[DA-006] GIS&T in Federal, State, and Regional Government

Abstract

While federal agencies establish national geospatial policies and produce foundational data, state and regional governments are the critical hubs where these national frameworks are adapted to meet regional needs and local priorities. State-level geospatial coordination is essential for aggregating data from local governments, providing a unified operational picture for statewide challenges, and ensuring that local data can integrate with national programs. The National States Geographic Information Council (NSGIC) provides a unified voice for states at the national level, while State Geographic Information Officers (GIOs) lead coordination efforts within their respective states. This entry examines the role of state and regional bodies in the U.S. geospatial ecosystem, their primary functions, common challenges, and their indispensable role in bridging national policies with local implementation. These state-level activities are conducted within the broader framework of national policies and programs, as detailed in the entry on *National Organizations and Programs* (DC-07-022).

Keywords: coordination, data governance, Geographic Information Officer (GIO), governance, infrastructure, intergovernmental collaboration, NSGIC, state government

Author & citation

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Explanation

1. Introduction

The U.S. geospatial ecosystem is inherently multi-leveled. While national programs provide a broad framework and foundational data, the vast majority of detailed, high-resolution geospatial data is created and maintained by state, regional, and local governments to support their specific missions—from property assessment and 9-1-1 emergency response to transportation planning and environmental management. The effectiveness of the entire national system depends on robust coordination at the state level to bridge the gap

between federal initiatives and the diverse needs of thousands of local entities.

State governments and their designated geospatial leaders play a pivotal role in this structure. They act as data integrators, policy adapters, and innovation hubs, fostering collaboration both vertically (with federal and local partners) and horizontally (with neighboring states and regional bodies). This entry focuses on the key organizations, roles, and programs that define state-level geospatial coordination in the United States.

2. The National States Geographic Information Council (NSGIC)

Founded in 1991, the National States Geographic Information Council (NSGIC) is a non-profit organization that promotes the effective use of geospatial information and technology to improve government services (NSGIC, n.d.). Its primary mission is to advance state-led geospatial coordination and advocate for state interests at the national level.

NSGIC's membership is composed primarily of State Geographic Information Officers (GIOs) and other state-level geospatial program leaders, creating a powerful peer network for sharing best practices and developing common solutions. Key activities of NSGIC include:

- **Advocacy**: Representing the collective interests of states before federal bodies like the FGDC and Congress, ensuring that national policies and programs (such as the 3D Elevation Program) are designed to benefit from and support state contributions.
- **Coordination:** Facilitating collaboration among states on issues of common interest, such as data sharing, standards development, and emergency management support.
- **Best Practices:** Promoting effective strategies for geospatial governance, funding, and technical infrastructure. NSGIC conducts a biennial Geospatial Maturity Assessment (GMA), which provides states with a report card on their capabilities and a roadmap for improvement (NSGIC, 2024).
- **Resource Sharing:** Acting as a clearinghouse for information on state programs, policies, and data portals, making it easier for states to learn from one another.

Through these activities, NSGIC ensures that states are not just consumers of federal data but are active and essential partners in building the National Spatial Data Infrastructure (NSDI).

3. The Role of a State Geographic Information Officer (GIO)

The effectiveness of geospatial coordination within a state often hinges on the leadership of a designated State Geographic Information Officer (GIO) or equivalent position. The GIO is typically a senior-level official responsible for providing strategic direction and oversight for the state's GIS programs and assets (CA DOT, n.d.). While the specific responsibilities vary by state, the core functions of a GIO generally include:

- **Leading a Statewide GIS Council:** Facilitating a coordinating body of representatives from various state agencies, local governments, and other

stakeholders to set priorities and policies.
- **Developing Statewide Policies and Standards:** Establishing guidelines for data governance, quality, and sharing to promote interoperability and reduce duplication of effort. This includes addressing critical issues of data privacy and security (MD GIO, 2025).
- **Managing Statewide Geospatial Infrastructure:** Overseeing the development and maintenance of state geoportals, data clearinghouses, and shared services that benefit all levels of government.
- **Fostering Collaboration:** Acting as the state's chief advocate for GIS, building partnerships between state agencies, and with federal, local, tribal, and private sector entities.

The GIO is the central figure responsible for transforming a collection of disparate agency GIS activities into a cohesive, enterprise-wide geospatial strategy.

4. State-Level Coordination in Action: Governance, Funding, and Applications

The value of state-level coordination is demonstrated through its governance structures, funding mechanisms, and the diverse applications it enables.

4.1. Governance and Funding Models

States have adopted various governance models, each with distinct implications for efficiency and innovation. A centralized model, like that in Maryland, consolidates GIS authority within a single office, which is highly effective for unified crisis response and enforcing standards. This structure is often supported by a cost-recovery or chargeback model (Leger 2020), where the central office bills agencies for services, ensuring the program demonstrates continuous value. In contrast, a hybrid model (Leger, 2020) balances central oversight of standards and infrastructure with the empowerment of individual agencies to develop mission-specific applications. This model, often considered the most mature, fosters broader innovation and collaboration (Geographic Technologies Group, n.d.). Sustainable funding remains a primary challenge. Beyond direct legislative appropriations and chargeback models, states leverage strategic grant acquisition. The key is not to find grants "for GIS," but to embed GIS as an essential component in grant proposals for broader state missions like transportation safety or emergency management, for which federal funding is available. This approach allows states to use federal dollars to build local capacity and data assets that align with national priorities (Esri n.d. (h), FEMA, n.d.).

4.2. Domain Applications

Coordinated state GIS programs support a vast array of government functions by providing foundational data for value-added applications.

