Using VA in IT Projects

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Toronto, Ontario

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Presentation Overview

- Value Analysis (VA) lead to a successful acquisition of two software solutions
  - Acquired best-in breed solutions
  - Optimistic that solutions will meet majority of needs
- My role: Business custodian of software solutions
- 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

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?

The Approach

- **Facilitated** development of a Functional Performance Specification (**FPS**)

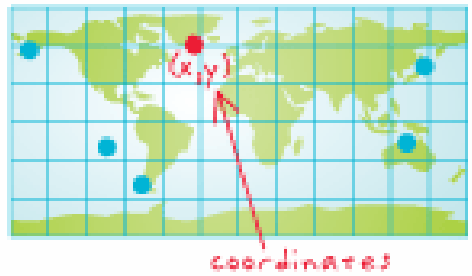
- Facilitated requirements gathering
  - Bring selected group together from broad spectrum of users
  - Focus input to “What is needed?” AND “Why is it needed?”
    - NOT focused on what is wrong now
    - NOT focused on end solution
  - Discuss performance criteria and level – How do you know when the need is meet?
  - Discuss the flexibility in meeting the need – How important is the need?
  - Facilitate discussion

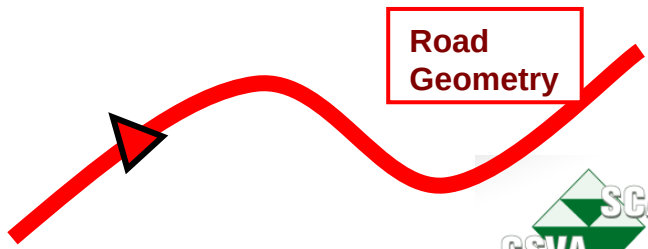
- Formal documentation as FPS

First I.T. Project: Location Referencing

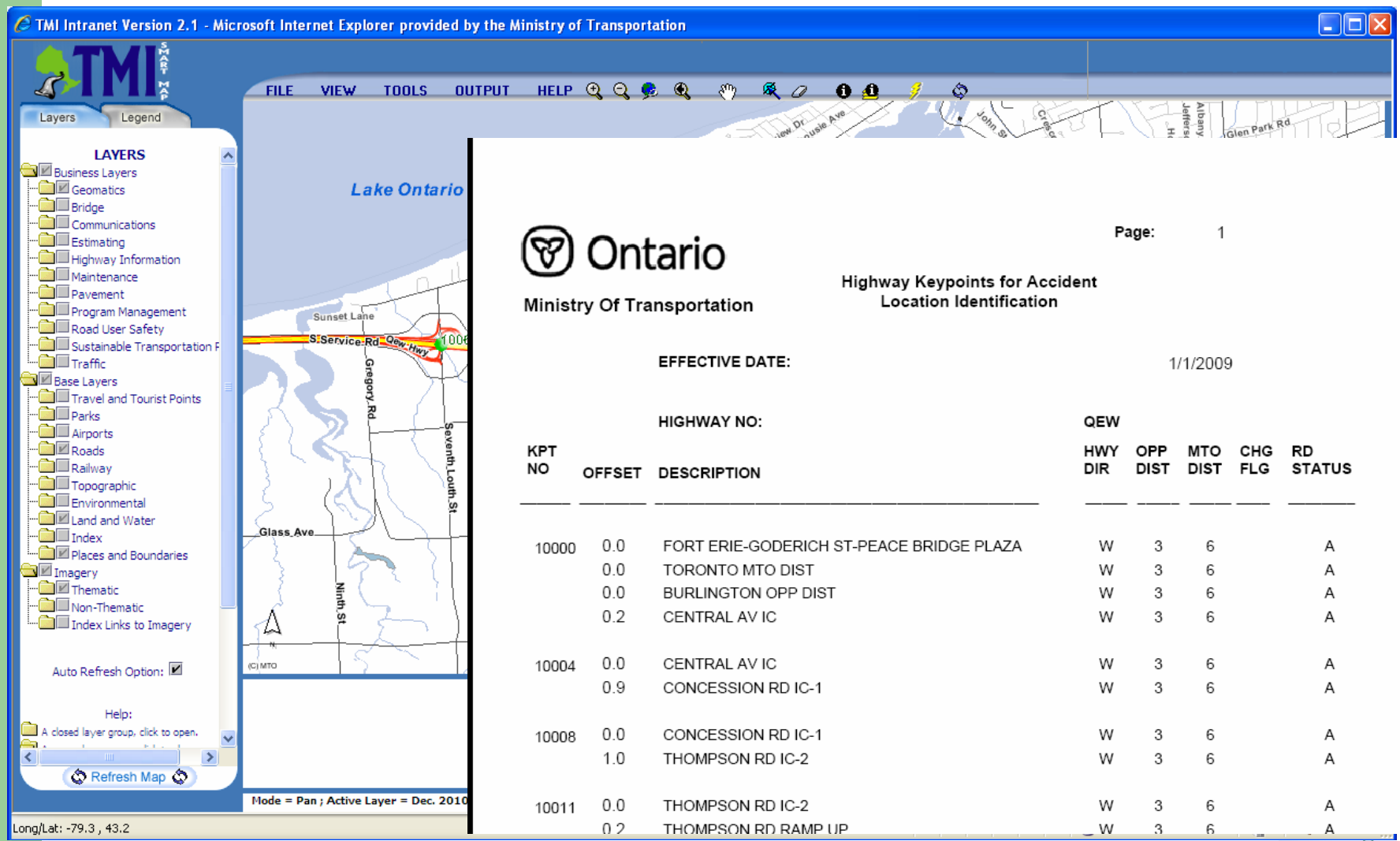
- What is it?
  - Location, Location, Location

- 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



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	MTO 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 !”

