

COLLABORATION IN GEOMATICS: MOVING FORWARD

R. Gorecki^a*, R. Ryerson^a

^a KIM Geomatics Corporation, Box 1125, Manotick, ON, K4M1A9 Canada – rgorecki@telus.net;
bryerson@kimgeomatics.com

Convergence in Geomatics: Challenges and Opportunities

KEY WORDS: Cooperation, collaboration, organization, building, understanding, strategies

ABSTRACT:

The subject of collaboration comes up frequently within the Canadian and international Geomatics communities. The reasons for seeking more collaborative approaches within our field are clear: we stand to become more successful in our projects, programs, research efforts and business pursuits. As Geomatics practitioners, we are also better positioned to play a leadership role in meeting the challenges of our changing world. We have learned a great deal regarding methods that foster collaboration in the use and management of geographic information. Entire programs have been created with the primary purpose of overcoming barriers to sharing geographic information. Initiatives of this nature have enjoyed varying degrees of success by implementing innovative strategies, processes and organizational elements that support and advance collaborative environments. But how far have we really come through these efforts? Despite our hard work and good intentions, the fact is that many silos still exist within and between organizations and jurisdictions. Why does this problem persist and how can we attempt to realize the full benefits of collaboration? This paper examines a selection of Geomatics studies, projects and programs in Canada and abroad where fostering collaboration is a key element. The issues, challenges, objectives, methods and outcomes in each case have been reviewed for the purpose of creating a framework for successful collaborative efforts within the Canadian Geomatics community.

1. INTRODUCTION

1.1 Internal Issues and Challenges

A common approach to the use and management of geographic information within organizations is to concentrate on supporting the needs of individual business units in order to solve specific business problems. This approach frequently results in the creation of silos of data, processes and technology. This translates into duplication of effort, information and applications. It also frequently leads to higher costs and less effective decision making.

When multiple versions of geographic information are produced, this information typically becomes inconsistent and business units find it difficult to meet the demands of providing quick and efficient services to clients. Errors and inconsistencies become evident when attempts are made to share data across the organization. Frontline service providers who depend on geographic information find it challenging to respond quickly to business demands in this environment and the organization is challenged in efforts to increase its capacity for work.

Additional symptoms of this 'silo syndrome' include:

- poorly defined roles and responsibilities;
- issues with respect to process and technology integration;
- pressure on requirements for transparency and accountability; and,
- high levels of competition for resources.

1.2 External Issues and Challenges

A number of external factors are converging with the internal issues and challenges identified above. Dramatic levels of economic development and population growth are putting increased pressure on already scarce resources and services. This growth is creating new environmental challenges and the corresponding need for new data sets, methods and models that can be shared.

Another important external challenge is the increase in expectations with respect to Geomatics services. For example, the growth of customer support that relies on GIS (e.g., 311 call centres) is increasing public expectations regarding geographic information access. Google Maps and Google Earth have also contributed significantly to raising expectations in this regard.

The growing trend toward regional partnerships presents challenges given that new agreements and standards must be created and implemented. Partnering organizations must learn to work together in a highly cooperative manner in order to achieve mutual objectives.

Advances in technology and data management are also catalysts for greater collaboration. In particular, we are seeing an exponential increase in geospatial applications, systems and processes which require integration.

1.3 A Case for Collaboration

We have identified some of the issues and challenges that motivate us to improve our collaborative efforts. It is generally accepted that these efforts will contribute toward our goals of

* Corresponding author.

less redundancy, increased efficiency and lower costs. These efforts should also us prepare for and mitigate the impact of multiplying and converging challenges within and surrounding our industry.

The objective of this paper is review a selection of cases where collaboration has been applied within the field of Geomatics and document the successful approaches. Although these approaches can reviewed and implemented at many levels (i.e., inter-organizational and intra-organizational), the focus of this paper is on fostering collaboration within the organization.

2. METHODOLOGY

2.1 Fundamentals of Collaboration

A brief investigation was made regarding the fundamentals of collaboration. Findings are derived largely from consultation with a subject matter expert: Mr. Wayne Boss of Boss Consulting Inc.

