Strategy for:

Connecticut Enterprise GIS

Developed for the:

State of Connecticut
Geospatial Information System Council (CGISC)

October 4, 2007

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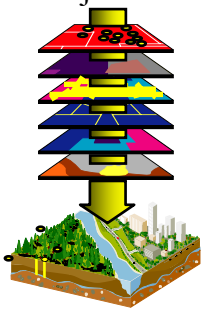
Table of Contents

1 EXECUTIVE SUMMARY

A geographic information system (GIS) is a computerized system used to create, store, manage, analyze and display maps and associated data using the characteristic of where the object is as the fundamental organizing principle. Like other database technologies, GIS is increasingly deployed on the World Wide Web. Commercial examples include systems such as MapQuest, Yahoo Maps and Google Earth. The main purpose of this document is to define the strategy for the development of a statewide GIS program for the state of Connecticut based on the needs of all of the stakeholders in the state including State, Regional, and Local Government agencies as well as private citizens.



The creation of this document was funded through a grant provided by the Federal Geographic Data Committee CAP grant program. The effort was overseen by the Connecticut Geospatial Information System Council and facilitated and documented by Applied Geographics, Inc, of Manchester, Connecticut.

The State of Connecticut has a long history with the use of geospatial technology and has made significant investments in GIS data and infrastructure. Numerous state and local government agencies generate a rich collection of geospatial data which is used in a variety of map making, analysis and web viewing applications. However, until recent years there has been little coordination of activities and no single place to discover what spatial data may be available. This lack of coordination leads to unfocused communication, duplication of effort and few standards. Some smaller communities lack the resources to implement local GIS technology and may not be able to contribute to statewide data aggregation programs.

Through a series of planning and informational gathering sessions, and an on-line survey three strategic goals were developed:

- Organize GIS Efforts across state and local government agencies
- Develop a core set of data layers that are kept up-to-date and made broadly accessible in a state managed data repository
- Communicate and educate potential users and decision makers about the benefits and capabilities achieved by GIS investments**.**

To achieve these strategic goals a series of programmatic goals were defined:

- Establish a GIS Coordination Unit reporting to the State CIO. This group will be appropriately staffed to coordinate GIS activities, organize a GIS outreach program, manage statewide data development programs and build a statewide data repository.
- Develop four statewide data layers:

  - **Orthophotos** – georeferenced aerial photography
  - **Parcels** – geographic representations of private and public real property
  - **Street Centerlines** – full hierarchy of all private and public roads
  - **Address Points** – specific point locations for all known addresses in the state

- Educate and build relationships with key political and executive level champions who support large high priority initiatives that can benefit from GIS technology. Initiatives that have been identified include:

  - Education
  - S.A.F.E. School Safety Initiative
  - Health Care
  - Human Services
  - Homeland Security and Public Safety
  - Land Preservation and Responsible Growth
  - Brownfield and Economic Development
  - Non-Emergency Governmental Telecommunications Service (311)
  - Transportation
  - Streamlined Sales Tax Project (SSTP)
  - Help America Vote Act (HAVA)

There is much to draw upon to make these goals achievable within the next four to five years. There is a large and diverse GIS user community with an established User-to-User group. This community is composed of practitioners from all levels of state, regional, and local governments. Regional water authorities and utility companies also have long and extensive experience. The private sector in Connecticut has a wide range of expertise that can augment the state's resources when necessary. Finally the Geospatial Information System Council is strong and provides and open forum that all interested parties can participate in. Participation by all stakeholder groups is strongly encouraged at regular meetings, working group sessions, and special events.

The following details the process that was followed to identify the goals for the state and the process that should be followed to achieve the goals that have been established.

2 STRATEGIC PLANNING METHODOLOGY

2.1 Getting Started

The National Spatial Data Infrastructure (NSDI) Cooperative Agreements Program (CAP) is an annual Federal Geographic Data Committee (FGDC) program to assist the geospatial data community through funding and other resources in implementing the components of the NSDI. The State of Connecticut was awarded a CAP grant in 2006. Applied Geographics, Inc. was hired to facilitate the development of this strategic plan.

2.2 Preliminary Planning

The first stage of this project was to conduct a kick-off meeting to refine the National States Geographic Information Council (NSGIC) strategic and business planning templates and tailor them to the State of Connecticut's needs. In addition the steering committee and project team established the overall approach and goals for the project at this meeting.

2.3 Strategizing

2.3.1 Geospatial Council Steering Committee Meetings

Connecticut's Geospatial Information Council (CGISC) consists of 21 members of state, regional, and local government and the CGISC meets on a monthly basis. A project steering committee was established from the members of this council to provide more frequent feedback and direction to the State's project manager and AppGeo's project team and to make decisions on the direction that the project was going. Five workshop sessions were held with the steering committee throughout the project duration. Participants included members of the council representing state agencies, regional planning agencies, and local government agencies. These sessions also worked to further define the key strategic goals, vision and to identify the programmatic goals outlined in this document.

2.3.2 Geospatial Council Business Meeting

Three monthly geospatial council business meetings and one special meeting were attended by project team staff and were used to report and track progress to the State. At these meetings the goals and visions were discussed and a degree of consensus on the emerging strategy and programmatic goals was established. These council meetings were the forum where final decisions were made and this plan was formally adopted.

2.3.3 Information Gathering Sessions

Four information gathering sessions were held around the state as group visioning sessions to identify and clarify goals and to define the needs at all levels of government. Members of state, regional, and local governments were invited to attend and the broader set of potential stakeholders were invited through

announcements placed on Connecticut's GIS User to User Network's listserv. These sessions were held in four different locations around the State; eastern, western, central and south central Connecticut and were attended by over 75 individuals. At these sessions the project team presented the following topics:

- Why is Connecticut doing this project?
- What is the process that is being followed?
- What are the goals for the project?

Following the presentation interactive discussions were held that revolved around the State's vision and goals for the future of GIS in Connecticut. During these sessions data was collected about the way GIS is used and funded at different levels of government. The meetings also served a secondary purpose of informing the GIS community of the GIS Council and an overview of the council's work developing a strategic plan. Finally, a number of national initiatives and systems were explained to the participants including the National Spatial Data Infrastructure (NSDI), the 50 States Initiative, Imagery for the Nation, and Geospatial One-Stop (GOS). The majority of time at each workshop was spent sharing among participants and collecting information about specific GIS data and how it is or could be created, collected, used, and shared throughout the state.

2.3.4 On-line Web Survey and Questionnaire

An on-line questionnaire was developed to reach out to people who did not attend the sessions and to ask more detailed questions of those who did attend the sessions. The survey included more than 50 detailed questions on the following topics:

- General information about the respondent and their organization
- The organization's GIS background and current use
- An inventory of GIS software
- Network capability
- Data usage and needs
- Funding and policy
- GIS training needs
- State GIS outreach program

Over 60 organizations have responded to the survey to date. The survey results are incorporated into the requirements section of this document, but it is important to note that the survey was not a scientific survey. The survey was a voluntary effort that provided a data point for decisions made, was considered representative, but may not be statistically accurate. A summary of survey results is provided in the appendix of the companion document "Funding Connecticut's Statewide GIS Program".

2.4 Authoring

The final stage of this project was to develop this document, the strategic plan, and also to develop one business plan. The strategic plan was developed by the project team and distributed to the CGISC for review and comment. A meeting was held with the steering committee at which their feedback to the plan content was discussed, and then the final version of the plan was created. Finally, the CGISC as a whole has adopted the plan at a special meeting held on September 12, 2007.

2.5 Monitoring

As with any strategic plan, conditions, technology, and the people applying the plan and using the technology change over time. It is important to review this plan on a regular basis and track the progress that is being made. It is recommended that this plan be visited on a annual basis, reviewed and updated to reflect the accomplishments that have been made, the goals that have been achieved, and the changes in direction that are needed.

3 CURRENT SITUATION

3.1 Who are we?

The Connecticut Geospatial Information Systems Council (CGISC) is chaired by the state CIO and the CGISC functions to provide geospatial guidance. The CGISC was established under House Bill No. 7502 during the June 2005 Special Session as Public Act No. 05-3

The mission of the CGISC is to: 1) coordinate a uniform geospatial information system capacity and 2) promote a forum in which geospatial information may be centralized and distributed.

This body is the official owner and facilitator of this plan.

3.2 Where are we now?

The State of Connecticut has a long history with the use of GIS and geospatial technology. The state has made significant investments in GIS including statewide orthophotos, procuring a government-wide, multi-year license for street centerline and addressing data, and most recently establishing the framework infrastructure for an enterprise GIS. Numerous state and local government agencies produce, generate, and maintain geospatial data. This data is shared on an ad-hoc basis with data consumers within and between agencies. GIS coordinators, GIS analysts, public officials, and the general public benefit from data produced throughout various state agencies, but data sources and consumers are organized on an ad-hoc basis. There is little coordination of activities between state and local government entities and there is no single place to discover what data may be available on a statewide basis. Many forms of output are produced by this data including:

- GIS analysis: Build out analysis, code enforcement mapping, crime analysis
- Paper maps using geospatial data: tax mapping, zoning mapping, wetlands mapping
- On-line viewers like those found on the web sites of West Hartford, Essex, Old Lyme, Darien, Hartford, Capitol Region Council of Governments, and Center for Land Use Education and Research (CLEAR). A more complete list of GIS web sites are being used in Connecticut can be found on the CGISC web site: http://www.ct.gov/gis/cwp/view.asp?a=2681&q=328084&gisNav=|

3.3 Strengths and Weaknesses

As already stated, in the State of Connecticut geospatial activities and the use of GIS technology have been around for a long-time. As a result the system has evolved throughout the years from a system that was used by a few early adopters to one that is in use by many state and local government agencies and departments. As with any

evolutionary process, the results have sometimes achieved a high level of efficiency, while at other times they are less efficient and effective. The end result is that Connecticut's geospatial activities have a number of strengths and weaknesses:

3.3.1 Strengths

Depth of Experience

Connecticut has a long track record of working with GIS technology at the state, local and regional government levels. This experience is represented in the diverse membership of the CGISC and provides a strong context for the development of coordinated GIS efforts throughout the state. The strength of this experience can be focused into a coordinated GIS program that sets standards and creates a full data repository that aggregates data from all levels of government across the state. In addition to governmental agencies, the University sector in Connecticut is extremely strong with many well established GIS programs to train an ever growing work force.

Data Rich

Connecticut government has a rich collection of data in the area of transportation, environmental management, natural resources, physical infrastructure and homeland security. This data can be combined into a single well known, frequently updated, widely accessible data repository that is fully supported by a targeted set of published data standards. There are also many high-quality statewide datasets including multiple years of land cover; LiDAR-derived elevation data; impervious surfaces; land type associations and riparian buffer areas (southern half of CT). UCONN's CLEAR and MAGIC currently serve a number of statewide and other image and GIS datasets including 2004 orthos, multiple years of land cover, and provide download capabilities for thousands of older GIS datasets.

