INTERIM REPORT

TO
THE GOVERNOR
AND
THE MISSISSIPPI LEGISLATURE

A
STRATEGIC PLAN
FOR
REMOTE SENSING AND GIS COORDINATION
IN MISSISSIPPI

The Mississippi Coordinating Council
For Remote Sensing And Geographic Information Systems
December 31, 2003

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Introduction

State, regional, and local governmental entities in Mississippi use Remote Sensing (RS) and Geographic Information Systems (GIS) for a wide range of activities, including economic development, natural and physical resource monitoring, tax parcel mapping, infrastructure planning, emergency/disaster preparedness and recovery, and regulatory issues. The private sector uses RS/GIS

extensively, as well. Utilities, real estate companies, telecommunications firms, and retailers all use GIS to make their products and delivery systems more efficient and cost effective. RS/GIS will be a powerful tool in the Homeland Security arsenal. This technology can save money, time, and man-hours—it allows people to make "better, faster, and cheaper" decisions.

Through collaboration among the state's universities, the Mississippi Development Authority (MDA), the NASA Stennis Space Center in Hancock County, numerous federal partners such as the U. S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), the U. S. Forest Service (USFS), the U. S. Department of Transportation (USDOT), the National Aeronautics and Space Administration (NASA), the Environmental Protection Agency (EPA), the Federal Emergency Management Agency (FEMA), the U. S. Army Corps of Engineers (USASCE), and private companies, Mississippi is poised to capture a significant share of the world's RS industry market, which is expected to grow to $6.0 billion by 2010.

However, to realize the potential benefits from RS/GIS, the state must obtain more up-to-date and accurate data than it has. Today, most of the state's United States Geological Survey (USGS) maps are over 20 years old. Mississippi's geographic data have low horizontal and vertical accuracy levels; and many of these data are not digital, and are therefore, not Internet accessible or useful for computer analysis. A more complete discussion of Mississippi's GIS and remote sensing needs is contained in the below referenced report by the Governor's Advisory Commission on Remote Sensing Technologies

Unfortunately, there has been a lack of policy coordination among public sector users and purchasers of RS/GIS data, and the responsibilities of Mississippi's various public sector entities for providing RS/GIS data were not well-defined.

This unfulfilled potential for leadership in the RS/GIS arena led Governor Ronnie Musgrove to create the Governor's Advisory Commission on Remote Sensing Technologies. This commission studied the needs and benefits as well as how best to approach the development of the Mississippi Digital Earth Model (MDEM) vision. The commission's final report, which contained a comprehensive discussion of Mississippi's GIS and remote sensing needs along with its recommendations, was published in November, 2002,

In response to the Commission's report, the 2003 Mississippi Legislature passed House Bill 861 which created the Mississippi Coordinating Council for Remote Sensing and Geographic Information Systems (MCCRSGIS). HB 861 was aimed at creating statewide coordination and sharing of geographic data. The Council is also responsible for overseeing the development of the MDEM.

MDEM is a digital land base computer model of the entire state of Mississippi. It will be composed of the seven geographic framework data layers identified by the Federal Geographic Data Committee (FGDC) as the essential layers upon which all other geographic data layers should be overlaid. If these framework layers are not accurate and up-to-date, the GIS is not as useful to decision-makers as it should be, regardless of the number of additional layers contained in the GIS.

Mississippi Coordinating Council for Remote Sensing and Geographic Information Systems

House Bill 861, which created the MCCRSGIS, established a clear purpose for the Council, as well as a specific list of responsibilities. The Council is directed to set and assure enforcement of policies

and standards to make it easier for remote sensing and geographic information system users around the state to share information and to facilitate cost-sharing arrangements to reduce the costs of acquiring remote sensing and geographic information system data. The council's responsibilities include, but are not limited to:

(a) Coordination of remote sensing and geographic information system activities within Mississippi;

(b) Establishing policies and standards to guide Mississippi Department of Information Technology Services (MDITS) in the review and approval of state and local government procurement of both hardware and software development related to remote sensing and geographic information system;

(c) Oversight of MDITS' implementation of these responsibilities;

(d) Preparing a plan, with proposed state funding priorities, for Mississippi's remote sensing and geographic information system activities, including development, operation and maintenance of the Mississippi Digital Earth Model;

(e) Oversight of the Mississippi Department of Environmental Quality's development and maintenance of the Mississippi Digital Earth Model, including establishing policies and standards for the procurement of remote sensing and geographic information system data by state and local governmental entities and establishing the order in which the seven (7) core data layers shall be developed;

(f) Designating Mississippi's official representative to the National States Geographic Information Council and to any other national or regional remote sensing or geographical information system organizations on which Mississippi has an official seat;

(g) Establishing and designating the members of an advisory committee made up of policy level officials from major state, local, regional and federal agencies, as well as members of the private sector;

(h) Creating a staff level technical users committee

(i) Coordinating with the State Tax Commission to assure that state and local governmental entities do not have to comply with two (2) sets of requirements imposed by different organizations.

