RESPONSE TO GEOSS CFP FOR ARCHITECTURE IMPLEMENTATION PILOT - PHASE 2 (AIP 2)

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Prepared for:

GEO Group on Earth Observations
OGC Technology Desk
techdesk@opengeospatial.org

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Prepared by:
Business POC
Jeanne Foust
e-mail: jfoust@esri.com
phone: (909) 793-2853

Technical POC
Marten Hogeweg
e-mail: mhogeweg@esri.com
phone : (909) 793-2853

Environmental Systems Research Institute, Inc. (ESRI)
380 New York Street
Redlands, California 92373-8100
Phone: (909) 793-2853

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1.0 Overview

Producing and managing better information about the environment has become a top Global priority. The Global Earth Observation System of Systems (GEOSS) has been described as "a large national and international cooperative effort to bring together existing and new hardware and software, making it all compatible in order to supply data and information at no cost. The U.S. and developed nations have a unique role in developing and maintaining the system, collecting data, enhancing data distribution, and providing models to help all of the world's nations."[1]

ESRI has actively participated in Phase 1 of the Architecture Implementation Pilot and has hosted a candidate for the GEOSS GeoPortal (http://keel.esri.com/Portal) since summer 2007.

Since completion of Phase 1, ESRI has released ArcGIS 9.3 which offers new and extended capabilities that will benefit GEOSS (http://www.esri.com/software/arcgis/index.html). ESRI plans to update the existing GEOSS Portal prototype to the current versions of the supporting software. ESRI plans to work closely with its business partner con terra GMBH, our distributor ESRI Canada, and the Open Source organization 52º North (http://52north.org) in the context of Phase 2 to provide a complete and comprehensive solution for GEOSS.

ESRI anticipates supporting the pilot by:

- Participating in the kickoff meeting September 25-26th and participating in weekly calls
- Review architecture documents and provide feedback.
- Hosting a GEOSS Portal and Clearinghouse prototype based on the latest version of the GIS Portal Toolkit.
- Making client components available for searching the GEOSS clearinghouses that may be used in ArcGIS Explorer (free download) or ArcGIS Desktop (for users who have a license to this software).

ESRI recognizes that GEO envisions a comprehensive and coordinated system of systems which will be sustained and yield societal benefits and, therefore, we are interested in continuing our participation in GEOSS and offer voluntary contributions in the form of advisory technical consulting support, sustainable software and solutions, hosting services for demonstration environment, SDLC best practices and partnerships.

[1] http://www.epa.gov/geoss/basic.html

2.0 Proposed Contributions

2.1 Societal Benefit Area Alignment and Support

At this point in time ESRI is not proposing to enhance the SBA descriptions and deployment. Our distributor ESRI Canada plans to respond independently with a focus on supporting SBA scenario development for Disaster Management. ESRI Inc. and ESRI Canada will coordinate their activities in the context of GEOSS.

2.2 Component and Service Contributions

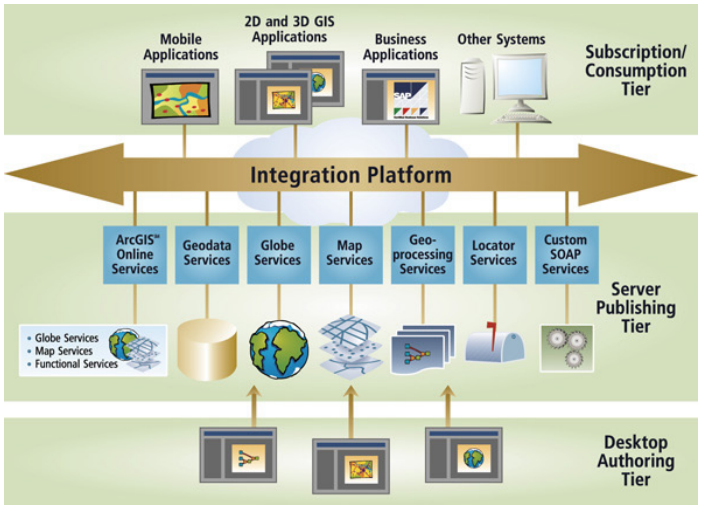
Description of the components and services to be registered with GEOSS

ESRI plans to continue hosting components and services in support of GEOSS from its servers in Redlands, CA. The components ESRI plans to make available include:

