Support and Asset Inventory Management of ITS Devices

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Jason Shaddix, ITS Support Lead
Oregon Department of Transportation
The goal of this presentation is to show how ODOT has utilized a Computerized Maintenance Management System (CMMS) to help solve many of the problems we face trying to support systems that are spread around a mostly rural state.
Outline

1. Presenter Information
2. ITS Assets
3. ITS Support
4. MicroMain Overview: Client, Reports, PDA
5. MicroMain Web Work Requests
6. MicroMain Web Asset Management
7. Conclusion
Presenter Information

Jason Shaddix, ITS Support Lead, Oregon DOT

• Team leader for ITS field support and ITS application developers.
• 10 years working in ITS, 5 additional years working in traffic signals
• Regional ITS Support Build-out: Offices, trucks, equipment, spares
• MicroMain Implementation: Review proposals, procure, deploy, enhance
• Alternate Network Connectivity –DSL, Cellular, WiFi.
• Traffic Signals Integration
ITS Assets

- Field Devices
- Transportation Operations Centers
- Servers
- Systems / Applications
- Traffic Signals
Oregon ITS in 2000

- 12 cameras in Region 1
- 6 RWIS stations
- 1 camera in Bend
- IT has 1½ FTE committed to ITS
- 5 Servers (RWIS Data Collection)
- 1 Application (SCAN)
Oregon ITS in 2010

- Total of approx 820 Field devices
- 4 Transportation Operation Centers
- 66 Servers
- 25 Applications
- 256 Cameras
- 98 Variable Message Signs
- 142 Ramp Meters
- 142 Portable Variable Message Signs
- 79 Road Weather Information Systems
- 100 Other devices such as HAR, Weather Warning Systems, and Ramp Gates.
- ODOT has 14 FTE committed to ITS Support
Traffic Signals Integration

• ODOT owns around 1000 traffic signals
• Implementing Adaptive Traffic Control
• Implementing Central Traffic Management
• Approx 30 traffic signals online so far
• 146 planned upgrades & connections this year
• Significant changes in support needs
Cameras
Transportation Operations Center System
Region 1 - Portland

ODOT’s Region 1 is mostly urban, including the Portland metro area. Region 1 constitutes approximately 44% of the ITS infrastructure in Oregon. ODOT-owned fiber optic communications infrastructure is available on most highway systems, and is the primary communications method employed.

- 135 Cameras
- 35 Variable Message Signs
- 142 Ramp Meters
- 34 Portable Variable Message Signs
- 14 Road Weather Information Systems
- 3 Other devices such as HAR, Weather Warning Systems, and Ramp Gates.
Region 2 - Salem

ODOT’s Region 2 is the second largest area asset-wise, and is comprised of mostly rural installations, with a few urban systems.

- 40 Cameras
- 15 Variable Message Signs
- 50 Portable Variable Message Signs
- 9 Road Weather Information Systems
- 56 Other devices such as HAR, Weather Warning Systems, and Ramp Gates.
Region 3 - Medford

ODOT’s Region 3 ties for the smallest area asset wise, and is comprised of mostly rural installations. Medford is the second region to build out and utilize a fiber ring for ITS and traffic systems.

- 29 Cameras
- 11 Variable Message Signs
- 19 Portable Variable Message Signs
- 10 Road Weather Information Systems
- 18 Other devices such as HAR, Weather Warning Systems, and Ramp Gates.
ODOT’s Region 4 has the third most ITS assets, and is mostly rural. Region 4 has been a leader in using broadband internet connections and implementing adaptive traffic control systems.

- 32 Cameras
- 11 Variable Message Signs
- 23 Portable Variable Message Signs
- 37 Road Weather Information Systems
- 7 Other devices such as HAR, Weather Warning Systems, and Ramp Gates.
Region 5 - LaGrande

ODOT’s Region 5 is the other area with the fewest ITS assets, and is the most rural of all the regions. No TOC.

- 20 Cameras
- 26 Variable Message Signs
- 16 Portable Variable Message Signs
- 9 Road Weather Information Systems
- 16 Other devices such as HAR, Weather Warning Systems, and Ramp Gates.
Field Device Connectivity

- Fiber Optics – ODOT Owned, leased dark fiber, bandwidth
- Frame circuits - 56K, T1
- Microwave – ODOT owned
- POTS – Dialup
- Leased Lines - Serial
- Cellular – Public, Private
- Broadband – DSL, Cable
Field Device Connectivity
Network Architecture

• Each TOC has head end network gear to catch field circuits
• Devices point to their regional TOC
• Redundant (back-up) circuits between TOCs
• All public circuits are firewalled, and terminate in a DMZ
• One 3G CDMA Cellular Private Network connection, more planned
Challenges in Asset Management

- Inventory Management
- Preventative Maintenance Scheduling and Tracking
- Asset Repair History
- Maintenance Cost Tracking
- Prioritization
- Standards
Oregon ITS Support
ITS Regional Organization

Statewide Budget, Standards, Maintenance Program, Operations

Responsible for setting regional priorities, allocating budget. ITSSC to perform or coordinate maintenance

Region ITS Manager

Region ITSSC

Coordination/Regional Priority

Specialist resources available to support coordinator to repair and maintain ITS systems.

