

## BIOGRAPHICAL INFORMATION

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### **Specific Responsibilities**

Jeff Meyers is a second-generation electrical engineer, and the president of Miner & Miner. In his 24-year utility career, Meyers has designed electric substations and transmission lines, and developed system planning and protection studies. Since 1987, he has worked on more than 50 GIS development projects for a variety of gas, electric and other utilities, based on the developing and evolving technology of ESRI and M&M.

Meyers is a member of the IEEE, and is a registered professional engineer in many western states of the US. He is a member of the IEC TC 57 Working Group 14, and a four-time Speaker of The Year award winner of GITA, of which he is also a member.

### **Past Experience**

***Project Principal – OMS/GIS Project, PSE&G, New Jersey.*** Mr. Meyers was responsible for developing the detailed cost and benefits assessment for the GIS portion of the project, including developing process improvements, and specifying data conversion methodologies

***Project Principal – Enterprise GIS Strategic Plan, KeySpan Energy Electric Business Unit, Long Island.*** Mr. Meyers provided the overall strategic planning framework, facilitated the internal workshops, and co-authored the final strategic Plan for the Electric Business Unit, including planning for Work Management integration, and an eventual replacement of a legacy OMS.

***Project Principal - GIS Business Case, Oklahoma Natural Gas, Tulsa, OK.*** Mr. Meyers was responsible for the overall Business Case templates used, and facilitated several workshops for ONG staff in the assessment of costs and benefits. Using the tools developed at M&M, Meyers co-authored the final Business Case document, along with key team leaders from ONG.

***Project Principal – Asset Management System – GIS, Hydro One, Canada***

Mr. Meyers provided support for the technical architecture, business processes and work practices to deploy a province-wide GIS-based work design tool.

### **Education**

Bachelor of Science in Chemical Engineering  
South Dakota School of Mines and Technology, 1978  
Master of Science in Electrical Engineering  
University of Colorado, 1980

### **Affiliations**

Institute of Electrical and Electronics Engineers  
National Society of Professional Engineers  
International Electrotechnical Commission, TC57, WG14  
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**WARS AND RUMORS OF WARS:  
CHANGE MANAGEMENT AND ENTERPRISE GIS IMPLEMENTATION**

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**ABSTRACT**

Despite advances leading to potential operational improvements, many organizations are not positioned to use the powerful spatial information technology that is available today. Far too many enterprise GIS implementations have failed to deliver promised benefits, not because the technology isn't ready for the business, but because the business isn't ready for the technology. Fortunately, the body of experience in enterprise deployment is growing, and lessons learned by others can be used to avoid mistakes. In this paper, a follow on to "10 Things I Hate About You: the 10 Worst Mistakes in GIS History", the author will humbly present both positive and negative change management experiences through case studies, and modestly but firmly propose some valuable techniques for managing the change that surrounds an enterprise implementation of GIS.

**INTRODUCTION AND OVERVIEW**

Spatial IT continues to mature, improving its capacity to provide business benefit to utilities. More modern architecture, better development tools, faster hardware and networks have all contributed to the betterment of organizational performance. But are these modern spatial information applications doing all that they can for businesses today? Of course they aren't.

Most of us have the sense today that, despite technological advances, or maybe because of them, the capabilities of spatial IT outstrip the ability of most organizations to absorb and make the most of it. Why is that? How can it be that technology that should improve the company's bottom line and its employee's lot in life often doesn't do either? One key factor is the inability of organizations and the people within them to embrace the changes that will have to occur in order to get maximum leverage from technology. Requiring people to do things differently nearly always meets with some resistance, driven from culture, habit, collective bargaining contracts and obligations, and plain human nature.

These barriers to change are nearly immovable corporate objects, and they are opposed by the mighty, almost irresistible forces that stimulate new technology and process. Improving performance has never been more critical. The short life cycle of many leaders in business today translates into a short life cycle for everything else, especially IT projects. Most executives understand that they have to deliver benefits and quickly, or they won't be around for long. And many utilities formed through merger or acquisition are faced with finding the best fit for platforms and processes that grew up in different organizational contexts.

When resistance to new technology and process meets with pressure to use new tools and techniques to improve performance, the resulting conflict can have a huge impact on benefits to be realized by the enterprise, not to mention the quality of life for everyone associated with project. And that's where the art and science of *change management* comes in.