- ArcGIS Server 9.3 – ESRI offers to host geoprocessing services created in the context of SBA, locator services, and gazetteer services (based on the OGC WFS-G discussion paper).
- GIS Portal Toolkit – ESRI will continue to host the prototype GeoPortal and clearinghouse based on ESRI GIS Portal Toolkit. ESRI also offers to connect a separate instance of the portal to the GEOSS Registry that has been created in support of Phase I of the AIP (or its continuation in Phase 2).
- ArcGIS Explorer – ESRI makes ArcGIS Explorer available as a free download (http://www.esri.com/software/arcgis/explorer/index.html). In combination with the CSW client that is part of the GIS Portal Toolkit, this becomes a useful client application that connects to the GEOSS registry for discovery of resources in support of SBA.
- ArcGIS Online – ArcGIS Online Services are a collection of 2D maps and 3D globes that can be accessed by ArcGIS Desktop and ArcGIS Explorer users via the Web. It includes but is not limited to satellite imagery for the world; a worldwide shaded relief map; as well as political world, physical world, world protected areas, and historical world globes and basemaps. These services may be used in support of SBA scenarios.

A more detailed description of these technologies is provided in Section 4 of this response.

Relationship of the components and services to the architecture



Adherence to standards makes it possible for the components mentioned above to integrate with other enterprise systems. Integrating GIS with other key business systems can extend the value of those systems by increasing accuracy, efficiency, and productivity. It also supports a collaborative environment and allows for the geospatial enabling of a Service Oriented Architecture (SOA). Open APIs allow organizations to build and deploy meaningful applications in a standards-based way or integrate GIS technology into existing applications (for more information, please see http://www.esri.com/software/standards/index.html).

Support of open standards by the services

For more than 25 years, ESRI has built open and interoperable commercial off-the-shelf software products. We have always been, and continue to be, keen advocates of the need for open access to geographic data and software functionality using widely adopted, practical standards.

ESRI has considerable experience in the development of standards and specifications including many efforts related to OGC, ANSI, and ISO TC 211. ESRI was the lead author for the OGC Simple Features SQL standard and participated in the COM and CORBA submissions. ESRI serves as the editor of the Open Location Services Specification and participated in the development of the CS-W, WMS, and WFS specifications. ESRI is active in ISO TC 211 and is playing a major role in the ISO metadata standards: ISO 19115 Metadata, ISO 19139 Metadata XML Schema Implementation, and ISO 19115-2 Metadata–Imagery Extensions. Many of these standards are directly related to GEOSS. ESRI staff chair or co-chair six of the OGC Working Groups or Revision Working Groups associated with these specifications. ESRI can facilitate feedback from the GEOSS proof-of-concept to ongoing portal, service, and metadata specification development and/or revision efforts.

Our current products have appropriate open application programming interfaces and support key data interchange formats and Web services standards for ensuring relevant GIS and IT interoperability between systems over wired and/or wireless networks.

In the last decade, ESRI launched a major initiative to re-architect its GIS product line to adhere to important, emerging IT and GIS standards. The resulting product, ArcGIS, is a scalable and modular family of software comprising a complete GIS. ArcGIS is founded upon key interoperability and Web computing concepts and is in use today by tens of thousands of organizations that rely on GIS and IT interoperability.

For a detailed description of ESRIs standards and interoperability please see:
http://www.esri.com/library/brochures/pdfs/standards-and-interoperability.pdf

Performance capability of the components

System performance is a function of an entire system and should not be measured against a specific GIS software application in isolation. System response times for tasks such as graphic data display, query and tracing operations, data processing operations, and even plotting and printing are difficult to estimate in a dynamic corporate environment, especially if the GIS interacts with other systems over a local or wide area network. System performance is a function of the following primary variables.

- Database design and size
- Client and Server hard disk performance
- Client graphics monitor performance
- Client and Server CPU processing ability and RAM availability
- Plotter/Printer processor and RAM availability
- Local and Wide Area (remote) network bandwidth availability and traffic load

Network performance can also vary depending on the work environments and habits of users. Individual workstation configurations, application functionality, and data structure complexity all have an impact on network performance. Simple data sets will obviously improve system response times and performance; however, depending on user requirements, simple data sets cannot always be realized. Because these variables are beyond our control or direct influence, ESRI cannot specify performance capability of the individual components upfront. However, all of ESRI's software systems are designed to take advantage of the latest advances in hardware operating systems and network technology in an effort to reduce these effects on system response time.

