3D Technologies Implementation Plan - 2013
Wisconsin Department of Transportation

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Chief Roadway Standards & Methods Engineer, WisDOT
2013 WisDOT 3D Technologies Implementation Plan

Background
- 2007 – 2009 Initiatives
- 2009 Implementation Plan

2013 Implementation Plan
- Vision Statement
- Current Initiatives
- Future Implementation Ideas
- Management Strategy
3D Technologies Implementation 2007 - 2009

2009 Plan was prompted by some prominent initiatives between 2007 - 2009:

Decision to implement 3D Design process

- Including selection of Civil 3D design software in 2007

Automated Machine Guidance (AMG) for grading

- Became contractor option statewide in 2009
3D Technologies Implementation 2007 - 2009

WisDOT had worked on a number of 3D initiatives for several years:

Some were recognized as being directly related to 3D technology

Others were not
3D Technologies Implementation 2007 - 2009

Realized need for a more comprehensive & coordinated effort

- A number of related & supporting initiatives
- Implementing 3D technologies is a national trend
  - Many engineering & construction benefits
  - A number of challenges & issues

Initiated a project to develop an overall implementation plan
2009 WisDOT 3D Technologies Plan

Plan Development Activities:

- Created Stakeholder Workgroup
- Developed Vision & Objectives
- Identified Initiatives
- Performed Research
- Prepared Interim Report
- Conducted Workshops
- Completed Final Report & Implementation Plan
2009 WisDOT 3D Technologies Plan

Five Initiatives:

- Real-Time Kinematic GPS Network
- DTM Data Collection
- 3D Design
- Automated Machine Guidance
- Field Technology and Inspection
2009 WisDOT 3D Technologies Plan

Topics addressed for each 3D initiative:

<table>
<thead>
<tr>
<th>Status</th>
<th>Issues</th>
<th>Timeline &amp; Expectations</th>
<th>Level of Effort</th>
<th>Benefits</th>
<th>Relationships with other Initiatives</th>
<th>Recommendations</th>
<th>Short &amp; Long Term Goals</th>
<th>Priority</th>
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</table>
2009 WisDOT 3D Technologies Plan

WisDOT Implementation Plan:
3D Technologies for
Design and Construction

CMSC: MC 08-09 – WO 2.6

May, 2009

Prepared for the Wisconsin Department of Transportation

Compiled by: Alan P. Vonderohe

Construction and Materials Support Center
University of Wisconsin – Madison
Department of Civil and Environmental Engineering
3D Technologies Implementation 2009 - 2012

Need for 2013 Plan was initiated by

- 2012 marked end of short term goals in 2009 Plan
- A need for 2 new initiatives
  - 3D information on utilities
  - LiDAR and digital mapping acquisition

Decided that 2013 Plan would be an update to 2009 Plan

- Refresh 2009 Initiatives
- Add new known Initiatives
- Expand beyond design & construction
2013 WisDOT 3D Technologies Plan

2013 Plan is an update to the 2009 Plan & addresses:

- Vision Statement
- Initiatives with Corresponding 1-3 yr Goals
- Future Implementation Ideas (beyond 3 yrs)
- Management Strategy
Vision Statement:

Adoption of three-dimensional (3D) methods and seamless data flows throughout:

- initial survey,
- design,
- contracting,
- construction,
- as-built survey,

and other applications included within the infrastructure lifecycle
2013 WisDOT 3D Technologies Plan

Began Initiative/Goal Effort Similar to a Strategic Plan

- Objective to identify highest priorities for next 1-3 years

Obtained Initiative/Goal Info from Following Functional Areas

<table>
<thead>
<tr>
<th>Survey</th>
<th>Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Real Estate</td>
</tr>
<tr>
<td>Construction</td>
<td>Structures</td>
</tr>
<tr>
<td>Asset Management</td>
<td>Utilities</td>
</tr>
</tbody>
</table>
2013 WisDOT 3D Technologies Plan

• Evaluation of initiatives from the functional areas identified interdependencies

• Determined that initiatives are either:
  
<table>
<thead>
<tr>
<th>Foundational</th>
<th>Independent</th>
<th>Dependent</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Needed to support other initiatives</td>
<td>• Don’t require foundational initiatives</td>
<td>• Require foundational initiatives</td>
</tr>
</tbody>
</table>
2013 WisDOT 3D Technologies Plan

Identified 1-3 yr Goals for the Foundational & Independent Initiatives:

- Survey
- Design
- Construction
- Utilities
- Roadway Lifecycle Uses of LiDAR
- Information Technology Infrastructure
2013 WisDOT 3D Technologies Plan

Survey Initiatives:

• Height Modernization Program (Passive and Active Networks)
• LiDAR and Digital Mapping Data Acquisition
2013 WisDOT 3D Technologies Plan

Design Initiatives:

- Statewide 3D Design Process
- Southeast Freeways 3D Design Process
2013 WisDOT 3D Technologies Plan

Construction Initiatives:

• Automated Machine Guidance (AMG)
• Southeast Freeways Field Technology and Inspection
2013 WisDOT 3D Technologies Plan

Additional Initiatives:

• Utilities
• Roadway Lifecycle Uses of LiDAR Data
• Inf. Tech. Infrastructure
2013 WisDOT 3D Technologies Plan

Functional Areas Identifying Future Ideas:

• Structures
• Real Estate
• Traffic Operations
2013 WisDOT 3D Technologies Plan

Wisconsin Department of Transportation
3D Technologies Implementation Plan

WisDOT Project ID: 0657-45-15
CMSC: WO 4.1

Final Report
March, 2013

Submitted to the Wisconsin Department of Transportation

Alan Vonderohe

Construction and Materials Support Center
University of Wisconsin – Madison
Department of Civil and Environmental Engineering
DTSD 2013 Strategic Initiatives

**DTSD Strategic initiatives**

*Department strategic initiatives* include mission, vision, and values.

