

Please Note: Different Location

MetroGIS

Coordinating Committee

Cooperation, Coordination, Sharing Geographic Data



Thursday, March 24, 2011

Metropolitan County Government Offices

2099 University Avenue, St. Paul

(Go to <http://www.mmcd.org/directions.html> for a map and directions)

1:00 to 3:30 p.m. (extend if needed)

Board Room on Main Floor

AGENDA

- | | <u>Page</u> |
|---|-------------------------|
| 1. Call to Order & Introduce New Ramsey County Representative (Matt Koukol) | |
| 2. Approve Agenda | <i>action</i> |
| 3. Approve Meeting Summary | |
| a) December 19, 2010 | <i>action</i> 1 |
| 4. Summary of January Policy Board Meeting | 7 |
| 5. Action and Discussion Items: | |
| a) Next Generation MetroGIS Needs Assessment – Preliminary Results | <i>action</i> 9 |
| b) 2011 Budget and Work Program Refinements | <i>action</i> 13 |
| c) GIS Demonstration for April Policy Board meeting | <i>action</i> 17 |
| d) Explore Potential for Collaborative Street Centerline Maintenance Model | <i>action</i> 19 |
| ***** Following Reports Distributed Only Via MetroGIS Website ***** | |
| 6. Major Project Updates (not an Action Item): | |
| a) Quantifying Public Value (QPV) of Geospatial Commons Study | |
| b) Next-Generation Regional Parcel Data Sharing Agreement | |
| c) Co-Host GECCo Event (Streamlining Data Access for Emergency Responders) | |
| d) Regional Address Point Dataset Implementation / Address Editing Tool Development | |
| e) Geospatial Commons (Collaboration between MnGeo and MetroGIS) | |
| f) Performance Measures – Phase II on hold for QPV Study | |
| g) Documenting Benefits & Organizational Structure for Cross Sector, Shared Power Environment | |
| 7. Information Sharing | |
| a) MetroGIS Policy Board member Steve Elkins appointed to Metropolitan Council | |
| b) MnGeo Awarded Grant to Develop Business Plan for Statewide Parcel Data Solution | |
| c) March Release - NCompass Street Centerline Data | |
| d) Statewide LiDAR Acquisition | |
| e) Anoka County Launches Online Map | |
| f) LOGIS Produces Standard USNG Map Books for Member Cities | |
| g) www.MetroMSP.org Enhances Interactivity and Adds Transit Station Information | |
| <i>Several other items of note from national sources</i> | |
| 8. Next Meeting | |
| June 23, 2011 | |
| 9. Adjourn | |

Mission Statement: "...to expand stakeholders' capacity to address shared geographic information needs through a collaboration of organizations that serve the Twin Cities metropolitan area."

Meeting Summary
MetroGIS Coordinating Committee
MN Counties Insurance Trust Bldg.
December 16, 2010

1. CALL TO ORDER

Vice Chairperson Henschel called the meeting to order at 1:05 p.m. and asked the others in attendance to introduce themselves.

Members Present: *Academic:* Francis Harvey; *Cities:* Bob O'Neil for Hal Busch (AMM: suburban cities - City of Bloomington); *Counties:* John Slusarczyk (Anoka), Peter Henschel (Carver), Jim Bunning (Scott); Mike Fiebiger (Ramsey), David Brandt (Washington); Randy Knippel (Dakota); *Metropolitan:* Rick Gelbmann and Mark Vander Schaaf (Metropolitan Council), David Bitner (Metropolitan Airports Commission), and Nancy Read (Metropolitan Mosquito Control District); *Non-Profits:* Jeff Matson (U of M CURA on behalf of Mn Council of Nonprofits); *Schools:* Dick Carlstrom; *Special Expertise:* Brad Henry (U of M) and Ben Verbick (LOGIS), *State:* John Hoshal (MnGeo) and Joella Givens (MN/DOT); *Utilities:* Allan Radke (Xcel Energy), and *Watershed/Water Management Organizations:* Melissa Baker, Capital Region Watershed District.

Members Absent: *Business Geographics:* (Vacant); *Cities:* Jim Engfer (AMM: core cities - City of St. Paul); *Counties:* Bill Brown (Hennepin), *GIS Consultants:* Larry Charboneau (NCompass Technologies), *Non-Profits:* Sally Wakefield (1000 Friends of Minnesota); *Federal:* Ron Wencil (USGS); *Metropolitan:* Gordon Chinander (Metropolitan Emergency Services Board, and *State:* Tim Loesch (DNR)

Open Seats: *Business Geographics*

Support Staff: Randall Johnson, MetroGIS Staff Support Team, and Mark Kotz, Chair of the Address and Technical Leadership Workgroups.

Visitors: Matt McGuire (Metropolitan Council), Brian Fischer (Houston Engineering), Carrie Mack (Ramsey Washington Metro Watershed District), and Jane Onorati (Mn PCA)

2. ACCEPT AGENDA

Member Givens moved and Member Radke seconded to approve the agenda with the addition of a new Item 5h, Endorsement 2011 Metadata CAP Grant. Motion carried, ayes all.

3. ACCEPT MEETING SUMMARY

Member Bitner moved and Member Givens seconded to approve the September 16, 2010 meeting summary, as submitted. Motion carried, ayes all.

4. SUMMARY OF JANUARY POLICY BOARD MEETING

Staff Coordinator Johnson summarized the information presented in the agenda report.

5. ACTION AND DISCUSSION ITEMS

a) **Election of Officers**

Vice Chairperson commented that he and Chairperson Wakefield are willing to serve another term if that is the wish of the Committee.

Member Bitner nominated Member Wakefield to serve as chairperson for 2011. Member Gelbmann seconded the nomination. No other nominations were offered. Motion carried ayes all.

Member Knippel nominated Member Henschel to serve as vice chairperson for 2011. Member Bunning seconded the nomination. No other nominations were offered. Motion carried ayes all.

b) **Municipal ID Standard**

Kotz provided historical context for the development of the subject standard and summarized the information presented in the agenda report.

Motion: Member Bitner moved and Member Givens seconded to recommend that the Policy Board endorse use of the proposed Municipal ID Standard as a standard for the MetroGIS community.

Following the motion, Vice Chairperson Henschel asked the members if any of them had used the standard and if there are any downsides to using the standard. Several members noted that they are using the standard and none was aware of any issues that had arisen due to its use.

