Interim Report

Project Title: A Return on Investment Case Study of Iowa One Map: A Public-Private Partnership for the shared development of the Iowa Geospatial Infrastructure

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Listing of Collaborating Organizations: see list of organizations contacted at end of report

Executive Summary

The Iowa Geographic Information Council (IGIC) is leading a multi-agency return on investment case study for the Iowa One Map public-private partnership. The public-private partnership will address the needs and interests of all stakeholders that will produce and consume data from the Iowa Geospatial Infrastructure (IGI), especially data needed for economic development activities and related decision making. IGIC is being assisted with their project by the Geospatial Information Technology Association (GITA), who participated in two earlier ROI studies of the IGI.

Anticipated outcomes will include an ROI study of one to three different IGI development scenarios. Scenario 1 includes a refined configuration of the basic IGI data layers, and adds economic development benefits to the overall financial analysis. Scenario 2 enhances the IGI with additional data layers and support infrastructure targeted at utility infrastructure data and applications for municipal, regional and investor-owned utilities. The financial analysis continues the economic development theme, but also includes benefits of improved asset and pavement management. Scenario 3 further extends the IGI using a financial analysis of the city of Dubuque's Smart City initiative to develop a "smart IGI" for the rest of the state.

Project milestones include interviews with economic development staff, municipal GIS staff and utility GIS managers.

Project Narrative

In 2007-2008, IGIC conducted a return on investment study of the Iowa Geospatial Infrastructure (IGI). The 20 year financial analysis covered an IGI defined as nine basic GIS data layers (control, boundaries, cadastral, imagery, transportation, elevation, water,

address points and structures), and two GIS services bureaus (county and state) to compile, manage and distribute these framework layers through the Internet to users as both data files and web services. The financial analysis basically stated that the IGI was a good investment, with costs of $3M/year returning benefits of about $15M/year. Two thirds of the cost was to be covered by the state with the rest consisting of the cost of counties without GIS to get the technology through regional consortia. Our analysis included a full-scale *Imagery for the Nation* program with the federal government contributing a third of the cost of 1' imagery every three years.

The original IGI concept was presented to decision makers in the summer of 2008, and while it was positively received, the flooding in June and economic downturn in the fall prevented any further consideration. Left out of the 2008 ROI project was an analysis of the benefits of IGI to emergency management and economic development. The flood provided the opportunity to study the benefits of IGI and GIS for emergency management, and with additional funding from Iowa's USGS State Geospatial Liaison office and help from GITA we were able to show a two fold increase in the benefits over the original study, with minimal extra expenses.

As for economic development benefits of IGI, there were indications from talking to a handful of participants in the original study that the magnitude of the benefits was possibly huge, compared to all of the other benefits combined. At the time, it seemed like the financial data for these benefits wasn't strong enough to include. In this study, we hope to quantify these benefits more extensively so they can be reliably included in all of IGI development scenarios outlined below.

The original 2007 IGI funding formula was $2M/yr from the state, $1M/yr from counties and a federal *IFTN* contribution of another $1M/yr. Because of the economic downturn in 2008-2009, it was communicated to us by decision makers that this level of funding was impossible to achieve, despite the 5 to 1 benefits to costs of IGI. No one group had any money to spend on any projects (with the exception of increased spending on floodplain management, due to the historic level of the flood) and indeed all governments were cutting back on everything, including education, health and human services. In our proposal for this current study, the funding formula was supposed to be modified to include a significant private sector contribution, mainly from utilities, enough to warrant calling it a true public-private partnership. The thought was that large gas and electric utilities would strongly benefit by better access to the local government's land base, especially parcels and boundaries, so they wouldn't need to maintain their own costly land base. In return for this access, utilities might be willing to contribute significant resources to the local maintenance of these layers. Early indications from interviews in the current study are that this scenario may have been too optimistic as well, with private entities not able to participate due to the economy, with the improved access not really creating enough compensation for such a plan. There is possibly an exception, in the case of siting new transmission lines for renewable energy sources, such as wind farms. Because the construction of new wind farms is stalled in the Midwest due to lack of new high-capacity transmission lines, a public-private initiative to share and maintain the land base, boundaries, and elevation layers may be possible. It could include possible support

from both state and private sources. This scenario basically involves the original IGI configuration, with no additional data layers. Financial analysis could include general economic development benefits (encouraging new business developments as identified in the original study with additional verification of benefits), plus possible benefits of spurring transmission line siting. A new funding formula needs to be worked out for this, which we'll call **Scenario 1**, with a slight refinement of the original IGI configuration.

Because of the lack of progress on *IFTN*, we will likely have to add additional costs to the state and local contributions to replace the federal part of *IFTN*. Some of this could come from the private side instead. Many counties are now acquiring 6" ortho-imagery or better, so this trend will have to be taken into account in the cost data as well.

Use of GIS in cities was also not part of the original IGI ROI study or configuration, so it was thought that an investigation of GIS usage in the municipal setting might reveal some needs that could be addressed by an enhanced IGI, or some general economic benefits that could be counted in Scenario 1. Cities are generally not big contributors to the nine framework GIS layers, except for addresses and structure data layers maintained by the bigger cities. There are 941 municipalities in Iowa, with 482 having a population of less than 500. Most big cities have successful GIS programs, while middle size ones generally work with their county GIS departments or other consortia. Smaller cities are very much left out of the GIS fold, with no IT assets, no GIS staff and the high costs of GIS software and data. In this study we have interviewed a range of city GIS people and projects to gain a sense of what applications are providing useful benefits, what are the barriers and what can be done in the future to encourage GIS usage. The results for smaller cities so far has been slightly positive to mostly negative. While there have been some notable successes, there seems to be many examples of good faith efforts that gradually do not maintain their momentum, persons leave or lose interest, and the return on investment isn't good.

