

Defining User Requirements for IT Solutions using VA

2014 CSVA Conference

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November 17, 2014

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Geomatics Office

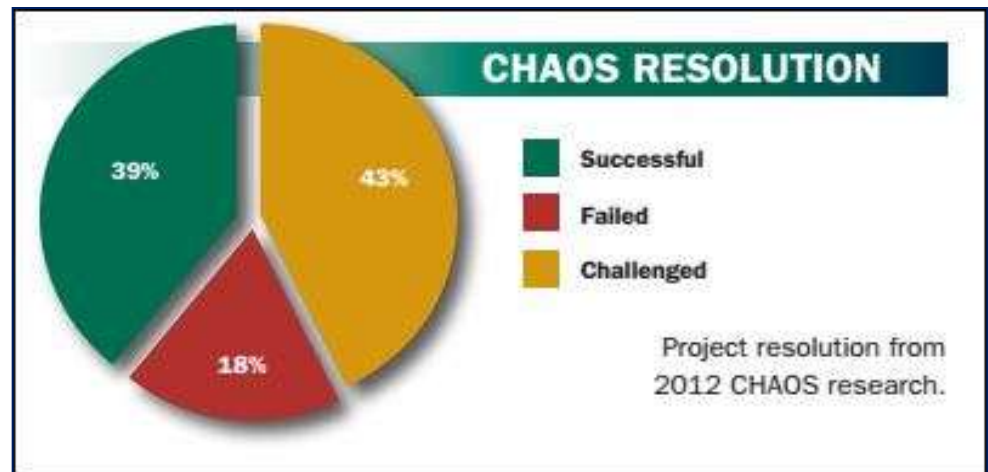
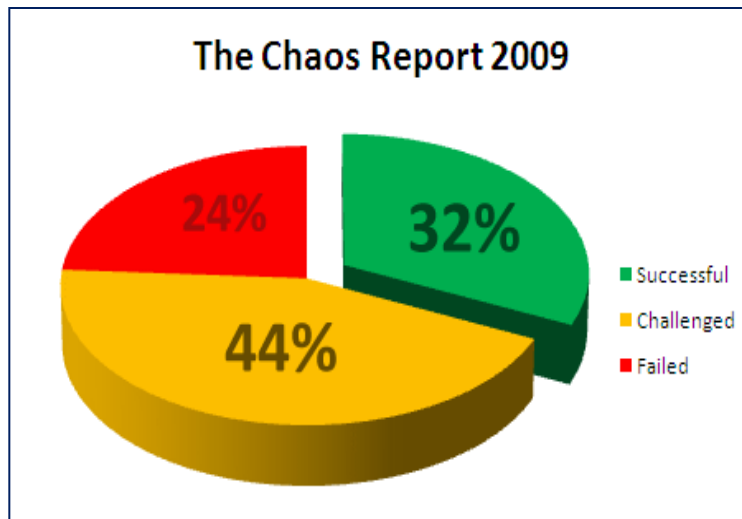
Ministry of Transportation Ontario

Presentation Overview

- Presentation Objectives:
 - Benefits of using VA for IT projects
 - What VA does NOT do
 - Provide some tips and suggestions for using VA in IT projects
 - VA after the IT project is done

Many IT projects fail ...

- *“Success in 68% of IT projects is improbable.”*
 - *Poor requirements analysis causes many of these failures, meaning projects are doomed right from the start.*



Successful :on-time, on-budget, and with all features and functions as defined in the initial scope;

Challenged: late, over budget, and/or with less features and functions than defined in the initial scope

Failed: cancelled prior to completion, or delivered but never used

IT project teams anticipate failure ...

- 75% of project participants lack confidence that their projects will succeed
 - “Fuzzy business objectives, out-of-sync stakeholders, and excessive rework”.
- 78% of respondents reported that:
 - “Business is usually or always out of sync with project requirements”



Top 10 Reasons IT Projects Fail



Lack of input from users



Lack of fact-based analysis



Unclear expectations



**Poor communication
between business and IT**



Internal politics



**Inadequate skills
for project completion**



Schedule overruns



Changes in key personnel



**Changes in project size,
budget, and scope**



Lack of governance

VA Improves Understanding Needs in IT Projects

- Gather **meaningful** input from users ...
- ... In Business Language
- Establishes Clear Expectations
- Fact-based assessment



Using VA to determine user needs and develop RFP

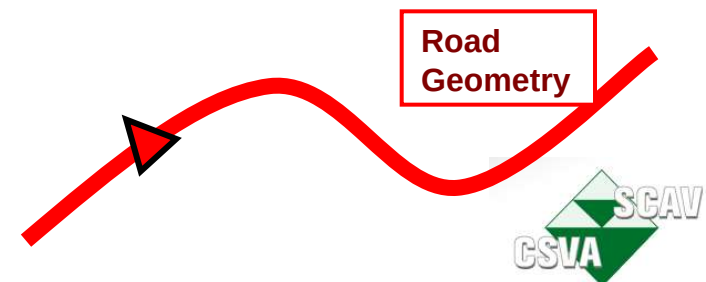
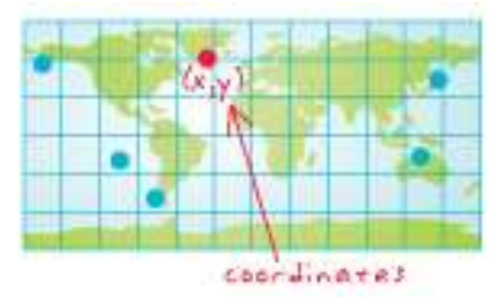


Problem Statement

- Needed to procure two enterprise-wide software solutions that support a broad spectrum of users.
 - Different business histories and challenges
- What **requirements** should be included in a RFP?
- What **evaluation criteria** will we use?
- What **weighting** should be used in the evaluation?
 - What is mandatory versus rated?
- How do you efficiently gather requirements?
- How do we get buy-in
- How do you keep users happy and spend budget on the most beneficial functionality?
- How to educate users on trade-offs to meet varying needs?