Motion carried, ayes all.

c) **GIS Technology Demonstration – January Policy Board Meeting**

- Member Hoshal summarized the Critical Structures website recently developed with a CAP grant. The key objective being to provide an interactive map through which local community officials can contribute infrastructure and other geospatial information rather than rely upon HSIP data in times of emergencies.
- Verbick provided an overview of LOGIS' gGOV application. The primary driver was to provide communities with a tool to update online information/maps for immediate access by citizens (parade routes, bridge closures, etc.)
- Gelbmann summarized Metro Transit's NextTrip Application. This interactive map based application provides citizens with a means to obtain up to date schedule information for buses which can be accessed on PCs as well as mobile devices. A critical component is a standardized base map. Over 700,000 maps are rendered each month.

The committee concluded that LOGIS's gGOV application would have the most appeal to Policy Board members. Member Verbick confirmed he could be available to present this application at the January Policy Board meeting.

Member Knippel shared that at the October Policy Board meeting he had presented to more alternates than elected officials. General discussion ensued about the need to understand why elected officials are differing to their alternates and the need to reevaluate if the current structure is consistent with current needs. Member Read commented that she has had the opportunity to see each of presentations, as the hostess for each Policy Board meeting, and that she has found them interesting and information. Read also encouraged other Committee members to attend THE Board meetings if only for these presentations.

d) **2011 Meeting Schedule**

Knippel moved and Harvey seconded that the Committee set the following dates for its meetings in 2011: March 24, June 23, September 22, and December 15.

Motion carried, ayes all.

e) **Regional GIS Projects – 2010**

(1) **Address Points Editing Tool**

Mark Kotz explained the history of this project and summarized the objectives sought via this tool using a [slide presentation](#). Kotz reported that the project advisory team had tested the prototype application the week of December 6th and that the consultant was in process of incorporating the agreed upon modifications.

In response to question from Bitner, Staff Coordinator Johnson and Kotz explained that the application is not open source, but is build using ArcGIS Server 10. Johnson and Kotz then summarized the arrangements that had been made with AppGeo for authorizing organizations to host the application at no charge to include - a state and or regional agency(ies), as well as counties

within the metro area and adjoining counties. Any address authorities would be allowed to be end users of the application.

Read asked if the application would include “pull-down” menus to minimize data input errors and expedite data input. Kotz acknowledged this would be the case.

A question from Slusarczyk about the attributes that will be collected for each address led to a wide ranging conversation about the method to be used to populate the address points dataset. The option of beginning with parcel points was raised, which in turn raised the policy question of whether the address points would qualify as a derivative product of the parcel dataset. Johnson commented that the objective is for a public domain dataset and that if a derivative product waiver is not possible the points would have to be developed without use of parcel data.

Knippel commented that Dakota County has recognized an internal business need for an address points dataset and have initiated its development using numerous sources. He stated that there is value in a collaborative effort to develop and maintain a system of aggregation from many sources.

(2) Best Image Service

Matt McGuire presented an overview of the design objectives for the Best Image Service and technical design being implemented by MnGeo to accomplish these objectives. [Click here](#) for the slide presentation. Version 1 of the service is expected to be fully operational by year end. McGuire noted that the contract with MnGeo permits the documentation and governance model to be completed by mid 2011. In response to a question McGuire explained that he expects the governance model to include representatives for area beyond MetroGIS’s interests (area comprised of the seven metropolitan area counties and the eleven counties in Wisconsin and Minnesota that adjoin the seven metropolitan area counties). McGuire concluded his remarks by noting that for imagery to qualify to be included in the Best Image Service, it must be loaded on the MnGeo image server. Members of the Committee offered that the existence of the Best Image Service may become a carrot to encourage counties to share their data with MnGeo.

(3) Geocoder Service Enhancements

Member Read summarized the two enhancements that had been made to the Metro Geocoding Service via the 2010 projects, as follows:

- Include a "universal one-line parser" to allow requests to the service to come in as one line instead of already split into micro (house# + street) and macro (city, state, zip) part. Steve Woodbridge was the subcontractor.
- Restructure the underlying PAGC geocoder code so that it can use other kinds of databases for its internal storage in addition to the current choice, Berkeley DB level 4.1-4.4 (a relatively old version in this business). Walter Sinclair was the subcontractor.

Read noted that issues remain with the “parser” enhancement to be addressed but that progress is being made and that she expected the project to be complete by year end as promised. Read completed her comments with a statement that the project resulted in the first expansion of the open source code when the programmer for the “parcer” enhancement agreed to put his work into the public domain as enhancements to the original code developed by Walter Sinclair.

(4) Proximity Finder Service

Brain Fischer, Houston Engineering and technical lead for the project, explained the design objectives and lessons learned as the design team made progress to accomplish the project. [Click here](#) for his slide presentation. Fischer emphasized that the project was designed to develop a prototype and that a production level service was not the intent. He went on to note that to move to a production level service, a host of custodial roles and responsibilities will need to be defined and implemented.

(5) Stormwater Digital Data Exchange Standard Testing

Carrie Mack, Ramsey Washington Metro Watershed District and technical lead for the project, summarized the objectives and lessons learned from the project as documented in the agenda report. Going into the study, the investigators were aware that stormwater infrastructure related data are collected and stored in many ways and as such without a standard, the data are difficult if not impossible to use for cross-jurisdictional decision support. The proposed exchange standard does not require participating entities to alter how they collect or maintain data, rather it standardizes the data format at the time of exchange with other entities. Jane Onorati, MPCA, explained the technical method used to test the proposed standard. The conclusion of the study is that compliance to a stormwater infrastructure data exchange standard would create public value without undue burden on the data producers.

f) 2010 Accomplishments

Staff Coordinator Johnson noted that the purpose of the report is to set the stage for the consideration of the 2011 work plan and noted that several of the more significant accomplishments had been shared in detail with the Committee during the previous agenda item. No questions were asked.

g) 2011 Program Objectives/Budget

Staff Coordinator Johnson commented that the only change to the 2011 work plan preliminarily approved by the Committee in September is the addition of offering a recommendation for Policy Board consideration on how best to increase use of the US National Grid by entities that serve the Twin Cities. Johnson noted that the Policy Board asked for this additional work objective after hearing a presentation about it at its October 2010 meeting.

