



NATIONAL SPATIAL DATA INFRASTRUCTURE STRATEGIC FRAMEWORK

REVIEW DRAFT V1

Federal Geographic Data Committee
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Note to Reviewers

The Federal Geographic Data Committee (FGDC) is seeking feedback on the draft strategic plan framework for the National Spatial Data Infrastructure (NSDI). This draft framework has been developed with inputs from multiple sources. These inputs have included forums for leaders of key geospatial organizations, workshops for Federal leaders, sessions at geospatial professional conferences, and public meetings of the FGDC Coordination Group, the FGDC Steering Committee, and the National Geospatial Advisory Committee. The ideas and suggestions we have received from partners have been instrumental in shaping this document. Following the feedback opportunity, a revised version of the framework will be prepared for final review by the FGDC Steering Committee. Following completion of the high-level strategic framework, the FGDC will develop a final strategic plan and implementation approach in 2017.

INSTRUCTIONS:

We would appreciate your review and feedback on the draft NSDI Strategic Framework. Additional Information about the strategic planning process, along with an electronic copy of this document, is posted at: www.fgdc.gov/nsdi-plan/2017. Feedback may be submitted electronically to: nsdicomments@fgdc.gov. Please use the feedback form posted on the website. Feedback is requested by November 23, 2016.

PART I: INTRODUCTION

Overview

Geospatial data is a critical national asset that has increased the value of America’s data resources and underpins key parts of the economy. Dependence on spatial data and services span all business sectors, levels of government, and public and private investments today. A recent study by the Boston Consulting Group (BCG) estimated that the U.S. geospatial industry generated approximately \$73 billion in annual revenue and comprises at least 500,000 high-wage jobs. BCG also found that geospatial services deliver efficiency gains in the rest of the economy that are valued at many times the size of the sector itself—with geospatial services driving \$1.6 trillion in revenue and \$1.4 trillion in cost savings.¹ These benefits create an important competitive advantage for the U.S. economy, and create a growing number of high-wage technology jobs. Geospatial data and services are now ubiquitous and integrated into almost everything we do, resulting in significant changes in citizen and economic behavior.

Geospatial technology and data make government at all levels more efficient and effective. For example, policymakers are provided tools to understand the spatial spread of the Zika virus in which predictive modeling is used to anticipate future outbreaks. Interactive real-time flood modeling allows first responders to more accurately target people in areas most likely to be displaced due to rising waters from hurricanes or other storm events. Scientific analysis of the impacts of climate change on food production, which allows for sustainable practices that increase food security for all citizens.

The National Spatial Data Infrastructure – the NSDI – provides a framework for the collaborative development of this critical digital infrastructure for the Nation. This document provides a high-level plan for the continuing development and expansion of the NSDI.

NSDI Timeline

- **1994:** Executive Order 12906 established the National Spatial Data Infrastructure (NSDI) as “the technology, policies, standards, and human resources necessary to acquire, process, store, distribute, and improve the utilization of geospatial data.” The Executive Order also created the Federal Geographic Data Committee (FGDC), with responsibility to coordinate the development of the NSDI across government.
- **2002:** The Office of Management and Budget (OMB) issued a revised version of Circular A-16, “Coordination of Geographic Information and Related Spatial Data Activities,” describing FGDC’s responsibilities for the development of the NSDI and detailing agencies’ roles and responsibilities.
- **2008:** The Department of the Interior established the National Geospatial Advisory Committee (NGAC) – composed of representatives from all levels of government, the private sector, non-profits and academia – to provide advice and recommendations on national geospatial policy issues and the development of the NSDI
- **2010:** OMB issued Supplemental Guidance to Circular A-16, requiring identification of specific datasets that are to be managed as National Geospatial Data Assets (NGDAs) through a geospatial portfolio management process.
- **2013:** FGDC adopted the “NSDI Strategic Plan 2014-2016,” which included an updated Vision:
“The NSDI leverages investments in people, technology, data, and procedures to create and provide the geospatial knowledge required to understand, protect, and promote our national and global interests.”

National Approach to the NSDI

The Federal government has had a pivotal impact across data, technology, and services fronts in advancing our national spatial data infrastructure and in helping to fuel innovation. However, the role of government in the geospatial ecosystem has changed significantly since the inception of the NSDI, with the advent of both flexible technologies to enable data access and multiple sources of geospatial data that are not government controlled. Increasingly, tribal, state, local and regional governments, as well as the private sector, academia and non-profits play a critical role in contributing to the national portfolio of geospatial data. Local governments manage some of the richest and highest resolution data, such as local roads, addresses, and parcels. Private firms collect and manage data both for their own use and for use by public entities, while also integrating publically funded data into commercially-available services.