Most ITS systems include components several crews would typically consider within their domain. The unusual complexity and interconnection of these systems create the need to manage support across crews. The ITS support Coordinator needs to understand each component in their systems, and possess the ability to communicate with each support crew they may need to get assistance from.
ITS Support Coordinators

- The ITS Support Coordinator performs, evaluates, and coordinates projects and activities that support operations and maintenance of ITS systems.

- Accountable for problem resolution even though effecting a solution may require action from many support teams.

- Single point of contact for TOC and field device issues.
Working Together
Remote Support

Technicians can access central applications from the field or home

- VPN Web Portal with Remote Desktop
- NetMotion
- Verizon Private Network / Gobi
- PDA
- Blackberry
Whale Web Portal

SQL 2005 Enterprise Cluster

Load Balanced Intranet Web Servers

*Applications Reside on Remote Desktop*
- XmWeb
- Xm Client
- Xm Reports
- Xm Mobile

Whale Web Portal Authentication

Internet
- WiFi, AirCard, DSL, Cable

Technician Laptop is a Terminal
Verizon Private Network

SQL 2005 Enterprise Cluster

Load Balanced Intranet Web Servers

State Data Center Firewall

Verizon Private Network (3G)

Applications Reside on Technician Laptop

XmWeb
Xm Client
Xm Reports
Xm Mobile
NetMotion

SQL 2005 Enterprise Cluster

Load Balanced Intranet Web Servers

NetMotion Server Authentication

State Data Center Firewall

Verizon Private Network (3G)

Internet
WiFi, AirCard, DSL, Cable

Applications Reside on
Technician Laptop

XmWeb
Xm Client
Xm Reports
Xm Mobile
Statewide After Hours Support

Adherence to standards and using Micromain has allowed us to provide statewide after hours support

• Micromain is used by all dispatch centers
• Records problems and initiates emergency call outs very quickly
• On-Call staff, Support Coordinators, and management get auto-notifications
• Emergency notification to On-Call staff
ITS Support Process
Transportation Operations Centers

System Failure!

Is the failure critical to operations?**

YES

** See ITS On Call SOG 50.11 - Attachment A

NO

Is there another way to perform the task?

YES

Did the alternate work?

NO

Enter XmWeb Request Service = "REPAIR"

TOC Mgr Approves?

YES

Enter XmWeb Request Service = "EMERGENCY"

NO

Done, problem is in Support Coordinator's work list.

NEXT PAGE
Enter XmWeb Request
Service = “EMERGENCY”

Call appropriate number.
See ITS On Call SOG 50.11, Attachment A

Update XmWeb request.
Call ITS if no response.

Is the System supported by ITS after hours?**

Call ITS On-Call Support Number
503-788-3387 Leave Voicemail

After Hours is Defined As:
- Weekdays: 5:00 PM to 7:00 AM
- Weekends: All Day
- Holidays: All Day

** ITS Support has 30 Minutes to Call back During:
A) Memorial Day Weekend
B) July 4 and appropriate Weekend
C) Labor Day Weekend
D) Winter Season November 1st through March 31st
E) Emergency need as determined by TOC Manager’s Group

At all other times, the technicians have 2 hours to call back

No call back within 2 hours
Escalate to ITS Mgt
Regional Support Challenges

• Work Request Management and Distribution
  – Requests: Techs, Dispatch Centers, Business
  – Work Flow / Process
  – Priority
  – Change Notification
  – Coordination of Efforts

• Crew Supervision
  – Workload Management
  – Performance Measures
  – Standards Enforcement
  – Time Tracking
MicroMain Overview

ODOT ITS chose MicroMain as its Computerized Maintenance Management System to solve these asset management and support challenges.

