitions.

In April 2004, the NGA Director Clapper issued the "NSG Statement of Strategic Intent." This document outlines NGA's priorities as the GEOINT functional manager for the NSG. The NCGIS Standards Roadmap, developed to guide the NCGIS in building a GEOINT Standards Program, incorporates each of these objectives. NGA recognizes that we must establish standards

through partnerships with industry and other government agencies. NGA leads the way in establishing stringent requirements for geospatial standards to ensure commercial geospatial products are reliable and interoperable. NGA's proposed standards support the use of SCOTS for common exploitation of geospatial data. In this process of standardizing data and implementing SCOTS, NGA must address the stores of legacy agency geospatial products that used out-dated DoD standards. In the interim, NGA will make legacy products available in their native formats and will transition them to the new standards over time.

NGA has a vested interest in the activities of the Federal Geospatial Data Committee (FGDC). As never before, it is imperative that the DoD, IC, and Federal civil communities work together to share information. Common geospatial standards are critical to enabling interoperability across these communities. The technical challenges of achieving interoperability also cannot be realized without the involvement and support from commercial industry. Consortia, such as the Open GIS Consortia (OGC), are critical to testing and promulgating open consensus based standards. One goal is to increase NGA's capabilities to leverage existing market driven SCOTS solutions for fulfilling analysts' needs in undertaking their missions.

NGA (through its predecessor organizations) has been an active member of the FGDC Standards Working Group since 1990 and has been instrumental in moving FGDC developed standards through the national and international standards arenas. The standards approved and established by the FGDC lay the foundation for GEOINT standards within the DoD and IC. NGA engages these communities through its GEOINT Standards Program. For example, NGA NCGIS participated in the development of Emergency Management Symbology by the FGDC, Homeland Security Working

Group, Symbology Sub-Working Group. The working group developed a symbol set for first responders and emergency managers that included symbols for incidents, operations, infrastructure, and natural events, and modifiers to indicate the degree of damage. NCGIS expertise was especially useful for comparison of Emergency Management Symbology with existing DoD Common Warfighting Symbology. NCGIS also provided funding (along with the Federal Emergency Management Agency) for an OGC interoperability project for Emergency Mapping Symbology to advance development of four draft OGC standards relevant to portrayal of geographic information. Maturation of these OGC standards will contribute to a NCGIS objective of developing a schema for SCOTS symbol registry based on OGC and other international/industry standards.

IV. Closing

NGA is proud to serve as the DoD lead on the e-gov GOS initiative and geospatial standards development. NGA has engaged agencies across the federal government to increase the effectiveness and efficiency of geospatial data while simultaneously reducing redundant purchases of information.

Improving our Nation's ability to populate and access standardized geospatial intelligence on-demand is not merely a "good government" activity - it is critical for securing the homeland, winning the war on terrorism, and meeting the unknown challenges of the future. NGA is committed to working with all of our industry and government partners to improve our collective ability to share publicly available geospatial data, coordinate government-wide acquisition of geospatial data, and implement geospatial data standards across the discipline. As the DoD and IC Community functional manager for GEOINT, NGA will continue to meet challenges that strike at the very core of our

mission and is embodied in our mission statement: "Know the Earth…Show the Way."

Chairman Putnam, Ranking Member Clay and members of the Subcommittee, thank you for allowing me to testify today, and we look forward to working with you in the future on critical geospatial intelligence issues.

Mr. PUTNAM. Thank you, sir.

We will begin with the first round of questions, beginning with Ms. Evans.

Ms. Evans, last year during testimony before this subcommittee your predecessor, Mark Forman, estimated that the Federal Government spends somewhere in the neighborhood of $4 billion per year on geospatial products and services, and went on to say that he estimated as much as half of that amount was wasted. I am aware that a recent report estimates the annual cost to be closer to $5 billion, with a high percentage of waste.

Empirically, what do we know about the Federal Government's annual expenditures on GIS, and what percentage of that do you believe is duplicative or redundant?

Ms. EVANS. I would say right now that we still do not have a good solid number that I can sit here and tell you, yes, sir, it is $4 billion, yes, sir, it is $5 billion going forward. This is an area where we are continuing our efforts, and as I included in my testimony, that we were going to give further guidance out to the agencies so that we could give a better definitive answer as to what is the actual expenditures in this area, how much of it is duplicative, and how much we intend to eliminate. So we are continuing to work in this area. We need to continue to give better guidance to the agencies, as was mentioned by GAO, so that I can provide a better answer. But right now I would say that we are still continuing to work on this.

Mr. PUTNAM. Do you have a ballpark figure on expenditures?

Ms. EVANS. If we look specifically at the expenditures that have been reported to date to us, the numbers are aligned with the geospatial data collections that are associated with the A–16 layers. Those numbers are much less, really less than the $5 billion number that you have given. So if we add in the other efforts that are going on, we can come closer to the $5 billion amount, but without all the level of specificity of what is involved in each of these investments, I can't answer the second part of the question, as to whether it is duplicative and redundant and it needs to be eliminated.

So we have numbers, but I can't definitively say, as my predecessor did, that 50 percent of those are wasted.

Mr. PUTNAM. Ms. Koontz, let me begin with this. Who in the Federal Government has the responsibility and accountability for coordinating all geospatial collection and data access activities across the Government?

Ms. KOONTZ. There are actually a number of entities that have some responsibility for coordination. That would include the agencies themselves. Agencies are charged under A–16 to coordinate their investments of geospatial assets. The FGDC is charged with the responsibility of promoting coordination both within the Federal Government and with State and local governments. And then OMB is charged with overseeing geospatial investments as part of their overall responsibility to oversee IT investments.

Mr. PUTNAM. So there is really not any one quarterback for the effort.

Ms. KOONTZ. There is no single entity that is totally responsible.

Mr. PUTNAM. Mr. Cameron, where do you fit into that?

Mr. CAMERON. Geospatial One-Stop's role in this context is to try to help OMB uncover where Federal geospatial data spending is going on, but I would suggest, perhaps more significantly, making available to Federal agencies with the voluntary cooperation of State and local governments, the data sets that State and locals own and maintain. Personally, I think if we had better access to the high quality and relatively recent data that State and local governments are producing, are acquiring, that would allow us to much more intelligently, much more efficiently spend the Federal dollar, whether that is $1 billion or $10 billion.

Mr. PUTNAM. Help me understand all the different pieces of this puzzle. How are the Federal Geographic Data Committee's efforts to develop a national spatial data clearinghouse different from Geospatial One-Stop's goal of serving as the primary portal for all GIS information?

Mr. CAMERON. OK. Back in the 1990's, shortly after President Clinton signed the National Spatial Data Infrastructure Executive order, the FGDC started assembling essentially a card catalog of metadata on Federal data holdings. What we have done through Geospatial One-Stop is taken that Federal data card catalog clearinghouse, I think made it easier to work with, made it more accessible, and introduced data holdings that are owned by State and local governments and the private sector. So you have a much bigger clearinghouse and a much more accessible clearinghouse than you did in the 1990's.

Mr. PUTNAM. Where does the National Map fit into all of that?

Mr. CAMERON. The National Map is a project that is spearheaded by the U.S. Geological Survey, and, actually, over the last year we have had much tighter integration between the National Map and the Geospatial One-Stop and the Federal Geographic Data Committee. The National Map is about pulling together data sets owned by various governmental sectors and making them available centrally. The link with the Geospatial One-Stop is the National Map would be accessed, if you will, through the Geospatial One-Stop portal.

So USGS, through the National Map, is in the data acquisition business, it is going out there and forging partnerships with State and local governments to go acquire data this year or the year after this; whereas, Geospatial One-Stop is a mechanism for sharing that information with the world once it is collected. And the Federal Geographic Data Committee's role is to help corral the Federal agencies' participation in the National Map.

Mr. PUTNAM. What role does the private sector play in the collection and preparation and application of geospatial information for the Federal Government?

Mr. CAMERON. Realistically, right now, most—well, I am not sure of most, because I don't have the specific knowledge, but a large amount of the money that is being spent by Federal agencies on geospatial data acquisition is in fact being paid to private sector contractors to acquire the data. Perhaps with the exception of the military or the defense community, I think relatively little time do you have Federal employees actually acquiring data. So the private sector has a significant role in physically collecting the data on be-

half of its own customers or various levels of Government for whom they may be contractors.

Mr. PUTNAM. Mr. Allder, would you address that as well, please?

Mr. ALLDER. Yes, sir. If I go back a decade, we had a significant in-house work force that was doing geospatial data collection and production. That has changed significantly over the last decade. We now rely very heavily on the private sector and the capability that has grown there to produce foundational geospatial information for us that we then use to populate our data bases and support our customer sets. We still have a work force internally doing some of that work, but it is down to less than 20 percent of what it was 10 years ago as the work has moved to the private sector. So we are heavily relying on partnerships and the very robust capability that has grown there over the last decade.

Mr. PUTNAM. Does today's current geospatial information sharing capability provide the opportunity for military and intelligence agencies to receive or provide access to data where there might be shared uses in the unclassified space?

Mr. ALLDER. I would say opportunity, yes, but I would not tell you there is a capability for exhaustively doing that to the point where we understand we are minimizing redundancy. We have historically had agreements from NGA that would be case-by-case with various civil agencies for exchange of information. An example would be with the Federal Communications Commission, where we exchange information on vertical obstructions that from our standpoint are important to safety of navigation, from theirs are important to understanding the state of the transmissions networks in the United States. We have case-by-case agreements like that. We also will get involved with either civil agencies or State and local governments through civilian agency in the case of something like a natural disaster through FEMA, and we, in those cases, would have specific goals and objectives for sharing information that we are able to do that. But we do not have a routine way to go in and make sure that information does not already exist.

Before we go out to acquire any information for a domestic mission, we do a search to try to find if there is something useful already in the Government, but that, again, is not exhaustive. That is exactly the kind of problem, though, that Geospatial One-Stop is intended to address. We see, as additional information gets populated there, there will be a lot more opportunity for us all to be more efficient in the use of resources here.

Mr. PUTNAM. Thank you very much. My time has expired. I will recognize the ranking member for 5 minutes.

Mr. CLAY. Thank you, Mr. Chairman.

Let us start with Ms. Evans. As I mentioned in my statement, my hometown of St. Louis, as well as Missouri, have utilized GIS for a wide variety of services and purposes. Can you outline for us what OMB is doing to improve the services provided by Federal Government geospatial programs for State and local agencies?

Ms. EVANS. I can highlight it at a high level, but I would also ask if Interior could also talk specifically about the ongoing work that is happening under Geospatial One-Stop.

We are, OMB, through its oversight and management through the Circular A–16, trying to ensure that the partnerships are there,

that they are established so that we can share the information. And as my colleague said from Interior, many times the information that is collected at the State and local level is much better than the information that is available at the Federal level. So through the Geospatial One-Stop, the President's initiative, we are trying to maximize the work that has already been done in this area.

I think that Scott would be glad to talk specifically about what is happening in the Federal Government efforts to ensure that partnership and that linkage at the State and local level.

Mr. CLAY. OK, thank you, Ms. Evans. I will give Scott a chance later. One more issue. You know the GAO report before us today states that OMB's methods for oversight have failed to eliminate duplication in geospatial investments across agencies. I know that the chairman asked a question, but let me ask you to give us specific examples of building partnerships. You mentioned in your statement that there was an effort to build partnerships. And tell me also how you have worked toward streamlining the budgeting process in this initiative.

Ms. EVANS. Specifically in fiscal year 2005, we specifically directed agencies that they needed to make this information available to Geospatial One-Stop, the President's initiative, of where they were going with their geospatial investments and that they needed to complete and send this inventory in to Geospatial One-Stop. We continue to work with the agencies to get that information. It is clear through Circular A–16 that there are oversight and policy issues that OMB needs to do in order to go forward to ensure the effective management of this.

I believe as we go forward and with the release of the Federal Enterprise Architecture's model of data, the data reference model has not been released yet, and it is intended to be released; that when you see that, we also talked about giving additional guidance out to the agencies. What we intend to do at that point, when that is released, is specifically talk about the data and how it relates to the circular so that the agencies will know how to report those investments in to us so that we will be able to get greater visibility into there and be able to promote the partnership between the agencies as well as through the State and local governments.

We haven't released that model yet; we are targeting for the end of next month to release that model because there has been a lot of discussion about how that model should read, and we want to make sure that when the model is released, that no matter who you are, you will be able to read it and understand exactly what we are talking about as far as the data that we are collecting and how we are going forward.

Mr. CLAY. Thank you for your response.

Ms. Koontz, according to GAO's report, the National States Geographic Information Council estimates the cost of building a complete NSDI at approximately $6.6 billion without factoring in the likelihood of redundancy and duplication among participants. Under the current organizational structure, do you believe such investments would be prudent? And what coordination steps do you recommend for this project among Federal, State, and local agencies to ensure that redundancy is minimal?

Ms. KOONTZ. To your first question, I think both the release of the data reference model that is part of the FEA, as well as OMB's proposal to have agencies report investments through Geospatial One-Stop are both promising in terms of providing the kind of complete and consistent and detailed information that OMB really needs in order to identify and reduce redundancies.

I think, to your second question, in our report we outline a number of recommendations that we are making to OMB and to Interior that we think will help reduce redundancies. Those include updating the national strategy for developing the NSDI, the National Spatial Data Infrastructure. We have also recommended that OMB develop criteria for assessing coordination when they are looking at particular investments, and we have also called for various measures to increase and improve OMB oversight.

Mr. CLAY. Thank you for that response.

Mr. Cameron, when will the Geospatial One-Stop project be completed? And at that time will all of its objectives be met, including developing an inventory of Federal geospatial data holdings and encouraging greater coordination among Federal, State, and local agencies?

Mr. CAMERON. Good question, Mr. Clay. I guess I could answer it on several different levels. There are obviously a couple of tasks that at some point will have a definite ending. The standards, for instance, will be completed in 2005; they will come out of the ANSI process. We will, in fact, have a second portal, again, in early 2005, late calendar 2004. But I think in the long run I would like to see the activities of Geospatial One-Stop move out of a project mode and become a normal routine way that the Federal Government does business, moving standards quickly; interacting much more heavily and much more on an equal-to-equal basis with State and local governments than we ever have before; more thoroughly and more reliably capturing our data investments.

So I think sometime, maybe 1½ or 2 years out, there ought to be an evolution, if you will, of where Geospatial One-Stop stops being a project and becomes mainstreamed into just a normal routine way for the Federal Government to interact with its partners and manage itself internally.

Mr. CLAY. Thank you for that response.

Mr. Allder, can you cite for us any collaboration your agency is undertaking with other Government agencies, and are these efforts improving the quality of data and information available within geospatial programs?

Mr. ALLDER. Yes. I mentioned several earlier, and I can hit a few more. I mentioned the Federal Communications Commission. We collaborated with the U.S. Geological Survey on the production of information over a data base for the 133 urban areas in support of Homeland Security. We have a team of our analysts who are actually resident inside of the Homeland Security Department who are working collaboratively with them. So, yes, sir, we have many such activities ongoing. Again, producing domestic information is not the major focus of our mission today; we do that on an opportunity basis, on an invitation basis. But, yes, sir, there are many examples. I think they are growing and they are certainly improving our service to our customer set.

Mr. CLAY. Thank you.

I thank the panel for their responses.

Mr. PUTNAM. Thank you, Mr. Clay.

Ms. Koontz, do you have any thoughts on the merit of establishing a geospatial information administrator within OMB or perhaps somewhere else, or even a geospatial information officer type of position within agencies? Just share your thoughts on something along those lines.

Ms. KOONTZ. I think either of those positions certainly have merit to consider. Without knowing further details, it does appear, though that if you are able to affix accountability with a single entity, I think experience has shown us that things tend to get done.

Mr. PUTNAM. Ms. Evans, what are your thoughts?

Ms. EVANS. I have thought about this question a lot, and I would say that I don't agree necessarily that there is a need for a geospatial information administrator or officer within the Office of Management and Budget. I would tell you that recently this position, the Vice Chair position of the FGDC, has been delegated to me from the Deputy Administrator for Management because it is about information management. We are looking, though, internally within OMB and the implementation and the oversight of A–16 is it now are we at the point do we heighten this to the point where we ask the agencies, similar to the way that we did when FISMA was passed, who is the central point of contact within your agency to deal with geospatial information? I also think that this person should be located within the CIO organization, because the Chief Information Officer is about the strategic management of information, regardless of what type, whether it geospatial, paper, electronic. And so we are really looking at what is the role and responsibility of this person and how we would like for them to go forward to get to the issue of accountability and be able to help the agency with its investments and how to manage that type of information strategically.

So I don't think that we need one within OMB because of the accountability and how we deal with things and how we work with the budget side of the House, but I do think that it is worth examining how we move forward with the agencies. Two agencies to date, EPA and DHS, have identified a geospatial information officer within their organizations. Both of those agencies do have that position reporting to the Chief Information Officer.

Mr. PUTNAM. As we talk through these GIS issues, including One-Stop, which is 1 of the 24 E-Gov initiatives, it leads me to ask, in reference to last week's action on Interior appropriations, the bill included language that would prohibit funding on four E-Gov initiatives. What is the impact of that language, Ms. Evans?