To achieve a truly national geospatial strategy that serves the common good, a coordinated, shared, and defined approach is required. To be successful from a user's perspective requires that the data, services, and supporting infrastructure of the NSDI are available, dependable, integrated into existing user devices and services, and seamless.

Roles and Responsibilities

The NSDI is based on a complex set of interagency and intergovernmental arrangements and public-private partnerships. This multi-faceted web of relationships enables creative interaction among sectors and collaborative development of new products, approaches, and technologies. However, the complex nature of the NSDI also poses challenges to effective coordination and governance. Roles and responsibilities for the components of the NSDI will vary among data themes and datasets, as they relate to partner organizations. Some NGDA datasets are most appropriately stewarded from the bottom up, with local governments producing data that can be aggregated the state or federal level. Other datasets may best be addressed through federal enterprise programs that are informed by and serve the broader public sector mapping ecosystem. In other cases agencies may collaborate on enterprise acquisitions of commercial data. A primary objective of the NSDI planning process is to define specific approaches – in collaboration with partners – that make sense for different data components and applications of the NSDI. Another key focus for the NSDI is to ensure coordination and alignment with the National System for Geospatial Intelligence (NSG). Executive Order 12333 established the Director of the National Geospatial-Intelligence Agency as the Functional Manager for Geospatial Intelligence (GEOINT). The Director established the NSG to contribute to the overall advancement of the GEOINT function.

Emerging Geospatial Technology Trends

The National Geospatial Advisory Committee has identified a set of important technology trends that will impact the geospatial community, and will require continued collaborative planning and consideration across sectors. These trends include the following:

- **Integration and interaction of real-time data collection and analysis**
The ability to continuously create and interact with real-time spatial and temporal data is transforming the ways in which geographic data are now collected, mapped, modeled, and used, both in geography and in science and society more broadly. This trend is realigning traditional relationships and driving new geospatial applications in governments, businesses, and society.

- **Miniaturization of technologies**
Miniaturization to create small and inexpensive devices and sensors, along with nearly ubiquitous wireless connectivity, is driving an explosion of the Internet of Things. Miniaturized and lower cost sensors are leading to dramatic increases in data collection and quality, and the ability to tailor sensors to specific data collection needs.
- **Proliferation of new mobile geospatial sensor platforms**
The rapid miniaturization of technologies has enabled new platforms for sensor distribution, such as small satellites (smallsats) and unmanned aircraft systems (UAS, or ‘drones’) that can be rapidly designed and deployed. These mobile geospatial sensor platforms greatly expand the capability of individuals, businesses, and governments to collect volumes of remotely sensed data for purposes including disaster response, environmental monitoring, and public safety.
- **Expanding wireless and web networks**
The expansion of data collection tools, and the resulting volumes of real-time spatial and temporal data, requires improved methods for data transmission and distribution, including wireless and web networks.
- **Advances in computing speed and capacity for geospatial data application**
High performance computing networks and cloud computing services provide individuals with access to vast repositories of geospatial data, tools, and services, as well as channels through which they can contribute to these repositories.

Scope of Strategic Framework

This high-level NSDI Strategic Framework has been developed through an analysis of the 2014-2016 NSDI Strategic Plan and the incorporation of input and requirements from non-federal partners and constituents, including the National Geospatial Advisory Committee and the organizations and sectors it represents. The FGDC also held a series of outreach meetings and listening sessions to gather input from key partners. The FGDC community has made significant progress over the past three years in driving activities such as the development of the National Geospatial Platform (GeoPlatform.gov), the establishment of the Geospatial Interoperability Reference Architecture (GIRA), and the enhancement of the National Geospatial Data Asset (NGDA) portfolio management process. In order to continue this progress, this Strategic Framework identifies three major goals for the Federal community to address and three major opportunities to work collaboratively with the broader geospatial community of practice.

PART II: KEY FEDERAL RESPONSIBILITIES

The following goals and objectives are primarily the responsibility of the Federal community but will require tribal, state, local and regional government participation to ensure success.

Goal 1: Expand the National Geospatial Platform

GeoPlatform.gov is the national registry for geospatial data and maps. It currently enables powerful collaboration and sharing of information to support better government and transparency. FGDC will work with partners to build on the success of the GeoPlatform by developing new communities and soliciting participation from tribal, state, local, and regional governments to expand opportunities to the broader geospatial community.