For over 15 years, ESRI has published its experiences and best practices in the System Design Strategies Whitepaper (http://www.esri.com/library/whitepapers/pdfs/sysdesig.pdf) and other whitepapers that are available for free from the ESRI website.

Availability of the components for participation in the Pilot

ESRI will continue to host an instance of the software that is part of the 'core capabilities' solution as described above on a server in the ESRI hosting environment. This environment will be monitored to ensure availability during regular Redlands, CA business hours. The environment will be hosted until 03/31/2009. ESRI may consider extending the period of hosting the core capabilities solution at its own discretion. ESRI will inform GEOSS no later than 02/28/2009 of its intentions with continued hosting of the environment.

We estimate the duration of the CFP Pilots to be around 6 months. ESRI will participate in the kick-off meeting scheduled for September 25-26. ESRI anticipates participating in weekly conference calls. In addition, ESRI will be ready to review architecture documents and contribute to the discussion on requirements and architecture for the GEOSS Architecture.

2.3 Architecture and Interoperability Arrangement Development

ESRI plans to comment and contribute to the architecture and the GEOSS Process for Reaching Interoperability Arrangements during the architecture implementation pilot.

ESRI is active member of several standardization communities and interoperability organizations, including but not limited to the Open Geospatial Consortium and the International Standards Organization. ESRI actively participates in interoperability efforts through its research and development activities and particularly through initiatives set by OGC's Interoperability Program. In the fall of 2006, ESRI participated in the digital rights management track of the OGC OWS-4 test bed and ESRI successfully completed the development of the Kentucky Watershed Modeling Information Portal in close cooperation with OGC.

ESRI Professional Services has built and maintained good working relationships with many of the GEOSS members and partner organization, both in the United States and internationally.

ESRI partner con terra GMBH supported the European Union's Joint Research Centre (JRC) with the Specification, design, implementation and Introduction of a Metadata Broker System based on OGC/ISO standards under consideration of INSPIRE guidelines. The result of this project is a solution for a cross-regional meta-information network consisting of distributed metadata catalogues. The solution supports distributed search while integrating selected national and pan-European metadata catalogue services, available as web services on the Internet. Con terra intends to respond independently to the CFP for AIP Phase 2, but ESRI and con terra intend to closely cooperate during Phase 2 to provide a comprehensive solution for GEOSS.

3.0 Description of the Responding Organization

3.1 General Description of ESRI

On any given day, more than a million people around the world use ESRI technology to improve the way their organizations conduct business.

ESRI develops and supports geographic information systems (GIS) at all levels, from the desktop to the enterprise. We provide software, educational services, user support, and consulting services ranging from needs assessments to system design and development. We are committed to producing excellent software and delivering exceptional services. As Jack Dangermond, president of ESRI, explains, "We at ESRI believe that better information makes for better decisions. Our reputation is built on contributing our technical knowledge, special people, and valuable experience to the collection, analysis, and communication of geographic information."

What We Provide

ESRI offers a complete range of GIS products and services including software, database design and development, custom applications programming, training, and installation.

We are the only GIS vendor that offers a complete geospatial solution—ArcGIS. The ArcGIS product suite is a complete system for authoring, serving, and using geographic information. You can use ArcGIS as an integrated collection of GIS software products for building and deploying a complete GIS wherever it is needed: on desktops, on servers, in the field, or over the Web.

For more than 25 years, we have built open and interoperable software products. We advocate open access to geographic data and software functionality through widely adopted, practical standards. Because we believe that the relationship between GIS technology and the rest of the IT infrastructure is crucial, our software tools support and integrate with virtually all commonly accepted standards. For you, this means compatibility and interoperability support with major enterprise systems such as enterprise resource planning, customer resource management, enterprise application integration, work management systems, and others.

We also offer sophisticated training, user support, and professional services to help you maximize your investment in ArcGIS. We provide training solutions for all budgets and schedules, and ESRI Support Services is available to answer any questions you have while using ESRI software. Our professional services team can also guide you through the entire GIS implementation process.

Why Choose GIS from ESRI?

More than 300,000 organizations worldwide use ESRI software, including most U.S. federal agencies and national mapping agencies, 45 of the top 50 petroleum companies, all 50 U.S. state health departments, most forestry companies, and many others in dozens of industries. The diversity of our customer base reflects three important facts.