ODOT evaluated 21 CMMS Applications, and decided on MicroMain based on features, standards, cost, and source code ownership.
MicroMain Components

- Server component: SQL database
- Xm Client
- Xm Reports
- Xm Mobile
  - Handheld (Win CE or Palm)
  - PC
- Xm Web
Application Details

- MicroMain Xm Enterprise SQL
- Purchase included source code
- Licenses are concurrent
- All user interfaces connect to central SQL DB
ODOT Server Environment

- ODOT Network Domain
- MS Windows Server 2008 64Bit
- MS SQL Enterprise 2005 (Clustered)
ODOT PC Environment

- Windows XP Professional, SP3
- MS Office 2003
- MicroMain Xm Client – MS Access
- MicroMain Xm Reports – MS Access
- .Net Web client
- IE Explorer V7
- .Net PDA client
Xm Client

- Quick Summary
- MS Access
- Linked Tables
- Accidental Changes
- Used by Admin
All detail data for this record

<table>
<thead>
<tr>
<th>Asset</th>
<th>VMS, I-84 EB @ Biggs Jct, Hwy2, MP103.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>Region 4</td>
</tr>
<tr>
<td>Description</td>
<td>Type 1</td>
</tr>
<tr>
<td>Asset Priority</td>
<td>Medium</td>
</tr>
<tr>
<td>Seasonal Priority</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Equipment</td>
</tr>
<tr>
<td>Account</td>
<td>M6284416/701-L18</td>
</tr>
<tr>
<td>Group</td>
<td>VMS</td>
</tr>
<tr>
<td>Subgroup</td>
<td>Type 1</td>
</tr>
<tr>
<td>Parent</td>
<td>I-84 @ Celilo - Biggs Jct - U597 - Rufus</td>
</tr>
<tr>
<td>MP</td>
<td>103.8</td>
</tr>
</tbody>
</table>

Record: of 2118
Un-checking a box hides its tab
All work requests for this asset
<table>
<thead>
<tr>
<th>WO Number</th>
<th>Service</th>
<th>Description</th>
<th>Status</th>
<th>Requested</th>
<th>Issued</th>
<th>Completed</th>
<th>Cost</th>
<th>Primary Failure</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>14125</td>
<td>Annual PM, VMS,</td>
<td>Auto-generated annual VMS PM, Ensure Mounting Hardware - esp. bolts are tight</td>
<td>Requested</td>
<td>4/11/2010</td>
<td>3/22/2010</td>
<td>9/15/2010</td>
<td>0.00</td>
<td>No Failure</td>
<td>8/18/09 J1 fan on port blackipe by door fan is out. Any question call us.</td>
</tr>
<tr>
<td>14119</td>
<td>Halted Inspection</td>
<td>Point 1: Sign enclosure fan operation, ACTIV sign housing fan operation</td>
<td>Requested</td>
<td>8/19/2009</td>
<td>9/10/2010</td>
<td>9/23/2010</td>
<td>0.00</td>
<td>No Failure</td>
<td>9/10/09 J1 JAWS pm sign failed fan behind power supply mobile rise tube left side facing sign</td>
</tr>
<tr>
<td>14102</td>
<td>WMS PM, Annual (R</td>
<td>Auto-generated annual VMS PM, Ensure Mounting Hardware, esp. bolts are tight</td>
<td>Completed</td>
<td>8/13/2009</td>
<td>9/6/2009</td>
<td>9/15/2009</td>
<td>0.00</td>
<td>No Failure</td>
<td>8/13/09 J1 WMS PM sign failed fan behind power supply mobile rise tube left side facing sign</td>
</tr>
<tr>
<td>14102</td>
<td>WMS PM, Annual (R</td>
<td>Auto-generated annual VMS PM, Clean Leaks - Clean Leaks inside &amp; outside</td>
<td>Completed</td>
<td>5/10/2009</td>
<td>6/30/2009</td>
<td>9/17/2009</td>
<td>165.00</td>
<td>9/15/08 Grb &amp; Jta Annual PM</td>
<td></td>
</tr>
<tr>
<td>14102</td>
<td>Repair</td>
<td>Do you know that we have to go thru Standalone to activate this sign?</td>
<td>Completed</td>
<td>12/27/2007</td>
<td>1/22/2008</td>
<td>12/10/2007</td>
<td>127.50</td>
<td>Operator Error</td>
<td>12/10/07 07/13 hrs - JAWS - Checked operation with Launcher and was successful. Confirmed with operator what occurred and found operator had activated more than once in Eclipse.</td>
</tr>
<tr>
<td>14102</td>
<td>Repair</td>
<td>Re-install UPS at this location. VMS would not work, Standalone mode failing no answer</td>
<td>Open</td>
<td>12/2/2007</td>
<td>8/22/2008</td>
<td>4/16/2008</td>
<td>67.50</td>
<td>No Failure</td>
<td>11/25/2007 JAWS - Have not been able to find the UPS that was replaced and returned per ups trading floor. Need to find UPS and reinstall at the location.</td>
</tr>
<tr>
<td>14102</td>
<td>WMS PM, Annual (R</td>
<td>Preventative Maintenance for permanent Variable Message Signs</td>
<td>Cancelled</td>
<td>8/12/2006</td>
<td>1/27/2007</td>
<td>4/16/2008</td>
<td>0.00</td>
<td>No Failure</td>
<td>8/12/06 J1 WMS PM sign failed fan behind power supply mobile rise tube left side facing sign</td>
</tr>
<tr>
<td>14102</td>
<td>Repair</td>
<td>While on site requested that TOC test VMS. Found that communciation was not possible</td>
<td>Completed</td>
<td>5/29/2006</td>
<td>6/4/2006</td>
<td>11/1/2007</td>
<td>522.00</td>
<td>Part Failure</td>
<td>11/24/07 Grb &amp; Da. Checked charging, all ok. Performed conductance testing. Results follow. BAT 1, 2, 3, 4.</td>
</tr>
<tr>
<td>14102</td>
<td>Emergency Repair</td>
<td>LSF fans on site failed equipment. LSF fans failed in sign not working.</td>
<td>Completed</td>
<td>3/10/2006</td>
<td>5/4/2006</td>
<td>4/1/2006</td>
<td>55.00</td>
<td>Utilities</td>
<td>3/23/2006 1000 perform check against problems. The UPS was turned off and found the battery was compromised.</td>
</tr>
</tbody>
</table>
Creates a clone of this asset
Brings up tree view of assets
Filters for what shows in the tree