The law also directed the Mississippi Department of Information Technology Services to work closely with the council to bring about effective coordination of policies, standards and procedures relating to procurement of remote sensing and geographic information systems (GIS) resources. In addition, MDITS is responsible for development, operation and maintenance of a delivery system infrastructure for geographic information systems data and is charged with providing a warehouse for Mississippi's geographic information systems data.

Additionally, the Mississippi Department of Environmental Quality, Office of Geology and Energy Resources is given the responsibility for program management, procurement, development and maintenance of the Mississippi Digital Earth Model, which includes the following seven (7) core data layers of a digital land base computer model of the State of Mississippi:

(a) Geodetic control;

(b) Elevation and bathymetry;
(c) Orthoimagery;
(d) Hydrography;
(e) Transportation;
(f) Government boundaries; and
(g) Cadastral

For all seven (7) framework layers, the Mississippi Department of Environmental Quality, Office of Geology and Energy Resources is designated as the integrator of data from all sources and the guarantor of data completeness and consistency and shall administer the council's policies and standards for the procurement of remote sensing and geographic information system data by state and local governmental entities.

Progress to Date

From the day the new law took effect on July 1, 2003, the Council has been hard at work to meet its legislative responsibilities. Among the Council's accomplishments thus far:

- The full Council has met five times beginning July 8, 2003
- The Technical Users Committees has been formed and convened to begin its work.
- The Policy Advisory Committees has been formed and convened to begin its work.
- Three work groups have been formed and convened to make recommendations on: (1) education and outreach efforts; (2) financial and legislative issues; and (3) software and hardware standards.
- Notification by correspondence to all Mississippi city, county and state governments advising them of the Council's existence and purpose, and requesting that the Council be kept informed of all planned RS/GIS activities.
- Notification by correspondence to all appropriate state and federal authorities of the Council's existence and purpose as Mississippi's official RS/GIS coordinating authority
- Development of an initial Strategic Plan for Remote Sensing and GIS Coordination in Mississippi.
- Appointment of an official representative to the National States Geographic Information Council (NSGIC).
- Produced and conducting a Request for Qualifications pursuant to procurement for: (1) acquiring statewide aerial photography in order to develop a state base map from orthophotography; and (2) development of new digital flood insurance rate maps (DFIRMS) for selected counties. Due to lack of funding, the Council has deferred any action on statewide aerial photography at this time but has selected a contractor to move forward with the DFIRM project.

This initial document issued by the Council is intended to be an Interim Report on the first six months of the Council's activities, pending a more complete report in December 2004.

A STRATEGIC PLAN FOR REMOTE SENSING AND GIS COORDINATION IN MISSISSIPPI

Overview

The Strategic Plan for Remote Sensing and GIS Coordination is meant as a tool for meeting the Council's statutory objectives for coordinating the expanding use of GIS throughout state, regional and local government, and the development of MDEM. MCCRSGIS has identified seven overarching goals that encompass the major issues the Council must address in coordinating RS/GIS in Mississippi :

1. Developing and Maintaining MDEM
2. Developing Standards for Purchasing of Hardware, Software, and Data
3. Establishing a Clearinghouse/Warehouse
4. Developing, Operating and Maintaining Delivery System Infrastructure
5. Education and Outreach
6. Staffing
7. Funding

Each goal has specific strategies and action steps. A brief background history of MCCRSGIS, and GIS in the state of Mississippi is given in Appendix A; Appendix B contains a list of the Policy Advisory Committee members and their responsibilities; Appendix C contains a list of the Technical Users Committee and their responsibilities; Appendix D contains a glossary of important geospatial terminology. Although the Council has only been in existence for a short time, the Council members felt strongly that this document was an important first step in carrying out its duties. This Plan will continue to be refined and amplified as appropriate through the coming year and an updated Plan will be reported to the 2005 session of the Mississippi Legislature.

Strategic Plan

1. Develop and Maintain MDEM

Strategies

(1) To reduce duplication and achieve economies of scale in procuring remote sensing data related to the seven core data layers.
(2) To capture and leverage all federal dollars available for development of MDEM layers.
(3) To produce the layers with the broadest benefits first.
(4) To produce something of value during the up-coming leaf-off flying season.

Steps

(1) *Develop an RFQ and select a contractor to perform the following work, beginning no later than late January, 2004, using available funds from federal, state, and local sources:*
  (a) Work required under the FEMA flood-mapping grants for FY 2003 and 2004 obtained by MEMA and MDEQ;
  (b) *Statewide orthoimagery at resolutions that can satisfy local governmental cadastral mapping requirements.*
(2) Request funding from the Legislature:
  (a) to complete development of statewide orthoimagery
  (b) to contract with a "global MDEM contractor" and continue MDEM development
  (c) to fund the infrastructure needs of ITS and local governments to enable the state to fully realize the benefits of MDEM.
(3) Develop an RFQ for a "global MDEM" contractor to complete a plan for capturing maximum federal dollars and completing MDEM development and to begin implementation of that plan.
(4) Select the global MDEM contractor by July 1, 2004.

