

Transportation Asset Management System:

The Manitoba Experience

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Presented at HEEP Area V – June 2013



Presentation Outline

- Background
- Goals and Objectives
- Methodology
- Findings
- Current Status

Definition of Asset Management

- Transportation Asset Management is the strategic and systematic process of operating, maintaining, upgrading, and expanding physical assets effectively throughout their life cycle. It is focused on the business and engineering practices for resource allocation and utilization with the objective of better decision making based upon quality information and well defined objectives.

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Background

- MIT's transportation infrastructure management duties cover the construction, maintenance, and operation of:
 - 19,000 kilometres of all weather roads
 - 2,200 kilometres of winter roads
 - 21,000 bridges and large culverts
 - 4,700 kilometres of drains
 - 75 dams, 61 reservoirs, 41 pumping stations
 - 24 northern airports (serving isolated communities)

Servicing a population of 1.3 million people

Sample Projects











Goals and Objectives

- Improve MIT's Planning Processes and Defensible Decision making
- Perform Overarching Asset Management System Trade-off Analyses
- Develop Investment Themes/Strategic Capital Planning
- Report on different funding scenarios

How to Achieve Goals and Objectives

- Use a highway asset management system as a tool to recommend short-term project selection that is aligned with the longer-term Strategic Goals of the Department
- Use a tool that is flexible/changeable as priorities and strategies change to reflect transportation and economic needs

How to Achieve Goals and Objectives

- Multi-objective Optimization

Being able to set priorities and trade-offs across disparate asset types (e.g. bridge vs. pavement) with different evaluation criteria (e.g. safety vs. function), within definable constraints (e.g. budgets or timelines or legislated mandates)

How to Achieve Goals and Objectives

- The initial focus will be on roads and bridges with the planned expansion of the asset management processes and software to other assets in the future
 - Airports
 - Drains
 - Dams
 - Reservoirs
 - Etc.