Network Infrastructure

Connecticut has a strong information technology organization which provides very good network connectivity to most state offices. In addition, almost all local governments have high speed Internet connectivity at their desks. This enabling technology allows for the sharing of data through the use of an Internet accessible repository that can be accessed via FTP, web services, and publicly available map data viewers.

Base GIS Infrastructure

The Department of Emergency Management and Homeland Security (DEMHS) is undertaking a project to implement an enterprise GIS infrastructure to support the homeland security emergency operations center (EOC) in Hartford. This project has a secondary goal of developing a parallel GIS infrastructure at DOIT that provides both a back up for the EOC and can also support the day-to-day enterprise GIS needs of state, regional and local governments, and the general public. The vision holds that this is the core infrastructure that is needed to implement the elements of this GIS strategy such as the data repository.

Full-time GIS Coordinator
A full-time, paid coordinator position is designated and has the authority to implement the state's business and strategic plans. Due to other conflicting responsibilities, this recently filled position does not have full availability to focus on geospatial coordination.

Coordinating Authority
The CIO of the state has the authority for statewide coordination, and legislative action empowered the CGISC as the formal geospatial coordinating body in Connecticut.

Formal CIO Relationship and Budget Authority
The CGISC has a formal relationship with the CIO's office. The CIO chairs the CGISC and has sign-off authority on all IT capital budget requests. Departmental GIS Coordinators also have the authority to enter into contracts and become capable of receiving and expending funds by following State procurement procedures.

Well Trained and Established University Sector
There are a large number of geospatial professionals within the university system. As just one example, within CLEAR there are nine fulltime geospatial staff with positions ranging from Professors, to Educators, to Research Associates. These people conduct classroom education, hands-on training, data development, geospatial research with state federal and other agencies, outreach, and provide thousands of contact hours working with state government staff. They also provide support to the general public providing technical assistance on a wide variety of topics relating to geoprocessing, database development, data deployment, etc.

3.3.2 Weaknesses

Communication
The single largest issue raised during the development of this strategy was a frustration by the GIS community regarding the lack of a coordinated communication plan. Geospatial events, decisions, and documentation are often late or too close to an event for proper planning to occur. Many stakeholders expressed frustration with not knowing where to go to find a data set, or where to get an answer about a data set. The GIS community would benefit greatly from a single known point of contact for access to coordinated statewide GIS information.

Lack of Dedicated Staff
Until recently there was no dedicated state resource who is dedicated solely to the coordinated development of a GIS infrastructure and data repository. Without specific resources assigned, efforts to develop policies, standards, data catalogs, etc. do not effectively move forward. The end result is policies and standards that are potentially misused or ignored, and tax dollars that are ineffectively spent.

Lack of GIS Coordination and Outreach Unit

GIS data and development activities need to be better coordinated across all levels of government to eliminate redundant efforts and maximize the use of tax dollars. State investments in GIS technology and data development should be better coordinated, and when possible, investment through multiple initiatives should be encouraged. Where this has been done in the past this has been highly successful, but not until recent years has coordination been done more formally. There has been some coordination between stakeholders such as state agencies, local and regional government, academia and the private sector (e.g., 2004 orthophoto project where funding came from 3 state agencies), but, more work still needs to be done. Education and training programs such as those at the University level should be better marketed or enhanced to introduce or augment the GIS capability of organizations at all levels of government in Connecticut.

Duplication of Effort

A lack of statewide coordination and communication results in multiple organizations performing the same work with a duplication of cost and effort. For example, the Department of Transportation (DOT) maintains street centerline data for the state highways, the Department of Public Safety (DPS) manages a dataset for both state and local roads, while many municipalities also maintain their own street centerline layers. A coordinated process to collect updates from municipal government, consolidate them on a statewide basis, and then make this data available for use within DOT, DPS, and the rest of the state would yield a more complete, current, and cost-effective statewide layer. An effort by DOT and DPS to improve this specific process is already underway.

Lack of Resources in Small Local Governments

Many communities and small towns in particular, do not have the financial or staff resources to contribute to a statewide GIS. Many local budgets do not have a GIS line item. In smaller communities, current GIS capability is very limited, if it exists at all. It is difficult to institute statewide initiatives, such as electronic submission standards, without a local GIS capability.

Lack of GIS Standards and Policies

The state should develop and/or adopt a set of GIS data standards including metadata standards, fees for data distribution and electronic submittal guidelines. When no standards exist, individual local policies are implemented causing different policies to be implemented in different municipalities. These disparate policies cause confusion between municipalities and create many difficulties when trying to aggregate data into statewide layers.

NSDI Responsibilities Not Assigned

There is no formal responsibility assigned for the development of the National Spatial Data Infrastructure and a State data clearinghouse.

Federal Government/CGISC Relationship
Some federal agencies (USGS, FGDC) do work through the CGISC, but most state agencies and programs work independently with the Federal government on geospatial matters.

3.3.3 Opportunities

Political or Executive Champion(s)
A champion is a high-level decision maker who is knowledgeable on the use of GIS technology and willing to support and advocate for the use of the technology to improve business processes in the state. There are numerous active champions within Connecticut government who provide critical context and support for the execution of the council's strategy as it is used to support the areas they are responsible for. These champions are critical to the successful growth of the use of GIS technology in the state.

3.3.4 Threats

Centralization of Resources
Centralization of all GIS state resources would generate resistance, require extensive time, take many years to accomplish, and would likely not be very successful. Many states have attempted this approach and have failed because of the diversity of expertise that is needed at the central office to support the needs of all of the potential users. The current trend at the state level is to create a central GIS Coordination Unit with staff who can act as liaisons with GIS Coordinators in the various state and local government agencies, who coordinate efforts in conjunction with all levels, and support those without internal capabilities and expertise.

Lack of Sustainable Funding
There is no sustainable funding for the core operations (operations of the proposed GIS unit) at the present time. The only funding that has been available is through departmental efforts, cooperative efforts and from grants. The current tendency to obtain GIS funding has become dependant on federal programs, but GIS projects are put in jeopardy when that funding disappears. Difficulties arise when organizations become reliant on the GIS technology and then face difficult trade-offs when funding is cut. Project timeframes are often driven by grant deadlines rather than industry best practices.

With that said, specific departments (DPS, DEP, DOT, etc) have maintained funding for their GIS efforts over the years and have also partnered and cost-shared in efforts that benefit the larger geospatial community.

High Rate of Turnover in GIS Industry in Connecticut
The state needs access to a well-rounded set of technical skills that is hard to obtain and maintain in a state where there is an observed high rate of employee turnover and increased demand.

Enhanced Data Sharing

GIS data is the most expensive component of a GIS. GIS requires comprehensive, current, and accurate data in order to bring the greatest value to an organization. Thus, once developed, good data should be readily available to any entity requiring it. The more people are using the data, the greater the return will be on the investment in the data. By increasing the ease with which data can be shared, the enterprise GIS infrastructure will deliver broad value to all state GIS stakeholders and the general public.

4 VISION AND GOALS

Looking 5 years ahead, a map of Connecticut will contain a complete inventory of all framework data layers (photographic imagery, parcels, street and transportation information, address points, water bodies, natural resource data, etc). The map will get more accurate and detailed as you zoom in. Labels can be added to identify businesses, services and other points of interest locations. More detailed or specific information can be added to the map for more complicated analysis and 3D features will become commonplace for improved visualization in the larger cities. This map would be used as a guide to people who do not know the state and will be used to connect people to the location of a feature for better communication throughout the state.

This vision can be achieved by starting to build upon local data and capability, focusing on standards, and building out the elements of this enterprise GIS strategy..

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4.1 Strategic Goals

The State of Connecticut has many agencies that individually have made significant investments in GIS over the years. Specific strategic goals have emerged during information gathering sessions and workshops that build upon these investments to achieve the vision stated above.

- **Organize GIS efforts** across state and local government agencies to improve coordination of GIS efforts throughout the state to reduce existing and future redundancies in GIS technology infrastructure and data development. Focus priorities to target specific funding initiatives that can contribute to GIS development initiatives. Provide geospatial guidance to share technology expertise to GIS practitioners at all levels.
- Develop a core set of **framework data layers** that can be shared across agencies and with local municipalities. Creating data is expensive; sharing data is very cost effective. Cooperative partnerships can be developed to increase the quantity, quality and effectiveness of the data available. A core set of data layers should be delivered on a common infrastructure that will enable sharing across all levels of state and local government.
- **Communicate, and educate** about the benefits and capabilities achieved by investments in GIS. By creating an increased awareness of the value of GIS, the use and application of GIS will be increased which will maximize the benefits and lead to more support. Relating GIS funding requests to specific statewide initiatives will capitalize on existing programs and help integrate GIS capability into the state's infrastructure and programs. Building relationships with potential high-level political champions, key executive

decision makers and local municipal constituents is key to the success of this strategic plan.

4.2 Programmatic Goals

4.2.1 Establish GIS Coordination Unit

Establish a sustainable GIS support organization with a small GIS Coordination Unit, headed by a full-time GIS coordinator that reports directly to the CT Chief Information Officer.

GIS Coordination Unit is responsible for:

- Coordination of GIS efforts throughout Connecticut state government
- Providing educational support and outreach services to GIS professionals, political officials, other state agencies, regional planning organizations and local municipalities
- Manage application development projects that are performed in-house or outsourced to private industry
- Build and maintain a statewide data repository to house framework data layers
- Provide some level of technical support to its GIS constituents
- Develop standards, templates and guidelines for metadata and "police" adherence to these standards by not allowing data to be loaded into the state clearinghouse without appropriate metadata

4.2.2 Initiative Based Funding

Develop sustainable funding through the identification of and alignment with statewide initiatives.

Some GIS initiatives, such as the CT Department of Emergency Management and Homeland Security (DEMHS) GIS have been successful because they are highly visible, and draw lots of interest. These large initiatives are not selling GIS; rather they are investing money on building the geospatial infrastructure to provide direct support to the initiative and other day-to-day activities. Positioning GIS funding requests in terms of strategic initiatives will increase the chances of obtaining funding. For example,

- The state needs address points in order to further enhance getting first responders to the correct location to save lives.
- The state needs statewide parcels for economic development, smart growth, open space preservation and brownfields

As part of the steering committee meetings and information gathering sessions a number of strategic initiatives were identified where GIS can be used for support. These are explored further in a companion document, "Business Plan for Funding Connecticut's Statewide GIS Program". These initiatives are:

- Managed Emergency Telephone Notification System (METNS)
- Education
- Health Care
- Human Services
- Land Preservation
- Homeland Security
- Public Safety/9-1-1
- Responsible Growth
- Brownfield Development
- Economic Development
- Transportation
- Utility System Infrastructure
- S.A.F.E. School Safety Initiative
- Streamlined Sales Tax Project (SSTP)
- Help America Vote Act (HAVA)

4.2.3 Framework Data Layers

Develop a core set framework data layers with standards that can be shared across state agencies and local municipalities.