It's a big topic, so here's a proposed working definition: *Change Management* means the tools and techniques that help end users accept new technology and associated business process and utilize them effectively. And not just a big subject, but a well-studied one. Today there is a wealth of information on organizational change, no further away than a web connection. In fact, this embarrassment of riches (a recent cruise through a well-known publisher's website revealed 3,161 texts on the subject) reminds us of Mark Twain's famous maxim: "Even popularity can be overdone."

With so much data, it seems kind of funny that change management isn't applied flawlessly in every major IT project. But, with so many choices, it can be tricky to find the right tools and techniques to support a specific enterprise IT implementation. Secondly, it isn't a key area of focus for many project teams. Most management personnel are well adjusted to the notion that if people can't or won't accept new technology and the processes that go along with it, their chances for a quantum leap in performance are minimal. But, many of the more technical among us shrink from the very thought of 'touchy-feely' subjects like this. We're not good at it, and we don't want to be. We intend to deliver solid, well-engineered applications. There has to be some presumption that the users will want the thing to work, so that they and our business can perform better. After all, we all want the same thing. Right?

Oddly enough, we *do* all want the same thing: a successful enterprise GIS implementation. That's why change management is so important. And that's why your author will present in this paper some accumulated experiences in enterprise GIS deployment, and go on to provide key tools and implementation concepts to help win the war of change.

### ACCUMULATED EXPERIENCES

To provide a perspective on user acceptance of new GIS technology and business process, the author surveyed ten utilities in various stages of enterprise GIS implementation. Some had advanced business applications like graphic work design and OMS, but all had the same foundation of production mapping and data management through core GIS technology. It wouldn't be fair to single out any one or even a few of the respondents, especially since they agreed to share their views on the basis on anonymity, but the overall body of experience represented by their survey answers is enlightening, and sets the stage for most of the specific ideas in the sections to follow.

The survey consisted of seven questions, all intended to give insight into user acceptance. The respondent in all cases was the utility user site Project Manager or Technical Lead; in other words, these answers came from an insider within the core project team. Each of the questions, and a summary of the results for each question, follows.

**Survey Question 1:** The most difficult aspect of gaining user acceptance was ...

- a. general resistance to change
- b. intimidated by computer technology
- c. application complexity
- d. mismatch between out-of-box and existing technology
- e. change in business process
- f. other (please specify)

**Response and Analysis:**

Question 1 was designed to determine a consistent pattern of key resistance factors, but the responses to this question were surprisingly evenly divided. Respondents were directed to indicate all answers that applied, and nearly all respondents cited more than one factor. *General resistance to change* was the most popular choice (7) followed by *application complexity* (6). The remaining other choices each got 4 votes. Among the most interesting *other* factors cited were a lack of time to learn new tools and techniques, and users who didn't see the need for new technology to do their work.

<b>Survey Question 2:</b> Looking back, the people who resisted most ...
a. were easy to spot b. should have been easy to spot c. surprised me d. were pretty much who I expected e. other (please specify) :

**Response and Analysis:**

The answers to this question clearly indicated that the most resistant people in most cases were both readily identifiable and expected by the core team. In fact, 70% of the respondents said that they were expecting the people who resisted most to do just that. However, 2 also said that there were 'hidden resistors', people whose true colors were not discovered through training and normal interaction with the core team. Among the more mature sites with multiple applications, 4 indicated that the ability to perceive resistance varied depending on the kind of GIS application. One very telling comment came from a large site whose company had merged and consolidated GIS platforms. This colleague stated that while most user resistance was on the surface, there was resistance from management hidden behind the scenes. Not surprisingly, at this site the people who resisted most were also users of the previous platform.

<b>Survey Question 3:</b> The people who resisted most all had in common ...
a. the same region/office location b. poor computing skills c. poor understanding of the job d. the same age e. other (please specify)

**Response and Analysis:**

Question 3 produced a diversity of response. Not surprisingly, 4 sites said *poor computing skills* were a common factor. Two utilities with fairly large geographic areas cited the *same region/office location* as a common factor. These 'pockets of resistance' as one respondent so eloquently described them, are a good thing to look for if your project is geographically diverse and/or requires support of users from a merged or acquired business unit. *Poor understanding of the job* was picked by 2 sites. Interestingly, only 1 utility replied that *an older group* of users was the most resistant. The *other* category in this question stimulated some interesting responses, from personality to users of a previous platform that didn't want to switch, to senior designers who felt that new technology would diminish their status.

