

Geospatial Strategic Plan for the Commonwealth of Kentucky

Kentucky Geographic Advisory Council



FIRST DRAFT

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Table of Contents

1	EXECUTIVE SUMMARY.....	4
2	STRATEGIC PLANNING METHODOLOGY	5
2.1	BACKGROUND.....	5
2.2	PRELIMINARY PLANNING	5
2.3	SUPPORT FOR THE PLANNING PROCESS	6
3	CURRENT SITUATION	6
3.1	WHO ARE WE?.....	6
3.2	WHERE ARE WE NOW?.....	8
3.3	STRENGTHS AND WEAKNESSES.....	10
3.4	OPPORTUNITIES AND THREATS	11
4	VISION AND GOALS.....	11
4.1	VISION	11
4.2	PRIMARY GOAL: MORE THOROUGH PLANNING PROCESS	11
4.3	SECOND-TIER GOALS: BUILDING RELATIONSHIPS	12
4.4	THIRD-TIER GOALS: MEETING DATA NEEDS	12
5	REQUIREMENTS.....	13
5.6.1	<i>Executive Support.....</i>	<i>15</i>
5.6.2	<i>Coordination and Oversight Procedures.....</i>	<i>15</i>
5.6.3	<i>Policy.....</i>	<i>16</i>
5.6.4	<i>Staffing.....</i>	<i>16</i>
5.6.5	<i>Budget Requirements.....</i>	<i>17</i>
5.6.6	<i>Outreach and Community Development.....</i>	<i>17</i>
5.6.7	<i>Assessing Risk.....</i>	<i>17</i>
6	IMPLEMENTATION PROGRAM.....	19
6.1	LESSONS-LEARNED	19
6.2	IMPLEMENTATION OF SUB PROJECTS	19
6.3	PHASING AND MILESTONES	19
6.3.1	<i>Communicate and Refine the Plan.....</i>	<i>19</i>
6.3.2	<i>Building Relationships.....</i>	<i>19</i>
6.3.3	<i>Meeting Data Needs</i>	<i>19</i>
6.4	<i>Budget Plan.....</i>	<i>20</i>
6.5	<i>Marketing the Program.....</i>	<i>20</i>
6.6	<i>Measuring Success and Recalibration</i>	<i>20</i>
7	APPENDICES.....	21
	<u>APPENDIX 1:</u> GIAC MEMBERS	
	<u>APPENDIX 2:</u> GIAC STRATEGIC PLANNING COMMITTEE MEMBERS	
	<u>APPENDIX 3:</u> LIST OF ATTENDEES TO LISTENING SESSIONS AND MEETINGS	
	<u>APPENDIX 4:</u> QUESTIONS ON THE ON-LINE SURVEY FROM THE GIAC’S STRATEGIC PLANNING COMMITTEE.	
	<u>APPENDIX 5:</u> PRELIMINARY SUMMARY OF RESPONSES TO GIAC ONLINE STRATEGIC PLANNING FEEDBACK SURVEY.	
	<u>APPENDIX 6:</u> DGI IN THE COMMONWEALTH OFFICE OF TECHNOLOGY (COT) ORGANIZATIONAL CHART.	
	<u>APPENDIX 7:</u> GEOGRAPHIC DISTRIBUTION OF KAMP MEMBERSHIP.	
	<u>APPENDIX 8:</u> GEOSPATIAL COMMUNITY-OF-PRACTICE IN KENTUCKY	
	<u>APPENDIX 9:</u> ESTIMATED GIS USERS IN KENTUCKY.	
	<u>APPENDIX 10:</u> GISP AND OTHER CERTIFIED PROFESSIONALS IN KENTUCKY.	

APPENDIX 11: MAPPING APPLICATIONS, DATA REPOSITORIES, AND INFORMATION SERVICES

1 EXECUTIVE SUMMARY

The Geospatial Infrastructure Advisory Council (GIAC) of the Commonwealth of Kentucky working with the Commonwealth Office of Technology's Division of Geographic Information (DGI) has worked to identify the key organizational elements required to increase the Commonwealth's overall effectiveness in delivering Geographic Information Services (GIS) to its many stakeholders. Kentucky has long been a leader in making GIS data available to its citizens. The barriers to further improvements are mostly organizational, not technological. Consequently, this strategic plan focuses on those organizational issues and lays out a framework to remediate them.

Prior to mid 2010 the GIAC had been inactive for many years. This has not prevented significant progress from being made in the deployment and use of GIS data within the Commonwealth, but without an active GIAC going forward it would be difficult to ensure that optimal goals and objectives are being set. Fortunately, the reconstituted GIAC has many members who are determined to move forward and leave the past behind.

The GIAC, working closely with DGI, held three listening sessions around the Commonwealth to gather stakeholder input for the development of this plan. An on-line survey gathered additional feedback from those who could not attend the listening sessions. We are confident that this open and inclusive process used in the development of this plan makes it an accurate representation of the needs of the Commonwealth as seen by its major GIS stakeholders.

Kentucky has a strong base of GIS professionals and a robust infrastructure to support them. Consequently, this plan has relatively little reference to infrastructure needs, as these are already reasonably well met. The major need going forward is for improved communication, leadership, and coordination among the various GIS stakeholders. This is needed to improve planning for the future. A second goal is to improve relationships and communication to ensure that a truly collaborative GIS environment exists. Thirdly, the plan identifies data needs for parcels, geocoding, and LiDAR data.

2.1 Background

An NSDI CAP Grant was awarded to the Division of Geographic Information (DGI) in 2009, with the purpose to assist the Geographic Information Advisory Council (GIAC) in the development of a Geospatial Strategic Plan for the Commonwealth. In its original scope, DGI would provide the support to enable GIAC to be re-constituted and re-convened, with the purpose of starting strategic planning process. Thus, during the drafting process, DGI's role would be one of facilitation, coordination and support. After adoption, DGI will assist the GIAC in implementing the recommendations in an efficient and timely manner. It was expected that this process would enable the stakeholders involved with geospatial data and activities in Kentucky to improve communication and coordination efforts resulting in better decisions, products, and services for the Commonwealth's citizens. The planning process was to evaluate the business needs of all stakeholders, identify opportunities for consolidation of resources and services, and open the flow of geospatial information between agencies. Additionally, the Enterprise Architecture Standards that relate to GIS Software and Hardware would be reviewed for currency and applicability within today's IT environment. Collectively, the process was to yield recommendations that would improve the support of GIS initiatives for all member organizations.

2.2 Preliminary Planning

Unfortunately, reconstitution of the GIAC was delayed by forces beyond the control of DGI, which left a shortened time frame for development of the strategic plan. The planning process was initiated on July 15th, 2010 with the first meeting of the new GIAC (see *Appendix 1*); at this meeting, William Andrews was appointed Strategic Planning chair. A supporting committee of volunteers from GIAC membership and the interested community at large was formed (see *Appendix 2*). DGI staff was committed to support the effort. Due to the restricted time frame, a concerted effort was made to engage the community at large and to gauge interest in the future of geospatial data in Kentucky and to solicit feedback. A series of listening sessions and communication meetings were scheduled, and a feedback survey was posted online.

A series of three listening sessions invited open feedback from the geospatial community in Kentucky. Verbal comments were recorded and discussed; the themes that arose from these discussions guided the general structure of the developing strategic plan. All attendees were encouraged to also submit their comments and feedback through the online survey. A series of communication meetings were also held with various representative constituent groups to ensure that feedback from those communities were reflected in the plan; these attendees were also encouraged to utilize the online feedback form. Dates and attendance lists of the listening sessions and communication meetings are available in *Appendix 3*.

Information recorded at a series of breakout-group focus sessions at the 2008 “Mapping and Monitoring Land-Resource Change: Bridging the Geospatial Divide for Decision Making” Conference, as well as feedback from GIAC Strategic Planning Committee members, was used to guide the development of questions for the online survey. *Appendix 4* contains the questions posted on the online survey form. The online feedback survey was posted in early September 2010, and was advertised through the KYGIS Listserv. Feedback was also encouraged from GIAC constituent communities and the membership of the Kentucky Association of Mapping Professionals (KAMP). A total of 208 responses were received through the online survey; preliminary results are summarized in *Appendix 5*. The shortened planning time-frame prevented complete analysis of the online survey results for this plan. Full analysis and review of the feedback will be used to continue the planning process going forward.

This document reflects the general trends of feedback received from the in-person listening sessions and meetings. Broad themes and preliminary statistics from the online feedback are used to prioritize the action items and objectives in this plan. More thorough and comprehensive analysis of the large number of feedback responses will be one of the key objectives in the next cycle of plan discussion and revision.

2.3 Support for the Planning Process

- a. In addition to the CAP grant, COT/OAD/DGI provided personnel for implementation of the listening sessions, document development, logistical and communication support, online survey and KYGIS listserv coordination.
- b. The Kentucky Geological Survey at the University of Kentucky provided support and permission for William Andrews’ time in pursuing feedback and coordinating the strategic planning effort.
- c. The Kentucky Area Development Districts (ADDs) of Big Sandy ADD and Pennyriple ADD, and Northern Kentucky Area Planning Commission hosted listening sessions at their facilities.
- d. KAMP provided communication support and volunteer time at the annual Kentucky GIS Conference.

