

NSDI Future Directions Initiative

Towards a National Geospatial Strategy and Implementation Plan

Submitted by the NSDI Future Directions Planning Team
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Executive Summary

The purpose of the National Spatial Data Infrastructure (NSDI) Future Directions Initiative was *to craft a national geospatial strategy and implementation plan to further the development of the NSDI*. Drawing on the collective insights and contributions of the geospatial community at-large, three overarching action areas emerged that provide the context for the goals and objectives enumerated in this document.

(1) Forging Partnerships with Purpose: A governance structure that includes representatives of all stakeholder groups guides the development of the NSDI.

The NSDI cannot be maintained and enhanced by a single organization. A well-coordinated, concerted effort inclusive of the private sector, academia and all levels of government led by the Federal Geographic Data Committee (FGDC), is needed to leverage resources, minimize redundancies and collaboratively solve problems to achieve the NSDI vision. A governance structure that fosters collaboration and shared responsibilities among stakeholders is critical to ensure success of this effort. Essential elements for achieving the objectives are a bottom-up approach and partnerships forged to achieve a common goal.

(2) Making Framework¹ Real: Nationally coordinated programs that include collection, documentation, access, and utilization of data are in place for generating framework data themes.

Standardization of framework themes is critical to the achievement of interoperability among diverse geospatial data suppliers and users. The national acceptance and utilization of American National Standards (ANSI) for framework data themes is the first step toward interoperability. Expansion of the current framework layers to encompass more themes of national, regional, local or topical importance is an FGDC priority.

(3) Communicating the Message: The NSDI is recognized across the nation as the primary mechanism for assuring access to reliable geospatial data.

The geospatial community must be able to communicate the benefits and value of the NSDI beyond the current user and supplier communities. The development of the business case, a strategic communications plan and training programs that support NSDI implementation will contribute to reaching this goal.

¹ Framework data themes: The most commonly used set of base geographic data - specifically geodetic control, orthoimagery, elevation and bathymetry, transportation, hydrography, cadastral, and government units.

Towards a National Geospatial Strategy and Implementation Plan

The *National Geospatial Strategy* lays out a context for action and guides the development of partnerships, core datasets, and a common direction to address the needs of the geospatial community. It is based on communication, cooperation, and partnerships and is designed to be a catalyst for coordination with the power to transform attitudes, policies and services. It reflects a comprehensive and integrated approach to provide access to critical geospatial data and products. The strategy recognizes the need of the geospatial community to communicate the value of the National Spatial Data Infrastructure (NSDI) beyond the current user and supplier communities.

The intent of the *National Geospatial Strategy* is to move this community forward by pursuing a shared vision supported by common goals and objectives. It is the product of more than twelve months of consultation across the geospatial community. It promotes efforts to change the way we currently conduct business and will have a significant impact on our business practices. It is ambitious because the geospatial community believes we cannot delay the work and investments needed to establish the spatial data infrastructure for this country.

As conceived, the *National Geospatial Strategy* requires a variety of organizations and individuals to become involved and share the responsibility for implementation. It emphasizes coordination of resources and appropriate technical services at all levels of government – federal, state, local, and tribal, as well as the academic community and the private sector. At the same time, the strategy focuses on achieving interoperability with a renewed effort to comply with and adopt framework standards.

The Goals and Objectives are built on past successes and provide the blueprint for collective action. The commitment of the partners to work together to achieve the goals and objectives is key to the success of the strategy.

The Action Plans, which accompany this report, more concretely outline procedures for achieving each objective and will serve as a starting point for leaders and teams to address the issues. Working Groups, Action Teams and Task Forces will be chartered to address each of the thirteen objectives.

In summary, the foundation of the National Geospatial Strategy is identification of common critical issues, a collaborative and inclusive approach to addressing those issues, and a strong emphasis on internal and external communications.