<b>Survey Question 4:</b> The percentage of initially enthusiastic users who became successful was...
a. 90 to 100 percent b. 80 to 90 percent c. 70 to 80 percent d. 60 to 70 percent e. less than 60 percent

**Survey Question 5.** The percentage of initially resistant users who became successful was ...

- a. More than 70 percent
- b. 60 to 70 percent
- c. 50 to 60 percent
- d. 40 to 50 percent
- e. 30 to 40 percent
- f. 20 to 30 percent
- g. 10 to 20 percent
- e. less than 10 percent

**Response and Analysis:**

Questions 4 and 5 were intended to give insight into the overall success of enterprise GIS from the perspective of user acceptance, and to compare final acceptance among users based on their initial resistance. The results are most useful when analyzed both as separate questions and then together for comparison. First the good news: the respondents rated users as very successful. For initially enthusiastic (IE) users, 7 companies had a success rate of *90 to 100 %*, 2 companies rated at *80 to 90 %*, and the lowest rating was *70 to 80 %* with only 1 response at that level. For initially resistant (IR) users, 8 responses said that the success rate was *More than 70 %*, and only 2 reported at *50 to 60 %*.

The internal comparison for each utility between success rates for the two different sets of users is also revealing. Within the sites with very high IE user acceptance, 2 respondents stated through additional comments that nearly all users for both IE and IR groups had essentially the same success. Most of the high IE user success sites had some differential for their IR users, and further reinforced the numerical results with anecdotal comments. The sites with lower IE user success consistently also had a slight differential between success among IE vs. IR users.

Only 1 response indicated that an IE success rate of *70 to 80 %* was matched by an IR success rate of *More than 70 %*. It is probably wrong to draw too many conclusions from such a small sample and relatively unscientific survey technique, but a few things seem pretty consistent. First, most users eventually become remarkably successful. Second, there is usually some differential in user acceptance which can be linked to initial attitude. Third, it seems possible to create an environment where success rates are fairly consistent among all users, regardless of initial attitude.

**Survey Question 6.** On a scale of 1 to 10 the success of our enterprise GIS would be rated ...

- a. by management as
- b. by users as
- c. by me as

**Response and Analysis.**

This question was intended to provide a general context to help interpret the previous numerical data. Like user success questions, it starts with good news. The average scores in each category were as follows

Management Rating: *8.1*

User Rating: *7.2*

Core Team Rating: *8.3*

In addition to making us feel pretty darn good, these numbers in aggregate tell us that management and core team members generally like technology and its performance enhancers, while users also like it but not quite as much. This difference is logical and expected, but perhaps the best news is that the gap is generally smaller than most of us might have thought. Still, it unmistakably exists; in only 1 of 10 surveys were the scores identical for all categories. And an internal comparison of what each respondent said reinforces a very consistent pattern. In 9 out of 10 surveys, the management view was judged to be equal to or more positive than the users view. Also in 9 out of 10, the core team view was judged to be equal to or more positive than the users view.

Interestingly, despite the nearly equal overall score between management and core team, in 7 out of 10 surveys the management view was assessed as equal to or more positive than the core team view. This is one of those “the average gap is different than the average of the gaps” things, a statistical anomaly that would take someone smarter than the author to explain the mechanics of. But without saying how it happened, here is what yours truly thinks it indicates: in general, management likes the value that it is getting for enterprise GIS, while most core team members think that it could be (and hopefully will be) better. Of course, there are several alternate explanations, including the idea that the responders are highly motivated, technical people, who have pretty high standards and expectations.

**Survey Question 7.** The one thing I would do over to ensure better user acceptance is ...

- Get to know users, and provide follow on support
- Have more technical support on hand during development and deployment
- Provide more training and follow-up
- Have a better understanding of detailed requirements and production capabilities
- Put more emphasis on supporting change, and have a realistic schedule
- Provide longer period of on-site support after deployment
- Give more upfront exposure to ensure understanding of complexity/effort
- Provide more skills for internal core development team
- Enlist and maintain management support throughout project (especially since we experienced a management change during project)
- Get/keep line supervisors and managers on board to reinforce user efforts

### **Response and Analysis.**

This question gets at the heart of the subject: what would some of the most successful, experienced people in this industry do differently to improve user acceptance? The answers provided are so clear and compelling that they hardly need commentary. On the other hand, your author isn't likely to let a little thing like that stop him.