First I.T. Project: Location Referencing

- What is it?
 - Location, Location, Location
- Location Referencing Methods
 1. Geographic Location
 - Location with respect to the earth
 - Eg. Latitude, longitude; GPS
 2. Indirect
 - Location with respect to a feature whose location is already known
 - Eg. Address, lot and concession, region, parcel
 3. Linear Referencing
 - Location along a linear feature
 - Eg. common version of highway



Linear Referencing

TMI Intranet Version 2.1 - Microsoft Internet Explorer provided by the Ministry of Transportation

FILE VIEW TOOLS OUTPUT HELP

Layers Legend

LAYERS

- Business Layers
 - Geomatics
 - Bridge
 - Communications
 - Estimating
 - Highway Information
 - Maintenance
 - Pavement
 - Program Management
 - Road User Safety
 - Sustainable Transportation F
 - Traffic
- Base Layers
 - Travel and Tourist Points
 - Parks
 - Airports
 - Roads
 - Railway
 - Topographic
 - Environmental
 - Land and Water
 - Index
 - Places and Boundaries
- Imagery
 - Thematic
 - Non-Thematic
 - Index Links to Imagery

Auto Refresh Option: ☒

Help:
A closed layer group, click to open.

Refresh Map

Mode = Pan ; Active Layer = Dec. 2010

Long/Lat: -79.3 , 43.2

Ontario
Ministry Of Transportation

Page: 1

Highway Keypoints for Accident Location Identification

EFFECTIVE DATE: 1/1/2009

HIGHWAY NO: QEW

KPT NO	OFFSET	DESCRIPTION	HWY DIR	OPP DIST	MTD DIST	CHG FLG	RD STATUS
10000	0.0	FORT ERIE-GODERICH ST-PEACE BRIDGE PLAZA	W	3	6		A
	0.0	TORONTO MTO DIST	W	3	6		A
	0.0	BURLINGTON OPP DIST	W	3	6		A
	0.2	CENTRAL AV IC	W	3	6		A
10004	0.0	CENTRAL AV IC	W	3	6		A
	0.9	CONCESSION RD IC-1	W	3	6		A
10008	0.0	CONCESSION RD IC-1	W	3	6		A
	1.0	THOMPSON RD IC-2	W	3	6		A
10011	0.0	THOMPSON RD IC-2	W	3	6		A
	0.2	THOMPSON RD RAMP UP	W	3	6		A

Location Referencing Project

- Location Referencing Management
 - Update location information
 - Managing changes to highway network over time
 - Managing relationships among different location referencing methods
- Location Referencing Services
 - Tools to validate locations, translate among different location referencing methods, reconcile changes in linear location over time, produce products

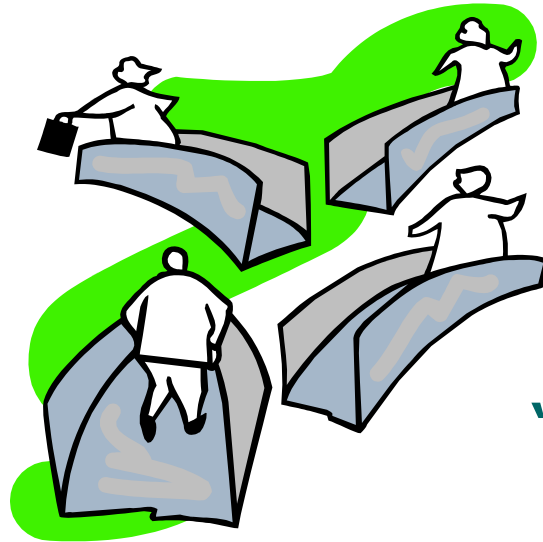
LR – A quick history

- Old database tools (20 years ++)
- Functional areas had diverged from common approach to meet specific needs
- Newer GIS-based approaches
- Disjointed and not always timely maintenance of information
- Responsibility for linear referencing recently moved to Geomatics Office

LR – State of Mind

“There is nothing wrong with our current approach !”

“LR is not meeting our needs ?@!”