2.2 Case Studies

A review was conducted of over 200 Geomatics projects from around the world for the purpose of determining what makes a Geomatics project successful or not. One aspect of this evaluation was to examine the impact of collaboration.

For the purpose of this paper, a selection of studies, projects and programs where fostering collaboration was a significant element or theme were further reviewed. These are as follows:

2.2.1 Designing a GIS to Meet Real Needs in the Maldives: Approaches that were used to overcome the many hurdles faced in developing a National Geographic Information System (NGIS) Strategic Framework and Implementation Plan are presented (Shafee *et al.*, 2010).

2.2.2 Geospatial Framework Data: Definitions, Benefits and Recommended Data Sources for Equatorial Regions: The role of spatial data infrastructures and the nature of essential geospatial data types are discussed. (Ryerson and Aronoff, 2009).

2.2.3 Toward Cooperative Spatial Data Infrastructure (SDI) in Small Island Nations: The Experience in Bermuda: An approach to overcoming the limitations of implementing an SDI in a small island nation is discussed (Atwood *et al.*, 2009).

2.2.4 Geocity – Building Common Ground: An overview of The City of Calgary’s program to improve collaboration in the use and management of geographic information is provided (Gorecki and Coulter, 2007).

2.2.5 Comparative Analysis of Thailand’s Successful National Program in Remote Sensing: Government Policy, Applied Research, Commercialization and Operationalization: Key factors associated with the varying use of remotely sensed data and the consequent derivation of benefits is examined (Ryerson and Peanvijarnpong, 2007).

2.2.6 Development of a Geomatics Framework for the Government of the Northwest Territories: Key factors in the development of a territorial governance model and system architecture for Geomatics are described (Gorecki *et al.*, 2004).

2.2.7 A Shared Vision Approach to Collaboration within the GIS Industry: Cases from the Geomatics sector are used as a framework for describing a shared vision model for collaboration (Boss and Gorecki, 2003).

2.2.8 GIS Professional Success: Interpersonal Communications within a Technical Environment: The elements of effective interpersonal communications and successful team development are described within a Geomatics context (Boss *et al.*, 2002).

2.2.9 Taking Remote Sensing from Development Projects to Operational Use: Some Common Attributes of Successful Projects: Operational characteristics and structural prerequisites that underlie successful geospatial projects and initiatives for technology transfer are presented (Ryerson and Quiroga, 2000).

2.2.10 An Approach to the Development of a Sustainable National Geomatics Infrastructure: An approach for the analysis and design of programs for the development of a national Geomatics infrastructure is described (Ryerson and Batterham, 2000).

3. RESULTS AND DISCUSSION

3.1 Perspectives on Collaboration

Collaboration can be defined simply as “to work jointly with others” (Merriam-Webster Dictionary). To compete, by contrast, is defined as “to be in a state of rivalry”. Common observation indicates that our efforts to collaborate are often overcome by our tendency to compete. If we want our collaborative initiatives to be more effective, a reasonable starting point is to be more conscious and intentional about why and how we collaborate.

Another perspective on collaboration is to regard it as a choice we make to work together within an environment of respect and trust so that our mutual interests are met. Fear can be regarded as the enemy of collaboration. We are afraid that we will lose advantages we have gained through competition in terms of power, influence, prestige or something more tangible like market share.

Research has demonstrated that our willingness to collaborate decreases when we feel that our voice is not being heard, and that our aspirations and interests are being discounted. Conversely, our willingness to collaborate increases when we feel that our voice matters and where others are willing to work with us in order to achieve mutual success.

In considering different approaches to collaboration, a useful objective is to determine the outcome(s) that takes into account the interests of everyone concerned. From an individual point of view, we should consider what we are contributing toward a shared vision.

Fundamentally, collaboration occurs when people choose to collaborate, and after they have chosen not to compete. People

collaborate when they believe that there is more to be gained by this action than by competing. They are further driven to collaborate when their personal interests as well as the interests of the organization they represent are acknowledged, valued and taken into account.

The remainder of this section presents findings derived from the review of studies, projects and programs outlined above. Discussion is focused on outlining strategies for fostering collaboration within the field of Geomatics.