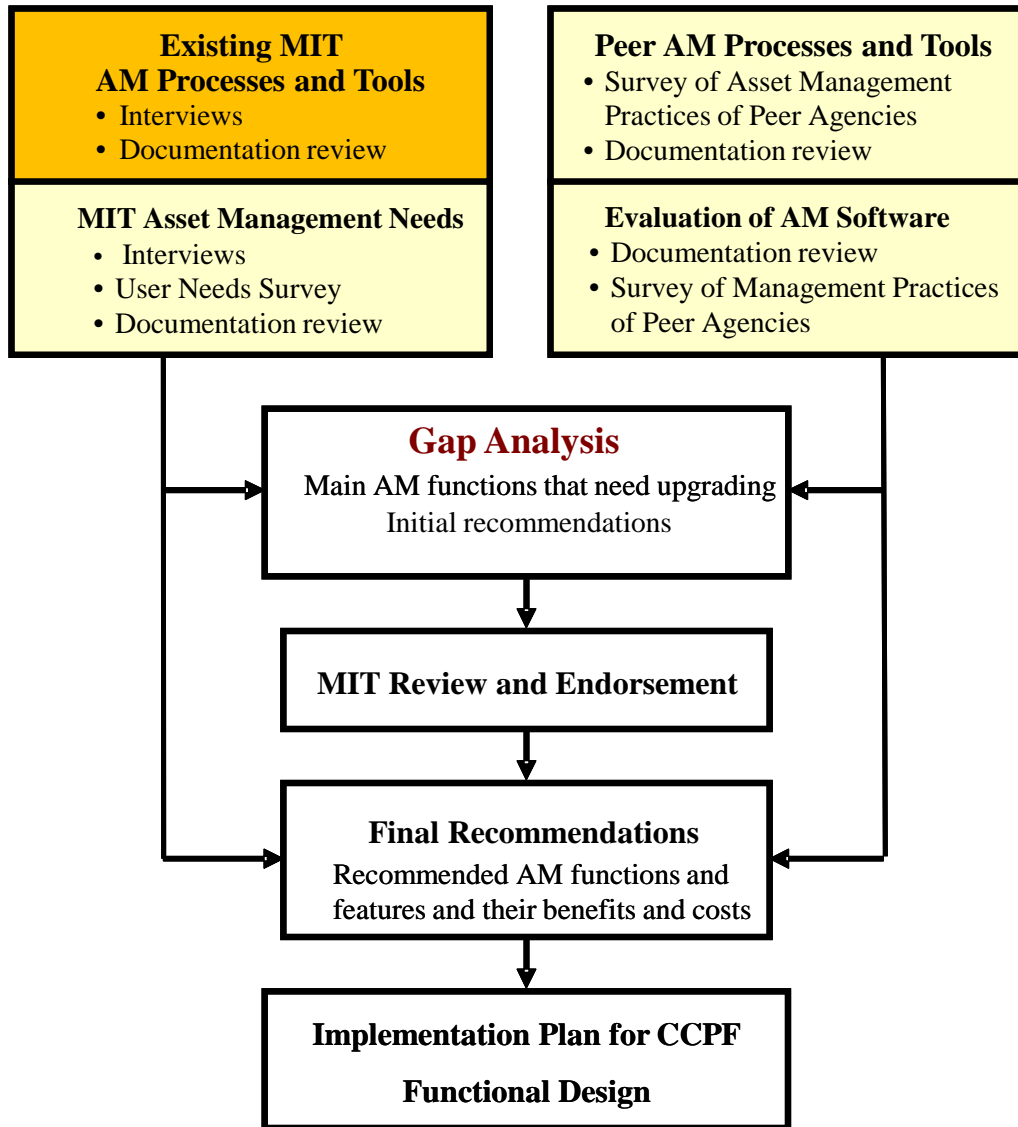
The Study Method

Through a competitive process, MIT engaged the service of:

Applied Research Associates, Inc.