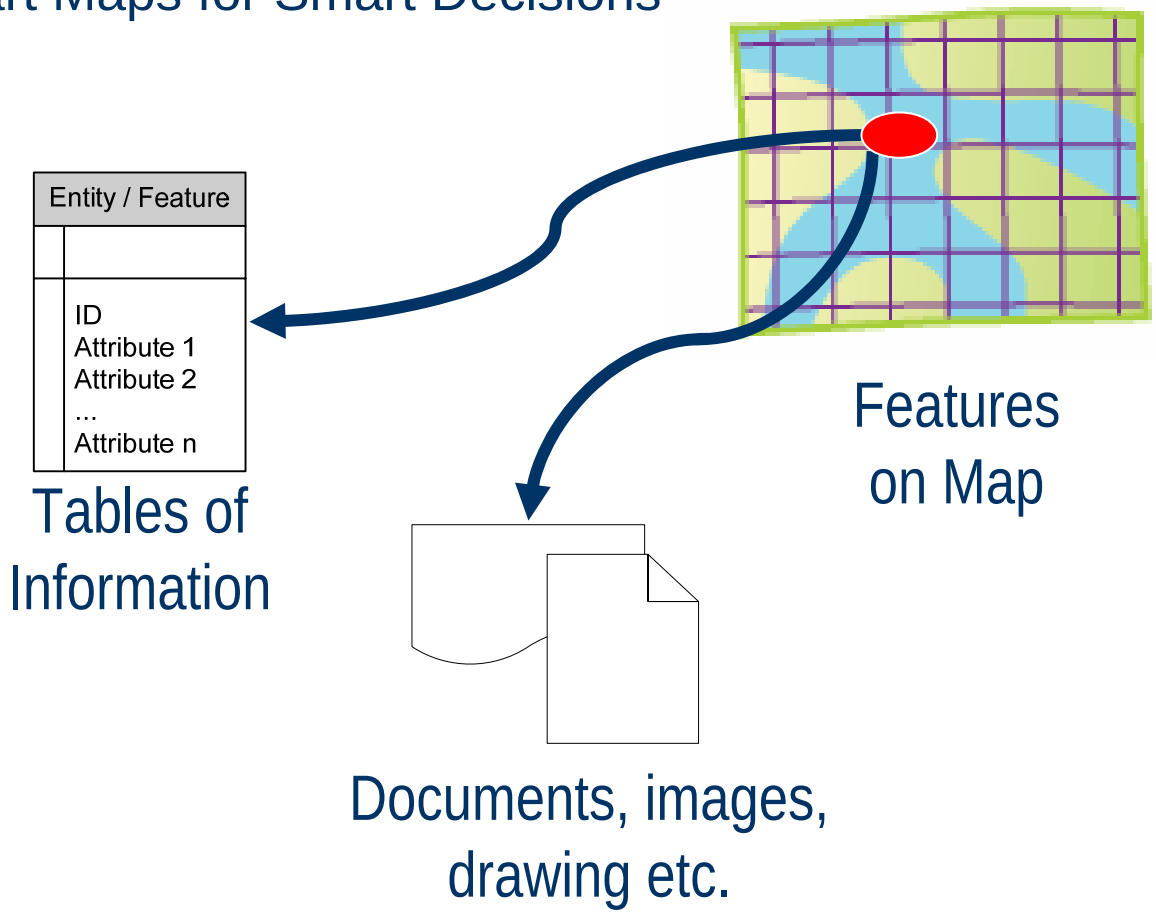
“LR is not meeting our needs ?@!”