Ms. EVANS. The administration has issued its statement on this particular issue and the impact of that, and we do, in the statement, generally we said that it would have great impact on the ability of the Government to be able to move forward as an enterprise to facilitate collaboration and coordination of our resources and to be able to come up with a common solution so that we can have one solution for the Government as a whole as we are moving forward and eliminating redundancies and becoming more efficient.

And so the administration has issued its statement on the effect of that particular language in the appropriations bill.

Mr. PUTNAM. Ms. Koontz, do you have an opinion on the effect that this would have on the mandated requirements set forth in the law, the prohibition of funding? What effect will that have on the agencies' ability to carry out their legislative mandate?

Ms. KOONTZ. I am sorry, I haven't studied the language in the appropriations bill. I don't think I can comment on that.

Mr. PUTNAM. Does anyone want to take a stab at it? Does Interior want to talk about what is in the Interior appropriations bill?

Mr. CAMERON. Interior very wisely, on matters of appropriations, defers to the Office of Management and Budget, so I agree with Karen.

Mr. PUTNAM. Well put. I think it sends a very disturbing message to our agencies and is something that we intend to work through.

We have votes currently planned for approximately 3, so what I would like to do, if there are no other questions, I would like to go ahead and seat the second panel and try to get through the opening testimony on that before we are called away. So I want to thank our first panel for your insight, and the subcommittee will recess until such time as the second panel is seated, hopefully very shortly.

[Recess.]

Mr. PUTNAM. The subcommittee will reconvene. I would ask the second panel of witnesses to please rise for the administration of the oath.

[Witnesses sworn.]

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

Our first witness is Zsolt Nagy. Did I say that correctly?

Mr. NAGY. That is correct.

Mr. PUTNAM. Welcome to the subcommittee. Mr. Nagy is president-elect of the National States Geographic Information Council. NSGIC is perhaps the primary intergovernmental organization seeking to develop interoperability and data standards between local, State, and Federal levels of government. He is also the manager of geographic information coordination program at the North Carolina Center for Geographic Information and Analysis, where he has done work on national, State, regional and local GIS initiatives, including efforts to develop the National Spatial Data Infrastructure.

Welcome to the subcommittee. You are recognized for 5 minutes. I would ask all of you to please help us stick to that. We will have five votes on the floor shortly. So you are recognized.

STATEMENTS OF ZSOLT NAGY, PRESIDENT-ELECT, NATIONAL STATES GEOGRAPHIC INFORMATION COUNCIL [NSGIC], GEOGRAPHIC INFORMATION COORDINATOR, NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES; FREDERIC W. CORLE II, PRESIDENT, SPATIAL TECHNOLOGIES INDUSTRY ASSOCIATION; JOHN M. PALATIELLO, EXECUTIVE DIRECTOR, MANAGEMENT ASSOCIATION FOR PRIVATE PHOTOGRAMMETRIC SURVEYORS; DAVID SCHELL, PRESIDENT & CEO OF THE OPEN GIS CONSORTIUM, EXECUTIVE DIRECTOR, OPEN GIS PROJECT; AND DR. DAVID J. COWEN, CHAIR, MAPPING SCIENCE COMMITTEE, NATIONAL RESEARCH COUNCIL, CHAIR, DEPARTMENT OF GEOGRAPHY, UNIVERSITY OF SOUTH CAROLINA

Mr. NAGY. Very good. Chairman Putnam and honorable members of the subcommittee, thank you for inviting me as president-elect of the National States Geographic Information Council [NSGIC], to participate in this important hearing on "Geospatial Information: Are We Headed in the Right Direction, Or Are We Lost?"

Mr. Chairman, we make maps for a living, so how can we possibly be lost? Let me continue.

NSGIC is a nonprofit organization that promotes effective government through the wise use and sharing of geospatial information. We provide a voice for the States to ensure that the State and local efforts form the foundation of a sustainable national spatial data infrastructure.

Core NSGIC members are senior State government managers and policymakers involved in daily coordination and application of geospatial technologies. Our members are nonpartisan in their passion for good government.

NSGIC has concerns about geospatial coordination in our country, especially as it relates to Federal efforts in data collection. It really should be viewed as a national effort. Rapid advances in technology have reduced the cost of geospatial systems, which are now significantly used in State and local governments. To maximize the effectiveness of this technology, we need to be smarter about how we collect and maintain the Nation's geospatial data.

Federal Government must recognize that a new cross-cutting collaborative role is required to coordinate and leverage geospatial data investments. To put it simply, we cannot afford to have duplicative geospatial initiatives horizontally among Federal agencies, or vertically between local, State, regional, and Federal Governments.

NSGIC members perform much of their work through statewide coordinating bodies. The most basic principle of a coordinating body is "build it once, use it many times." There is a potential that the cost for broad-use data will be higher, but that one-time expense is still much less costly than the alternative of redundant and incompatible efforts by multiple levels of government. Accordingly, geospatial data must be built to address the requirements in local government applications. With prudent adherence to basic standards and best practices, local government data can be rolled up to meet the needs of agencies at all levels. There are many advantages to this approach, since locally used data is most likely to be maintained, accurate and complete.

Of course, it can be daunting for Federal agencies to contemplate assembling a nationwide data base from thousands of local government systems, and we also know that many local governments do not have the data. So this is where the statewide coordinating bodies come into place. They bring all of the relevant stakeholders to the table to coordinate development in support of geospatial data that meet multiple needs.

We know that statewide coordinating bodies work. What we did not know until recently was how they measured up on a national basis. NSGIC membership developed a set of nine criteria that define a model State program. They include having a full-time statewide coordinator that is paid; a clearly defined authority for statewide coordination; that there is a relationship with that group to the State CIO; that there is a political or executive champion; that there is an NSDI clearinghouse, a state-based clearinghouse; that there is significant input from local government, academia, and the private sector; there is sustainable funding; and they are able to enter into contracts and receive and expend funds; and that the Federal Government works through the statewide coordinating body.

NSGIC conducted a survey among the 50 States to ask how many of these nine criteria they met. Thirty-two States reported meeting six or more of the criteria, including nine States that meet all. Eighteen States reported meeting five or fewer of the criteria. What this tells us is that most States are well positioned to coordinate with Federal agencies and that there are opportunities to strengthen the remaining statewide coordinating bodies.

In summary, we respectfully ask the subcommittee to consider the following recommendations: Coordination of Federal agency geospatial activities need to be done in the context of national priorities, not just Federal priorities. One key element of this is to work through the statewide coordinating bodies.

Two, partnering with State and local governments is absolutely essential in meeting the country's collective geospatial data needs. In States where the coordination infrastructure is weak, Federal programs can provide a powerful incentive to strengthen them.

Third, funding streams for Federal geospatial programs must be adequate and sustained to support development and maintenance of data that meet local requirements.

And, fourth, better mechanisms need to be in place for funding to leverage the needs of Federal programs for the joint benefit of State and local government.

I will close by saying there are many agencies involved in geospatial information technologies, and many are heading in different directions. We are not lost, but there are certainly opportunities to streamline, reduce costs, and yet meet many important national and local government criteria. Borrowing from the well known phrase that all politics are local, NSGIC submits to you that all data are local.

Mr. Chairman and members of the subcommittee, thank you for the opportunity to share these views with you today.

[The prepared statement of Mr. Nagy follows:]

Statement of
Zsolt Nagy, President-Elect
National States Geographic Information Council
June 23, 2004

Chairman Putnam and honorable members of the Subcommittee, thank you for inviting me as President-Elect of the National States Geographic Information Council (NSGIC) to participate in this important hearing on *"Geospatial Information: Are we headed in the right direction or are we lost?"*

Mr. Chairman, we make maps for a living, so how can we be lost?

NSGIC is a non-profit organization that promotes effective government through the wise use and sharing of geospatial information. We provide a "voice of the states" to ensure that state and local efforts form the foundation of a sustainable National Spatial Data Infrastructure.

Members of NSGIC include senior state government managers and policy-makers involved in the daily coordination and application of geospatial technologies. Our members are non-partisan in their passion for good government.

The members of NSGIC have some concerns about geospatial coordination in our country, especially as it relates to our federal effort in data collection. It really should be viewed as a *national* effort. Rapid advances in technology have dramatically reduced the costs of geospatial systems which are increasingly used by state and local governments. However, to maximize the potential effectiveness of this technology, we need to be smarter about how we collect and maintain the nation's geospatial data.

The federal government must recognize that a new cross-cutting collaborative role is required to coordinate and leverage geospatial data investments. To put it simply, we cannot afford to have duplicative geospatial initiatives either horizontally among federal agencies or vertically among local, state, and federal levels of government.

NSGIC members perform much of their work through statewide coordinating bodies. The most basic principle of these bodies is "build it once, use it many times." This nearly always means that the data investment is more costly than if the data were prepared to meet lower resolution requirements of state or federal agencies. However, this one-time cost is still much less expensive than redundant, incompatible efforts by multiple levels of government. Accordingly, geospatial data must be built to address the requirements of local governments. With prudent adherence to basic standards, local government data can be "rolled up" to meet the needs of state and federal agencies. There are many advantages to this approach since locally used data is most likely to be maintained, accurate, and complete. However, it can be daunting for federal agencies to contemplate assembling a nationwide database from thousands of local governments, and we also know that many local governments do not have the data or are presently unable to produce it. This is where the statewide coordinating bodies can be most valuable.

Statewide coordinating bodies bring all of the relevant stakeholders "to the table" to coordinate development and support of geospatial data and applications that meet multiple needs. We know that the statewide coordinating bodies work. What we did not know until recently was how well they measure up on a national basis. Last year the NSGIC membership developed a set of nine criteria that define a model state coordination program. These nine criteria include:

- Having a paid, full-time coordinator
- Clearly defined authority for statewide coordination
- State coordination has a formal relationship with the state CIO
- A political or executive champion supports the coordination
- Responsibilities for the NSDI and a state Clearinghouse
- Coordination with local government, academia, and the private sector
- Sustainable funding
- Ability to enter into contracts and receive and expend funds
- The Federal government works through the statewide coordinating body

Late last fall, NSGIC conducted a survey among the 50 states to ask how many of these 9 criteria they met. The results were very interesting. Thirty-two states reported meeting 6 or more of the criteria, including nine states that meet all nine. Eighteen states reported meeting five or fewer of the criteria. What this tells us is that most states are well positioned to coordinate with federal agencies, and that there are opportunities to strengthen the remaining statewide coordinating bodies. At this time, there is no requirement for Federal agencies to coordinate with existing state coordination bodies.

We further believe that the effectiveness of the State Coordination Model can be gauged using the following 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.

It is important to note that a single "model" does not fit all states with respect to coordination activities or development of the National Spatial Data Infrastructure. While the majority of issues are in common, there are distinct differences due to geography, demographics, maturity of programs, political structure, local vs. federal priorities and regional issues for which we must account. In several instances, state and federal interests have recognized these issues and built very effective coordination mechanisms.

NSGIC believes that a new Congressional initiative is needed that will establish a single federal agency, with cross-cutting authority, that can direct and speak for all federal agencies on geospatial development and coordination. This agency would have the authority to coordinate all federal data production efforts with state coordination councils. This would likely require that a Federal employee be assigned to each state to work with the state coordination councils and to establish themselves as part of the local environment. NSGIC believes the additional costs for such a program are insignificant when compared to the potential to prevent the waste of several billion dollars. With the right models and effective partnerships with state coordination groups, federal agencies can work with states to build data and applications that meet their own needs and are useful at state and local levels to avoid duplication of effort. This measure would also provide Congress with a process to closely scrutinize all appropriations and expenditures for geospatial technologies.

In several **instances the hands of Federal employees have been effectively tied and they are prevented from coordinating appropriately with state, local and tribal governments.** Two particular issues are notable in this regard. First is the Federal Advisory Committee Act (FACA) which prevents federal agencies from putting state, local or tribal organizations on their advisory committees. The other concern relates to the inability of federal agencies to quickly survey user communities and stakeholder groups on important national issues, due to the federal limit on survey sizes. How can we expect federal agencies to make informed decisions on the management of the National Spatial Data Infrastructure when they are denied these essential feedback mechanisms?

When data production programs are coordinated and stable, they result in significant savings that can be used for data maintenance programs or other essential activities that are included in a complete National Spatial Data Infrastructure. For example, many types of data products require the acquisition of orthophotography and other imagery products such as LIDAR. It is well established that there are fixed mobilization, acquisition and management costs that are the same regardless of the size of the area to be imaged. States frequently find it is possible to save 20 to 40 percent of the acquisition costs for these products by letting statewide or regional contracts. The Federal government can sometimes leverage even greater savings in national programs such as the National Aerial Photography Program (NAPP) and the National Digital Orthophoto Program (NDOP) and it is important that we promote "seamless" national programs that provide equally for the "haves" and "have-nots" so that all of our programs serve the nation equally regardless of the economic status of certain regions.

Data production requires stable partnerships between Federal, state and local entities that each put up a share of the funds. Having stable fund sources allows us to plan for and execute data acquisition programs that make sense. We generally find ourselves having to work in opportunistic ways, because stable fund sources generally do not exist at any level of government. This instability causes many agencies to embark on their own production programs to make certain that their business needs are met. When this happens, they fail to cooperate with others or meet recognized standards and duplication is sure to follow. Effective data partnerships are built when each level of government knows that it can trust the others to uphold their end of the bargain year after year. It also helps to prevent the end of fiscal year "scrambles" that agencies

succumb to every year, that also often result in poor choices for data production. A final point on the stability of data production partnerships is that **a non-lapsing fund administered by the appropriate agencies for each of the NSDI framework layers would be an invaluable tool to help stabilize data production.**

The existing methods used to develop data standards can generally be measured in years. This is clearly not acceptable. For example, after 9/11, all levels of government moved to identify critical infrastructure and begin mapping these features along with the operational capabilities found within the emergency management communities. At the federal level, the National Geospatial-Intelligence Agency (NGA) established a team that developed the Homeland Security Information Partnership (HSIP) plan. They did a nice job of identifying common data needs, but this report is now eighteen months old and the states are uncertain if data models and standards are being developed at the federal level to support this list of data needs. As a result, many states and local governments are creating their own "standards" and they will naturally be reluctant to adopt a federal standard when it becomes approved in the future due to the inherent costs of converting their data that already meets their business needs. **Clearly, mechanisms are needed in the federal government to "fast track" standards development and other coordination issues to meet important national problems in a timely fashion (<6 months).** This requires available funding reserves that are dedicated for such activities to allow agencies to hire appropriate contractors for quick turnaround projects. These activities should also be conducted with the full cooperation of Advisory Committees that are comprised of state, local and tribal representatives.

In summary, we respectfully ask the Subcommittee to consider the following recommendations:

- Coordination of federal agency geospatial activities needs to be done in the context of *national* priorities, not just *federal* priorities. One key element of this is to work with and through the statewide coordinating bodies.
- Partnering with state and local governments is absolutely essential in meeting the country's collective geospatial needs. In states where the coordination infrastructure is weak, federal programs can provide a powerful incentive to strengthen them.
- Funding streams for federal geospatial programs must be adequate and sustained to support development and maintenance of data that meet local requirements through partnerships.
- Better mechanisms need to be in place for funding, partnering via grants and cost-share programs, as well as contracting to leverage the needs of federal programs for the joint benefit of state and local governments.

I'll close by saying, that there are many agencies involved in geospatial information technologies, and many are heading in different directions. We are not lost, but there are certainly opportunities to streamline, reduce costs, and yet meet many important national and local criteria for geospatial information. Borrowing from the well known phrase that "all politics are local," NSGIC submits to you that "**all data are local.**"

Mr. Chairman and members of the Subcommittee, thank you for the opportunity to share these views with you today.

Mr. PUTNAM. Thank you very much.

Our next witness is Fred Corle. Mr. Corle is president of the Spatial Technologies Industry Association. The Spatial Technologies Industry Association, established in 1996, supports the industry's business development efforts in the public sector, improving performance of government with GIS technology and promotes the industry and commercial markets worldwide. Over 100 companies have participated in the Association's activities. Prior to joining STIA, Mr. Corle was national Federal marketing and sales director for Sun Microsystems Federal Inc. He managed Sun's Federal Government strategic market development efforts for civilian agencies.

Welcome to the subcommittee. You are recognized.

Ms. CORLE. Chairman Putnam, Ranking Member Clay, distinguished members of the subcommittee, I want to thank you for the opportunity to testify before the subcommittee on behalf of the Spatial Technologies Industry Association concerning our views on Federal Government geospatial technology programs and policies.

I have submitted a detailed written statement for the hearing record and will only briefly highlight the main points here.

You titled this hearing, "Geospatial Information: Are We Headed in the Right Direction, Or Are We Lost?" Our opinion is that we are not lost, although the road has clearly been filled with some potholes, detours, and maybe even some wrong turns. Industry is ready to partner with government to build consensus about the best roadman that will help us achieve the great goals for our Nation of efficient and effective government services, security home and abroad, and economic competitiveness. In response to the important issues you have raised, we offer some specific recommendations for Federal Government policies and programs to more efficiently, effectively, and rapidly spatially enable the business enterprise of all levels of Government.