Motion: Member Bitner moved and Member Henry seconded that the Coordinating Committee endorse the following actions for Policy Board approval:

- 1) The following program objectives as priorities for 2011, with the understanding that additional priorities are anticipated when the results of the *Next-Generation MetroGIS Needs Assessment* are known (Item k).
 - (a) Sustain traditional “foster collaboration” support activities
 - (b) Complete Phase I (*Information Needs*) Next-Generation MetroGIS Needs Assessment (*in process*)
 - (c) Complete/Make Substantial Progress on Geospatial Commons Testbed (*with MnGeo*)
 - (d) Complete/Make Substantial Progress Accomplishing Phase I of the Regional Address Points Dataset Implementation (*in process*)
 - (e) Complete Quantify Public Value (QPV) Study (*in process*)
 - (f) Investigate Appropriate Organizational Structure (*in process via NGAC*)
 - (g) Negotiate and Execute a Next-Generation Regional Parcel Data Sharing Agreement
 - (h) Co-Host GECCo Forum (*Tentatively Third Quarter*)
 - (i) Investigate New Street Centerline Collaboration Model (*Third Quarter start*)
 - (j) Develop a plan to promote broader use the U.S. National Grid in the Twin Cities
 - (k) (*TBD project(s) following completion of Next-Generation MetroGIS Needs Assessment*)
- 2) The 2011 “Foster Collaboration” budget presented in Attachment A of the Agenda Report.

Motion carried ayes all.

g) 2011 NSDI CAP Grant Application for Metadata Training

Member Matson requested Committee endorsement of a NSDI grant application concept to improve documentation of data maintained by non-traditional users of geospatial technology. He explained that the proposal is being proposed by proposed by a partnership of 1000 Friends of MN, U of M

CURA and MnGeo. Matson also commented that the proposed methodology would build upon methods successfully used by MnGeo for previous NSDI funded metadata training.

Motion: Member Bitner moved and Member Knippel seconded to:

- 1)** Endorse the application concept as being consistent with MetroGIS objectives \
- 2)** Direct Vice chairperson Henschel and staff to:
 - a) Confirm the final endorsement letter is consistent with the concept explained to the Committee.
 - b) Guide signing of a letter of endorsement from the highest-level MetroGIS official possible to comply with the January 7th application submittal deadline.

Motion carried ayes all.

Following the vote, Member Read asked where the metadata would be published (e.g. state GIS Clearinghouse, MetroGIS DataFinder, other). Matson stated that he was not sure but would pass this request along to the grant writers to ensure it is addressed in the application. Gelbmann also suggested that the grant training be used as vehicle to encourage the documentation of services and applications, as well as, geospatial data.

h) Next Generation MetroGIS Needs Assessment

Staff Coordinator Johnson summarized the objectives of the next generation needs assessment and encouraged any of the members who had not completed the online survey to do so. He also encouraged the members to register for the January 13 workshop at which the consultant team will facilitate discussion to build upon the survey results.

i) Quantify Public Value (QPV) of Geospatial Commons Study Update

Staff Coordinator Johnson explained that permission had been received on December 8 from the federal grant authorities to radically rescope the project, given our finding that the required GITA ROI methodology is not appropriate for our study objectives. Johnson went on to explain that the local advisory team meeting that had been scheduled for December 15 had been cancelled while the support team investigated rescoping options. He mentioned that late January is the tentative target for holding the local advisory team meeting.

6. NEXT MEETING

The next meeting of the Coordinating Committee is scheduled for March 24, 2011.

7. ADJOURN

The meeting adjourned at 3:35 p.m.

Prepared by,

Randall Johnson, AICP
MetroGIS Staff Coordinator



TO: Coordinating Committee

FROM: MetroGIS Staff Support Team
Contact: Randall Johnson (651-602-1638)

SUBJECT: January 2011 Policy Board Meeting Highlights

DATE: March 14, 2011
(For the Mar 14th Meeting)

The following **major** topics were considered / acted on by the Policy Board on January 19. Refer to the meeting [minutes](#) for information about each item and other topics considered by the Board.

1. Technology Demonstration

Ben Verbick, GIS Manager for [LOGIS](#), demonstrated a web-based application entitled gGOV, which developed by LOGIS.

2. Refine Coordinating Committee’s E-Vote Process

The current process provides a 5-day voting process. There was a general concurrence that the proposed 3-day comment period plus 2 days to vote might lead to amendments of substance. In the end, the Board concurred that the current language adequately provides for a means to move time sensitive matters forward. **No action** was taken on the proposed amendment.

3. New Municipal ID Standard

As recommended by the Committee, the Policy Board endorsed use of the municipal codes defined in the state “Codes for the Identification of Cities, Townships and Unorganized Territories (CTUs) in Minnesota” standard as a best practice/standard for the MetroGIS community, replacing endorsement of the former FIPS 55-3 codes.

4. 2011 Program Objectives and Budget

The Board unanimously approved:

- a) The program objectives listed above as priorities for 2011, with the understanding that additional priorities are anticipated when the results of the *Next-Generation MetroGIS Needs Assessment* are known.
- b) The 2011 “Foster Collaboration” budget as presenting in the agenda report.

5. 2011 NSDI Grant Endorsement – MnGeo Applicant

The Policy Board unanimously:

- a) Endorsed MnGeo’s application for a \$40,000 federal grant that seeks to develop a business plan for a statewide parcel dataset that builds upon MetroGIS’s Regional Parcel Dataset.
- b) Authorized Chairperson Schneider to sign and submit the letter of endorsement presented in the agenda report.

This grant proposal was subsequently approved.



TO: Coordinating Committee

FROM: Project Team – Next-Generation MetroGIS Needs Assessment
Staff Contact: Randall Johnson, MetroGIS Staff Coordinator (651-602-1638)

SUBJECT: Next Generation MetroGIS Needs Assessment –Preliminary Results

DATE: March 7, 2011
(For the Mar 24 Meeting)

INTRODUCTION

The Needs Assessment Project Team is seeking advice from the Coordinating Committee concerning the preliminary summary of geospatial needs preferences captured via the web-based survey conducted in December and at the Needs Assessment Workshop held in January. Specifically, the Project Team wants to be sure the needs are representative of the community and hear suggestions for gathering additional information that may be helpful in determining actionable outcomes from this planning process. The current plan is to also seek similar input from the Policy Board at its April meeting.

Applied Geographics (AppGeo), of Boston, MA is serving as the lead support for this project. Michael Turner, with AppGeo, is scheduled to join the Committee and Policy Board via the Internet to facilitate discussion and to clarify and supplement the preliminary results.

