

**Testimony of
Susan Marlow
Smart Data Strategies, Inc.
before a field hearing of the
Committee Education and the Workforce
U.S. House of Representatives
on
"Reviving our Economy: The Role of Higher Education in Job Growth and Development"
Columbia, Tennessee
April 21, 2011**

Mr. Chairman, Dr. DesJarlais, I'm Susan Marlow, Chief Executive Officer of Smart Data Strategies, Inc. in Franklin, Tennessee. Smart Data Strategies provides a variety of geographic information systems (GIS) software and services that focus on Real Property Intelligence™ which is the result of combining location with information and making it readily accessible through easy to use mapping tools. Our firm helps state and local government, Federal agencies, and private sector clients manage data about their land and real property including asset inventories, rights-of-way, and land parcels.

It is my honor to be here today to discuss the critical need for a coordinated, strategic approach to workforce development in the geospatial profession. The term Geospatial refers to a location-based technology, and commonly referred to as mapping. This technology has experienced a rapid adoption rate partly due to the introduction of Google Earth and Microsoft Bing Maps as well as the disasters of 9/11 and Hurricane Katrina. Today's mapping is the collection, storage, utilization, application and analysis of geographic information. Geo-referenced or location-based data is layered on maps to give business, government and consumers information they need for thousands of decisions and applications. The geospatial profession is a practice that uses geographic information as a base to provide faster, more efficient and accurate solutions to a plethora of issues. In today's electronic world, geospatial applications offer a visual perspective to clients, users and consumers that was only previously available to a limited market, particularly engineers and the military. Geographic information systems (GIS), with their meaningful and easy to read formats, have become common in everyday life of government, the commercial sector, and the consumer. This provides decision makers more complete information that helps them make crucial decisions - such as where tax revenues are generated, the condition of the infrastructure, and how and where to spend, maintain or conserve resources - faster and more accurately. From the family planning the route for its summer vacation, to McDonalds determining the best sites for its next restaurants, to local government needing to know who owns what land, and who's paying taxes and who is not, to analyzing the relationship between chemicals at a factory with the incidence of cancer in neighboring communities, geospatial information is an exploding field. Geospatial information plays a crucial role in every sector of today's society. Recent studies estimate that up to 90% of government information has a geospatial information component and as much as 80% of the information managed by business is connected to a specific location. As a result of this growing demand for geographic information data, software, products and services, the geospatial community has been identified by the U.S. Department of Labor as one of the "High Growth" workforces in the United States.

The State of Tennessee has recognized the importance of geospatial data when they invested \$28,000,000 in the Tennessee Base Mapping Program. This program included the creation of a statewide imagery collection and standardized property information. Our firm Smart Data Strategies performed all of the property mapping for this program. What this means is that geospatial data is available to every county, city, and state agency throughout Tennessee. While the state has invested heavily in data creation, we have not seen this level of investment in geospatial technology education.

There is a critical need for a strategic and inter-sector partnership approach to meeting the demand for a trained, qualified and productive workforce in this expanding field. I'd like to address those challenges and offer some solutions.

Geography in K-12 Education

In March of 2010, Tennessee was one of two states awarded Race to the Top grant money during the first phase of the competition. This announcement set the stage for Tennessee to be a national leader in raising the bar for education in the United States. Research has shown that the use of geospatial technologies in curriculum can be one of these creative new ways to connect the classroom to the real world and get students excited about learning. (Goldstein, D. (2010). Integration of Geospatial Technologies into K-12 Curriculum: An Investigation of Teacher and Student Perceptions and Student Academic Achievement.) GIS provides educators with an innovative way to connect classroom learning with real world applications. It allows students to see how their learning today is relevant to the world around them and their future within it. In addition, GIS acts as a common operating platform for visualizing, analyzing and presenting real-world information from multiple disciplines. And, most importantly it helps get young people excited and inquisitive about geography, thus stimulating their interest in this field as a career.