3.2 Values: The Heart of the Matter

As implied in the previous section, certain core values lie at the heart of collaboration. The findings of this study reveal that, while most organizations develop and communicate a set of corporate values, these values are not always implemented in a consistent and effective manner.

With respect to collaboration, we need to consider whether stakeholders have a genuine willingness to cooperate. Does their behaviour suggest that they are ready to put into practice values that underpin a spirit of collaboration; attributes such as honesty, empathy, respect and trust?

Our investigation has shown that, with any effort made to enhance collaboration, a reasonable starting point is to gain perspective on the organization's values in terms of both substance and practice.

3.3 Resolving Conflict: Clearing the Deck

The results of this study confirm that conflict is not uncommon within the field of Geomatics. There are frequently divergent opinions regarding such things as project objectives, technology platform, application development, data management, processes and organizational design.

In order for a project to successfully move forward, it is extremely beneficial for any conflict to be resolved. Otherwise, considerable time and money may be poorly invested.

Often conflict is rooted so deeply (e.g., between business units) that it is not practical for the organization to deal with it through the use of its own resources. In these instances, it has been proven that an external mediator or facilitator can be of tremendous value by offering expertise and impartiality.

3.4 Engagement: Getting Everyone to the Table

Our results indicate that the use of effective engagement practices is critical in any effort to build collaboration. Effective engagement has the overall objective of bringing together stakeholders with a common objective within a mutually supportive, respectful and constructive environment.

This study has demonstrated that success at each stage of a project (chartering, scoping, implementation, etc.) depends on well managed dialogue, where each stakeholder is given a fair opportunity to contribute toward (and take some ownership of) a shared outcome.

Facilitation is an essential ingredient in engagement. A good facilitator should have not only a grasp of the subject matter, but insight to the range of interests, issues, 'politics' and risk

factors. This individual should be highly skilled in leadership, presentation and time management.

Based on the cases reviewed in this study, a number of engagement techniques are more commonly employed. These include surveys, interviews, workshops and seminars. Most styles of project management have engagement strategies embedded.

3.5 Organizational Design: Connecting the Dots

The findings of this study indicate that organizational structure and governance can have a remarkable impact on collaboration. Where Geomatics business entities are well distributed and integrated, there is a positive impact. On the other hand, where integration is poor or nonexistent, there is a negative effect.

A number of approaches have been found to work well in aligning Geomatics interests and activities in an organization. Various types of discussion and working groups can be formed to bridge different areas of business. These can exist at various levels and may be designed to function formally or informally. The focus for these groups can range from project coordination to strategic oversight. The most successful groups were found to have a Terms of Reference and Rules of Engagement.

Communities of Practice represent an option for enhancing organizational design. Typically these groups are created around a particular domain such as environmental management. In a similar way, people from different business areas within the organization can form a community of practice based on their mutual interest in Geomatics.

An important aspect of organizational design is governance. It has been found that, although governance models vary widely in design, there are some common attributes that lead to success. Most notably, a governance model should incorporate strong leadership, well defined roles and responsibilities, a solid decision making process and clear accountabilities.

3.6 Communications: Getting the Message Out

Our research has shown that, even when other measures to foster collaboration are successfully installed, a lack of effective communication can be detrimental. A well designed and executed communication plan can serve as the glue between the other measures. In many organizations that were reviewed, however, such a plan or strategy was not effectively in place.

The components of a communications plan vary according to the specific objectives of the program or initiative. Elements that appear to be more common include newsletters, 'lunch and learn' events, informational workshops and the use of networking/sharing tools (e.g., Microsoft SharePoint). Print media (e.g., brochures) should not be overlooked since these are often the preferred source of information for senior staff.

3.7 Policy: Is the Hammer there if you need it?

Our research shows that there is a distinct lack of geospatial policy guiding the use and management of geographic information within organizations in Canada. In many cases, there is a reliance on policies developed by and for Information Technology or other business areas.

Policy may or may not have a significant impact on building collaboration. This will depend on the degree to which the policy focuses on corporate alignment and how much influence the policy has within the organization to begin with.