This hearing provides an important opportunity to raise awareness within Congress, and not only about the challenges, but also about the present power and promising future of the application of geospatial technologies and spatial data.

I describe the integrated spatial technologies industry and its various sectors in my written testimony, but suffice it to say that this growing industry is vital to our Nation's future security and prosperity. Its success depends on an effective partnership between industry and Government. For example, the global positioning system sector grew out of the defense sector, but now, through private sector innovation, employs thousands of workers in a $10 billion a year commercial industry. In addition, the location technology developed for our Nation's precision weapons systems can now precisely locate critically injured motorists from an emergency 911 call.

These are two of literally thousands of applications being developed and implemented by our member companies. We are committed to creating a private/public partnership that will depend on private enterprise to develop innovative products that protect property, save lives, and, through the genius of private enterprise, achieve low-cost products to enhance our standard of living.

Federal policies should facilitate, rather than inhibit, the expansion of our industry so that it can achieve its potential as an engine

of economic growth and jobs. That industry expansion will result in cost efficiencies in data collection and availability and economies of scale that lower the cost of products and services and enhance our citizens' well-being.

We support moving away from process-intensive and Federal Government-centric geospatial policies to ones that are market driven and citizen-centric. The Bush administration's U.S. Commercial Remote Sensing Space Policy, which was issued last year, is an excellent example of meaningful progress toward this goal. We believe that the Federal Government needs a well-funded, highly coordinated business plan to acquire and maintain the key framework data layers of the National Spatial Data Infrastructure through cooperation among State, regional, local, and tribal governments, as well as private industry.

The Bush administration's Geospatial One-Stop Initiative, U.S. Geological Survey's National Map program, the Federal Geographic Data Committee's grant programs, and a myriad of other Federal programs do represent significant progress for the NSDI. We need a true business plan for the NSDI and an integrated applications and systems to accomplish high priority functions of Government such as homeland security and E-Government. This new business plan should match funding commitments to a business case and return on investment using an enterprise approach that maximizes interoperability, integration, and sharing. The policies should spur integrated interoperable systems and solutions rather than single-purpose applications and data sets.

We have developed 10 recommendations which I will quickly run through in my final moments. Action 1, is to establish a blue ribbon task force for experts from Government, industry, and academia stakeholders' groups, White House, and Congress to assess the progress made to date on spatially enabling the Government enterprise and to recommend options for future policies; adopt market-driven standards for spatial data and GIS software interoperability; strength the management structure for geospatial programs by establishing a dedicated person in the White House OMB Office of Electronic Government; Action 4, establish a business plan that includes a new grant Federal funding program; Action 5, develop a national strategy to achieve the level of geospatial preparedness required to address high-priority homeland security threat scenarios; Action 6, support the development of a reliable and consistent metrics and data about the geospatial enterprise; Action 7, ensure that geospatial technologies and spatial data are well defined and fully integrated in OMB's Federal Enterprise Architecture; partner with industry and public sector organizations to raise awareness about best practices; 9, more forcefully encourage Federal agencies and Federal grantees to make use of standards-based commercial geospatial products and services to the maximum extent feasible; and, last, empower the DHS, in conjunction with FGDC Homeland Security Working Group, to take a lead role on issuing regulations and guidelines for spatial data security and access.

Mr. Chairman, Ranking Member Clay, I appreciate the opportunity to present our views to you today.

[The prepared statement of Mr. Corle follows:]

Testimony of Fred Corle

President, Spatial Technologies Industry Association

Before the U.S. House Committee on Government Reform

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

Hearing on

"Geospatial Information: Are we headed in the right direction or are we lost?"

June 23, 2004

Chairman Putnam, Ranking Member Clay, distinguished Members of the Subcommittee, it is my privilege to testify before the Subcommittee on behalf of the Spatial Technologies Industry Association (STIA) concerning our views on federal government geospatial technology programs and policies.

Founded in 1996, STIA is a national trade association representing more than 60 companies in the integrated spatial technologies industry operating in the U.S. I serve as president of the association under a fifteen-member board of directors that includes many senior industry leaders.

The title of this hearing is *"Geospatial Information: Are we headed in the right direction or are we lost?"* I am confident in stating that it is STIA's opinion that we are not in fact lost. We have made significant progress on many important goals, but the road to where we are today has clearly been filled with potholes, detours, and even some wrong turns.

Federal government geospatial programs are at the crossroads, yet the path ahead will be bright if the right policy decisions are made. STIA is dedicated to assisting the integrated spatial technologies industry in the United States (U.S.) to be a full partner with government in building consensus about, and implementing, the right choices.

Now is the time for Congress to more actively engage in helping all levels of government, stakeholder organizations, and industry to produce the roadmap that will guide us to achieving great goals for our nation with geospatial technologies and spatial data. Congress must be actively involved in geospatial policy issues and programs because they are fundamental to our country's most important civilian government services, national security, homeland defense, and economic competitiveness.

My testimony expresses STIA's specific recommendations for federal government policies and programs affecting the integrated spatial technologies industry. STIA's proposals are primarily designed to accelerate the process of more efficiently and effectively spatially-enabling the business enterprise of all levels of government. I also highlight the tremendous value of, and

business case for, spatially-enabling government with commercial geospatial technologies and spatial data. My testimony directly addresses the important issues that you have targeted for this hearing:

- Progress made by the federal government to consolidate and improve utilization of the vast amounts of geospatial data sets collected by the departments and agencies across the federal government as well as by state, regional, and local governments.

- Government and industry efforts to develop standards for the collection and use of geospatial information to accelerate horizontal and vertical data sharing across the federal government enterprise and non-federal levels of government .

- Review of President Bush's Geospatial One Stop (GOS) Initiative.

- An overview of the key role that the private sector plays in achieving cost efficiencies and improving geospatial data quality for government users.

I commend Chairman Putnam for demonstrating leadership in holding this hearing to examine significant federal government policies and programs affecting the use of geospatial capabilities. In addition, this hearing helps to raise awareness within Congress about the present power, and promising future, of geospatial technologies and spatial data.

Mr. Chairman, I applaud your vision for having Congress address this highly complex, and often overlooked, issue of great consequence to our nation. While we are not lost, federal government geospatial programs need more direction from Congress to accomplish their enormous potential. It is the hope of STIA that this hearing will quicken the pace of the progress that has been made since your landmark hearing of last year.

Integrated Spatial Technologies Industry

The integrated spatial technologies industry includes a number of distinct sectors: geographic information systems (GIS) software, remote sensing and aerial imagery, spatial database software, information technology systems integration, spatial data, geo-information services and mapping, Global Positioning Systems (GPS), and location-based services. U.S.-headquartered companies are market leaders at home and abroad in this industry.

The industry in the U.S. is comprised of thousands of private companies that have combined annual revenues estimated by some observers in excess of $30 billion while employing tens-of-thousands of highly-skilled, well-paid professionals in all 50 states. A number of senior executives and analysts believe that the industry is growing steadily and was not affected as much as other components of the U.S. high-tech market that recently experienced a downturn. The integrated spatial technologies industry is truly an outstanding American high-tech success story.

It is estimated that there are millions of public and private sector professionals and citizens in the U.S., and millions more around the world, who are dependent on commercial geospatial products such as GIS software and GPS equipment. Recognition of the economic importance of the industry and robust economic multiplier effect of professionals and citizens using these capabilities is increasing. For example, the Bush Administration's High Growth Job Initiative administered by the U.S. Department of Labor Employment & Training Administration (DOL) has targeted the geospatial industry as a top priority in its national job creation strategy.

Role of STIA in Advancing the Integrated Spatial Technologies Industry

STIA is dedicated to increasing the participation of the industry in public policy decision-making, the legislative process, and regulatory actions that directly affect the vitality and success of companies in the U.S. STIA supports sound public policy that advances geo-information government and commerce based on the use of commercial geospatial products and services that enable better decision-making, greater efficiency, increased accountability, improved management, and superior performance.

STIA's corporate membership includes such companies as Autodesk, BAE Systems, Boeing, Cisco Systems, Digital Globe, EarthData, ESRI, Garmin, GDT, General Dynamics, Harris, IBM, Intergraph, Lockheed Martin, MapInfo, NAVTEQ, Northrop Grumman, Oracle, Questerra, Sanborn, Sun Microsystems, SAIC, Space Imaging, SDS, and Trimble to name a few.

Transforming Government and Private Enterprise

Commercial geospatial technologies and spatial data are transforming government and private enterprise by enabling more effective and efficient operations, improved communications, and, ultimately, better decision-making. These capabilities are assisting the public and private sectors to do such things as growing the economy, building well-designed infrastructure, saving lives, protecting critical infrastructure and strategic assets, improving quality of life, conserving the environment and empowering citizens with vital information about their communities.

Commercial geospatial technologies and spatial data are being used daily by almost every agency of the federal government and agencies in all 50 states as well as an estimated 80% of local governments, regional governments, and public authorities. Police departments, fire departments, public health agencies, emergency management agencies, environmental agencies, transportation authorities, urban planning departments, and land record offices are just a few of the core units of government that are dependent on geospatial capabilities. Also, each day the number of private business users increases as more companies learn how these capabilities can improve productivity and profits.

During the U.S. House Subcommittee on Government, Management and Information Technology's 1999 hearing on federal government GIS policies, Wyoming Governor Jim Geringer testified that "Geographic Information Systems, properly used, are the most significant applied technology since the advent of the World-Wide-Web and the Web Browser." He told Subcommittee Members that the potential for GIS "is unlimited since every service at any level of government can in some way be associated with spatial reference."

In fact, it is commonly estimated that 80% of all public and private sector data sets have a spatial reference that enables them to be analyzed with GIS. The use of GIS allows the inventorying, analysis, visualization, and communication of complex relationships among people, land, natural features, man-made structures, and an almost unlimited number of factors. GIS is a powerful tool that provides the ability to understand, visualize, and manage vast numbers of complex data sets which are associated with the most complicated challenges facing society today.

Perhaps most importantly at this time in our nation's history, commercial geospatial technologies and spatial data are mission critical to America's homeland security and defense of freedom around the globe. The Department of Defense (DoD), Central Intelligence Agency, and

U.S. Department of State made extensive use of these capabilities prior to, and during, Operation Enduring Freedom and Operation Iraqi Freedom.

According to the DoD, commercial geospatial technologies and spatial data played a key role in providing the information superiority, and guidance for "smart weapons," that assisted U.S. forces to quickly defeat the enemy during the initial major combat operations with relatively few casualties and limited collateral damage. After helping to defeat the enemy on the battlefield, many of these same geospatial capabilities are being used by America and its coalition partners in our efforts to win the peace by rebuilding a free Iraq and Afghanistan.

On the home front, U.S. Department of Homeland Security (DHS) officials have publicly stated that geospatial technologies are one of the top three technologies that the department views as being essential for accomplishing its mission. The DHS is currently working with all levels of government and the private sector to achieve geospatial preparedness for the nation.

In this regard, DHS is working with other appropriate federal agencies to implement Homeland Security Presidential Directive-7 (HSPD-7) that was issued during December of 2003 by President Bush. HSPD-7 directs the department to geospatially map, image, analyze, and sort critical infrastructure and key resources by utilizing commercial satellite and airborne systems, and existing capabilities within other agencies. STIA commends the President's vision for issuing HSPD-7 and strongly supports DHS' efforts.

The DOL High Growth Job Initiative for the geospatial technologies industry is another very important federal government initiative. DOL's initiative addresses the workforce development challenges associated with rapidly growing demand for commercial geospatial products and services as well as the need to maintain the leadership of American-based companies in this important component of the U.S. economy and security strategy. The geospatial industry is one of only twelve high growth industries on which DOL is focusing.

The return-on-investment and business case for the implementation of commercial geospatial technologies and spatial data is very positive and well documented for deployments in federal, state, regional, local, and tribal government as well as in the private sector. There is, however, no question that many senior government officials, private sector executives, and the majority of the general public are not yet fully aware of these remarkable success stories.

There is an urgent need for the public and private sectors to work together to educate senior decision-makers and the public about the proven success of commercial geospatial technologies and spatial data. Today's hearing provides an exceptional chance to underscore how President Bush's Management Agenda and E-Government programs such as the GOS initiative are utilizing these capabilities to improve the performance of government, increase the return-on-investment for taxpayers, and achieve a more citizen-centric government.

Proven Record of Success, Ready-to-Go Solutions

There are literally hundreds-of-thousands of success stories about the use of commercial geospatial technologies and spatial data in our country. I will highlight a number of examples that may be of particular interest to Chairman Putnam, Ranking Member Clay, and other Members of the Subcommittee.

- The DoD used commercial satellite imagery for targeting and damage assessment in Operation Enduring Freedom and Operation Iraqi Freedom. These same capabilities are now being used to rebuild a free Afghanistan and Iraq.

- The Secret Service, in coordination with state and local governments, uses geospatial capabilities in command and control operations centers to provide protection for high profile national events such as the presidential inaugural, presidential political conventions, Super Bowl, and Olympics.

- The National Commission on Terrorist Attacks Upon the United States (also known as the 9-11 Commission) is using GIS to visualize and analyze the events of the September 11th attacks.

- New York City made extensive use of GIS and GPS during the response and recovery efforts following the September 11th attacks.

- The State of Florida and many local governments in the state are using GIS to plan for, and carry out, evacuations caused by hurricanes.

- The City of St. Louis is using GIS to analyze and plan key infrastructure, land-use, and economic development projects.

- Macomb County, Michigan is using GIS to assist in the county-wide deployment of E-911 services.

- The City of Los Angeles is using web-GIS to provide city officials and the general public real-time traffic flow information for major streets.

- The City of Sacramento is using GIS for planning and implementing capital improvement projects.

- The City of Boston Police Department is using GIS to assist crime reduction activities.

- The Commonwealth of Pennsylvania is using GIS to track, analyze, and respond to outbreaks of the West Nile Virus.

- Warren County, Ohio is using GIS to improve and automate its land information and real estate records systems.

- Sears is using GIS to manage its national fleet of delivery trucks.

Problems, Challenges, and Solutions

The federal government has over the years been a true leader in the use of commercial geospatial technologies and spatial data while greatly assisting non-federal levels of government to deploy these capabilities. The time has come, however, to think anew about the federal government's role and programs needed for our nation to realize the full potential of commercial geospatial technologies and spatial data.

In general, federal government geospatial programs would benefit from increased awareness by the industry as a whole, greater participation by industry experts from all sectors, and more specific goals linked to the type of solid return on investment analysis commonly done in the private sector. Most importantly, the private sector must be a full partner -- *not just a vendor* -- in the process of developing plans and policies to effectively and efficiently implement programs for spatially-enabling the government enterprise.

The spatial technologies industry is leading the way in terms of innovation and investment to provide the high quality products and services that government needs to meet its highest priorities. We must support and accelerate the movement from process intensive and federal government-centric geospatial policies to ones that are market-driven and citizen-centric. The Bush Administration's U.S. Commercial Remote Sensing Space Policy, which was issued last year, is an excellent example of meaningful progress toward this goal.

Based on the views held by a majority of STIA member companies and many of their public sector customers, STIA holds the opinion that the federal government needs a well-funded, highly-coordinated business plan to acquire and maintain the key framework data layers of the National Spatial Data Infrastructure (NSDI) in conjunction with state, regional, local, and tribal government as well as private industry. The Bush Administration's GOS initiative, U.S. Geological Survey's (USGS) National Map program, Federal Geographic Data Committee's (FGDC) grant programs, and a myriad of other federal programs do represent significant progress for the NSDI.

It is time, however, to establish a true business plan for the NSDI with integrated applications and systems that accomplish high priority functions of government such as homeland security and e-government. This new business plan should match the federal government's funding commitments to the strong business case and return-on-investment potential for this vitally important national asset. The business plan's structure should be based on an enterprise approach that maximizes principles of interoperability, integration, and sharing. The goal should be to build integrated, interoperable systems and solutions rather than single purpose applications and data sets.

In addition, the business plan should, to the maximum extent feasible and appropriate, provide incentives to all levels of government to procure commercial geospatial products and services to complete these framework data layers for the NSDI with integrated, interoperable systems and solutions in a timely manner.

Many private and public sector leaders in the geospatial community think that the lack of an effective federal government business plan for the NSDI is the main cause of problems such as "stove-piped" spatial data programs, stalled or cancelled GIS deployments, duplication of spatial data collection, and the slow progress to adopt all necessary spatial data and GIS software interoperability standards. In the absence of a business plan, these problems will undoubtedly become worse ultimately costing the taxpayers much more money than is necessary to spatially-enable government.

Yet, we must be very careful not to confuse apples and oranges when defining and addressing the problems of "stove pipe" programs and duplication of effort in this business plan. Spatially-enabling the government enterprise will inherently mean that government agencies will have similar geospatial capabilities that they use in their own workflow.

During this subcommittee's hearing last year on this topic, former OMB Director Mark Forman estimated that duplication of spending on geospatial data could be as high as 50% when taking into account all levels of government. While everyone in geospatial community acknowledges that duplication of expenditures and "stove pipes" are problems, STIA is not aware of evidence that supports a figure as high as 50%.