Introduction / Purpose of the Project

In 2003 the Federal Geographic Data Committee (FGDC) Secretariat was charged by the FGDC Steering Committee to pursue the National Spatial Data Infrastructure (NSDI) Future Directions Initiative. The purpose of the initiative was *to craft a national geospatial strategy and implementation plan to further the development of the NSDI*. FGDC Staff Director Ivan DeLoatch established the Future Directions Planning Team in October 2003 and hired a consultant team from LEAD Alliance to direct the effort. The Planning Team consisted of members from the FGDC Secretariat staff and Coordination Group.

Ideas and perspectives for the Future Directions Initiative were solicited and collected through interviews, Coordination Group meetings, workshops, forums, staff meetings, and conferences held between December 2003 and April 2004. FGDC staff members and Coordination Group members contributed valuable insights and committed a considerable amount of time to this initiative. The 1997 NSDI Strategic Plan and the FGDC May 2000 Design Study Team Report served as the foundation documents for this initiative. Participants from the National Association of Counties (NACo) GIS Committee, National States Geographic Information Council (NSGIC) Mid-Year Conference, the Professional Organizations Forum² and the Environmental Systems Research Institute, Inc. (ESRI) Federal Users Conference provided input into the vision description, national goals, and roles of partners. The goals and objectives that emerged represent the collective thinking of many, but not all, segments of the national geospatial community.

Three key actions heard repeatedly – Forging Partnerships with Purpose, Making Framework Real, and Communicating the Message – provide the structure for the goals, objectives and the strategic action plans of this initiative.

Profile of the National Spatial Data Infrastructure (NSDI)

Executive Order 12906 defines the NSDI as “the technology, policies, standards, and human resources necessary to acquire, process, store, distribute, and improve utilization of geospatial data.”

As detailed in OMB Circular A-16, the NSDI “assures that spatial data from multiple sources (federal, state, local, and tribal governments, academia, and the private sector) are available and easily integrated to enhance the understanding of our physical and cultural world.”³The FGDC is designated as the coordinating entity responsible for developing and implementing national strategies to advance the goals of the NSDI.

² Participants included: ACSM, ASPRS, GDT, GITA, MAPPS, MSC, OGC, STIA, UCGIS, and URISA,

³The revised version of OMB Circular A-16 is available at http://www.whitehouse.gov/omb/circulars/a016/a016_rev.html#4#4

In 1994 and again in 1997, the FGDC, with the cooperation of public and private sector stakeholders, developed strategic goals to implement and advance the NSDI. These strategic planning efforts focused primarily on public outreach, standardization of procedures, developing a national geospatial data clearinghouse and building institutional relationships to create a community of data-sharing stakeholders.

Since the mid 1990s, the NSDI has served as an overarching vision for the geospatial community. Beginning as a conceptual construct, the NSDI has evolved into a complementary set of actions implemented by a range of programs dealing with geospatial data and application activities. These programs are managed by government agencies participating in the NSDI and dedicated to achieving the goals of the NSDI as defined in OMB Circular A-16. The Federal Geographic Data Committee (FGDC), Geospatial One-Stop (GOS), and *The National Map* (TNM) are three examples of separate but interrelated activities, contributing to the development of the NSDI.⁴

- *Federal Geographic Data Committee (FGDC)* – coordinates and facilitates the implementation of the NSDI and related geospatial data activities.
- *Geospatial One-Stop (GOS)* – “implements the basic elements of the NSDI by providing an Internet portal (www.geodata.gov) to facilitate data sharing for decision support systems and by encouraging partnerships across organizations.”
- *The National Map (TNM)* – “integrates base geographic data in partnership with content producers at all levels.”

Other current initiatives and programs are designed to facilitate advancement towards the vision of a robust spatial data infrastructure. The initiatives listed below represent only a small sampling of the growing list of programs contributing to the NSDI development.

- *HAZUS* – a program sponsored by the Federal Emergency Management Agency (FEMA) to develop methodologies and software tools to model and estimate potential hazards from natural disasters such as floods, earthquakes, and hurricanes.
- *National Integrated Lands System (NILS)* – a partnership between the Bureau of Land Management (BLM) and the US Department of Agriculture (USDA) Forest Service to “develop a common data model and software tools for the collection, management, and sharing of survey data, cadastral data, and land records information.”
- *Regional Crime Analysis Geographic Information System (RCAGIS)* – an initiative spearheaded by the Department of Justice and the City of Baltimore to develop spatial data and application tools for the regional analysis of crime patterns.