This program goal creates a state spatial data infrastructure (SSDI) and supports the National Spatial Data Infrastructure (NSDI). Data layer development and accuracy and metadata standards are created and published. Data generated by local government efforts is aggregated in a coordinated way and published for wider distribution at a statewide level.

The CGISC data workgroup has determined eleven (11) categories of data that can be used and are important across all levels of government. These eleven (11) categories are:

- Administrative and Political Boundaries
- Imagery
- Cadastral
- Census and Demographics
- Critical Infrastructure
- Elevation and Bathymetry
- Geodetic Control
- Geographic Names and Places
- Hydrography

- Land Use and Land Cover
- Transportation

Of these categories four (4) specific areas have been determined through the strategy planning process as priority layers for the states SSDI.

- **Orthophotos** – georeferenced aerial photography
- **Parcels** – geographic representation of private and public real property
- **Street Centerlines** – full hierarchy of all private and public roads
- **Address Points** – specific point locations for all addresses

In addition to these four data layers administrative boundaries (in particular municipal boundaries) were also identified as a layer of great importance to the state. Currently there is no available statewide source for municipal boundaries and there are many known conflicts that exist along the boundaries of communities. It is recommended that a definitive administrative boundary layer be created and the CGISC should create a working group to develop a business plan for creating this layer.

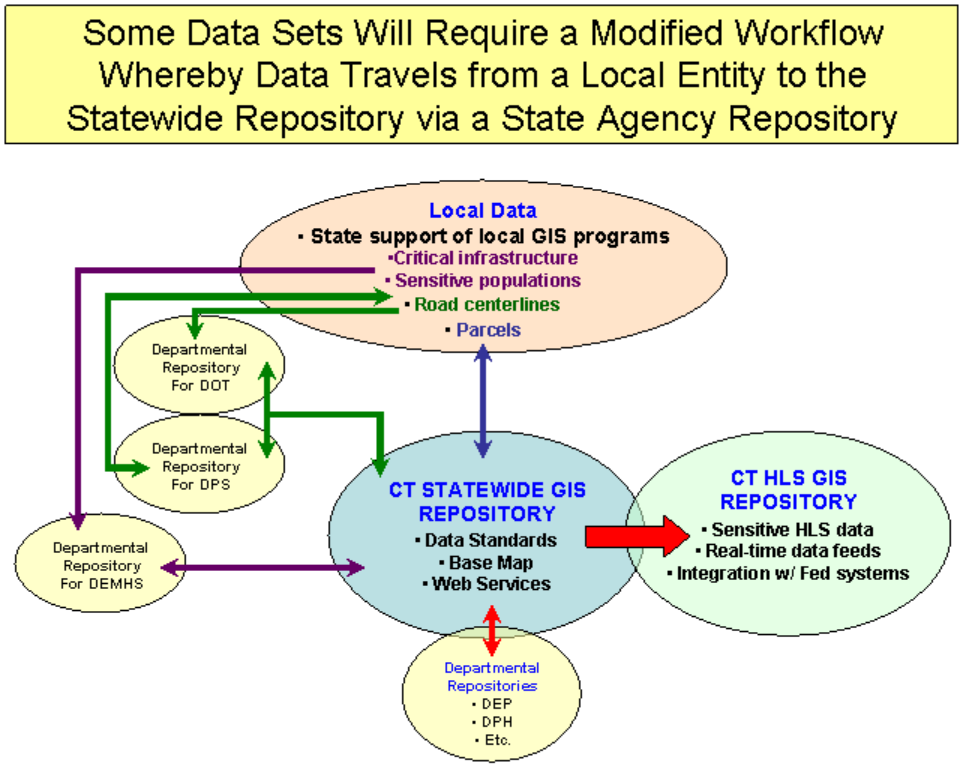
4.2.4 GIS Technology Infrastructure

A state clearinghouse to house the framework data layers should be created.

The core of this infrastructure is being established by the Department of Emergency Management and Homeland Security (DEMHS) project. Data are currently being developed, stored, and maintained in disparate departmental agencies in a disconnected manner. By creating an infrastructure that is broadly accessible to all levels of government and has the most recently published data, a greater degree of reliability, accuracy and efficiency can be produced in all GIS applications throughout the state.

A longer term requirement for the state GIS data repository is to track historical changes by archiving snapshots of key data layers at particular points in time. This would build a record of changes over time that would be useful for future planning and historical research.

The following diagram illustrates the workflow that might be put in place to populate the GIS data repository:



4.2.5 Enlist GIS Champions

Identify and build relationships with key champions, who support large high-priority initiatives.

A champion is a high-level decision maker who is knowledgeable on the use of GIS technology and willing to support and advocate for the use of the technology to improve business processes in the state. There are numerous active champions within Connecticut government who provide critical context and support for the execution of the council's strategy as it is used to support the areas they are responsible for. In addition to these active champions other key people have been identified who will likely support the use of GIS technology once they see appropriate applications for it. These people should be sought out and educated on how the technology can be used to support their needs so the CGISC can gain their support and the state can benefit as whole. By identifying champions that can benefit from GIS technology, building relationships with them, and educating them on the use of the technology, all users of the technology in the state will benefit from the achievements made by the group as a whole.

As the state's system matures it is advantageous to have multiple champions who have the same need (e.g. statewide parcel data), but for different goals. They each provide different perspectives and provide a positive influence to help the effort. For instance, one champion may support open space initiatives and this initiative requires statewide parcel data to help plan for future open space acquisition. Another champion that supports economic development also needs statewide parcels to

provide improved information to potential tenants looking for a place to do business in the State. Both of these needs can be served by creating a single parcel base that meets the requirements of both champions. Identifying programs where GIS technology can be beneficial and identifying and educating the people that are responsible for the program and are not aware of GIS technology is one of the important roles of the active GIS champions.

Educating and gaining the support of champions who are high-level decision makers has been proven to be a key to establishing sustainable funding for geospatial technology. If people understand the use of the technology, and use the technology to improve the business processes they are responsible for, then it is logical that funding will be provided to support the effort.

The high level political and executive champions who have a history of supporting the use of GIS technology for their organization's mission are:

- Lt. Governor, Michael Fedele, sworn-in on January 3, 2007 formerly Chairman and CEO of Pinnacle Group an information technology solutions and services provider
- Legislative leadership in both houses of State Government
- Secretary Robert L. Genuario, CT office of Policy and Management (OPM)
- Chief Information Officer Diane S. Wallace, CT Department of Information Technology (DOIT)
- Commissioner Skip Thomas, Department of Emergency Management and Homeland Security (DEMHS)
- Commissioner Gina McCarthy, CT Department of Environmental Protection (DEP)
- Commissioner John Danaher, CT Department of Public Safety (DPS)
- Commissioner Ralph Carpenter, CT Department of Transportation (DOT)
- Commissioner Michael Starkowski, CT Department of Social Services (DSS)
- Commissioner F. Phillip Prelli, CT Department of Agriculture (DAG)
- Commissioner Joan McDonald, CT Department of Economic and Community Development (DECD)
- Commissioner Raeanne V. Curtis, CT Department of Public Works (DPW)
- Chairman Daniel Caruso, CT Siting Council
- Director Dr. Louis A. Magnarelli, CT Agricultural Experiment Station (CAES)

4.2.6 Communication, Education and Outreach

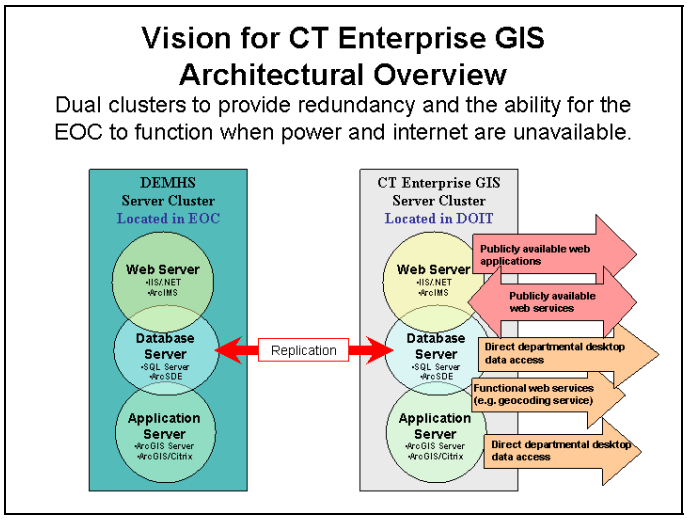
Develop a position within the GIS Coordination unit that focuses on outreach to champions, other state agencies, and all levels of the state's GIS community.

Effective coordination depends on sound communication, information sharing, and community involvement. Direct outreach to local municipalities is resource intensive and may tend to provide uneven service levels. A hierarchical approach that helps build an outreach capability through Regional Planning Organizations (RPO's) is recommended. This is further discussed in the Outreach and community Development Section of this document.

5 REQUIREMENTS

5.1 Inventory of Existing Infrastructure and Suitability Assessment

Below is a diagram that describes the GIS infrastructure recently implemented to support the DEMHS project. This architecture provides a scalable, redundant, infrastructure that can provide the underlying technology to support the various standards, coordination, and communications efforts described in this strategy.



The five main components of this enterprise architecture are:

Hardware and Software

Three separate GIS server clusters are used to provide on-line mapping services. One is located at the EOC and two are at DOIT (staging and production). The DOIT clusters provide redundant capacity to serve the Emergency Operations Center as well as departmental and public access to a GIS data repository.

Statewide Data Repository

The enterprise GIS database will serve as a definitive collection of Connecticut's spatial data assets. The repository will be highly structured, well-documented, and optimized for efficient data delivery.

Web Services Infrastructure

The data within the repository will be made available via a series of Web services. A Web service is a software system designed to support communications between two applications on separate computers connected to a network, such as the Internet. They allow web-based applications to share business logic with each other. These services implement industry standard application programming interfaces (APIs) to allow a

variety of systems to directly access GIS data. In addition to serving data, other services such as geocoding (converting addresses to geographic coordinates so they can be shown on a map), will be made available.

End User Applications

In a number of state agencies departmental initiatives are creating applications that are geared to solving the specific business problems within that department. At DEMHS applications such as flood response and emergency evacuation are being stood up to support their business needs. At the DEP applications such as the Site Information Management System (SIMS) and the Air Emissions Inventory Management System are being deployed. DOIT resources have created a Wild Bird Mortality Reporting application that allows the public to provide information used to research of pandemic influenza. Each of these departmental applications can benefit from and contribute to the overall state enterprise. This federated approach to an enterprise system is becoming more common.

Staffing and Management Support

New staffing within DOIT will oversee the Enterprise system and departmental staff within other departments will coordinate their departmental effort and specific departmental data and application development projects. The key to success of this approach is open lines of communication and coordination between the departmental coordinators and the State's coordination office.