(5) *By December 1, 2004, develop a consensus long-term funding approach for completion and maintenance of MDEM that will make maximum use of state and local funds currently being spent on related remote sensing and GIS activities, for submission to the 2005 Legislature.*

2. Develop Standards for Purchasing of Hardware, Software, and Data

A. Develop Standards for Purchasing of Hardware and Software.

Strategies

(1) *To maximize purchasing power within the state and to optimize use of in-house skills.* Currently State Agencies purchase GIS software individually from several vendors. There is a need to consolidate these purchases to allow the state to get deeper discounts based on the volume of purchases statewide, rather than agency-by-agency. A master agreement with the vendor could be leveraged statewide, including allowing cities and counties to purchase GIS software from this contract. This would provide a single point of access for procurements of GIS hardware and software by government entities. This strategy would allow the state to build on the inventory of installed hardware and leverage volume purchasing power statewide.

(2) *To allow agency users to focus on application development and data maintenance in line with their agency mission.* The individual agencies would be able to procure software from an approved vendor list with prices, terms and conditions established by ITS for the software products the agencies require. The visibility provided by ITS to all purchases within the state will allow a coordinated effort among entities that use GIS software in terms of adopting standards for sharing data and interoperability.

(3) *To implement a GIS Clearinghouse/Warehouse to serve as a portal for accessing GIS applications and data.* Data and applications that can be shared across agencies and among cities and counties could be discovered and accessed via a portal that would have links to all GIS information available within the state. Besides providing a common access point, the portal would be the logical place to house a catalog of available data and applications. The entities that have data and applications that are to be made available to other entities can use the portal as the platform for informing others of what is available and for allowing access to the resources. This approach avoids the situation where a single entity spends time and resources developing and implementing point-to-point interfaces among many other entities, rather an entity makes the information available on the portal one time and it is accessible by all others.

Steps

(1) *Develop an inventory of installed hardware supporting GIS applications, both servers and clients.* A project is on-going to develop a survey that can be made available on the ITS website so that current users of GIS applications can provide the information about what software and data are being used currently. This information can be consolidated and used to negotiate with vendors for better pricing. The inventory of installed software and data can also be used to determine the interfaces and interoperability middleware that are required to leverage the use of GIS resources statewide.

(2) *Analyze the inventory and determine what is state of the art and what is old technology that should not be part of the standards.* The collective knowledge of the user community can be used to minimize incapability and to maximize the leverage the state has in keeping the software in use updated with the latest releases. Standards for data sharing and

interoperability can also be determined based on current usage to maximize the lifespan of the software investment.

(3) These recommendations will come from the Technical User's Committee based on the analysis described above. These recommendations would be taken to the Policy Advisory Committee for review. Once accepted by the Policy Advisory Committee, these recommendations would be passed to the Coordinating Council for RT/GIS approval.

(4) *Develop a procurement mechanism for GIS hardware and software that will be available to all state and local government entities.* From negotiations, ITS would develop a Master Agreement with a vendor to establish clip levels or enterprise licensing for their products. For vendors that do not have a great enough presence within the state for a master agreement, an Express Products List would be maintained to allow purchase of their products without an individual procurement activity being required for each individual purchase.

(5) *Develop procedures for implementing and governing standards for hardware and software.* As entities gain expertise in implementing GIS solutions there should be a set of guidelines for others to follow containing lessons learned, best practices, etc. that would guide others as they implement the same solution. For example, the counties with GIS operations could be used as an example for other counties to determine cost and effort to establish GIS operations within their county.

B. Develop Standards for Purchasing Remote Sensing and GIS Data.

Strategies

(1) To maximize state, regional, and local government purchasing power.

(2) To minimize duplication.

(3) To provide guidance to state, regional, and local government entities.

(4) To evolve toward standards that are consistent with MDEM without imposing additional costs on state, regional, and local governments.

(5) To promote development and maintenance of MDEM in the most cost effective manner.

Steps

(1) Develop guidelines for data purchase.

(2) As the plan for developing MDEM matures, evolve toward specific standards for each kind of data purchase.

3. Establish a Clearinghouse/Warehouse

A. Clearinghouse/Warehouse Standards

Strategies

(1) *Develop Standards for common Data Structures within the Clearinghouse/ Warehouse and other GIS application and data sources.* These standards could include, for example, common metadata for GIS data sources, perhaps built on the Federal guidelines, with extensions agreed upon by those in the state who have GIS operations in place. This would assure that all entities within the state would use the same format and fields to define the data within their operation, thus facilitating the sharing of data among entities.

