U.S. Department of the Interior

Geospatial Services Model and Geospatial Modernization Blueprint

Serving the Geographic Business Needs of the U.S. Department of the Interior

The "Geospatial Services Model: Serving the Geographic Business Needs of the U.S. Department of the Interior" and the Geospatial Modernization Blueprint describes the critical findings and recommendations resulting from a geospatial analysis of those bureaus under the U.S. Department of the Interior (DOI). DOI's business activity depends on geospatial information—knowing where things are and understanding how they relate to one another. The purpose of these documents is to define how geospatial data and technology will be used to enhance DOI business activities and the achievement of its mission and goals. Geospatial data and technology are strategic, national assets involving major investments. While geospatial capabilities have been implemented in all DOI bureaus, the implementation hasn't been documented or systematic, causing impediments to potential interoperability and lost potential for cost savings. Geospatial information is produced and maintained by many different bureaus and program areas in DOI, resulting in a confusing collection of data and services that are difficult for DOI business areas to utilize. DOI's geospatial investments, assets, and services currently are not managed in a cohesive manner.

The Geospatial Services Model and the Geospatial Modernization Blueprint (GMBP), available at http://www.nps.gov/gis/egim/, describe a recommended path to a target state and milestones for measuring performance. This modernization blueprint is part of the DOI Enterprise Architecture process that is developing take-action modernization blueprints [1] using the Methodology for Business Transformation (MBT) process [2]. This process conforms to the Federal Enterprise Architecture (FEA) [3] efforts with the goal of making the best use of available funds to achieve strategic goals and objectives for the DOI through Information Technology (IT) Capital Planning and Investment Control (CPIC) [4]. DOI's Geospatial Blueprint effort has been coordinated with the Office of Management and Budget's (OMB) Geospatial Line of Business (GeoLoB) [5] to prevent duplication of effort and to ensure a clear division of labor with other federal agencies. The Enterprise Geospatial Information Management (EGIM) team [6], composed of bureau subject matter experts on the Geospatial Enterprise effort within DOI, was tasked to support the development of the GMBT in coordination with the Core Modernization Blueprint Team (CMBT) [7] or Core Team, composed of bureau executives and sponsors, which provides governance for the GMBP.

> DOI geospatial business stakeholders are confronted by a common set of issues and needs. These include:
>
> - "I know the information exists, but I can't find it ..."
> - "If I can find it, can I trust it"? "I don't know who else I could be working with ..."
> - "I have no way to share costs across DOI."
> - "[What are] all the existing DOI geospatial capabilities."

The recommendations identified in these reports are centered on creating a strategic shift in the delivery of future geospatial data and services. These recommendations are intended to provide the foundation for a sustainable migration to a service delivery model for DOI business improvement. This migration involves an approach that includes the optimization and standardization of geospatial programs, systems, and data assets to achieve an integrated "enterprise services" model that is supported by an improved governance approach and coordinated enterprise planning and investment strategy (Figure 1). The OMB GeoLoB [5] has established these categories to classify federal geospatial improvement efforts.

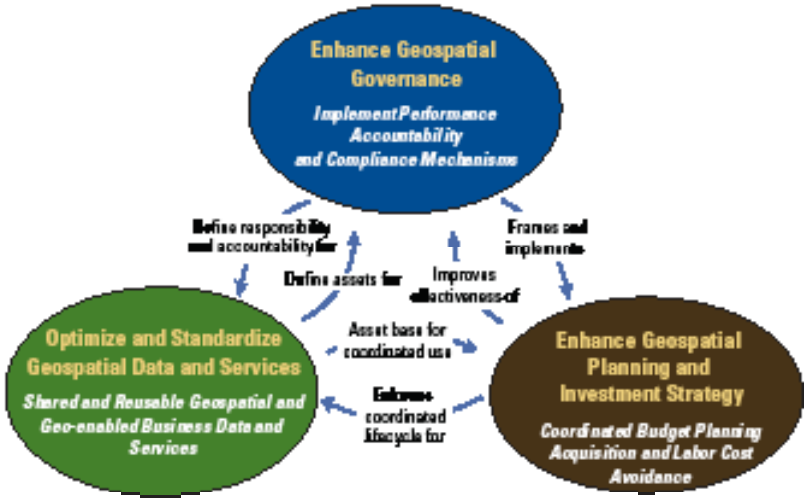


Figure 1. Geospatial Blueprint Recommendations

The cost avoidance and savings potential is already demonstrated as shown in the following list:

- ESRI GIS Enterprise License Agreement...$46 million over 5 years [8]
- ...using open geospatial standards...can yield a 26% total lifecycle cost savings [9]
- ...data acquisitions resulted in $72 million of data at the cost of $11 million in 1999 [10]

Vision:

DOI mission areas and goals of resource protection and use, recreation, and serving communities are enabled effectively and efficiently with geospatial data, information, and services [5]. The vision for the geospatial business focus area is to:

- Improve the ease, usability, and reuse of location-based information and services
- Create long-term savings and business efficiencies
- Improve the effectiveness of DOI investments

Strategies and objectives for achieving the geospatial vision for DOI include:

- Identification and development of critical reusable enterprise geospatial services and supporting business processes to improve business effectiveness
- Identification of areas to improve existing business processes, data, or IT to support program decision making
- Improvement in the usefulness of existing geospatial investments and assets by:
  - Identifying opportunities to collaborate
  - Improving geospatial interoperability through appropriate standards adoption
  - Reducing duplicative databases and business processes
  - Aligning "best-of-breed" existing capabilities with existing and future requirements
  - Investing in missing capabilities to achieve program objectives
  - Improving the quality and reliability of DOI-trusted data assets

Digital Raster Graphic (DRG) San Francisco area (Credit: USGS)

Recommendations:

Establish Geospatial Governance, Geospatial Management Office, and Portfolio Management — Effective governance will facilitate optimization of business planning requirements, reduction of unnecessary expenditures, management of Service Level Agreements (SLA), Enterprise License Agreements (ELA), data exchange agreements, and optimization of IT investment requirements for the portfolio (Figure 2). Implementation of this recommendation will aid in development of an inventory of enterprise data and services creating a geospatial portfolio for DOI. Geospatial technology, services, and information assets will get an established baseline value and efficiency contribution to DOI's business. This recommendation is a key solution necessary to adopt shared enterprise business practices to deliver consistent, high-quality data and to manage operational costs.

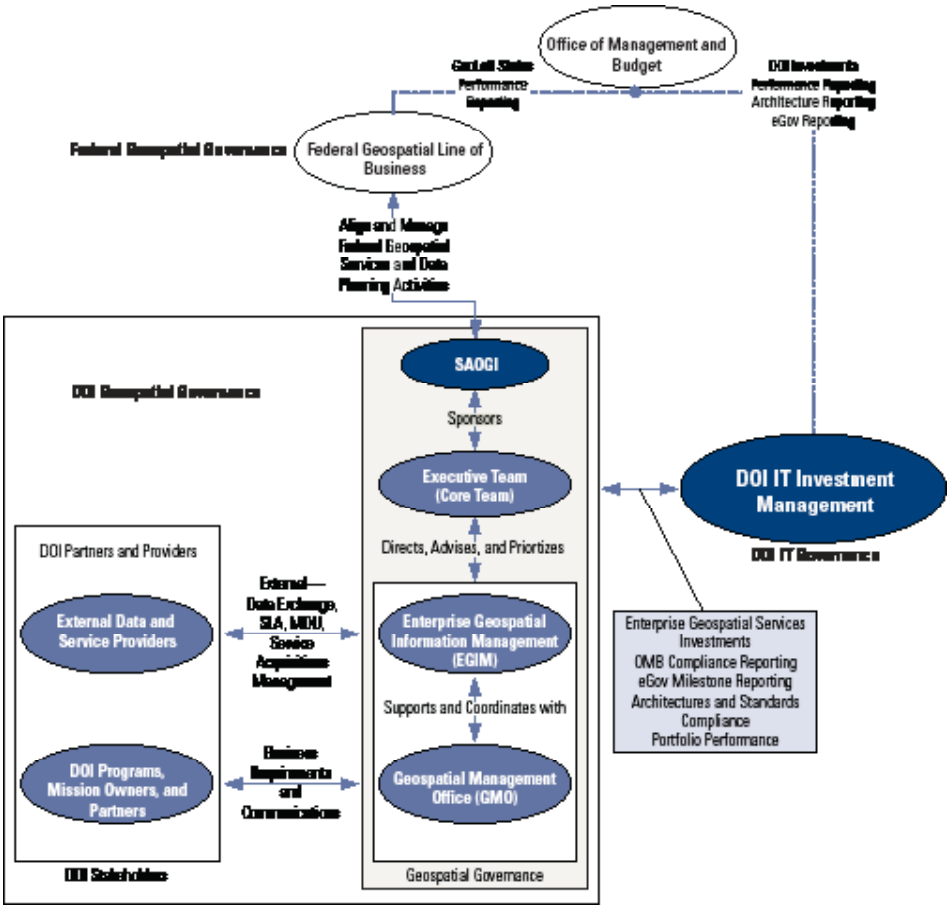


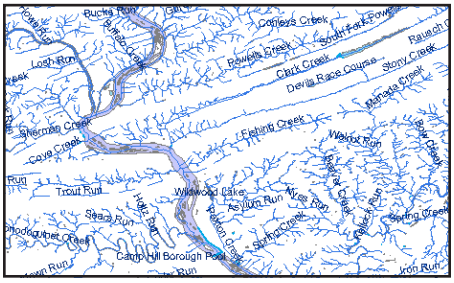
Figure 2. Geospatial Governance Model Recommendations

Establish a Geospatial Business Requirements and Investment Planning Process — Acquisition costs for DOI's geospatial data, services, and products have been hidden from true understanding at the enterprise level. Improvements in costs and efficiency, or benefits to the business have not been established quantitatively. Implementation of this recommendation would manage and optimize the requirements to identify cost savings and avoidance opportunities for contract services, skills, data, IT services, and technology purchases, as well as enhance DOI's work activity and CPIC [4] planning efforts.