Many key initiatives exist, with varying degrees of partnership, at all levels of government, the private sector, and academia.

⁴ Quotes taken from <http://www.geospatial-online.com/geospatialolutions/article/articleDetail.jsp?id=89953>

Trends, Challenges and Opportunities

Ongoing developments in the public and private sector require the active leadership of a cross-cutting entity to effectively articulate a larger national vision, as well as to guide and coordinate geospatial activities in a manner that best serves national and public interests. Increasing demands for immediate access to accurate and documented geospatial data across agencies and sectors are pushing open-source and standardization initiatives. Decision support systems that rely on geospatial information have proliferated over the past few years and are increasingly embedded in the operations of government at all levels.

Societal demand for wide-ranging and accurate geospatial data that can be quickly integrated with other data sets is rising. This places a premium on effective geospatial data coordination and sharing. Achieving more cost-effective use of geospatial data requires concerted and creative efforts to adopt common standards and interoperability across agencies and sectors.

Since the advent of the Internet, the Federal government has pursued electronic Government (e-Gov) as a means to more effectively serve the public through electronic information dissemination and web-based services. The nation's post-9/11 homeland security efforts have added new urgency to the need for widespread and accessible geospatial data that conforms to uniform interoperability standards for search, discovery, access and metadata documentation. There is concern among stakeholders that many of these initiatives may never reach their full potential without more effective data sharing and coordination within the entire geospatial community - public, private, academic, military and intelligence sectors.

Stakeholders voiced a need for a level playing field in the design and implementation of the NSDI, with an emphasis on true equity and interdependence within the network of NSDI participants at all levels. A corollary to this view is that the FGDC should play the role of a neutral facilitator and convener of stakeholder interests, ensuring that all relevant points of view are accounted for as the NSDI evolves.

The successful development of the NSDI is threatened by the lack of an effectively communicated shared vision and a clear business case for stakeholder participation. Incentives that are misaligned with the needs of stakeholders and the goals of the NSDI can also pose challenges to its development. The continuation of "isolated" geospatial programs, and the need for agencies at all levels of government to support their specific mission goals, pose an additional challenge to the development of a vital NSDI.

Key factors for ensuring the continued vitality of the NSDI include: a strong business case, accessibility of data and standards, a clear statement of the interrelationship among participants, and a collaborative, open environment.

NSDI Vision Statement

The NSDI Strategic Plan (1997) states, “Current and accurate geospatial data will be available to contribute locally, nationally and globally to economic growth, environmental quality and stability, and social progress.” Contemporary interpretation of this statement has led to the following collective vision description of the NSDI in 2010.

Federal, state, and local government agencies, the private sector, academia, and others engaged in an unprecedented national project to design, build, and maintain a highly accurate, distributed, and consistent geospatial framework during the first decade of the 21st century. This revolutionary partnership continues to leverage resources, technologies, and investments to create the geospatial framework that supports the national information infrastructure and enables informed decision-making at all levels of society.

A distributed network of core foundation layers serves as the building block for the seamless mix of government and commercial geospatial data holdings available to the consumer for information access and decision-making. The coordinated development of NSDI is enabling a new awareness of and accessibility to the fundamental interrelatedness of people, places, and things, and is driving an unprecedented market expansion of geospatially-enabled activity. Visualization, navigation, and spatially enhanced query tools help cost-effectively serve a larger information infrastructure. Spatial intelligence is pervasive and ubiquitous, and is now accessible to all via widely distributed geospatial technology.

The NSDI continues to evolve and is fueled by new ideas, technologies, applications, and services. Coordinated research and development along with training, education, policy and standards add value to the many services provided. Relevant, dependable geographic data, services and analysis tools are available 24/7 to the user. Instant and universal access to data is inexpensive, seamless, reliable and valuable. NSDI has become an integral part of work and recreational activities. Behind the scenes and invisible to the user are the partnerships, people, framework, and technologies bound together by a common vision.