PROCESS OVERVIEW

A summary of the preliminary results has been shared with the participants of the January workshop. They have been encouraged to offer refinements to ensure that identified needs are correctly captured. They were asked to submit their comments by Wednesday, March 23 to share with the Committee at its March meeting. Once the Committee and Policy Board have had an opportunity to comment on the preliminary results, a ranking exercise will be conducted to identify those activities that would have the greatest potential value to the community.

AppGeo will then prepare a written report to document the process and results. Their report will include an action plan to ensure that limited resources are used to tackle the highest priority, and most achievable shared geospatial-related needs of the MetroGIS community. Final action is tentatively planned for the July Policy Board meeting. See Reference Section for the major project components.

KEY RESULTS - HIGH-LEVEL OVERVIEW

Consistency with Current Strategic Direction: Each of the needs statements identified in the preliminary results directly maps to one or more core services and strategic objectives defined in the 2008-2011 MetroGIS Business Plan (see Reference Section).

This outcome is interpreted to mean that the existing strategic direction is inclusive and relevant to current needs. If the Committee concurs, a finding is recommended to this end.

Preliminary Listing of Needs:- A high-level summary follows of suggested actions to improve upon solutions implemented by MetroGIS as well as to improve upon MetroGIS’s operations. These “needs statements” are presented in three broad categories. No relative rating of

importance is intended. Once the list of needs statements is finalized, work on priority setting will follow.

- **Data, Services and Products**

- Address quality, currency, and documentation shortcomings with current regional data solutions
- Improve standardization, pursue additional endorsed regional datasets (e.g., impervious surfaces)
- Demonstrate capabilities to develop derivative products (e.g., regional base map –
- Make data into more useful end-user oriented products (e.g., Google Earth compatible)
- Identify key data initiatives to prototype
- Pursue facilitation of group purchases (e.g., of geospatial data sets)

- **Communication and Collaboration:**

- Explore and potentially leverage Web 2.0 and social networking capabilities
- Re-vamp www.metrogis.org website
- Document geospatial success stories / return on investment (ROI) successes
- Expand MetroGIS's participants to more fully engage non-profits, for-profits & collar counties

- **Organizational**

- Re-examine the overall organizational structure (Is there an opportunity to be more nimble?) Examples of organizational approaches that might be explored, include:
 - Governance and committee structure
 - Funding models
 - Mission/mandate

RECOMMENDATION

That the Committee:

- 1) Identify any desired modifications to MetroGIS's current policy foundation, as set forth in the 2008-2011 MetroGIS Business Plan and presented in the Reference Section.

If no changes are desired, a finding is suggested that the current policy foundation is inclusive and relevant to current needs and that only the work plan component of the 2008-2011 MetroGIS Business Plan is in need of updating at this time.

- 2) In preparation for priority setting, offer supplemental and clarifying information to refine the preliminary results of Next Generation MetroGIS Needs Assessment, as presented by AppGeo.

REFERENCE SECTION

A) NEEDS ASSESSMENT PROJECT COMPONENTS

The current project is the first of two major phases.

Phase I is comprised of two major activities – a pre-workshop survey in December 2010 and the workshop held on January 13. Phase I is principally about defining geospatial needs (data, services and applications) shared by MetroGIS stakeholders and identifying action priorities for the next 3-5 years.

Phase II, not yet funded, would define institutional and operational issues that, if effectively addressed, would improve the community's capacity to more fully accomplish and sustain solutions to shared geospatial needs.

B) ELEMENTS OF 2008 – 2011 METROGIS BUSINESS PLAN

(www.metrogis.org/about/business_planning/2008-2011_businessplan.pdf)

- **Vision Statement:** The vision for the result of MetroGIS's efforts, or destination expected to be attained, is *“organizations serving the Twin Cities Metropolitan Area are successfully collaborating to use geographic information technology to solve real world problems”*.

The efficient use of geospatial information and shared knowledge of best practices benefit the region's citizens and their leaders:

- They are better able to solve real-world problems.
- In solving these problems, they make better decisions.
- Because better decisions are made, regional economies are strengthened.
- Citizens are better informed regarding geophysical and geopolitical objects and events.
- Because of all these factors, citizens and their leaders are more likely to reach community goals.

And, ultimately these outcomes play a substantive role in providing citizens a safe place to live and work; enhancing environmental systems and green space; improving housing and transportation systems.

- **Mission Statement:** MetroGIS exists to enhance the capacities of its principal stakeholders to carry out their responsibilities in the most effective and economical way possible”. Specifically, *“to expand stakeholders' capacity to address shared geographic information technology needs and maximize investments in existing resources through widespread collaboration of organizations that serve the Twin Cities metropolitan area”*.

- **Core Services and Desired Outcomes:**

1) *Foster GIS Coordination Among Stakeholders*

- Provide an inclusive, trusted forum to collaboratively resolve geospatial data and GIS technology-related issues and opportunities of common interest.
- Improve trust and mutual understanding within the GIS community through frequent opportunities to communicate with colleagues and peers.
- Build sustainable solutions to common geospatial data-related needs through the use of collaborative and consensus-based processes that seek to institutionalize custodian roles and responsibilities pertaining to data capture, maintenance, documentation and distribution of commonly needed data.
- Enhance individual stakeholder GIS programs and capabilities through sharing technology and proven practices with colleagues and peers.

2) *Oversee Solutions To Shared Information Needs*

- Increase access to, and use of, trusted, reliable and current data needed to support business needs through sharing data and creating community-endorsed [regional data solutions and related applications](#). *Build once and share many times.*
- Improve decision support for its entire stakeholder community through the use of minimal [data standards](#) pertaining to assembly of data produced by multiple organizations into regional

datasets. These datasets work together horizontally within a given geospatial data theme and vertically among themes.