Only ESRI Offers a Complete Geospatial Solution

ESRI is the only GIS vendor able to offer a complete enterprise geospatial solution. The success of our company is a direct result of the options we provide our customers in deploying GIS, from single desktop licenses to enterprise-wide solutions complete with Web services. Our GIS software allows you to:

- Access information through a full spectrum of clients from thick to thin, wired to wireless, standalone to embedded.
- Manage and utilize information from any standards-based file, database, or subscription service.
- Distribute your information to virtually any other system or device, through nearly any type of connection.
- Share data, workflows, and tools through Web services.

ESRI Supports Standards

Our GIS is a mature, open, and highly configurable technology that allows choices in hosting, development, and deployment. Our software supports all leading IT development and application environments as well as OGC and ISO GIS. The standards we support include:

- **Operating systems** including Windows, UNIX, and Linux
- **DBMSs**, such as IBM DB2 Universal Database and Informix Dynamic Server, Oracle, and Microsoft SQL Server, including support for all spatial types
- **Spatial data formats** including translators; direct read and data access via SQL, OLE COM, XML, and GML; Web services; published APIs; CAD data; and other GIS formats
- **Network protocols** such as TCP/IP, HTTP, and HTTPS

- **Developer environments** including Visual Basic, C#, C++, Visual Studio .NET, and Java (J2ME, J2SE, J2EE, ASP/JSP)
- **Handheld devices**, including Windows CE and Pocket PC, within the 802.11 standard
- **Enterprise applications** such as SAS, IBM DB2, SAP, IBI, and FileNET
- **Web services** such as XML, SOAP, UDDI, and WSDL; OGC specifications such as WFS, WMS, WCS, SLD, CS-W, and GML; and application servers such as IBM WebSphere or BEA WebLogic.

ESRI Is Dedicated to the User Community

The development and evolution of our GIS software hinges on the relationship ESRI maintains with its user community. By listening closely to the people who use our software every day, we routinely incorporate user feedback and recommendations in our product releases.

ESRI also provides a comprehensive suite of support options for our users, including standard telephone support as well as moderated discussion forums and a variety of regional and specialty user groups. ESRI hosts the largest GIS industry event in the world, publishes the two largest circulation periodicals in the industry, and operates the leading GIS book publisher.

Furthermore, ESRI continues to deliver the most sought-after training and consulting solutions in the GIS industry. These are all demonstrations of ESRI's commitment to you, the user of our software.

3.2 ESRI Inc. Support for the AIP Phase 2

ESRI anticipates supporting the pilot by:

- Participating in the kickoff meeting September 25-26th and participating in weekly calls
- Review architecture documents and provide feedback.
- Hosting a GEOSS Portal and Clearinghouse prototype based on the latest version of the GIS Portal Toolkit and supporting software as described above.
- Making client components available for searching the GEOSS clearinghouses that may be used in ArcGIS Explorer (free download) or ArcGIS Desktop (for users who have a license to this software).

3.3 Programmatic and Technical Contact

Point of Contact:
Business POC: Jeanne Foust
Business POC: jfoust@esri.com
Business POC: (909) 793-2853

Technical POC: Marten Hogeweg
Technical POC: mhogeweg@esri.com
Technical POC: (909) 793-2853

4.0 Additional Information

4.1 Disclaimer

In performance of this agreement, it is anticipated that no participant or sponsor will be responsible for delivery or the work proposed by other participants or sponsors. Provision of any data and/or software will be provided under the terms of the vendors' standard license agreement. The demonstration software and hardware provided will be for the duration of the pilot only, and remains the property of the contributing participant or sponsor.

4.2 Description of Components

Below is a detailed description of the components ESRI plans to make available for the AIP Phase 2 project.

4.2.1 ArcGIS Server

ArcGIS Server is a complete and integrated server-based geographic information system (GIS). It comes with COTS, end user applications and services for spatial data management, visualization, and spatial analysis. ArcGIS Server offers open access to extensive GIS capabilities that enable organizations to publish and share geographic data, maps, analyses, models, and more. With ArcGIS Server's rich standards-based platform, centrally managed, high-performance GIS applications and services can be accessed throughout an organization using browser-based, desktop, or mobile clients.

ArcGIS Server offers the following advantages: browser-based access to GIS; lower cost of ownership through centrally managed, focused GIS applications; integration with other enterprise systems; support for interoperability standards; and the ability to create custom applications and services for browser, desktop, mobile, Smart Client, and enterprise deployments using .NET or Java.