3 CURRENT SITUATION

3.1 Who are we?

In Kentucky, a strong and diverse geospatial community-of-practice represented the right stakeholder community participating in this effort, as seen in the listing below:

- a. *Geographic Information Advisory Council (GIAC)*: is a legislatively mandated body created to advise the Commonwealth’s Chief Information Officer on issues relating to

geographic information and geographic information systems (GIS). The council recommends policies and procedures which assist state and local jurisdictions in developing, deploying, and leveraging geographic information resources and GIS technology for the purpose of improving public administration and to ensure maximum use of geographic information by minimizing redundancy of data and resources. The founding legislation specifies membership in the board, and members are appointed by the Governor. Meetings are open to the public, and the 2010 meetings of the GIAC have attracted significant attendance from the broader geospatial community. GIAC ceased to function by the end of 2004, and was reconvened for the first time on July 15, 2010, following a failed effort in 2006 to constitute a new entity, the Kentucky Geospatial Board ([KRS 42.740](#), [KRS 42.742](#)) <http://technology.ky.gov/gis/Pages/GIAC.aspx>

- b. *Division of Geographic Information (DGI)*: is a state government agency charged with collecting, compiling, and facilitating the production of geospatial data for the Commonwealth. Maintenance of the Commonwealth's enterprise GIS services and on-going support of the Kentucky Geography Network are the primary responsibilities of the Division of Geographic Information. The DGI is responsible for collaborative relationships with all levels of government in order to promote the application of GIS through strategic planning, technical support, policy development, and provides administrative and technical support of the GIAC. The DGI is in the Executive Branch, currently under the Commonwealth Office of Technology, Office of Application Development (<http://gis.ky.gov>; [KRS 42.650](#)). The DGI executes these duties with a staff of three full-time professionals, and has experienced a high rate of director turn-over and physical office moves in the last six years. The agency has no direct budget, and its operating costs are defrayed by a fee structure from state government cabinets and organizations. DGI's position in state government is shown in organizational chart on *Appendix 6*.
- c. *Kentucky Association of Mapping Professionals (KAMP)*: is a professional association of GIS practitioners in Kentucky formed in 2003, prior to GIAC's last functioning year (<http://kampro.org>); much of the development of KAMP activities and organization has developed during the absence of an active GIAC. KAMP provides quarterly meetings, an online webpage and bulletin board, and has organized the statewide GIS conference (at which attendance was sold out in October 2010). KAMP's membership is approximately 160 and its geographic distribution is shown on *Appendix 7*.
- d. *Stakeholders in the Community-of-Practice*: Some entities are almost exclusively data producers (such as the private sector photogrammetric firms) or data users (state and local government). Several of the stakeholders identified, however act in a dual role of being data producers and users. The main categories are:
 - i. Federal
 - ii. State government
 1. Multiple cabinets and agencies
 - iii. Regional government

1. Area Development Districts
- iv. Local government
 1. City, county, municipal
- v. Planning and professional organizations
- vi. Academia
- vii. Private businesses, including consultants (photogrammetry, GIS, remote sensing, etc.)

A detailed and more comprehensive – but not all-inclusive list appears in *Appendix 8*. Preliminary numerical estimates of the sector appear in *Appendix 9*.

- e. *Certified Professionals*: Kentucky has 94 certified GIS Professionals (GISPs), 10 Certified Photogrammetrists, and 4 Certified Mapping Scientists. A list appears in *Appendix 10*.

3.2 Where are we now?

Kentucky has a metadata Clearinghouse (the KYGEONET) for data that is harvested by the Geospatial One Stop on a weekly basis. The KYGEONET currently has 564 GIS data and mapping published resources. The KYGEONET leverages Esri's Geoportal Toolkit for their metadata portal. Kentucky does not use the Ramona GIS Inventory Tool since we have an existing inventory tool.

GIS Coordination is done through the Division of Geographic Information (DGI). DGI currently has an Acting Director who also has other duties. In addition, the DGI director position has had substantial turnover in recent years, making it difficult to sustain a steady direction. The Division of Geographic Information (DGI) is a part of the Commonwealth Office of Technology and is responsible for encouraging, coordinating, and implementing GIS programs throughout the Commonwealth of Kentucky. DGI works with both state and local government, and serves as liaison to federal agencies. Activities include strategic planning, implementation services, technical and administrative support, dissemination of geospatial data, grant administration, research, and policy development. DGI also provides assistance to the newly reformed Geographic Information Advisory Council (GIAC).

The GIS community within Kentucky State Government works closely together and has been successful in data sharing, standards development and implementation and data documentation. In the past there has been little coordination between State and Local Government. Specifically, although State Government provides a diverse array of statewide data via the Kentucky Geography Network, only a few local entities have contributed data to the KYGEONET clearinghouse.

See section 5.1 for information on the current State of Technology Infrastructure.

Framework Layer	Status (Non-existent, Incomplete, Complete)	Available to NSDI (Yes/No)
Geodetic Control	Complete	Yes
Cadastral	Incomplete	No
Orthoimagery	Complete	Yes
Elevation	Complete	Yes
Hydrography	Complete	Yes
Administration Units	Complete	Yes
Transportation	Complete	Yes
Other Base Themes of Significance:		
Structures	Incomplete	No
Land Use	Incomplete	No

NSGIC Criteria	Status (Non-Existent=RED; Partially in Place=YELLOW; Completely in Place=GREEN)	Status Description
1. A full-time, paid coordinator position is designated and has the authority to implement the state's business and strategic plans.	Non-Existent	There is currently an acting director for the State GIS Office.
2. A clearly defined authority exists for statewide coordination of geospatial information technologies and data production.	Completely in Place	The GIAC has been recently been reestablished
3. The statewide coordination office has a formal relationship with the state's Chief Information Office (CIO).	Completely in Place	
4. A champion (politician or executive decision-maker) is aware and involved in the process of geospatial coordination.	Partially in Place	
5. Responsibilities for developing the National Spatial Data Infrastructure (NSDI) and a State Clearinghouse are assigned.	Completely in Place	http://kygeonet.ky.gov
6. The ability exists to work and coordinate with local governments , academia, and the private sector.	Partially in Place	

NSGIC Criteria	Status (Non-Existent=RED; Partially in Place=YELLOW; Completely in Place=GREEN)	Status Description
7. Sustainable funding sources exist to meet project needs.	Partially in Place	
8. GIS Coordinators have the authority to enter into contracts and become capable of receiving and expending funds.	Partially in Place	
9. The Federal government works through the statewide coordinating authority.	Completely in Place	

A wide range of public-facing, on-line geospatial information services exist in state and local government in Kentucky; examples of this are:

- a. Kentucky Geography Network (<http://kygeonet.ky.gov>): the premier service for publication and sharing of geospatial data in the Commonwealth
- b. Two main services (KYVECTOR and KYRASTER) are made available to LAN users within state government.

A comprehensive listing of services, portals and data sources is given in *Appendix 11*.

3.3 Strengths and Weaknesses

a. Strengths:

- i. Community of engaged and dedicated professionals and practitioners.
- ii. Framework of agencies is available to provide support.
- iii. Fully capable infrastructure for data production, management, and distribution.
- iv. Community has numerous relationships established that can facilitate communication and collaboration.

b. Weaknesses:

- i. Limited budgets.
- ii. Uneven distribution of GIS professionals through the multiple stakeholder communities.
- iii. Recent administrative instability surrounding DGI, the GIAC and resulting lack of coordination; DGI funding is limited to a state-agency fee structure and external grants; DGI is operating with a limited full-time staff.

- iv. Limited opportunities for continuing education, training and skills development.
- v. Bureaucracies business models, and procedures do not always facilitate cooperation.

3.4 Opportunities and Threats

a. Opportunities:

- i. A brand new GIAC has been formed
- ii. KAMP is strong, with highly engaged and talented membership
- iii. The cost-savings that GIS allows with improved data management and access for facilities management, environmental monitoring, decision making, etc could be leveraged to improve support for GIS services and activities during an otherwise-tight budget period.

b. Threats:

- i. Recent poor communication and coordination while the GIAC was inactive has left community relationships fragile
- ii. Current economic situation suggests little potential for increased funding support for adding personnel, training, large-scale data-collection initiatives, etc

4 VISION AND GOALS

4.1 Vision

Facilitate statewide geographic data sharing and its application for simplified decision making, greater efficiency, public protection, and economic vitality. Provide input to help determine what is required to successfully improve statewide GIS data coordination, and additional application integration of GIS data, throughout Kentucky. Develop a vision and recommendations for anticipated future data requirements. Improve the integration and communication in the geospatial community at all levels, among the full range of stakeholders.

4.2 Primary Goal: More Thorough Planning Process

In the next year, have GIAC take the time to develop a comprehensive Mission Statement for statewide GIS, while engaging the broader GIS community as identified in this feedback and planning process.

The next step is to spend the following two years methodically developing a more comprehensive strategic plan properly, building upon the feedback and contacts generated through this current effort, and deliberately and deeply integrate the GIS community (public/private, producers/users) into the process. Conversations with all levels of the Kentucky geospatial community will foster understanding of the roles and goals of the major organizations and entities and will enable closer coordination and

collaboration for future initiatives. This will facilitate efficient approaches to future problems and issues, and allow the Kentucky geospatial community to leverage its strengths in improving the state’s geospatial data infrastructure.