**2013 initiatives**

- 3D Strategic plan
- Compensation philosophy
- Innovation
- Leadership
- Lean government initiatives
- Performance management
- Training
- Workforce development
DTSD 2013 Strategic Initiatives

Strategic Initiatives - 3D Technologies Implementation Strategic Plan

Goal statement
Adoption of three-dimensional (3D) methods and seamless data flows throughout initial survey, design, contracting, construction, as-built survey and other applications included within the infrastructure lifecycle.

- Executive Summary WisDOT 3D Technologies Implementation Plan
- WisDOT 3D Technologies Implementation Plan

Steering Team members
Rebecca Burkel (lead), Scot Becker, Susie Forde, Joe Nestler, Lisa Orken, Alan Vonderohe, Brett Wallace, Ken Wickham and Jerry Zogg

Steering Team purpose
The team keeps abreast of and coordinates the activities recommended in the plan, provides a report structure for the recommended groups and activities, keeps upper level management informed of progress, advocates for the overall effort and develops outreach mechanism to keep the broader transportation community aware of and involved in the planned activities.

Liaisons identified for initiatives
Relay action items/stay in tune with status of initiatives/participate as time permits.

- Scot Becker - Southeast Freeways 3D Design Process
- Rebecca Burkel - LiDAR and Digital Mapping Data Acquisition
- Rebecca Burkel/Joe Nestler/Susie Forde - Roadway Lifecycle Uses of LiDAR Data
- Rebecca Burkel - Utilities
- Lisa Orken/Scot Becker - Information Technology Infrastructure
- Brett Wallace - Southeast Freeways Field Technology and Inspection
- Ken Wickham - Height Modernization Program
- Jerry Zogg - Automated Machine Guidance (AMG)
- Jerry Zogg - Statewide 3D Design Process

Objectives
Identify and complete key initiative identified in the plan such as:

Short term (1-3 years)
- Automated Machine Guidance (AMG)
- Height Modernization Program (Passive and Active Networks)
- Information Technology Infrastructure
- LiDAR and Digital Mapping Data Acquisition
- Roadway Lifecycle Uses of LiDAR Data
- Southeast Freeways 3D Design Process
- Southeast Freeways Field Technology and Inspection
- Utilities

Long term
- Review and update implementation plan.
### 2013 WisDOT 3D Technologies Plan

**Work Plans for Each Initiative:**

#### Initiative 4 - Automated Machine Guidance (AMG)

**Overall Goal:** Improve and expand the use of Automated Machine Guidance on WisDOT roadway projects

**Objective(s):** Evaluate, refine, and expand WisDOT's construction specifications for AMG beyond earthwork

**Timeframe:** 1-3 years

**Lead Section(s):** Bureau of Project Development - Project Services Section and Roadway Standards and Methods Section.

**Champions:** David Castleberg & Frank Alfaro

**Team Members:** Frank Alfaro, Michael Hall, Rich Herrick, Dan Tyler, David Castleberg, Don Greuel, Jerry Zogg

<table>
<thead>
<tr>
<th>Individual Goals</th>
<th>Lead Role</th>
<th>Target Date for Completion</th>
<th>Resource Constraints or Risk Issues</th>
<th>Status of Progress</th>
<th>Actual Completion Date for Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.A. Prepare initial work plan for meeting these short-term goals. Include a timeline for each goal.</td>
<td>Jerry Zogg</td>
<td>June 17, 2013</td>
<td>Obtaining funding approval for CMSC is necessary to complete Initiative 4</td>
<td>Conduct initial Team meeting</td>
<td>6/17/13</td>
</tr>
<tr>
<td>4.B. Investigate conducting pilot projects to evaluate robustness of the quality assurance component of the AMG HMA base course specification.</td>
<td>Frank Alfaro</td>
<td>Spring/Summer of 2014</td>
<td>Finding sufficient projects and willing participants to complete the evaluation</td>
<td>Identify 2014 projects where contractors are already planning to use AMG for grading. Request project team and contactors to use AMG HMA spec in parallel (not for contract administration). Include AMG HMA base course specifications to projects where WisDOT is providing 3D models (see Goal 4.D.)</td>
<td>Spring/Summer 2014</td>
</tr>
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2013 WisDOT 3D Technologies Plan

Created Steering Team to:

- Monitor Initiatives & coordinate if necessary
- Create reporting structure
- Keep upper mgmt informed
- Advocate for overall effort
- Develop outreach mechanisms for internal & external stakeholders
References & Contacts

2013 WisDOT 3D Technologies Implementation Plan:

http://cmsc.engr.wisc.edu/reports.html

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