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

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

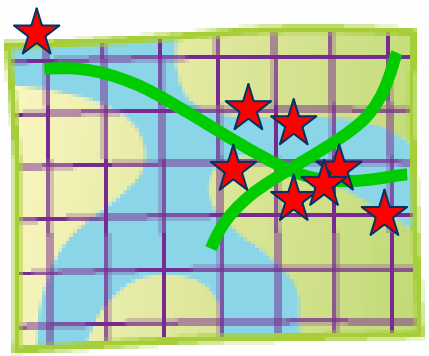
Second I.T. Project: Mapping Services

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



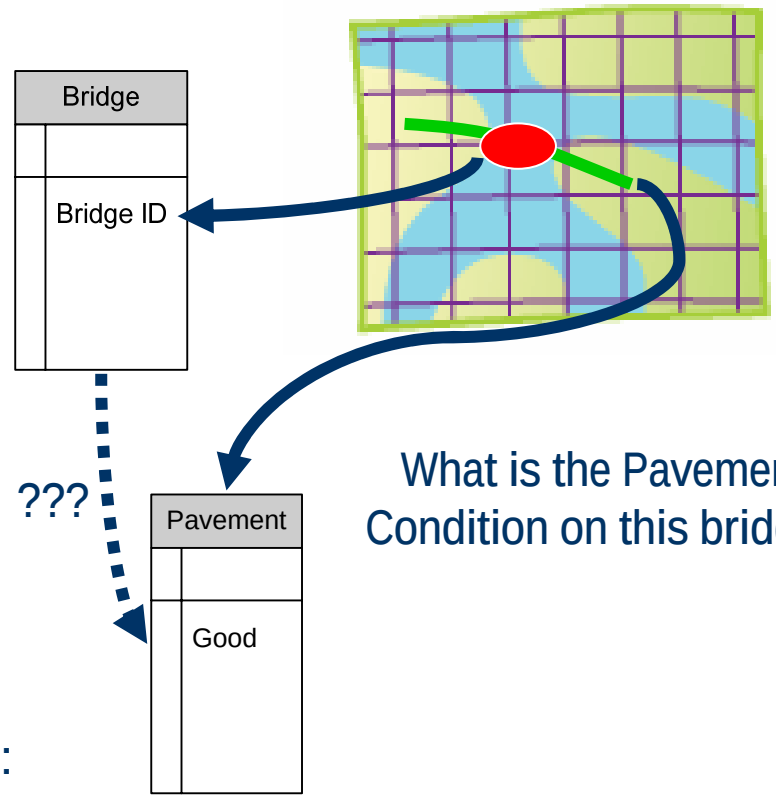
Mapping Services: Why Is it important ?

- 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

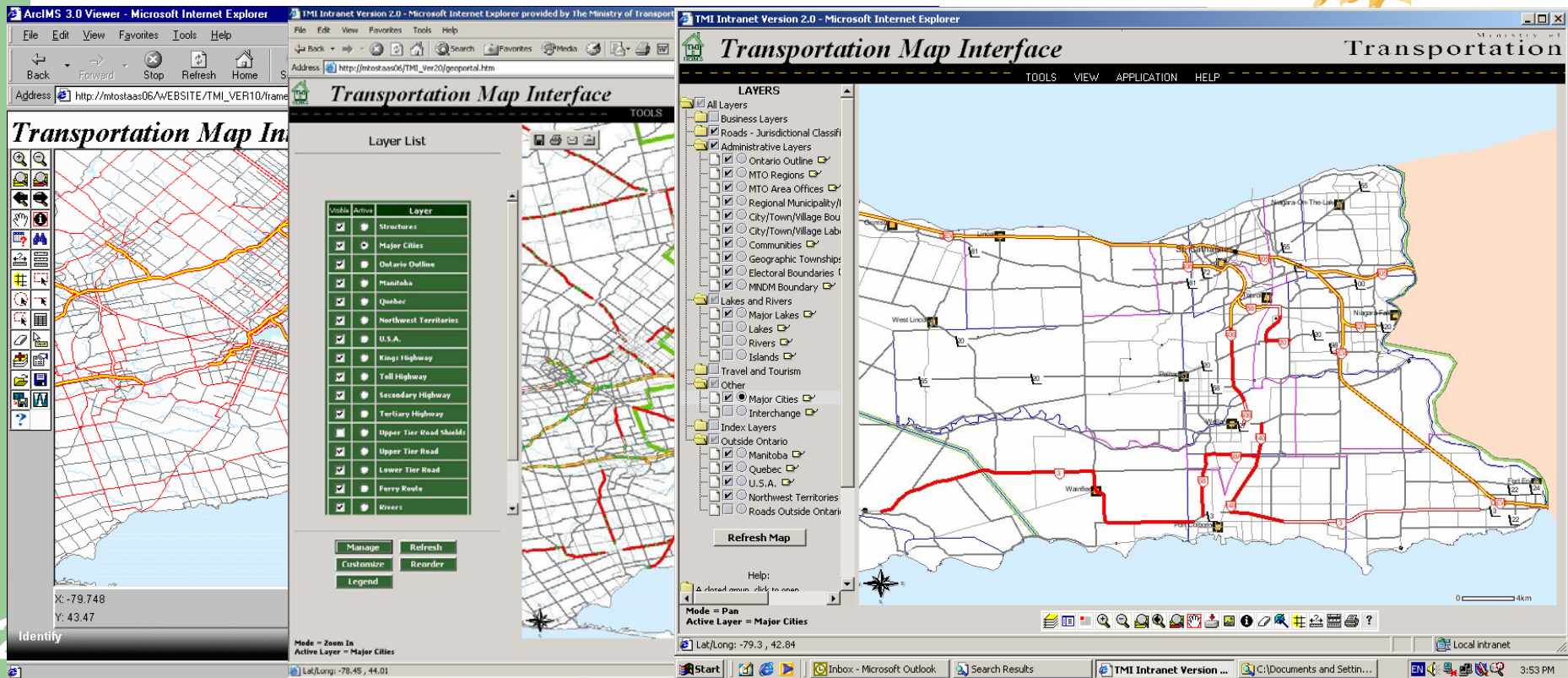
What is the ID of Bridge on Hwy 401 over Hwy 427 ?



What is the Pavement Condition on this bridge?