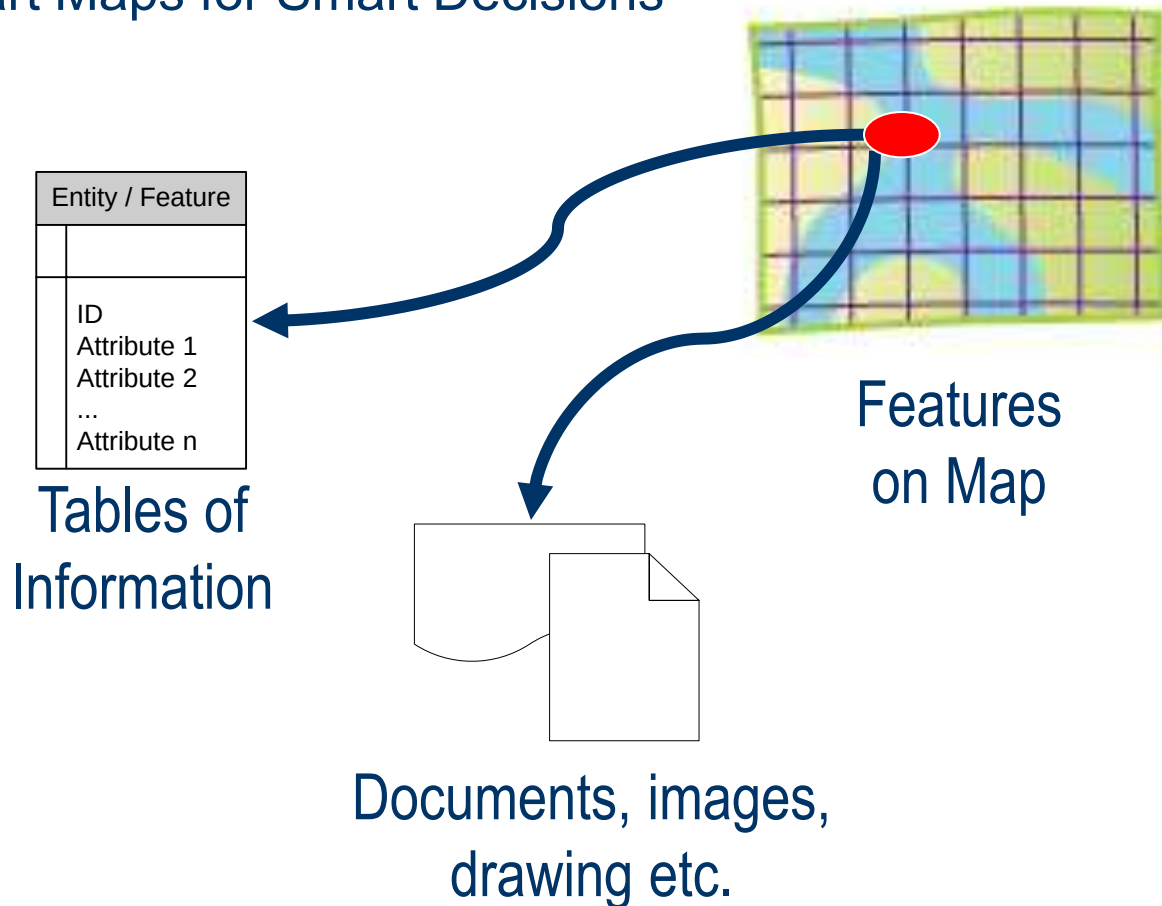


“LR is a foundational system and high priority to replace.”

“Why do we need LR anyhow – can’t we just use GPS ???”

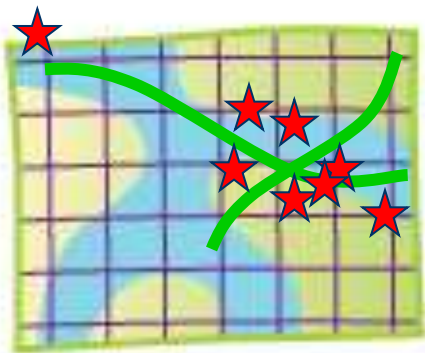
Second I.T. Project: Mapping Services

- What is it?
 - Google Maps / Bing Maps with MTO data
 - “Smart Maps for Smart Decisions”



Mapping Services: Why Is it important ?

- Another way to drill into information
 - Know where it is but not what (ID) it is
- Relate information by location
- Analyze Spatial Relationships

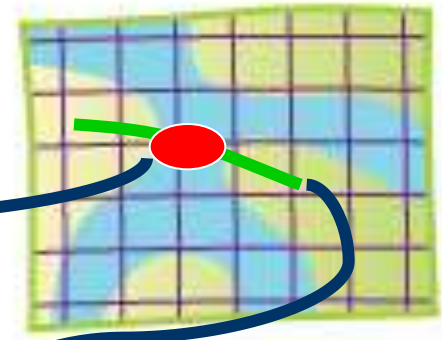


Cluster of accidents at:

- Level intersection
- steep hill
- tight horizontal curve
- pavement slippery when wet

What is the ID of Bridge on Hwy 401 over Hwy 427 ?

Bridge	
	Bridge ID



???

Pavement	
	Good

What is the Pavement Condition on this bridge?

Mapping Services – State of Mind

February 2005



**"Our existing technology
is old – it pre-dates
Google Maps"**

"We need better GIS tools now"

**"I want GIS ...
With my data
Fast, like Google
As easy to use as Google"**

"What's happening?"



**"No IT resources
available"**

Why I decided to use an FPS?

- Opportunity –Traffic needed LR and Mapping Services

“Ever consider doing a FPS?”

