7.0   THE PRIVATE SECTOR AND THE NSDI

7.1   Private Sector Demand for the NSDI

7.1.1 General Demand

Framework data are clearly available for much of the United States. However, differences exist in the resolution, quality, coverage, currency and other characteristics depending on the source of the data. The FGDC sponsored a large investigation of framework status in the United States by funding the National States Geographic Information Council (NSGIC) to conduct a Framework Data Survey, as discussed in a previous section.

The survey was distributed to organizations of all types as determined by designated state government coordinators located in each of the 50 states. Priority was placed on acquiring responses from counties. In total, 5,188 survey responses were received, including from 1,683 of the nation's 3,140 counties. This is the most reliable set of responses from a national standpoint, though the results cannot be compared across the country for these respondents like the others, due to different respondent sampling design and composition, priorities and methods. However, some of the results can be useful, such as the finding that transportation data is the most common theme developed by respondents, followed by governmental units. The results also clearly indicated the use of various data resolutions.   Some of the resultant statistics were:

This Section Addresses

- Private sector demands and uses of NSDI offerings

- Market segmentation model

- Identification of private sector activities that support the NSDI

- What did the private Sector say at the GeoData Policy Forum, Framework Data and Product Development Thread

- A case study of a service to the agriculture community by the private sector

- Of the 5,188 total respondents, 430 or 8% were from "private sector organizations," including utilities (either public or private), non-profit organizations, and for-profit private firms (Gillespie, 2000, 1).

- More than 75% of respondents reported being active in digital geographic data.

- Nearly 60% indicated being active in framework data; most often hydrography and transportation.

Similar to the discussion above about problems with the current seven framework themes, private sector respondents indicated more use of private land ownership

data (as would be in a Multipurpose Cadastre) than any of the framework themes.

While more information and investigation would be desirable about the private sector in terms of framework data and other needs than has been conducted or provided through this survey, anecdotal information indicates that wide spread interest in the NSDI is lacking. This is due, in part, to:

- the conflicted interests of the private vs. the public sectors,
- availability, reliability and other data limitations, and
- Public policy assumptions for private sector participation.

7.1.2 Data Providers

The private sector is not just made up of users. It is also made up of providers. These companies sell software solutions and data content, hardware, and consulting services, etc. Their inclusion to any program fostering increased private sector participation is essential. They bring rich data sets, lists of current and prospective customers, and success stories to the equation.

During our research, we attended many events where private sector data providers were exhibiting their wares. Most of them were excited that the FGDC was focusing on private sector needs and increasing private sector participation. The data providers were surprisingly receptive to data sharing. They felt that there was enough unique or custom content in their offerings to allow them to maintain a competitive edge. If a central storehouse maintained core data to industry standards, they would be able to focus on value-added data, at higher margins.

7.2   Applications

The framework can be used by private and public entities. Different organizations have needs for data with differing resolutions, however:

- Local and regional governments create and use data on a smaller scale, particular to their jurisdictions and regions.

- State governments use less detailed data for their larger regions, usually based on a theme. At times, they need very detailed data as well.

- Federal agencies also use less detail due to broader coverage and focus on specific data themes related to their operations. They do have a need for more detailed data at times.

- In the private sector, some users may be:
  - Utility companies
  - Companies requiring street networks, statistical data on particular areas
  - Firms requiring parcel data for land use studies
  - Companies creating detailed data for sale
  - Companies creating lower resolution data for large areas
  - Providers of hardware, software and other systems developing solutions requiring data
  - Service providers offering system development, database development, operations support and consulting services
- Non-profit and educational institutions also create and use a variety of geographic data and provide GIS-related services.

Within the private sector, participation has been limited even though the need for data has only grown. Many private sector companies have built their own data or purchased it and spent budget dollars improving this data for their own needs.

The user model of the framework has core data and applications data. Core data is used by most and shared by everyone. Applications-specific data is created and used by some participants, depending on their needs. This data is not widely shared and may not conform to Framework standards.

The seven layers of data include:

- Geodetic control – providing a common reference system to establish the coordinate positions for all geographic data.
- Orthoimagery – provides a positionally correct image of the earth prepared from aerial photography or other remote sensing information.
- Elevation – provides information about terrain. Elevation refers to a spatially referenced vertical position above or below a datum surface.
- Transportation – includes the following common features of transportation networks and facilities:
  - Roads
  - Trails

- Railroads
- Waterways
- Airports and ports
- Bridges and tunnels

- Hydrography – for surface water feature such as lakes and ponds, streams and rivers, canals, oceans and shorelines.