GIS – The early years (2002-2004)

- TMI Intranet
  - v1.0 – Jan 2002 - **$30K**
  - v2.0 – June 2003 - **$25K**
    - **58 layers (1 Gb)**
  - v2.0.1 – Sept 2004



GIS – Enlightenment (2004 – 2005)

"I have CAD, Why do I need GIS"

GIS - SIP
MTO's GIS VISION

December 2004

- GIS Strategic Implementation Plan
  - Should MTO invest in GIS, how do we organize it, what needs to be done?

Google Maps

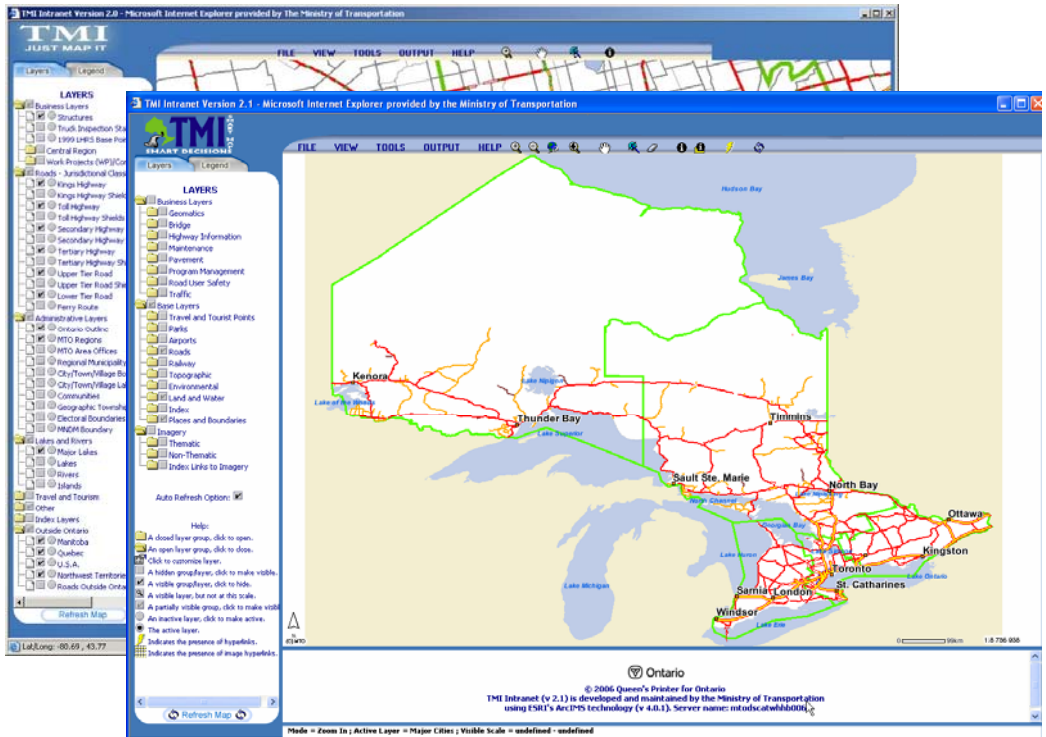
February 2005

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

GIS – Waiting (2005 – 2007)

“No resources available … ”

- v 2.0.2 Improved Performance: July 2005
- v 2.1 (Quick Wins): March 2006
  - **15 days of IT time**
- v 2.1 Implement Visual Standards: July 2006



“I want GIS …

With my data

Fast, like Google

As easy to use as Google”

“What’s happening?”

GIS – The opportunity - Fall 2007

Traffic Volume
Fall 2007

"I want GIS …
With the traffic volume data
Fast, like Google
As easy to use as Google"

"I need LR for traffic volume too!"

"Ever consider doing a FPS?"

5 Permanent
Regional GIS Coordinators
November 2007

"We need better GIS tools now"

- v2.1 – Fall 2007 - Layer maintenance tools
  - **373 layers (4.2 Tb)**

Why I decided to use an FPS?

“Ever consider doing a FPS?”

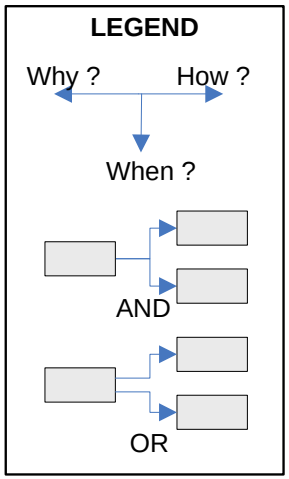
- Recommended by Traffic … used for TVIS II
  - Identify needs and why you need it
  - Prioritize functionality
  - Document it
  - Bring a group of people together … helps to gather consensus

