10.0 INDUSTRY PROFILING, SELECTION CRITERIA, PRIORITIZATION

10.1 North American Industry Classification System (NAICS)

As discussed in the previous section on marketing strategies, one of the best ways to approach such a broad endeavor as the NSDI is to segment the breadth of potential industries into more discreet targets. Before defining these industry targets to profile, we needed to choose a common naming and classification structure for the chosen industries.

We have chosen the North American Industry Classification System, or the NAICS. We have chosen this classification system because it is the successor to the SIC (Standard Industry Classification) system used by marketing departments in most private industry firms. The NAPA study also defines industries, but these definitions are more from a public sector need standpoint.

This Section Addresses

- Industry Classification Schema
- Identifying private sector drivers
- Targets likely targets and applications
- Private Sector Participation Defined
- **Recommendations**

The SIC system was last updated by the OMB in 1987. In 1992, the OMB charged the ECPC (Economic Classification Policy Committee) with the task of building a new, more complete, classification system. The system was to take many more industry classifications, particularly those in technology and computing, into account. The information technology area had been significantly underserved by the SIC system.

In fact, special attention is given to new and emerging industries as well. The resultant system is the NAICS. Within the NAICS, producing units using identical or similar production processes are grouped together. The NAICS uses a 6-digit code (SIC used 4-digits) to classify companies as follows:

- XX Industry sector
- XXX Industry sub-sector
- XXXX Industry group
- XXXXX Industry
- XXXXXX US, Canadian or Mexican National Specific

The NAICS defines 20 high level sectors:

- Agriculture, forestry, fishing and hunting
- Mining
- Utilities
- Construction

- Manufacturing
- Wholesale trade
- Retail trade
- Transportation and warehousing
- Information
- Finance and insurance
- Real estate and rental and leasing
- Professional, scientific and technical services
- Management of companies and enterprises
- Administrative and support and waste management and remediation services
- Education services
- Health care and social assistance
- Arts, entertainment and recreation
- Accommodation and food services
- Other services
- Public administration

We will choose the target industry names and NAICS codes from this list. Within each major, high level industry classification are hundreds of sub-classifications.

These NAICS codes map to the NAPA industries as follows:

NAPA	NAICS
Property and Voting Rights	Public administration
Revenues from property	Real estate, rental and leasing
Transportation, navigation and commerce	Transportation and warehousing, Wholesale trade, Retail Trade
Public land and marine sanctuary management	Public administration
Agricultural and natural resource development	Agriculture, forestry, fishing and hunting
Environmental protection and ecosystem management	Public administration
Community and economic development including utilities, housing and public works	Utilities, Construction, Public administration,
Emergency management	Public administration
NAPA	***NAICS***
Public service delivery including health, education, social and criminal justice	Education services, Health care and social assistance, Public administration

National defense	Manufacturing, Other services, Public administration
Earth system sciences and GI technologies	Information, Public administration

10.2 Target Markets Defined

10.2.1 Potential Driver/Advocates for Each Target Market – Phase II

In Phase II of this effort, when defining the private sector drivers for each target market, we will consider several factors:

- Ability for this company to influence other companies
- Size of the company
- Number of customers
- Number of alliances or business partnerships
- Current or potential use of NSDI offerings
- Ability to contribute new content to the NSDI

We will create a ranking system for each industry and choose ten to fifteen potential industry drivers for each industry. After comparing them based on the criteria listed above, we will rank these potential drivers. Then, we will contact the top five companies in each industry to discuss their participation. Our goal is to solicit at least one driver for each industry.

In order to win participation at high levels, we will have to show the benefits of NSDI participation to these companies. These benefits must be presented from the perspective of the private sector firm, in a competitive environment, with liability issues, the need to maintain proprietary and intellectual property rights, and needs for short-term profits.

We will work with the NSDI to build a marketing "messaging" document outlining these benefits now and as planned.

10.2.2 Criteria for the Selection of Market Drivers – Phase II

As mentioned in the previous section, our criteria for choosing market drivers are a list of six factors. We will assign each factor a percentage with all six factors adding up to a total of 100%. Each company will be assigned a score for each factor in the range of one to ten. The score multiplied by the percentage will equal the factor score. The total ranking score for each company will be calculated by adding together the six factor scores. The total ranking scores for each industry will then be listed in order from highest to lowest.