Using GIS in a linked learning environment that is grounded in project-based activities enables students to use technology that allows them to do the deep thinking, analysis and problem solving that is necessary to compete in the global economy. This is especially the case in the STEM (Science, Technology, Engineering and Mathematics) disciplines which leads to the longer term benefits for students, society and the American economy. They are acquiring skills for the jobs of the future that will continue to be in high demand. While geography and geospatial sciences is clearly a STEM discipline, our profession is disappointed that the Obama Administration has failed to understand this fact and has failed to include geography in the STEM initiative. A letter from MAPPS, the association of private sector geospatial firms, of which Smart Data Strategies is a member, is attached to my testimony.

Moreover, not all states even assess or require geography education. As The Orlando Sentinel has reported in 2006, (http://www.orlandosentinel.com/news/education/orl-geographydummie07apr26_0,2336745.story) many public schools do not even teach geography, and if they do, many give it a short shrift as part of a history or social studies class. According to a 2006 National Geographic Society survey of Americans aged 18 to 24, less than four in ten can identify Iraq on a map of the Middle East; one-third of young Americans cannot calculate time-zone differences; even after Hurricane Katrina, two-thirds cannot find Louisiana on a U.S. map; almost one-third think that the United States has between 1 and 2 billion citizens; and two in ten, amazingly, cannot point to the Pacific Ocean on a world map.

The need for geography education at the K-12 level is the first step toward a long term, strategic approach to building the geospatial workforce. I have also attached a letter on this topic from February of this year signed by the 11 organizational members of the Coalition of Geospatial Organizations.

Unfair University Competition

A new form of unfair government sponsored competition is causing concern in the geospatial community. Universities, veering from the typical teaching and research most Americans associate with the Nation's leading institutions of higher learning, are entering the mapping, remote sensing and geospatial *business*, by selling services in the *commercial marketplace*. This trend of unfair competition from universities is invading the mapping community.

More than 80% of my colleagues in MAPPS, the principals, owners and partners in America's leading private sector geospatial firms, indicated in a survey that they have encountered competition in the marketplace from universities. More than 85% responded to a MAPPS membership poll that university competition was an issue that deserved public policy attention.

For example, the Broadband Mapping program funded through the American Recovery and Reinvestment Act (ARRA), commonly known as the "stimulus bill", resulted in a number of states awarding their broadband map work to universities, thus providing little private sector job creation or economic stimulus. Federal agencies regularly contract with universities for geospatial production services, requiring little or no education or research. These contracts are for typically commercial, production services readily available from scores of private firms in the "Yellow Pages". The national Science Foundation funds a National Center for Airborne Laser Mapping (NCALM) at the University of Houston and the University of California at Berkeley, to conduct research on Light Detection And Ranging (LIDAR), a geospatial data acquisition technology. LIDAR was a NASA program that was commercialized some 20 years ago. LIDAR is a proven technology and a commercial activity. Private firms are engaged, on a daily basis, in research and development of LIDAR applications for the projects in which they are engaged and are continuously developing new applications to market to their clients. Private firms provide commercial LIDAR services to clients on a regular basis. Nevertheless, a Federal agency recently awarded a commercial, production LIDAR contract to NCALM.

Congress should amend the Higher Education Act to focus universities on their core missions – education and research. Legislation should be passed to apply a "commerciality" test to all non-core university activities. Any university that receives direct federal funding, or indirect funding through tax-exempt or "non-profit" status, should be prohibited for using such institutions for the performance of commercial, tax generating activities otherwise available in the private sector.