- Facilitate use of data standards and best practices.
- 3) *Support Internet-based mechanisms for discovery and ready access to geospatial data, web services and applications.*
- Support *MetroGIS DataFinder* (www.datafinder.org) as a node of the National Spatial Data Infrastructure (NSDI).
 - Advance GeoServices Finder as the go-to means to discover and leverage existing GIS web services and applications of value to the MetroGIS community.
- **Strategic Objectives**
 - 1) *Develop and maintain regional data solutions to address shared information needs.*
 - 2) *Expand endorsed regional solutions to include support and development of application services.*
 - 3) *Facilitate better data sharing by improving processes, making more data available, and enlisting more users.*
 - 4) *Promote a forum for knowledge sharing.*
 - 5) *Build advocacy and awareness of the benefits of collaborative solutions to shared needs.*
 - 6) *Expand MetroGIS stakeholders.*

Maintain funding policies that make the most efficient and effective use of available resources and revenue for system-wide benefit.
 - 7) *Optimize MetroGIS governance and organizational structure.*



Cooperation, Coordination, Sharing Geographic Data

TO: Coordinating Committee

FROM: MetroGIS Staff Coordinator
Randall Johnson (651-602-1638)

SUBJECT: Refinements - 2011 MetroGIS “Foster Collaboration” Work Objectives and Budget

DATE: March 8, 2011
(For the Mar 24th Meeting)

INTRODUCTION

In preparation for defining priorities for the next 3-5, as part of the in process Next Generation MetroGIS Needs Assessment, the Coordinating Committee is respectfully requested to refine the conditionally approved 2011 MetroGIS work plan and budget as suggested herein. Further refinements are expected at the conclusion of the in-progress Needs Assessment (Agenda Item 5a).

APPROVED MAJOR 2011 WORK PROGRAM ACTIVITIES

The Policy Board approved the following work objectives and accompanying budget (Attachment A) at its January 19th meeting with the understanding “that additional priorities are anticipated when the results of the Next-Generation MetroGIS Needs Assessment are known. (*Refer to the Reference Section for major assumptions that underpin efforts planned for 2011.*)

Suggested modifications are illustrated below and in the accompanying budget (Attachment A)

1. Sustain traditional “foster collaboration” support activities (*ongoing*)
2. Complete Phase I (*Information Needs*): Next-Generation MetroGIS Needs Assessment (*in process*)
3. Complete/Make Substantial Progress on Geospatial Commons Testbed (*in collaboration with MnGeo*)
4. Complete/Make Substantial Progress Accomplishing Phase I of the Regional Address Points Dataset Implementation (*in process*)
5. Complete Quantify Public Value (QPV) Study (*in process*)
- ~~6. Investigate Appropriate Organizational Structure (*in process via NGAC*)~~
6. Negotiate and Execute a Next-Generation Regional Parcel Data Sharing Agreement (*Second Quarter start*)
7. Co-Host GECCo Forum (*Tentatively Third Quarter*)
8. Investigate New Street Centerline Collaboration Model (*Third Quarter start*)
9. Develop a plan to promote broader use the U.S. National Grid in the Twin Cities (*in process*)
10. (*TBD project(s) following completion of Next-Generation MetroGIS Needs Assessment*)
 - a) ~~Investigate Appropriate Organizational Structure - if among the highest priorities for 2011.~~

SUGGESTED REFINEMENTS

The changes explained herein are offered to free up resources for needs that will be defined as priorities for the next 3-5 years via the in process Next Generation MetroGIS Needs Assessment.

Work Plan:

- Delete “via NGAC” for Investigate Appropriate Organizational Structure and move to TBD project status. Leveraging NGAC resources is no longer an option, as this topic is no longer a priority of the NGAC. This topic is anticipated to be a focus of the planned, but as yet unfunded, Phase II Next Generation Needs Assessment – Organizational Structure Component.

Budget

- Deleted \$3,000 for GECCo Forum. GITA officials have arranged for federal funding.

RECOMMENDATION

That the Committee recommend that the Policy Board refine the conditionally approved 2011 work plan and budget, as described herein, to free up resources for use to address priorities to be defined via the in process Next Generation Needs Assessment.

REFERENCE SECTION

MAJOR ASSUMPTIONS UNDERPINNING 2011 WORK PROGRAM

1. The Metropolitan Council's budget will continue to include \$86,000 for projects, in addition to staff support at not less than the 2010 allotment.
2. The Technical Leadership Workgroup will continue to serve in the capacity of a quasi Technical Coordinator providing support needed to continue to move forward on a range of priority objectives.
3. Agreed-upon roles and responsibilities for support of MetroGIS endorsed regional solutions, which have been accepted by stakeholder organizations, will continue to be performed in accordance with expectations.
4. Representatives from key stakeholder organizations will continue to actively participate in MetroGIS's efforts to define and implement sustainable solutions to shared geospatial needs.
5. A contract will be executed in early 2011 with Applied Geographics, the selected contractor, to support a study to investigate options for a new street centerline collaboration model.

ATTACHMENT A
2011 MetroGIS Budget
“Foster Collaboration” Function

(SEE THE DOCUMENT ON THE FOLLOWING PAGE)

		2011	2012
Main Activity	Sub-Activity	Preliminary	Preliminary
Professional Services/Special Projects		\$57,900	\$12,700
	A. Identify and Implement Solutions to Specific Shared Information and Application Needs		
	1) Regional GIS Projects - 2011		
	(a) TBD Project(s) (<i>Priorities to be set following Next Generation Needs Assessment</i>) Increased from \$9,500	\$12,500	
	(2) Feasibility Study - New Street Centerline Collaboration Model (<i>Contingency if partnering or grant funds do not materialize</i>)	\$10,400	\$12,700
	(3) Co-host GECCo Forum (September 2011) (Federal funding secured) Freed up \$3,000	\$0	
	B. Organizational Development and Communication Projects		
	(1) Performance Metrics (Phase II) (Postponed for Results of Next Generation Needs Assessment)	TBD	
	(2) Next Generation MetroGIS Needs Assessment (<i>Total budget \$50,000, includes an addition \$15,000 in 2010</i>)	\$35,000	
Data Access/Sharing Agreements	Regional Parcel Data Sharing Agreement (contract payments to counties per 2009-2011 agreement)	\$28,000	TBD
Outreach	Brochure /Hand outs /Web domain registrations (www.metrogis and www.datafinder - \$32/ea)	\$100	
		\$86,000	
	Projects not listed because no funding from MetroGIS budget:		
	- Quantify Public Value Study - \$50,000 NSDI CAP Grant		
	- Street Centerline Data Access Agreement - Funded by the Metropolitan Council from another source		
	- Testing of Geospatial Commons - Joint Project with MnGeo with voluntary support		
	- Phase 1 Regional Address Points Dataset development - Voluntary effort by the Address Workgroup.		