(2) *Use this data structure for defining and accessing data across agency boundaries.* From the data standards come requirements to share data stored in different formats. If there is a requirement to share data between an application implemented based upon the software of Vendor A and an application implemented using software from Vendor B, then the

optimum methods for sharing data between these two environments should be developed and used by all entities that have the requirement to share data between these two implementations. The Clearinghouse would house information about standard procedures that have been developed and information on implementing the procedure.

(3) *Require all data that has enterprise wide implications to conform to this structure*. The Council should encourage all entities with a requirement to share data to conform to the standards that have been agreed upon. When a new requirement arises a standard solution should be developed and then documented in the Clearinghouse for others to use.

Steps

(1) *Identify the different data structures that are in use that have enterprise wide applicability.* This information should come from the online survey described in section 2 above. The Technical User's Committee would review the survey results and determine those data that are candidates for enterprise wide use.

(2) *Define methodology for interfacing these existing structures with the "standard" data structure.* The Technical User's Committee would examine interfaces currently in use and analyze others that would be required. For each interface there would be a recommended method for sharing data and/or interoperability to be presented to the Policy Advisory Committee. After review by the Policy Advisory Committee these recommendations would go to the Coordinating Council for RS/GIS for approval.

(3) *Develop procedures for implementing and governing standards for the Clearinghouse/Warehouse.* Once approved by the Council, the Technical User's Committee would develop procedures for implementing the standards and store them in the Clearinghouse. The Policy Advisory Council would establish guidelines for governing the use of standards by all participating entities.

(4) *Determine the governing bodies that control standards.* In order to assure that standards are implemented there must be a controlling authority to encourage the use of the standards. The Policy Advisory Committee should be the focal point for determining the controlling body, obtaining their commitment to the standard and establishing an outreach program to inform users of the standards and the policy that encourages the use of the standards.

B. Shared Application Emphasis

Strategies

(1) *Identify applications that have enterprise wide implications*. This information should also be obtained via the survey described in section 2 above. Implementing an application one time and allowing it to be shared by others is a major technique for minimizing costs and leveraging the GIS investment. Once an application is identified, a solution for sharing must be established. This could include implementing the application on the Clearinghouse Portal, or having the hosting entity provide access to the application where it is currently implemented.

(2) *Identify a vendor neutral method for sharing applications and minimizing duplication across government entities (ex: web services).* The objective of this strategy is to minimize the impact on the current users of the application while making it available to others who use software from another vendor. To try to get all entities to use the same software is an impossible task. The alternative is to develop a method for users to access the application in a vendor neutral manner. This could be by using one of the standards developed by the

OpenGIS Consortium. Some vendors provide APIs to allow access by other products. The Technical User's Committee should identify such solutions and recommend them to the Policy Advisory Committee, who would review them and pass them to the Coordinating Council for approval.

(3) *Classify application as one of the following:*

(a) Client/Server Applications. These applications require that the user have client software installed on their workstation in order to access the application. The Master Agreements and/or Express Product Lists described in section X above could be used to procure client software and to leverage the volume purchases across the state. This approach would also maximize compatibility among the client packages in use and over time increase the usage of those that provide the best results and maximize volumes of these packages in use.

(b) Intranet Applications. This set of applications is used within the State Agencies, cities and counties. If access to these applications is entirely via the state network then they are considered Intranet applications and are protected from the World Wide Web by the state firewall. This network currently connects over three thousand locations and will be expanded to include counties in the future.

(c) Internet / Portal Applications. These applications are available from the World Wide Web (Internet) as well as from locations within the state via the state Intranet. Some of these applications will allow access to information that is not restricted and can be accessed by anonymous users on the Internet, as much information is currently available on the State Portal at www.ms.gov. If data and applications are to be available on the Internet that require security the facilities of the State Portal for userID/Password protection can be used to limit access. If additional security is required, such as digital signatures, this could be implemented via the State Portal, also. This strategy optimizes the use of state resources and removes from individual entities the burden of maintaining security staff, equipment and procedures. This allows GIS applications to be delivered as any other application that is accessible on the Internet.

Steps

(1) *Develop a standard for applications that are shared across agencies*. On a case-by-case basis, the Technical Users' Committee, or a sub-group thereof, will determine the best method for sharing applications that have enterprise wide impact. These methods should be passed to the Policy Advisory Committee for review and forwarded to the Coordinating Council for approval. Once approved, these methods would become standards and would be documented in the Clearinghouse for all users to share.

(2) *Develop a "front-end" for existing applications that allow them to be accessed in a standard way by other applications*. For existing applications that have enterprise wide implications, the same process would be used to develop a "front end" process that makes the existing application accessible by others while minimizing the changes required to the application. These "front end" solutions would pass through the same approval process as above and be documented in the Clearinghouse.