Generally, policy is not written specifically to foster collaboration but can help indirectly (e.g., by defining roles and responsibilities). Even when relevant policy is created and implemented, it may be of little value if it is not properly communicated and lacks 'teeth'.

3.8 Financial Structure: Where does the Buck Stop?

Whether a Geomatics organization exists within the private, public or academic sector, money is always central. 'Money' can mean operational funding for programs and business units, or capital to drive projects and other initiatives.

This investigation has found that financial models that support Geomatics increasingly depend on collaborative efforts in order to function effectively. Funding often becomes the real test of whether collaboration is working. Are those in control of budgets willing to behave in support of a shared vision or common objective (e.g., share funds)?

Increasingly it is important from a Geomatics perspective to demonstrate tangible (quantifiable) value to the organization. This can be achieved through conducting a Return on Investment or cost/benefit analysis. Another approach is to establish acceptable performance measures. It has been found that these efforts are enhanced when they are grounded in a spirit of cooperation.

4. CONCLUSIONS

With the convergence of a growing number of driving issues and challenges, there is a strong case for fostering greater collaboration within the field of Geomatics. A selection of studies, projects and programs were reviewed where collaboration was a significant element or theme. Based on this analysis, a series of strategies for building collaboration have been defined and outlined.

Collaboration has greater potential for growth and sustainment where there is adherence to supporting corporate values. Effective methods of stakeholder engagement are essential as is the establishment of appropriate organizational elements and governance models. Communications should not be overlooked as a vital instrument for building awareness and common understanding of issues and objectives.

Overall, this paper seeks to provide a framework for building collaboration within the Canadian Geomatics Community. A full explanation of supporting information and how the results can be implemented is constrained by the length of this paper. Further discussion is welcomed by the authors.

REFERENCES

Atwood, D., K. Mayall, and R.A. Ryerson, 2009. Towards cooperative spatial data infrastructure in small island nations: the experience in Bermuda. Presented Paper at: *American Society of Photogrammetry and Remote Sensing Annual Conference*, Baltimore, MD, USA.

Boss, W. and R. C. Gorecki, 2003. A shared vision approach to collaboration in the GIS industry. Workshop presented at: *GeoTec 2003 Conference*, Vancouver, B.C., Canada.

Boss, W., R.C. Gorecki and R. Letourneau, 2002. GIS professional success: interpersonal communications within a technical environment. In proceedings for: *2002 ESRI International User Conference*, San Diego, CA, USA.

Gorecki, R.C. and D. Coulter, 2007. Geocity - building common ground. In proceedings for: *GITA 2007 Annual Conference*, San Antonio, Texas, USA.

Gorecki, R.C., H. Epp and R. Sims, 2004. Development of a geomatics framework for the Government of the Northwest Territories. Paper presented at: *GeoTec 2004 Conference*, Toronto, Ontario, Canada.

Shafee, M., K. Lim, R.A. Ryerson, 2010. Designing a GIS to meet real needs in the Maldives. Presented at: *American Society for Photogrammetry and Remote Sensing Annual Meeting*, San Diego, CA, USA.

Ryerson, R.A., and S. Aronoff, 2009. Geospatial framework data: definitions, benefits and recommended data sources for equatorial regions. Invited closing plenary session paper at: *Asian Conference on Remote Sensing*, Beijing, China.

Ryerson, R.A. and R.J. Batterham, 2000. An approach to the development of a sustainable national geomatics infrastructure. *Photogrammetric Engineering and Remote Sensing*, 66(1) pp. 17-28.

Ryerson, R.A. and E. Quiroga, 2000. Taking remote sensing from development projects to operational use: some common attributes of successful projects. Session keynote paper at: *Geo Asia Pacific Conference*, Bangkok, Thailand.

Ryerson, R.A. and C. Peanvijarnpong, 2007. Comparative analysis of Thailand's successful national program in remote sensing: government policy, applied research, commercialization, and operationalization. Opening plenary session paper at: *Asian Conference on Remote Sensing*, Kuala Lumpur, Malaysia.