Duplication of expenditures and "stove-pipe" problems in government agencies should be defined by replication of functionality and use rather than by the mere presence of geospatial capabilities. In this regard, we should establish the mission of the business plan to achieve the most efficient and effective use of geospatial capabilities across the enterprise rather than to simply cut costs. Simply stated, the federal government should seek to maximize the taxpayers' investment in geospatial capabilities by focusing on the value of spatially-enabling government rather than solely its price.

Another significant issue that needs attention is the lack of consistent and well defined standards for spatial data security and access. This is important from the standpoint of concerns about homeland security, crime prevention, and individual privacy. Despite the progress being made by the FGDC Homeland Security Working Group, currently there is no single policy or set of guidelines governing how the federal government handles and disseminates spatial data. As a result there have been differing policies among various federal agencies that have raised serious concerns in the industry and user community. These discrepancies have been compounded by a similar lack of uniform policies among state, regional, and local governments.

On one hand, all levels of government must be careful not to provide highly sensitive spatial data sets to individuals who would use this information for criminal or even terrorist activities. On the other hand, spatial data sets are essentially the fuel for GIS and other geospatial capabilities. Overly restrictive policies could choke the industry and diminish the power of these capabilities for the geospatial user community.

The results of a recent Rand Corporation report entitled "Mapping the Risks: Assessing the Homeland Security Implications of Publicly Available Geospatial Information" highlights the importance of not overreacting to this challenge. Rand studied the possible threat that publicly available geospatial data on federal government web sites might pose in the hands of terrorists. Rand concluded that less than one percent of the 629 federal spatial data sets they reviewed appeared to have notable value to would-be terrorists. Although the overall tone of the Rand report is reassuring, the need for stronger federal government leadership on spatial data access and security policies should not be dismissed.

This issue gets even more complex when one considers the fact that sensitive spatial data on state, regional, and local government critical infrastructure is in some cases being processed and integrated into GIS at overseas commercial facilities located in countries such as India, Pakistan, and even China. While the fierce and dynamic global economy has compelled many American-based companies to engage in offshoring, it is the responsibility of the federal government to determine if this practice will cause any security risks that should be mitigated.

Notwithstanding these challenges that are inhibiting the growth of the industry and the realization of the full potential of the NSDI, I want to strongly emphasize the fact that commercial geospatial products and services have a proven record of success and offer ready-to-go solutions right now.

Faster progress could be achieved if the public and private sectors of the geospatial community formed a clear and compelling consensus on how the federal government can best assist in the development of a sustainable and market-driven NSDI that will provide a foundation for spatially-enabling the business enterprise of homeland security, e-government, public safety, economic development, environmental conservation, and other vital governmental functions. This consensus could also enable the NSDI to be a robust platform for emerging private sector location-based services and mobile commerce.

In this regard, STIA strongly supports the National States Geographic Information Systems Council's (NSGIC) white paper entitled "Saving Lives and Saving Money - An Urgent Call to Build the National Spatial Data Infrastructure in Support of Public Safety" that was approved by the NSGIC membership during its business meeting at their 2002 annual conference.

In order to be a better partner in the effort to make the vision and potential of the NSDI a reality, STIA recommends that the federal government implement the following ten priority actions:

Action 1. *Establish a blue ribbon task force of experts from government, industry, academia, stakeholder groups, White House, and Congress to assess the progress made to date on spatially-enabling the government enterprise, and to recommend options for future policies.*

Federal government geospatial programs are at the crossroads. While there have been significant successes, it is widely acknowledged in the geospatial community that there is a need for a more inclusive and consensus-based strategy to enable federal government geospatial programs to make the NSDI a reality. In particular, there is a need to more actively enage the private sector in the NSDI to ensure that it is market-driven and sustainable.

We should not continue to look to the federal government to provide the majority of policy alternatives through a "top down" approach; rather, all stakeholders should have a meaningful role in assessing the problems and recommending the solutions. The White House Office of Management and Budget's (OMB) Office of Electronic Government, in conjunction with the FGDC, should establish and oversee a blue ribbon task force to accomplish this goal. In order to define a vision for the task force and the steps that would be needed to make it a reality, a national summit could be called to kick off the effort.

Action 2. *Adopt market-driven standards for spatial data and GIS software interoperability in a timely manner.*

The federal government should be careful, however, not to let standards adoption limit the choices of government buyers and consumers, undermine successful business models, or inhibit innovation.

The federal government should adopt market-driven approaches that reward companies which invest in developing more robust capabilities that enable users to achieve better performance and outcomes. The work being done by the Bush Administration's GOS initiative, FGDC, USGS, International Organization for Standardization, and Open GIS Consortium (OGC) should be accelerated with greater federal support.

Action 3. *Strengthen the management structure for geospatial programs by establishing a dedicated position in the White House OMB Office of Electronic Government responsible for administering and coordinating national geospatial policies and programs.*

This OMB official should directly oversee the work being done by the GOS initiative and FGDC. Section 216 of the E-Government Act of 2002 authorizes OMB to establish a director position in the Office of Electronic Government charged with the responsibility of working with the administrator of the office, federal agencies, non-federal levels of government, and private industry to establish common protocols for the development, acquisition, maintenance, distribution, and application of geographic information. The act also requires the director to oversee coordination with non-federal levels of government, public-private partnerships, and other interested persons to align geographic information, develop common protocols, and adopt standards.

STIA ardently urges Congress to provide the full funding required by OMB to establish this director position and carry out all the activities detailed in Section 216.

Action 4. *Establish a business plan that includes a new grant federal funding program, possibly modeled on many aspects of the Federal-aid Highway Program, to form consistent, standards-based, and equitable partnerships with state, regional, local, and tribal government as well as the private sector to build and maintain a market-driven and sustainable NSDI with integrated applications and systems that accomplish high priority functions of government such as homeland security and e-government.*

This business plan should be designed to foster market-driven, performance-based partnering that will leverage financial resources at each level of government. Federal agencies and non-federal government grantees should make use of commercial geospatial products and services to the maximum extent feasible and appropriate to implement these activities detailed in the business plan. This business plan should be fully integrated with the USGS' National Map Program and the GOS initiative.

Action 5. *Develop a national strategy to achieve the level of geospatial preparedness required to address high priority homeland security threat scenarios identified by Congress and the White House. This strategy should also deal with all major hazards determined by state, regional, local, and tribal government as well as the private sector to endanger lives, property, and critical infrastructure.*

STIA encourages Congress to provide strong support for the work being done by the DHS to formulate a national strategy for geospatial preparedness.

The White House National Strategy for Physical Protection of Critical Infrastructures and Strategic Assets, published during 2003, included a key recommendation to "develop an integrated critical infrastructure and key asset geospatial database." Homeland Security Presidential Directive-7 directs the department to geospatially map, image, analyze, and sort critical infrastructure and key resources by utilizing commercial satellite and airborne systems, and existing capabilities within other agencies.

Congress should allocate the funding necessary for the DHS to determine the best way of achieving these important White House goals.

Action 6. *Support the development of reliable and consistent metrics and data about the geospatial enterprises in the federal government.*

It is extremely important that the federal government be committed to developing and maintaining appropriate geospatial metrics about its many funded activities. Government and industry must work together to come up with the framework for those metrics and overcome reluctance to measure, report and share information.

One of the fundamental problems in the geospatial arena is the lack of reliable and consistent measures and data about virtually every important management factor: spatial data collection plans, spatial data holdings, planned applications, geospatial data usage, and geospatial budgets. The federal government should lead the way in measuring its own geospatial enterprises and making those measures available to the public.

These measures have many benefits both for government and the industry. Sound forecasts about federal government demand for commercial geospatial products and services will enable the private sector in the U.S. to have the capability and capacity to deliver what is needed.

By way of example of government and industry cooperation in developing better metrics, I would note that STIA has been working with the DOL on the department's High Growth Jobs Initiative for the geospatial technologies industry. The purpose of this DOL initiative is to use the demand for workers from this and other high growth industries to drive the education/training and employment actions of our national work force system in order to produce workers whom employers want and need to hire. Unfortunately, the lack of good metrics about the geospatial industry has been identified as a major barrier. STIA hopes to work with DOL in a cooperative effort to define the industry and its work force needs. This lack of metrics is a pervasive problem that requires significant government-wide focus.

Action 7. *Ensure that geospatial technologies and spatial data are well-defined and fully integrated in the OMB's Federal Enterprise Architecture (FEA).*

Inclusion in the FEA will help assure that geospatial technologies are properly integrated into all necessary areas of the federal enterprise. Furthermore, this measure will help to expand the ability of federal agencies to collaborate and share critical geospatial information for homeland security and other government service missions.

Action 8. *Partner with industry and public sector organizations to raise awareness about "best practices," performance-based business cases, and positive return-on-investment (RIO) case studies for the use of commercial geospatial technologies and spatial data.*

There are many excellent examples of successful deployments of geospatial capabilities at all levels of government and in the private sector. Sharing information about "best practices," business cases, and ROI case studies can help to reduce, and prevent, problems such as duplication of efforts and "stove piping." This type of information could be made available to the public through the GOS web site.

Action 9. *More forcefully encourage federal agencies and federal grantees to make use of standards-based commercial geospatial products and services to the maximum extent feasible and appropriate.*

The federal government should make a more diligent effort to define and end geospatial activities that are not inherently governmental in nature in order to avoid, to the greatest degree possible, competition with the private sector. One of the main criteria for making this determination should be based on whether superior performance and outcomes can be achieved for citizens by using commercial geospatial products and services.

The OMB and U.S. Department of Interior (DOI) should include the private sector on the board of directors for the GOS initiative. An industry committee should be formed with a common representative invited to attend GOS board meetings and make comments about pending issues. Direct and balanced private sector input would increase confidence, speed the adoption of industry standards, and provide a transparent and vendor-neutral means for the DOI and GOS board to learn about innovations and trends in the integrated spatial technologies industry.

STIA also believes that this action should include specific measures by OMB and National Institute of Standards and Technology to develop and disseminate consistent guidance to federal agencies with respect to the use of OMB Circular A-119 in the adoption of standards developed by voluntary consensus organizations. The timely inclusion of international and industry standards in federal acquisitions is a market-driven step toward the effective advancement of innovative, easy to integrate technology products and service capabilities.

Action 10: *Empower the DHS, in conjunction with the FGDC Homeland Security Working Group, to take a lead role on issuing regulations and guidelines for spatial data security and access.*

Currently there is no single policy or set of guidelines governing how the federal government handles and disseminates spatial data in the context of concerns about homeland security and individual privacy. Differing policies among various federal agencies have raised concerns in the industry and user community. These concerns have been compounded by a similar lack of uniform policies among state, regional, local, and tribal governments.

While experts have determined that the vast majority of federal spatial data available on web sites is of limited or no value to would-be terrorists, some data sets are clearly very sensitive. The practice of offshoring the processing of spatial data sets about critical infrastructure of state, regional, and local governments for GIS has further exacerbated worries. The DHS, in conjunction with the FGDC Homeland Security Working Group, should provide leadership in addressing these challenges and preventing potential problems from occurring.

STIA is committed to supporting all public and private sector entities working to improve federal government policies and programs to achieve these ten recommendations. STIA seeks to develop a consensus within the industry and public sector user community about these priority actions and other related national public policy issues. STIA has been working with the Council for Excellence in Government, Geospatial Information & Technology Association, Intelligent Transportation Society of America, National Association of Counties, NSGIC, Urban and Regional Information Systems Association, and many other stakeholder organizations on consensus building activities.

NSDI Vision, Performance, and Outcomes

If the federal government implements these ten priority actions, the great potential of a market-driven and sustainable NSDI can be achieved. The business case for the NSDI has never been stronger given the proven success of geospatial capabilities for both military and civilian government mission critical functions.

The NSDI is a powerful tool to achieve the level of preparedness required to win the War on Terror and accelerate the knowledge-based economy while creating high-wage, high-growth jobs in the U.S. These are the types of jobs that are fundamental to our nation's economic well-being and global competitiveness.

We are now facing security threats from weapons of mass destruction which resourceful and determined enemies of America seek to use in order to cause maximum harm to our citizens, infrastructure, economy, and ultimately, our way of life. We cannot fully meet these new national security threats and economic challenges with old approaches. The military has already recognized the need to transform its methods of fighting wars through a network-centric, information-rich environment that permits rapid, effective sensing and response to increasingly complex and changing threats. Our nation's homeland security and economic security deserve no less.

Transformation using standards-based, interoperable geospatial technologies and spatial data will not happen overnight, but failure is not an option. The NSDI should be a core component of the foundation for America's national security, economic prosperity, and social progress in the 21st Century.

Conclusion

Once again, I would like to thank Chairman Putnam and Ranking Member Clay for the opportunity to testify and submit a written statement for the hearing record. I look forward to working with both of you and the other distinguished Members of the Subcommittee.

STIA is committed to supporting sound federal government public policy and programs that will promote the use of commercial geospatial capabilities through free market competition while achieving a more citizen-centric, market-driven, and performance-based government that provides the best possible services to the public with the greatest financial and non-monetary return on the taxpayers' investment. We are not lost, but we must make mid-course corrections to achieve a secure future for our nation.

Mr. PUTNAM. Thank you very much.

Our third witness on this panel is John Palatiello. Mr. Palatiello is executive director of the Management Association for Private Photogrammetric Surveyors [MAPPS], the Nation's oldest and largest trade association of private firms in the geospatial field. Founded in 1982, MAPPS has more than 170 member firms. Mr. Palatiello is also president of the firm of John Palatiello & Associates, a public affairs consulting firm in Reston, VA, providing government affairs and association management services to firms and organizations with a specialization in services to the architect engineer, remote sensing mapping, and GIS communities. He also serves as administrator of the Council on Federal Procurement of Architectural Engineering Services, a coalition of the Nation's leading design professional societies.

Welcome to the subcommittee. You are recognized for 5 minutes.

Mr. PALATIELLO. Thank you, Mr. Chairman. I appreciate the opportunity to be here and share our views.

As you indicated in your opening statement, this is a follow-on to a hearing that was held in June of last year, at which time Mr. Mike Ritchie, then president of MAPPS, was honored to testify. At that time, he pointed to several areas where we thought improvement was needed in the Federal Government's geospatial activities, and I would like to take a few moments today to update you on where improvement has been made and where we believe further action is necessary.

In his testimony last year, Mr. Ritchie indicated that Geospatial One-Stop was akin to a cable television system that only carried PBS channels or a card catalogue in a library that only carried GPO publications. We indicated that in order for Geospatial One-Stop to become a true one-stop shopping portal for geospatial data, that private data, as well as government data, must be included. We are very pleased that steps have been taken to ingest private data into Geospatial One-Stop, and we give Mr. Cameron, who updated you on that, a lot of credit for his initiative. But there is a lot more data out there, and a much more aggressive outreach program must be implemented to ensure that the entire assets resident within commercial data providers is accessible via Geospatial One-Stop.

One of the areas where there has not been any further action, although I am pleased that there have been stakeholder meetings and focus group studies and an attempt to at least identify problems, is the fact that neither FGDC nor GOS fully reached their potential because of their limited structure and participation. FGDC only includes Federal agencies; there is no representation by folks like Mr. Nagy and his organization, by the States, by local government, or the private sector. We simply do not have seats at the table. The Geospatial One-Stop Board includes both Federal and State and local government, but, again, the private sector does not have a seat at the table. And we believe broader participation by private sector interests in setting policy and strategy for FGDC and GOS will result in a stronger offering to better represent the interests of the American people and business and all stakeholders.

At the Federal level, we have come to the conclusion that FGDC and GOS are not reaching their full potential because they are es-

sentially voluntary and secondary responsibilities for the participants. Other than very small staffs at FGDC and GOS, for everyone else it is not their full-time job; it is something they do as an afterthought, after fulfilling the core mission of their agency. There is neither a carrot nor a stick to incentivize or mandate conformance. And we think a change in the charter and implementation of FGDC must be carried out in order to assure its full implementation.

I think it is worthwhile to look at a little history, and we have this outlined in our statement. Prior to the issuance of what is now OMB Circular A–16 in 1953, in the old Bureau of the Budget there was a much stronger role in what was then called surveying and mapping within the Bureau of the Budget. There was a Board of Surveys and Maps that reported to BOB. That was later disbanded and in the 1940's it was brought into an actual staff position in the Bureau of the Budget. All of that went away when the predecessor to A–16 was promulgated and it was devolved down to the individual agencies.

We believe, as you alluded to, that we should explore the re-establishment of an OMB office or the committee should be directly an OMB committee. It is our view that delegating responsibility for coordinating mechanisms down to the agencies has not been the most effective model, and that a stronger OMB role is necessary to make coordination, interoperability, duplication avoidance, and data sharing a reality.

We would take one exception to a response that Mr. Cameron did make to his questioning, and that is the fact that there is still a considerable amount of Federal Government competition with the private sector in the geospatial area. There are still far too many agencies that have considerable production capabilities that both duplicate and compete the private sector, and a more robust effort is necessary to harness the capabilities and talents and technology that is resident in the private sector. So there is not only duplication across Federal agencies and on an intergovernmental basis, but there is also duplication of the private sector.