C. Assimilating Acquired Data Into the Clearinghouse/Warehouse.

Strategies

(1) Ensure that data acquired by MDEQ is assimilated correctly into the Clearinghouse/Warehouse.
(2) Develop Clearinghouse/Warehouse QA Process.
(3) *Develop Procedures for Refreshing Data.*

Steps

(1) *Develop procedures for populating the Clearinghouse/Warehouse with data that has been acquired and quality assured.* A set of procedures should be developed by the Technical Users' to facilitate the process of adding data to the Clearinghouse that MDEQ has procured and passed through the Quality Assurance process. These procedures should provide a non-disruptive method of adding data to the Clearinghouse including a back out procedure to use in case the loading process is unsuccessful. These procedures would be subject to the approval process described above, then documented in the Clearinghouse.
(2) *Develop procedures for QA of data loaded into the Clearinghouse/Warehouse*. MDEQ should develop a set of standard processes for Quality Assuring the data that is acquired. These processes should cover all types of data procured and should be used for all data procured in order to maintain consistency in the process. These processes should pass through the same approval process from Technical Users' Committee to Policy Advisory Committee to Coordinating Council for approval. Once approved these procedures should be documented in the Clearinghouse. .
(3) *Develop procedures for refreshing data.* All data stored in the Clearinghouse should be assigned to a single entity for stewardship of the data. The steward would be responsible for making the data available to the Clearinghouse; meeting the requirements for Quality Assurance and metadata definition that all data stored in the Clearinghouse must meet. This entity should be approved by the Council and have responsibility for specifying the frequency of updates that the data should have, the method for acquiring these data via the procedures described in (1) above, and the techniques used to share the data with others. (i.e. data distribution/replication, etc.) After approval by the Council, these procedures should be documented in the Clearinghouse, along with information concerning who the steward is.

D. Access to Legacy Data.

Strategies

(1) Use vendor-supplied interfaces among like entities and use OpenGIS standards for interoperability.

Steps

(1) *Standardize methods for accessing and sharing data across different hardware and software platforms.* The method described above for developing the procedures above for acquiring data, populating the Clearinghouse, and refreshing data, should be used to define procures for accessing legacy data on existing GIS databases. Once legacy databases have been identified and found to have enterprise wide impact the Technical Users' Committee should review on a case-by-case basis the legacy data that needs to be made available enterprise wide. Working with users and vendors, procedures should be developed for accessing each legacy database. These procedures should be passed to the Policy Committee and then to the Council for approval. Once approved the procedures should be documented in the Clearinghouse.

(2) *Identify existing GIS applications that have cross agency implications. Determine the optimum manner for making legacy applications available in a standard way. (i.e. "wrappering software", middleware, etc.)* The process described in (a) above for developing access interfaces to legacy data should be followed to provide access to GIS applications in a vendor neutral, open method to allow interoperability among different user communities. These processes should follow the approval process to the Council and be documented in the Clearinghouse.

(3) *Identify the client software required to access legacy data.* Each procedure approved for accessing legacy data and existing applications should include recommendations for the optimum client software to be used to access the data or applications. (i.e. browser, client GIS software, etc.) This information should be added to the Clearinghouse.

E. Data Transfer.

Strategies.

(1) Identify a vendor neutral architecture for sharing information among agencies.

(2) *Develop a set of standard interfaces to be used between unlike data storage technologies, to avoid multiple interfaces being developed and maintained between unlike systems.*

Steps

(1) *Identify the different data structures that are in use that have enterprise wide applicability.* The Technical Users' Committee, or a sub-committee, should review all data structures that have enterprise wide applicability and determine a standard method of sharing data with incompatible environments.

(2) *Identify any interface methodologies that are currently in use to share data among these different data structures. (i.e. FTP, VPN, etc.).* If there is an acceptable method being used to share data then this method should be adopted as standard for future requirements to share data among those data structures. If there are multiple methods in use the committee should determine, in a cooperative manner, among the participating users the optimum method for this transformation and all users should adopt this method as the standard method. After approval by the Council, this should be documented in the Clearinghouse. This process should be repeated for all data that need to be shared.

(3) *Document standard interfaces and publish implementation guides.* In addition to documenting the standards that come out of this effort, the Clearinghouse should also contain the information required to implement the transformation, in the form of instructions or an implementation guide.

F. Spatial Data Formats.

Strategies

(1) MDEQ and ITS will define requirements for data formats that will be used to acquire new data and to store operational data.

(2) *The standards defined will serve as a guide for procurement of new data and interoperability among agencies.*

Steps

(1) Agencies will identify all Geospatial data products that will be available to outside entities.