4.3 Second-Tier Goals: Building Relationships

1. Improve state-level communication to and from the “front-line” local-level and private GIS practitioners, users, and producers across the state. Encourage a re-visioning of GIS decision-making in the state from a top-down mandate approach to a local-up data- and needs-sharing paradigm. Communication and coordination/leadership roles have been by far the most intense and common topic of discussion at the listening sessions. This issue can be addressed by a series of targeted listening sessions and conversations between the GIAC, DGI, and practitioners familiar with local and regional data needs, issues, and constraints.
2. As one of several ways to further that goal, consideration should be given to reorganization of the GIAC to reflect the actual/functional distribution of GIS producers and users across the Commonwealth. The GIAC was originally legislatively mandated when most of Kentucky’s GIS production and management occurred at the state level, but this function has shifted toward regional, local, and private entities now. Initially, this could be in the form of specific invited guest attendance at GIAC meetings for representatives of—as examples—KAMP, the CMRS Board, and MAPPS (representing the private aerial photography and photogrammetry industry). Ultimately, this could lead to updating the legislative formulation of the GIAC membership.
3. Consider restructuring the business model for certain data themes/layers/topics to support local-level real-time updates for certain vector/point data and to distribute the costs of the updates to those who benefit from and participate in the on-the-ground changes that necessitate those updates. Data themes that could be considered for real-time updates include roads, land parcels, and structures/addresses. This will require focused conversations with traditional collectors of these data, and the entities that generate the associated changes (engineers, surveyors, etc).
4. Encourage more state-collected datasets (e.g. from active regulatory activities, related to specific projects) to be promptly and consistently provided online. This issue can be directly discussed by the GIAC and its member constituents, to solicit even more state agency contributions to the KYGEONET and state-operated data services.

4.4 Third-Tier Goals: Meeting Data Needs

Third-tier goals can be formulated around optimizing access, efficiency, and quality for data sets identified as key by the feedback process for this plan.

According to the online survey responses, roads and geocoded addresses are the most-used data theme. Land parcels and topographic/elevation data roughly tie for second place. Demographic information comes in a close third.

5.1 Inventory of Existing Infrastructure and Suitability Assessment

The Commonwealth has a robust GIS data service infrastructure, which will continue to be maintained and updated on behalf of all stakeholders in the GIS Community:

- The Commonwealth's GIS server environment consists of three dedicated Database servers, three application servers, and one testing server. The Database servers have attached RAID Devices and two have access to DGI's SAN (Purchased with USGS Grant Funds). The database servers were recently upgraded (fall 2010) and are now in full production.
- The GIS computing infrastructure is based on industry-standard software that is in compliance with all COT Enterprise Architecture Standards (EAS). DGI's databases are housed in Microsoft SQL Server, database and application servers run Windows Server. Web and Database development is carried out in MS Visual Studio .NET and Macromedia Dreamweaver, while leveraging Javascript, Java Server Pages, XML, Python, Perl, and other scripting tools/protocols as required.
- The Commonwealth's Geospatial data holdings are maintained on the aforementioned hardware and software infrastructure and all data is organized using industry standard ISO categories and are documented accordingly with FGDC based metadata. These data holdings are exposed via the KYGEONET and are harvested weekly the Geospatial One Stop.

5.2 Data Requirements

The Commonwealth's data resources are cataloged, maintained, and exposed using Esri's ArcGIS Server Geoportals Extension on the KYGEONET. Below is summary of the resources that support these services.

- The Kentucky Geography Network (KYGEONET) is the geospatial data clearinghouse for the Commonwealth and is used for data dissemination throughout Kentucky's GIS Community. (Note: -- this site currently sustains between 5.5 and 7.5 million server requests per month, serving up data to entities such as state agencies, private business, education institutions as well as others, who require such data to support their business processes.) This service is harvested weekly by the Geospatial One Stop.
- The data resources are hosted on infrastructure based on the industry-standard RDBMS (Microsoft SQL Server) & Esri's Spatial Database Engine (SDE) and ArcGIS Server. All software runs on Enterprise-class servers at the Commonwealth Computing Center thus leveraging COT infrastructure and resources.
- KyRaster – a geodatabase that contains all the aerial images, topographic maps, digital elevation models, hillshade, landcover, percent slope and other critical raster GIS base layers. This critical resource is available to power internet mapping sites for the Commonwealth and for delivering GIS data to

Desktop users across the WAN. This geodatabase contains many of the Commonwealth's authoritative thematic layers.

- KyVector – a robust geodatabase that contains vector-based (points, lines and polygons) GIS data throughout the state (DB contains over 260 thematic layers) KyVector is arranged by thematic feature-classes (categories) that contain GIS layers for particular “themes” of data. This critical resource is available to power internet mapping sites for the Commonwealth. This geodatabase contains many of the Commonwealth's authoritative thematic layers.
- A wide variety of publishers (or custodians) feed the KYGEONET clearinghouse. These publishers come from all levels of government and actively make metadata updates as necessary. Each relies on a set of published metadata requirements that leverages the FGDC metadata template.
- Currently, the data sharing that feeds the KYGEONET is not supported by specific data sharing agreements.
- One specific enhancement to the Commonwealth's Data resources will be sought as a part of this plan by acquiring additional LiDAR and leaf-off orthoimagery data to cover the entire Commonwealth. A plan to fund and acquire this data will be developed in 2011.
- An authoritative address enabled road centerline database does not exist for the Commonwealth. As a result of this plan, DGI intends to create a plan to offer a geocoding service in 2011.
- The need for parcel data is expressed time and time again by many stakeholders. Obtaining access to this Revenue-held dataset could introduce a whole new level of efficiency and savings to those in the GIS Community.

5.3 Technology Requirements

The Commonwealth has a robust base of technology including a secure data center at Cold Harbor in Frankfort, a redundant high speed network, and adequate server and storage to house the additional data that we propose to acquire in this plan. It is important that the infrastructure be refreshed periodically so as to take advantage of advances in technology, especially storage.

5.4 Resource Requirements

It is important for DGI to employ at least one or two more high-end GIS staff persons. DGI Staff is currently at capacity and it is difficult to take on new initiatives without appropriate resources. An enhanced level of staffing is critical if DGI is to continue to provide the level of GIS Services so desperately needed by the Commonwealth's GIS Community.

5.5 Standards

The Commonwealth has fully embraced the FGDC standards related to metadata and utilizes ISO standards for data theme organization. This is necessary so as to be compliant with the Geospatial One Stop and in order to support the KYGEONET metadata services.

Several published data layer standards exist in the Commonwealth as well as Kentucky specific coordinate system. These standards can be found on the KYGEONET.

All hardware and software utilized to support Kentucky's geospatial services are in compliance with the Commonwealth's Enterprise Architecture Standards (EAS).

5.6 Organizational Needs

The Commonwealth Chief Information Officer serves as the Chairperson of the GIAC. The composition of the GIAC was legislated several years ago and will be reviewed as part of the implementation of this Strategic Plan. It may be necessary to seek legislative changes if it is determined to be in the best interests of all of the stakeholders to change the makeup of the GIAC.

Currently there are many agencies within the Commonwealth that have active GIS departments and many others that rely on data hosted by DGI. In addition, many counties and larger municipalities have GIS departments.

5.6.1 Executive Support

One of the main roles of the reconstituted GIAC will be to build upon the political support that GIS already enjoys within the Commonwealth. There is already widespread political support for GIS based on its extensive use within the Kentucky Transportation Cabinet (KYTC), Parks and Adventure Tourism, Homeland Security, and many other bodies.

Given the tight budget picture for the Commonwealth, the ability to reduce labor costs through increased use of GIS will be a major benefit to elected officials and policy makers at all levels of government.

The fact that the GIAC did not meet for several years will require some regaining of momentum, but the GIS community continued to grow during that period of inactivity. With the recently revitalized GIAC, even greater communication with policy makers will be possible.

5.6.2 Coordination and Oversight Procedures

Currently the Commonwealth CIO chairs the GIAC. This gives the CIO de facto responsibility for leading the GIS community within the public sector. The current legislated composition of the GIAC, which is heavily weighted to state agencies, makes it difficult for the GIAC chair to lead nongovernmental GIS initiatives that involve utilities, private business, academia, and the general public.

One of the goals of this strategic plan will be to review the composition and role of the GIAC and recommend changes. As technology continues to evolve at an ever increasing rate, it may be necessary to increase the flexibility of the GIAC in terms of its composition. It may be desirable to have the Chair of the GIAC be a full time position, but that has yet to be determined.

DGI currently has one full time employee devoted primarily to outreach activities with an emphasis on local governments and academia. The limited DGI staff (3 FTEs) plus an acting Director, is a constraint on further outreach activities. In addition, the DGI director position has had substantial turnover in recent years, making it difficult to sustain a steady direction.

The GIAC is currently made up of Commonwealth Agency personnel and volunteers. The GIAC does not have a budget. DGI is funded through assessments to various state agencies, but provides services to a wide variety of customers for which it generates no revenue. DGI also performs a limited amount of paid project work. Finally, DGI has received a limited number of grants to fund certain specific activities, such as the development of this Strategic Plan.

In general, despite the constraints outlined above, overall cooperation among the various GIS stakeholders within the Commonwealth has been good. Most data has been shared and made available to all. There have been issues surrounding the access to parcel data, and those issues will be addressed as a part of the implementation of the Strategic Plan.

5.6.3 Policy

As referenced in 5.6.2 above, the details of the GIAC are defined in legislation. It may be necessary to request legislative changes in order to implement all aspects of this Strategic Plan. Any such proposed changes, if any, have yet to be determined.