**Area** assets used for logical grouping where more than one device may be located in a particular area

**Equipment** assets are the assets we count, such as field devices and servers

**Vehicle** assets include Portable VMS and bucket trucks

Tree shows parent-child relationship within the database, region being the top level
These features not available through XmWeb
Key feature
Estimated time it takes to perform task

Task priority

Assign responsibility

This is the only interface to create or edit tasks
Any kind of schedule can be created
Displays all assets associated with this task

Date last completed

<table>
<thead>
<tr>
<th>Asset</th>
<th>Property</th>
<th>Base Reading</th>
<th>Last Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera, I-5 NB @ Dillard Access Rd, Hwy1, MP186.84</td>
<td>Region 2</td>
<td></td>
<td>5/13/2009</td>
</tr>
<tr>
<td>Camera, I-5 NB @ Enchanted Way, Hwy1, MP247</td>
<td>Region 2</td>
<td></td>
<td>10/19/2009</td>
</tr>
<tr>
<td>Camera, I-5 NB @ Lake Creek, Hwy1, MP214.51</td>
<td>Region 2</td>
<td></td>
<td>6/29/2009</td>
</tr>
<tr>
<td>Camera, I-5 NB @ N Albany, Hwy1, MP236.78</td>
<td>Region 2</td>
<td></td>
<td>10/2/2009</td>
</tr>
<tr>
<td>Camera, I-5 NB @ Perkins, Hwy1, MP261.88</td>
<td>Region 2</td>
<td></td>
<td>6/24/2009</td>
</tr>
<tr>
<td>Camera, I-5 NB @ Portland Rd, Hwy1, MP258.63</td>
<td>Region 2</td>
<td></td>
<td>8/13/2008</td>
</tr>
<tr>
<td>Camera, I-5 NB @ State St, Hwy1, MP254.9</td>
<td>Region 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camera, I-5 SB @ Arndt, Hwy1, MP280.44</td>
<td>Region 2</td>
<td></td>
<td>6/23/2009</td>
</tr>
<tr>
<td>Camera, I-5 SB @ Kuebler, Hwy1, MP252.3</td>
<td>Region 2</td>
<td></td>
<td>10/19/2009</td>
</tr>
<tr>
<td>Camera, I-5 SB @ McVey Hwy Jct, Hwy1, MP190.94</td>
<td>Region 2</td>
<td></td>
<td>9/10/2009</td>
</tr>
<tr>
<td>Camera, I-5 SB @ Mission (OR22), Hwy1, MP253</td>
<td>Region 2</td>
<td></td>
<td>10/19/2009</td>
</tr>
<tr>
<td>Camera, I-5 SB @ Portland Rd, Hwy1, MP258.63</td>
<td>Region 2</td>
<td></td>
<td>7/23/2008</td>
</tr>
<tr>
<td>Camera, OR126 W @ Cushman Flood, Hwy62, MP3.01</td>
<td>Region 2</td>
<td></td>
<td>11/23/2009</td>
</tr>
<tr>
<td>Camera, OR18 WB @ Murphy Hill, Hwy39, MP15.4</td>
<td>Region 2</td>
<td></td>
<td>5/20/2010</td>
</tr>
<tr>
<td>Camera, OR18 WB @ Valley Junction, Hwy39, MP23.6</td>
<td>Region 2</td>
<td></td>
<td>11/25/2009</td>
</tr>
<tr>
<td>Camera, OR22 EB @ Detroit South, Hwy162, MP51.3</td>
<td>Region 2</td>
<td></td>
<td>6/22/2006</td>
</tr>
</tbody>
</table>
Inspection points are added and removed from the task here.