5.2 Data Requirements

Most of the components contained within this strategic plan rely on a set of framework data layers. In keeping with the CGISC's goal of a uniform GIS capacity throughout the state, the highest priorities for data development are the data layers used at all levels of government. While most of the data required at the state level can be derived from aggregations of data collected at the local level (e.g. Parcels), it may be cost effective to acquire some data at a state level and make it available for regional and local purposes (e.g. Orthophotos).

Setting data development priorities and accuracy standards is a complex task, but an absolute requirement for success of a coordinated system. Priorities of the layers may shift depending on the task being performed and the entity performing the task so all stakeholder needs have to be taken into account during the planning process. There are a number for factors that affect scale and accuracy as well as data development priorities:

- Who is using the data? (municipal planner versus municipal engineer)
- What task is being performed? (Watershed analysis versus an engineering application)
- Where is the location of the area being mapped? (Data that is sufficient in a rural setting may not be accurate enough in an urban setting.)
- How often is the data updated? (Plan of development versus building permit)

- What resources are available for data development? (The smallest municipalities do not have time/resources to assist in data collection.)
- How far along with GIS implementation is the organization? (Some municipalities need base maps before fully utilizing automated parcel data.)

Much discussion took place around the scale that is needed on a statewide basis to support the varying number of users. Consensus was reached that base map data can be developed to a standard of 1:200 feet to meet many statewide needs, but it is necessary that the data be at a 1:100 foot scale to meet the broader local needs, such as supporting tax assessment. In some cases, even a higher level of accuracy may be necessary in urban area or for engineering applications. A concept, modeled after the Imagery for the Nation initiative, was discussed and is widely supported in which smaller divisions of government can "Buy-Up" to a larger scale of data to achieve a level of accuracy that is greater than the standard developed by the state. In other words, if the state funds the creation of orthophotos at a scale of 1" = 200 feet, and a municipality feels they need data at a scale of 1" = 40 feet, then the municipality can pay the differential between the cost of the 200 scale and 40 scale data. This creates equity for all, while still supporting the needs of disparate stakeholders.

Standards and accuracy are discussed further in the Standards section of this document.

5.2.1 CGISC Data Working Group Categories

The Connecticut Geospatial Council established a Data Inventory and Assessment Working Group in April 2006. This group was tasked with identifying framework datasets for Connecticut and establishing standards, policies and procedures for the collection and distribution of geospatial data. The working group expanded the 7 framework data layers established by the National Spatial Data Infrastructure (NSDI) into 11 geospatial dataset categories that are needed and in use in Connecticut. A voluntary sub-group comprised of council members and non-council members will focus on each category.

Administrative and Political Boundaries

This data category consists of the following types of boundaries: Official Political Boundaries (State, Municipality, County, Congressional Districts, Voting Districts, Borough and Independent Cities), State/Municipal Administrative and Analytic Boundaries, Census/Demographic and Planning Boundaries and Property Boundaries (federal, state, municipal, and privately owned properties). Data in this category are owned by the State Legislature and maintained by various agencies.

Imagery

This category contains four types of mapping imagery:

- **Base Map Imagery** - scanned and georeferenced digital copies of current and previously published maps including USGS topographic quadrangle maps and NOAA nautical charts.

- **Oblique Photo Imagery** - Georeferenced aerial photography (side view). Various potential aspects include color/black and white, leaf on/leaf off, etc.
- **Orthoimagery** - This category contains georeferenced aerial photography (bird's eye view) that provides a positional correct image of the earth. Geodetic control and elevation models are needed to create ortho images. Thus, orthoimagery supports the development of nearly all other map themes including, elevation, transportation, and critical infrastructure. Included are current and historic photography with various aspects: black and white, color, color infrared, leaf on, leaf off, etc. Orthoimagery provides a positionally correct image of the earth. Many geographic features, including those that are part of the framework, can be interpreted and compiled from ortho images. An example is the 2004 CT orthophotos.
- **Photo Imagery** - This category includes un-georeferenced aerial photography (bird's eye and side-view photos). Aspects include: black and white, color, color infrared with leaf on, leaf off, etc. Photos should include a photo index which provides a georeferenced photo center points. An example is the 1965 DEP photos.

Cadastral

Parcel mapping data represents the geographic extent of the past, current, and future rights and interests in real property including privately owned and publicly administered land: military reservations, state parks, and open space, etc. These property ownership boundaries are used and maintained by Municipal/City Assessors for each municipality in Connecticut. It is meant as a graphic representation of the field card information recorded by assessors displaying, at minimum, property boundaries, parcel id (Map/Block/Lot), and street names. Many municipalities have converted existing hardcopy maps to digital formats including GIS and CAD. The number of municipalities that have this information in a digital format is not certain, but is estimated at over 80%. In a digital format, it is possible to link the parcel property to the digital version of the assessor CAMA database (Computer Aided Mass Appraisal) system and perform more detailed analysis with the data.

Census and Demographics

This category provided by the US Census identifies the blocks and tracts and delineates population by region and demographic characteristic (age, ethnicity, etc). This data set is often too cumbersome to decode and sometimes it is aggregated at too high a level for municipal use. This factor makes this demographic data more useful to larger cities and towns than smaller rural communities.

Critical Infrastructure

This category represents assets that are considered to be critically important in the time of an emergency event such as a flood, hurricane, or other natural or man-made disaster. The following are the types of features represented in this theme:

- State and federal offices
- Municipal offices, police stations, firehouses

- Hospitals, clinics, EMS, nursing homes, emergency shelters
- Public Safety Answering Points (PSAPs)
- Mental health facilities
- Universities, colleges, high schools, middle schools, elementary schools
- Day care facilities
- Stadiums and conference centers
- Military and National Guard bases
- Emergency equipment and supply houses

Elevation and Bathymetry

This category includes data that measures the height of land surfaces and the depths of the ground surface below water surfaces. This includes natural and man-made structures (trees and buildings), spot elevations and contour lines.

Geodetic Control

The Geodetic control category is a database of current statewide survey markers and control points. This data has been collected by various government agencies and is developed and maintained under the direction of a licensed land surveyor. This category will serve as a georeference for the production of other geospatial themes. This category does contain control points collected by government agencies, but should be expanded to include data from contributing organizations. It provides a common reference system for the establishing coordinate positions

Geographic Names and Places

Georeferenced official names of natural, physical and cultural features such as bars, bays, beaches, channels, cliffs, falls, flats, gaps, hills, hill ranges, islands, lakes, ledges, points, populated places, reefs, ridges, rivers, rocks, swamps, cities, towns, valleys, etc.

Hydrography

Hydrography defines the system of fresh and saline surface water in Connecticut, neighboring portions of Massachusetts, New York, and Rhode Island, and Long Island Sound (extending south to Long Island, west to New Rochelle, and east to Watch Hill). The surface water system is comprised of natural and manmade features. Hydrography features include rivers, streams, brooks, reservoirs, lakes, ponds, estuaries, bays, harbors, coves, ditches, canals, aqueducts, dams, tidal flood gates, breakwaters, jetties, and shorelines. Hydrography also includes surface water monitoring, discharge and withdrawal locations such as stream gage and precipitation monitoring stations, industrial and water supply intakes, wastewater outlets, and culverts. Hydrography excludes intermittent water body, wetland, marsh, swamp, tidal flat, and submerged rock information acquired and maintained using other methods or data sources.

Land Use and Land Cover
Land use data defines the current use (vacant, residential, commercial, industrial, etc) of the land while land cover data details the cover type (paved, grass, water, trees, etc). Land use and land cover data is often derived from other data sets such as orthoimagery and is often stored in a grid pattern to expedite more complex analysis.

Transportation
This category contains major common features of transportation networks and facilities. It consists of spatial information and associated attribute data for the following modes of transportation in Connecticut: Public roads, railroads, ports and aviation. It can be used for urban and regional planning, disaster preparedness, service delivery, E9-1-1 emergency response, zoning, routing, and intermodal planning for the movement of goods and people.

5.2.2 Priority Data Layers

As part of both the steering committees meetings and the informational gathering sessions eleven (11) categories or layers were discussed and prioritized based on need and usefulness to all stakeholder groups. In addition the on-line survey provided further information about the usefulness of the data. The following table summarizes the results of the high-priority layers.

Percentage of respondents who have described a high need for this data *

Layer Name	All Respondents %	Government Entities Only - %
Digital Orthophotos	88	88
Parcels	77	91
Street Centerlines	79	88
Address Points	60	77
Hydrography	83	91
Administrative and Political Boundaries	66	69

* High need means they need this data to do their job

Although any one layer does have a high-level of importance to many of the groups, four layers have been identified as core data framework layers. These data layers are discussed in further detail in the business plan document.

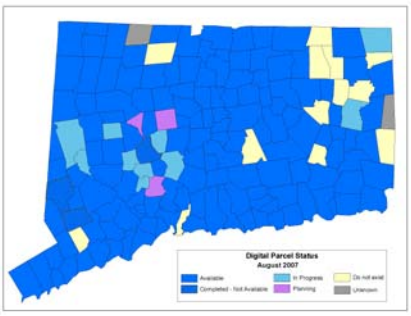
Orthophotos – *georegistered aerial photographs that can be used to create spatial accurate base map data. Orthophotos have a wide number of uses in GIS from providing background map detail to in-depth data development such as land use.*

Orthophotos are expensive to generate. This is one data layer where is it very cost effective to share data development costs. Various resolutions

and scales can be used for different needs. Coordination of effort is necessary to ensure that all users' requirements are being met at a minimum of investment. The ability exists for the state to coordinate a flyover program that produces data at one statewide scale and allow for participating municipalities to add additional money to create larger scale imagery during the same data collection process.

Historic photos are important to large number of stakeholders who need to perform historical research and analyze change over time. An archive of all versions of orthophotos available within Connecticut should be created

Parcels – *cadastral data, collected at the local level that identifies the geometric shape for a given piece of real estate property. Used for tax valuation and a variety of planning and mapping purposes.*



Parcel data is collected at the municipal level. There are many issues related to the aggregation of data to produce a statewide layer. The methods of data creation and updates as well as the actual attribute data collected differ from municipality to municipality. There are numerous examples of spatial conflicts such as a common boundary being defined differently by two adjoining municipalities.

Street Centerlines – *a core set of layers showing the full hierarchy of roads throughout the state from private roads to interstate highways. Centerlines are used for a variety of purposes from geocoding addresses to route determination.*

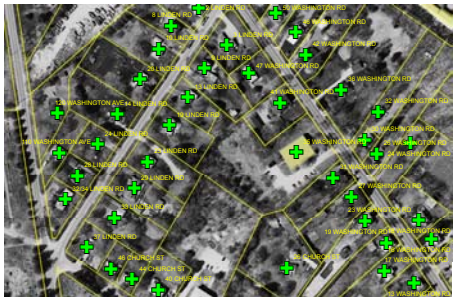
The DOT maintains and re-inventories the public roads each year. The centerline update process is in place, although incremental process improvements are needed based on feedback from stakeholders. A subgroup of the CGISC data workgroup is currently working on a data model and plan for improvement in this area and has completed a pilot project to test their process.