- **Objective 1.1:** Develop additional interagency communities and solicit mutually beneficial participation from tribal, state, local, and regional governments.
- **Objective 1.2:** Extend the capabilities, expand the services, and enhance the data provided by the GeoPlatform.
- **Objective 1.3:** Increase the number and variety of common analytical services and tools that promote ready access to available National geospatial resources.
- **Objective 1.4:** Ensure the GeoPlatform portfolio of easy-to-use data, applications, and services are hosted on a secure cloud infrastructure that maximizes interoperability, allows better managed geospatial data, increases sharing and reuse of resources, and stimulates innovation and entrepreneurship.

Goal 2: Enhance the Management of Federal Geospatial Assets

Promote the development, management, and accessibility of consistently documented spatial data across the geospatial community. FGDC will work with data stewards and partners to refine the National Geospatial Data Asset (NGDA) portfolio management initiative based on best practices and lessons learned.

- **Objective 2.1:** Enhance NGDA portfolio management capabilities through activities including:
 - Dataset maturity assessments.
 - Development of implementation plan for NGDA Data Themes.
 - Support and training for NGDA Theme Leads and Dataset Managers.
- **Objective 2.2:** Promote development and utilization of national and international standards applicable to the geospatial community through activities including the following:
 - Continue and broaden Federal participation in voluntary standards organizations to support development of key geospatial standards
 - Support and enhance agency implementation of applicable geospatial standards
 - Consider recommendations of the NGAC Standards Coordination Subcommittee
- **Objective 2.3:** Promote increased access to geospatial data and services utilizing enterprise approaches when appropriate.

Goal 3: Update the National Geospatial Policy Framework

The policy framework guiding national geospatial programs and activities needs to be updated to reflect significant changes in technology, the expanded use and value of geospatial information, and the evolving roles of partner organizations. Executive Order 12906, “Coordinating Geographic Data Acquisition And Access: The National Spatial Data Infrastructure,” was issued in 1994. OMB Circular A-16, “Coordination of Geographic Information and Related Spatial Data Activities,” was last updated in 2002. Revisions to the policy framework are needed to better support Federal geospatial programs and the nation’s geospatial ecosystem.

- **Objective 3.1:** Review and revise OMB Circular A-16 in collaboration with OMB and stakeholders to update the guidance to federal agencies for collection and management of geospatial assets.
- **Objective 3.2:** The Circular A-16 Supplemental Guidance, which was issued in 2010, should be incorporated into the revised version of A-16. The content of the Supplemental Guidance, which describes a portfolio management approach for National Geospatial Data Assets (NGDAs), should be updated to reflect the recommendations of FGDC’s recent NGDA/portfolio management evaluation process.
- **Objective 3.3:** Consider developing new policy direction through an updated Executive Order or through working with Congress on enabling legislation to codify NSDI requirements.

PART III: OPPORTUNITIES FOR THE GREATER GEOSPATIAL COMMUNITY

The opportunities identified for the national geospatial community in furthering the development of the NSDI cannot be the sole responsibility of the Federal community. These activities will require the engagement and participation of all levels of government, academia, and the private sector in order to achieve maximum impact. The Federal geospatial community, under the leadership of the Federal Geographic Data Committee, should serve a catalyst for the success of these initiatives.

Focus on National Priority Data Initiatives

Engage with the greater geospatial community to collaboratively develop identified national priority data sets, which may include: Address Data, 3D Elevation, Imagery, Transportation, and Open Water Data. Document best practices and lessons learned from the collaboration and partnerships to replicate for future initiatives. Key players include data stewards, data providers, stakeholders, and users for each of the priority data sets.

Key Elements:

- **Designate and empower executive champions to lead and coordinate the development of the priority datasets with appropriate partners.** Collaborate with appropriate partners and utilize project management strategies to coordinate implementation of priority datasets.
- **Develop national partnerships and governance models for priority data initiatives.** Build formal relationships and define roles and responsibilities for geospatial community stakeholders.

- **Align with the National System for Geospatial Intelligence (NSG).** Engage with the National Geospatial-Intelligence Agency to harmonize and coordinate NSDI and NSG activities.
- **Expand FGDC subcommittee/working group membership.** Subcommittee and work group chairs will evaluate membership and reach out to include underrepresented geospatial community participants.
- **Host forums to enable participation by the greater geospatial community.** Use geospatial community and industry forums to supplement subcommittee and working group activities on national priority data initiatives.
- **Promote/highlight existing partnerships.** Share information about successful collaborations.
- **Additional activities may include the following:**
 - Increase communication and outreach to key geospatial community participants.
 - Incentivize and promote partnerships and participation by non-federal and non-governmental entities.
 - Establish and enable data exchange models and partnerships.
 - Create partnerships and models to fund new national datasets.