5.6.4 Staffing

As referenced in 5.6.2 above, the GIAC is composed mostly of Commonwealth Agency personnel as the GIAC does not have a budget or source of funding. DGI is funded through Assessments, paid project work, and grants. DGI has a staff of 3 full time GIS professionals and an Acting Director who also has other duties.

The current staff is easily justified by the legislatively defined functions of DGI (see 3.1.b). As GIS technology has become more important to all stakeholders within the Commonwealth, the efforts required by DGI to support these stakeholders continue to increase. There has not been a commensurate increase in budget or staff, and this will need to be addressed in the next biannual budget of the Commonwealth in 2012-2013.

In addition to the existing staff, two additional resources are needed to support the servers, data and software. DGI also needs two developers to enable the development of custom applications, both fixed and mobile. DGI believes there is a solid business case to be made for these resources, which will be referenced in greater detail in the future business plan document.

5.6.5 Budget Requirements

The GIAC does not have a budget. How GIAC will be funded in the future will be determined as one of the outcomes of the implementation of this Strategic Plan. The fact that the GIAC has been unable to spend any money has been a severe constraint.

DGI does not have a budget, as by Statute, budgets are defined at the Office level. DGI is a Division within OAD. Consequently, it consumes a portion of the OAD budget. It should also be noted that OAD is an Office within COT, and COT zero based budgeted. COT can only spend what revenue it generates through a combination of assessments, paid work, and grant monies.

DGI generates revenues through a separate GIS assessment that has remained flat since 2001. DGI also generates revenue from paid project work and grant monies. There will be a comprehensive review within COT of the DGI funding model, which may need to change to properly support its stakeholders going forward. This review will result in proposed funding modifications for the 2012-2013 Commonwealth biannual budgets.

5.6.6 Outreach and Community Development

Communication and Collaboration within the GIS community was definitely compromised for several years after the GIAC was disbanded. This, in conjunction with decreasing funding and personnel made it difficult for DGI and others to devote significant resources to outreach.

Entities such as the Kentucky Association of Mapping Professional (KAMP) have done a good job at outreach and have worked to maintain a sense of community. It is important that such groups work closely with the GIAC and DGI in the future so as to underscore the importance of the Commonwealth's geospatial activities.

In the absence of an active GIAC, DGI performed, and still performs, a number of outreach activities to the Kentucky GIS community. DGI has worked closely with the GIAC in conducting the listening sessions performed as part of this strategic plan development effort. DGI has one technical resource largely devoted to outreach activities.

5.6.7 Assessing Risk

For Kentucky, like most states, the great recession has taken an awful toll on revenues and budgets. This represents the largest risk to our plans. If the economy continues to remain weak, DGI could be impacted and this would cascade down to its many stakeholders. The economy could also limit the GIAC in its ability to revitalize itself. Finally, a weak economy has the potential to negatively impact stakeholders at the county and local level, as well as academia and the private sector.

On a positive note however, GIS technology can help stakeholders reduce costs. By increasing productivity organizations at all levels may be more amenable to making GIS investments.

6 IMPLEMENTATION PROGRAM

6.1 Lessons-learned

6.2 Implementation of Sub Projects

6.3 Phasing and Milestones

The implementation of this program will have multiple phases. The first phase will be for the GIAC to refine this strategic plan. The second phase will be to build relationships among key stakeholders. The third phase will be to acquire data not currently available. The third phase will run in parallel to the first two phases.

6.3.1 Communicate and Refine the Plan

This Strategic Plan represents the first version of an ongoing effort to document the Strategic goals for the Commonwealth GIS Community. This plan now needs to be refined and enhanced with detail to make it more actionable.

Now that the GIAC has been revitalized, it can work to see that as many people as possible are aware of this plan. The GIAC will be in a position to solicit feedback from people and organizations to add detail where detail is needed. It is important that this plan get wide distribution. The GIAC will work with DGI, KAMP, and other groups to see that distribution is sufficient.

As feedback becomes available through the first half of 2011 the plan will be refined. This will lead to a proposal to develop a more detailed Business Plan in 2012.

6.3.2 Building Relationships

In addition to soliciting feedback through listening sessions and surveys, consideration will be given reviewing the composition of the GIAC to determine if its current defined membership best meets the needs of the Commonwealth.

This debate will need to take place both within the GIAC and among the other GIS stakeholders within the Commonwealth. Since any change will require a political consensus, since the makeup of the GIAC is defined in statute, no date can be given as to when this can be accomplished.

6.3.3 Meeting Data Needs

A need has been identified for better parcel data availability. Discussions will begin in early 2011 to determine what technical or organizational barriers exist to improve parcel data access. We expect to have recommendations by mid 2011.

In early January DGI intends to begin work on a plan to acquire additional LiDAR Data for the Commonwealth. In December 2010 DGI intends to work on seeking

funding to develop that plan with the expectation that data can be acquired beginning in late 2011.

Also in early January 2011, DGI intends to develop a plan to offer a geocoding service to all state and local agencies and public organizations. The goal will be to implement this plan by the end of 2011.

6.4 Budget Plan

DGI will seek funding for the planning and acquisition of the LiDAR data for the Commonwealth. It is expected that many counties and local governments and agencies will be willing to contribute to this effort. DGI already has key technological components necessary to do geocoding. Funding will be sought for the planning and implementation of a geocoding service. This function will be implemented as a web service that should be affordable to all who need it.

6.5 Marketing the Program

Once the refined Strategic Plan has been created by the GIAC, additional listening sessions will be held around the Commonwealth to communicate, educate and inform the GIS Community. Feedback will be sought through the use of these listening sessions and an on-line survey. Presentations will also be scheduled with multiple GIS professional organizations within the Commonwealth.

6.6 Measuring Success and Recalibration

Measuring the first two goals of the plan will be done through the listening sessions and surveys. We have a benchmark set of data from the listening sessions and surveys used to develop this plan. We should see improvement in the satisfaction level expressed by stakeholders as we refine the plan and continue implementation. Areas of dissatisfaction will be indicators that changes may need to be made in the plan or that timetables are inadequate.

The third goal regarding data acquisition is more straightforward, as we will be able to implement these plans or not. If they are implemented, we will use surveys to determine the level of satisfaction by users of the data.

7 APPENDICES

APPENDIX 1: GIAC Members

<i>Agency/Organization</i>	<i>Member s Name</i>
Commonwealth Office of Technology	Lori Flanery (Acting CIO)*
Department of Agriculture	Craig Maffet
Economic Development Cabinet	Ken Robinson
Department of Education	David Couch
Environmental & Public Protection Cabinet	Len Peters
Finance & Administration Cabinet	Lori Flanery (Acting CIO)
Cabinet for Health & Family Services	Rodney Murphy
Justice & Public Safety Cabinet	Brad Bates
Department of Military Affairs	Colonel Rod Hayes
Tourism, Arts & Heritage Cabinet	Elaine Wilson
Transportation Cabinet	Jon Clark
Governor's Office for Local Development	John Covington
Council on Postsecondary Education	Mark Wiljanen
Legislative Liaison (non-voting)	Scott Hamilton
Kentucky Geological Survey	Steve Cordiviola
Council of Area Development Districts	Kevin R. Cornette
Kentucky Association of Counties	Tony Lindauer
Kentucky Association of Counties	Roger Recktenwald
Kentucky League of Cities	Harla McClure
Kentucky League of Cities	Ann N. Miller
Kentucky Chamber of Commerce	James R. Riney
Kentucky Association of Land Surveyors	Theodore L. Niemann
Kentucky Board of Registered Geologists	William M. Andrews, Jr
Kentucky Society of Professional Engineers	Lisa G. Martin
Kentucky Chapter of the American Planning Association	Larisa K. Sims

* Council Chairperson; Updated November 2010.

APPENDIX 2: GIAC Strategic Planning Committee Members

<i>Member</i>	<i>Affiliation</i>
William M. Andrews, Jr, Chair	GIAC
John Covington	GIAC
Tony Lindauer	GIAC
Roger Recktenwald	GIAC
James R. Riney	GIAC
Larisa Sims	GIAC
Mark Wiljanen	GIAC
Stephen Berry	Clark County GIS
Pete Crosswell	Crosswell-Schulte, Consulting
Susan C. Lambert	EarthWorks, LLC, Consulting
Stephanie McSpirit	Sociology Dept., Eastern Kentucky Univ.
Ted Niemann	Elizabeth Niemann & Associates, Inc.
John Schneider	Vaughn and Melton, Consulting
Reid Webb	KY National Guard

Administrative support for planning process:

Thomas Rossman, Acting Director, DGI
Demetrio Zourarakis, DGI
Carrie Cottew, COT

Also assisting with feedback process:

Trisha Brush and Christy Powell, NKAPC
Curt Bynum, LOJIC
John J. Patterson, CMRS Board
Will Holmes, Kentucky Transportation Cabinet
Ron Householder, MapSync

APPENDIX 3: List of Attendees to Listening Sessions and Meetings

LISTENING SESSIONS

A. Big Sandy Area Development District

Prestonsburg KY, August 30 2010

1. Shane New, BGADD, shane@bgadd.org
2. Chris Coleman, BSADD, chris.coleman@bigsandy.org
3. Mark Wiljanen, CPE (GIAC), mark.wiljanen@ky.gov