- Governmental Units – shows the geographic areas of units of government like the entire nation, states, counties, incorporated areas and consolidated cities, functioning and legal minor civil divisions, Federal or state owned American Indian reservations and Alaska Native regional corporations.

- Cadastral Information – specific to property interests such as surveys, legal descriptions reference systems, and parcel-by-parcel surveys and descriptions.

There are many applications for framework data. When seeking private sector companies as targets for increased participation, many different sectors, applications and industries can be represented as shown in the following list.

- Scientific investigations

- Resource management

- Development planning

- Emergency planning and emergency response

- Environmental changes and management and conservation

- Asset and facilities management

- Decision support systems

- Retail management

- Transportation/logistics

- Real estate

- Finance, banking and insurance

- Health care

- Government

- Defense
- Business process improvement consulting/streamlining work flow processes
- Mapping
- Petroleum exploration and distribution
- Health departments
- Forestry products
- Agriculture
- Utilities
- Higher Education, K-12 education
- Law enforcement and Criminal Justice
- Libraries and museums
- Mining
- Telecommunications
- Waste management
- Customer Relationship Management (CRM)
- Enterprise Resource Planning (ERP)
- Providers of infrastructure
  - Databases, database tools
  - Reporting tools
  - Computer hardware
  - Computer software (more than 2000 providers)
  - Computer networking

Over time, as the list of participants grows, the FGDC will be able to ascertain valuable marketing information about different applications and user/provider groups. This information will allow the FGDC to further target new participants, and spend valuable resources where they can have the most impact on current and future participation.

7.3   Markets

According to a study done by the IDC (International Data Corporation) in 1999, this marketplace is named SIM (Strategic Information Management) and has three distinct segments:

- GIS

- Business support systems

- Personal productivity

According to this study, all three segments have used comparable spatial information handling technology. Where they differ is in the use of data, as one might expect. The use of data suggests different user requirements, distribution methods, data and applications.

The IDC report, states the differences to be:

Segment	Key Requirement	Applications	Characteristic
GIS	Handle geographic information well	Spatial data conversion, analysis, modeling and cartographic display	Companies control their accounts and their customer's attention as well as access to their applications and data through API (application programming interfaces)
Business Support Systems	Ability to add spatial data of their own or from their business alliances to their existing systems and databases	Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Online Analytical Processing (OLAP), data mining, decision support systems (DSS)	Spatial information complements what they do but is not the most important information they manage

Personal Productivity	Assemble and communicate information users need in their daily jobs.	Software office suites, palm devices, hand held devices, GPS systems in automobiles and over the Internet	Information is accessed on demand from applications with very simple user interfaces. Data must be current but the degree of accuracy is not as critical. Rapid access is key.

7.4   Private Sector Activities in Support of the NSDI

The private sector has contributed significantly to the development of the NSDI, however, many of the contributions have not been as a direct result of actions taken by the Federal Geographic Data Committee to advance the National Spatial Data Infrastructure (NDSI).

The Open GIS Consortium has developed, and is developing, interface specifications to enable geospatial interoperability. These specifications provide the details of how software packages can work together in processing geographic (or spatial) information and communicating with one another.

Everything OGC does is in some way aimed at developing and sharing this information. Armed with OGC specifications, software developers can build software products that work together, irrespective of brands, computing systems, and networks.

OGC has developed a consensus process to help members work together to build and approve specifications. This formal process brings concept to reality through the following steps:

- Establish a Special Interest Group (SIG), which defines the needs and potential benefits of a new specification.

- With a clear definition, a Working Group (WG) is created to write a public Request for Proposals (RFP) for an "implementation specification."

- Vendors or teams of vendors submit proposed OpenGIS Implementation Specifications, which are refined and in time, approved.

This process was used to develop some of the first specifications including the Simple Features and Coordinate Transformations (projections) specifications.

The specifications that came from that work created a strong infrastructure for the Interoperability Program (IP). These efforts turned the specification program on its head by working almost backwards. With a particular interoperability problem set down by sponsors, vendors modified existing software to come to a solution. These hands-on engineering environments may yield candidate specifications that move into the Specification Program for approval.