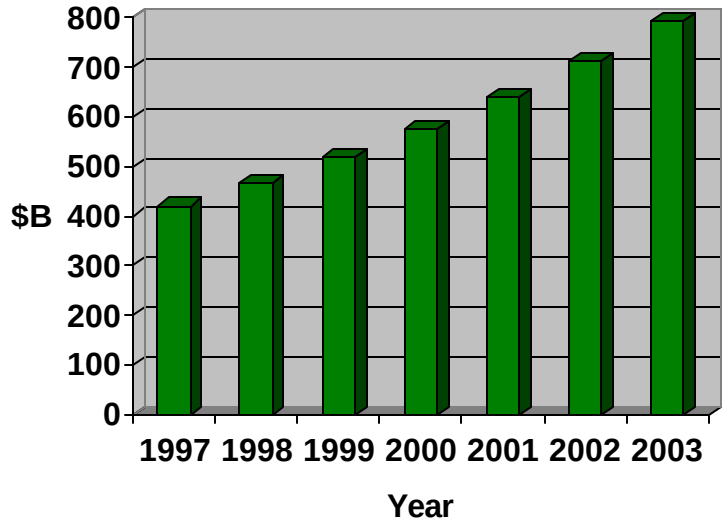
10.2.3 List of Most Likely Markets and Applications

Some of the most likely markets to focus on in Phase II are listed below. Some examples of how the NSDI could benefit these companies or how they use geodata today are provided.

10.2.3.1 Telecommunications

The telecommunications industry sector includes companies offering telecommunications equipment, satellite equipment, wireless services and equipment, fiber optics, switching equipment, and microwave equipment. It is also populated with companies offering telecommunications services like local and long-distance telephone access, cable access, satellite television, DSL and other high-speed Internet access links.

As we all know, this industry is working very hard to keep up with consumer and commercial demand for services and equipment. This industry is growing at a rapid rate. The following chart, prepared by Multimedia Telecommunications Forecast (2000), shows this growth:



This represents Corporate Aggregate Growth (CAGR) of 11% from 1997 through 2003.

Companies in this space range from very small Internet service providers (ISPs) and competitive local exchange carriers (CLECs) to large telephone corporations. These industries are involved in the following activities (The Asaba Group, 2000).

Industry Player Types	*Marketplace Drivers*
Component and Technology Providers	Focusing on core technologies for data transfer with broad industry applications like Optoelectronics, wave division multiplexing (WDM),

	etc.
Equipment Manufacturers	Developing end-to-end solutions for voice and data applications like switching and transmission platforms. These companies are driving innovation for data-packet switching equipment to increase bandwidth capabilities and integrate core technologies for enhanced data networking.
Long Distance Carriers (IXCs)	Expanding scale and scope of product and service offerings to enhance positions in long distance, enter new markets (local and broadband), and develop embedded applications for data and voice needs.
ILECs/RBOCs	Consolidating and building scale, unbundling key assets like wireless, and developing new products like enhanced local services, broadband, etc.
CLECs	Focusing on most profitable segments in local markets like small to mid-sized businesses and industrial parks.
Cable	Focusing on leveraging residential customer base to add broadband and local telephone services.

A great deal of consolidation is going on in this industry in the form of mergers, acquisitions, and companies going out of business. As a result, many of the larger firms' needs for GIS have increased as they combine operations and the need to service customers in new geographies and with new services.

Another positive factor relative to the consolidation is that there will be a smaller number of large potential contributors or participants for the NSDI.

Because much of the equipment required to fuel our telecommunications engine is installed outside, and perhaps, underground, spatial data is critical to these companies. Many have built or are building their own spatial databases to help them more accurately plan for and build more capacity for individuals and businesses.

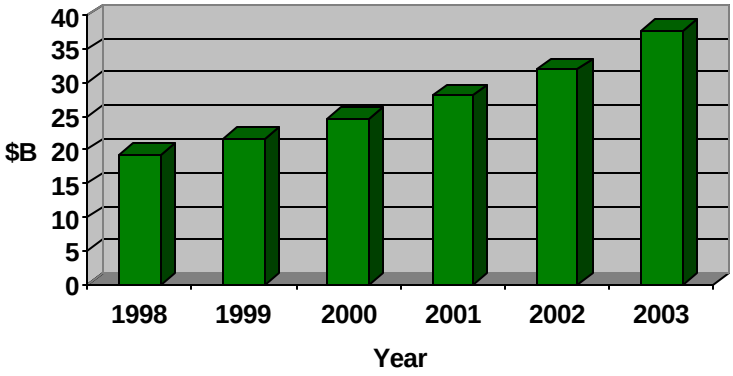
Pacific Bell, for example, has developed the Pacific Bell Enterprise Spatial Database to provide a company-wide spatial technology database. This database has been built using ESRI and Oracle technology.