ArcGIS Server can be scaled to support both small workgroups and large enterprise configurations. ArcGIS Server Advanced Enterprise is designed for large organizations needing to share geographic data, maps, and analyses with the highest level of system flexibility and scalability. ArcGIS Server Advanced Enterprise can be implemented across a distributed computing environment and is designed to leverage various enterprise class database management systems.

ArcGIS Server Advanced Enterprise is designed for GIS organizations that want to provide a server-based GIS for distributing GIS services across the organization or over the Internet. It provides spatial data management, visualization (both 2D and 3D), and spatial analysis capabilities. Optional extensions to ArcGIS Server Advanced Enterprise are available for data interoperability (through custom data transformation procedures), network-based spatial analysis, spatial modeling, and three-dimensional modeling. Users can connect via the Internet or intranet with a variety of clients including ArcGIS Desktop, ArcGIS Explorer, browser-based applications, and mobile devices.

4.2.2 ESRI GIS Portal Toolkit (GPT)

ESRI's GIS Portal Toolkit is a combined technology and services solution for implementing local, regional, national, and global Spatial Data Infrastructure (SDI) portals. As the name identifies, the toolkit is essentially a software development kit for setting up geospatial metadata portals.

The GPT incorporates advanced geography-based and term-based search capabilities. Geospatial information portals based on ESRI GPT technology has been used in support of Phase 1 of the GEOSS AIP (http://keel.esri.com/Portal) and has been used for over 5 years to discover and access geospatial resources in National, State, and enterprise SDI.

The latest version of GPT, version 9.3, was released at the end of July 2008. The suite of software modules with the GPT includes the following:

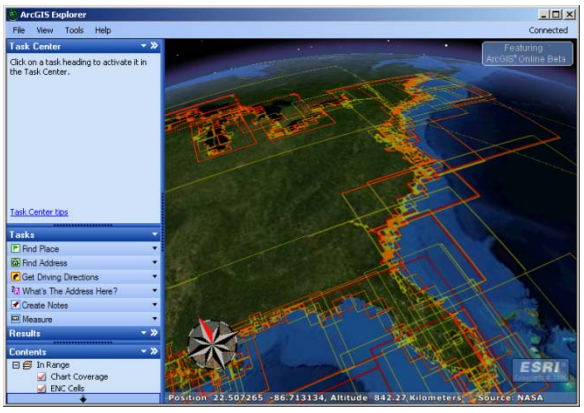
- A customizable portal module (the principal interface and capability for publishing, administering, and searching metadata).
- A map viewer for viewing and combining and querying map data discovered from within the GIS Portal. The Map Viewer supports OGC WMS, WFS, and WCS services.
- A desktop metadata "Harvesting Tool" for accessing original or updated metadata from participating metadata publishers for posting using the Portal module.
- Support for integrating with a content management system to support focused user communities (including but not limited to SBA).
- Data extraction service for downloading data for a resource, with the ability to specify an extent, projection and download format.
- CSW Clients, which are freely downloadable extensions for ArcMap and ArcGIS Explorer to enable searching CSW catalogs from within those environments
- WMC File Opener, which is a freely downloadable extension for opening saved web map context files in ArcMap

In addition to providing the ability to administer portal management functions and seamlessly communicate with data services that use a wide range of communication protocols, the GIS

Portal Toolkit enables users to publish metadata in conformance with a variety of metadata standards, query metadata records for relevant data and services, and link directly to the online sites that host the data services referenced and described by the metadata. The GIS Portal Toolkit also enables those who implement it to establish user community communication capabilities, visualize referenced data as maps, and use referenced data in geographic queries and analyses.

4.2.3 ArcGIS Explorer

ArcGIS Explorer is a freely available lightweight desktop client for ArcGIS Server. It can be used to access, integrate, and utilize GIS services, geographic content, and other Web services. ArcGIS Explorer can also be used with a variety of other GIS services such as those published using ArcIMS, ArcWeb Services, Web Map Services (WMS), and other Web services. In addition, ArcGIS Explorer can use local data such as shapefiles, file geodatabases, JPEG 2000, GeoTIFF, MrSID, IMG, and other image formats.



ArcGIS Explorer integrates the rich world of GIS datasets and server-based geoprocessing applications. It does this by accessing the full GIS capabilities of ArcGIS Server including geoprocessing and 3D services.