With that, I was going to mention that we are not proceeding with a good map, but I think my time is up. But thank you for the opportunity to participate, and we look forward to working with you on these initiatives.

[The prepared statement of Mr. Palatiello follows:]

Testimony of John M. Palatiello
Executive Director
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: Are we headed in the right direction or are we lost?"
June 23, 2004

Mr. Chairman, members of the subcommittee, I'm John Palatiello, Executive Director of the Management Association for Private Photogrammetric Surveyors (MAPPS) the nation's oldest and largest national association of private sector firms in the mapping, spatial data and geographic information systems field. The more than 170 member firms of MAPPS are engaged in mapping, 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. As you will recall, our President, Mr. Mike Ritchie, testified before the Subcommittee in June of last year. At that time, MAPPS pointed to several areas where improvement is needed in the Federal Government's geospatial activities in order for the citizens of our Nation to receive the full benefit that geospatial technologies has to offer. My testimony today will focus on areas in which improvement has been made in the past year, as well as areas where further action is needed.

In his testimony last year, Mr. Ritchie said Geospatial One-Stop was akin to a cable television system that only carried PBS or a card catalogue in a library that only carried GPO publications. We indicated that in order for Geospatial On-Stop to become the true one-stop shopping portal for geospatial data, it must include private data, as well as government data. We are pleased that steps have been taken to ingest private data in Geospatial One-stop and data one can find metadata on several of our members' holdings. We commend Geospatial One Stop, and Mr. Cameron in particular, for bringing this about. However, a much more aggressive outreach program must be implemented so that the entire assets resident among commercial data providers is accessible via Geospatial One Stop.

One of the shortcomings of both the Federal Geographic Data Committee (FGDC) and Geospatial One Stop (GOS) is their limited structure and participation. FGDC only includes Federal agencies. Neither state and local government nor the private sector has seats at the table. The GOS Board includes state and local government representatives, but not the private sector. Broader participation by private sector interests in setting policy and strategy for FGDC and GOS will result in a stronger offering that better represents the interests of the American public and American business, and will engage all stakeholders.

Under the current structure, for Federal agencies the FGDC and GOS processes are essentially voluntary and secondary. Agencies are focused on their own missions, not a broader national strategy. Coordination, data sharing, interoperability and duplication-avoidance are secondary to meeting the agency's own program needs. They are after-thoughts or low priority items. For all agency employees, other than the very small staffs at FGDC and GOS, these goals are no one's full time responsibilities. There is neither a carrot nor a stick to incentivize or mandate conformance. A change in the charter and implementation of FGDC in particular must provide either incentives or penalties to assure compliance.

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Delegating responsibility for implementation of these coordinating mechanisms to entities within the Department of the Interior is not the most effective model. The widespread perception is that these are Interior or USGS activities, not OMB activities affecting all Federal agencies. We believe a stronger OMB role must be established to make coordination, inter-operability, duplication-avoidance and data-sharing a reality.

Prior to the promulgation of the first version of OMB Circular A-16 in 1953, the old Bureau of the Budget had a much stronger role in coordinating Federal geographic information activities. Executive Order 3206, issued on December 30, 1919, established the Board of Surveys and Maps of the Federal Government to coordinate and promote improved surveying and mapping activities by Federal agencies. It was a Bureau of the Budget entity. Its name was changed to the Federal Board of Surveys and Maps by Executive Order 7262 on January 4, 1936. Under that authority, in 1941, the Bureau of the Budget issued the "United States National Map Accuracy Standards," which applied to all Federal agencies that produce maps. The standards were revised several times, and the current version was issued in 1947. They are still used today. The Board was abolished by Executive Order 9094, on March 10, 1942 and functions were transferred to the Bureau of the Budget. An office in the Bureau of the Budget coordinated Federal geographic information activities. Those responsibilities were devolved to voluntary coordination activities of the agencies when Circular A-16 was issued in 1953. We believe the reestablishment of an OMB office should be considered by OMB and the committee.

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. The President's Competitive Sourcing initiative is designed to implement the aforementioned policy through OMB Circular A-76 and in accordance with the Federal Activities Inventory Reform (FAIR) Act, Public Law 105-270.

Mr. Chairman, we would like to reiterate that GOS 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 the enforcement of OMB Circular A-16 all have one thing in common: they attempted to treat the symptoms, rather than the disease.

There are dozens of Federal agencies engaged in geospatial activities. Neither the agencies, nor OMB, have 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, needs improvement. There is considerable duplication and redundancy, little sharing of data, and development of standards for "interoperability" of data has been far too slow. 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 and the Department of Homeland Security is still too young to be an effective player, let alone leader.

There are far too many Federal agencies operating geospatial production capabilities that are expensive, inefficient, and which duplicate and compete with the private sector. 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 consider "commercial" in nature, agency compliance with the FAIR Act, 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. There is no cross reference to these policies in NSDI, A-16, FGDC, GOS or Executive Order 12906.

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. Much of this expenditure is outside the GOS, FGDC and A-16 structure.

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 last year's White House Policy on Commercial Remote Sensing, and we are confident 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. 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.

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 government 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. MAPPS strongly supports H.R. 3367 by Rep. Sessions and S. 1230 by Senator Allard to create a statutory geospatial program in DHS.

Mr. Chairman, the title of this hearing is: "Geospatial Information: Are we headed in the right direction or are we lost?" The short answer is we are not proceeding with a good map. 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 the 1930s. 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. Thank you, Mr. Palatiello.

Our next witness is David Schell. Mr. Schell serves as president and chief executive officer of the Open GIS Consortium, a nonprofit trade association with a current membership of 260 commercial, government, and academic organizations whose primary objective is to create a consensus forum and related industry collaborative for the solution of critical, technical, and business development problems in the geoprocessing community. In 1992 he left industry to organize the Open GIS Foundation in order to formalize technology transfer programs for GIS and related technologies, and to define and support the development of the Open GIS movement. In 1993 he initiated the Open GIS Project and reorganized OGF as the Open GIS Consortium.

Welcome to the subcommittee. You are recognized for 5 minutes.

Mr. SCHELL. Thank you very much. I have not spoken in this forum before, and I think before starting I would just like to say that I would like to in effect spend my time clarifying the position of my organization, and I think that is, in itself, a kind of policy statement equivalent to what many of the other participants have made, because what I am concerned with, what my organization is concerned with is the technology that in fact sets policy.

I am very concerned about definitions, and you will not hear me use the term GIS, you will hear me use terms like spatial enablement of the enterprise. And I am very much concerned with the issue of clarifying the difference between GIS application systems and issues like data standards. I think there is a great deal of confusion in the language that is used by most people in policy positions in government about these things. And now I will begin my formal statement.

I am president of the Open GIS Consortium [OGC], a voluntary consensus standards organization. OGC is a not-for-profit global industry association founded in 1994 specifically to address the geospatial information sharing challenges that give rise to this hearing. The OGC's worldwide membership, which totals 260 entities, includes geospatial software vendors, government integrators, information technology platform providers, U.S. Federal agencies, agencies of other national and local governments and universities.

To position my organization a little better, I would like to begin by pointing out that the network of public/private partnerships embodied by OGC has accomplished literally for the geospatial information community something similar to what the U.S. railroad companies had accomplished in 1986, when they achieved consensus on the adoption of a common rail gage. I think this is a very important thing for everybody to understand because it is at the heart of the issue of software versus data. By having a common gage, they eliminated the excessive cost of transshipping freight and passengers across previously impassible junctions defined by differing and proprietary track designs. What the railroads did with track gage the OGC has done with standards that enable technology to transship geospatial information between and among differing and proprietary computer application systems, with similar immediate cost savings and even more dramatic financial benefits for long-term institutional and societal developments. This is the key issue.

In this light, I would like you to imagine one of the results of this. Imagine a road contractor who uses one vendor's software to develop a plan for a street, and then directly over the Internet updates a city highway department's street data base, which the department holds in another vendor's software. Notice, another vendor's software which can be accessed in realtime. Next, a policeman uses a third vendor's software on a handheld device to view a simplified map generated from the highway department's street data base so he can route traffic around the scene of a fire. The multiple vendor systems work together in realtime because they use the same open standards-based software interfaces. Again, this is the point, open standards-based software interfaces.

Due to the work of the OGC, ISO, and other standards organization, a framework of standard-based technologies now exists upon which Government can build at reasonable cost capacity for interagency data sharing and decision support using geospatial information. Hundreds of commercial products now implement OGC member-defined standards. Hundreds of organizations. Major organizations now integrate location intelligence as a ubiquitous capability in their enterprise architectures by implementing the OGC standards. With this acceptance in the market, we are at a critical point in the spatial enablement of Government, that is, the barrier-free use of spatial information in the enterprise.

But important work does remain. There are two kinds of standards relating to geospatial information. First, there are the data content standards that govern what specific codes or alphabets are used to record the details of spatial location or the shape of geographical structures. Developing data content standards is the focus of the FGDC. Second, there are the interoperability standards that govern the software interfaces used to access, manage, and communicate geospatial data within operational IT systems, whether located in a single location or widely distributed among a variety of different proprietary software systems and the Internet.

The OGC is the only organization that develops and promotes such geoprocessing interoperability standards. The OGC does the same kind of work the Worldwide Web consortium does, but our efforts are focused specifically on geospatial technologies.

Your theme for this hearing is "Geospatial Information: Are We Headed in the Right Direction, Or Are We Lost?" We are headed in the right direction in the sense that both the FGDC and the OGC continue to develop the necessary standards. We are lost to the degree that, in practice, policymakers have overlooked the importance of OGC's interoperability standards efforts and have not accepted and done what is necessary to reap the benefits of OGC's work. A policy commitment to the development and deployment of both geospatial data content and geospatial interoperability standards is critical to a national strategy for geospatial information sharing.

The way forward requires leadership and policies that promote development and uptake of content standards and interoperability standards. Our key recommendations are documented in our written testimony. Here I wish to emphasize one key observation: The Government's geospatial information goals would be attained sooner and at less expense, far less expense if there were stronger agen-

cy participation in the OGC's open and collaborative industry process. Only through active participation and support can Government ensure that unfinished standards such as those evolving for broad access and application of sensor data, geospatial data, geospatial digital rights management and data security be developed to reflect the needs of the public and the requirements of the Government agencies entrusted to serve the public interest.

Mr. PUTNAM. Mr. Schell, if you could just summarize real quickly, and then we will get to Dr. Cowen. We can revisit this in questions.

Mr. SCHELL. OK. In conclusion, on behalf of OGC, I thank you, Chairman Putnam and Ranking Member Clay, and the distinguished members of the committee. And I am sorry I went over my time; there is a lot to say.

[The prepared statement of Mr. Schell follows:]

Written Testimony of David Schell
President of the Open GIS Consortium, Inc. (OGC)

Before the U.S. House Committee on Government Reform

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

Hearing on "Geospatial Information: Are we headed in the right direction or are we lost?"

June 23, 2004

Chairman Putnam, Ranking Member Clay, and distinguished Members of the Subcommittee,

Thank you for the opportunity to appear before you today at this oversight hearing on "*Geospatial Information: Are we headed in the right direction or are we lost?*" From my viewpoint, the answer to the question is that we are basically on the right track, but we need to make some mid-course corrections.

I am president of the Open GIS Consortium (OGC), a voluntary consensus standards organization. The OGC is a not-for-profit, global industry association founded in 1994 specifically to address the geospatial information sharing challenges that gave rise to this hearing. The OGC's worldwide membership, which totals 260 entities, includes geospatial software vendors, government integrators, information technology platform providers, US Federal Agencies, agencies of other national and local governments, and universities.

The network of public/private partnerships embodied by the OGC has accomplished for geospatial information what the US railroad companies had accomplished by 1886, when they achieved consensus on the adoption of a common rail gauge. By having a common gauge, they eliminated the excessive cost of transshipping freight and passengers across previously impassible junctions defined by differing and proprietary track designs. What the railroads did with track gauge, the OGC has done with standards that enable technology to "transship" geospatial information between and among "differing and proprietary" computer application systems, with similar immediate costs savings and even more dramatic financial benefits for long-term institutional and societal development.

Imagine that a road contractor uses one vendor's software to develop a plan for a street and then, directly over the Internet, updates a city highway department's street database, which the department holds in another vendor's software. Next, a policeman uses a third vendor's software on a handheld device to view a simplified map, generated from the highway department's street database, so he can route traffic around the scene of a fire. The multiple vendors' systems work together in real time, because they use the same open, standards-based software interfaces.

Due to the work of the OGC, ISO and other standards organizations, a framework of standard-based technologies now exists upon which government can build, at reasonable cost, capacity for inter-agency data sharing and decision support using geospatial information. Hundreds of commercial products now implement OGC member-defined standards. Major organizations now integrate "location intelligence" as a ubiquitous capability in their enterprise architectures by implementing the OGC's standards. With this acceptance in the market, we are at a critical point in the "spatial enablement" of government.

Your theme for this hearing is, "*Geospatial Information: Are we headed in the right direction or are we lost?*" We are on the right track in the sense that the Federal Geographic Data Committee (FGDC) and the OGC continue their decade-long projects to develop the complementary standards that are necessary for consolidating and improving utilization of the masses of geospatial data collected by departments and agencies across the federal government and by state and local governments. We are lost to the degree that in practice, policy makers have overlooked the importance of the OGC's interoperability standards effort and have not accepted and done what is necessary to reap the benefits of either the FGDC's or the OGC's work. A policy commitment to the development and deployment of both geospatial data content and geospatial interoperability standards is critical to a national strategy for geospatial information sharing.

There are two kinds of geospatial standards: data content standards and software interoperability standards.

To date, this Subcommittee's Geographic Information System (GIS) hearings and Geospatial One-Stop (GOS) itself have focused almost entirely on spatial data content standards. These standards involve the way that data is "written", that is, the way the data is collected and the way geographic features are represented. These standards help spatial data developers answer questions such as: How do you define a road in a digital database? How do you structure the data so it can be efficiently used with other systems? What is the common structure of the metadata, that is, the digital documents in which you describe and catalog the spatial datasets so one can search for and find data using automated methods? This is the kind of standards work the interagency FGDC does.

The OGC is the only organization that develops and promotes geoprocessing software interoperability standards. Interoperability involves different systems exchanging data and instructions in real time through open, consensus-defined interfaces. The OGC's geospatial software interoperability standards help software users and developers answer questions such as: How can my different Geographic Information Systems (GIS) and/or Computer-Aided Design (CAD) systems exchange geospatial data and geoprocessing instructions in real time? What open interfaces do I need to build a spatial data catalog, or "spatial search engine", that works as well as, or better than, Google and Yahoo work with text data? These software interface and encoding standards are called OpenGIS® Specifications. OpenGIS Specifications are free and publicly available software engineering specifications similar to those that underlie the Web. The OGC does the same kind of work the World Wide Web Consortium does, but our efforts are focused on

complex and diverse geospatial technologies. The OGC creates the spatial dimension of the Web. The OGC's standards make it possible for spatial information of all kinds to be easily communicated over the Web.

In the past, GISs and systems for earth imaging, location based services, navigation, surveying and mapping, facilities management, digital cartography and spatial databases were integrated into government solutions using proprietary interfaces. Integrators had few choices. But in today's interconnected, plug and play world, no new government software should ever depend on proprietary interfaces where similar open interfaces are available. And legacy systems should be upgraded with open interfaces so they can be part of larger networks. As DISA's chief technology officer, Dawn Meyerriecks, says, "We want to have standards applied to all important interfaces.... Being vendor-independent, vendor-neutral helps us protect our equity."

The FGDC and the OGC have complementary missions. The most visionary leaders in the FGDC have understood that the OGC's standards, implemented now in hundreds of products, are essential for the NSDI and for the enterprise architecture initiatives of organizations like DISA and the Dept. of Homeland Security. FGDC participates in the OGC at the highest level, as a Strategic Member. The OGC works closely with FGDC in those areas where data content standards and software interoperability standards must advance together to provide essential National Spatial Data Infrastructure capabilities, such as in catalogs. And both organizations have supported each other in their outreach and education activities.

Though FGDC's mission is important, perfection is impossible. Two road databases, for example, created by two different organizations with different missions and business objectives, will often not contain exactly the same kinds of details about roads. Some of the OGC's standards help people get around such data model mismatches by enabling automatic translation between data sets that use content models that are similar but not the same. The key standard involved here is the OGC's Geography Markup Language (GML), an XML encoding schema for spatial data. XML (eXtensible Markup Language) is a World Wide Web technology. Such translation is not perfect, but it enables people to make the best possible of use of data that is not exactly what they would ideally like to have, data that would otherwise be unusable.