Consider the cost to maintain this data for Pac Bell considering the amount of change the data undergoes due to urban sprawl, commercialization of rural

areas, etc. and due to the consolidation of telecommunications companies described above. Because a great deal of equipment is located above or below ground, or will be transmitted above ground, data that includes height information is critical.

In the past, survey teams in the field built this data. Today, aerial photographs can capture this information into a GIS to use for planning and design of networks, RF engineering, wave propagation modeling for cellular and PCS networks, site selection and the planning and design of tower sites for public impact analyses.

These companies are building new infrastructural components daily, and maintaining their existing equipment. The MMTA, TAG analysis of 2000 shows the dollars these firms will spend on Network Infrastructure Support Services:



This represents CAGR of 14.3 % between 1998 and 2003.

10.2.3.2 Agriculture

Agriculture falls under the Food, Beverage and Tobacco industry sector. This sector includes food manufacturers, farms and other food producers, agricultural services companies, beverage makers, and tobacco companies.

Technology helped to transform our economy from an agrarian one to first a manufacturing economy and now a services economy. A very small portion of the U.S. population is involved in farming. Large producer conglomerates have also replaced many small family owned farms. As the amount of farmland has decreased, the need to maximize the output of farmland has increased, especially for large public farming firms that must answer to stockholders. Small farms, seeking to compete with the larger firms and coops, must also employ technology to help them survive.

Mergers and acquisitions activity has increased in this industry segment. Unilever acquired Best Foods in June, 2000. Philip Morris bought out Nabisco in the same time frame. General Mills agreed to purchase Diageo, a unit of Pillsbury in July of 2000. Pepsi purchased Quaker Oats in December of 2000.

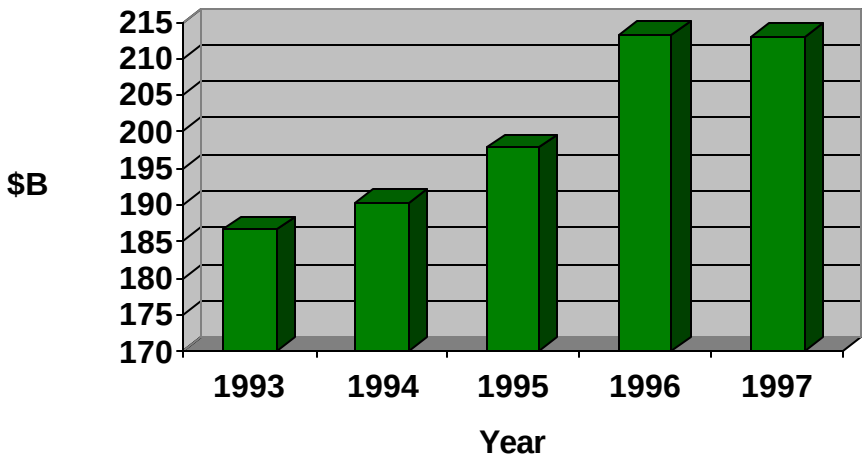
Some of the top agricultural competitors include:

- Phillip Morris Companies
- British American Tobacco
- Weyerhaeuser Company
- Deere& Company
- Archer-Daniels-Midland
- R.J. Reynolds Tobacco
- Ag-Chem Equipment Company
- Agribrands International
- Gencor Industries
- Georgia-Pacific
- Delta and Pine Land Company

The average yearly growth of this industry is 2.5% according to Business Week at www.businessweek.com, 3/16/01.

Output has grown from $271.0 Billion in 1997 to $305.4 Billion in 2001. Productivity per employee in this industry has risen from $74.7 thousand/employee in 1997 to $81.4 thousand/employee in 2001. (www.businessweek.com, 3/16/01)

United States farm sales have grown as shown in the following chart from the U.S. Department of Commerce/U.S Department of Agriculture:



Spatial data can be used in many different applications in the agricultural sector. For example, there is a concept called “precision agriculture.” Precision agriculture is used to apply land resources, such as fertilizers, across a field as required by the crop. Because the needs of a crop may vary from point –to-point across the field, the need to store information with these points is critical. In addition to precision farming, the tracking of pesticides and fertilizers might become a necessity as counties try to minimize pollution due to run off.

