

Development of Web-Based GIS Tools for the Management of Transportation Infrastructure

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Overview

- Project Background
- SRAMS (Snow Removal Asset Management System (SRAMS))
- WMDSS (A Web-based implementation of Winter Maintenance Decision Support System)
- Goal
- Methodology: GIS tool development using ArcIMS
- Results
- Conclusion and Future Direction

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SRAMS ?

- The Snow Removal Asset Management System (SRAMS)
- The main goal of the SRAMS was to build a knowledge-base that allows the Iowa Department of Transportation and other agencies to optimally manage snow removal assets and resources.
- The system is able to run various scenarios and generate prioritized snowplowing routes in visual format, and to optimize the allocation of assets and resources for snow removal.

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SRAMS Architecture

- The SRAMS uses
 - MapObjects (ESRI), a geographic information system (GIS) package, to access and manage road and bridge data;
 - Visual Rule Studio 2.2, an artificial intelligence (AI) shell, to create a knowledge base;
 - and Visual Basic 6.0, a programming tool, for its user interface

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SRAMS- Screen Shots

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WMDSS: Goal

- A major goal of the project is to implement a Web-based Winter Maintenance Decision Support System (WMDSS) that enhances the capacity of stakeholders (city/county planners, resource managers, transportation personnel, and policy makers) to evaluate different procedures to optimally manage assets for snow removal.
- **Collaborators:** University of Missouri-Columbia and UNI industrial Technology

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Why Web or Internet?

- The Internet is used as development platform mainly because of its advantages such as:
 - Reaches a large number of potential users
 - Platform independency
 - Save on distribution costs and maintenance problems
 - Ease of use
 - Ubiquitous accessing and sharing of information
 - Security issues
 - No time and money available for learning software
 - Centralized data storage

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Goal

- The objective of this project is to design and implement a web-based winter maintenance decision support system that improves the ability to evaluate different procedures for optimally managing the assets for snow removal for the state of Iowa

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WMDSS Objectives

- To develop up-to-date transportation infrastructure extraction (mainly road network) and
- Web based snow removal asset management system (SRMS) implementation and technology transfer.

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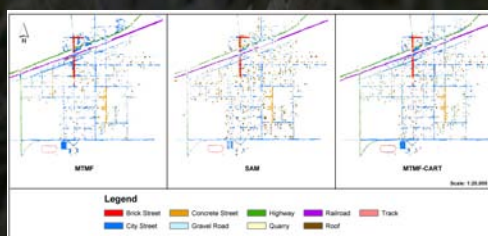
Road Infrastructure Databases

- Accurate road infrastructure databases do not exist for vast areas, particularly in areas experiencing rapid expansion.
- Infrastructure Update
 - Remote sensing-based
 - Web-based manual update

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Road Extraction From Hyperspectral Data

- AVIRIS Image



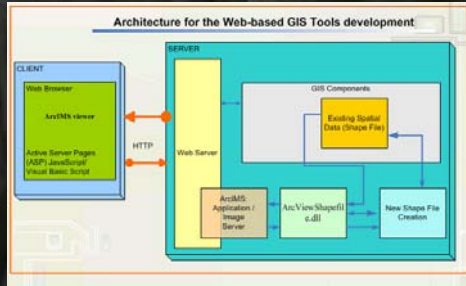
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Development of WMDSS

- The development of Web-based GIS tools for the management of transportation infrastructure include
 - ArcIMS 4.0.1
 - ArcObjects
 - Arcviewshape.dll
 - ASP
 - VBScript
 - JavaScript

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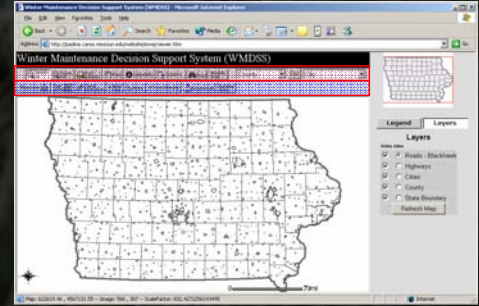
WMDSS: ArcIMS-based GIS Tools



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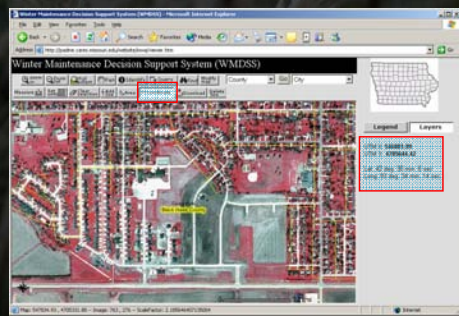
ArcIMS based WMDSS Website

Http: Padme.cares.missouri.edu/website/iowa



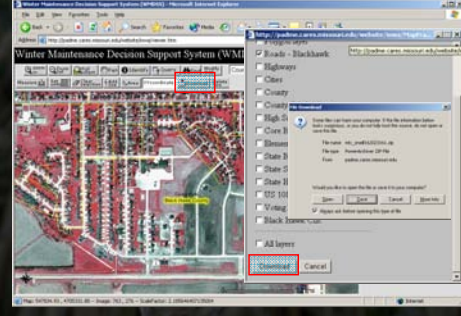
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More GIS Tools



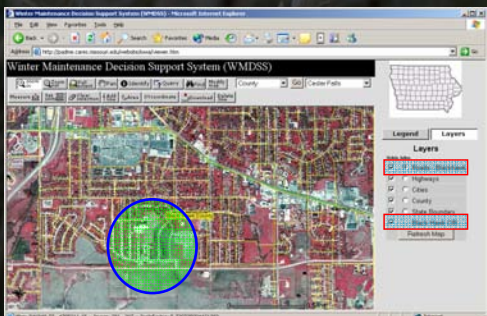
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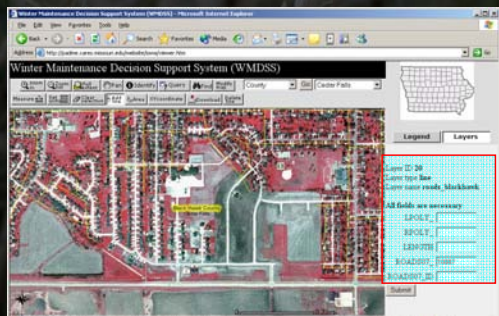
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Update: Scale Dependent



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Attribute Information



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Conclusion and Future Direction

- A Web-based GIS tools are very effective in managing the transportation infrastructure
- Geodatabase-based data
- ArcSDE for rapid retrieval
- Develop an agent-based winter maintenance model

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**Thanks:
Any Questions or
Suggestions?**

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