With ArcGIS Explorer, you can:

- Fuse your local data with data and services from ArcGIS Server, ArcIMS, Open Geospatial Consortium WMS or KML, as well as ESRI-hosted services from ArcGIS Online.
- Perform GIS analysis using existing tasks (e.g., visibility, modeling, proximity search).
- Share the results of your analysis with ArcGIS Explorer with others.
- Use maps and data from your own secure servers.
- Consume GeoRSS feeds.

ArcGIS Explorer is available as part of ArcGIS Server 9.3. Users of ArcGIS Explorer can access the beta version of ArcGIS Online Services, which provides a series of ready-to-use online map services, globe services, and other GIS services.

4.2.4 ArcGIS Online

ArcGIS Online Services are a collection of 2D maps and 3D globes that can be accessed by ArcGIS Desktop and ArcGIS Explorer users via the Web. It includes satellite imagery for the world; a worldwide shaded relief map; and a seamless, multi-scale street map with highway data for the world and local street-level data for the United States and Canada as well as political world, physical world, world protected areas, and historical world globes and basemaps.

These maps and globes work directly with prebuilt tasks in ArcGIS Desktop, such as placefinder and gazetteer, and all the default ArcGIS Explorer tasks including Find Place, Find Address, and Get Driving Directions. ArcGIS Online Services are deeply integrated with ArcGIS and provides immediate access to these cartographically designed, seamless globes and basemaps to which users can easily add their own data.

Users can embed ArcGIS Online Services content and tasks into their own maps and applications and share their results with others. Users save time since they can focus on their mission-critical work and not on creating basemaps, and they save money because they don't have to worry about data acquisition and maintenance. And since ArcGIS Online Services are hosted and powered by ESRI's ArcGIS Server, users don't have to make additional investments in hardware infrastructure or additional staffing to maintain data. ESRI updates the ArcGIS Online Services data content annually or semiannually so that users always have access to the most current data.

For more information please visit http://resources.esri.com/arcgisonlineservices

4.3 Relevant Experience

4.3.1 Spatial Data Infrastructures

Today, the concept of National Spatial Data Infrastructure has developed into a more sophisticated vision. The GSDI organization describes SDI as "a basis for spatial data discovery, evaluation, and application" which includes the following elements: geographic data, metadata, data models, services, clearinghouse, standards, and partnerships.

In Europe, INSPIRE identifies very similar high-level requirements for the European SDI: Metadata, Network services, Data and Service sharing, and Monitoring and reporting. INSPIRE also goes further to define the kinds of organizational roles and activities that are necessary to achieve regional and national SDI: Data and Service Provider, National Geoportals, a European Geoportal, and Domain applications.

Implicit in the SDI elements outlined by GSDI and INSPIRE is the concept of interoperability. It is a simple concept that all the data and services need to interoperate regardless of who or what

is providing or consuming information. In practice, however, achieving true interoperability can sometimes be elusive due to interpretations of existing standards or use of immature specifications.

This is an area where ESRI's real world experience really shines. ESRI has been active with consulting and implementing SDI in all continents around the world. In the sections that follow, we outline some selected SDI consulting efforts describing their significance and ESRI's involvement.

4.3.2 National Spatial Data Infrastructure Portals and Clearinghouses

Geospatial One-Stop

In 2005, ESRI was selected by the U.S. Department of the Interior to develop the Geospatial One-Stop (GOS) Operational Portal version 2, the U.S. National Spatial Data Infrastructure (NSDI) that would serve to encourage greater collaboration and coordination in the use of geospatial technologies across all levels of government. GOS 2 provides a one-stop ability to search for geospatial data from local, state, and federal sources; Web mapping services; data collection activities; and geospatial best practices and standards. The portal is open and interoperable and incorporates industry-approved standards. GOS 2 represents a dramatic advance not only for geographic information system (GIS) technology on the Internet but also for the entire geospatial field.