Points can be grouped.

Points can be added individually or by group.
Queues tasks

Creates work requests from queue
Administration
Actions
Resources
Facilities
Fleet

Accounts
Activities
Categories
Conditions
Customer Survey
Failures
Functions
Inspection Points
Services
Specifications
Training/
Certifications

Data Link  About  Help  Exit

Form View
Xm Reports
Filters available for report(s)

Next step
Can export reports

Asset Details with Parts and Specifications

Filter Property = "Region 5"
Region/Asset
Region 5

Beacon 01, Boardman RAR, I-84 EB, MP155.66

Latitude: 45.28931
Longitude: 118.02492
Manufacturer: Highway Information

Specifications:
- Dot ESN: 0898682
- ESN: 0898682

Parts:
- HPI Flasher
- Network, Cellular Router, Dog Connected Port Multiplexer
- Power Supply, DC to DC
- Power, Battery, 12 Volt DC, Gen Cell, 180 Mah
- Power, Remote Reset, Isolated

Beacon 02, La Grande RAR, I-84 EB, MP267

Latitude: 45.26931
Longitude: 118.02541
Manufacturer: Highway Information

Specifications:
- Dot ESN: 0898682
- ESN: 0898682

Parts:
- HPI Flasher
- Network, Cellular Router, Dog Connected Port Multiplexer
- Power Supply, DC to DC
- Power, Battery, 12 Volt DC, Gen Cell, 180 Mah
- Power, Remote Reset, Isolated

EA: 6557626-20X-L17
Model Number: HC0800

EA: 6557626-20X-L17
Model Number: HC0800
Xm Mobile
Download to Handheld

Upload from Handheld

Log
<table>
<thead>
<tr>
<th>WO Number</th>
<th>Status</th>
<th>Service</th>
<th>Property</th>
<th>Asset</th>
<th>P...</th>
<th>Due</th>
<th>Requested By</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>192</td>
<td>Open</td>
<td>Repair</td>
<td>Region 2</td>
<td>Camera, Ore 22 @ Detroit</td>
<td>2</td>
<td>2/4/2006</td>
<td>Jason</td>
<td></td>
</tr>
<tr>
<td>228</td>
<td>Open</td>
<td>Repair</td>
<td>Region 2</td>
<td>PVMS, RE05xxxx, P2-03-</td>
<td>2</td>
<td>2/10/2006</td>
<td>Station 2 (Bob)</td>
<td>503.378.2299</td>
</tr>
<tr>
<td>321</td>
<td>Open</td>
<td>Repair</td>
<td>Region 2</td>
<td>PVMS, RE05xxxx, P2-03-</td>
<td>2</td>
<td>3/3/2006</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Windows CE
Xm Web

ODOT has heavily modified the XmWeb interface. It’s now the primary interface used by technicians and dispatch operators for:

• Work Requests and Assignments
• Repair and Maintenance Documentation
• Asset Inventory Management
• After Hours Communications and Notification
XmWeb Work Requests

- Create Work Requests
- Edit Work Requests
- Search Work Requests for Status
- Labor Entry
Live Demo XmWeb
Work Requests
Easy to find: http://micromain

System login auto populates

Cookies

Check to get an email when the work request is completed
### New Work Request

<table>
<thead>
<tr>
<th>Property</th>
<th>Region 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset</td>
<td>Camera, US26 @ Vista Ridge Tunnel, CAIV</td>
</tr>
<tr>
<td>Service</td>
<td>Please Select a Service</td>
</tr>
<tr>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Requester Name</td>
<td>ODOTVad100</td>
</tr>
<tr>
<td>Phone</td>
<td>503-932-2274</td>
</tr>
<tr>
<td>Requester Email</td>
<td></td>
</tr>
</tbody>
</table>

- Send email when WG is closed.

**Create Request**
There are already work requests for this asset.

If the problem you are reporting is already in the system, please click Work Order Number below to update it.