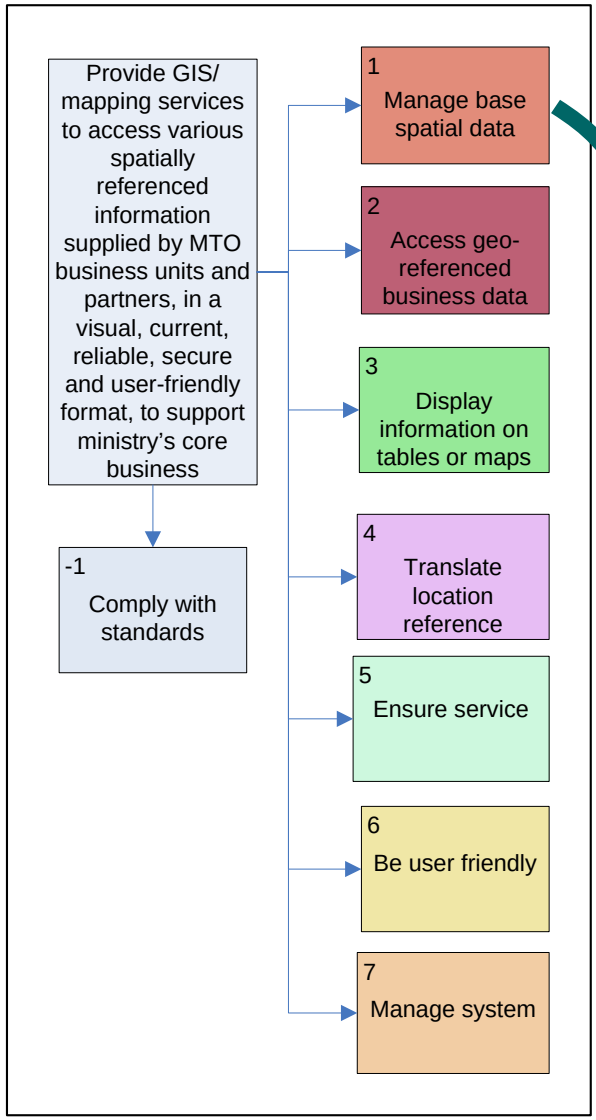
“15 days of IT time …”

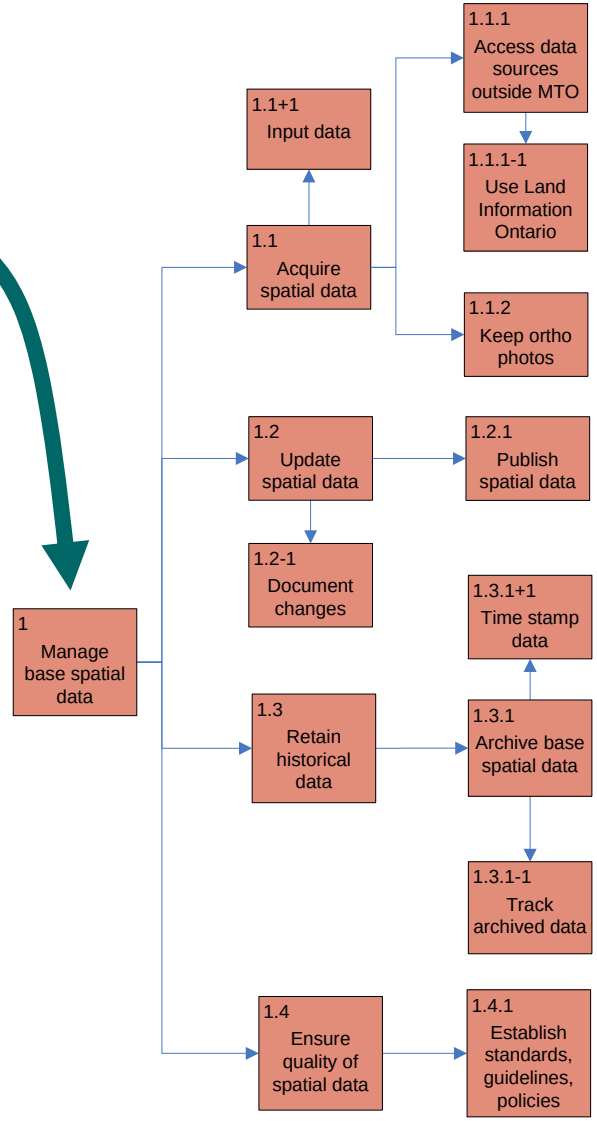
- Prioritize and justify
- Users define needs and priority – not me!
- Efficiency
  - Broad user group
  - Enterprise solution
- To help solve a business issue