The first immediately emerging pattern is that close, on-site technical support during and after deployment is extremely valuable. This just plain makes sense, and supports a conclusion long ago reached by yours truly. No matter how well trained the user, and how well tailored the application is to the business, there will be rough spots in deployment. Having a close source of help to quickly and competently resolve those issues is absolutely critical to developing a group of confident, happy users. Interestingly, most of the respondents think of training and technical support as related but separate activities. As one respondent said: “Training is a tool, not a cure.”

A number of respondents also would put more priority on management issues. This theme cannot be overstated; engaging management to understand and support the project and to reinforce its value to the end user is absolutely vital to success. In a related vein, two respondents cited the need to clearly understand the functionality, scope and schedule. This is also a management issue, as well as a core team and even a user one.

## CHANGE MANAGEMENT TOOLS AND TECHNIQUES

The experiences and ideas of the utilities that responded to the survey discussed previously, plus the author's own mistakes and accidental successes in the field, and some scholarly research into the topic, provide the basis for the text that follows. Maybe the research wasn't that scholarly. But the tools and techniques described are designed and proven to help organizations embrace the technology and accompanying changes of enterprise GIS. The four tactics discussed include.

1. The Organizational Self Analysis Quiz
2. The Planning for Influence Matrix
3. The Touch Point (Follow Up) Matrix
4. The Overall Implementation Methodology

Your author humbly submits that improving efforts in these areas will improve user acceptance, which will in turn improve overall performance and make your apparently happy management *even happier*.

### 1. Organizational Self Analysis.

There are certain givens in any project, and resistance to change is one of them. But resistance can take many forms, so before any Core Team starts to think about building change management into its implementation, it is probably a good idea to spend a little time analyzing the kinds of resistance that are likely to be met. This topic is closely related to the developing science of knowledge capture, meaning the way that organizations learn about the knowledge that they possess. Many organizations have taken keen interest in getting more leverage from their aggregate experiences.

## ORGANIZATIONAL SELF-ASSESSMENT QUIZ

<b>Management</b>	
1. My company has recently undergone a major shift in management, like a reorganization or a replacement of a key management member.	Y/N
2. On a scale of 1 to 10, how was that management change accepted?	1 = Poorly, 10 = Well Accepted
3. On a scale from 1 to 10, how important does management reckon this system as a part of the overall company strategy?	1 = Not Important, 10 = Vital
4. A management-level sponsor for this implementation is readily identifiable.	Y/N
<b>Organizational</b>	
1. My organization does business over a wide geographic area.	Y/N
2. My organization has recently been a part of a merger/acquisition, the effects of which are still being felt.	Y/N
3. On a scale from 1 to 10, do the business units in the organization operate consistently, that is, do the groups that do the same thing, do it in the same way?	1 = Inconsistent, 10 = Very Consistent
4. One or two (or more) super users could easily be identified from among the end users community to help with this project (and management would let them).	Y/N
5. My organization has at least one collective bargaining unit.	Y/N
<b>Technology</b>	

1. On a scale from 1 to 10, are the targeted users for this project generally computer literate?	1 = Poor Literacy, 10 = Very Proficient
2. On a scale from 1 to 10, was the most recent major system implementation or change well accepted?	1 = Poorly, 10 = Well Accepted
3. My core team feels confident that it has the technical knowledge and skill to design, develop and deploy this technology.	Y/N
4. My core team has (or has access to) training and technical support resources to make our users happy and confident.	Y/N

The Organizational Self Analysis quiz is designed to help core teams and management review the overall corporate response to change. It isn't infallible; like most tools, it will help to guide the worker, but it won't produce a finished piece of furniture. It asks a series of questions to stimulate thought about areas of the organization or aspects of the project that could require change management focus.

The information gathered from this quiz will help you to examine how your organization, management, and technical staff has responded in the past and will respond in the future to the kinds of change that an enterprise GIS might impose. In each area, these clues will be important to helping you plan your approach to change management.

For example, in the management area, residual troubles from a merger/acquisition hangover might tell you that you need to get representation on your core team (and management sponsorship) from both pre-merger sides of the business. At the organizational level, inconsistent business practices or collective bargaining issues could indicate the need for special focus on training. Poor computer literacy in the target audience might incline the team to provide some basic skills before the application rollout training starts. In each of these areas, using this analysis will help to eliminate surprises in key parts of the enterprise.

## **2. Planning for Influence.**

The previous tool helped you to analyze the overall corporate context for change, and look for weak spots or places where your plan is going to need reinforcement. This next tool is designed to help you look at the individuals in the targeted user group, assess their potential for resistance, and design a means for mitigating it. The overall technique for this tool was pioneered by a management consultant named George Eckes, who uses it as a part of his Six Sigma training program [1]. The tool presented here is a modification/simplification of the original, geared towards enterprise GIS.