- Recommended by Traffic ... used for TVIS II
 - Identify needs and why you need it
 - Prioritize functionality
 - Document it
 - Bring a group of people together ... helps to gather consensus

“15 days of IT time ...”

- Prioritize and justify
- Users define needs and priority – not me!
- Efficiency
 - Broad user group
 - Enterprise solution

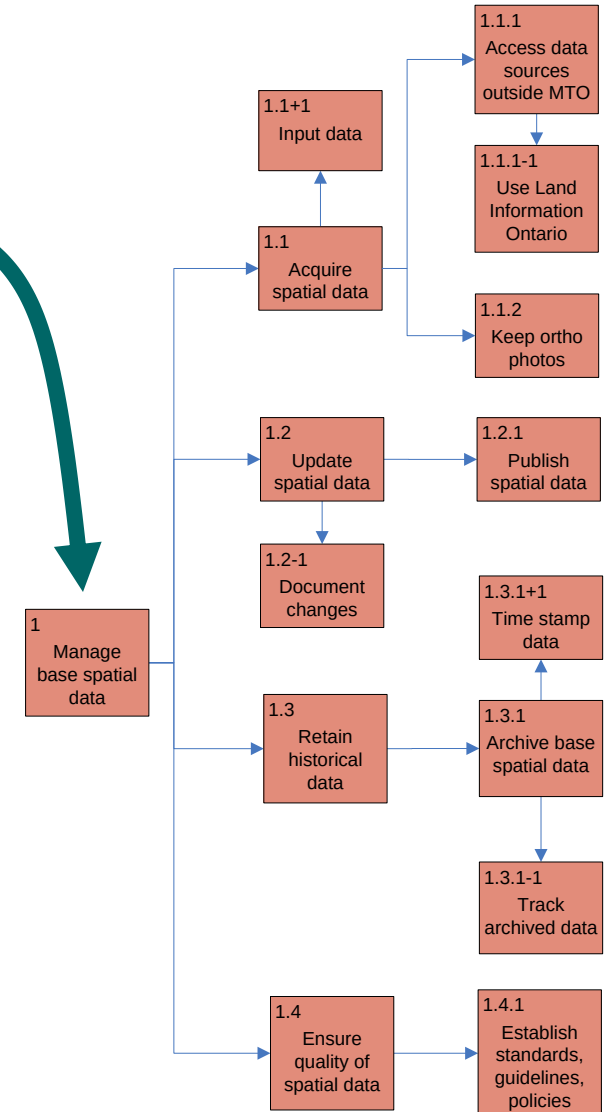
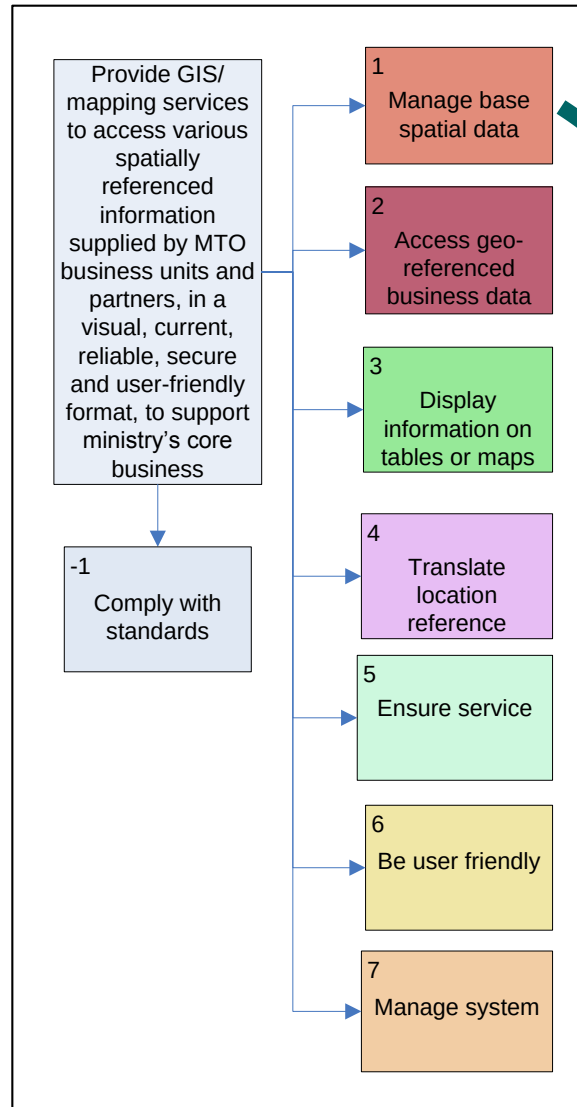
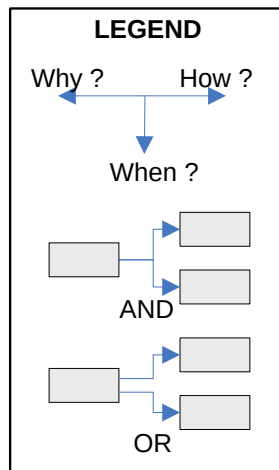


The Approach

- **Facilitated** development of a Functional Performance Specification (**FPS**)
- Facilitated requirements gathering
 - Bring selected group together from broad spectrum of users
 - Focus input to “What is needed?” AND “Why is it needed?”
 - NOT focused on what is wrong now
 - NOT focused on end solution
 - Discuss performance criteria and level – How do you know when the need is met?
 - Discuss the flexibility in meeting the need – How important is the need?
 - Facilitate discussion
- Formal documentation as FPS