Rebrand the NSDI to Broaden Awareness and Understanding of the Geospatial Community

Raise awareness and understanding of the impact of geospatial information and its role as part of critical national infrastructure. Develop an NSDI community communications effort that engages a broad range of partners in building and conveying the NSDI message. Engage partners to demonstrate the value of geospatial information to quality of life, economic development and jobs, security and public safety, and global competitiveness. Key players include leaders of professional organizations, including but not limited to: AAG, ASPRS, COGO, GITA, MAPPS, NAPSG, NSGIC, OGC, UCGIS, URISA, USGIF.

Key Elements:

- **Establish partnerships.** Reach out to key geospatial organizations to form a partnership/joint effort to lead the initiative to explore the rebranding of the NSDI and further the discussion.
- **Create a communications network.** Identify Points of Contact with professional organizations to share information and solicit ideas & feedback.
- **Conduct a Geospatial Leaders Summit.** Invite members of geospatial professional organizations to a Summit meeting with the purpose of exploring ideas and building consensus on rebranding the NSDI.
- **Conduct user forums at industry conferences.** Identify 3 - 5 industries dependent on geospatial information in order to conduct business. Attend, present, and facilitate sessions at identified conferences.

- **Launch a public engagement campaign.** Develop and execute a communications/marketing strategy. Focus on social media to build awareness and understanding of the power of geospatial technology. Consider podcasts, YouTube videos, and blogs. Include infographics, compelling examples of geospatial technology at work, and social media utilizing guest postings, etc.

Address Emerging Topics

Collaborate with the greater geospatial community and other partners to address key emerging issues, including cyber infrastructure protection, geospatial privacy, and education and training for the 21st century geospatial workforce.

Key Elements:

- **Address Emerging Technologies.** The NSDI community needs to assess and plan for emerging technology trends and their impacts on the geospatial landscape. These trends include:
 - **Data collection and generation** utilizing new technologies and platforms.
 - **Data analytics** supporting analysis of big data, multi-dimensional data, and spatiotemporal data.
 - **Infrastructure** to support growing needs for collection, processing, storage, delivery, and protection of data and systems.
 - **Access to technology and data** through changes in wireless systems and internet access, and how we protect sensitive information.
- **Build workforce development strategies.** Collaborate with partners to develop skills training for the next generation of spatial analysts, as well as consideration for how we broaden and diversify the spatial workforce.
- **Engage with key partners.** Identify and collaborate with new organizations engaged in developing policies and approaches for emerging topics. For example, continue and formalize FGDC's relationship with Federal Privacy Council regarding geospatial privacy issues.
- **Utilize the NGAC to reach out to emerging partners.** Collaborate with the organizations represented on the National Geospatial Advisory Committee to build new partnerships with industry groups, other levels of government, and other organizations to address emerging issues that will impact the geospatial community.

PART IV: CHALLENGES

Key challenges for the geospatial community include the following:

- **Coordinating within the Federal geospatial community.** Congress authorizes and provides appropriations for agencies to fulfill their mission responsibilities, and collaborative interagency projects and initiatives are sometimes regarded as of secondary importance. In addition, multi-agency approaches can face funding and authorization constraints. In this context, the challenge for the FGDC community is to build effective and reliable multi-agency partnerships to achieve common geospatial goals.

- **Building effective partnerships with non-Federal partners.** As the NSDI has evolved, non-Federal organizations and governments have taken a greater role in geospatial data production and have developed new levels of capability and expertise. This changing landscape requires similar changes in partnership arrangements. Partnerships and agreements should be tailored based on the nature of the relationship – some will be formal service-level agreements and others will be more informal collaborative partnerships to better serve the public.
- **Acquiring and aligning resources.** As geospatial data and technology have become growing components of the Nation’s critical digital infrastructure, ensuring an appropriate and reliable level of resources has become an issue of increasing importance. The challenge for the FGDC community is to align financial and human resources to support changing and evolving technologies, priorities, and partnership opportunities.

PART V: CONCLUSION

Successfully establishing a truly national NSDI will serve the U.S. and its citizens, spur innovation, help protect life and welfare, and build the economy – and will help ensure that the U.S. retains its global leadership in spatial data infrastructures. Continued investment in and establishment of shared data resources and services, increased development of national data collections, and national concurrence of strategic direction and activities is required to achieve this vision. This NSDI Strategic Framework provides a coordinated approach for the continued development of the national spatial data infrastructure.

¹ The Boston Consulting Group, 2012, December, Putting the U.S. Geospatial Industry on the Map, accessed November 8, 2016, at <http://www.ncge.org/files/documents/US-FullReport.pdf>