TO: Coordinating Committee
FROM: MetroGIS Staff Coordinator
Contact: Randall Johnson (651-602-1638)
SUBJECT: GIS Technology Demonstration Topic – Upcoming Policy Board Meetings
DATE: March 14, 2010
(For Mar 24th Meeting)

INTRODUCTION

The Committee is asked to agree on a GIS Technology Demonstration topic for the Policy Board’s April and July meetings and persons to present them.

REQUEST FOR CANDIDATE PRESENTATION IDEAS

-Two candidate presentation ideas were submitted in response to the request earlier this month. They are:

- GIS Web Viewer - Exploring and Discovering Recreational Opportunities – Offer received from Matt Koukol (Ramsey County), Peter Henschel (Carver County) and Brian Fisher (Houston Engineering) to present this topic.

(Demonstrate GIS Web Viewers under development for Ramsey, Carver, Scott and Anoka Counties, with assistance from Houston Engineering. The viewers’ focus is around “Exploring and Discovering” Recreation opportunities within each respective community. An attempt is also being made to promote Active Living and Healthy eating. All the applications were developed with ESRI ArcGIS Server and the Silverlight API. They also all have a similar look and feel and use a common data model.

- TIES efforts to foster greater use of GIS technology by metro area school districts – Offer received from Dick Carlstrom (TIES) and Policy Board member Dan Cook (TIES) to present this topic.

(Demonstrate how GIS technology and regional data solutions (parcels, street centerlines, city/county boundaries, etc) are being used across TIES’ membership districts for enrollment projections, school boundary determination and other applications.

-Demonstration ideas offered previously but not as yet selected:

- Regional base map web service developed by the Metropolitan Council
- Open Street Map & other public participation GIS (PPGIS), crowd sourcing, Web 2.0,
- GIS for Emergency Response/ GIS in SEOC
- Cyclopath
- Metropolitan Council’s Natural Resources Digital Atlas

PREVIOUS PRESENTATIONS

See the listing on the following page.

RECOMMENDATION

That the Coordinating Committee recommend a GIS Technology Demonstration topic for the April and July 2011 Policy Board meetings and persons to present these topics.

PAST POLICY BOARD GIS TECHNOLOGY DEMONSTRATION TOPICS

- Jan 2011 LOGIS's gGov Application
- Oct 2010 Emergency response maps consistent across jurisdictions, based on U.S. National Grid
- Jul 2010 Multi-county collaboration for public access property information application
- Apr 2010 Coordinated Data Management via Internet - Council and Counties
- Jan 2010 How Use of Shared Web Services is Improving Organizational Efficiencies
- Oct 2009: Red River Valley Flood Response
- Jul 2009: LOGIS –Improving Service Delivery through Collaborative GIS Programs
- Apr. 2009: Safe Road Map Project – University of Minnesota Connection
- Jan. 2009: Twin Cities Economic Development Website
- Oct. 2008 Regional Data Sets and Analysis of School District Housing Stock
- Jul. 2008: Twin Cities Regional Parcel Data and Community Revitalization: Highlights of National Report By Lincoln Institute of Land Policy
- Apr. 2008: Mapping Minnesota Emergency Response Structures: An Initiative to Support the National Map and National Spatial Data Infrastructure
- Jan. 2008: GIS's Role In Response to I-35W Bridge Collapse
- Oct. 2007: Metropolitan Mosquito Control District's Web Application
- Jul. 2007: Metropolitan Council's new "Maps" Web site
- Apr. 2007 Efficiencies Realized Through Coordinated Application Development: Lessons Learned From The OpenMNND Project
- Jan. 2007: Effective Decisions Through Effective Data Distribution
- Oct. 2006: M3D Internet Application
- Jul. 2006: State Geospatial Architecture
- Apr. 2006: Evacuation Planning for Homeland Defense – U of M Research Project
- Jan. 2006: *No presentation*
- Oct. 2005: Natural Resources Atlas Made Possible Via Data Sharing
- Jul. 2005: Ramsey County GIS User Group's Internet Mapping Service (IMS) site
- Apr. 2005: How Watershed Districts are Benefiting from MetroGIS's efforts
- Jan. 2005: Regional Mailing Application
- Oct. 2004: Improving Operational Effectiveness with GIS - Dakota County's Experience
- Jul. 2004: City of Roseville's Combined Use of Socioeconomic Data and GIS Technology to Improve Decision Making and Service Delivery
- Apr. 2004: Metro 911 Board initiative to integrate GIS into day-to-day operations of 27 Metro Area PSAPs
- Jan 2004: Scott County's Use of GIS technology to improve intra-department efficiencies
- Oct. 2003: GASB34 – GIS Technology's Relevance
- Jul. 2003: Minneapolis Neighborhood Information System use of GIS and data sharing activities
- Apr. 2003: Metropolitan Mosquito Control District use of GIS and benefits from MetroGIS
- Jan. 2003: Emergency Management Response applications developed by Carver and Washington Counties.
- Oct. 2002: Metropolitan Airports Commission use of GIS and benefits from MetroGIS
- Jul. 2002: MetroGIS DataFinder Café Rollout
- Mar. 2002: Presentations from each metro county regarding their respective GIS programs
- Jan. 2002: GIS's Role In Responding To The World Trade Center Tragedy – Mapping Ground Zero (*Paul Olson, Grand Rapids Office of the Minnesota DNR - Division of Forestry*)
- Oct. 2001: TIES – Benefits to School Districts as a result of MetroGIS
- Jul. 2001: DataFinder And Functionality Sought Via Proposed Internet-Enabled Data Distribution Mechanism (*since named DataFinder Café*)
- Apr. 2001: LMIC's Metro viewer software: A Mapping Tool for the Public
- Jan. 2001: Regional Census Geography and Legislative Redistricting Software/Process
- Oct. 2000: North Metro I-35W Corridor Coalition's Socio-Demographic Database Development
- Jul. 2000: DataFinder and Council's Internet-based Existing Land Use Application
- Apr. 2000: Regional Parcel Dataset (Version 1)
- Jul. 1999: Presentation to House of Representatives Subcommittee on June 9th
- Apr. 1999: North Metro I-35W Corridor Coalition GIS Capabilities
- Nov. 1998: Orthoimagery and its Uses
- Sep. 1998: DataFinder and Dakota County's Parcel Query Application
- Jan. 1997: Benefits from GIS in general and uses being made by all classes of stakeholders represented on the Policy Board.



TO: Coordinating Committee
FROM: MetroGIS Staff Support Team
Contact: Randall Johnson (651-602-1638)
SUBJECT: Study - Explore Potential for New Collaborative Street Centerline Maintenance Model
DATE: March 10, 2011
(For the Mar 24th Mtg.)