FGDC's Content Standard for Digital Geospatial Metadata is a standard schema for "data about data" that describe the content, quality, condition, and other characteristics of spatial data. Such a standard is essential in internet-based clearinghouses or catalogs that enable users – or automated services – to search for data sets that match certain criteria. The OGC's OpenGIS Catalog Services Specification defines software interfaces that enable construction of catalog services that respond to automated, network-based queries from any client application that structures its query to conform to the Catalog Services Specification. The OGC-defined services depend on data that conforms to the FGDC metadata content standard. This now-standard mechanism for automated search and discovery of spatial data is critically important for the NSDI. It is perhaps the single most important NSDI capability that requires both OGC and FGDC standards.

Other OGC standards address other interoperability problems that have little or nothing to do with data content standards or metadata. OpenGIS Specifications document industry consensus on how different vendors' systems are to work together to provide capabilities like these:

- Perform coordinate transformation in such a way that all overlaying views of geodata ("maps") from diverse sources automatically use the same spatial reference system.
- Provide uniform access by Web clients to maps rendered by diverse map servers on the Internet.
- Provide common ways for different raster-based systems to request and view satellite images, digital elevation models, and digital orthophotos and to request execution of certain kinds of analysis such as histogram calculation, image covariance and other statistical measurements.
- Enable companies in the Location Based Services value chain to "hook up" and provide seamless integration of their pieces of applications such as emergency response (E-911, for example), personal navigator, traffic information service, proximity service, location recall, mobile field service, travel directions, restaurant finder, corporate asset locator, concierge, routing, vector map portrayal and interaction, friend finder, and geography voice-graphics.
- Enable a client to instruct that a particular "view" be created of a geospatial feature collection, associating presentation rules (such as "black, 2 pixels wide") with feature types (such as "secondary roads").
- Enable one GIS to instruct another GIS to publish, store, access, and perform operations on features described using vector data elements such as points, lines and polygons.

OpenGIS Specifications are available for download free of charge at www.opengis.org.

The important concept for members of this Subcommittee is that the data content standards developed by FGDC, an interagency committee, and the interoperability standards developed by the OGC, a voluntary industry consensus standards organization, are the two essential parts of an effective GOS and an effective National Spatial Data Infrastructure (NSDI). Both are essential to the integration of spatial information in any public sector or private sector enterprise architecture. Both are useless unless they are deployed widely. The timing is very good – consensus has been reached on important elements in each organization's standards portfolio. Both are increasingly being used.

The challenge is now "uptake" or deployment, as well as refinement of existing specifications, completion of specifications in the development pipeline, and refinement of compliance and interoperability testing to provide a solid foundation for open procurements that extricate agencies from expensive stovepipes. Government is in a very effective position to

accelerate the wide deployment of data content and interoperability standards, with extraordinary near-term and long-term benefits.

This Subcommittee can take actions that will enable industry and government to solve the challenges described in this and previous hearings, with little delay. Success will be easy to see and easy to measure. The risk is minimal: hundreds of commercial and open source products and applications now implement the OGC's OpenGIS Specification standards. The cost is minimal. In fact, government's cost for software is already going down due to the new standards. The rewards, in monetary terms, are savings that will be tallied in the billions of dollars per year nationally. These savings are due to reduced redundancy in data collection, improved data sharing, and the ability to buy "plug and play", "loosely-coupled" component solutions rather than full-featured, vertically integrated "tightly-coupled" solutions.

Other rewards include: increased use of spatial capabilities by a much larger number of people; growth in the domestic and export markets for spatial software and spatial data; increased employment in the spatial market sector; growth in the number, quality and value of spatial data products and services; and increased efficiencies and capabilities wherever interoperable spatial software and services are introduced in government, business and daily life.

The way forward requires leadership and new policy.

Leadership and policies to promote uptake of both kinds of standards are the only way out of the GIS stovepipes that waste time and money and introduce risk in so many critical functions at all levels of government. Our recommendations are as follows:

1. The FGDC and other federal agencies need to continue to participate in the OGC to ensure that unfinished standards – such as those involving security, sensor webs, geospatial data pricing and ordering, operations on geospatial data, and geospatial digital rights management – reflect the needs of the public and the requirements of the government agencies entrusted to serve the public interest. Many of the Federal Government's geospatial information goals would be attained sooner and at less expense if there were stronger agency participation and support at all levels in the OGC's open, collaborative industry process, including strategic goal setting, specification development, interoperability testing, and outreach and uptake. Membership is not enough. Active participation is needed.

2. The FGDC needs support from GAO and OMB in its dealings with other federal agencies. As the Spatial Technologies Industry Association (STIA) recommended in these hearings last year and is recommending again this year, this Subcommittee should work to strengthen the management structure for geospatial programs by establishing a dedicated position in the White House Office of Management and Budget's (OMB) Office of Electronic Government responsible for administering and coordinating national geospatial policies and programs. As the Chair of this Subcommittee pointed out last year, developing a unified game plan is generally not technology-driven, but rather

management and people-driven. That is certainly true, and this recommendation would give us the possibility of having a strong and fair coach who could come up with a unified, standards-focused game-plan and assure that the many players execute it well. He or she must be dedicated to, and perhaps accountable for, fair and open procurements.

3. The FGDC needs support from GAO and OMB in mandating data standards and interoperability standards whenever federal money pays for spatial data or spatial technology purchased by federal, state or local agencies. Note that every physical infrastructure project, every environmental program, and many other programs require spatial data. FGDC needs to develop, establish federally, and promote nationally best practices for the development and procurement of both spatial data and spatial systems. That is, FGDC needs to be able to mandate federally and to promote nationally both data content standards and software interoperability standards as the two-part solution to spatial data sharing problems.

4. Much as STIA recommended last year, this Subcommittee ought to ask the OMB to write a business plan that includes a new grant funding program, possibly modeled on many aspects of the Federal-aid Highway Program, to form consistent and equitable partnerships with state, regional, local, and tribal governments as well as the private sector to build and maintain a market-driven and sustainable National Spatial Data Infrastructure (NSDI) with standards-based data, applications and systems that accomplish high priority functions of government such as homeland security and e-government.

In conclusion:

On behalf of the OGC, I thank Chairman Putnam, Ranking Member Clay, and distinguished Members of the Subcommittee for the opportunity to speak here today and to submit testimony for the written record. I hope this testimony has made it clear what needs to be done to get back on track. The good news is that we are ready to begin harvesting the fruit of many years of difficult but productive consensus work. Government just needs to organize the harvest, while also attending to unfinished standards such as those for sensor webs, geospatial data pricing and ordering, geospatial digital rights management, and geospatial data security on the OGC side and cadastre, wetlands and other framework content standards on the FGDC side. The OGC looks forward to working with this Subcommittee and the Government's executive-branch agencies to ensure that our nation obtains the geospatial standards it needs and then benefits from them to the fullest extent possible.

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Mr. PUTNAM. There is a lot to say, and we are going to try to get to it. We want Dr. Cowen to have an opportunity, though, before we are called away for votes.

Dr. Cowen is our final witness on this panel. David J. Cowen is Chair of the Department of Geography at the University of South Carolina and a Carolina distinguished professor. He is the current Chair of the Mapping Science Committee of the National Research Council and has been actively involved in spatial data handling for more than 30 years. He is also the co-director of the NASA Affiliated Research Center. He has served as the president of the Cartographic and Geographic Information Society and as a U.S. delegate to the IGU Commission on GIS. During his career, he has been involved in scores of GIS projects relating to a wide range of topics, including economic development, land use changes in real estate.

Welcome to the subcommittee. You are recognized.

Mr. COWEN. Chairman Putnam, Ranking Member Clay, distinguished members of the subcommittee, it is my privilege to testify before the subcommittee on behalf of the National Research Council's Mapping Science Committee. We greatly appreciate being included in today's hearing. The Mapping Science Committee was created in 1989 and has severed as a blue ribbon committee of experts from all levels of Government, academia, and the private sector, and we provide pro bono service to the Nation. Our committee provides independent advice on scientific, technical, and policy matters relating to spatial data, and we promote the informed and responsible development and use of spatial data.

Since 1989, we have conducted 15 studies that relate to the way that we can improve the way the Federal Government makes spatial data available to all aspects of society. Today we are pleased to present to the committee copies of our most recent report, a Geospatial Framework for the Coastal Zone: National Needs for Coastal Mapping and Charting. This report highlights the cooperation between NOAA and the USGS to integrate elevation and bathimetric data.

I will point out to you, Mr. Chairman, that is Tampa Bay on the cover.

We also will soon release our comprehensive study on licensing geographic data and services that addresses one of the most significant obstacles that we have.

It is important to address the specific issues relevant to this hearing. Most importantly, the Mapping Science Committee believes that in the last year the Federal Government made an important midstream adjustment and the path is much better marked than it was previously. We are pleased to see the articulation of the distinct but related roles of the FGDC, the National Map, and Geospatial One-Stop. This model of a three-legged stool appears to cover the major bases in a coherent manner.

We believe that the role of FGDC is clear and that the organization has served as a valuable focal point for the coordination of Federal activities. However, and this is important, we do not believe the FGDC has had sufficient clout to get its work done in an expeditious manner. We have found its partnership programs to be underfunded, too short in duration, and not sufficiently rigorous.

We also believe that its future plans do not express the urgency required to complete their valuable work. We would also encourage the FGDC to adopt a less Federal-centric governance structure.

A recent committee report provided an in-depth analysis of the USGS plans for the National Map. We found the concept of the National Map to be ambitious, challenging, and very worthwhile. We also encourage the agency to develop a more rigorous implementation plan to place a priority on building the necessary partnerships. We are pleased to see the progress that the USGS is making on all these fronts. The National Map is the critical data leg of the NSDI stool; it holds great technical and institutional promises for changing the way that the public sector assembles, integrates, and distributes geographical data. However, the plan requires voluntary participation from partners and unfortunately, from local and State government perspectives, there are few incentives to create these partnerships.

Geospatial One-Stop is the third leg, and it represents the one that we still have to evaluate. The committee has not conducted any specific studies about this. These are my personal viewpoints about Geospatial One-Stop. First of all, and most importantly, it is the place where agencies come together and define what their future position is on spatial data acquisitions. However, the Geospatial One-Stop is not necessarily the place their users are going to go to acquire spatial data or to discover about it. We believe that the marketplace will determine whether that aspect of Geospatial One-Stop will be important or not.

I would like to also comment on the importance of partnerships and why I believe that the absence of partnerships is a major obstacle that we face. The Census Bureau and the USGS have worked to establish partnerships with State and local governments such as the North Carolina One Map program. I want to point out the National Map and its partnerships. There are no Florida GIS operations listed as partners of the National Map, although we know there are some excellent GIS operations going on.

I want to comment a little bit about my county, my county, Richland County, SC. It has very high resolution data spatial data. I have a little example of this. We have excellent digital aerial photography, existing building footprints, highly accurate street center lines, complete addresses, and all kinds of very important data for homeland security. The unfortunate message is that this data will not be available to the Census Bureau for the 2010 census. This is protected by a licensing program that prohibits that data from going to the public domain. So I think it is an egregious error to allow that to happen.

I think I better close my statements now, and appreciate very much being asked to be here today. Thank you.

[The prepared statement of Mr. Cowen follows:]

Testimony of Dr. David J. Cowen
Chair, Department of Geography, University of South Carolina
Chair, National Research Council, Mapping Science Committee

Before the U.S. House Committee on Government Reform

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

Hearing on

"Geospatial Information: Are we headed in the right direction or are we lost?"

June 23, 2004

Chairman Putnam, Ranking Member Clay, distinguished Members of the Subcommittee; it is my privilege to testify before the Subcommittee on behalf of the National Research Council's Mapping Science Committee. We greatly appreciate being included in today's hearing. The Mapping Science Committee was created in 1989 and has served as a blue ribbon committee of experts from all levels of government, academia and the private sector who provide pro bono service to the Nation. Our committee has three important missions relating to today's hearing:

1. We provide independent advice to society and to government at all levels on scientific, technical, and policy matters relating to spatial data.
2. We address aspects of geographic information science that deal with the acquisition, integration, storage, and distribution of spatial data.
3. The committee promotes the informed and responsible development and use of spatial data for the benefit of society.

Since 1989 we have conducted fifteen studies and reports that relate to improving the way the federal government makes spatial data available to all aspects of society. Of particular note are the following studies:

Toward a Coordinated Spatial Data Infrastructure for the Nation (1993) that helped to define the National Spatial Data Infrastructure (NSDI),

Promoting the NSDI Through Partnerships (1994) that identified the importance of partnerships in building a successful NSDI

National Spatial Data Infrastructure Partnership Programs: Rethinking the Focus (2001) that evaluated the effectiveness of the FGDC grant programs

Weaving the National Map: Review of the U.S. Geological Survey Concept of the National Map (2003) that critiqued the USGS plan for the National Map.

Today we are pleased to present to the committee copies of our most recent report A Geospatial Framework for the Coastal Zone: National Needs for Coastal Mapping and Charting. This report highlights the cooperation between NOAA and the USGS to integrate elevation and bathymetry. We will soon release our comprehensive study Licensing Geographic Data and Services that addresses one of the most significant obstacles facing the integration of spatial data.

The Mapping Science Committee has monitored the transformation of the use of spatial data from an era dominated by paper maps into a robust $5 billion annual market that provides critical information for business, government and the general public. Our 1997 report The Future of Spatial Data and Society accessed the trends in the field and predicted the impacts on business and government. Many of our predictions are being realized today. For example, some recent forecasts expect the demand for location based services supported by GPS technology and accessed through wireless mobile devices will lead to a six fold increase in a market that could reach $30 billion in a just a couple of years. The general public is increasingly aware of and dependent on digital spatial services. A recent three page article in Newsweek highlights the importance of this technology. Few of us could survive without MapQuest and GIS technology coupled with Census data is at the core of all redistricting plans and strategies for political campaigns. Of course, we all understand that accurate and current geospatial data provides our military with a critical advantage. At the same time, a spatially aware and technically savvy public is demanding government services that fully utilize geospatial data and services. They expect on line access to information about their property and public resources. They certainly expect an ambulance to find their house. It should be noted that the increased reliance on spatial data and services led the Department of Labor to forecast that job growth in geotechnology will soon rival that of nanotechnology and biotechnology.

It is important to address the specific issues relevant to this hearing. These issues focus on whether the Federal government is on the right track with respect to its role in the coordination and utilization of geospatial data. The Mapping Science Committee believes that last year the Federal Government made an important mid-stream adjustment and the path is much better marked than it was previously. We are pleased to see an articulation of the distinct but interrelated roles of the FGDC, The National Map and Geospatial One Stop. This model of a

three legged stool appears to cover the major bases in a coherent manner. We believe that the role of the FGDC is clear and that the organization has served as a valuable focal point for coordination of federal activities. We are particularly pleased with the FGDC role in pushing the importance of spatial meta data. This effort provides a critical tool for discovering, distributing and sharing data. We are also very pleased with the serious work of the FGDC Cadastre Working Group that has brought the right players together and has worked diligently to develop a standard that is acceptable to a broad community. However, we do not believe that the FGDC has had sufficient clout to get its work done in an expeditious manner. We have found its partnership programs to be under funded, too short in duration and not sufficiently rigorous. We also believe that its future plans do not express the urgency required to complete their valuable work. We also believe that the FGDC would benefit from adopting a less federal centric governance structure.

The Committee's recent report Weaving the National Map: Review of the U.S. Geological Survey Concept of the National Map provided an in-depth analysis of the USGS plans for The National Map. We found the concept to be ambitious, challenging and worthwhile. We encouraged the agency to develop a more rigorous implementation plan, to place a priority on building the necessary partnerships, and to take a leadership role to work with the FGDC processes to nurture these partnerships. We are pleased to see the progress that the USGS is making on all of these fronts. The National Map is the critical data leg of the NSDI stool. It holds great technical and institution promise for changing the way that the public sector assembles integrates and distributes geospatial data. However, the plan requires voluntary participation from partners through all levels of government. Unfortunately, from the local and state perspective there are few incentives to create these partnerships and there is a real threat that the National Map will never be truly national in scope.

The Geospatial One Stop (GOS) E-Government experiment represents the third leg of the stool and is the one that still needs to demonstrate its value. The committee has not conducted any specific studies on the scope or performance of GOS; therefore, the following comments are my personal views. I believe that it has been a useful experiment and has brought together an extremely inclusive group of participants. In many ways, GOS is just an Internet portal that would like to be the first and most popular place for discovering and accessing geospatial data. However, in today's world, users have many ways to search and retrieve information. In this competitive environment it has not been demonstrated that GOS is the most preferred way to find geospatial data. I believe that it is a useful start and does provide a fairly comprehensive portal. Its unique contribution is to provide a place to coordinate planned data acquisition activities. It is safe to say that GOS will be evaluated in the market place. Success will be determined by user traffic and whether it truly becomes a One Stop Shop for geospatial data.

It is also important to comment on the role of the private sector. The bottom line is that we have a very robust private sector that has responded to business opportunities and seems well positioned to serve a rapidly expanding market. The data conversion companies are providing outstanding technical alternatives for the creation of affordable high quality spatial data. This means that we can truly build data bases that have a reliable high resolution framework that should stand the test of time. The software vendors have produced software that is easy to use, exciting and fully integrated into the internet. The Open GIS Consortium has successfully addressed some sticky issues regarding interoperability and made location based services a reality. I believe the business sector is well positioned to meet future needs as long as we take immediate steps to address critical labor market issues.