FPS: Functional Tree

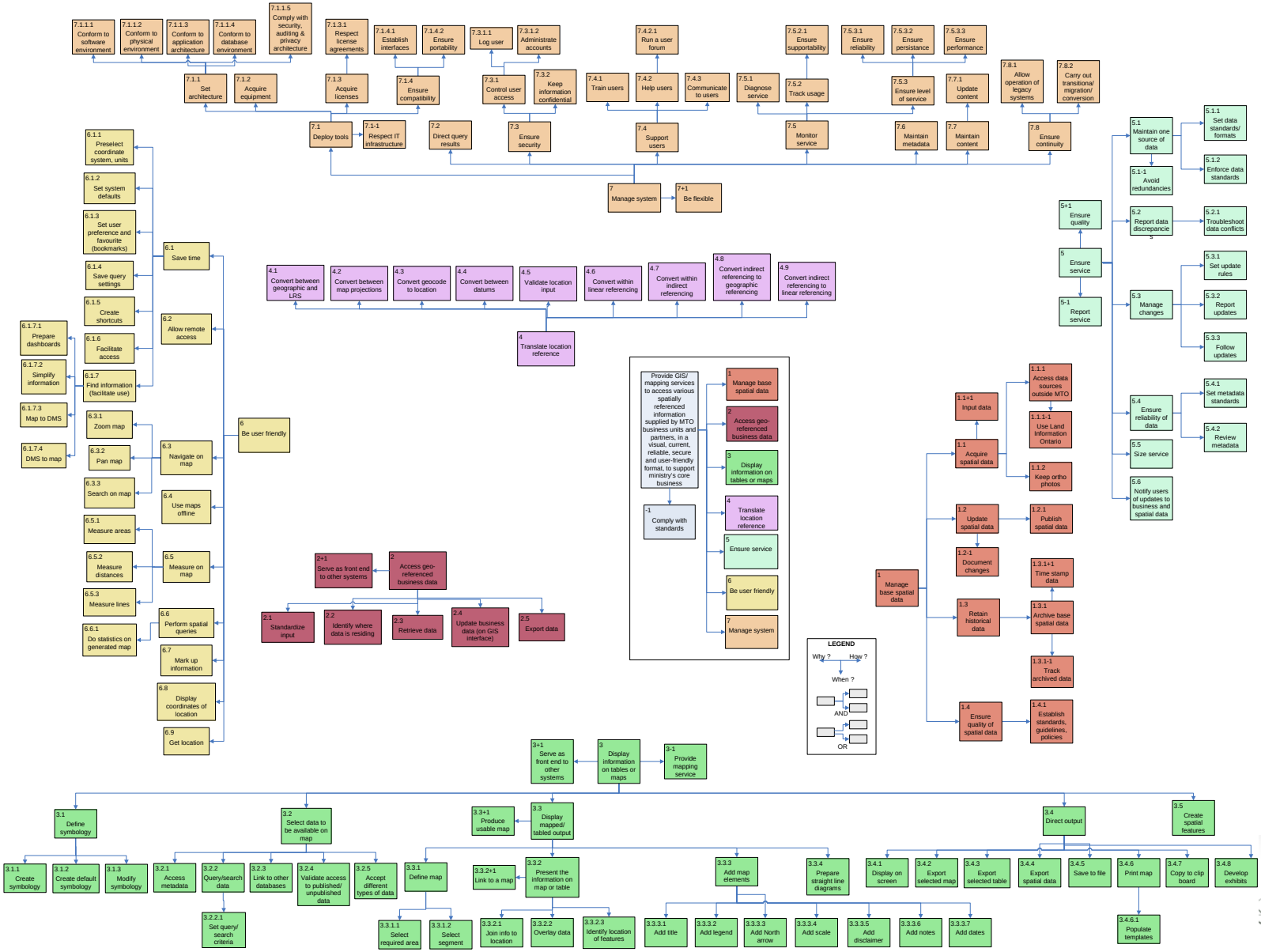
- Identify Functions
- Clarified mission
- Organized functions in a tree







Mapping Services Functional Tree



FPS: Characterization of Functions

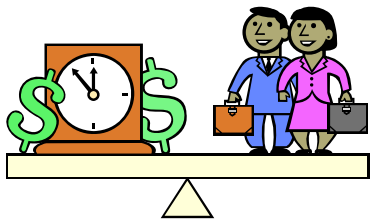
- **Criteria** and **Performance level** of function

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	
3.2.1	Create Catalog of Available Data	catalog	content decided by business units	F1	mapping should be 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	

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

FPS: Characterization of Functions

- **Flexibility**
  - **F0: Must have no matter the cost …. F3: Nice to Have**



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		saving	general	F0	
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			administrator	F0	
		saving	local for user and general for admin	F1	

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		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	
		estimated time			

Flexibility – definition / guideline

The flexibility of each specification identifies how negotiable the level of performance is, ranging from absolutely no flexibility to total flexibility. The flexibility is expressed as follows:

F0:	**No flexibility**	The stated performance level of the requirement must be achieved.
F1:	**There is very little flexibility**	The stated performance level of the requirement needs to be achieved but not at any cost.
F2:	**There is some flexibility**	Although achieving the stated performance level of the requirement is still desired, there is room for negotiation.
F3:	**There is lots of flexibility**	The stated performance level of the requirement is either not critical to the users of the location referencing system or poor achievement has minimal negative impact.