If you want to add a new work order, please close this pop-up and continue as usual.

Results 1-2

<table>
<thead>
<tr>
<th>Number</th>
<th>Asset</th>
<th>Service</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>14885</td>
<td>RWIS, I-205 NB @ Glenn Jackson Br, Hwy 66, MP25.4</td>
<td>Annual PM, RWIS, 10/15/2010</td>
<td>Autogenerated annual RWIS PM.</td>
<td>Requested</td>
</tr>
<tr>
<td>13602</td>
<td>RWIS, I-205 NB @ Glenn Jackson Br, Hwy 66, MP25.4</td>
<td>RFW</td>
<td>No comments</td>
<td>Open</td>
</tr>
</tbody>
</table>

Already 2 work requests in the system
Select service
Standard Operating Guideline includes supported systems and process.

Emergency request pages support personnel.
This request will:

- Send out a notification email (all requests do this)
- Text message on-call staff because emergency was selected
- Email the requester when completed because the box was checked

Submits work request
Brings you to this screen

Cumulative filters

If you know the Work Order Number you want status on
Intelligent Transportation Systems
xmWEB
Web-based Work Requests

Search by property
Search by assets are limited to those in the selected property.
Search by work request status
Search by labor assignment
### Sort-able column headers

<table>
<thead>
<tr>
<th>Number</th>
<th>Urgency</th>
<th>Priority</th>
<th>Asset</th>
<th>Service</th>
<th>Description</th>
<th>Status</th>
<th>Due</th>
<th>Requester</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15188</td>
<td>Medium</td>
<td>High</td>
<td>Region 1 General ITS</td>
<td>RFW</td>
<td>Help Floyd with video/Coax connections, please arrange to meet him and go over what we use.</td>
<td>Open</td>
<td>5/9/2010</td>
<td>ODOT\Você100</td>
<td>Updated 5/4/2010 1:18 PM by ODOT\Você76g: JT talked with Floyd ordered 250' of 5 wire for Astoria ...</td>
</tr>
<tr>
<td>15186</td>
<td>Medium</td>
<td>Low</td>
<td>Camera, 1-5 Interstate Bridge, NB</td>
<td>RFW</td>
<td>Camera repair, image box</td>
<td>Hold</td>
<td>5/9/2010</td>
<td>ODOT\Você76g</td>
<td>Updated 5/4/2010 7:27 AM by ODOT\Você76g: Changed status to 'Hold'. Updated 5/4/2010 7:19 AM by...</td>
</tr>
<tr>
<td>15184</td>
<td>Medium</td>
<td>High</td>
<td>Region 1 General ITS</td>
<td>RFW</td>
<td>ITS General time for May 2010</td>
<td>Hold</td>
<td>5/9/2010</td>
<td>ODOT\Você69e</td>
<td>Updated 5/4/2010 7:06 AM by ODOT\Você69e: Changed status to 'Hold'. Updated 5/4/2010 7:06 AM by...</td>
</tr>
<tr>
<td>15178</td>
<td>Medium</td>
<td>High</td>
<td>Region 1 General ITS</td>
<td>RFW</td>
<td>Sadelman Reg,1 gen for May</td>
<td>Open</td>
<td>5/9/2010</td>
<td>ODOT\Você70a</td>
<td>Updated 5/3/2010 11:34 AM by ODOT\Você70a: Changed status to 'Open'. Original Comments:</td>
</tr>
<tr>
<td>15174</td>
<td>Medium</td>
<td>High</td>
<td>VMS, 1-5 SB @ Terwilliger, Hwy1, MF209</td>
<td>RFW</td>
<td>Comm Loss</td>
<td>Open</td>
<td>5/9/2010</td>
<td>ODOT\Você70a</td>
<td>Updated 5/3/2010 10:57 AM by ODOT\Você70a: Changed status to 'Open'. Original Comments:</td>
</tr>
<tr>
<td>15171</td>
<td>Medium</td>
<td>High</td>
<td>Comm Infrastructure, CDDOT</td>
<td>RFW</td>
<td>Digitize Orion Drawings to CADD</td>
<td>Open</td>
<td>5/9/2010</td>
<td>ODOT\Você628</td>
<td>Updated 5/3/2010 9:45 AM by ODOT\Você628: Digitize Drawings Updated 5/9/2010 9:45 AM by...</td>
</tr>
</tbody>
</table>
### Intelligent Transportation Systems

#### xmWEB

Web-based Work Requests

Return to the status request page.

Click Work Order Number for Details.