Establish Authoritative Data Sources (ADS) and Supporting Geospatial Services – Implementation of this recommendation will establish data management control to support standards development effective data management and will reduce redundant proliferation of service development. The ADS governance approval will involve the Data Advisory Committee, Geospatial Core Team, affected bureau or program sponsors, principal data stewards, and the DOI Investment Review Board (IRB). Governance and consistent, reliable, funding mechanisms will be determined to support sustainable ADS implementations and to build cross-organizational trust.

The DOI ADS approval process consists of three phases:

- Assess and designate the candidate ADS
- Acceptance
- Transition and Maintenance



National Hydrography Dataset subbasin (Credit: USGS)

Establish Data Lifecycle Management, Policy, and Services Practices – Implementation of this recommendation will establish data lifecycle management, standards, policy, and services practices. This effort will align local geospatial data producers and the target ADS to establish standards, best practices, and to provide a sustainable ADS model. In addition to increased data reuse potential, the lifecycle processes will greatly enhance the capability to track data assets of DOI-wide interest that are produced in its federated model. The federated model recognizes the need for organizationally and geographically distributed information producers with their expertise to be key contributors to the enterprise model. The preferred solution would be to extend the existing capabilities of Geospatial One-Stop (GOS) [11] to accommodate this process.

ADS Services:

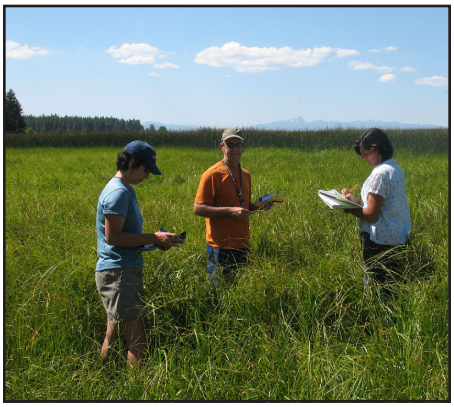
- Data Service
- Map Service
- Exchange Service

Establish DOI Product Generation Services for Geospatial Products and Information – Implementation of this recommendation will establish DOI product generation services for geospatial products and information and provide access to a consistent, business-oriented and user-friendly system to present, manage, process, and deliver available geospatial data, products, and services. The target model is designed to address simplified access across multiple repositories of data, provide standardized product configuring, eliminate the development of similar functionality at each ADS, and provide efficiencies by automating complex data manipulations. This will make it possible to develop functionality once, reuse it for many systems in the enterprise, and identify future functionality.

Key Business Operations Supported by Product Generation Services:

- Provide a business oriented DOI-wide geospatial product catalog
- Provide data services to generate geospatial databases, products, etc.
- Provide user navigation, product configuration, and status tracking services

Implement Geo-Enabled Key Asset and Stewardships Business Systems Interfaces – Implementation of this recommendation will geo-enable key asset and stewardships business system interfaces and will provide the ability to spatially associate and display such information. The geospatial interfaces take advantage of existing key enterprise data assets and offer a new means to perform quality assurance, analysis, visualization, and reporting on improved real property and land assets.



Vegetation survey Klamath Marsh, Oregon with FWS (Credit: BOR)

Adopt and Implement Geospatial Interoperability Standards and Licensing for Enterprise Geospatial Technology and Data – Implementation of this recommendation identifies the need to establish key technologies and standards for existing applications and new technology investments and establishes a cost benefit recommendation for the respective products and reviews by the DOI governance community. Technology and interoperability standards will be evaluated for adoption into the DOI Technical Resource Model (TRM). Interoperability specifications such as the Open GIS Consortium (OGC) will be foundational to the development and maturity of the DOI geospatial services.

Implementing Technology Standards:

- Review standards and adopt those appropriate and applicable for geospatial technologies
- Establish training for developers to ensure adoption of OGC services and standards
- Establish ELAs for key supporting technologies

Business Transformation Sequence Plan:

The transformation sequence plan for the recommendations is presented in Figure 3. This plan summarizes the tasks and timelines identified for each of the recommendations and requires that multiple activities start in parallel. Detailed discussion of analysis and supporting information will be available in the Geospatial Modernization Blueprint scheduled for publication late in 2007. Final approval of the blueprint is anticipated by the IRB in 2007.