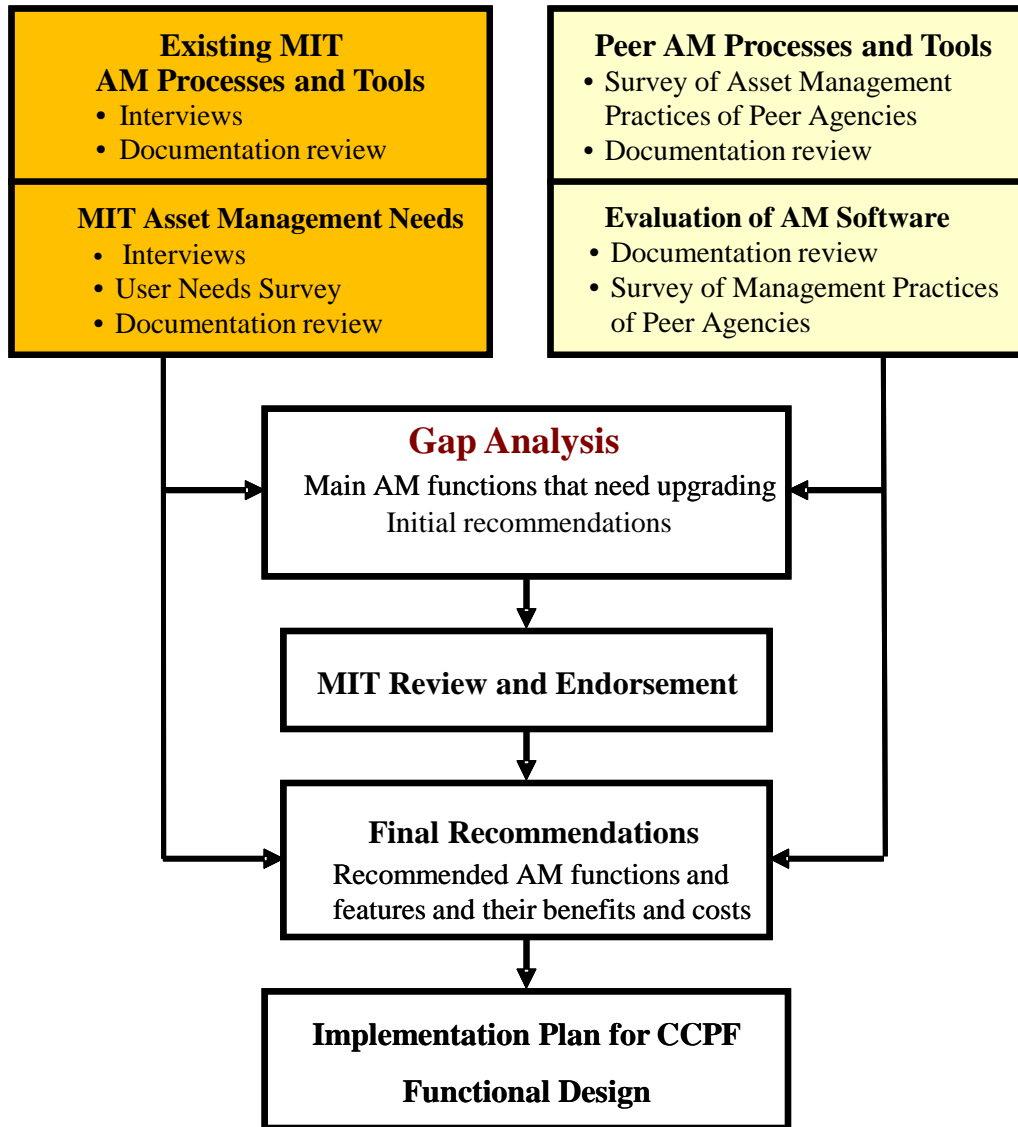
Project Overview

Manitoba



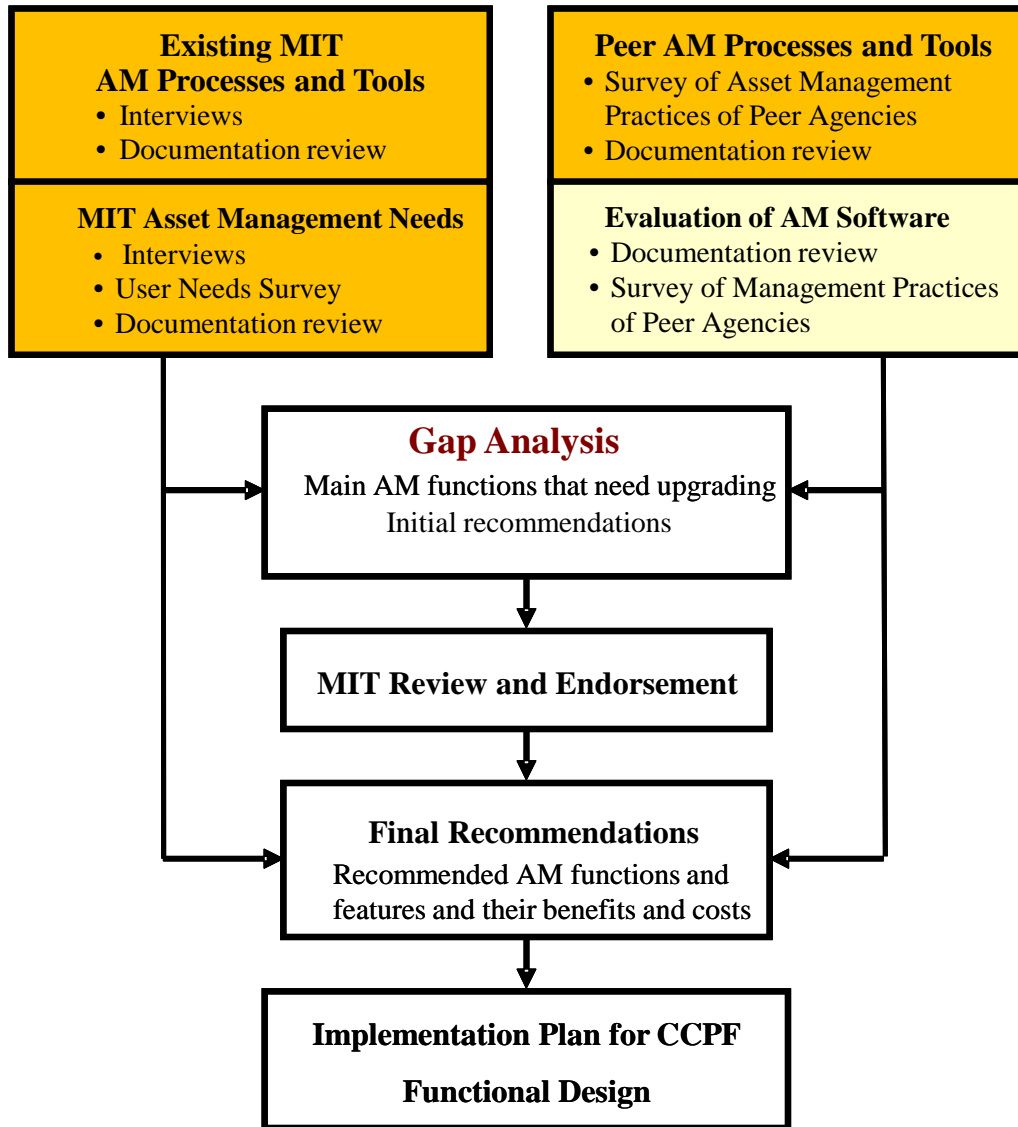