Click to edit work request

<table>
<thead>
<tr>
<th>Number</th>
<th>Urgency</th>
<th>Priority</th>
<th>Asset</th>
<th>Service</th>
<th>Description</th>
<th>Status</th>
<th>Due</th>
<th>Requester</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>15188</td>
<td>Medium</td>
<td>High</td>
<td>Region 1 General ITS</td>
<td>RFW</td>
<td>Help Floyd with video/Coax connections, Please arrange to meet him and go over what we use.</td>
<td>Open</td>
<td>5/9/2010</td>
<td>ODOT|wya76g</td>
<td>Updated 5/4/2010 1:18 PM by ODOT|wya76g: JT talked with Floyd ordered 250’ of 5 wire for Astoria ...</td>
</tr>
<tr>
<td>15186</td>
<td>Medium</td>
<td>Low</td>
<td>Camera, 1-5 Interstate Bridge, NA</td>
<td>RFW</td>
<td>Camera repair, image box</td>
<td>Hold</td>
<td>5/9/2010</td>
<td>ODOT|wya76g</td>
<td>Updated 5/4/2010 7:27 AM by ODOT|wya76g: Changed status to ‘Hold’. Updated 5/4/2010 7:19 AM by ...</td>
</tr>
<tr>
<td>15184</td>
<td>Medium</td>
<td>High</td>
<td>Region 1 General ITS</td>
<td>RFW</td>
<td>ITS General time for May 2010</td>
<td>Hold</td>
<td>5/9/2010</td>
<td>ODOT|wya09a</td>
<td>Updated 5/4/2010 7:06 AM by ODOT|wya09a: Changed status to ‘Hold’. Updated 5/4/2010 7:06 AM by ...</td>
</tr>
<tr>
<td>15178</td>
<td>Medium</td>
<td>High</td>
<td>Region 1 General ITS</td>
<td>RFW</td>
<td>Stadelman Reg.1 gen for May</td>
<td>Open</td>
<td>5/9/2010</td>
<td>ODOT|wya70a</td>
<td>Updated 5/3/2010 11:34 AM by ODOT|wya70a: Changed status to ‘Open’. Original Comments:</td>
</tr>
<tr>
<td>15174</td>
<td>Medium</td>
<td>High</td>
<td>VMS, 1-5 SB @ Terwilligar, Hwy1, MP298</td>
<td>RFW</td>
<td>Comm Loss</td>
<td>Open</td>
<td>5/9/2010</td>
<td>ODOT|wya70a</td>
<td>Updated 5/3/2010 10:37 AM by ODOT|wya70a: Changed status to ‘Open’. Original Comments:</td>
</tr>
<tr>
<td>15171</td>
<td>Medium</td>
<td>High</td>
<td>Comm Infrastructure, ODOT</td>
<td>RFW</td>
<td>Digitize Orion Drawings to CADD</td>
<td>Open</td>
<td>5/9/2010</td>
<td>ODOT|wya626</td>
<td>Updated 5/3/2010 9:45 AM by ODOT|wya626: Digitize Drawings Updated 5/9:45 AM by ...</td>
</tr>
</tbody>
</table>
Asset can be changed

Technicians update as work progresses

Newest comments append at the top
Email work request

From: XMWeb@odot.state.or.us
To: ODOTITSSmWebR1@odot.state.or.us;jason.p.shaddix@odot.state.or.us
Subject: RE: xmWEB: Updated Work Request - 15188

Updated 5/5/2010 4:07 PM by ODOT\hywe76g:
JT met with Angie and walked her through cable building and how to put the bnc on the right way. Tracked down the right bubble connectors for the Belden RG59 we have. Picked parts up for Folyd and ordered what was not here.

Updated 5/4/2010 1:18 PM by ODOT\hywe76g:
JT talked with Floyd ordered 250' of 5 wire for Astoria camera hook up and double bubble bnc connectors. Items coming from Urs. Meeting with Angie at noon on the fourth of May.
Changed status to 'Open'.

Original Comments:
Responsibility for the work request is set here.
Technicians enter time they spend on work here, which populates their timesheet. All time spent on this work request shows here.
Used when a part needs to be returned for repair

Only shows up if the work request is a scheduled preventative maintenance task
New work request is created that includes all inspection points with “Assign WO” checked.