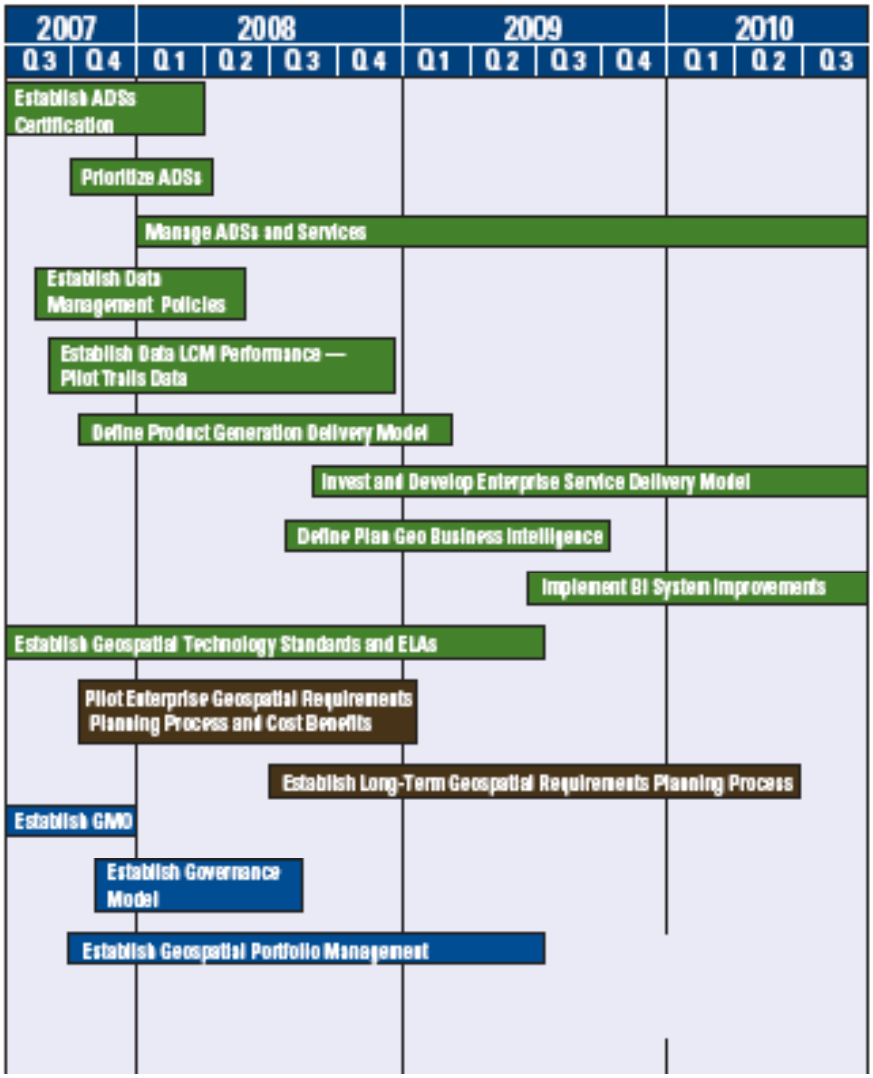
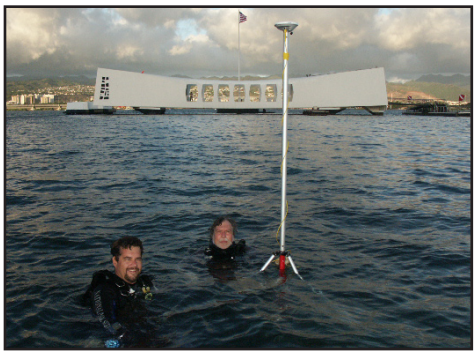
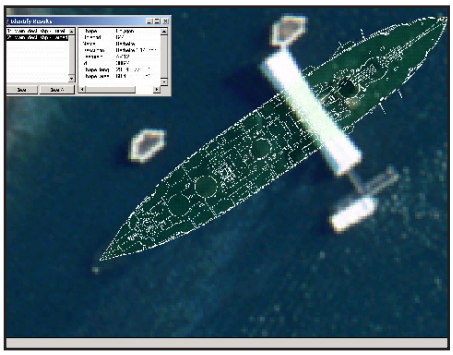


Figure 3. Recommendation Implementation Overview



USS Arizona mapping project (Credit: NPS)



USS Arizona map project in GIS (Credit: NPS)

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For more information:

Further information can be obtained at http://www.nps.gov/gis/egim or contact Dr. Bob Pierce at 703-648-5231 or rrpierce@usgs.gov.