- **Public Safety:** States facilitate the creation of standardized address and road centerline data from local governments, which is essential for the transition to Next Generation 9-1-1 (NG9-1-1) (NENA, n.d.).
- **Transportation:** State Departments of Transportation (DOTs) manage extensive public GIS portals. For example, the Wisconsin DOT provides interactive maps for

asset management, such as culvert inventories, and for planning, such as the State Transportation Improvement Program (WI DOT, n.d.).
- **Environmental Management:** State environmental agencies offer public data portals with hundreds of layers. The Pennsylvania Department of Environmental Protection uses GIS not only to share data on topics like abandoned mines and water quality but also to create compelling story maps that educate the public on complex environmental issues (Esri n.d.(i), PA DEP, n.d.).
- **Public Health:** The COVID-19 pandemic highlighted the power of state GIS to provide public-facing dashboards for tracking disease spread and hospital capacity. States also use GIS to analyze the social determinants of health and ensure equitable resource allocation (Leger, 2020).
- **Election Administration:** GIS is fundamental for managing electoral boundaries and ensuring voters receive the correct ballot. States are increasingly using GIS to optimize the placement of polling locations and provide public-facing lookup tools for voters (US EAC, n.d., Esri n.d. (i)).
- **Economic Development:** State and regional agencies use GIS for business intelligence and site selection analysis to attract new businesses. They also support "economic gardening" by providing local businesses with sophisticated market analysis to foster organic growth (Esri, 2020).

5. Regional Collaboration in Practice

Many challenges, such as managing transportation corridors or large watersheds, transcend political boundaries and require regional collaboration. Metropolitan Planning Organizations (MPOs) and Councils of Governments (COGs) often serve as natural hubs for these initiatives. For example, the Maricopa Association of Governments (MAG) in Arizona leads a multi-state effort to develop a common GIS platform to streamline data sharing for transportation projects across the Intermountain West. Similarly, the Ohio-Kentucky-Indiana (OKI) Regional Council of Governments developed targeted, cross-jurisdictional tools to support emergency response and streamline transportation funding applications for its members in all three states. These collaborations save time and money, increase efficiency, and lead to improved decision-making by providing a more complete picture of regional systems (FHWA, 2015).

6. Federal Initiatives Driven by Geospatial Assets

Just as states leverage geospatial data for their initiatives, the federal government uses national-scale geospatial assets to drive federal policy and programs, often in direct partnership with state and local entities.

- **FEMA's National Risk Index (NRI):** The Federal Emergency Management Agency (FEMA) developed the NRI as an online mapping tool to visualize community risk for 18 natural hazards across the United States (FEMA, n.d.). By combining data on expected annual loss, social vulnerability, and community resilience, the NRI provides a standardized baseline for identifying the nation's most at-risk communities. This federal tool directly drives national and state-level initiatives by helping to prioritize and allocate resources, enhance hazard mitigation plans, and inform risk

communication efforts. For example, states have used the NRI to develop drought resilience plans and to identify coastal communities with limited emergency access, demonstrating how a federal geospatial product empowers targeted state action (FEMA, n.d.).

- **USGS 3D Elevation Program (3DEP):** Managed by the U.S. Geological Survey, 3DEP is a major federal initiative to acquire high-resolution lidar elevation data for the entire nation. This foundational dataset is essential for a wide range of applications critical to national priorities, including flood risk management, infrastructure construction, energy development, and landslide hazard assessment. The program is inherently collaborative, with the USGS partnering with other federal, state, and local agencies to jointly fund data acquisition, ensuring the data meets a wide range of user needs (USGS, n.d.).
- **Infrastructure Investment and Jobs Act (IIJA):** The implementation of this major federal law relies heavily on geospatial data to guide trillions of dollars in investment (GFOA, n.d.). A key example is the **Climate and Economic Justice Screening Tool**, a geospatial map used to identify disadvantaged communities that are marginalized and overburdened by pollution. This tool ensures that federal investments in transportation, broadband, and climate resilience are distributed equitably, directly linking a core policy goal of the IIJA to a geospatial application (GFOA, n.d.). The Geospatial Data Act (GDA) itself underpins these efforts by promoting the efficient, coordinated use of geospatial data to maximize the value of such large-scale federal investments (Hatch, 2019).

7. Interconnections and Challenges

State geospatial programs operate within a complex web of intergovernmental relationships and face a distinct set of challenges.

- **Federal-State Relations:** The relationship is ideally a two-way street. States rely on federal data (e.g., aerial imagery, elevation) as a base, while federal agencies increasingly depend on more accurate, state-aggregated data to enrich national datasets. Federal grants often provide an incentive for states to adopt national standards.
- **State-Local Relations:** This is arguably the most critical and challenging relationship. States must provide tangible value and clear guidance to encourage local governments to participate in statewide initiatives. Unfunded mandates and lack of trust can be significant barriers.
- **Persistent Challenges:** State programs often face hurdles related to governance (establishing clear authority for coordination), political support (justifying GIS as critical infrastructure rather than an IT commodity), and sustainable funding. As noted in NSGIC's Geospatial Maturity Assessment, even mature state programs struggle to secure stable, long-term funding for coordination and data maintenance activities (NSGIC, 2024; Quinlan, 2024).

8. Conclusion

State and regional governments are the indispensable linchpin of the U.S. geospatial

ecosystem. They perform the crucial function of adapting national policies to fit diverse regional contexts and aggregating local data into cohesive, statewide assets. Led by GIOs and supported by organizations like NSGIC, state programs are hubs of innovation in geospatial governance, funding, and collaboration. While they face persistent challenges, the success of the entire National Spatial Data Infrastructure depends on the strength and vitality of its state-level partners. A continued focus on empowering and funding these state-level coordination efforts is essential for building a truly integrated and responsive national geospatial capability.

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