Another application might be the assessment of crop damage due to flooding, temperature, fire, etc. In general, farmers may use GIS to monitor crops for nutrient and water deficiencies, nitrogen, crop maturity, weeds, and disease. For these purposes, spatial data, combined with spectral re presentations and analyses provide farmers with valuable information.

The VantagePoint Network is an excellent example of the combination of infrastructure, data, and expertise to improve the abilities of large and small farmers to succeed.

Other B2B or Digital Farm companies have emerged as shown below in this Business.com Research report, March 31, 2000:

Company	*Launch Date*	*Registered Members*
XSAG.com	1/99	50,000
Farms.com/eHarvest.com	1/95	3,500
DirectAg.com	8/99	20,000
Farnbid.com	7/99	90,000
Gofish.com	9/99	N/a

10.2.3.3 Transportation and Logistics

This sector includes airlines, air couriers, trucking companies, railroads, shipping companies, bus companies and companies that provide logistics and other transportation services.

Some of the largest companies in this industry are:

- UPS
- Federal Express
- DHL Airways
- Union Pacific
- Burlington Northern/Santa Fe
- Budget Group
- Knightsbridge Tankers
- RailAmerica
- Conrad Industries
- RailWorks
- Interpool

This industry will experience 2.6% average growth in revenues in 2001. Productivity per employee will rise 0.8% in 2001. (www.businessweek.com, 3/16/01)

More than 8 million containers exist in the world. They all have to be tracked. Because of this, Global Systems for Mobile Communications or GSM satellites and radio tags are being employed to track cargo. Transportation simulators are also being employed to improve transportation productivity.

Within this industry, spatial data can play a large role in determining trip forecasts. Today, forecasting or trip planning involves a method that assumes that factors do not change like:

- The spatial topology
- Spatial pattern
- Population
- Traffic patterns
- And other factors

This is obviously not the case, especially in formerly rural areas now covered with strip malls and tract homes.

The use of GIS solves this problem. Now transportation forecasters can predict travel demand on geographical areas. Those responsible for trip logistics for entire fleets can better determine trip routes and times to more effectively use their equipment. With rising energy and fuel costs, more effective routes can save large companies millions in expenses each year.

In addition to these routing tools, GIS and spatial data can be used for navigational purposes once a vehicle is on the ground and en route. Dispatchers can assist drivers who experience issues while driving like congestion, construction, and other delays.

10.2.3.4 Manufacturing

The sector called manufacturing encompasses many different sub-sectors like machinery (light to heavy), hardware, machine tools, metal fabrication, flow control equipment, packaging makers, rubber and plastic parts manufacturing, glass manufacturing, and electrical equipment and product manufacturing. In addition to the manufacture of goods, this category can also contain the distribution of these goods.

Although it may not be obvious that this sector would use spatial data, there is a place for its application, particularly in the decision-making process.

These organizations are faced with decisions about capacity, cost reduction, quality management and logistical support for their enterprises each day. Add to these concerns the need to assess the acquisition of another company or the disposition of a current division, and the uses of spatial data become clearer.

A manufacturing company many decide to downsize or move operations to a lower cost region or country to improve profitability. Spatial data, and the use of GIS, will help this company evaluate other locations to determine those where operations can be set up more cost effectively. These systems can also help them decide between the merits of several existing facilities as they consider consolidation or the intrinsic value of their assets for valuation purposes.

Those companies that deal with the distribution of goods may use spatial data and GIS to evaluate the logistical merits of several distribution channels or distribution hubs – to see which better serves their strategic plans and profit goals. For example, one distribution channel may have locations all over the country, serving local retail outlets. Another may have far fewer depots across the country serving just as many retail outlets. The logistics of supporting the depots versus more local warehousing could make the decision of which distributor to use a moot point from a cost standpoint.