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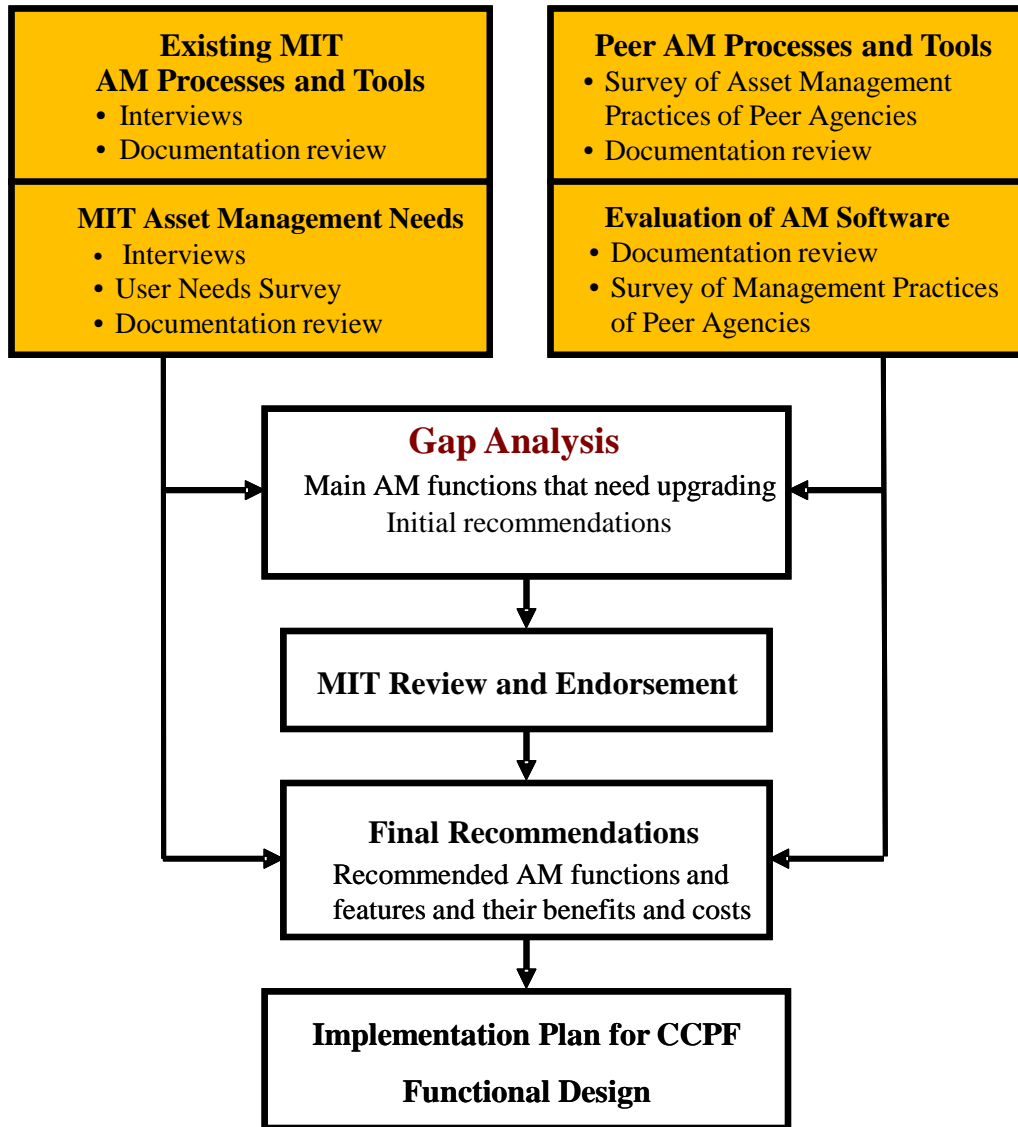
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Manitoba