Therefore are we are the right path? All three of the legs of the stool have moved beyond the demonstration stages. With a few quick web searches one can find working prototypes of each program. The technology is robust and supportive of the programs. The fact that we are growing impatient is a measure of the importance of these functions. Therefore, the only successful way to reach the desired destination is to put a priority on the completion of the systems. All the FGDC standards must be completed. The federal government should assist in the creation of framework data. The National Map will only be successful if it is truly incorporates a nationwide system of local and state data sources to complement the federal programs. The GOS will only be successful when it is a comprehensive portal for the discovery of all geospatial data.

I would also like to comment on the importance of partnerships and why I believe that the absence of partnerships is the major obstacle we face. The Census Bureau and the USGS have worked to establish partnerships with state and local governments such as the North Carolina One Map program. Unfortunately, there are critical gaps across the country. If these data are considered important resources to meet federal program objectives then these gaps must be closed. For example, there are no Florida GIS operations listed as partners on the National Map web site. While there are major GIS operations in Orlando and Tampa they have not voluntarily joined the National Map program. In my state of South Carolina only Charleston and York Counties have become National Map Partners. More importantly, because of our own lack of organization there is no official relationship between the National Map and our State Government. Furthermore, in several counties excellent data will not be shared with the USGS, the Bureau of the Census or DHS. Of particular note is the Richland County GIS data created and maintained in my community. The county has invested about $6,000,000 in the creation of extraordinary spatial data to support local government business functions. These data include high resolution digital aerial photography, building footprints, highly accurate street centerlines, complete addresses, and land ownership parcels. The county even requires developers to digitally summit their plans for new roads and developments. For example,

through this program users can view planned roads prior to construction. I believe that Richland County data is the best data for the Census 2010 modernization program and to support the needs of any first responders. Unfortunately, these data resources are controlled by a licensing agreement and cannot be placed in the public domain through either the National Map or the Census program. In the absence of a local / federal partnership taxpayers will be paying to create a new set of street centerlines to accommodate the 2010 Census for Richland County. I find that to be an egregious waste of public resources.

I would also like to comment on the importance of land parcel data. The land parcel is the only authoritative source of information regarding who owns a piece of property, its use and its value. I recently co-authored an article that recommends a reexamination of the recommendations for a nation wide land parcel system made by a 1980 National Research Council Committee. That report, the Need for a Multipurpose Cadastre, advocated a strong role for the Federal government to coordinate a three-tier program that would dynamically capture and maintain a nation wide property record data base. This system would function much like the one in Richland County. Through property transactions each county would continuously monitor changes in property ownership parcels, streets and addresses. These would support all the local needs for property taxation, regulatory compliance and planning. However, instead of staying in the county these records would be forwarded to the state government that would assemble all the county records into a comprehensive, current and accurate database for state level programs such as equalization of educational funding. It should be noted that this is exactly the data required to meet the needs of federal programs such as No Child Left Behind. In this three-stage hierarchical model, the state organizations would link their data to the National Map for common distribution and integration with other data resources. Through such a system the National Map goal of seven day update for new features would be met and the Census Bureau would only have to take a snapshot of the current data to conduct the decennial census. Furthermore, the Department of Homeland Security would have fundamental geospatial data it needs to support first responders and the FEMA floodplain program. We would also do a better job of making sure ambulances and fire trucks get to the right address – even at construction sites. It should be noted that the idea of a nation wide property record system compliments the new executive order that mandates a program for Federal Real Property Asset Management which will include a Federal Real Property Council.

In summary, the Mapping Science Committee believes that Geospatial data is important to the basic functioning of government and is the catalyst for a robust economy. These data are also a critical resource to support homeland security. We believe that it is a proper role for the Federal government to take an active role in the coordination of geospatial data activities. We believe that the NSDI is about making useful data available for the operation of government and industry.

Therefore, we strongly support the USGS program for the National Map. However, much of the essential data are collected by local governments and utility companies who currently see few incentives to participate in the critical partnerships that will help us truly build a relevant National Map. Voluntary partnerships are not working and the Federal government must find a combination of carrots and sticks to realize the potential of the NSDI. We also believe that most of the critical planning, regulatory and homeland security decisions are made at the parcel level. Therefore, the new executive order relating to real property management provides an opportunity to examine whether this is the time that the United States should create the comprehensive geospatial data system that we really need.

The Mapping Science Committee is proud of its role as monitors of the NSDI and is ready to serve the Nation any way it can.

Mr. PUTNAM. I want to thank all of you. This worked out clearly well for us to get through the testimony. We have approximately five votes that I estimate will be 40 to 45 minutes before we can return, so we will recess for approximately 45 minutes, until such time as we can come back from the floor. Hang loose, enjoy your orange juice, and we will be back as soon as possible.

The subcommittee is in recess.

[Recess.]

Mr. PUTNAM. The subcommittee will reconvene. If everyone would please take their seats. And at the appropriate time, as soon as everybody is settled, I will recognize Mr. Clay for 5 minutes.

Mr. CLAY. I thank the chairman and thank the panel for being here. I will start with Mr. Cowen, if we may.

In your opinion, does the Federal Government have a business plan that is equitably sharing the cost of building and maintaining the framework data layers of the NSDI with non-Federal levels of Government and the private sector?

Mr. COWEN. Let me put that in the context of what I think is the most important aspect of geospatial data, and that is the land record parcel data. The fundamental building block for society is the property that we own. A land parcel, as defined by your tax map, defined by your county assessor, it provides an authoritative source of information about who owns a piece of property, its use, and its value.

I believe that it is important to build what we call a nationwide multipurpose cadastre to do that. The only information we know about what is happening on the ground about property is developed at the local level, so local level data should be forwarded to States, States should organize that, and States should provide that to the Federal Government. Right now there is no incentives for doing that at the local level.

Several years ago, 20 years ago or so, when I first served on the Mapping Science Committee, the Federal Government never mapped data at a high enough resolution of accuracy to have individual parcel level data, but now it is possible to do that. In the 1980, the National Research Council put forth a proposal for what we call a national multipurpose cadastre, and it called for a very strong role by Federal Government to organize the information that we are talking about. We think it is time to look at that again and find out should the Federal Government be investing in supporting the local level data that is needed for a nationwide 911 system. When you call for an ambulance, that ambulance should be able to find your house. Only the local government people have that information.

When the census wants to do its 2010 update, shouldn't it be able to just go grab the most recent local level data? We are spending $320 million, the Census Bureau is, working with every county in the United States to get the best set of street center line for the 2010 census. We believe that the Federal Government should help subsidize local government so that they can use the data at the local level. States can take that data and do such things as equalization of educational finance. Shouldn't we know the value of property throughout a whole State so that we can equitably finance

local education? Things like Leave No Child Behind require that kind of information.

So the answer to your question, sir, is no, I don't think the Federal Government is doing the right thing.

Mr. CLAY. Thank you for that comprehensive answer.

Mr. Corle, let me go to you. Are Federal agencies engaging in geospatial data collection efforts that could be better conducted by the private sector? And what kinds of geospatial activities would be best undertaken by the private sector?

Mr. CORLE. Ranking Member Clay, the Federal agencies clearly have a role in the data collection in this whole area, going back to Lewis and Clark. I mean, there is a long history of this. So the question I think in terms of the evolution of technology and what the private sector role is and I think the NGA folks earlier today indicated that they have now begun to outsource some of their needs to the private sector.

Part of our role as a trade association is really looking at how we can support the growth of our industry's capabilities to meet these growing needs. And as the capability develops and as the industry grows, you achieve economies of scale that lower the cost and make this technology more ubiquitous and cheaper to address protecting property and saving lives.

So it is really a long-term kind of a transition of government agencies outsourcing capability, industry developing capability, and ultimately economies of scale lowering the cost of this technology. So it is a long-term process, but clearly Federal agencies are involved in some of this, but it is moving in the right direction.

Mr. CLAY. Thank you for that response.

Mr. Nagy, what incentives could the Federal Government use to encourage States to better coordinate their geospatial investments with the Federal Government?

Mr. NAGY. There are probably a couple answers to that. One, we can take a look at some of the traditional methods, of incentives of using dollars to provide to cost shares, as an example for equitable cost shares for data production in local government and in State government and in the development of applications. There are other programs where that kind of mechanism has been used by Federal Government as an incentive, to withhold or to provide dollars for cost shares. An awful lot of public funds are being expended to build local and State data systems, and it is not always clear in where the Federa share is coming from, and they could provide for some additional dollars to support that.

The other is relevancy. And I think that when we actually see vertical integration between local data, State data, local regional data, and Federal Government and see local investments in aerial photography, street center line data showing up on a Federal product that actually has relevance back to a local ,government such as a flood insurance rate map or for other emergency management purposes, then there is an incentive for the local community to actually share that data, because it means something to them in the end. So that joint ownership of that entire product is very important as an incentive, I think, for sharing data and working on systems together.

Mr. CLAY. I thank you for your response. I think you and Dr. Cowen make the point that some of this data collection could be done in a more inexpensive way and a more efficient manner if there was better coordination. So I thank you both.

Mr. PUTNAM. Thank you, Mr. Clay.

Mr. Nagy, I want to followup on that. We all appear to be in agreement State and locals are doing an awful lot of this. What is the level of maturity at the State and local level of their GIS information?

Mr. NAGY. There are pockets of maturity that are very advanced, especially in metropolitan areas, especially in areas where there have been long coordination programs established within States. There are pockets of maturity where there has been a lot of involvement from all the stakeholders, and that includes local government, the private sector, academia, State government, and the Federal Government as well.

The business case for organizing data within States is increasing, and what I am seeing is that a lot of organizations within States are making their own business cases for developing their own State-based NSDIs. And I think part of what we are seeing is the maturity of the coordination efforts and the characteristics that are described in the exhibit here that show how important it is to have an authority for coordinating GIS, some sustained dollars involved in GIS, and also some of these other characteristics, as well lend itself to the maturity we are seeing.

I think one thing we don't see as often is many of the Federal organizations participating in the development of those systems, and that is one thing that we could actually suggest, is that more Federal organizations participate and become involved in the planning for those systems.

Mr. PUTNAM. Could you elaborate on that? Let us name names. Which department is doing a good job of coordinating and which ones are; which ones ought to be?

Mr. NAGY. I can base some of those experiences on mine in North Carolina. What is effective within States is when we are working on the National Map program, where there is a liaison from the National Map that is actually stationed within the State that is working with us every single day on initiatives that bring geospatial data programs together between the Federal programs and the State programs and the local programs. That is a USGS representative. We would invite other Federal organizations to do the same and to work closely with us on developing those systems.

Mr. PUTNAM. Dr. Cowen, is that the point that you are trying to make in your slide presentation which highlighted God's country in Florida? The USGS map from space, or someplace close to it, just about as useful, and the other one is Mapquest, that brings you straight into it, is that the point that you were trying to make?

Mr. COWEN. That is exactly the point I am trying to make, sir. It is clear that we have Web-based technology like Mapquest. Mapquest was built on Census Bureau data and it expanded upon that. It is time for the Census Bureau to work directly with local governments and make sure that we have current and up-to-date data. The USGS National Map program is a voluntary program; State and local governments have to raise their hand and say we

wish to submit our data. I don't believe that this is any way to do business. I think we can't rely on voluntary participation, we have to have a series of carrots and sticks that are going to make the National Map truly comprehensive. I think it is a real shame. We are missing the type of data that local government is collecting.

A report that we did on the National Map pushed forward a scenario that said if everybody worked together nicely, when we had to do the 2010 census, all you would do is go grab the street center lines and addresses from the National Map. We should have a coordinated program, and this was called for in 1980 by a National Research Council Committee, active role by the Federal Government to incorporate local governments organized at the State level and feeding the data up. And if you could do it in 1980, we certainly could do it today.

Mr. PUTNAM. OK, you triggered two paths here. Mapquest, the basis of Mapquest is census data?

Mr. COWEN. Originally it was based on the Tiger data files. Now, the Census Bureau starts with a process of they only have a decennial interest, right? So Mapquest started with taking the Tiger data and saying that this isn't positionally accurate, it is out of date, so we are going to work out arrangements to track transactions at local government. But the fundamental building block was an initiative by the Census Bureau.

Mr. PUTNAM. The National Map is voluntary. What carrots and sticks do you suggest to make it comprehensive and complete?

Mr. COWEN. Our Mapping Science Committee met last week and we heard about a very interesting program that the Department of Transportation put together. They said we need a comprehensive data base of all of the pressurized natural gas lines in the country. Now, natural gas lines are owned by local utility companies. So how does the Federal Government encourage local utility companies to provide that data? Well, they said you will do it in 6 months, you will do it in any format you have, a paper map or anything else, and if you don't do it, we will fine you $1 million. It got done.

Mr. PUTNAM. That is the stick.

Mr. COWEN. That was a pretty good stick.

Mr. PUTNAM. What is the carrot?

Mr. COWEN. Well, the carrot was in some cases a local utility company just had a paper map that showed where its lines were. Well, they submitted that and, in fact, the Department of Transportation then digitized that, made that into a GIS data base and gave it back to them. So they got some value added as a result of that. The problem with that, just take that little example, natural gas pipelines in the United States. Shouldn't that all be on a common base map? Shouldn't we have high resolution photography so we know exactly where those things are placed? Shouldn't we know how those things relate to other types of our infrastructure? We don't have this common base for this country, what we call framework data that FGDC has talked about. We ought to build out that framework data, and the Federal Government should help do that.

Mr. PUTNAM. What is the data framework for the National Map? What are the stated parameters for the National Map? The datums that could be incorporated into it could be endless, I would think.

Mr. COWEN. They are endless. They are absolutely endless. But there is something that we call framework data. If everyone has the same framework, which would include a high resolution aerial photograph—I included that example in there. That is not a high resolution aerial photograph. In my county, I can show you one-foot pixels, I can show you the footprint of every building. I know that my street center line falls in the right location. So we need what we call digital oriphal photography so we have a high resolution base so the Census Bureau can put its streets in the right place and make sure that they fall not in terms of somebody's property, but on the right-of-way. So we need that. We need a high resolution topography data base, and FEMA has worked hard on that. Zsolt didn't talk about the program that FEMA has in terms of providing what we call lidar data, very high resolution digital elevation data. In your own State, it is not adequate to have 10-foot or 20-foot contour lines, you need half a foot contour lines. If the east coast of Florida gets hit by a hurricane, you would like to know exactly where that flood is going to go and what property is going to be impacted, the value of that property that is going to be impacted by that.

So it calls for a series of framework data, and then other people can put their layers together with that.

Mr. PUTNAM. Mr. Nagy.

Mr. NAGY. In terms of the implementation of those framework data, those are very, very critical. When we get into settings with local governments and when they are looking at building their GIS systems to meet their local business requirements on a day in and day out basis, they are looking at, easily, 16 to 20 different themes of data that are important for them, everything from voting district boundaries to infrastructure and water and sewer; and they are building those for their own purposes.

One huge objective is to put the framework data sets in place, into a seamless base map upon which all local governments can build their data so that those data can be more easily shared across the board to serve all applications, whether it is for economic development or homeland security, emergency preparedness, or conservation and planning exercises.

Mr. PUTNAM. For all of you, what is the appropriate agency or department to head up this effort? If you are looking for accountability, if you are looking for a clear sense of direction about where we ought to be going, who ought to be in charge?

Mr. COWEN. I would volunteer that if you look at the OMB Circular A–16, it defines custodial responsibility. It specifies which agencies should be responsible for different layers of the framework data. I think it is pretty clear. I mean, the USGS, I think, has the lead role for coordination of those activities, and setting up that framework and getting it done, and I think the National Map provides the umbrella to put all that together. I mean, A–16 spells it out pretty directly.

Mr. PUTNAM. Anyone else?

Mr. PALATIELLO. Mr. Chairman, my organization has been looking at this issue for a great number of years, and I think we have come to the same conclusion or are narrowing our options to the same conclusion I think that you may be coming to, and that is

that it has to be at OMB, for accountability reasons and primarily for budgetary reasons.

I have here a 1973 report that OMB did, the most comprehensive governmentwide study of Federal, what they called then, mapping, charting, geodesy and surveying. I have loaned this to your staff. They recommended the creation of a single Federal surveying and mapping administration in 1973. The model that they used is what is now NGA. NGA was NIMA, and before NIMA it was the Defense Mapping Agency. The Defense Mapping Agency was a consolidation of very disparate mapping activities spread among a big part of the Department of Defense and the intelligence community, and there was a consolidation into a single agency. And that model is what OMB recommended in 1973. Unfortunately, President Nixon had to leave office and didn't have a chance to implement this, but this was on his desk the day he resigned.

Now, the creation of a new Federal administration, a new agency, I don't think, our organization does not think, it works anymore, and the reason is that we talk a lot about duplication and redundancy, but there is a lot of very special purpose, single-purpose mapping and geospatial data collection that is done by agencies, and some duplication and redundancy is unavoidable. And in order to fulfill each individual agency's mission, it is going to have to have its own program and its own activities in the geospatial area. So trying to have a one-size-fits-all agency, I don't think works.