Many factors contribute to the growth of the NSDI, including a collaborative approach to solving problems, increased awareness and understanding of the benefits of the NSDI, commitment and accountability of partnering organizations, realistic goals to further the implementation roadmap, and leadership support at all levels.

Goals to Focus a Geospatial Strategy for the Nation

The goals and objectives that have emerged from the workshops, conferences and forums fell into three major action areas and provide the focus for the National Geospatial Strategy.

Forging Partnerships with Purpose

By 2006, a governance structure that includes representatives of all stakeholder groups guides the development of the NSDI.

1. By 2005, options for restructuring the FGDC to make it more effective and inclusive are identified, evaluated and acted upon.
2. By 2005, agreements are in place to facilitate participation of the private sector and utility industry in building the NSDI.
3. By 2006, twenty tribes are engaged and contributing to the development of the NSDI.
4. By 2006, fifty state coordinating councils are in place and routinely contributing to the governance of the NSDI.
5. By 2006, ten non-geospatial national organizations are engaged in and contributing to the NSDI.

Making Framework⁵ Real

By 2007, nationally coordinated programs that include collection, documentation, access, and utilization of data are in place for generating the framework data themes.

1. By 2005, American National Standards (ANS) for framework data themes are approved, adopted, and implemented.
2. By 2005, FGDC member organizations use FGDC-accepted metadata standards and publish to the Geospatial One-Stop portal.
3. By 2006, consensus-based standards and Web protocols for access to framework data are adopted and used by Federal, state and local agencies.
4. By 2006, 50 percent of the 133 urban areas⁶ have data for all framework themes.
5. By 2008, American National Standards (ANS) for additional data themes of national significance as identified in revised OMB Circular A-16 are adopted by the Federal departments and independent agencies.

⁵ Framework data themes: The most commonly used set of base geographic data - specifically geodetic control, orthoimagery, elevation and bathymetry, transportation, hydrography, cadastral, and government units.

⁶ As identified in 1996 by NIMA's (NGA) 133 Cities Project

Communicating the Message

By 2007, the NSDI is recognized across the nation as the primary mechanism for assuring access to reliable geospatial data.

1. By 2005, a comprehensive business case that demonstrates the value of geographic data to government, business and academia is compiled and articulated.
2. By 2005, a strategic communications plan is developed and implemented.
3. By 2006, training and education programs are in place to support implementation of framework standards and national initiatives to develop the NSDI.

Summary

The goals and objectives serve as the foundation of a national geospatial strategy. They build on past successes and serve as a roadmap toward the future. The successful development of the NSDI will be dependent on FGDC leadership and support for building partnerships and coordinating efforts among federal and non-federal partners. Partners must work collaboratively to solve problems and to develop realistic action plans to accomplish the goals. Implementation and progress monitoring will be key to the success of this effort.

The continued development of the NSDI requires that the private sector, academia, and the utility industries as well as state, tribal and local governments play a major role. It demands the commitment of all sectors and a governance structure that is representative of all stakeholder groups.

The renewed focus on implementation of framework standards will be supported by the collaborative efforts of staff members, participating agencies and organizations, and partnerships to deliver the training and support.

The development of the business case, a strategic communications plan, and training programs that support implementation will lead to the recognition of the NSDI as the primary vehicle for assuring access to reliable geospatial data.

The convergence of geospatial technology and community needs requires the geospatial community to think nationally, model regionally and act locally. A distributed network that assures accurate, reliable, and valuable geospatial data from multiple sources requires a coordinated, concerted effort among all the partners. It also requires a commitment from the partners to work together toward these common goals. If we, as partners, can commit to making it happen, the vision that was described for 2010 may indeed become reality.

Acknowledgements

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Mapping Science Committee (MSC)
National Association of Counties (NACo) GIS Committee
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Participants from the following sessions:

FGDC/GOS Staff Meetings
FGDC Coordination Group Monthly Meetings
NSGIC Mid-Year Conference
ESRI Federal Users Conference
NACo GIS Committee Meeting
Professional Organizations Forum