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

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

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 …

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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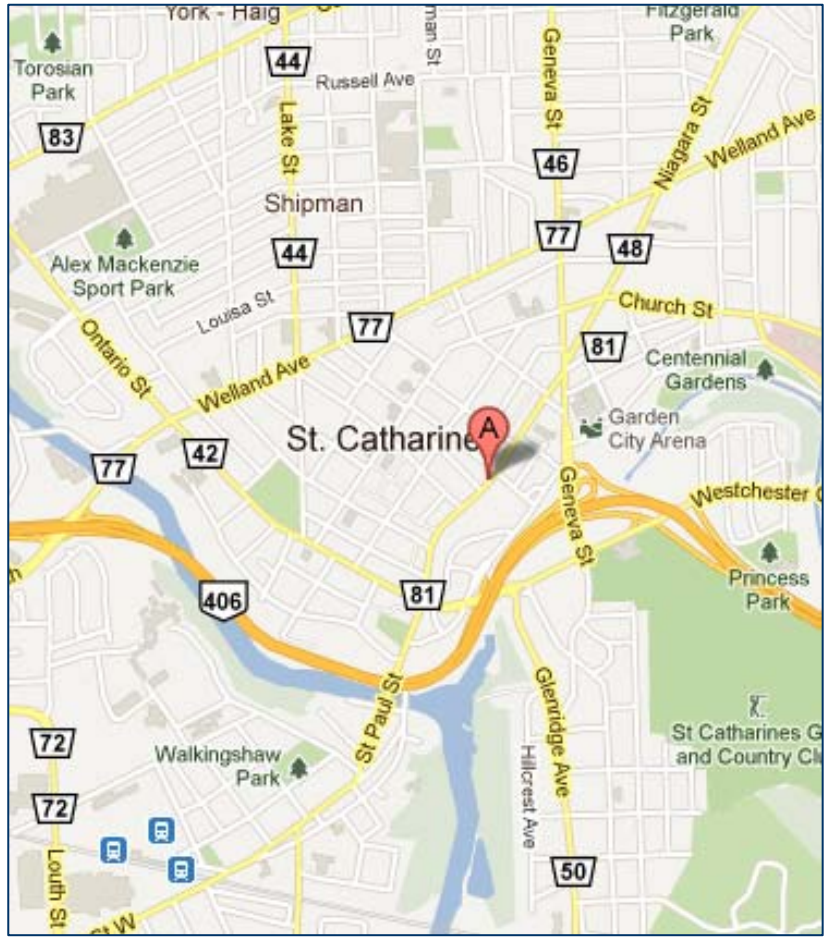
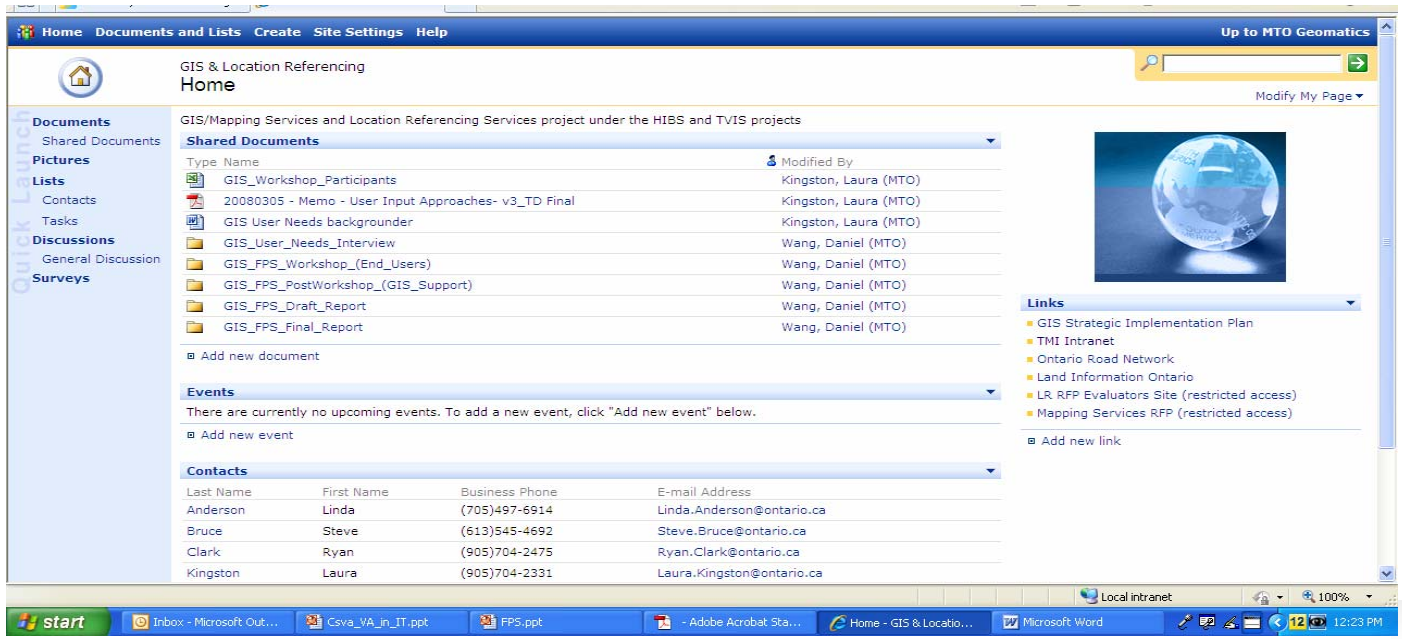


(43.15886 °, -79.24327 °)
or (43° 9’ 31.52”, -79° 14’ 35.48”)

More information

- GIS and Location Referencing Portal SharePoint site (internal to MTO):

http://portal.mto.ad.gov.on.ca/sites/MTO/PHM/HSB/go/GISLR/default.aspx



Thank You – Questions?