The name of this gizmo is the Planning for Influence Matrix. It is designed to help the core team assess the change management needs of the individuals in the project. The idea is simple but powerful.

Use of the PFI Matrix starts with an identification of the people who will be involved with or impacted by the change, known as *stakeholders*. These are the actors who are critical to the success of the project. For each of them, the idea is to come up with 2 assessments of their position on the project or change. The first view is their *current position*. Are they eager, or hesitant? Outright against the whole darn thing? It is helpful to think of these attitudes in terms of five categories, from *strongly supportive*, to *strongly against* the idea, with *moderately supportive*, *neutral*, and *moderately against* positions along the spectrum. The second assessment is a determination of the *required position* of the stakeholders in order to ensure the success of the project. What do we need their attitude to be? Is moderate support good enough, or do we need their complete commitment? An example best illustrates the idea.

The case below is completely fictitious (except for the attitudes), and is directed at deploying a graphic work design tool in one region of an energy utility. The stakeholders are what we might expect in such a case, including a regional manager, line supervisor, a super-using planning tech, and a cast of design techs. Within the matrix, an X marks the current attitude (as assessed by the core team) of each stakeholder, with parentheses around positions that aren't totally clear. An O indicates the required position for each stakeholder to ensure success.

### THE PLANNING FOR INFLUENCE MATRIX

**Plan Part 4: Rollout Graphic Work Design in Area 4** X = Current Position O = Required Position

Stakeholder	Strongly Supportive	Moderately Supportive	Neutral	Moderately Against	Strongly Against	Issue(s)	Strategy
Charles (Regional Manager)	O		X			Wasn't his plan	Make sure Gene (VP Operations) reinforces business case with Charles during project
Betty (Line Design Supervisor)	O	(X)				Will help her with supervisory workload issues; will be worried about going against Mike	Meet with Charles and Betty to discuss poss impacts (after Gene meets with Ch); check in with Betty throughout deployment phase
Rich (Super User/ Core Team)	X O					Loves technology; will serve on core team	Done deal
Ellen		O		(X)		Is Sr. Designer in group; lacks computing skills	Plan for early skills training; ask her for help in designing custom trning class for her area
Mike		O	X			Best Designer, but will look for which way wind is blowing before committing	Betty's commitment is key
Frank			O (X)			Generally non-committal kind of guy	Betty's commitment will help

Both positional assessments are key; the first gives an indication of where to look for trouble and why. The second should be an honest evaluation of how much change to try to work for. The *Issue(s)* column should contain a brief statement of the problem to be addressed, and the *Strategy* column a sentence on what is needed. That strategy statement is also critical, because later the core team will designate some specific tasks on which to follow up.

The example probably speaks for itself, but there are a few key things to note. First, this situation doesn't suffer from an active antagonist. There is no one here, lurking in the weeds, actively trying to sink the ship. But, there is a gap between management's (Charles, Betty) perceived attitude, and what the core team believes is required for success. Getting both on board is obviously paramount. Also, note that a Sr. Design Tech, Ellen, is likely to resist. She probably fears losing her position and status, since the new technology is sort of an equalizer. But the core team (those clever people) are on the right track; instead of declaring Ellen the enemy, they are incorporating her ideas into the training program, and providing her with some computing skills in advance, so that it doesn't look to her peers like she's way behind during training.

It is also worth noting that the core team has realistic, honest goals about what it needs from stakeholders for success. Strong support from management and the super user, and moderate support from some key techs are necessary. For the others, simple neutrality will suffice. Everyone isn't going to love this thing, but that isn't the team's goal. They just want to succeed.

This might be the point where some gentle readers from larger organizations will find themselves pondering the practicality of this technique. “Sure,” they say, “that’s fine for a group of 5 or 6 users. But how the heck are we supposed to evaluate the positions of 200 or so, in regional groups of 15 to 50?” An excellent question. One technique that has worked is to assess the individual managers, and then to identify at least one key person or resistance type in each category from among the user group. Usually, a knowledgeable super user from with the core team can finger the typical kinds of culprits, which should help plan to influence them. Getting regional management to help in the assessment will not only provide the team with data, but can also serve to help clarify the mission of the project and make them (management) feel a part of it.

