# NSDI Cooperative Agreements Program
## *Participation in The National Map*
## Final Project Report

Cooperative Agreement Number:      04HQAG0190

Project Title:      Maryland Centerline Data for the
National Map

Project Start and End Dates:      August 20, 2004 to September 30, 2005

Lead Project Organization:      Towson University Center for GIS

Project Lead:      Matthew Felton

USGS Mapping State Liaison:      Roger Barlow

Collaborating Organizations:      Maryland State Highway Administration
Maryland State Geographic Information
Committee

Data Themes:      Transportation

Project Summary


Since 2000, the Towson University Center for Geographic Information Sciences (CGIS), in partnership with the Maryland State Geographic Information Committee (MSGIC), has been actively involved in coordinating development and delivery of geospatial resources through a series of USGS/NSDI/FGDC CAP Grants. This Final Project Report describes the 2004-2005 Category 6 *Maryland Centerline Data for the National Map* project.

The CAP Category 6 Award represents the synergy of several ongoing efforts centered on interoperability and data sharing in Maryland. CGIS served as the project integrator and leader; the Maryland State Highway Administration (SHA) was the primary data provider; and MSGIC assisted with ensuring that the project remained consistent with relevant state and federal standards and programs currently underway. The Category 6 CAP grant allowed CGIS, MSGIC, and SHA to leverage existing SHA efforts toward creation of a Statewide Centerline dataset to make a valuable contribution to *The National Map*. The project was also designed to establish a repeatable process that can be used by other agencies to contribute data.

<u>Project Objectives</u>

The following are the original proposed objectives, all of which have been successfully fulfilled throughout the one-year CAP project:

1. Ensure that Maryland SHA transportation data are complete; follow FGDC, ISO, and OGC standards; and that proper preparations are made to incorporate the data into *The National Map.*

2. Assist SHA with database development, documentation, and posting data to *The National Map.*

3. Collaborate with SHA and MSGIC to assure that the Maryland Roads web Map Service complies with applicable International for Organization Standardization (ISO), Federal Geographic Data Committee (FGDC), and Open GIS Consortium (OGC) standards.

4. Publish all relevant metadata in the Maryland Mapping Resource Guide (MMRG), which is harvested by the Federal Geospatial One-Stop.

5. Create a "Deploying Data to *The National Map*" white paper to further such efforts in the State of Maryland.

6. Continue participation with MSGIC efforts toward data technology interoperability.

<u>Project Accomplishments</u>

CGIS has been involved with the SHA Cooperative Centerline Program since October 2004. As part of the 2004-2005 Category 6 CAP grant, the project team researched and made recommendations on the following standards: the Geospatial Positioning Accuracy Standard, Part 3, National Standard for Spatial Data Accuracy (FGDC-STD-007.3-1998), and the Draft Standards for Content of Transportation.

Through the conclusion of the 2004-2005 Category 6 CAP grant project, several CGIS staff members continue to be actively involved with the SHA Cooperative Centerline Program. CGIS staff members are completing geometric editing, attribution, and applications development to assist SHA with preparing county level centerline data to be incorporated into the statewide dataset.

As stated in the interim report, CGIS and SHA developed a pilot that outlined the target counties for inclusion in the initial Web Service. The target counties comprise Montgomery, Howard, Baltimore, Harford, Anne Arundel, and Prince George's. Montgomery, Howard, Harford, and Baltimore counties were successfully published to *The National Map* in July 2005. As part of the

preparations, CGIS worked with SHA to develop guidelines to edge match counties at the boundaries and edit the databases to assure consistency throughout the data. The remaining pilot counties will be coming online as they are completed.

In order to ensure sustainability, the data must be kept up-to-date. CGIS developed a method that allows the centerline data, which are hosted on servers at CGIS but maintained at SHA, to be consistently updated. An innovative system of secure Web folders allows access by SHA and CGIS. The secure Web folder system also facilitates the ability to move large datasets. The Webdav protocol has been implemented to allow efficient transfer of large files in a secure environment. SHA has been successfully using this system since October 2004.

CGIS researched different tools for publishing a Web Map Service (WMS). These include ESRI's "out of the box" WMS connector, ESRI's downloadable WMS connector, and the Minnesota Map Server (a practical open source option). After researching these tools it was decided that ESRI's downloadable connector would best suit this project's needs.

To create a repeatable process for others in Maryland, the project team has been actively involved in MSGIC's Interoperability Committee. Team members have reported on their technical experience with Web-based mapping and the publishing of map services in open standards. The team has written a white paper that offers insight on the process of contributing data to *The National Map*. The white paper can serve as an administrative and technical resource for those who wish to bring other Maryland *National Map* layers online by emulating the process described in the white paper.

Partners in Category 6 CAP grant project have discussed methods to gauge the overall success of the effort across different governmental levels. One way to measure the success of this project is by prompting other counties or state agencies to share data to *The National Map*. A primary goal of the white paper is to provide lessons learned and technical knowledge for the purpose of encouraging others to publish data to *The National Map*. CGIS will continue to work with MSGIC to promote this aspect of the project.

Challenges

As stated in the Interim Report, one of the largest challenges the project team faced was convincing data owners to share their data. This project has resulted in methodology that allows local governments to provide centerline and address information, while SHA provides roadway distance measurements, linear referencing, quality control, and data validation. This methodology is successful because neither entity actually edits the other's data, the project allows better exchange of information about the roadway system, gives each entity a common model when referring to the system, and provides opportunities for more efficient

collection of information about roadway assets. The proven success of this methodology results in a valuable contribution to *The National Map*.

The interim report discussed issues that have arisen regarding the distribution of address range information. Some counties have license agreements that prevent them from distributing address ranges while others are concerned about distributing proprietary information. The project team is currently involved in ongoing discussions about methods to overcome these issues.

Framework Data

The CGIS-SHA-MSGIC contribution is for the Transportation framework layer. As part of the Cooperative Centerline Program, all county participants have agreed that the statewide centerline dataset will be publicly available.

Metadata has been created for the State Centerline file and the Map Service. This is catalogued in the Maryland FGDC clearinghouse node (www.marylandgis.net). The metadata is available through the Maryland Mapping Resource Guide (MMRG).

Relationship with USGS

The need to create cross-organizational partnerships, processes, and standards that facilitate data sharing is paramount to the overall effort. This goal is shared among most Maryland state agencies and is currently being manifested through the Maryland Department of Natural Resources (DNR) recent draft Memorandum of Understanding with USGS to become a participant in *The National Map*.