FPS: Functional Tree

- Identify Functions
- Clarified mission
- Organized functions in a tree



20



FPS: Characterization of Functions

- Criteria and Performance level of function

No.	Function	Criteria	Performance Level	Flex	Remarks
3	Display Information on Tables or Maps				
3+1	Serve as Front End to Other Systems				
3.1	Define Symbology				
3.1.1	Create Symbology	aspect	size, colour, symbol, combinations, fill types and colors,...	various	see list in ARC GIS
		gradation	based on attribute	F0	
		location of symbol	modifiable	F0	
		presence of symbols	on-off by user	F0	
		levels of sophistication	desk-top or web base	F1	
3.1.2	Create Default Symbology	basic library	yes or no, expandable	F0	
		creation	easy	F0	
		authority	administrator	F0	
		saving	general	F0	
3.1.3	Modify Symbology	modification	easy	F1	
		authority	user enabled	F2	
			administrator	F0	
		saving	local for user and general for admin	F1	

No.	Function	Criteria	Performance Level	Flex
3.2.2.1	Set Query/Search Criteria	identify map feature (map feature to attributes)	on one specified layer	F0
			through all visible layers	F1
			on selected set of layers	F1

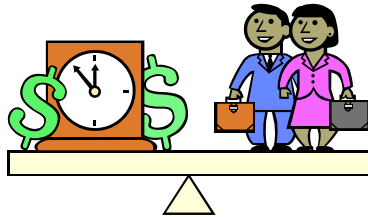
3.2.1	Create Catalog of Available Data	catalog	sorted by business units	F1	catalogued, saves time and promotes use
		search criteria in catalog	by attributes, by location, by metadata	F0	
3.2.2	Query/Search Data				
3.2.2.1	Set Query/Search Criteria	search criteria	by attributes by location	F0	
		delay	within a few minutes	F3	



FPS: Characterization of Functions

● Flexibility

F0: Must have no matter the cost F3: Nice to Have



No.	Function	Criteria	Performance Level	Flex	Remarks
3	Display Information on Tables or Maps				
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		delay	within a few minutes	F3	



Mapping Services User Needs and FPS

1. User Needs Interviews

- Internally by MTO (GIS Support)
- Traditional user needs approach
- Used as input to FPS



2. Functional Performance Specification (FPS)

- Value Engineering Consultant
- Workshop with **End Users**
 - Identify and characterize GIS user functions
 - Participants:
 - Across functional areas
 - Across Regions
 - **Keen and capable**
- Workshop with **GIS Support**
 - Add more detail and further characterizes GIS user functions, especially for complex functions
 - Add GIS support functions
 - Participants:
 - Regional GIS Coordinators
 - GIS Support from Geomatics Office
 - IT GIS Application and infrastructure support



LR Services FPS

- Questionnaire
- Value Engineering Consultant
- Workshop with **End Users**
 - Identify and characterize functions/needs
 - Participants:
 - Key functional areas
 - Across Regions
 - **Keen and capable**
- Invited LR Subject Matter Expert



Relationship of FPS to RFP

FPS

- Identify Functions
- Clarified Mission
- Organized functions in a tree
- Criteria and Performance Level
- Flexibility

RFP

- Functional Needs
- RFP scope
- Functional needs and justification
- Evaluation Criteria
- Evaluation Weighting

FPS Results

- Mapping Services
 - Validated functions and documented their importance
 - Verified desire to have reliable data in Ministry
 - Ready to prepare RFP
- Location Referencing
 - Moved toward better understanding of everyone's needs
 - Identified need to better define what the new location referencing world would look like
 - Location Referencing Standards Project
 - Hired LR Subject Matter Expert
 - Developed and obtained agreement of Location Referencing Standards

Some tips

- Choose participants wisely
 - Keen and capable
 - Cross-section of roles, different perspectives
- Manage number of participants
- Need a good facilitator
 - Focus on needs; FPS structure assists
 - Avoid whining
 - Stay away from “This is how things are done now”
 - Stay away from “That is not possible”
 - Even though looking for IT software – application may not be entire solution
 - Ensure full participation and safe environment
- Kick start thinking prior to workshops
 - Questionnaire / interview
- Off-site location
- Consider including external expertise
- Invite IT (application and architecture) as observers only
- Business custodian – listen, patience, don’t tell people your answer

Was FPS the “easy button” for RFP?