We collected one spectacular example of IGI benefits for a small city, where lidar derived contours were provided to a small town to assist in their plans for new sanitary sewers and a wastewater treatment plant. The project consultants actually refunded $21,000 to the city because of the availability of the lidar contours. The city invested $6000 of the refund into a general infrastructure plan. When ARRA stimulus money became available in 2009, the city's plans were deemed "shovel-ready" and received over $2M in funding to address elements of their infrastructure plan. This is a nice example of how data accessibility and sharing can have a very positive domino effect. This effect may be difficult to duplicate everywhere due to the many fortuitous circumstances and sharp local people involved, but at least it shows what should happen when everyone cooperates.

We are collecting some of the benefits of municipal asset management of utility infrastructure with some of the bigger city GIS programs, possibly looking for ways to downscale to the mid-range and smaller cities. This can include joint trenching, where all the various infrastructure managers (gas, electric, sewer, water, cable, fiber) get together and plan construction or repair projects together, so the pavement may be "trenched" or

opened fewer times, which is very costly. There is evidence that the cost savings from this can easily fund the conversion of paper plans to digital. A **Scenario 2** for enhanced IGI development might include the addition of GIS layers for utility infrastructure for municipalities, rural electric and water coops, and investor owned utilities. While utility infrastructure is not traditionally considered part of the NSDI, there may be compelling reasons to include the development and maintenance of these layers at a regional or state-wide level. Information on utility infrastructure is very useful to state and local economic development agencies for describing sites for new business development or existing business expansion. Combined with the benefits of utility asset and pavement management, a compelling story for assisting cities with their GIS projects may be developed.

Finally, we have a very unique opportunity to study the benefits of a "smart city". The city of Dubuque, along with its private partners, is developing and installing several types of smart city technology, starting with water meters that communicate the water usage of individual houses and commercial buildings on a 15 minute basis. The city's GIS has played an essential role in the planning and deployment of 22,000 water meters, and will ultimately be used to help indentify leaks and tampering, manage repairs and perform other useful analysis. Other projects are looking at installation of smart electric and gas meters, traffic lights, and geothermal wells. A financial analysis of GIS aspects of Dubuque's smart city initiative could lead to a possible **Scenario 3** for a "Smart IGI" where we try to model the costs and benefits of applying this technology to other parts of the state.

While such a plan for a "smart IGI" might at first glance seem somewhat theoretical, bordering on science fiction, actual smart hardware is being installed on a community level in Dubuque right now (not just a small demonstration). Even at a concept level, a plan for developing the smart spatial data infrastructure for eventual deployment statewide is a singular opportunity that may pay huge dividends to the state over the next 20 to 50 years. As society transitions to other forms of energy in a carbon-limited future, the cost of developing scenarios 2 and 3 now might seem not only doable, but essential. And because the analysis focuses on the real costs and tangible benefits, it remains better fixed to reality than other technology development plans. Again, this could be a useful model for federal efforts for a national spatial data infrastructure.

Approach: Mary Ann Stewart from GITA and I have talked to several individuals from three basic groups: economic development service providers, utilities and cities. Questions include how GIS is used in their organization, what data layers are important, how important is data sharing to their GIS efforts and if the Iowa Geospatial Infrastructure concept be extended to improve their situation as well as others in the state, not as far along with GIS. Mary Ann is collecting cost/benefit metrics where available, and will develop the financial analysis of the scenarios as they are further developed. Overall the approach, developed from past projects, is working as planned.

Deviations: Aspects of the public-private partnership are evolving. The original partnership concept may or may not work as intended, but may still actually be doable as

the political climate in the state shifts from government driven to more business driven. The choice of economic development as the overarching benefit seems to have been fortuitous.

Challenges: Interviews during the summer proved to be difficult as many people were not available on a timely basis. Some conversations stretched over months of email and phone calls. Enough information has been gathered to develop the above three scenarios for further IGI development. **We will be formally requesting a six month extension so that we can adequately analyze the various scenarios and involve stakeholders in listening/working sessions.** To do the stakeholder meetings, it is best to avoid winter months so the driving conditions are safer. Therefore it is necessary that these meetings be held early next spring to avoid winter ice and snow storms, which have been numerous the past 5 years.

List of Organizations Contacted:
Iowa Dept of Economic Development, Catherine Bierling, research assistant, IT Bureau
Iowa Area Development Group, Dan Anderson, CEcD, SVP
Alliant Energy, Nate Pollock, GIS Manager
NextEra Energy, Mark Trumbauer,
Iowa Association of Municipal Utilities, Jessica Lillie
Linn County Rural Electric Cooperative, Kevin Stucker
Iowa League of Cities, Heather Roberts
City of Ute, Peggy Bridgeman, city clerk
City of Leon, Pete Buckingham, city councilor
City of Johnston, Dave Croll, GIS manager
City of Polk City, Bob Schultz, GIS coordinator
City of Cedar Rapids, Steve Cooper, GIS Manager Utility Dept
City of Dubuque, Nikki Breitsprecker, GIS Manager
Dubuque Smart City Project, Dave Lyons