Peer Agencies Reviewed

- Canadian Provinces:
 - Ontario
 - Alberta

- US States:
 - Minnesota
 - North Dakota

Findings for Manitoba

- MIT has the majority of the “asset systems” in place to competently manage the transportation infrastructure

Findings for Manitoba

- MIT has the majority of the “asset systems” in place to competently manage the transportation infrastructure
- However..... the systems are:
 - Fragmented (users, data consistency, accuracy, etc.)
 - Aging
 - Not effectively integrated
 - Not user friendly
 - Data is not consistently geo-referenced

Main Findings of the Peer Review

- The goals and strategies used by MIT in their highway capital programming function are consistent with those of peer transportation agencies
- Agencies indicate that they are working towards an overall integrated asset management system but none are actually using such a system in practice
- Pavements and bridges/structures are the primary focus of asset management systems (other features are mainly considered for inventory only)

Main Findings of the Peer Review

- Each agency has established capital programming functions
 - Typically include primary emphasis on maintenance and preservation
 - Programs such as system expansion, safety, operational and environmental related improvements are delivered within the context of available budgets
- Most agencies establish needs-based budgets
 - set performance targets for infrastructure, objectively monitor condition, and estimate budget requirements to meet performance targets
- Agencies do use provincial or state government priorities to develop agency-specific priorities and strategies

Main Findings of the Peer Review

- Most agencies have ongoing, or are planning, large-scale projects to update their asset management software applications
- There is growing emphasis on developing a consistent inventory of all assets linked to a corporate GIS system
 - Agencies are working to redevelop or improve their Linear Referencing Systems (LRS)

Asset Management Systems Reviewed

Note that this was a high-level review of vendor-published capabilities. No detailed analysis or comparison to MIT's needs was done. Systems were not tested.

- Agile Assets
- Bentley/Exor
- Stantec
- Deighton/dTims
- Cartêgraph
- Vemax/PMS

Highlights of the Asset Management System Reviews

- Very wide range of capabilities, features and experience
- Each vendor provides a different perspective on asset management
- Variety of data reporting and presentation tools
- No current system provides the complete asset management optimization and trade off analysis solution MIT is looking for
- Each system would require significant customization for use in Manitoba to integrate and use data from the existing systems

Manitoba's "Go Forward" Plan - Phase 1

- Improve Bridge Management
 - Implement AASHTO Bridge Management System (PONTIS)
- Develop More Data Integration and Consistency
 - Implement Bentley Exor System
 - Integrate various data stores (data warehouse)
 - Include data from municipalities and counties
- Redevelop the Provincial Linear Referencing System
 - Consolidation of various LRSs used in MIT (routable)
 - Include LRS data from municipalities and counties and cities

Manitoba's "Go Forward" Plan - Phase 1

- Improve Bridge Management
- Develop More Data Integration and Consistency
- Redevelop the Provincial Linear Referencing System
 - Target Phase 1 to be completed in three years
 - Will then look again at Asset Management Systems for "Multi-Objective Optimization"

Questions?