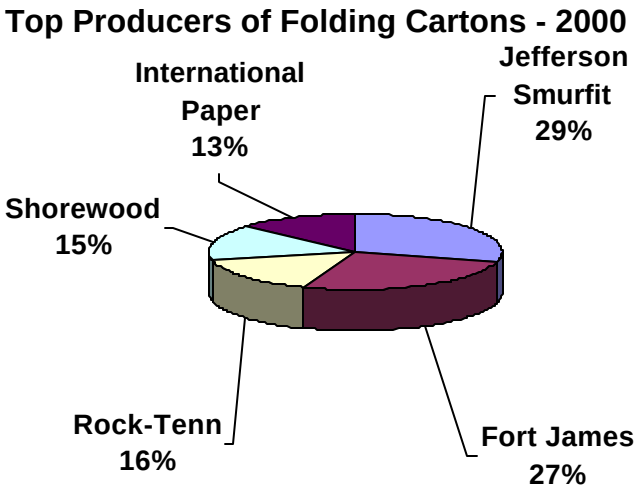
10.2.3.5 Forestry

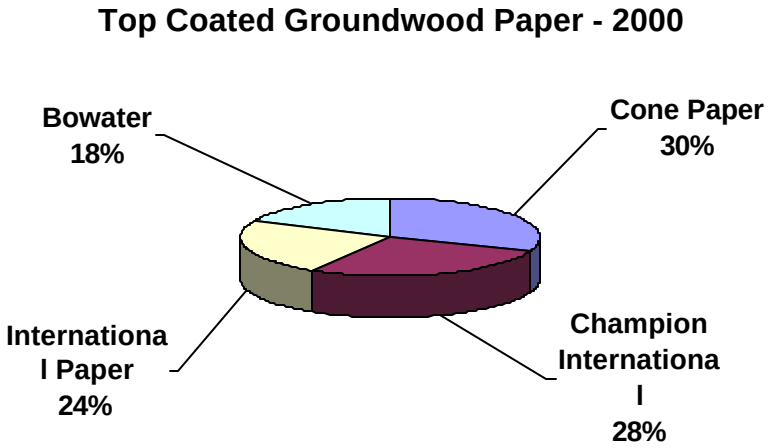
The Forestry industry falls within the Materials and Construction sector. This sector includes companies making construction materials, growing and

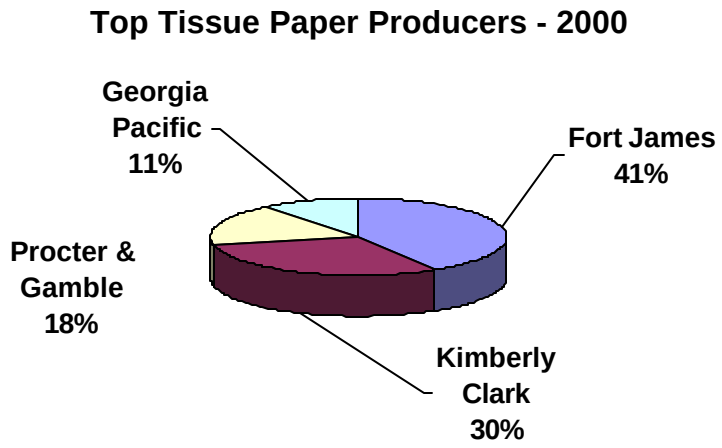
harvesting timber, milling lumber, extracting stone and producing concrete, builders of manufactured housing, architectural and engineering firms, heavy construction companies (not residential construction companies), industrial maintenance companies, and management and recycling.

According to the US Business Reporter, October 29, 2000, the forestry industry will continue to consolidate. This is a highly competitive industry. Gaining competitive advantage through the use of technology is critical.

The top competitors in the Market are depicted below. These would be excellent targets for the Phase II activities:







For the forestry sub-sector, many uses of spatial data are apparent. The spatial data, coupled with a GIS, can help catalog and inventory a timber company's "inventory" of timber acreage. This inventory can carry characteristics about the land itself, the trees, the general environment, as well as, the routes to and from the forests, the effects of environmental events on the forests (fire, heavy rains, etc.), forest density, forest maturity, and weather characteristics of the forest through out a twelve-month period.

By using spatial data, forest management can reduce waste, thus improving our use of a precious national resource. Forest managers can more responsibly manage their existing reserves for the long term, reducing their need to continually acquire and decimate new forests. They can use this information to help them build reforestation plans into their cost structures for growth planning purposes. They can also use this information to determine the responsible ways to harvest with respect to the effects on habitat. Some large users of forestry products, like The Home Depot, will only use timber products from well-managed forests. Using GIS, in this case, can also help a forestry company market their products and win new customers.

The use of spatial data and GIS in forestry is expected to yield definite benefits in terms of productivity and quality increases, product enhancements as forest managers understand more about their crops, and the ability to share this information with company partners and regulatory agencies, all at a lower cost.

A potential partner site for Phase II is www.forestindustry.com, providing e-business solutions for the forestry industry. This site is a portal with excellent community content and a products exchange.

10.3 Summary

While many more vertical markets exist, these would be excellent initial targets to pursue for Phase II of this project, where we begin to implement many of the suggestions in this Phase I report.