- Did we take FPS and directly list out functionality?
 - No; however provided strong basis for development of RFP
- Why?
 - Terminology and grouping of functions
 - End-user vs. business vs. COTS terminology
 - Procurement requirements
 - More words
 - Mandatory, rated and business requirements
 - Needed more than functional requirements
 - Software maintenance, vendor experience & capability, services, IT technical requirements ...
 - In reality, the technology available does impact solution or scope of RFP



FPS Benefits – people perspective

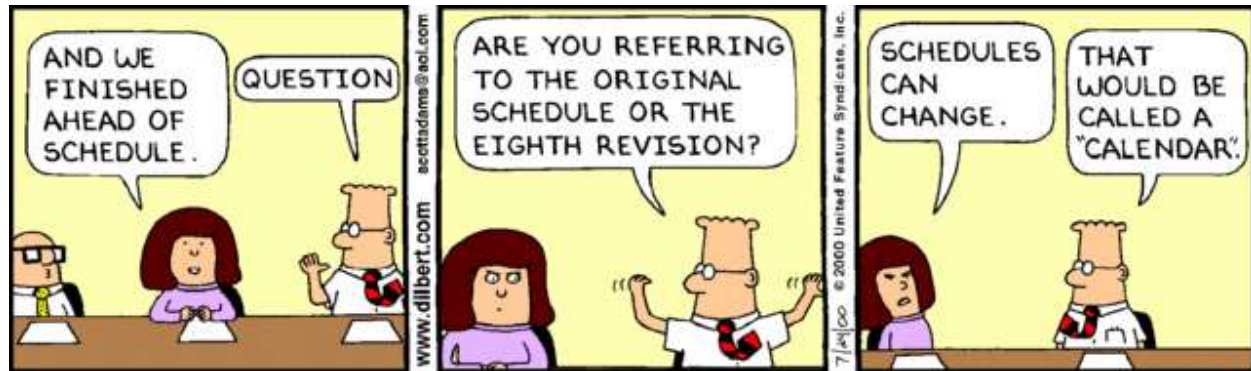
- Effectively moved towards common understanding of basic needs
- Improved understanding of others needs
 - More the same the different
- Constructive conversation
 - Facilitated
 - Focused on reasonable solution
- Efficient and effective method to gather needs
 - Broad input; focused workshop
 - Leads towards buy-in and trust
- Documented needs / justification
 - IT standard versus business need

FPS – more suggestions

- FPS documentation is very concise
 - Take “notes” trying to capture richness of conversation
- Functional tree
 - Do not ‘fret’ over organization of functions in tree
- Improved understanding more important than completely filling out FPS
 - Details can be filled in later
- It is hard work for participants
 - Provide chocolate, social breaks, comfortable room
 - ...

Were the IT Projects Successful?

- Location Referencing challenged
 - Behind schedule
 - Full mission/vision will take more time and effort to achieve



- Mapping Services successful
 - Implemented March 2014
 - Regions are using
 - Usage continues to expand

After the IT Project is Done ...

... Principles of VA are still useful

- What is the business value of an enhancement requested?
 - Need structured approach to discuss
 - Need key people to participate in discussion:
 - Provide input
 - Understand the trade-offs
 - Be part of developing the solution
 - Need a simple way of presenting information

Approach Used to assess business value

1. Determine what **criteria** should be used to determine the benefit of an enhancement
2. Assess the **relative weight** among the different benefits criteria
3. Define how the **costs** will be ranked (on a scale of 1-9)
4. For each enhancement, select (on a scale of 1-9) the ranking for each benefit **criteria**
5. Calculate the overall benefit, and **benefit over cost ratio**

1. Criteria

● Identify criteria and it's performance measure

Criteria			
No	(Active verb + noun)	Comments	Performance Criteria / Measure
1	Used broadly		- Affects most or all users and/or a very large range of systems/or key stakeholders - Affects a large set of users and/or large range of system functionality - Affects a moderate set of users and/or moderate range of systems - Affects a small set of users and/or a small range of systems - Affects a minimal set of users and/or a very small range of systems
2	Saves time	end user, administrator, IT; improves performance	Time saved by end user; admin work, IT troubleshooting
3	Improves/repairs existing functionality	Severity of issue solved from technical and business perspective Known issues	- Data loss, data corruption or system unavailable - Important functionality is unavailable with no workaround - Important functionality is unavailable but has a reasonable workaround - Secondary functionality is unavailable but has a reasonable workaround - Cosmetic issues or some functionality unavailable but has a simple workaround Business processes are severely impacted by this enhancement, but continue to operate – albeit in a less than efficient manner Business processes are moderately impacted by this enhancement. Processes move forward at an expected but not exceptional rate Business processes are slightly impacted by this enhancement. Processes move forward at best possible rate, but could be further improved with this enhancement. No impact to existing business processes. RFE may represent a possible future direction or enhancement to existing products but without a definite business justification.
4	Has future business value		- high potential frequency of being used and high potential likelihood of being used - high potential frequency of being used and lower potential likelihood of being used - lower potential frequency of being used and high potential likelihood of being used - low potential frequency of being used and low potential likelihood of being used
5	Attractive to end user	Wow factor; Adds to the user experience	

2. Relative Weighting of Criteria

- Pairwise Comparison

No	Criteria	Final Weights from Pairwise
A	Used broadly	28%
B	Saves time	21%
C	Improves/repairs existing functionality	36%
D	Has future business value	10%
E	Attractive to end user (WOW)	5%