I would also add that mapping and geospatial activities are subjected to unfair competition by government agencies, particularly at the Federal and state level. Government agencies also perform geospatial activities in-house, with government employees, which are commercially available. This duplication and competition with the private sector results in waste and inefficiency in the government, and contributes to the debt and deficit now threatening our Nation. Not only must private sector firms compete with government for work, we must also compete for workers. Economic growth in the geospatial field is being stymied by government competition. We are delighted that last week, Rep. John J. "Jimmy" Duncan, Jr. of Tennessee, with Rep. Marsha Blackburn of Tennessee as an original cosponsor, introduced the Freedom from Government Competition Act, H.R. 1474. A companion bill, S. 785, was also introduced by Senator John Thune (R-SD). This bill would make the 'Yellow Pages Test'

national policy. If an activity being performed by government is also available from private enterprise listed in the Yellow Pages, that activity should be reviewed for performance by a tax-paying, for-profit company, rather than the government entity. The Freedom from Government Competition Act would put such a process in place in the Federal government. We respectfully urge you to become cosponsors of this legislation.

Moreover insourcing - an initiative to convert work currently performed by private sector contractor firms to performance by Federal government employees – is taking place in the geospatial field. We urge Congress to impose an immediate moratorium on insourcing.

Duplication in Federal Geospatial Workforce Development Programs

As I mentioned earlier, the U.S. Department of Labor has invested more than \$8 million in the geospatial community for workforce development upon identifying geospatial as one of 14 targets in the High Growth Job Training Initiative.

However, the Department of Labor is not the only Federal agency funding workforce development activities in the geospatial profession. While the geospatial workforce has been identified as a High Growth sector of the U.S. economy, there has been an unfortunate proliferation of programs in the federal government to meet the employment demand. Several federal agencies have funded activities with no strategic objective and no coordination, resulting in waste, duplication and inefficiency. There is virtually no coordination with the employer community in the private sector. These programs are duplicative and they fail to seek the needs and meet the market demands of employers. Here are a few examples:

NASA funded the Integrated Geospatial Education and Technology and Training (iGETT) project to help faculty to develop model learning units and expand their programs to address workforce needs for employees who can use geospatial data.

NASA also funded the National Workforce Development Education and Training Initiative (NWDETI) in an effort to develop a trained geospatial workforce and assisted the Geospatial Workforce Development Center (GeoWDC) at The University of Southern Mississippi.

The National Science Foundation (NSF) funded the National Geospatial Technology Center of Excellence (GeoTech Center) to establish national common core competencies for geographic information systems (GIS) technicians, facilitate installation of remote desktop application access technology at 10 colleges and supporting use at secondary and middle schools, increasing enrollment in geospatial technology programs at partner colleges, and update the geospatial technology skills of teachers and technicians.

NSF also provided funds for “A Plan for the National Coordination of Geospatial Technology Education from a Community College Perspective”, a year-long study to document the needs and concerns of community college educators and use this information to produce recommendations for the development and operation of a National Geospatial Technology Center (NGTC).

The National Geospatial Intelligence Agency (NGA), has provided funds to the National Research Council (NRC) of the National Academy of Science to “Study on the Future US Workforce for Geospatial Intelligence”. The study will examine the need for geospatial expertise in the United States and explore possible ways to ensure adequate availability of the needed expertise.

AmericaView is a USGS funded consortium of universities, begun with a Congressional earmark, to conduct K-12 and higher education, workforce development, and technology transfer in remote sensing.

Individually, these are laudable endeavors. However, they are fragmented, stovepipes that are devoid of a coordinated or strategic approach to workforce development. Many of the activities funded by these grants are duplicative while others fail to address the needs of employers. I would recommend that the Education and Workforce Committee develop a more coordinated approach to geospatial workforce development, either through a consolidation of all such federal activities, or a clearinghouse approach to avoid duplication and create a more comprehensive and considered approach that seeks and responds to private sector employers’ needs.