Two other issues raised during the sessions are:

- Data is needed to create routes for over-sized and over-weight vehicles.
- Data about private roads is not currently collected. There are cases, such as some constructed subdivision roads, where the as-built documentation is not to an acceptable standard and is therefore not added to the centerline file.

Address Points – *a point layer that identifies a specific point for a particular address such as a rural driveway, an urban condominium entrance way, or the actual centroid of the building for the site address for any given physical address in the state.*

Currently only a small number of communities have address points for the structures in their community. Many communities use the centroids of their parcels as a low-cost substitute for a physical structure address point. These centroid points have no direct correlation to building or buildings that sit on the parcel. For smaller parcels a parcel centroid may be placed within the building footprint, but on larger, more rural parcels, the centroid may often be far from any buildings. Also, if multiple buildings exist on a parcel, they are not properly represented by this method. There is risk that emergency responders will be misdirected if parcel centroid based address points are used for dispatch.



One option the state has is to create an address point layer of their own by digitizing point locations on top of aerial photos, GPS locating structures in the field, or performing a combination of both of these approaches. A pilot project has been started using the draft FGDC addressing standard to determine the statewide needs.

Two potential commercial address point sources were also discussed:

- Commercial providers such as TANA, NAVTEQ, or Group 1 will provide less expensive parcel centroid based address points. These companies are in the process of collecting parcel data for Connecticut that could be used for more accurate geocoding. This data set, like their street centerlines, would likely be owned by the company and provided through a license agreement.

- AT&T address point data is also available. AT&T has discrete point locations for each building or structure in the state, but no address data is currently attached to these points. In addition, past licensing practices may limit the usefulness of this data. Based on recent discussion with AT&T this may become more accessible as their business model continues to be modified.

In addition to these two named sources there are a number of other commercial sources that are available. A key point that was raised with this dataset and street centerlines is that the state retains ownership of the products.

5.2.3 Secondary Data Layers

Additional data layers were identified by users during workshop sessions as being important to a single or a small number of user constituencies. These are important layers, but are not of primary importance across many user groups. They are listed here to track the needs expressed. However, they are not part of the primary framework data layer set and will not be addressed in the business plan.

Municipal Boundaries Layer

At the current time there is no official administrative boundary layer for the municipalities in the state. As a result, most municipalities have mapped their digital

parcels based on the tax assessor's tax maps. When matching these boundaries from community to community there are often discrepancies (gaps or overlaps) between towns that are adjacent to each other. These overlaps can create instances where a homeowner is being taxed on the same property in multiple towns. In addition, in areas where gaps exist, a community may be losing tax revenue because the owner is not being appropriately taxed by either community. The state should create an official administrative boundary layer for all municipalities to definitively define these boundaries and to create equity for all citizens in the state.

Hydrography

Note that the survey results, shown in the table above, indicate that hydrography data is ranked as the second highest need of all geospatial data. With that said, this layer never came up in any discussions that took place at the information gathering sessions.

Affordable Housing

This layer identifies the locations of affordable housing and provides status (intact, vacant). This is tied to Federal funding.

Utility Infrastructure

Complex layers of sensitive data. Utility companies are not currently represented on the CGISC, but many users expressed the need for these layers as they are an important resource that should be made available.

5.3 Technology Requirements

An enterprise GIS strategy for Connecticut needs to support adoption and integration of GIS at all levels of government. This strategy serves to advance GIS efficiency and capability. The following describes some of the technology requirements that full implementation of this strategy will address.

Spatial Data Clearinghouse

The state should provide a spatial data clearinghouse that contains the most recently published data available within the state. A geospatial data catalog should be developed and managed by the GIS Coordination Unit. Data that resides in the clearinghouse should be made available for use by all GIS users throughout the state via a series of web services with an FTP download site and physical CD/DVDs providing additional data transfer backup capability.

Develop Data Maintenance Procedures

To maintain a single authoritative data source, multiple agencies may need to work together to maintain a dataset prior to a new version being made available across the enterprise. For example, DOT may be responsible for updating the street segments of the statewide road centerline file, while DPS would have responsibility for the local roads and for keeping attribute data, such as address ranges or points, updated. Currently, these two agencies are maintaining non-identical but somewhat overlapping duplicative datasets. Municipalities are also the first ones knowledgeable of new roads that are constructed and approved in a community, thus they also need

to be involved in the process. Establishing clear protocols and responsibilities for data maintenance on a layer-by-layer basis across the enterprise will encourage the use of authoritative data while reducing data duplication and maintenance efforts.

Web Services Infrastructure

Capitalizing on Web services is an important part of an overall enterprise GIS architecture. Web services deliver content and/or capability to an application rather than to an end user. The state should publish a series of Web services that could be consumed by individual agencies or authorized third parties (e.g., individual municipalities) that build their own applications. Web services should deliver both data (e.g., Web services for providing access to the state orthophotos) and functionality (e.g., a geocoding service that would return the latitude/longitude of a submitted address). Ultimately, using Web services will both increase the efficiency of application development (e.g., several individual agencies would not need to redundantly build a geocoding capability), and they will help establish the enterprise GIS as the authoritative data source for Connecticut.

To support the broader adoption of these Web services, the state needs to publish the appropriate Web service interface documentation. The state's application programming interfaces (APIs) should be based on existing standards such as those developed by the Open Geospatial Consortium (OGC: a non-profit, voluntary organization that is leading the development of geospatial standards).

Support Standards Development

The development of data and metadata standards to support the easy exchange of data across all levels of government tiers is required. Having data that originates from multiple diverse sources, but uses common data standards greatly assists in the consolidation of these datasets into a seamless, statewide spatial data layer. This model should also be extended to include non-spatial data such as land-use codes.

Metadata is data that describes the contents of a dataset (e.g., the source, accuracy, method used for creation and the date of creation). Metadata is critical for the process of data sharing, especially across organizational lines. Without good and comprehensive metadata, data consumers may not know enough about a dataset to determine its appropriate uses. As with Web services, there are several existing metadata standards available at the federal level that Connecticut should adopt and adapt as appropriate.

Another aspect of standards development is helping municipalities bring their data up to the state standards. The state should provide technical assistance to explain the standards, hold training sessions, and perform one-time conversions of existing municipal data.

Web Viewer Development

The State should build a basic state data viewer for local use by small municipalities to access the statewide repository. A viewer similar to what MassGIS has developed called Oliver is what is envisioned for the state. Communities with more complex

needs and greater resources can develop more advanced capability locally. The development and deployment of the enterprise system components (including Web services, authoritative data sources, data standards, metadata, etc.) will support the ready development of one or more simple Web-based data viewers. This will be of great value to many smaller communities that cannot afford to implement their own GIS. Without their own local GIS datasets, these entities can gain ready, online access to the state's best available data for elements such as aerial photography, natural resources, and transportation to aid in local planning.

Technical Assistance and Training

Based on the on-line survey results the GIS Coordination Unit resources should provide technical advice to constituents in the outreach hierarchy including:

- Organized training:
    - Advanced Desktop GIS
    - Introduction to Server GIS
    - Advanced Server GIS
    - Introduction to relational databases
    - Advanced relational databases
    - Basic and advanced GIS programming
    - GIS field data creation
    - Geocoding
    - Data management and editing
    - Cartography and map making
- Technical assistance and problem solving
- Guidance on building data layers
- General GIS Education seminars

5.4 Standards

5.4.1 Defining Standards

A large amount of data is being collected across the state, but much of it is not accessible on a statewide basis because it is stored in varying, inconsistent formats. The creation of common standards would allow for easier integration of data and enable the building of a single data repository. Standards are critical and need to be in place before data development efforts will yield effective results.

Defining data standards is not as important as having a standard and consistently using it. Often efforts to build unique data standards yield an end result that is very similar to other existing standards. Federal standards already exist and should be followed unless there are specific reasons why a separate standard should be developed. Sometimes federal data standards must be met to receive federal funding (HSIP). In other cases, there is no practical reason to not use a national standard unless the data set created is meant for a different purpose. For instance, the National

Hydrology Data shows a complete nation-wide line network with flow direction and reach codes. This is excellent for modeling applications, but it is not a practical standard when cartographic output is desired.

Investigate Other Standards

An early task for the GIS Coordination Unit should be to investigate standards that are in place in other states. The Unit should also work closely with the data development working group of the CGISC. Group members are volunteers, but have a vested interest in seeing coordinated efforts for collecting and publishing standardized data. A statewide parcel layer has been identified as the highest priority for development of a standard. All other New England States have adopted a parcel standard that was based on the one established by MassGIS years ago and this standard should be looked to as a model template.

Local municipalities often do not have the resources to create and maintain local standards. Often they are willing to follow a standard if presented with one. When asked local government agencies that do not have a parcel standard said they would use it if it existed. Those that already have parcels said they would comply with or migrate to the standard, but incentive funding needs to be provided to support this effort. The State should implement a parcel grant program similar to the Massachusetts program to expedite creation of a statewide parcel layer.

On water projects, federal dollars are often given directly to local municipalities for work that is not in line with state standards. State guidance should focus on how to build infrastructure to state standards, not on what projects to fund.

This strategy also recommends the creation of standards that define electronic submission requirements. These standards would allow for local data collection that can easily be aggregated into statewide layers. The following layers should be priorities for electronic submission standards development.

- Parcels (subdivision plan submissions)
- Digital CAD Submission Standards
- New Street Construction (Centerlines)
- Utility Systems

A data distribution policy standard is another high priority area of focus. There are numerous issues involved with Freedom of Information Act requests in Connecticut. Standards and clarification of policies that exist would be of particular help to local municipalities who are dealing with requests for data. This set of standards should be encoded in either state policy or adopted by the legislature where appropriate.

5.4.2 Incorporating Non-standard Data

Existing data that does not meet a state GIS standard can still be incorporated into the repository through the use of Extract, Transform, Load (ETL) procedures that are tailored for each individual data source. These procedures are easily modified and can

be reconfigured over time as sources migrate toward the standard. The Capital Region Council of Governments (CRCOG) has recently created a data viewer that displays parcel data from its 29 member cities and towns. Each municipality's parcel and Computer Aided Mass Appraisal (CAMA) data was collected in its native, local electronic form. CRCOG has an ETL procedure for each municipality that reads the data and imports it into a CRCOG standard format. Over time, when the municipality changes the form of the data submitted, that municipality's ETL procedure can be modified to map to the new format. This is a viable approach for the state until a standard is in place and adopted by all entities.

5.4.3 GIS Coordination Unit Transformation Services

Municipalities may not have a need for a standardized format, but would be willing to use a format that maps to a state standard. However, they may not have the resources or capability to convert their local data to a state standard. There may be cases where the GIS Coordination Unit or RPO's performs data transformation services for local municipalities. Local data should be transformed to a standard and then given back to the municipality in an updated format. From this point forward, local changes would be easy to incorporate since it would already be in state format. The only concern that a community may have is if they have built applications to run off of the data in the old format. These applications would need to be modified to work with the new data format.