The idea, though, of having a stronger traffic cop in OMB, I believe does work. Let the agencies still have their own missions and program, but right now I would respectfully disagree with Dr. Cowen. We do not believe A–16 works because there is no enforcement. And I think you heard testimony here today that steps are being made in the right direction, but, for example, I have been very disappointed that both the staff of Geospatial One-Stop and the staff of FGDC are located in Reston at the USGS. To me, that sends a message across the Government. It is a message that this is not a high level OMB activity that everybody has to pay attention to. I think it sends a signal that is a USGS program, and if we can play nice with them, that is fine, but we have our own mission to carry out.

So putting it in any individual agency, whether you try to put it in DHS or you try to put it in USGS, or any of the current operational agencies, I think would be a mistake, and I think that OMB is the place to do it, either through some position or, as you suggested, some coordination with a geographic information officer in each agency. But there has to be some (a) leadership and (b) some accountability and relationship to the budget process to make this work, and, to me, OMB is the place.

Mr. PUTNAM. Mr. Schell.

Mr. SCHELL. I have to agree with that, but for a different reason, and one that I tried to express before. This issue can no longer be looked at as simply a geographic information issue. You have issues that relate to the information technology infrastructure of the Nation, issues of system architecture. I think where you see some of the most important activity going on in agencies that are concerned with spatial information, like in Homeland Security

there is an enterprise architecture effort underway. The same is true in the DOD, which probably has more use of spatial information than anyone else. You find that spatial information becomes a really vital aspect of enterprise architecture.

Now, I think that one of the problems we have had so far is that the National Spatial Data Infrastructure has been under the control, you might say, of organizations that have been primarily concerned with geography. It is not geography, and it is not even framework data; it has to do with spatial information and the way spatial information is used within enterprise architectures, it is integral to it. Everything about the Web, the spatial Web, the semantic Web, these are things that are embracing information technology issues, and I believe that if we have a central—I believe you are referring to the fact that OMB is in a position to provide some supervision over information technology architecture in the Government in general—if that is the case, then I see there is no other location within the Government to deal with this.

I think people don't understand the incredible significance of spatial information in terms of the way the whole information infrastructure is being evolved. It is not just geospatial, it is much more general. So it needs to be in a location where the issue is management, and not simply a question of figuring out issues that relate specifically to geography.

Mr. PUTNAM. I am trying to digest all that.

Mr. SCHELL. Well, it is a big thing to digest, but I will tell you, from where I sit, running a private sector consortium that deals with major industry all over the country, what I see is that our industrial base is critically dependent on spatial information. Almost any major corporation you go to, you will find that there is a major dependence on spatial information one way or another. Look at utilities; look at all your distribution and logistical organizations. You find that our economy runs to a very great extent on the integration of spatial information with enterprise architectures. We are talking about, in a way, in our national spatial data infrastructure, of enfranchising the whole commercial sector, and you are talking about what is turning into one of the most important management approaches within the commercial sector of this country.

And one of the issues that has been brought up today is that the Government is depending more and more on the commercial sector for its spatial data resources. Well, the commercial sector is ubiquitous, and it is doing more in the area of developing and using and processing spatial information than the Government will ever do. So you have to look at this as quite literally a management issue, and you have to have ways of assessing how much activity there is in the area of the development use and general, you might say, management efficiencies involved in using spatial information, and the Government becomes, you know, a special case of that.

Mr. PUTNAM. Let me jump to the private sector. One of the inefficiencies that was identified in the Federal Government is the situation where the same geospatial data is being purchased by a number of different agencies at varying prices. Obviously, that might actually be beneficial to the vendor community. So help walk me through where you see the first bite of the apple in efficiencies are

and how that will help the public sector save money and help the private sector as well.

Mr. Palatiello.

Mr. PALATIELLO. A very good example, Mr. Chairman. This came up when GAO did a focus group session with my membership, and one of my members brought to GAO's attention the fact that about a half dozen different Federal agencies were mapping Mobile Bay, AL at the same time in the same year. Now, again, some of that you can shake your head at and say that is terrible. Part of it is unavoidable. For example, if one agency has a lower resolution, smaller scale mapping requirement and another has a higher resolution, larger scape mapping requirement, the latter can be aggregated to fit the former, but you can't go the other way technically, so there are reasons why two people would need to map the same area at the same time at two different scales and resolutions.

But the fact of the matter is you had five or six different agencies mapping the same area at the same time, and one would say, well, you guys in the private sector, if those were all contractors doing it, you benefited from that. But think of it this way. When is the Federal Government going to revisit Mobile Bay? It is probably going to be 10 or 15 years. If we had taken that money that we spent in 1 year and duplicated it and remapped and instead revisited over a period of years, that would be in the better interest of the taxpayers. The business would still be there for the private companies to do the work for the agencies, but it would be a sounder investment by spreading it over time and revisiting.

Remember that there is some mapping data that is somewhat static and can be used over time, but also keep in mind that every time a new road is built, every time a new house is built, every time somebody goes to the courthouse and files a survey plat for a new subdivision, the geography of this country has changed. There are thousands of those transactions that happen in courthouses in the 3,200 counties of this country every single day. So one of the biggest mistakes that is made with GIS, particularly at the local government level, is they will make an investment in the first year and say we have this great system, and then they don't budget for maintaining it over time and the data gets stale and the utility of that GIS goes down. So if you spread that investment over time and keep the data fresh and, again, collect it once, use it many times, and then go back in the next year and collect it again, that is more efficient than five or six agencies mapping the same area at the same time.

Mr. PUTNAM. Does the technical capacity exist under Mr. Schell's framework that it would automatically update itself, it would automatically make itself accurate every time there is a property transaction? I mean, obviously you have to physically take the picture to see movements of sandbars in Mobile Bay, but the other pieces of the puzzle, an extension of a natural gas pipeline, the construction of a new transmission line, does the capacity exist for that to automatically correct itself without having to reinvent the wheel, so to speak?

Mr. Schell.

Mr. SCHELL. The technology exists, it is a question of your priorities as to whether or not you are going to implement that in a

given situation. These things happen now. The situation you just described happens now in many places. It is a question of whether or not you have software architectures that are capable of integrating the various data sets, for example, a base data set and then a set of changed data that might be, in fact, collected with a different system, perhaps a more modern system, perhaps different technology, and then merging the two. The technology does exist. Again, my message is that the priorities need to be set so that we can look more at the technology. I don't mean less at the data, but more at the technologies that enable us to automate some of these processes, because in automating some of these processes, what you can do is eliminate some of the costs in building multiple versions of the same data set.

Mr. PUTNAM. Mr. Palatiello, did you have a comment on this?

Mr. PALATIELLO. There are not in the commercial sector artificial intelligence systems where you can do what you described without human hands touching it and doing some processing to do the change detection. It is highly automated, and your second generation map is going to be much less expensive than your first generation map because you don't have to go and remap every feature, you just map the changes. But there is still a professional service involved in working with that data to identify those areas that have changed from time A to time B.

Mr. PUTNAM. Dr. Cowen.

Mr. COWEN. Yes. One of the things that we in universities do is look at cutting-edge research, and that has changed with respect to the quality of the data that is being provided now in the private sector. In this past year I had a master's thesis that looked at what we call digital globe data, which is satellite data of basically two-foot resolution, and it said could we look across our county and identify by using commercial satellite data where new roads and where new houses have been constructed, and the answer is yes, we can, because we have basically 2-foot type resolution.

So that means that you don't have to—a lot of money is spent on aerial photography missions that cover the entire county again, when in fact we know all we are really interested in is where have the changes taken place. So, therefore, if you can identify where the changes are, even if you have to go out and visit those things in person, there are ways to identify where the changes are taking place and then to trap those kinds of transactions. And, of course, the individual transactions take place at the courthouse, but clearly, my little example there is every developer is required to do a digital submission of any planned subdivision. Now, the beauty of that is the planned subdivision is in the data base. I have an example there that shows you where planned roads are. Well, again, you are on a constructionsite, there is a new house being built, and you have an accident. In most 911 systems, the ambulance can't find that address. In this system, with digital submission of the plans—and that was just county government requiring that of the developers to do this; you won't get permission for your new development plans, your new roads or other type of utilities unless you submit things digitally to us, and that has happened. So then you trap those transactions even before they are constructed. I mean, it is happening out there in local government.

Mr. PUTNAM. Final comments before we wrap up. We will start with Mr. Nagy. Anything that you would like to leave with the subcommittee that you were not asked or you would like to complete a thought, perhaps.

Mr. NAGY. Well, for the past few years, maybe a decade or so, we have been working off of this notion of discovering data for our business applications and our GIS systems and such, and I think we are transitioned to a point where, because of many other business requirements that transcend an entire region, an entire State, an entire country, we need to be at a point where we have reliable data that is in place across the country, and that is for those seven or eight framework data sets, and probably another 20 data sets as well. In terms of maturity, there are many haves out there; we also have many have-nots. And then we also have what I call the half-nots, which are the folks that are in between that are able to participate to a certain extent, but not completely.

So we have to solve for the complete picture and we have to solve at the local level, and it has to include Federal participation. Local government consortia and State government consortia need to have an easy way to get to Federal Government to negotiate things like equitable cost shares or talk about what the payback is for participating in sharing of data and such, such as the FEMA map or the USGS National Map, because it really is relevant for local, States, and Federal groups altogether.

Mr. PUTNAM. Mr. Corle.

Mr. CORLE. I would just make a brief comment. I think I certainly agree with many of the comments that have been made here today in terms of the role of the private sector and certainly the role of Government. I would like to suggest, however, that we have talked about the stick, and certainly OMB, as a coordinating body, there is a lot of merit to taking a look at what their role would be in coordinating at the Federal level. I think that one of the things that our industry association has worked on with industry, with our member companies, is looking at the carrot aspect of it, and a funding program that would provide resources on a cost-shared basis over a sustained period of time, along the lines of mapping and doing it on a sustainable basis that would develop this sort of national level capability.

So our view of the world would be to first address the coordination and the issue that your hearing today is focused on, and then second of all would be, in the medium to longer term would be to create a national Federal funding program that would require standards and a series of other requirements that communities could then make those investments that would support Federal requirements. For instance, the Secret Service is tasked with providing security at national events. They are going to be supporting the conventions in Boston and New York this year; they were in Salt Lake; they go to New Orleans. So there are a number of activities that the Federal Government is involved in, and certainly since September 11, that building this national capability will support those kinds of activities. And so from a high level perspective, it is really creating that kind of partnership, that Federal funding incentive, the OMB stick that would kind of transform these relationships so that we can build this national capability.

Mr. PUTNAM. Mr. Palatiello.

Mr. PALATIELLO. Thank you, Mr. Chairman. Three points I would like to highlight. One is in terms of intergovernmental partnerships, I think there are some best practices models that would be worth the committee's attention. One is the National Map. The USGS, over the years, with their digital ortho program and the National Map, have had two ways to provide, in some respects, both a carrot and a stick, and that is they do what they call innovative partnerships and what they call joint funding agreements. A joint funding agreement is when a State brings money to the USGS and says we will partner with you and cost-share the mapping of our State, and the State agrees to do it to the USGS standards so that it contributes to the National Map.

The innovative partnerships is basically a grant, it is when Federal money goes to the State along the same lines. Then the mapping will be done to USGS standards and it ends up going in the National Map.

The problem is that Congress has not provided sufficient funds for USGS to meet the demand of what they are getting from the States. So the demand is out there, but the seed money from the Federal Government has not been sufficiently appropriated.

The second is NOAA has a Coastal Services Center in Charleston, SC, where they will do a data buy and they will provide the geospatial data to the States in a coastal zone and work with them to have the data they need for permitting and infrastructure maintenance, environmental management, and all the other applications that are necessary in a coastal zone.

And the third was a program that is now gone, but it was called the National Aerial Photography Program [NAPP], and, again, the USGS coordinated that; there was an interagency coordinating committee. Their goal was to refly the entire United States on a 7-year cycle, and they set priorities based on who came to the table with funding, whether it was other Federal agencies or State and local government. When sufficient money came to the table to do your State, it got done. But, again, that was the incentive, that was the carrot, if you helped pay for it, you got to the top of the line.

Two final things. One is as long as we have been in this business, there is still not a clear definition of the respective roles of all of the parties and all the stakeholders. You heard it today about Federal, State, and local on an intergovernmental basis, and there still is not a good definition of roles and responsibilities on the part of the Federal Government with regard to the role of the private sector. The Government is still trying to do too many things that are best left to the private sector.

And the final thought that I would leave with you, and perhaps Mr. Schell is the expert and can elaborate on this more than I, but I am convinced that the challenges and the obstacles that we have, they are political, they are bureaucratic challenges, they are not technical challenges. The technology in this community is extraordinary. For example, interoperability is not a technical issue, it is a political and administrative issue.

Mr. PUTNAM. Mr. Schell and Dr. Cowen quickly?

Mr. SCHELL. I appreciate the lead-in, because I think you are absolutely right in mentioning that it is policy issues, it is not tech-

nology issues which are our barrier. Technology exists right now to do things like compilation of heterogenous data sets, the integration of diverse data sets, the aggregation of all kinds of diverse data sets, fusion of data sets, change detection, I mean, you name it. You really need to take a tour of some of the advanced laboratories in some of our integrators and advanced government laboratories to see the magic that they can do.

Now, the issue really has to do with the way these techniques are applied, and standards are what make these techniques applicable broadly across our national resources. I would argue that it would be far less expensive for us to create a policy to apply standards in terms of aggregating existing data sets consistently across our national infrastructure than it would be to continue to develop new data resources. We have data of all kinds; there is data everywhere. The biggest problem is that the systems that create the data sets can't communicate, and, therefore, two data sets that represent adjacent areas can't, in effect, be put together because the software that is creating them is simply incompatible.

The technology exists right now so that—shall I say the standards exist right now so that if the standards were applied uniformly across our country, we would be able to reduce the cost of compiling some of these national data sets dramatically, and the question is why aren't the standards applied. That is what I tried to say before. We don't have a policy at the top. We don't have a national policy that says that the technology standards have to be applied consistently. Now, this is where I think the FGDC has a real opportunity. You know, we usually think of the FGDC as having a mandate for data standards. In fact, it has a mandate also for best practices, and standards for technology fall under that. And I think, again, that it is that kind of approach we should take within the FGDC, with the leadership that we were talking about before, central national leadership that related to the building of an information infrastructure with consistent standards, I think we would go a long way to solving our problems. That is purely a matter of policy and the will to do it.

Mr. PUTNAM. Dr. Cowen.

Mr. COWEN. First of all, let me thank you very much for inviting me today. I have devoted my life to this business, and this is the highlight of it, so thank you very much.

Mr. PUTNAM. Thank you.

Mr. COWEN. I guess my takeaway message is if it is important, it shouldn't be voluntary. That is no way to do business. A–16 is there; it should have OMB enforcement behind it. So I think the structure is there, we have just got to enforce it. Maybe you need standards police or whatever we need. That needs to be done.

The other comment I would like to make, put my academic hat on for just a moment here, I am the chair of a geography department. The Department of Labor has identified geotechnology, along with nanotechnology and biotechnology, as the hottest labor market issues in this country. We are going to face a labor market shortage, and I know that President Bush has an initiative to try to address some of those issues, and I think it would be remiss of me not to have at least concluded with the fact that we need to train the next generation of the labor force.

Thank you very much.

Mr. PUTNAM. Thank you very much.

Before we adjourn, I want to thank all of our witnesses from both panels for your participation. I appreciate your willingness to share your lifetime of knowledge and experience and thoughts with us today.

I also want to thank Mr. Clay for his participation.

While the progress we have made toward the development of standards and toward collaboration on the issue of collection and dissemination of geospatial data is encouraging, we have much work yet to complete. Because oversight is not as stringent as it should be, we still have agencies acting unilaterally to collect and maintain duplicative data and systems, resulting in costly redundancies.

Part of the problem is logistical; the infrastructure for efficient information sharing is not yet complete. But as has been pointed out, a great deal of it is cultural. Agencies are not forthcoming on their GIS expenditures because they have little or no incentive to coordinate with sister agencies. In fact, they have disincentive: a fear of losing funding for future years. The fact that agencies are slipping their projects under OMB's radar is in itself disturbing. We need to institute more stringent oversight to ensure that redundant GIS investments are identified and corrected. OMB must be prepared to withhold funding approval and allocation for projects that are determined to be redundant and fail to meet the requirements of a review process.

I believe OMB is adding tools and strategies to address the issue identified by GAO at this hearing, and perhaps with the addition of a central figure responsible for GIS coordination or some similar strategy, more efficient investment and information sharing will become a reality. I believe that we are on the right track and that these efforts will lead to significant cost savings as this work advances.

In the event that there may be additional questions that we did not have time for today, the record shall remain open for 2 weeks for submitted questions and answers.

I particularly want to thank the second panel for your patience with our voting schedule. We appreciate your efforts.

And with that, the subcommittee stands adjourned.

[Whereupon, at 5:40 p.m., the subcommittee was adjourned, to reconvene at the call of the Chair.]

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