B. Northern Kentucky Area Planning Commission

Fort Mitchell KY, September 16 2010

1. Jeff Lovin, Woolpert, jeff.lovin@woolpert.com
2. Brian Cox, Kentucky Transportation Cabinet, brian.cox@ky.gov
3. Rich Allen, Magic, Rallen@magicgis.com
4. Steve Gay, Boone County, sgay@boonecountyky.org
5. Trisha Brush, NKAPC, tbrush@nkapc.org
6. Kyle Snyder, NKAPC, jksnyder@nkapc.org
7. Gretchen Boyce, NKAPC, gboyce@nkapc.org
8. Tom East, NKAPC, teast@nkapc.org
9. David Smith, Esri, david.smith@Esri.com
10. Thomas Brackman, NKU, brackmant1@nku.edu

C. Pennyrile Area Development District

Hopkinsville KY, September 27 2010

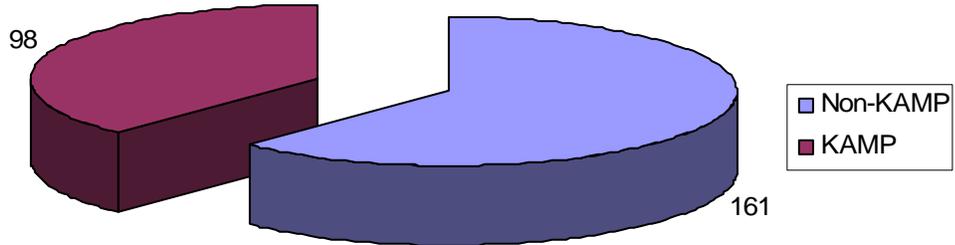
1. Zeda Rosser, Oak Grove Water Dept., ogutil1@oakgroveky.org
2. Bill Chaudoin, City of Oak grove, bchaudoin@oakgroveky.org
3. Clay Hughes, Caldwell County, chughes417@gmail.com
4. Tiffany Lindsey, Muhlenberg County 911, tiffany_lindsey07@att.net
5. Roger Green, Muhlenberg County 911, rogerandtammy102@yahoo.com
6. Pat Lee, Pennyrile ADD, pat.lee@ky.gov
7. Jim Creighton, Pennyrile ADD, jim.creighton@ky.gov
8. Tim Barnes, Pennyrile ADD, tim.barnes@ky.gov

C. 2010 Kentucky GIS Conference

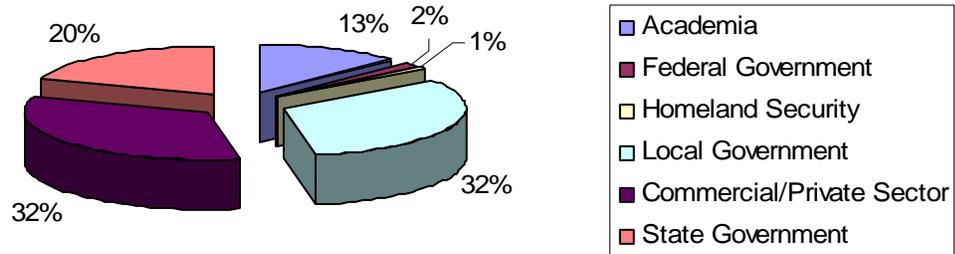
Frankfort KY, October 15 2010

There was no sign-in sheet, but the attendance to this 2-hour listening session was estimated at 170. A summary breakdown of 259 registrants to the conference is shown below:

Attendance to the KY 2010 GIS Conference
 (Total: 259 Registrants)
KAMP Membership



Attendance to the KY 2010 GIS Conference
 (Total : 259 Registrants)
Occupational Sector



MEETINGS

A. University of Kentucky Geospatial Working Group
 Lexington KY, September 3 2010

1. Tom Mueller
2. Mark Lauersdorf
3. Carol Hanley

4. Philip Mink
5. Brian Lee
6. Jeff Levy
7. Tiku Ravat
8. Michael Kennedy
9. Ole Wendroth
10. Daehyun Kim
11. Dan Carey
12. Demetrio Zourarakis
13. Michelle Ellington
14. Andy Johnson
15. Songlin Fei
16. Wei Wan
17. Brad Lee
18. Surendran Neelakantan
19. Chris Pappas
20. Jonathan Phillips
21. Jerry Weisenfluh
22. Blazan Mijatovic

B. Eastern Kentucky University GIS Faculty

Richmond KY, September 9 2010

1. Stephanie McSpirit
2. Alice Jones
3. Bruce Davis
4. Tyler Huffman

C. Kentucky CMRS Board

Frankfort KY, September 13 2010

1. John J Patterson
2. Joe Barrows

D. Kentucky Association of Professional Surveyors Board

Frankfort KY, September 18 2010

1. Brian Cox
2. Bob Westermeyer
3. Chuck Felts
4. James Mayo
5. Don Pedigo
6. Kevin Phillips
7. David Dummer
8. James R. Riney
9. Tom Bushelman
10. Ted Niemann
11. Richard Montgomery
12. Curtis Felts
13. Tom Clayborn
14. Johnny Justice
15. John K. Schneider

16. Joseph B. Mylor
17. Chris Gephart
18. Bill Jones
19. Betty Gray

2008 LANDSCAPE CONFERENCE

A summary report from the 2008 conference as well as scans of the flip-chart notes from breakout-session focus group discussions, from which some of the feedback survey questions were derived, can be found through the KYGEONET at ftp://ftp.kymartian.ky.gov/kls/KentuckyMappingandMonitoringConference2008FinalReport_Complete.pdf (PDF, 128Mb)

APPENDIX 4: Questions on the On-line Survey from the GIAC's Strategic Planning Committee

Your name: _____ Organizational affiliation: _____

- 8 What is your role in the organization?
- 9 What applications do you use?
- 10 What do the applications do?
- 11 Are those applications working? YES NO If not, what needs to be fixed?
- 12 What data themes are necessary to run your applications?
- 13 What resolutions are necessary to run your applications?
- 14 How often do you need to refresh/update your data?
- 15 What datasets would you like to see available to you (or your agency/business) for your work?
- 16 What new datasets need to be collected?
- 17 What datasets exist, but are not readily available?
- 18 How can communication/coordination be improved WITHIN the Kentucky geospatial community?
- 19 How can communication be improved FROM the Kentucky geospatial community?
- 20 Would you participate? How?
- 21 What specific actions can be undertaken to improve partnerships in the Kentucky geospatial community?
- 22 What are some risks you can identify to the future of Kentucky geospatial data? How can those risks be overcome?
- 23 What are some constraints hampering the Kentucky's geospatial data potential/implementation/integration?
- 24 How can GIS make doing business in Kentucky easier?
- 25 How can GIS make development decisions more efficient?
- 26 How can GIS help communities better track and manage their assets?
- 27 How will GIS develop in the future?
- 28 How can Kentucky position itself to gather pertinent data now?
- 29 What could state/regional/local agencies do to help you do your job better?

TOPICAL QUESTIONS

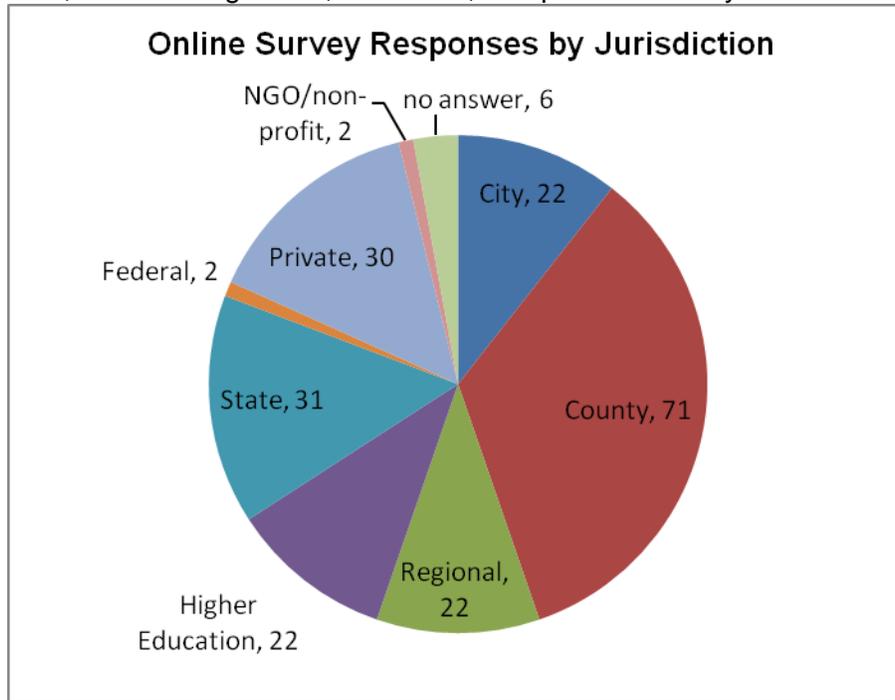
- 1 Will GIS standards help government assist communities across the commonwealth?
- 2 Should the state-wide GIS be parcel based?
- 3 Should the parcel boundaries be seamless and accurate (using mapping standards)?
- 4 Are buried utility locations important mapping features?
- 5 How current should the photographic imagery maintenance schedule be (annually, bi-annually, and quarterly)?
- 6 Are legal easements or setbacks important mapping features?
- 7 Do you perform emergency services or catastrophic recovery services?
- 8 Are data sources, demographics or local mapping features immediately available in your organization/community?