5.4.4 Scalability and Accuracy of Data

The National Map Accuracy Standard (NMAS) dictates accuracy of data required for various map scales as one-fortieth of the mapping scale or:

Scale	Accuracy
1:40'	1'
1:100'	2.5'
1:200'	5'
1:400'	10'
1:1000'	25'
1:2000'	50'

The scalability and accuracy of data are two issues with many variables. There may be different standards for data accuracy at different scales. Some examples of scale related issues include:

- 1:24,000 (1:2000') scale is a standard for USGS topographic maps and recognizable and used for many purposes.
- Street centerline data developed by private vendors is tuned for business use and may not be accurate for municipal and state work.
- Stream data may not align directly with orthophotos, making them less than ideal for local use, but sufficient for statewide analysis.

- Localities may have a "local resolution" that is higher than data collected at a statewide level

All of these factors influence the definition of data standards. Standards should be seen as a functional template, rather than a description of cartographic accuracy. Accuracy requirements also vary depending on use. Generally, the smaller the governmental unit, the higher degree of accuracy that is required. Also, the more densely populated the area, the higher level of accuracy that is required. Some applications need better accuracy than others. For example, statewide analysis of hydrology can be performed with higher scale data 1:2000 feet, while local wetlands protection requires a significantly greater degree of accuracy 1:40 feet. Also, some data layers need better accuracy depending urban/rural nature of the location being mapped.

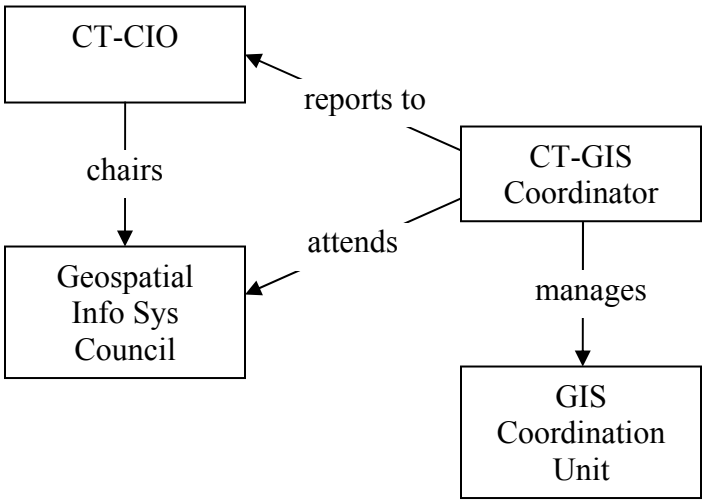
The following table summarizes key layers that were discussed as part of this project and the scale that was determined to be appropriate for each layer.

Layer Name	State		Regional		Local	
	Priority	Accuracy	Priority	Accuracy	Priority	Accuracy
Cadastral Information	M-L	200	M	200	H	100
Basemap Imagery/ Orthoimagery	H	200	H	200	H	40-100
Address Points	H-M	100	M	100	H	100
Transportation Centerline	H	200 *	H	200	H	100
Hydrography	H	2000	H	200	H	100
Geodetic Control	L	40+	M	40+	H	40+
Elevation Bathymetry	H	200	M	200	H	200
Utilities	H	200	H	200	H	40+
Census And Demographics	H	2000	H	2000	L	100
Critical Infrastructure	H	200	H	200	H	200
Administrative Boundaries	H	2000	H	200	L	40-100

* Same as Orthoimagery

5.5 Organizational Needs

This figure shows the relationships between the GIS organizations described below.



5.5.1 Geospatial Information Systems Council (CGISC)

The CGISC's function is to coordinate GIS capacity throughout the state and promote a forum for collection and distribution of geospatial information. As a public institution, the council is responsible for being the definitive source of information about coordinated GIS activities throughout the state. The council also sets priorities to target funding initiatives that will benefit all stakeholder groups.

Currently the chairperson of the CGISC is appointed by the Governor. The Chief Information Officer (CIO) of the State is the current chair of the council. It is a recommendation of this strategy that the CIO role should be permanently formalized as the chairperson for the CGISC. This is important because the involvement and relationship of the CIO with the CGISC is considered to be one of the keys to successful coordination as recommended in the nine criteria for successful statewide coordination in the Fifty States Initiative. The CGISC might lose important effectiveness if someone in a role other than the state's CIO is appointed chair by either the current or some future governor.

Council Membership should be reviewed to determine if the council should be expanded. Currently, utility companies (telephone, electrical, gas, and water) are not included in council membership. Utility companies are large users and potential GIS data providers for Connecticut. This strategy recommends adding utility representation to the council. In addition, there are some significant state agencies that are using GIS but are not represented on the council. Coordination with state agencies would be improved if additional membership included:

- Connecticut Department of Mental Retardation (DMR)
- Connecticut Department of Correction (DOC)
- Connecticut Agricultural Experiment Station (CAES)

The NSGIC has conducted a survey of other state GIS Councils and has published statistics of council memberships. Two numbers are presented: the percentage of

councils that have extended voting rights to certain organizational entities; and the **additional** percentage of councils that have extended invitations to attend as non-voting members:

- Private sector – Official voting member 27%, non-voting, an additional 38%
- Federal agencies – Official voting 27%, non-voting, an additional 33%
- Utility Companies – Official voting 26%, non-voting, an additional 55%

In addition to these presented modifications to the CGISC membership additional working groups could also be established to better coordinate special interest groups. One example of this that was identified was human services. A committee could be established to address this need. This committee could:

- Create a forum for public and private human service agencies to address the special needs of human service populations. This would include state agencies, municipal agencies and non-profits like Infoline.
- Determine resources currently available and needed in the future to coordinate with the work of the council. Many human services agencies may not even know of the Council
- Promulgate standards and data relevant to social service agencies.

5.5.2 GIS Coordination Unit

Positioning the GIS Coordination Unit within the CT DOIT organization matches the industry trend of integrating GIS services into IT organizations. This supports a business model where common services are shared across the entire enterprise.

The GIS Coordination Unit should drive data and related coordination efforts that could realize budgetary savings. For instance, in the hypothetical situation where three agencies have scheduled flyovers, the GIS Coordinator should percolate the need for coordination up the organization and convene appropriate meetings to develop a common set of requirements that might produce the same or better results, for the same investment.

As the GIS Coordination Unit builds it abilities to coordinate various GIS activities across the state, manage outsourced projects, and build a data repository, it is also important that the unit be able to produce as well as manage. This is especially important in the early years of implementation when the unit develops its reputation.

The unit should fulfill the following GIS roles:

- Inventory and coordinate federal, state, and local government geospatial activities
- Gather needs across state agencies and determine priorities for statewide GIS development efforts.
- Review all geospatial related purchases for DOIT

- Coordinate assignment of the state's NSGIC representative. This should be a Coordination Unit staff member or, by agreement, the representative could be assigned from a municipality or another state agency.
- Coordinate data development efforts within various departments with the work of the Council's Data Inventory Working Group
- Coordinate development of the framework data layers including maintenance protocols and ownership responsibility
- Build and maintain the statewide data repository and geospatial data catalog
- Provide data transformation services to help local municipalities bring their data up to the state standard
- Act as project manager for application development efforts performed internally or by outsourced private industry on-call resources
- Develop and implement communication and outreach programs and plans
- Develop educational materials that support outreach programs
- Publish API documentation for Connecticut's web services infrastructure
- Retain some application development and other hands-on GIS expertise to provide technical coordination and support to state agencies and to the outreach hierarchy.
- Establish standards, develop templates for, and "police" the creation of appropriate metadata for GIS data in the state

The steering committee and CGISC discussed the need for a full-time programming staff within the GIS Coordination Unit and it was decided that it is not required for a number of reasons:

- A federated system of developers within the various agencies formalized with agreements can be drawn upon to provide some application development to all agencies. However most agencies are end-users of GIS and not technical developers.
- Other DOIT programming resources already exist and can be used to provide programming services for GIS applications.
- Development of framework data layers is a much higher priority than application development at this time. Resources should first be spent on the development and maintenance of a data repository.
- Outsourcing the development of applications is the current practice of almost all large-scale development projects in the state. Maintaining a full-time programming staff and training requirements requires a significant investment by the state may not be the most cost-effective approach.

With that said there can also be significant benefits to the State internalizing programming functions, and there is a desire of the CGISC to add this capability over the longer-term.

5.5.3 State GIS Coordinator

Recent efforts have established a State GIS coordinator Role. The State GIS Coordinator was appointed by the CIO and manages the GIS coordination Unit. The GIS coordinator is not a member of the CGISC, but attends council meetings, and chairs the meetings when the CIO is not available. It is critical to the success of this strategy that management of the GIS Coordination Unit be the sole responsibility of the state GIS Coordinator.

This person would act as the overall program director for the enterprise GIS once it is built and will oversee the three functional areas described above including the setting of statewide GIS policies and procedures. This person should also function as the enterprise GIS project leader. Due to the fact that it is recommended that Connecticut create a small, tight enterprise GIS team as opposed to a large, centralized GIS department, it must be recognized that the Connecticut GIS Coordinator will not merely be a program executive. Rather, this person will require diverse skills and will likely be directly involved in covering one of the three primary functions of GIS technology management: system administration, GIS and internet application development & management, spatial data warehouse administration

The state GIS Coordinator should possess the following skills:

- Strong communicator
- Experience managing personnel within a government bureaucracy
- Experience with intergovernmental coordination
- Experience conducting government procurements and contracting
- Strong project management and leadership skills
- Strong technical background in geospatial technology
    - Hands-on ESRI GIS software skills
    - Experience with geospatial data development
    - Experience with related technologies such as GPS, image processing, and CAD
    - Experience with GIS/Web GIS programming or management of application development
    - Experience with implementing GIS data standards

- Strong technical background with general information technology
    - Web development and Web services
    - RDBMS administration
    - Wireless and mobile computing

5.5.4 Centralized GIS Staff Reporting to the GIS Coordinator

A single GIS Coordinator can not effectively cover all of these responsibilities. The coordinator must have access to support staff. It is recommended that four people be assigned to work under the GIS Coordinator to cover the technology management, agency GIS functional support, and GIS outreach.

Any new positions are required to be in line with state job descriptions and classifications. Both the coordinators and the technical positions have suitable state descriptions that are on par with the Information Technology industry. However, the Geospatial Technology Manager/Database Administrator position requires special skills to manage geospatial databases. Back-end data processing, including the verification of ETL procedures require a full-time position that will prove more difficult to fill than the other positions. In addition, overall industry demand may attract trained state-level technical resources causing turnover related issues.

The State should review the GIS job descriptions and classifications to assure that they are on par with industry standards for pay grades to attract the most technically experienced staff.