(2) Data being distributed on a transactional basis via the Internet will use the Clearinghouse and State Portal.
(3) All Geospatial data within state agencies will be documented through the spatial metadata in the Clearinghouse.
(4) This documentation will include information for security control and accessing the data.
(5) *The metadata information and query mechanisms will be designed so that they may be used for internal (intranet) requests as well as external (Internet) requests.*

4. Develop, Operate and Maintain Delivery System Infrastructure.

Strategy

Implement and operate the Clearinghouse/Warehouse using the methodologies used in setting up and operating the State Portal, www.ms.gov

Steps

(1) *Size the seven layers that make up the core information of the Clearinghouse/Warehouse.* This effort should incorporate existing data that make up the seven layers described in the legislation that established the Council. These data will be housed in the Clearinghouse with all data having an entity designated as steward of that set of data. The stewards designed for data within in the Clearinghouse will be responsible for maintaining those data under published procedures for sharing and updating the data. The steward will provide ITS with information determining the storage required to house the data as well as the facilities required to make these data available to others.
(2) *Identify the applications that access these data and the procedures for making these data available to those applications as described above.*
(3) Develop a hardware/software configuration for the GIS Clearinghouse/Warehouse infrastructure.
(4) *Develop a funding estimate for the legislature.* Working with other agencies and vendors, ITS should determine the cost of implementing a Clearinghouse to support the applications, data and procedures approved by the Council.
(5) *Obtain Funding.* The legislature should be presented the estimates for the costs of the Clearinghouse for funding approval.
(6) *Procure hardware and software.* ITS should coordinate the procurement of the hardware and software required to implement the Clearinghouse using the optimum procurement vehicle available for this purpose.
(7) *Install hardware and load software.* ITS should oversee the implementation of the selected hardware and installation of the software determined to be required to meet the functions assigned to the Clearinghouse.
(8) *Load identified data.* As part of the installation of the Clearinghouse, ITS should oversee the initial loading of those data that have been identified as being part of the Clearinghouse.
(9) Perform acceptance testing. ITS should define and oversee testing to assure that the software and data have been properly installed and the Clearinghouse is ready for operation.
(10) Set up operational procedures. ITS should define procedures for the operational personnel to follow in the ongoing operation of the Clearinghouse. These procedures should include operations guidelines for fail over of malfunctioning components and periodic backup of data and procedures for recovering data in case of a failure. These

procedures should include the operation instructions for data sharing and transformation among users.

(11) Monitoring by Network Operations Center (NOC). The monitoring software currently in use in the NOC should be used to monitor the operations of the Clearinghouse on a 7x24 basis. Procedures must be defined and implemented to instruct operational personnel of the steps to be taken to correct errors and restore operations after failures.

(12) Support users via the help desk. The current help desk operation should be updated to include supporting users of the Clearinghouse.

(13) Develop procedures for refreshing data and adding new data. The procedures established by the steward of sets of data should be implemented by the operational staff and monitored for correct operation.

(14) Operate data transfer/transformation utilities. The operational staff should be trained in any functions that are required of them in the case that automated processes do not perform correctly, including the steps to take to correct the situation or to notify on-call personnel in the organization that has stewardship of those data.

(15) Implement Clearinghouse/Warehouse. The sum of the steps above will result in the implementation of the Clearinghouse and on-going operations required to maintain its function.

5. Education and Outreach Plan

An education/outreach element of the overall plan for the Coordinating Council will provide an information delivery system to assist the Council with a uniform vision, message, and process. The educational component will serve to train, through formal and continuing education, the current and next generation of RS/GIS professionals, as well as educating the various stakeholder groups on the value and power of RS/GIS. Outreach utilizes the network of knowledgeable and experienced professionals (those already pursuing MDEM implementation). A coordinated outreach effort also leverages the Council's authority and effectiveness.

Strategies:

Use outreach mechanisms and MDEM participants to:

- Disseminate the shared, common vision
- Gather information and generate reports
  - Technical
  - Contacts
  - Calendar
  - Surveys

Use and develop existing and outreach mechanisms for:

- Capacity building through:
  - Technical training and education
  - Internships and Co-Op programs

Program delivery modes may include:

- Short courses
- Conferences
- Training sessions
- Demonstrations and tours
- Distance learning

- Online information access
- Traditional media

Steps:

Create an education/outreach program coordinated by the Council that will:

- Develop program offerings in order to disseminate the vision and work pace of the Council to the Policy Advisory Committee, Technical Users Group and the public.
- Develop a dynamic inventory of:
- Professionals currently involved with the implementation of MDEM
- Existing and planned data acquisitions
- Existing and planned GIS applications
- Existing and planned training opportunities
- Develop technical training and educational programs to be delivered through ITS and the MSU Extension Service.
- Develop a co-op/internship program through IHL and the Community Colleges to more rapidly develop the workforce in Mississippi.