3. Cost Ranking

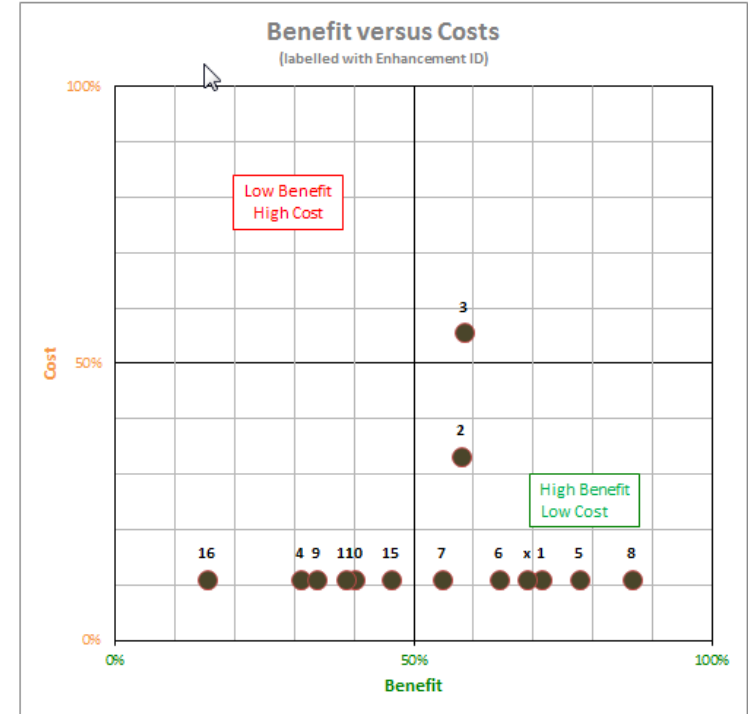
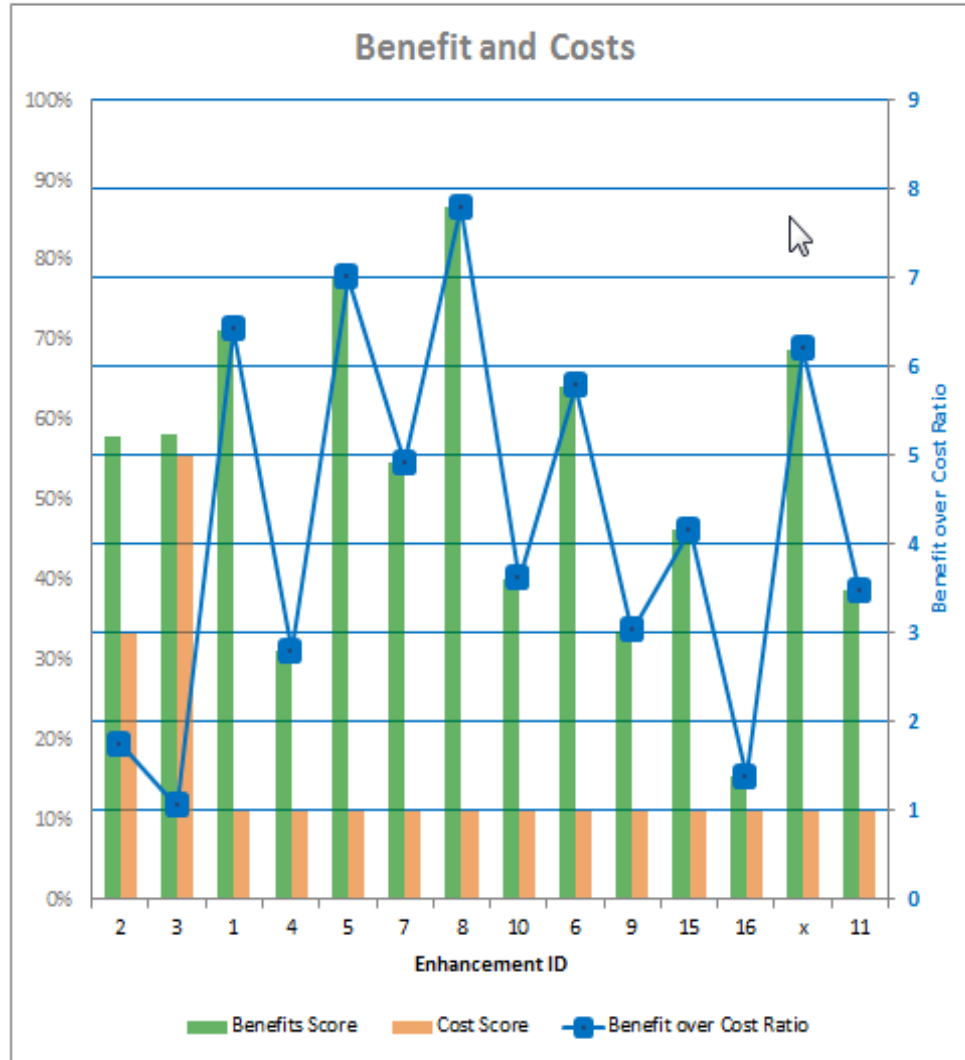
Rank	Project Size
1	< \$ 10K
2	
3	\$ 10 - \$ 20K
4	
5	\$ 20 - \$ 50 K
6	\$ 50 - \$100K
7	\$ 100 - \$ 125 K
8	
9	> \$ 125K