The OGC has used two formats for the IP:

- Test-beds, where the emphasis in on research and development

- Pilots, where existing and candidate specifications are put to the test using real world scenarios and data.

The former are a place to experiment, the latter, a place to kick the tires. The IP has thus far provided a revolutionary way to jumpstart or move the development of specifications along. In the Web Mapping Test-beds and Web Mapping Pilots, willing sponsors and participants were able to satisfy the needs of industry, government and education to bring specifications to light in a matter of months, not years. Competing companies saw the benefit of working hand in hand and "coopetition" became a reality. These methods have been refined and now form a proven way to get work done at a rate that can keep up with technological change.

As a result of these kinds of "rapid development" methodologies, the major database companies, Oracle, IBM, Informix, and Sybase have spatially enabled their database products to accommodate georeferenced data.

7.5 Private Sector Perspectives on the NSDI

The 1999 GeoData Policy Forum – "Making Livable Communities a Reality," was sponsored by the Federal Geographic Data Committee, in collaboration with academic, public and private sector organizations, to further the development of the National Spatial Data Infrastructure.

On the second day of the three day forum, seven concurrent sessions or "threads" explored various aspects of the evolution of the NSDI. One of the "threads" entitled, "Pillars of the Community: Framework Data and Product Development," focused on a series of questions:

- Is the Framework meeting community needs?

- What are the barriers to achieving the vision to develop, maintain, and integrate Framework data within a geographic area?

- How can the private sector contribute to benefit from this effort?

The Framework thread examined, through three working examples, how well the purpose and goals of developing a National Digital Geospatial Data Framework were being met.

The format included a series of case studies that traced spatial data sources to Framework data and provided the material for discussion among a panel of experts assembled to critique the case studies and to enter into a dialogue with the thread attendees. One of these case studies is discussed below.

7.6   VantagePoint Network

One of the case studies described VantagePoint Network, an innovative e-commerce product to support the agriculture sector. Vantage Point Network is an online, field-to-food information-management system for advancing engineering in the agricultural and food industries.

VantagePoint Network is an Internet-based, information-sharing network designed to help subscribers create and capture value in the consumer-driven food chain. The VantagePoint Web site provides information and services that enable farmers to keep crop records; track grain storage and sales; and communicate with their advisors to make sound agronomic, management, and marketing decisions.

As early as 1996, John Deere & Company realized the evolution of agriculture as being a more information-intensive business. Deere, a leader in mechanized agriculture, recognized a paradigm shift to a more knowledge-based industry that would utilize data collected from their technology and precision farming tools. The vision soon included partnerships with GROWMARK Inc. and Farmland Industries, providing the retail cooperatives a broader data management tool, and leveraging the existing producer relationships on a local level for the implementation of such Internet technology.

From these partners emerged the VantagePoint Network®, LLC, organized as a partnership on July 28, 1999. VantagePoint was envisioned as a fully Web-enabled channel for information and communication exchange for professional retailers, farm managers, and consultants to extend their services online to their customers. The Online network has since expanded to include all corporate participants throughout the agricultural value chain, enabling information sharing

from input manufacturers through producers, and ultimately, to food/fiber processors.

Trends in the food and agriculture industries demand that agriculture producers keep comprehensive records, including seed varieties, tillage practices, and chemical applications. By keeping production agricultural information in an easily navigable network, producers can share precise data with commodity buyers and other end-customers desiring specific traits or growing conditions. This information, in addition to the crop itself, adds value to the farmer's business operation.

The VantagePoint Network has assembled a team of partners to support the agricultural client fielding a "producer and team" comprised of virtual resources like insurance agents, lenders, landlords, government agents, marketing experts, crop experts and dealers.
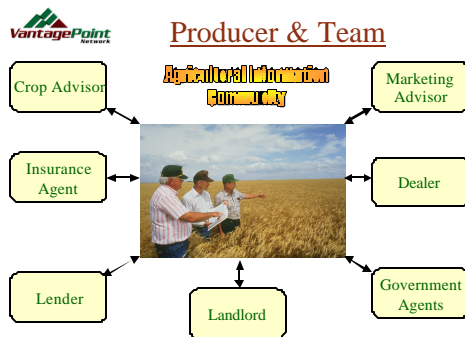
Once the VantagePoint customer is registered, he can make accurate geo-referenced maps of farms and fields, maintain a crop's identity from the seed to sale, keep track of all planting, fertilizing, tillage, crop protection and harvest activities on the field level. He can also maintain farm management reports, document seed and chemical use, generate profitability reports, determine costs per acre or per bushel, and perform break-even analyses.