REQUEST

The Coordinating Committee is respectfully requested to authorize creation of a Project Advisory Team to provide oversight and direction for this pending study – “*Explore Potential for Collaborative Street Centerline Maintenance Model*”.

PROJECT OVERVIEW – PROCUREMENT AND BUDGET

The MetroGIS Policy Board authorized this study as a priority 2011 work objective.

An RFP was published last year calling for a two-part proposal: 1) the subject study and 2) street centerline data solution that could be implemented by January 1, 2011. Upon the recommendation of a Proposal Review Team, which included representatives from the MetroGIS community, NCompass was selected as the vendor for the data component and Applied Geographics (AppGeo) was selected as the contractor for the study component. The Metropolitan Council is the funding and contracting authority for both.

The project contract authorizes \$40,400 for the study component, over two funding years. MetroGIS’s approved 2011 budget provides \$10,400, with an additional \$10,000 from the Council’s Street Centerline data line item. In 2012, \$12,700 would come from MetroGIS’s project funds, with the remaining additional \$10,000 from the Council’s Street Centerline data line item. Our preference is to complete the study in 2011 but to do so, a partner(s) would need to contribute the \$20,400 currently allocated to 2012 budgets.

PROJECT OVERVIEW –PURPOSE AND TIMING

A high-level statement of the study’s purpose, extracted from the complete Scope of Work presented in Attachment A, follows:

“...vision for a new collaborative, multi-participant system model for contributing to and maintaining street centerline network for the Twin Cities region on a transactional basis. A cross-sector solution is the goal, wherein related business drivers and roles and responsibilities are defined for non-government and government interests alike. The purpose of this feasibility study is to explore and test the practicality of such a collaborative model...”

In 2010, Applied Geographics served as the lead support to develop a strategic plan for the Transportation for the Nation (TFTN) initiative. The intent is that MetroGIS’s study will be able to leverage, possibly test, ideas developed for the TFTN initiative.

The project is set to launch late summer if a funding partner cannot be not secured. If a partner were to be secured, the project could begin late Spring following completion of the Next-Generation MetroGIS Needs Assessment, also supported by Applied Geographics.

RECOMMENDATION

That the Committee:

- 1) Authorize creation of a Project Advisory Team to provide oversight and direction for the pending project, entitled “*Explore Potential for Collaborative Street Centerline Maintenance Model*”
- 2) Identify candidates to serve on this Project Advisory Team.

ATTACHMENT A

Specifications/Scope of Work

Testbed Feasibility Study Explore New Street Centerline Collaborative Maintenance Model

Driver – Create Public Value:

Creation of public value, through broadly, collaborative solutions to shared information needs, is the ultimate driver for MetroGIS' existence. Acting on this philosophy, MetroGIS views itself as a building block of the National Spatial Data Infrastructure (NSDI) and, as such, strives to apply principals that underpin the NSDI vision with each regional solution it implements to address a shared geospatial information need.

Stated more explicitly, MetroGIS leaders firmly believe that public value creation potential can be increased if the street centerline data solution for the Minneapolis-St. Paul metropolitan area (Twin Cities Region) were to work in concert with the street centerline solution(s) maintained for the adjoining counties. Further, MetroGIS leadership believes that public value creation potential can be exponentially increased if the street center solution for the Twin Cities Region were to be interoperable with a statewide solution, and ultimately a functional component of the NSDI.

Accordingly, the subject exploration of technical; legal, and organizational implications of migrating to a collaborative, multi-participant system model for maintaining street centerline network for the Twin Cities Region is intended to not only be valuable to the Council and the greater MetroGIS community, including local government, but also offer insight for addressing a host of operational questions that underpin realizing the vision of the NSDI. Such a collaborative model is also expected to enhance the quality of the data and assure that users at the local level will continue to find value in participating and in the actual resulting data asset.

Purpose – Test a Vision:

The Council and MetroGIS have a vision for a new collaborative, multi-participant system model for contributing to and maintaining street centerline network for the Twin Cities region on a transactional basis. . A cross-sector solution is the goal, wherein related business drivers and roles and responsibilities are defined for non-government and government interests alike. The purpose of this feasibility study is to explore and test the practicality of such a collaborative model.

General Assumptions:

- MetroGIS will continue to oversee the custodial relationships for the Metropolitan Area component of the endorsed regional solution for street centerline data.
- Data from multiple sources can be effectively assembled into a single dataset comprised of "best available data" to address locally-defined business information needs.
- The "public domain" principal of the NSDI can be achieved if the producers are able to quantify the value to themselves of contributing to a single collaborative solution versus supporting a solution on their own.
- Organizations with sufficient operating capacity will be willing to assume the various roles and responsibilities required to achieve and sustain the envisioned collaborative model.
- Non-government interests can both add value important to government interests and benefit for collaborating with government interests to support a single street centerline network for the Twin Cities region.
- The data producers will have the right to market components of the data and related products that are not available in the "public domain" in return for serving custodian roles.

Research Topics, Methodology, and Study Report

The representative types of research topics, methodology proposed through which to seek answers to these research topics, and reporting of the results by AppGeo, as described on Pages 22-25 of AppGeo's proposal (Exhibit 1), are hereby accepted in totality, with the exception of the Task Timeline on page 25. The timeline shall be as defined Section 5.01 of this agreement, which specifies the agreement term.

EXHIBIT 1

Testbed Feasibility Study: Exploring a New Street Centerline Collaborative Maintenance Model

Pages 22-25 from the proposal submitted by NCompass Technologies and Applied Geographics, Inc., dated July 30, 2010 and entitled “Next Generation Regional Centerline Solution”, are presented below.

The information presented in this proposal excerpt hereby establishes the study expectations concerning representative types of research topics, methodology proposed through which to seek answers to these research topics, and reporting of the results pertaining to the subject *Testbed Feasibility Study - Exploring a New Street Centerline Collaborative Maintenance Model*.