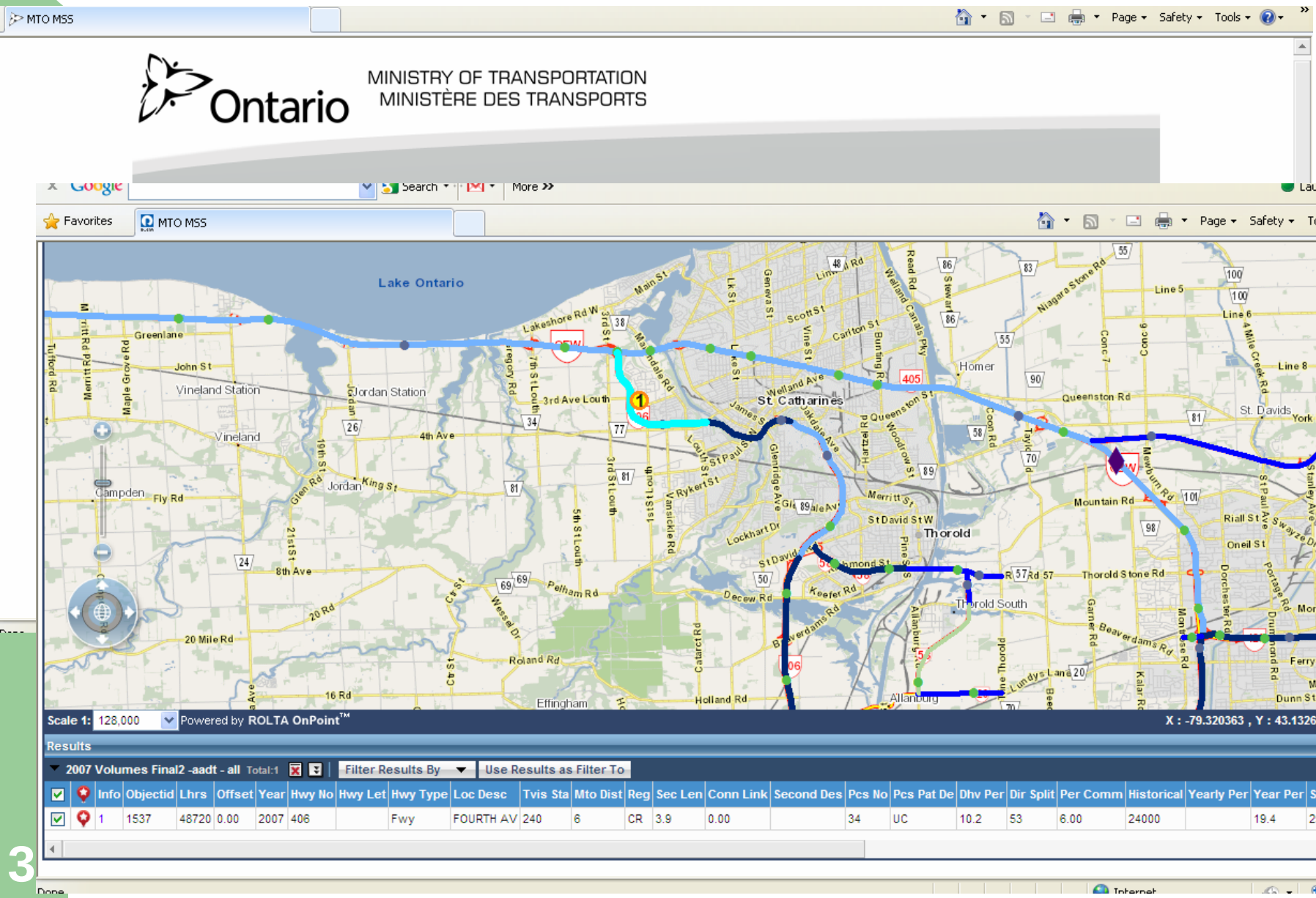
Location, Location, Location

A picture is worth a thousand words …

A map is worth a thousand pictures …

An interactive map is worth a thousand maps

Pre-release of Mapping Services



Info	Objectid	Lhrs	Offset	Year	Hwy No	Hwy Let	Hwy Type	Loc Desc	Tvis Sta	Mto Dist	Reg	Sec Len	Conn Link	Second Des	Pcs No	Pcs Pat De	Dhv Per	Dir Split	Per Comm	Historical	Yearly Per	Year Per	Sadt	Sawd
1	1537	48720	0.00	2007	406		Fwy	FOURTH AV	240	6	CR	3.9	0.00		34	UC	10.2	53	6.00	24000		19.4	25500	27800

Successful Location Referencing Vendor

g System (MLRS) | Transp...

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Multilevel Linear Referencing System (MLRS)

Intergraph's Multilevel Linear Referencing System (MLRS) application provides everything you need to build, maintain, and analyze a multilevel, temporal linear referencing system for representing road networks. Editing tools give you a complete data maintenance environment for MLRS data. You can easily add a temporal dimension to both your data maintenance and data analysis.

Downloads

- **Solution Sheet:** Multilevel Linear Referencing System (MLRS)
- **Webcast:** Discover How Nevada Uses Intergraph's MLRS
- **White Paper:** Multilevel Linear Referencing System (MLRS)
- **White Paper:** MLRS Enterprise Architecture

MLRS is an automated approach to managing the components of a linear reference system network and event data, regardless of the location method or geometric representation used. MLRS is different from the traditional LRS management practice in that the base network can represent multiple linear referencing methods (LRMs), such as county-route-logmile, street name-address, intersection-offset, etc., and can be displayed on the map using multiple geometric representations. Intergraph's core data model and software manage the various parts of the LRS independently through database joins and relationships. A temporally stable datum links

SCAV CSVA