4. Rank benefit of each enhancement

Date of workshop: October 7-9 2014

ID	Rolta Enhancements for Consideration	Benefits Realized						Cost			Benefit over Cost Ratio	
		Used Broadly	Saves Time	Improves functionality	Future Business Value	WOW	Notes on Benefits Realized	Benefits Score	Rolta Effort	Cost in \$, or Project size estimate		Cost Score
	Weights	0.28	0.21	0.36	0.1	0.05	9					
Enhancements List												
2	End user defined field list in results grid	3	6	7	5	2		58%	3	\$14,280	33%	1.74
3	Clustering on point layer	8	2	4	8	7		58%	5	\$37,740	56%	1.05
1	Redlining circle defining centre coordinates and radius	6	7	7	6	3		71%	1	\$9,180	11%	6.42
4	Defining reply to email in OnPoint site	5	2	2	2	1		31%	1	\$7,140	11%	2.79
5	Using redlining objects to perform selections or buffer	7	7	7	7	7		78%	1	\$7,140	11%	7.00
7	More options to control legend properties	8	3	5	2	1		55%	1	\$7,140	11%	4.92
8	Determining coordinates in a different projection from map tab	8	8	8	8	4		87%	1	\$7,140	11%	7.80
10	Predefined searches should honour configuration sets	5	3	3	4	2		40%	1	\$9,180	11%	3.61
6	Exporting redlining objects as KML	5	7	6	6	3		64%	1	small	11%	5.78
9	Defining order of fields in simple report	2	2	5	2	1	Is it solved for DIIMS. Based on non-DIIMS use	34%	1	\$6,120	11%	3.03
15	Administrator ability to add date/time to simple reports	6	5	3	3	1		46%	1	\$4,080	11%	4.16
16	Administrator ability to add page breaks between features in simple reports	2	1	1	2	1		15%	1	\$4,080	11%	1.38
x	Resizable iVision window	8	5	6	5	5	Stuck in map frame	69%	1	\$4,080	11%	6.20
11	Line Symbol used in Thematic Mapping	6	1	4	1	1		39%	1	\$4,080	11%	3.48

5. Calculate Benefit over Cost Ratio



Select enhancements where:
Benefit over cost > 2

Results of business value workshop

- Workshop: 3-4 hours held during Geomatics Learning Event
 - Preparation – list of potential criteria
- Decided which enhancements had business value.
- Agreement and buy-in from all workshop participants
 - Good use of time
 - Can re-use approach
- Prepared Statement of Work with vendor, vendor doing work

Closing Statement

- FPS leads toward identifying clear business needs
- The better the understanding of needs the better the IT solution
- Provides structured efficient approach to gathering needs
- Educates and informs people on trade-offs and other peoples needs
- Provides information to make better decisions
- But ... not a magic bullet ... just part of the work that needs to be done

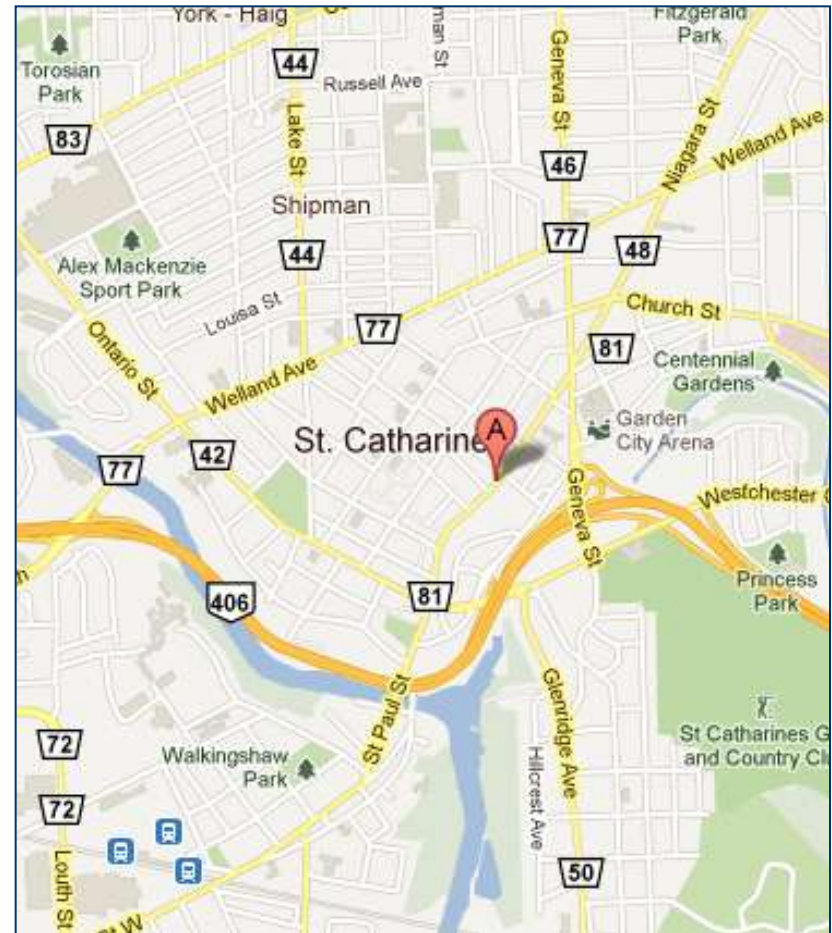
Contact Information

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(43.15886 °, -79.24327 °)
or (43° 9' 31.52", -79° 14' 35.48")

Thank You – Questions?

Location, Location, Location

A picture is worth a thousand words ...

A map is worth a thousand pictures ...

An interactive map is worth a thousand maps