Please use the space below (or extra sheets) for any additional thoughts/comments related to any of the preceding questions.

APPENDIX 5: Preliminary Summary of Responses to GIAC Online Strategic Planning Feedback Survey

The survey questions in Appendix 5 were posted online at <http://www.surveymokey.com/s/KyGISsurvey> from September 1 through October 20, 2010. The survey was advertised through the KYGIS listserv, the GIAC Strategic Planning Committee, and through email contact with selected constituencies as suggested by Strategic Planning Committee members.

A total of 222 responses were received; 14 were blank entries. The respondents represented a broad range of the Kentucky stakeholder community, predominantly from local, regional, and state agencies, academia, and private industry.



Jurisdiction	No. of responses
City	22
County	71
Regional	22
Higher Education	22
State	31
Federal	2
Private	30
NGO/non-profit	2
no answer	6
<i>Total</i>	<i>208</i>

The local and regional respondents represented sometimes overlapping activities. Emergency response and public safety, planning and mapping, and public works generally predominated.

	City	County	Regional	Grand Total
Administrator (mayor, city manager, county judge exec)	3	2		5
Clerk	3	2		5
PVA		7		7
Public works (water, sewer, electric, utilities)	6	5	3	14
911 office		31		31
Public safety, police, emergency management	3	4		7
Economic development, Area Development Dist	1		13	14
Planning commission	3	6	5	14
GIS office (unassigned?)	3	11		14
Board of education		3		3
Health dept			1	1
<i>Grand Total</i>	<i>22</i>	<i>71</i>	<i>22</i>	<i>115</i>

The 31 responses from state agencies represented 16 different divisions or offices, in 6 different cabinets. The Energy and Environment Cabinet produced 15 responses; 6 more came from the Transportation Cabinet.

Responses were received from Eastern Kentucky University, Morehead State University, Murray State University, Northern Kentucky University, University of Kentucky, Western Kentucky University, and Jefferson Community and Technical College. Of the 22 total responses, 6 were from the field of geography, 4 were from the Kentucky Geological Survey, and the others represented the fields of anthropology, agricultural extension, landscape architecture, library science, political science, public affairs, remote sensing, transportation research, and facilities management.

Private industry responses represented GIS consultants (13), surveyors (13), and aerial mapping/engineering/photogrammetry (4), landscape architects, electric utilities, a private vendor, and personnel training.

What software do they use?

(NOTE: Mention of brand names, products and trade names in this document do not constitute endorsement, and are merely stated to better identify and understand the Kentucky geospatial community.)

Most respondents use ESRI geographic information system software, and Trimble GPS products, but many other individual products were mentioned at least once.

ESRI ArcGIS/ArcMap	139
ESRI ArcGIS Server/ArcIMS	22
ESRI ArcPad	3
ESRI ArcReader	3
ESRI ArcView	3
Trimble Pathfinder	57
NRCS Soil Data Viewer	14
FEMA HAZUS-MH	12
MapSync GeoSync	6

Google products	6
WRIS Edit	6
AutoDesk AutoCAD products	4
ERDAS Imagine	2
InterAct Geo	2
MapInfo products	2

What data do they use?

The respondents represent a wide range of activities in jurisdictions of various scale and function. Data themes relating to roads, land parcels and land ownership, and topography elevation were the most commonly mentioned as being important to the work of Kentucky geospatial practitioners and stakeholders.

Roads network	143
Land parcels/ownership data	123
Topographic/elevation data	115
Demographic data	83
KIA water and wastewater database	47
NRCS soils data	44
Administrative boundaries (federal, state, county, city, election precincts, annexations, parks, public lands, emergency service zones, school districts)	22
Aerial/satellite imagery (including leaf-off)	21
Hydrography/drainage/watersheds	15
Address data (needs coordination)	13
Structure footprints/points/GPS data	12
Landcover/land-use data	9
Flood and floodplain data	7
Geology (including karst)	7
Zoning	4
Health/disease data	3

What data needs have been identified?

The full data set from these questions have not yet been completely compiled, but preliminary overview of the data suggest that the following themes appear to be the most mentioned as needing attention:

PVA Parcels: many respondents use land parcel data. Most commented that access and data standards varied from county to county. A few noted concerns over mapping accuracy standards and security of the data if the data theme was to be posted as a statewide, publically available layer. Some PVA offices use these data as a source of revenue.

Addressing and structure locations: respondents identified an inter-related set of issues involving improved and up-to-date road centerlines, address ranging on those centerlines, standardized addressing, and comprehensive structure point/footprint data. These data are key in digital 911 dispatching (eg. CMRS Board applications), and are important for numerous other applications as well.

LiDAR: can provide high-resolution topography for flood and landslide hazards delineation, as well as other detailed landscape and planning applications. LiDAR is being flown for some parts of the state, but a need for a statewide dataset or statewide repository has been identified by the respondents.

Utilities: respondents noted a need for more data on utility locations and infrastructure. Some respondents noted the sometimes proprietary nature

of these data, while others mentioned concerns over security to protect the utilities from sabotage or harm.

What other needs and issues were raised?

These data also have not yet been fully analyzed, but many thoughtful responses and ideas have been received. Again, a broad overview seems to suggest a few key themes recur through the responses:

Coordination: respondents overwhelmingly encouraged more coordination and communication between GIAC, DGI, KAMP, and the stakeholder community. Many noted the talented personnel available in DGI, while others described difficulties in pursuing specific issues with the office. Several recognized the instability of the GIAC and DGI leadership and physical office location as hindering the DGI's capacity to act in a coordinating role. Future coordination between all entities will improve the communication, perceptions, and efficiency of each organization involved.

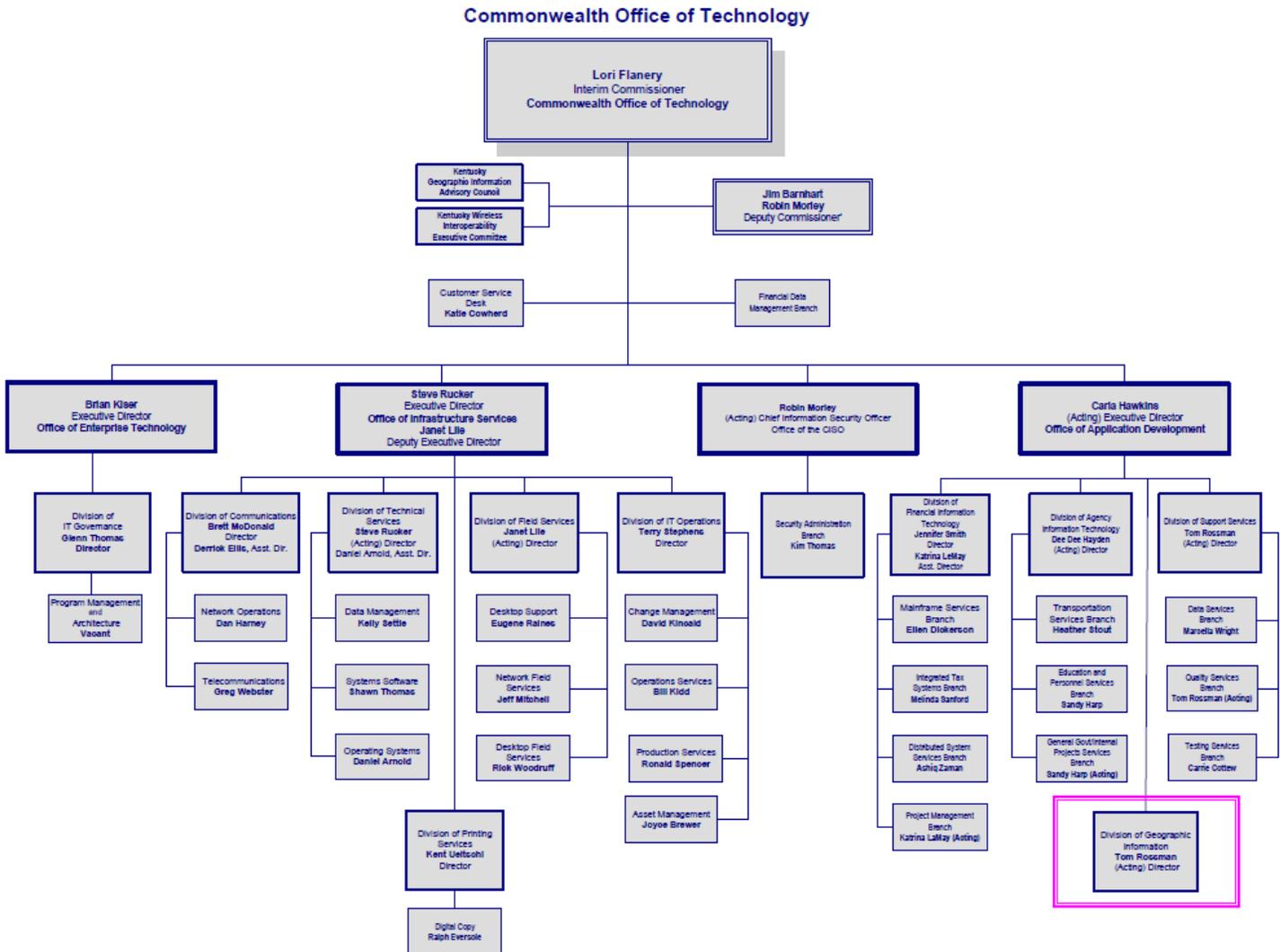
Communication: respondents suggested many mechanisms for improved communication between coordinating entities, stakeholders, and practitioners, including more regular meetings, workshops, email newsletters, listserv's, and online forums.