Participants and roles will include:

- Institutions of Higher Learning
  - Undergraduate education
  - Graduate education
  - Continuing education
- Community Colleges
  - Two-year degree programs
  - Continuing education
  - Workshops/shortcourses
- Mississippi Information Technology Services and MSU Extension Service
  - Workshops/shortcourses
  - Online educational materials
  - Publications
  - Conferences
  - Demonstrations/tours

6. Staffing

The Coordinating Council on Remote Sensing and Geographical Information Systems requests new positions to address the needs described in this chapter. Without the requested positions, the Council, utilizing existing staff of MDEQ, ITS, and other agencies, will continue to improve coordination and seek federal and other funding for the development of MDEM and a data clearinghouse; however, progress will be much slower.

Staffing Needs		
Function	FY 2005 Initial Ramp-up Need	FY 2010 Need When Fully Functional

	(PINs)	(PINs)
Management (including coordination with state and local agencies)	1	2
Operate Data Warehouse	3	5
Coordinate MDEM Data Collection and QA/QC	1	2
Training and Technical Assistance	3	7
Totals	8	16

7. Funding priorities and request for the 2004 session of the Legislature.

The Coordinating Council on Remote Sensing and Geographical Information Systems requests the funding described below for purchasing remote sensing data and developing critical infrastructure. Without the requested funding, the Council will continue to improve coordination and reduce duplicative spending through the standard setting and coordination mechanisms authorized in law; however, progress will be much slower.

The Council requests the 2004 Legislature to provide the following funding for data, hardware, and infrastructure:

- $7.5M to purchase digital orthoimagery for the whole state;
- $1M for a data warehouse;
- $1M initial costs and $0.75M/year for a high-speed, secure network connection between state and county governments; In addition to the initial costs, there will be a need for $0.75M/year for ongoing leasing of circuits.

APPENDIX A
MCCRSGIS Policy Advisory Committee

Mr. Phil Sullivan, CHAIRMAN — Chief Operations Officer

City of Tupelo

Mr. Homer Wilkes
State Conservationist
USDA Natural Resources Conservation Service

Mr. John Cox
President
Mississippi Geological Society

Mr. Charles Swann
Mississippi Mineral Resources Institute
University of Mississippi

Dr. Dean Pennington
YMD Joint Water Management District

Mr. Stan Rucker
Electric Power Association of Mississippi

Mr. Michael Pantin
Public Service Commission

Mr. Scott Bruner
Mississippi Association of Realtors

Mr. Richard Toms
Mississippi Institute for Forestry Inventory

Mr. Kevin Lackey
Supreme Court of Mississippi

Mr. Emad Al-Turk, P.E.
Iraq Contractors Group, Inc.
(represents Mississippi Engineering Society)

Mr. Blake Wilson
Mississippi Economic Council

Mr. Joe Bennett
Mississippi Department of Human Services

Mr. David Swanson
Director, Center for Population Studies
University of Mississippi

Mr. Steve Boudereaux
Mississippi Trucking Association

Ms. Elaine Wilkinson
Gulf Regional Planning Commission

Mr. John Baggott
Mississippi Band of Choctaw Indians

Mr. Sam Johnson, Executive Director
Ms. Jerri Pierce
Mississippi One Call System, Inc.

Dr. Robin C. Buchanan
Director, Enterprise for Innovative Geospatial Solutions
University of Mississippi

Mr. Greg Easson
Enterprise for Innovative Geospatial Solutions
The University of Mississippi

Mr. Chris Alonzo
Department of Wildlife, Fisheries and Parks

Mr. Jim Lipe
Department of Agriculture and Commerce

Mr. Dwight Tidwell
Department of Finance and Administration

Mr. Shep Montgomery
Mississippi Department of Insurance

Ms. Lindsey O. Murphy
MS Army National Guard

Mr. Mark Gilbert
Soil and Water Conservation Commission

Mr. Paul Davis
MARIS - IHL

Dr. Henry Johnson

State Superintendent of Education

Dr. Fred Deegen
Department of Marine Resources

Mr. David Stewart
State Tax Commission

Mr. Walter Boone
Supervisor, Oil and Gas Board

Mr. Ken P'Pool
Department of Archives and History

Mr. Phil Bryant
State Auditor

Mr. Scott Blouin
Workforce Development Center
(Community & Junior Colleges Board)

Mr. Brian Ray
Public UtilitiesCimmission

Dr. Brian Amy
State Health Officer

Mr. Mickey Plunkett
U. S. Geological Survey

Mr. Gerry Farmer
U. S. Forest Service

Mr. David Beaudreaux
NASA Earth Science Applications Directorate

Mr. Randy S. Stewart
Tunica County Emergency District

Mr. Jim Steil
Remote Sensing Technologies Center
Mississippi StateUniversity

Ms. Robbie Fisher
Mississippi Chapter of
The Nature Conservancy

Mr. Clovis Reed
Rankin County Administrator

Mr. Jim Borsig
Chief Administrative Officer
City of Biloxi

Mr. Eddie Myers
Director of Administration/City Clerk
City of Hattiesburg

Ms. Renee W. Newton
City of Tupelo

Mr. Jonathan Smith
City of Ridgeland
P. O. Box 217

Mr. Caleb Dana
Eco-Systems
(MS Council of Consulting Engineers)

