Improving National Transportation Geospatial Information

December 14, 2007
The National Academies Keck Center
Washington, D.C.

Organizer
TRB Geographic Information Science and Applications Committee

Cosponsors
The National States Geographic Information Council
TRB Statewide Transportation Data and Information Systems Committee
TRB National Transportation Data Requirements and Programs Committee
TRB Critical Transportation Infrastructure Protection Committee

Supported by
Federal Highway Administration Office of Interstate and Border Planning

www.TRB.org/conferences/2007/Geospatial
Participating in National Initiatives

This workshop will examine the potential benefits and costs for the transportation community from improvements to the national geospatial information infrastructure for transportation. The information from the workshop should serve to inform both the transportation and mapping communities about potential strategies for transportation participation in national geospatial information. The specific workshop objectives are to

- Investigate the likely applications, benefits and costs of an improved national geospatial information system for the transportation community;
- Identify likely users, beneficiaries, and funding sources;
- Discuss key data elements that could be included;
- Suggest potential roles, mechanisms for sharing data, and approaches to integrate required data for multiple sources; and
- Explore institutional arrangements that could facilitate such an initiative.

Highways and streets likely will be dominant in our discussions because of wider interest and more mature geospatial activities in these areas. I encourage all of you who are interested in the use of geospatial information to improve the performance of the transportation system to join in the workshop deliberations.

—Reginald R. Souleyrette
Iowa State University
Planning Team Chair and Cochair of the TRB Geographic Information Science and Applications

WORKSHOP PLANNING TEAM

Reginald Souleyrette, Professor, Iowa State University, Chair
Joseph Burns, National Transportation Liaison, U.S. Fish and Wildlife Service
Robert Denaro, Vice President, NAVTEQ
Peggi Knight, Director, Office of Transportation Data, Iowa Department of Transportation
David Moyer, National Geodetic Survey (retired)
Roger Petzold, Team Leader, Office of Intermodal and Statewide Programs, Federal Highway Administration
Mark Sarmiento, Federal Highway Administration

Ronald L. Vibbert, Manager, Asset Management Section, Michigan Department of Transportation
Joyce Wenger, Manager, Federal Transportation Business, Booz Allen Hamilton, Inc.
Daniel K. Widner, Coordinator, Virginia Geographic Information Network, State of Virginia
Frank Winters, GIS Manager, New York State Office of Cyber Security and Critical Infrastructure Coordination, State of New York

TRB Staff
Thomas M. Palmerlee, Associate Division Director, David Floyd, Senior Program Associate,
Since emergency management and security activities are inherently related to location there are distinct benefits that could be gained from a national transportation geospatial application. Overall, use of such data would provide a common operating picture for decision makers, showing what relevant activities are occurring and where. In most current cases, decision makers either don’t have access to sufficient regional data, don’t have access to data as quickly as is needed, don’t have data of the appropriate scale, or most significantly, don’t have geospatial information associated with much of the data they do have. Access to information through a single software application (which would draw on multiple data sources) could provide considerable benefits, such as convenience and speed, for assessing situations and making decisions.

**Improving National Geospatial Safety Data** (Keck 110)
Reginald Souleyrette, Professor, Iowa State University; and Ronald L. Vibbert, Manager, Asset Management Section, Michigan Department of Transportation, **Facilitators**

Traffic safety professionals make extensive use of the road network to plan and execute engineering, enforcement, education, and emergency response treatments for safety problems. Analyses range from site-specific studies to regional, statewide, and even national assessments. These require varying degrees of detail and attribution of the road network. Few states geocode crash information for all crashes on all public roads. For those states or local agencies that do geocode crashes, roadway attributes are similarly rare for all roads. While nonspatial data may be compiled to assess state performance, crash data by type and severity must be correlated to road type by attribute to “normalize” any comparisons. There is concern about the way the information is presented, because no single measure of safety covers all aspects that may influence the allocation of resources.

**Corridor Management and Congestion** (Keck 100)
Frank Winters, GIS Manager, New York State Office of Cyber Security and Critical Infrastructure Coordination, **Facilitator**

Congestion and corridor management requires seamless GIS data which spans state lines and all jurisdictions of roads. The motoring public or freight industry really don’t care who owns the road they just expect that “government” has their act together to make the system work. As an example, a tie up on I-95 in New Jersey may send vehicles onto state, county, and local roads. This flooding of roads comes over the line to New York, which will affect a parade scheduled on Main Street of some small village. Good seamless GIS data, which provide a common operating picture for all levels of government is critical to putting in place the means to deal with congestion, both before and during events.

**Routing and Navigation** (Keck 100)
Robert P. Denaro, Vice President, NAVTEQ; and Peggi Knight, Director, Office of Transportation Data, Iowa Department of Transportation, **Facilitators**

Routing and navigation make extensive use of the road network to solve the problem of shortest path to a selected destination from current vehicle position. The “shortest” path can be in terms of time or distance, typically time, and other constraints can be included such as avoiding known hazards, low bridges, sharp turns, legal vehicle restrictions, etc. Use of road network information for special operations
such as emergency response or evacuations may require additional information about the road infrastructure such as key facilities, bridge and tunnel identification and classification, rail crossings, river crossings, and other data. Routing of vehicles is rarely restricted to a single state or smaller jurisdiction. In order to route successfully, an absolutely fixed standard format and content for the data is necessary. Not only does this enable seamless navigation across legal boundaries, but in-vehicle systems need to access and interpret the data in a consistent manner. It is extremely costly to collect and process road data for navigation. There is little consistency and often lack of completion of road attributes by various municipalities, whether at the city, county, or state level. Standardizing the data collection within states and developing a method for sharing data between states would assist greatly in development of national geospatial data. Improved records, standard coding, and dissemination of road data by all authorities would be very useful. The freshness of the data and change management are issues.

Environment and Planning (Keck 204)
Joseph Burns, National Transportation Liaison, U.S. Fish and Wildlife Service, Facilitator

Geospatial data can assist transportation specialists in understanding the ecological implications of an individual transportation project and the cumulative impacts of a larger regional or statewide transportation system on the natural environment. Increased understanding of the ecological relationships and the implication of those ecological relationships can improve transportation designs that minimize impacts to the environment, reduce mitigation costs, and project delivery delays due to environmental impacts. As individual environmental elements are influenced ultimately by ecological processes that are regional or even global in nature, data that provide a larger regional or national context can identify ecological relationships and pathways that may pass through the project planning area and design projects that minimize or avoid disruptions to these pathways and ultimately minimize environmental impacts. And, as individual transportation projects are part of a larger system, which occur beyond regional, state, and even national boundaries, regional and national context can improve the overall efficiency of the transportation system by improving multimodal connections that span regional or state boundaries.