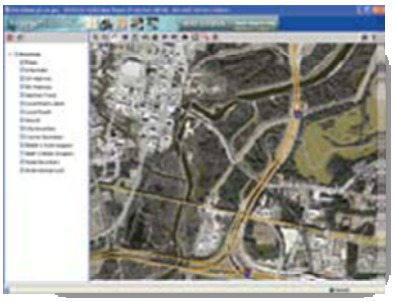
ESRI provided design, interoperability consulting, implementation, and hosting for this project. We also continue to provide outreach support to various thematic communities of interest. ESRI also provides consulting support on implementing SDI governance processes.
http://www.geodata.gov

INSPIRE Support

ESRI and ESRI technology have been instrumental in building many of the automated geospatial information systems that have been implemented in Europe and are each candidates for participation in INSPIRE as ge ospatial information resources nodes. ESRI's familiarity with and participation in European GIS development over the past 30 years enable ESRI to understand the circumstances in which INSPIRE was envisioned and the circumstances in which it is being built. Together with its technology base, this provides ESRI with experience and resources that can contribute significantly to the successful realization of the INSPIRE vision.

4.3.3 State GIS Portals and Clearinghouses

Mississippi Geospatial Portal and Clearinghouse



In 2007, the Mississippi Department of Information Technology Services set out to provide comprehensive access to GIS resources for Mississippi for use by government, academia, and the private sector and reduce the duplication of GIS efforts across the state. The department also wanted a central place to store and implement the Mississippi Digital Earth Model, which establishes a state digital land base that includes seven core data layers and will provide the basis for a uniform GIS in each county. The result is the Mississippi Geospatial Clearinghouse (MGC), developed by ESRI using GIS Portal Toolkit. The site lets users view and obtain GIS data, maps, information, and much more to help them build effective GIS applications. The portal enhances GIS data distribution in Mississippi through effective cooperation, standardization, communication, and coordination.

For SDI data production and maintenance, ESRI worked collaboratively with Mississippi to design and implement a uniform database model for framework data, development of reusable Extract-Transform-Load tools for data aggregation, and development of business processes for data dissemination

	and map services derived from local and cooperating state agencies. For SDI data sharing, ESRI and the state collaboratively designed, developed, and deployed the Geospatial Portal web site within a robust and secure enterprise IT environment. http://www.gis.ms.gov/Portal
Other SDI web sites	EPA Geodata Gateway Alabama Data One-Stop Arkansas GeoStor GIServOhio Rhode Island GeoData Gateway Northwest Environmental Data Discovery Portal GISData.Virginia.gov Kentucky Geography Network District of Columbia Dept of Health District of Columbia Office of Technology Horry County, South Carolina Maine Geolibrary Board Montana State Library New York Geodata Inventory Large Marine Ecosystems GeoSask Canada West Coast Habitat Portal Colorado Geo Information Portal

4.3.4 Other Portals and Clearinghouses

Conservation GeoPortal

The Conservation GeoPortal is a collaborative effort by and for the conservation community. Its purpose is to facilitate the discovery and publishing of GIS data and maps to support biodiversity conservation decision makin g and education. Goals include providing a free tool for all conservation practitioners and supporters to use and contribute content, minimizing the proliferation of geospatial data catalogs as well as reducing duplication of effort in building and maintaining metadata catalogs and map viewers.

ESRI provided site design and implementation. Additionally, ESRI provided consulting on sustainable business models for the SDI.

GRID-Nairobi

DEWA/GRID-Nairobi is one of the UN Environment Program's major centers for data and information management, with a unique, "value-adding" mandate in the handling of national, sub-regional and regional environmental statistics and data, which in turn supports the environment assessment and early warning activities of UNEP and its partners.

Located at UNEP's Headquarters based in Nairobi, Kenya, GRID-Nairobi occupies an important niche in the global GRID Network. The center also functions as a support provider to the DEWA-Africa Programme in the area of capacity building for African countries using environmental information for decision-making and action.

ESRI works with UNEP and local ESRI distributors to provide a partnership of software, training, outreach, and knowledge transfer to the GRID-Nairobi region.

4.3.5 Other ESRI Activities

Support for ISO and OGC Standards	ESRI fully encompasses Open Geospatial Consortium, Inc. (OGC) specifications and standards as well as comprehensive IT standards such as those related to ISO, W3C, ANSI, CEN, and many other leading de-facto industry standards. T his includes adherence to and leadership work in areas such as XML, SOAP, SQL, etc. Our goal is to support appropriate specifications as they become finalized and to participate in the development of GIS standards via active participation in ISO and OGC. By serving in leadership roles in many of the programs and specification efforts of both the ISO TC211 committees and the OGC initiatives, we are able to contribute knowledge in interoperability and ensure the realization of standards compliance in our software products.