Smart Data Strategies Experience in Workforce Development

The Institute for Geographic Information Systems Studies (IGISS), of which I am founder and Chairman of the Board, was the recipient of one of these grants. Recognizing that the geospatial technology sector is an emerging field that, like the computer and information technology industry, cuts across a host of other user and applications-focused industries, IGISS found there were no career ladders and a great disparity in curriculum and other approaches for meeting the needs of the geospatial communities. There was also a need to keep lower-skilled, but technically demanding database management jobs in the United States, rather than being off-shored, due to privacy and homeland security data sensitivity issues and to assist transitioning manufacturing-based rural economies. IGISS’ proposal, entitled “The Geospatial Business Hub Project: Preparing the Nation’s Geospatial Workforce,” developed a career and education advancement ladder and user-focused curriculum for the land records management and utilities’ geospatial technology applications.

With its \$2 million grant, IGISS established a Geospatial Business Hub model and regional infrastructure to provide training for future geospatial technology workers that was designed to reduce the practice of sending such work overseas; deployed a program to create geospatial community support for newly trained placements; and, 3) developed training to unemployed and underemployed workers in North Carolina and Tennessee in the geospatial fields of utilities services and land management using a work-study approach. As a result of this grant, the Virtual Business Hub was created which provided the platform to manage a remote workforce.

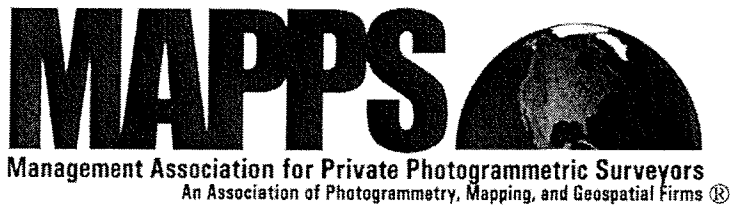
Unfortunately, the Labor Department failed to allocate funds for marketing the Virtual Business Hub. In fact, these follow-through activities were part of the original IGISS grant application, but were denied. It is regrettable that much of the work product of IGISS and the other recipients of the \$8 million in federal grant funds is sitting on shelves in the Department of Labor with no emphasis on actual implementation.

Summary and Recommendations

We urge the Committee to take a comprehensive look at geospatial workforce development. This growing and critically important profession can contribute immensely to the quality of life and economic well being of the Nation for decades to come. As we transition to a knowledge-based economy, geospatial data will become the underpinning for billions of dollars in commerce, as well as efficiency in the delivery of government programs.

Whether it is licensed professionals who have advanced degrees, or technicians who are trained in community colleges and technical schools, there is a growing demand for workers in the geospatial market.

In order for this demand to be met, a comprehensive and strategic approach to geospatial workforce development must be developed. This needs to include government and the private sector, educators at the K-12 elementary and secondary level, community colleges and 4-year degree institutions, private, for profit technical schools, and advanced degree program administrators and teachers. Such a strategy must be responsive to the needs of private sector employers. The silos in which the Federal government current funds and administers workforce development in our field must be busted, and replaced with a better coordinated approach. And the Federal government, through direct spending, as well as grants to state and local government and universities, should recognize that government is the demand for geospatial data, products, software and services, and rely on the private sector to be the supply.



November 30, 2009

The President
The White House
Washington, DC 20500

Dear Mr. President:

On behalf of the member firms in MAPPS, I would like to commend your Administration for launching the "Educate to Innovate" campaign to improve the participation and performance of America's students in science, technology, engineering, and mathematics (STEM).

Formed in 1982, MAPPS is the only national association exclusively comprised of private firms in the remote sensing, spatial data and geographic information systems field. Current MAPPS memberships span the entire spectrum of the geospatial community, including Member Firms engaged in satellite and airborne remote sensing, surveying, photogrammetry, aerial photography, LIDAR, hydrography, bathymetry, charting, aerial and satellite image processing, GPS, and GIS data collection and conversion services. MAPPS also includes Associate Member Firms, which are companies that provide hardware, software, products and services to the geospatial profession in the United States and other firms from around the world. MAPPS provides its 180+ member firms opportunities for networking and developing business-to-business relationships, information sharing, education, public policy advocacy, market growth, and professional development and image enhancement.