The VantagePoint Network is a low-cost, easy-to-use information system serving agriculture and the farming community. Traditional record keeping and data management can be accomplished more efficiently, more effectively, and faster than ever before. Farmers and their professional advisers can harvest valuable insights for farm management decisions by using VantagePoint Network, a fully-secured cyberspace storage bin for the vast amount of data generated by their own individual production operations.

The VantagePoint Web site offers weather reports, as well as, easy access to current market reports, both U.S. and foreign. Agricultural news is provided as well as chat rooms and discussion groups to discuss ideas and find out what other people are thinking.   A sophisticated search engine helps find agricultural information on the Web. Reference material on crop protection products help insure proper use and application of farm chemicals.

VantagePoint offers services that include a complete online crop management

system with grain-storage and sales-tracking capability.   VantagePoint enables the creation of field maps and a wide variety of management reports.

As a base, NSDI Framework and other data, as illustrated below, is used to support the VantagePoint service.   Some of the data is developed specifically from the client's farm operation, and some is available from the public domain. By integrating various data sets into a deliverable product, VantagePoint has developed a "total product" designed to meet the needs of the farming community. Further, the product is supported by the VantagePoint team to ensure that the client has access 24 hours per day, 7 days per week, and 365 days per year.

The VantagePoint Product includes four basic components:

- Current information including current commodity market data, news, and weather

- Reference information from the public domain including DOQQ, SSURGO, TIGER, PLSS, and Landsat TM, and Library reference information on seeds, crop protection, equipment and pests

- A web search engine

- e-mail capability.

Farming is Geospatial
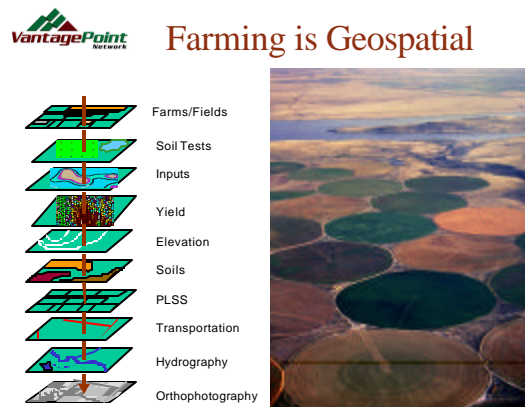
VantagePoint has incorporated digital orthoquads with soils information from the Natural Resources Conservation Service (NRCS). VantagePoint Network's use of these public domain mapping products illustrates a value added product developed and marketed to the agricultural community.

The integration of spatial data into a total agricultural community information product, delivered to the customer over the Internet using World Wide Web technology, illustrates one application that is contributing to that nation's gross domestic product. The need for a "national" spatial data infrastructure is essential to effectively managing and sustaining the U.S. economy in global markets. Achieving the proper "private/public sector" relationships to take full advantage of the U.S. investment in "spatial data" demands new thinking and a review of the federal governments role.

7.7 The Geography Network

The Geography Network is a virtual global network established by and for data providers with the sole purpose of making geographic content more readily available to its visitors. They believe that better data will help companies and individuals make better decisions. The Geography Network provides the exchange infrastructure and data providers, service providers and users provide the content. The site can be found at www.geographynetwork.com

This includes access to digital maps that are free and others that are fee-based from leading map publishers. They also offer a forum where members can exchange their own maps.

Similarly, free or fee-based data resources are available, as well as, a clearinghouse to find and download other data.

The Geography Network is also a forum for services providers to make known their expertise with respect to the use of data. Similarly, knowledge about custom built solutions is also available on the site. They also facilitate the publishing of applications.

ESRI, Inc. and the National Geographic Society are sponsoring a Geography Network Challenge on the site to increase awareness of the site.

The challenge has several categories:

- Government
- Data Sharing
- Education
- Citizen involvement
- Application or GIS solutions on the Web
- Conservation
- Science

The contest will be judged based upon creativity, user interface, documentation and performance.

This site is an excellent example of how private sector providers and users can come together to share information, while also promoting the commerce of provider wares.