Mr. Jerry "Sam" Russell
DeSoto County GIS

Mr. Robert K. Boteler
Mississippi Emergency Management Agency

Mr. Mike Womack
Mississippi Emergency Management Agency

Mr. Frank McCain
State Tax Commission

Russ Beard
NOAA National Coastal Data Development
Center

Mr. Larry Barr
State Fire Coordinator

Dr. William Hawkins
Executive Director
Gulf Coast Research Lab

Mr. James L. Cummins
Mississippi Fish & Wildlife Foundation

APPENDIX B
MCCRSGIS Technical Users Committee

Jim Steil, CHAIRMAN
Mississippi State University

Claude Johnson
ITS

Mr. Paul Davis
MARIS

Bud Douglas
ITS

Kevin Schultz
Department of Marine Resources

Cliff Davidson
Secretary of State

Jackie Surrell
Department of Human Services

Bennie Nult
Department of Audit

Jimmy Slay
Lauderdale County

David Rankin
Pike County

Barbara Yassin
MDEQ/Geology

Peter Hutchins
MDEQ/Geology

David Bandi
Gulf Coast PDD

Mike Howse
East Central PDD

Matt Crisler
Ducks Unlimited

Milton Chambliss
University of Mississippi / Jackson State University

Marta L. Charria
MDOT

Julie Daughdrill
Natural Resource Conservation Service

Mike Seal
US Army Corps of Engineers

Bill Cooke
Mississippi State University

Lindsey O. Murphy
Mississippi National Guard

Larry Barr
Mississippi Department of Insurance

Jack Moody
MDEQ

DeLaine Stacy
Department of Public Safety

Neal Smith
MARIS

Madalan Lennep
Secretary of State

Mike Scales
Department of Health

Walter Belokon
MARIS

Chuck Carr
Central Mississippi PDD

Jerri Pierce
MS One Call

Amanda Russell
MS One Call

David Stodghill
PRVWSD

Mary Love Tagert
Mississippi university

Michael Clair
U.S. Geological Survey

Mark Stiles
YMD Water Management

Brenda Miller
USDA Forest Service

Roscoe Henry, Jr.
MS Dept. of Education

Pete Kohn
MS Development Authority

Jamie Miller
GCT

Ken Holland
Gulf Regional Planning

Kurt Brummett
TRPDD

Keil Schmid
MDEQ/Geology

Gary Hennington
MDEQ

Cragin Knox
MDEQ

APPENDIX C
GLOSSARY OF TERMS

departmental GIS – Departmental GIS is based on a shared GIS database, which is available to a number of desktop-level users throughout the department or workgroup. (see also enterprise GIS, project GIS)

enterprise GIS – Geographic information systems for entire organizations which span across departmental boundaries and use managed GIS databases. These systems can include many different types of applications. (see also departmental GIS, project GIS)

framework layers – The Federal Geographic Data Committee has identified the following seven framework layers of GIS data as essential to the National Spatial Data Infrastructure and all general GIS use: geodetic control, elevation and bathymetry, orthoimagery, hydrography, transportation, political boundaries, and cadastral.

geographic information system – A computer program and associated data bases that permit cartographic information (including geologic information) to be queried by the geographic coordinates of features. Usually the data are organized in "layers" representing different geographic entities such as hydrology, culture, topography, etc. A geographic information system, or GIS, permits information from different layers to be easily integrated and analyzed. (from AGI *Glossary of Geology*)

geomatics – Geomatics is a term that is used internationally for this very broad sweep of capabilities and technologies that brings everything geospatial into it: GIS systems, remote sensing itself, anything within the geospatial context is what we mean by geomatics. (Dr. David Shaw)

geospatial data – Digital geographic data that are spatially referenced primarily for use in a geographic information system.

lidar – A device that is similar in operation to radar but emits pulsed laser light instead of microwaves. (from *Merriam Webster's Collegiate Dictionary*)

project GIS – GIS used for project-level mapping and GIS tasks, utilizing local or group databases, typically performed by one or a small group of people. (see also departmental GIS, enterprise GIS)

remote sensing – The science of collecting, processing, and interpreting images that record the interaction between electro-magnetic energy and matter. Acquiring information about an object or phenomenon by a recording device that is not in physical contact with the subject being studied. Aerial photographs and imagery acquired from a satellite are examples of remotely sensed information. (from AGI *Glossary of Geology*)

seamless – A characteristic of a collection of like data, across a specified region, which does not contain data gaps or inconsistencies.