On November 23, your Administration (www.whitehouse.gov/issues/education/educate-innovate) stated the following "must do" list:

- 1) Increase STEM literacy so that all students can learn deeply and think critically in science, math, engineering, and technology;
- 2) Move American students from the middle of the pack to top in the next decade; and
- 3) Expand STEM education and career opportunities for underrepresented groups, including women and girls.

Mr. President, MAPPS stands ready and willing to work with you and your Administration to help accomplish these important goals. The STEM components serve as vital background and education for mapping and geospatial disciplines. American students are the key to our Nation's future by serving as the next wave of experts and entrepreneurs spurring innovation and leadership in geospatial activities, professions and private sector job growth.

In 2003, the Government Accountability Office testified (www.gao.gov/new.items/d03874t.pdf) before Congress:

"According to the Department of the Interior, about 80 percent of all government information has a geospatial data component, such as an address or other reference to a physical location."

John M. Palatiello, Executive Director
1856 Old Reston Avenue, Suite 205, Reston, Virginia 20190
P (703) 787-6996 F (703) 787-7550 E info@mapps.org www.mapps.org

A National Academy of Public Administration (NAPA) study (*Geographic Information for the 21st Century*, Washington, DC, January 1998) estimates that geographic information plays a role in about one-half of the economic activities of the United States.

Your Administration, via the Office of Management and Budget, has generated an increased emphasis on “place-based” (www.whitehouse.gov/omb/assets/memoranda_fy2009/m09-28.pdf) data, otherwise referred to as geospatial data. This August 11 memo entitled “Developing Effective Place-Based Policies for the Fiscal Year 2011 Budget” states:

“Between now and 2050, the expected population growth – of nearly 140 million people – will require, among other things, the construction of more than 200 billion square feet of new housing, business space, and retail development and major new investments in all forms of physical infrastructure. The new construction will constitute an estimated two thirds of all development on the ground in 2050. This provides an unprecedented opportunity to create more sustainable communities for generations to come. It will require a broad-based strategy to deal with the energy, environmental, and health repercussions of development, as well as workforce and business development demands.”

It is important to consider the following financial effects that geospatial data can play for infrastructure investments and for other important projects. Geospatial activities such as aerial photography and surveys have a significant multiplier effect, leveraging additional investment and job creation. Aerial photography is 5-10% of typical mapping costs. Mapping costs are 5-15% of engineering costs. Engineering costs are 6-8% of the construction costs. And construction costs are 90% of project costs. Thus, every dollar invested in aerial photography and surveys has a multiplier of 9074. In data from an actual project, \$6,000 invested in aerial photography and surveys resulted in \$49 million total (surveying, mapping, engineering and construction) activity.

We respectfully offer to your Administration the assistance of the geospatial community on this high priority initiative.

Sincerely,



Jeff Lovin
President

Coalition of Geospatial Organizations

February 16, 2011

The Honorable John P. Holdren, PhD.
Assistant to the President for Science and Technology
Director, Office of Science and Technology Policy
Executive Office of the President
725 17th Street, Room 5228
Washington, DC 20502

Dear Dr. Holdren:

I am writing to you on behalf of the Coalition of Geospatial Organizations (COGO), a coalition of 15 national professional and advisory organizations representing more than 35,000 individual producers and users of geospatial data and technology. The purpose of this letter is to share with you concerns that COGO has with the September 2010 PCAST report entitled "*Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future*".

The members of our coalition feel strongly that the report defines STEM fields far too narrowly. The document asserts that STEM education includes only the subjects of mathematics, biology, chemistry and physics, along with the critical subjects of computer science, engineering and geology. Excluded from this list are the social, behavioral, and economic sciences, especially those core social science disciplines like geography, that have long been the catalysts for education and research in the *geospatial sciences*, which is currently ranked as one of the three top American employment fields by the U.S. Department of Labor.