Sharing data: respondents noted that many of the key successes recorded in the recent history of the Kentucky geospatial community are due to the willingness of entities and practitioners to willingly share their data with others. They noted that that still occurs, but some agencies and individuals can become territorial with their data, while in other cases developing bureaucracies intended to support data sharing have actually made the process more cumbersome.

Training and education: respondents noted a need for continuing education and training on the rapid advances in technology, on newly available products and services, and on the issues facing the community.

Funding: respondents identified diminishing budgets and lack of funding as a key limiting factor in many data-collection efforts, and none seemed optimistic that the current economy or budget situation was likely to improve in the near term.

APPENDIX 6: DGI in the Commonwealth Office of Technology (COT)
Organizational Chart



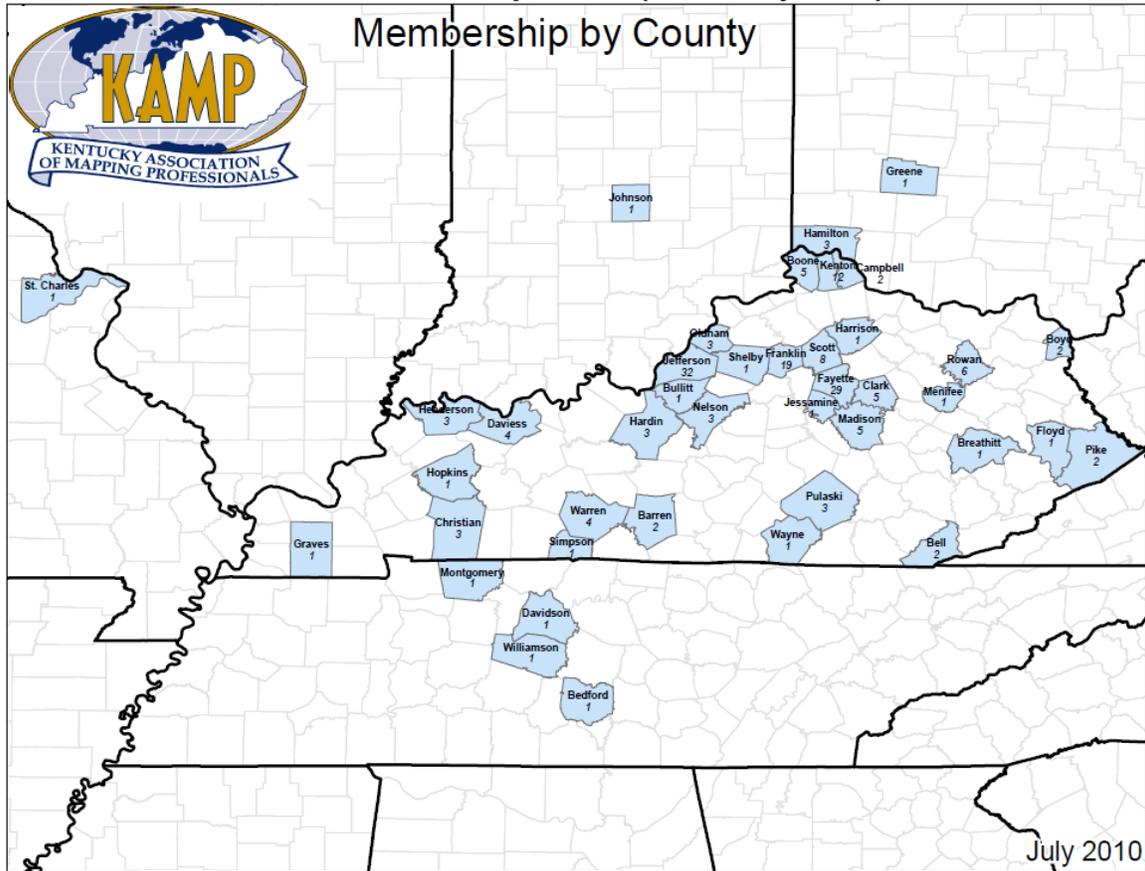
(To report an update contact: Kathy.Bartlett@ky.gov)

Commonwealth Office of Technology Organization

Oct. 2010

APPENDIX 7: Geographic Distribution of KAMP membership

KAMP members: total membership is 154 (as of July 2010).



APPENDIX 8: Geospatial Community-of-Practice in Kentucky

a. Government agencies:

i. Local:

1. City government
2. County government

ii. Regional: Area Development Districts (ADDs)

iii. State:

1. Executive Branch Cabinets and Individual Agencies:

- a. Kentucky Department of Library and Archives
- b. Department of Agriculture
- c. Department of Revenue - County PVA Mapping Projects
- d. Department of Fish & Wildlife Resources
- e. Department of Parks
- f. Division of Water
- g. Division of Emergency Management
- h. Kentucky Transportation Cabinet
- i. Energy and Environment Cabinet
- j. Education and Workforce Development Cabinet:
 - i. KY Virtual Schools
- k. Cabinet of Health and Family Services

iv. Boards, Commissions, Councils, Offices, and Authorities:

1. Commercial Mobile Radio Service Board (CRMS)
2. Public Service Commission (PSC)
3. Kentucky Infrastructure Authority (KIA)
4. Office of the Secretary of State (SOS)
5. Legislative Research Commission (LRC)
6. Kentucky State Nature Preserves Commission (KSNPC)
7. Kentucky Heritage Council

v. Federal:

1. United States Department of Agriculture
 - a. Natural Resources Conservation Service
 - b. Forest Service
2. United States Geological Service

3. United States Army Corps of Engineers
4. United States Parks

b. Academia:

i. K-12:

1. School Districts
2. Kentucky Virtual Schools

ii. Higher Education

1. Kentucky Community and Technical College System

2. State Universities:

- a. University of Kentucky
- b. University of Louisville
- c. Northern Kentucky University
- d. Eastern Kentucky University
- e. Western Kentucky University
- f. Morehead State University
- g. Murray State University
- h. Kentucky State University

3. Private Universities

- a. Berea College
- b. Center College
- c. Georgetown College
- d. Bellarmine University

iii. Council on Postsecondary Education

iv. Kentucky Geological Survey

v. Institutes and Centers at Universities

c. Private Businesses: including private GIS Consultants and data-producers:

i. Photogrammetry and surveying:

1. PhotoScience
2. GRW
3. Woolpert
4. Surdex
5. Others

ii. GIS and Environmental

1. Stantec
2. Others

iii. Hydrology/geologic

1. Tetra Tech
2. Third Rock

- 3. Others
 - iv. Geospatial integration and application development:
 - 1. Others
 - v. Chambers of Commerce
- d. Non-profits and citizens groups:
 - i. Conservation and preservation:
 - 1. The Nature Conservancy
 - 2. The Bluegrass Conservancy
 - ii. Watershed/stream protection:
 - 1. Kentucky Waterways Alliance
 - iii. Recreational and out-of-doors
 - iv. Community development:
 - 1. MACED
 - v. Other user groups
- e. Security and homeland/hometown protection:
 - i. Kentucky National Guard and Military Affairs
 - ii. State Police
- f. Professional organizations:
 - i. GIS and mapping professionals: KAMP
 - ii. Kentucky Association of Professional Surveyors
 - iii. Kentucky Society of Professional Engineers
 - iv. Kentucky Board of Registration for Professional Geologists
 - v. Kentucky Landscape Architecture Board
 - vi. American Planning Association
 - vii. Kentucky Association of Mitigation Managers

APPENDIX 9: Estimated GIS users in Kentucky*

ENTITIES	ESTIMATED GIS USERS		
	Minimum	Maximum	Average
1- Government			
1.1 City and County Government	15	20	17.5
1.2 Area Development Districts	20	30	25
1.3 Property Valuation Administrations	150	300	225
1.4 State Government	300	400	350
1.5 Consortia/Planning Commissions	10	15	12.5
1.6 Homeland and Hometown Security	20	50	35
1.7 Federal	40	80	60
Subtotal	555	895	725
2. Private/Commercial			
2.1 Non-Profit Organizations	5	10	7.5
2.2 Photogrammetric Surveying Firms	10	20	15
2.3 Engineering Firms	200	400	300
2.4 Geological and Geotechnical Consulting Firms	30	60	45
2.5 Environmental Consulting Firms	20	40	30
2.6 Landscape Architecture and Urban Planning Firms	10	50	30
2.7 Land Surveying Firms	100	200	150
2.8 Crop Consulting Firms	5	10	7.5
Subtotal	380	790	585
3. Academia			
3.1 K-12	20	150	85
3.2 Higher Education	50	150	100
Subtotal	70	300	185
TOTAL	1,005	1,985	1,495

**** Preliminary estimates were constructed by consulting a variety of sources, such as professional organizations, commercial listings, sponsorship lists, agencies personnel and subject matter experts.***