The following describes the four positions that are recommended to be created, and the roles and responsibilities of each of these positions:

Geospatial Technology Manager/DBA
This position would oversee and administer the key technology components of the enterprise GIS including the enterprise GIS server clusters. This position is highly technical in nature, and the person should possess the following skills:

- Strong Microsoft operating system and network administration experience
- Microsoft IIS Web site administration skills
- SQL Server database administration experience
- Strong ESRI server software administration skills
  - ArcSDE database administration
  - ArcGIS Server Web site and Web service administration
- Programming/Scripting skills with tools such as VisualStudio .NET (e.g., C#, Visual Basic .NET), Python, Java, JavaScript, XML, and so forth.

Enterprise GIS Analyst (2)
These positions would work closely with the GIS Coordinator and other state agency GIS personnel to initially help support the adoption of the enterprise GIS architecture. Over time, these positions would help new state agencies come online to use the enterprise GIS infrastructure and would help directly support state agencies that do not possess their own GIS staff. These positions would be strong hands-on users of GIS technology and should possess the following skills:

- Strong communication skills
- Project management skills
- Strong hands-on skills using ESRI's ArcGIS software for data editing and high-quality cartography
- Experience with ESRI server software
  - Working with ArcSDE to load data
  - Working with ArcGIS Server to create map services
- Experience with related technologies such as GPS, image processing, CAD, and mobile computing
- Strong end user relational database management skills (e.g., SQL)

GIS Outreach Coordinator
This position will work closely with the GIS Coordinator, other state agency GIS personnel, as well as regional and local government GIS personnel. The main job functions include promoting the work of the GIS Coordination Unit and making sure that GIS users throughout the state are informed of the technical and data resources available from the state. This will be done by developing and implementing communication and outreach plans. The elements of these plans are discussed further in the Outreach and Community Development section of this document.

Connecticut will need to decide how to fill these positions described above and whether these are newly created positions or potentially transfers of responsibility for existing personnel. In all cases, it is important that these staff members report directly to the GIS Coordinator so that there is an unequivocal focus on maintaining and sustaining the enterprise GIS.

5.5.5 Policy and Legal

Protected Data Legislation
There are many issues surrounding data that can be addressed at either the state executive (through regulatory guidance) or legislative levels. Freedom of Information (FOI) issues are becoming a large issue in Connecticut as well as around the country. Recent rulings have suggested that municipalities need to provide data in the format requested at a potentially high cost. If a municipality has an ordinance in place governing it policies for providing copies of data, it is far more likely that cost recovery can be achieved. As these ordinances are being tested, state regulations on data distribution are being upheld.

The State Department of Public Works (DPW) currently has the authority to determine which municipal and state data is exempt for the Freedom of Information Act (FOIA). As of October 1st, 2007 new legislation goes into effect that moves the responsibility for exempting municipal datasets from the DPW to the DEMHS. With this new regulation state data exemptions still remains with the DPW department.

Utility companies, in particular, are reluctant to share their data for a number of reasons. These data sets are of a proprietary nature and are valuable to competitors. In addition, companies are concerned about liability issues should incorrect or

obsolete data be used to make a decisions and a decision is made based on the data that results in an accident or death of a first responder or citizen. Data providers, such as utility companies, are reluctant to share because of these reasons, as well as security reasons and they need to know where there are protections in place before they are willing to share their data.

The Legal and security working group of the CGISC should perform a number of tasks in this area that would be valuable to the stakeholders:

- Review existing legislation and make recommendations for changes
- Propose new legislation
- Educate stakeholder community on existing legislation, policies, and best practices
- Create a repository for information on distribution of Geospatial data
    - Past FOI cases and rulings
    - Process for exemption of GIS data with DPW, DEMHS
    - Identify past data sets that have been exempted, and those that have not
- Potentially standardize fee structure for distribution of data to requestors

5.5.6 Funding Related Issues

Given the reality that budget requests are often reduced in size, it is recommended that the plan encompass the full-built out GIS Coordination Unit that can be implemented in stages. All positions can be filled as budget becomes available. It is important that the unit be initially staffed with enough resources to be able to show early successes.

Blanket Contract Authority

The GIS Coordination Unit would have the authority to enter into contracts, but significant time and effort is required to make this happen for GIS related functions and it often is not in a timely manner. This process would be more effective if the State of Connecticut established a GIS blanket contract process. The overall contract would be negotiated with a small group of approved companies, and then individual task orders could be issued without the need for complex contract negotiation and approval processes. This is already done for many IT functions in the State of Connecticut.

Sustainable Funding Importance

It is difficult to sustain an organization such as the GIS Coordination Unit without being funded as a budget line item. Initiative only funding runs the risk of being eliminated forcing the reduction of staff and or services provided. Initiative based funding might provide for initial and incremental improvements to the GIS infrastructure. However, long-term viability of the GIS staff can only truly be assured by creating a permanent budget.

Funding Strategic Goals

A separate companion document titled "Business Plan for Funding Connecticut's Statewide GIS Program" details a list of initiatives and budget requirements necessary to implement the goals and vision of this strategic plan.

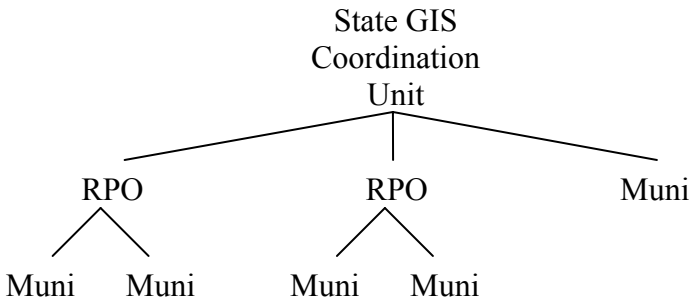
5.5.7 GIS Community Outreach and Communication

Previously, there has not been a strategic focus on determining the needs across all levels of Connecticut government (State Agencies, RPOs, and municipalities.) Current activities are performed on an ad-hoc basis. Smaller communities tend to work through the RPOs, while larger communities have the resources to work directly with the state. During the information gathering sessions the single most important issue emphasized by all groups was to increase the effectiveness of communication with stakeholder groups.

This strategy proposes that the GIS Coordination Unit develops and maintains a communication plan as part of the larger community outreach plan. Properly implemented these two plans will create an atmosphere of open dialogue and bidirectional flow of information with all stakeholder groups

These two functions (communications and outreach), while working with the same people and organizations are distinct and different. A communication plan routinely identifies and transmits messages about current and future events as well as summaries of past events. Also included in a communication plan is notification and documentation of decisions made and standards that have been set. On the other hand, outreach is more proactive program of engaging the community to provide guidance and identify opportunities available. Create an atmosphere of open dialogue and bidirectional flow of information with all stakeholder groups

Since there is no county government in the state, an outreach program that would have face-to-face contact with all cities and towns at least once a year would require 169 working days. This is nearly an entire working year. An alternative approach would establish or utilize an easily understood hierarchy with known points of contact to reach all levels more effectively. A model such as the following is recommended:



This section outlines some of the elements that can be used to support both an outreach and a communication plan.

Municipal GIS Coordinator Contact List

The lead GIS practitioner's role varies by municipality. It is important to maintain a correct list of current contacts and have a policy in place to collect updates and periodically review the contact list. For some municipalities, the primary GIS contact may be in the engineering department, for others the contact may be in the assessing or planning department. If a few cases, there may be a separate GIS department. A process should be developed to build a GIS coordinator contact list. This process should include a periodic review to ensure that the information remains current. This process could be modeled after the existing process that manages an E9-1-1 coordinator for each municipality. E911 has the legal responsibility to maintain a list of municipal E911 coordinators that are identified by the Chief Elected Official. This contact should be made publicly available on the CGISC web site.

Conference Outreach

Municipalities often attend various conferences. These venues provide a good opportunity to perform outreach functions.

- Connecticut Chapter of the American Planning Association (CCAPA)
- Connecticut Conference of Municipalities (CCM)
- Connecticut Chapter of the Institute of Transportation Engineers (ITE)
- Connecticut Chapter
- Connecticut Association of Land Surveyors (CALS)
- Connecticut Association of Assessing Officers (CAAO)
- Connecticut Council of Small Towns (COST)
- Connecticut Fire Chiefs Association (CFCA)
- Connecticut Association of Chiefs of Police (CACP)
- Connecticut Government Management Information Sciences (GMIS)
- Public Works

Newsletter

The GIS Coordination Unit should regularly publish a newsletter that details current GIS related activity within the state. This can be used to promote new applications and services available, announce new submissions to the data repository, list upcoming events, and highlight new educational material available. This is typically done by other states on a monthly basis.

Educational Materials

The GIS Coordination Unit should create standard presentations or materials for use in education about the use of GIS in the state. These should be on a variety of subjects from "GIS 101" presentation to community groups to detailed documents that explain the web services architecture.

User to User Group

The User to User group is a large diverse group of GIS practitioners with a variety of disciplines that represents a diverse set of organizations. There is no formal connection between the CGISC and the existing Connecticut GIS User to User group. However the GIS Coordination Unit's communication and outreach efforts should provide frequent and regular updates to this group. User to User members are welcome to attend the open CGISC meetings, but they are two different groups with two different audiences.

6 IMPLEMENTATION PROGRAM

A separate companion document titled "Business Plan for Funding Connecticut's Statewide GIS Program" details a list of initiatives and budget requirements necessary to implement the goals and vision of this strategic plan.

7 APPENDIX

7.1 Summary Results of 2006 NSGIC State GIS survey

http://www.surveymonkey.com/Report.asp?U=234318384321

7.2 House Bill 7502 enacting the CT Geospatial Information System Council

House Bill No. 7502

June Special Session, Public Act No. 05-3

AN ACT CONCERNING THE IMPLEMENTATION OF VARIOUS BUDGETARY PROVISIONS.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Sec. 84. (NEW) (*Effective from passage*) (a) There is established a Geospatial Information Systems Council consisting of the following members, or their designees: (1) The Secretary of the Office of Policy and Management; (2) the Commissioners of Environmental Protection, Economic and Community Development, Transportation, Public Safety, Public Health, Public Works, Agriculture, Emergency Management and Homeland Security and Social Services; (3) the Chief Information Officer of the Department of Information Technology; (4) the Chancellor of the Connecticut State University system; (5) the president of The University of Connecticut; (6) the Executive Director of the Connecticut Siting Council; (7) one member who is a user of geospatial information systems appointed by the president pro tempore of the Senate representing a municipality with a population of more than sixty thousand; (8) one member who is a user of geospatial information systems appointed by the minority leader of the Senate representing a regional planning agency; (9) one member who is a user of geospatial information systems appointed by the Governor representing a municipality with a population of less than sixty thousand but more than thirty thousand; (10) one member who is a user of geospatial information systems appointed by the speaker of the House of Representatives representing a municipality with a population of less than thirty thousand; (11) one member appointed by the minority leader of the House of Representatives who is a user of geospatial information systems; (12) the chairperson of the Public Utility Control Authority; (13) the Adjutant General of the Military Department; and (14) any other persons the council deems necessary appointed by the council. The Governor shall select the chairperson from among the members. The chairperson shall administer the affairs of the council. Vacancies shall be filled by appointment by the authority making the

appointment. Members shall receive no compensation for their services on said council, but shall be reimbursed for necessary expenses incurred in the performance of their duties. Said council shall hold one meeting each month and such additional meetings as may be prescribed by council rules. In addition, special meetings may be called by the chairperson or by any three members upon delivery of forty-eight hours written notice to each member.