The following points highlight what we see as the critical significance of including the social, behavioral and economic sciences in K-12 STEM education:

- In the White House memorandum "Developing Effective Place-Based Policies for the FY 2011 Budget" (8/11/09), guidance was provided to Federal departments for budget submissions that placed heavy emphasis on "place-based" policies and programs. The term "place-based" is synonymous with geography and geospatial. Knowledge of geospatial concepts is necessary for the implementation of effective policies and programs.
- The U.S. Department of Labor, Employment and Training Administration published "New and Emerging Occupations" (March 2006) highlighting 12 high-growth industries, one being geospatial technologies. Geospatial technologies are described as being economically critical, projected to add substantial numbers of new jobs, and are being transformed by technology and innovations. In order to provide a workforce competent in geospatial technologies, STEM education must include instruction in geospatial relevant disciplines.
- The Department of Labor, in collaboration with the geospatial technology community, adopted the Geospatial Technology Competency Model (June 2010) that identifies the knowledge and skill areas (KSAs) required for success in each of the many allied fields that rely on geospatial technologies and employ geospatial professionals. Among the core academic competencies is geography. The inclusion of this and other core academic competencies in this model necessitates that these skills be learned in K-12 curriculums.
- The Directorate of Education and Human Resources at the National Science Foundation (NSF) includes social and behavioral sciences as STEM disciplines. NSF's Social, Behavioral and Economic Sciences Directorate, which houses the Geography and Spatial Sciences program, in addition to 28 other social science based programs provided \$7 million in funding in the past 2 years for *GIScience and Technology-based* research.
- The National Geospatial Technology Center for Excellence funded in part by NSF is a collaborative effort between colleges, universities and industry to expand the geospatial workforce. While the program focuses on college curricula, it is critical that K-12 students learn the basic geographic skills that form the foundation of higher-level learning in the geospatial sciences. It is also important that we expose K-12 students to the geosciences to better inform them of future education and employment opportunities in the field.
- The PCAST Report quotes President Obama: "We must educate our children to compete in an age where knowledge is capital, and the marketplace is global." Students must be trained to think spatially and globally

Coalition of Geospatial Organizations

in order to meet this objective. These skills come from K-12 education in geography and the social, behavioral and economic sciences.

- The “Troubling Signs” section of the PCAST Report emphasizes the development of education methods to improve comprehension of STEM concepts. Geographic Information Systems, as a geospatial technology, is an integrative technology that can teach K-12 students how to apply STEM theories to real world problem solving.

All of these points highlight the significance of social, behavioral and economic sciences to geospatial technologies in both academic and workplace environments. Geospatial technologies are a high-growth career field representing significant job opportunities. As it is clearly a goal of enhanced STEM education to graduate K-12 students who are college and career-ready, it would be a critical shortcoming to exclude the foundations of geospatial learning in STEM curricula at the K-12 level.

We reiterate our position that a broader perspective of which disciplines constitutes a STEM education in the United States be adopted, and that the value of the social, behavioral and economic sciences is recognized as critical for the development of a workforce prepared for careers in geospatial technologies.

COGO stands willing to provide assistance to the Administration to clarify the importance of the geospatial science and technology in STEM education and in the Reauthorization of the ESEA.

Sincerely,



Genevieve Terry, GISP, MGIS
Chair, Coalition of Geospatial Organizations

cc: COGO Member Organizations

American Congress on Surveying and Mapping (ACSM)
American Society for Photogrammetry and Remote Sensing (ASPRS)
Association of American Geographers (AAG)
Cartography and Geographic Information Society (CaGIS)
Geographic Information Systems Certification Institute (GISCI)
International Association of Assessing Officers (IAAO)
Management Association for Private Photogrammetric Surveyors (MAPPS)
National States Geographic Information Council (NSGIC)
United States Geospatial Intelligence Foundation (USGIF)
University Consortium for Geographic Information Science (UCGIS)
Urban Regional Information Systems Association (URISA)