### 3. Touch Point (Follow Up) Matrix.

Analyzing resistance and developing your plan to influence change is only part of the battle. Just about any text that you pick up on the subject will tell you that for changes to really take hold, they have to be practiced and reinforced over a period of time. To help ensure that the plans we made using the PFI Matrix come to fruition, a tool called the Touch Point (or Follow Up) Matrix can be handy. Like the PFI Matrix, this little gem wasn’t thought up by the author, but instead is a customized version of an idea from Bill Jensen’s book on simplicity, called “Simplicity” [2].

## THE TOUCH POINT MATRIX

<b>Change Touch Point Subj:</b> <u>GWD Deployment, Area 4</u>		<b>Date</b> <u>Dec. 03</u>
<b>Expectations</b>		
<b>1. What commitments and behavior do we expect?</b>	Support from Area 4 Mgt; access to super user; extra training time as required	
<b>2. What is the definition of success?</b>	All jobs prepared by GWD by June, 04.	
<b>Change Management Risks</b>		
<b>Stakeholder:</b> Charles	<b>Touch Point:</b> Prior to meeting with Ellen, then monthly staff mtg	
<b>Issue:</b> Might resist plan (it wasn’t his idea)	<b>Frequency/By:</b> Gene (once), then Andy monthly	
<b>Strategy/By:</b> Gene (VP of Ops) plus Andy (core team meet to reinforce business case)		
<b>Stakeholder:</b> Ellen	<b>Touch Point:</b> Check up before production training session	
<b>Issue:</b> Loss of prestige, poor compute skills	<b>Frequency/By:</b> Once/Todd (need to monitor during training and after rollout)	
<b>Strategy/By:</b> pre-training in computer skills/Todd (core team trainer)		
<b>Non-CM Factor Risks</b>		
<b>Risk:</b> Server Performance	<b>Touch Point:</b> Site Acceptance Test; Monthly Review	
<b>Mitigation/By:</b> Tuning and Testing/Dave (core team DBA)	<b>Frequency/By:</b> Monthly/Dave	

The idea behind this Matrix is to link the issues and strategies in the PFI matrix to some specific tasks to give core team and management a reminder to follow through. In the example above, we see risk mitigation strategies for Charles (the regional manager) and Ellen the (Sr Design Tech), and a designated person or persons to execute the strategy and follow up. Note that for the sake of brevity, strategies that are associated with the same stakeholder are combined. In real life, that is probably a bad idea, and it would work better to have the one time and periodic events separated for better tracking of follow through.

One more noteworthy point. Some core teams have also found this tool to work pretty well for the non-change management risks in a project. Even when everyone wants the thing to work and is doing their best to make it so, there are still risky issues out there. Tracking both kinds of risk in one place might make sense.

#### **4. Integrating Change Management Into Your Implementation Methodology.**

It is a fairly well-accepted axiom that good methodology makes a good project. Most organizations have developed a method for buying, building and deploying IT, whether they formally acknowledge that or not. We strongly suggest that every project have a well-documented, published plan to give users and management confidence that the core team knows what it's doing, and when and what to expect. The key aspects of methodology in the *change management* context are that the game plan must be well known, and that change management must be built in, rather than added on, to the implementation plan. Within that plan, here are three key principles to keep in mind throughout the design, development and deployment: [3]:

**Principle No. 1:** Expose the technology early and often to both users and management.

**Principle No. 2:** Involve key users in the Core Team to build internal advocates.

**Principle No. 3:** Don't give the technology to users until they are ready for it, and vice versa.

Building in change management means accounting for each of these principles right from the start. For example, key super users can and should participate in the design. Throughout the long dark days when the system is not quite ready, core team members can and should be sure that target user and management groups know what the thing is going to look like. And of course, no demos of new functionality should ever be 'hands-on' unless the users know what to expect, and the application is ready for prime time.

The true integration of *change management* into enterprise GIS implementation, including the tools and techniques addressed here, spans many issues. There is an entire set of topics left out here, including managing the scope and expectations, and providing for on-going support. In fact, those sound like the subject of another paper.

"When you hear of **wars** and **rumors** of **wars**, do not be frightened; those things must take place; but that is not yet the end." Mark 13:7

#### **REFERENCES**

[1] Eckes, George; *The Six Sigma Revolution*; Wiley Press, 2001.

[2] Jensen, Bill; *Simplicity, The New Competitive Advantage*; Perseus Publishers, 2000.

[3] Meyers, Jeff; *Building Your ArcFM*; Published by M&M; 2001.