Pages 22-25 excerpt from NCompass/App Geo Proposal:

ROLE 2. COLLABORATIVE TESTBED STUDY

APPROACH FOR THE GEOSPATIAL COLLABORATIVE TESTBED

TASK UNDERSTANDING

The Geospatial Collaborative Testbed is the concept of a transactional and multi-user system for maintaining street centerline data for the region. The preliminary vision set forth in the RFP is for a public–private partnership, and for the involvement and coordination of many data users/contributors to a single database. The scope of effort for this project task is to research, evaluate, and define the practicality of such an approach. Key aspects to explore in this are business, organizational, workflow, technical, cost-effectiveness, sustainability and risks. Representative types of questions to be addressed include (but are not limited to):

- What are the implications of the collaboration of public and private sector firms for intellectual property concerning methods and tools, and for-profit business interests in the resulting data?
- Who are the essential participants in the system, and what are the key roles and responsibilities – data provider/editor, data quality control and review, overall database administration, application development/hosting/maintenance, system coordination and leadership, and so forth? What is the role for the private sector?
- What changes to organizational structure, relationships, agreements are essential to such a collaborative system?
- Which workflows/business processes are relevant to this collaborative model? How does the data maintenance activity fit into (improve upon, change) existing workflows/business processes involving street centerline data? What new workflows are required for the system?
- Are data stewards and business process owners willing to change/adjust their current practices to accommodate the collaborative system?
- Is the concept technically feasible (practical, efficient, fast) using current GIS/IT technologies – online data editing, database systems, security and authentication, and so forth?
- Are there models/case studies/operational systems that exemplify the concept and approach envisioned?
- What is the rough estimate of the cost to create such a system? What is the rough cost to operate such a system? How do these compare with the current cost of data development/maintenance?

- What are the risks and constraints associated with the collaborative test bed model? What mitigation strategies or steps could be taken?

DEFINING AND EVALUATING THE TESTBED CONCEPT

In order to assist the Metropolitan Council to define and evaluate the Collaborative Testbed, the response Team will perform the following three tasks, with AppGeo staff acting as the lead for the overall effort:

1. **Information gathering and scoping**, outreach to stakeholders, discussion with Metropolitan Council, MetroGIS and others
2. **Collaborative Testbed Definition and Comprehensive Description**
3. **Pro and Con Assessment of Collaborative System**

These three tasks form the core tasks included in the Geospatial Collaborative Testbed budget. These tasks will be performed sequentially on a schedule to be determined during the Base Professional Services Agreement. Completion of these tasks will result in a **Comprehensive Report** with three main parts: (1) Collaborative Testbed Definition, (2) Comprehensive Description, and (3) Pro and Con Assessment. The Comprehensive Report will provide the basis for evaluating the feasibility and desirability of the Collaborative Testbed and determining next steps in its potential development. The Metropolitan Council will have the opportunity to review, comment on and participate in discussion with the Team on all written report components in draft form before they are finalized.

The following paragraphs describe the above project tasks.

INFORMATION GATHERING AND SCOPING

The Team will organize and facilitate an outreach and information gathering effort designed to engage with and learn from stakeholders:

1. Identify (inventory) key stakeholders to the collaborative system
2. Identify and understand current business processes, applications, uses, and data creation and maintenance activities of these stakeholders
 - a. Develop an inventory of the primary applications and requirements for street centerline data among the stakeholders
 - b. Develop a description of the primary processes, current responsibilities, and capabilities of stakeholders involving the creation and maintenance of street centerline data (spatial and attributes)
 - c. Identify the types of uses, users, and primary applications/systems that rely on current centerline data
3. Obtain sample data, database schema, application descriptions
4. Gauge stakeholder interest in and ideas for a collaborative system

Outreach methods will include workshops, interviews, onsite visits, review of database and system documentation, and consultation with the Metropolitan Council. The combination and timing of these efforts will be determined in coordination with the Metropolitan Council.

We assume that the Metropolitan Council will be an active partner in this outreach effort, including support to the Team for:

- Identification of stakeholders and key processes
- Support for meeting or workshop logistics
- Participation in meetings, interviews, workshops
- Participation In discussions with the Team
- Review and feedback on findings and questions of the Project Team

The Team will also investigate and gather materials documenting similar systems for maintaining street centerline data in a collaborative fashion elsewhere.

COLLABORATIVE TESTBED DEFINITION AND COMPREHENSIVE DESCRIPTION

A definition of the Collaborative Testbed will be developed based on the concepts articulated in the RFP, reference to the current Address Points Dataset project, and based on the outreach and information gathering process. AppGeo project staff will draft a concise working definition of the system purpose and scope. The definition will establish a vision for the system. Review and consensus with the Metropolitan Council will lead to finalization of the working definition.

AppGeo staff will develop a comprehensive description of the systems major elements. Major elements to be discussed in the description include:

- Overall architecture
- Roles and responsibilities of key participants
- Workflows, especially concerning data editing and attribution and verification
- Standards (data, metadata)
- Data suitability for existing systems and applications that rely on centerline data for various purposes
- Database and storage systems
- Security and administrative requirements
- Rough Order of Magnitude Cost Estimate
- Sustainability and business considerations (intellectual property interests in methods and data products)

The Team will draft the description for review and discussion with the Metropolitan Council.

The goal of developing the complete description is to provide a sufficient level of detail so that the major assumptions, methods, system organization, roles, costs, and data products are clarified. In this way, the description provides the basis for development of a technical specification and detailed budget. It also provides the basis for a useful Pro and Con analysis.

PRO AND CON ASSESSMENT OF COLLABORATIVE SYSTEM

The Pro and Con Assessment is the third planned part of the evaluation of the Collaborative Testbed. AppGeo staff along with assistance from experienced and intimately knowledgeable NCompass staff will review the complete system description and comment on the strengths, weaknesses, opportunities and threats of its main elements. For example, the Pro and Con Assessment will identify and discuss some or all of the following as appropriate:

- Concerns and constraints raised by stakeholders
- Business concerns and opportunities
- Strengths and weaknesses of the Collaborative Testbed compared with the current way of doing business in terms of:
 - Currency, accuracy, completeness of data
 - Expected efficiency of overall system
 - Administrative and organizational requirements
 - IT infrastructure
 - GIS technology capabilities
- Opportunities and threats associated with the Collaborative model in terms of external factors such as funding, policy, coordination with state and federal standards, technology change, and so forth

Depending on the system assessment and decisions of the Metropolitan Council, additional tasks that the Team is prepared to perform include:

- **Technical Description of the System**, covering system architecture, software, hardware, database, and other GIS/IT details required for an operational system
- **Detailed Budget Estimate** for prototype and/or complete system
- **Develop, Test, and Document Prototype Testbed**
- **Full Collaborative System development and deployment**