(b) The council, within available appropriations, shall coordinate a uniform geospatial information system capacity for municipalities, regional planning agencies, the state and others, as needed, which shall include provisions for (1) creation, maintenance and dissemination of geographic information or imagery that may be used to (A) precisely identify certain locations or areas, or (B) create maps or information profiles in graphic or electronic form about particular locations or areas, and (2) promotion of a forum in which geospatial information may be centralized and distributed. In establishing such capacity, the council shall consult with municipalities, regional planning agencies, state agencies and other users of geospatial information system technology. The purpose of any such system shall be to provide guidance or assistance to municipal and state officials in the areas of land use planning, transportation, economic development, environmental, cultural and natural resources management, the delivery of public services and other areas, as necessary.

(c) The council may apply for federal grants and may accept and expend such grants on behalf of the state through the Office of Policy and Management.

(d) The council, within available appropriations, shall administer a program of technical assistance to municipalities and regional planning agencies to develop geospatial information systems and shall periodically recommend improvements to the geospatial information system provided for in subsection (b) of this section.

(e) On or before January 1, 2006, and annually thereafter, the council shall submit, in accordance with section 11-4a of the general statutes, a report on activities under this section to the joint standing committee of the General Assembly having cognizance of matters relating to planning and development.

7.3 Connecticut Geospatial Information System Council Bylaws

The Connecticut Geospatial Information Systems Council, hereafter referred to as the CGISC was established under House Bill No. 7502 during the June 2005 Special Session as Public Act No. 05-3 "AN ACT CONCERNING THE IMPLEMENTATION OF VARIOUS BUDGETARY PROVISIONS".

1. GISC Mission Statement

The mission of the CGISC is to: 1) coordinate a uniform geospatial information system capacity and 2) promote a forum in which geospatial information may be centralized and distributed.

2. GISC Goals

a. The council, within available appropriations, shall coordinate a uniform geospatial information system capacity for municipalities, regional planning agencies, the state and others as needed, which shall include provisions for:

- Creation, maintenance and dissemination of geographic information or imagery that may be used to:
  - Precisely identify certain locations or areas, or
  - Create maps or information profiles in graphic or electronic form about particular locations or areas, and
- Promotion of a forum in which geospatial information may be centralized and distributed.

In establishing such capacity, the council shall consult with municipalities, regional planning agencies, state agencies and other users of geospatial information system technology. The purpose of any such system shall be to provide guidance or assistance to municipal and state officials in the areas of land use planning, transportation, economic development, environmental, cultural and natural resources management, the delivery of public services and other areas, as necessary.

b. The council, within available appropriations, shall administer a program of technical assistance to municipalities and regional planning agencies to develop geospatial information systems and shall periodically recommend improvements to the geospatial information system provided for in subsection (a) of this section.

c. The council may apply for federal grants and may accept and expend such grants on behalf of the state through the Office of Policy and Management.

3. CGISC Membership

a. As designated by Public Act No. 05-3, there is established a Geospatial Information Systems Council consisting of the initial 21 following members, or their designees:

1. Secretary of the Office of Policy and Management.
2. Commissioner of Environmental Protection.

3. Commissioner of Economic and Community Development.
4. The Commissioner of Transportation.
5. The Commissioner of Public Safety.
6. The Commissioner of Public Health.
7. The Commissioner of Public Works.
8. The Commissioner of Agriculture.
9. The Commissioner of Emergency Management and Homeland Security.
10. The Commissioner of Social Services.
11. The Chief Information Officer of the Department of Information Technology.
12. The Chancellor of the Connecticut State University system.
13. The President of the University of Connecticut.
14. The Executive Director of the Connecticut Siting Council.
15. One member who is a user of geospatial information systems appointed by the President Pro Tempore of the Senate representing a municipality with a population of more than sixty thousand.
16. One member who is a user of geospatial information systems appointed by the minority leader of the Senate representing a regional planning agency.
17. One member who is a user of geospatial information systems appointed by the Governor representing a municipality with a population of less than sixty thousand but more than thirty thousand.
18. One member who is a user of geospatial information systems appointed by the speaker of the House of Representatives representing a municipality with a population of less than thirty thousand.
19. One member appointed by the minority leader of the House of Representatives who is a user of geospatial information systems.
20. Chairperson of the Public Utility Control Authority.
21. Adjutant General of the Military Department.
22. Any other persons the council deems necessary appointed by the council.

b. The Governor shall select the chairperson from among the members. The chairperson shall administer the affairs of the council.

c. Vacancies shall be filled by appointment by the authority making the appointment.

d. Members shall receive no compensation for their services on said council, but shall be reimbursed for necessary expenses incurred in the performance of their duties.

e. Each member shall have one (1) vote on the CGISC.

4. CGISC Executive Committee

a. The CGISC may, for purposes of expediting process, establish an Executive Committee comprised of nine (9) of its members. The Executive Committee shall be constituted in the following manner:

1. Designee of the Department of Information Technology
2. Designee of the Department of Environmental Protection

3. Designee of the Office of Policy and Management
4. Designee of the Department of Public Health
5. Designee of the Department of Public Safety
6. Designee of the Department of Transportation
7. Designee of the Department of Emergency Management and Homeland Security
8. A Municipal Designee
9. Regional Planning Organization Designee

b. The CGISC shall bestow upon the Executive Committee full authority to conduct specific tasks on its behalf. Said authority may include, but not be limited to:

- Management of the State Homeland Security Portal Contract
- Grants administration
- Other administrative needs of the Council

c. All actions of the Executive Committee must be detailed within the Chairman's Report at each monthly meeting.

d. Formal action taken by the Executive Committee on an authorized task shall require a unanimous vote of its membership in order to be binding

e. Other actions taken by the Executive Committee that result in a majority vote, but not a unanimous vote, must be forwarded to the CGISC for further consideration.

f. The Executive Committee shall meet as necessary to address authorized tasks as described in 4.b. above, or whenever specifically directed to do so by the CGISC.

5. CGISC Working Groups

a. The CGISC shall have the authority to designate Working Groups to conduct and facilitate its business needs, as necessary.

b. Each Working Group Chair shall be selected from among the CGISC member organizations and ratified by the CGISC.

c. Each Working Group shall focus its efforts on the tasks set forth by the CGISC under the direction of the CGISC.

d. Each Working Group shall involve key stakeholders and experts in the field in the identification of mission-specific issues, and shall make recommendations to the CGISC.

e. Participation in each Working Group shall be open to all stakeholders, but the total number of participants in any such Working Group shall be no more than fifteen (15) persons.

f. The Working Group leader shall determine the composition of Working Group membership, facilitate meetings, make presentations regarding recommendations to the CGISC, and forward any such recommendations and reports to the CGISC for consideration.

g. Each Working Group shall provide a summary report of its monthly activities to the CGISC Chair.

6. CGISC Communications

a. A CGISC Web Site shall be established and hosted through the Department of Information Technology.

b. The CGISC Web Site shall maintain information on membership and meeting schedules for the CGISC, the CGISC Executive Committee, and the CGISC Standing Committees. The CGISC Web Site shall include agendas and minutes for CGISC meetings, as well as links to related geospatial information.

c. The CGISC Web Site will be developed to include secure areas for the business of the CGISC and areas that will be open and accessible to the public.

7. Meetings

a. Said council shall hold one meeting each month and such additional meetings as may be prescribed by council rules. In addition, special meetings may be called by the chairperson or by any three members upon delivery of forty-eight hours written notice to each member.

b. Scheduled meetings of the CGISC shall be announced to the members and the general public at the end of each CGISC meeting and through the CGISC Web Site.

c. A quorum of CGISC membership shall be required for a binding vote. A quorum is defined as a simple majority of appointed members (initially 11 members) subject to change as new members are added to the Council.

d. Roberts Rules of Order shall be the governing method of process for all meetings of the CGISC and its Executive Committee.

e. The CGISC Chair shall provide a copy of the monthly meeting agenda to all Council members five days prior to a scheduled meeting.

f. The CGISC membership shall be given a minimum of five days to review materials prior to a major CGISC vote.

g. Meetings of the CGISC and its Standing Committees are open to the public.

8. Reporting Requirement

a. On or before January 1, 2006, and annually thereafter, the Council shall submit, in accordance with section 11-4a of the general statutes, a report on activities under this section to the joint standing committee of the General Assembly having cognizance of matters relating to planning and development and any other committees as the Council deems appropriate.

9. Bylaws Ratification and Revision

a. Ratification or amendment of the Bylaws requires a super-majority vote defined as a two-thirds of the CGISC membership.

7.4 Acronym Glossary

3D	Three Dimensional
API	Application Programming Interface
AppGeo	Applied Geographics, Inc.
ArcGIS Server	ESRI Product: Mapping Server
ArcSDE	ESRI Product: Spatial Database Engine
ArcView	ESRI Product: Desktop mapping application
CAD	Computer Aided Design
CAES	Connecticut Agricultural Experiment Station
CAMA	Computer Aided Mass Appraisal
CAP	Cooperative Agreements Program
CD/DVD	Compact Disks/Digital Video Disks
CIO	Chief Information Officer
CLEAR	Center for Land Use Education and Research
CRCOG	Capitol Region Council of Governments
CT	Connecticut
DEMHS	Department of Emergency Management and Homeland Security
DEP	Department of Environmental Protection
DOIT	Department of Information Technology
DOT	Department of Transportation
DPS	Department of Public Safety
DSS	Department of Social Services
EMS	Emergency Medical Services
EOC	Emergency Operations Center
ESRI	GIS Software Vendor
ETL	Extract, Transform, Load
FGDC	Federal Geographic Data Committee
FOI	Freedom of Information
FOIA	Freedom of Information Act
FTP	File Transfer Protocol
GIS	Geographic, or Geospatial Information System
GISC	Connecticut Geospatial Information System Council
GOS	Geospatial One-Stop
GPS	Global Positioning System
IT	Information Technology
METNS	Managed Emergency Telephone Notification System
NOAA	National Oceanic & Atmospheric Administration
NSDI	National Spatial Data Infrastructure
NSGIC	National States Geographic Information Council
OGC	Open Geospatial Consortium
OPM	Office of Policy and Management
RDBMS	Relational Database Management System
RPO	Regional Planning Organization
RPO	Regional Planning Organizations

SIMS	Site Information Management System
SQL	Structured Query Language
SSDI	State Spatial Data Infrastructure
SSSTP	Stream Lined Sales Tax Program
USGS	United States Geological Survey