APPENDIX 10: GISP and other Certified Professionals in Kentucky

GIS Professionals (GISP – GIS Certification Institute): 94 total

NAME	CITY	STATE	TITLE
Ackerman, Jeffrey David	Louisville	KY	Database Analyst
Anderson, Michael E	Lexington	KY	GIS Manager
Andrew, Karla M	Bowling Green	KY	Environmental Informatics Section Manager
Bailey, Kenneth M	Louisville	KY	Customer Support Specialist
Bates, James J.	Louisville	KY	Process Owner: GIS, Infrastructure Records and Surveying
Bearden, Benjamin Kyle	Bowling Green	KY	GIS Manager
Belcher, Darrin	Lexington	KY	Supervisor/Project Manager
Berry, Stephen M	Winchester	KY	GIS Analyst
Beverly, J. Howard	Lexington	KY	Senior GIS Specialist
Blondin, Phil	Owensboro	KY	Integrity Management Specialist
Bradshaw, Jeff	Frankfort	KY	GIS Programmer/Analyst
Brush, Trisha Wildey	Fort Mitchell	KY	Deputy Director GIS Administration
Busemeyer, Joseph R	Ft Mitchell	KY	Principal GIS Specialist
Bynum, Curtis Ray	Louisville	KY	GIS Coordinator
Cambron, Kevin	Owensboro	KY	GIS Analyst/Programmer
Carpenter, Will A.	Owensboro	KY	GIS Manager
Carroll, Bruce	Louisville	KY	GIS Database Administrator
Cary, Kevin B.	Bowling Green	KY	Instructor/GIS Facility Manager
Casana, Alfonso	Bowling Green	KY	Planning Engineer- GIS/GPS & Mapping Director
Clemons, Calvin Keith	Elizabethtown	KY	Engineering Technician
Cole, Gerald T.	Elizabethtown	KY	GIS Administrator
Conley, Benjamin Thomas	Louisville	KY	GIS Specialist
Creighton, Jim	Hopkinsville	KY	GIS/Data Integrator
Croswell, Peter L	Frankfort	KY	President and Consultant
Dickison, Scott Edward	Lexington	KY	GIS Programmar Analyst
Dowdy, Therese Cunningham	Lexington	KY	GIS Specialist/Instructor
Drane, Wade Whitfield Shade	Fisherville	KY	GIS Application Analyst
East, Thomas C.	Ft Mitchell	KY	Senior GIS Specialist
Ellington, Michelle	Lexington	KY	GIS Analyst
Ferrell, Kathy	Henderson	KY	Associate Director/GIS Manager
Gardner, Steve E.	Owensboro	KY	GIS Analyst II
Gay, Steven T.	Union	KY	Director of GIS Services
Greene, Michael A	Lexington	KY	GIS Analyst

Greenwell, Louis	Louisville	KY	GIS Program Manager
Harney, John N	Burlington	KY	GIS Application Analyst
Hench, Robert M	Lexington	KY	Vice President GIS Manager
Herrick, Thomas A	Versailles	KY	Wildlife Technician
Hill, Louis R	Burlington	KY	GIS Specialist-User Support
Horton, James	Burlington	KY	GIS Data Specialist
Householder, Ronald W	Lexington	KY	Vice President GIS Analyst
Ivanovich, Eric Stephen	Lexington	KY	GIS Section Manager
Jefferson, Laura M	Maysville	KY	Infrastructure Development Manager
Jenkins, Robert S	Frankfort	KY	Principal
Johnson, Brady W.	Lexington	KY	GIS Manager
Kelly, Ryan	Lexington	KY	Associate Professor of Geography
Kent, Ryan	Ft Mitchell	KY	Principal GIS Specialist
Laird, Jeffrey McCall	Frankfort	KY	GIS Analyst
Lashlee, Jeff T	Bowling Green	KY	City Engineer
Lee, Pat	Hopkinsville	KY	GIS Manager
Levy, Jeffrey E.	Lexington	KY	GIS Analyst/Instructor
Lewis, Brandon L	Middlesboro	KY	GIS Manager
Littell, Ashley	Bowling Green	KY	GIS Analyst
Lucas, David S	Lexington	KY	Director 9-1-1
Martin, Lisa	Demossville	KY	GIS Administrator
Mc Laughlin, David	Louisville	KY	GIS Analyst
McGarry, Joseph A.	Louisville	KY	GIS Analyst
Meyer, Philip W.	Owensboro	KY	Integrity Management Specialist
Meyers, Brian	La Grange	KY	Applications Analyst
Moore, Laura M Wise	Louisville	KY	GIS Career and Technical Education Teacher
Morris, Lance G	Owensboro	KY	GIS Analyst/Programmer
Murphy, Amy E.	Lexington	KY	Senior GIS Analyst
New, David Shane	Lexington	KY	Director of Information Development District
Poole, Jane M	Louisville	KY	Customer Support Administrator
Powell, Christy Ann	Fort Mitchell	KY	Senior GIS Specialist
Prestigiacomio, Philip	Louisville	KY	Program GIS Analyst
Price, Julie L	Louisville	KY	Applications Administrator
Ray, Michale S.	Owensboro	KY	GIS Project Manager
Rink, Timothy K	Louisville	KY	GIS Analyst
Rowles, Ruth Anderson	Georgetown	KY	Geoprocessing Specialist
Rush, Edward R	Louisville	KY	Information Systems Manager
Schwartz, Michael D	Ft Mitchell	KY	Deputy Director for Current Planning
Shelby, Shane E.	Lexington	KY	Staff GIS Analyst III
Sherer, Craig	Louisville	KY	Engineering Planner

Snyder, J. Kyle	Ft Mitchell	KY	Principal GIS Specialist
Sprandel, Gary	Frankfort	KY	Geoprocessing Specialist
Stepro, D. Scott	Louisville	KY	GIS Coordinator
Stevens, Christi L.	Louisville	KY	GIS Coordinator
Talbot, Alex F	Louisville	KY	Senior Application Developer
Taylor, Daniel Ryan	Louisville	KY	Geographer/GIS Specialist
Thomas, Bert E	Henderson	KY	GIS Specialist / Coordinator
Totty, Jon M.	Winchester	KY	GIS Specialist
Tri, Thomas G	Louisville	KY	Senior Project Engineer
Uptain, D Michelle	Louisville	KY	Senior GIS Analyst
Vichitbandha, Daniel	Frankfort	KY	Database Manager/Geoprocessing Specialist
Wagoner, Matthew D	Louisville	KY	GIS Manager
Walls, Michael D.	Lexington	KY	Sr. IT Consultant
Weakland, Andrea Lee	Louisville	KY	GIS Analyst
Wethington, Marshall Keith	Frankfort	KY	Wildlife Program Coordinator
Whisenhunt, James Lawrence	Lawrenceburg	KY	GIS Manager
Williams, Wm. Todd	Lexington	KY	Director of Operations
Wolff, Michael J.	Frankfort	KY	GIS Coordinator
Wood, Jason E.	Russellville	KY	Excavation Coordinator
Zimmermann, Brian	Kevil	KY	GIS Technician
Zourarakis, Demetrio P	Frankfort	KY	GIS and Remote Sensing Analyst

Other certified professionals (American Society of Photogrammetry and Remote Sensing): 15 total.

Name	City	State or province	Type of Certification	Cert Number
Mr. Peter L. Croswell, CMS	Frankfort	KY	Certified Mapping Scientist GIS/LIS	R140GS
Mr. Jeffrey M. Laird, CMS	Frankfort	KY	Certified Mapping Scientist GIS/LIS	R138GS
Mr. Glenn D. Logan, CP	Lexington	KY	Certified Photogrammetrist	R1039
Mr. Mitchell Jay Long, CP	Lexington	KY	Certified Photogrammetrist	1411
Mr. Daniel J. Marsh, CP	Lexington	KY	Certified Photogrammetrist	R1019
Mr. Daniel J. Marsh, CP	Lexington	KY	Certified Mapping Scientist RS	RS155
Mr. Mark E. Meade, CP	Lexington	KY	Certified Photogrammetrist	R1050
Mr. Jack L. Mitchell, CP	Lexington	KY	Certified Photogrammetrist	R849
Mr. Jeremy L. Mullins, CP	Lexington	KY	Certified Photogrammetrist	1404

Mr. C. Keith Ricks, CP	Lexington	KY	Certified Photogrammetrist	R1049
Mr. G. Michael Ritchie, PE, PLS, CP	Lexington	KY	Certified Photogrammetrist	R1030
Mr. Jon K. Sciberras, CP	Louisville	KY	Certified Photogrammetrist	R783
Mr. Clay D. Smith, CP	Lexington	KY	Certified Photogrammetrist	R939
Dr. Demetrio P. Zourarakis, CMS	Frankfort	KY	Certified Mapping Scientist GIS/LIS	GS208
Dr. Demetrio P. Zourarakis, CMS	Frankfort	KY	Certified Mapping Scientist RS	RS161

APPENDIX 11: Mapping Applications, Data Repositories, and Information Services

A. Mapping Applications

A comprehensive listing of mapping applications can be found on the KYGEONET (<http://kygeonet.ky.gov>) by searching for Live Data and Maps.

B. Data Repositories:

A comprehensive listing of downloadable data resources can be found on the KYGEONET (<http://kygeonet.ky.gov>) by searching for Downloadable Data.

C. Information Services:

As a service to State government agencies, DGI manages a wide array of geospatial data resources that are exposed to users via KyRaster and KyVector (See section 5.2 for a description) and via a wide array of ArcGIS Server and ArcIMS services.