WO# would appear here if assigned.
<table>
<thead>
<tr>
<th>Inspection Point</th>
<th>Fail</th>
<th>Rating 1-4</th>
<th>Measurement</th>
<th>Assign WO</th>
<th>WO Number</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemometer - Validata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Check that wind speed and direction are changing with the conditions. Test if necessary.</td>
</tr>
<tr>
<td>Asset Condition - Cabinet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ensure cabinet is in good condition, any rust is under control, and graffiti is painted over</td>
</tr>
<tr>
<td>Asset Condition - Electronic Components</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Observe all control equipment operation.</td>
</tr>
<tr>
<td>Asset Condition - Fence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Check for damage or future problems such as vegetation growing through fabric.</td>
</tr>
<tr>
<td>Asset Condition - Boxes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Check boxes for proper bonding, conduit seal, and pest infestation.</td>
</tr>
<tr>
<td>Asset Condition - Obsolescence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Is the manufacturer still in business?</td>
</tr>
<tr>
<td>Asset Condition -</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Use to give an estimation of the asset's overall condition.</td>
</tr>
</tbody>
</table>

Asset condition rating assessed here
Preventative maintenance inspection point failure here

Location for any recorded values, i.e. source voltage

<table>
<thead>
<tr>
<th>Inspection Point</th>
<th>Fail</th>
<th>Aging</th>
<th>Measurement</th>
<th>Assign WO</th>
<th>WO Number</th>
<th>Corrective Action</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemometer -Valid data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Check that wind speed and direction are changing with the conditions. Test if necessary.</td>
<td>Check that wind speed and direction are changing with the conditions.</td>
</tr>
<tr>
<td>Asset Condition - Cabinet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Asset Condition: 1=Good; 2= Fair; 3= Poor; 4= Critical</td>
<td>Ensure cabinet is in good condition, any rust is under control, and graffiti is painted over.</td>
</tr>
<tr>
<td>Asset Condition -</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Asset Condition: 1=Good; 2= Fair; 3= Poor; 4= Critical</td>
<td>Observe all control equipment operation.</td>
</tr>
<tr>
<td>Electronic Components</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Asset Condition: 1=Good; 2= Fair; 3= Poor; 4= Critical</td>
<td>Check for damage or future problems such as vegetation growing through fabric.</td>
</tr>
<tr>
<td>Asset Condition - Fence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Asset Condition: 1=Good; 2= Fair; 3= Poor; 4= Critical</td>
<td>Check boxes for proper bonding, conduit seal, and pest infestation.</td>
</tr>
<tr>
<td>Asset Condition -</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Asset Condition: 1=Good; 2= Fair; 3= Poor; 4= Critical</td>
<td>Is the manufacturer still in business?</td>
</tr>
<tr>
<td>Obsolescence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Asset Condition: 1=Good; 2= Fair; 3= Poor; 4= Critical</td>
<td>Use to give an estimation of the asset's total condition.</td>
</tr>
<tr>
<td>Asset Condition - Obsolete</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Asset Condition: 1=Good; 2= Fair; 3= Poor; 4= Critical</td>
<td></td>
</tr>
</tbody>
</table>
XmWeb Asset Management

- Create New Assets
- Edit Assets
- Searching for Assets
- Asset Parts
- Asset Specifications
Live Demo XmWeb
Assets
### Wild card search of asset name

Enter Asset: parking

### Click to view asset

Click Asset for Details.

### Click to create NEW asset

Add New Asset

<table>
<thead>
<tr>
<th>Modify Asset</th>
<th>Property</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beacon 01, I-5 SB @ Perkins Rd</td>
<td>Region 2</td>
<td>I-5 SB just north of Salem</td>
<td>Equipment</td>
</tr>
<tr>
<td>Camera, I-5 NB @ Perkins, Hwy1, MP261.88</td>
<td>Region 2</td>
<td>3C003; PT2 Camera Site</td>
<td>Equipment</td>
</tr>
<tr>
<td>I-5 S &amp; Perkins</td>
<td>Region 2</td>
<td>Type 1</td>
<td>Area</td>
</tr>
<tr>
<td>VMS, I-5 NB @ Perkins, Hwy1, MP261.88</td>
<td>Region 2</td>
<td></td>
<td>Equipment</td>
</tr>
</tbody>
</table>
Active assets show up in all work request drop-downs. Un-checking this will remove the asset from queries, while retaining all the data.
Asset type can be Equipment, Area, or Vehicle.

Parent asset is often an “Area” type asset.
Account is populated with ODOT’s internal cost tracking expenditure account numbers, which are unique for each asset. Any work requests for this asset will include this account number, which is then automatically populated on staff timesheets.
Group is the general classification of the device. Examples: VMS, CCTV, RWIS, HAR, Server.
Sub-Group further classifies the asset. If the Group is VMS, we still need to know what kind of VMS.
Seasonal Priority is used for devices such as mountain pass RWIS, that are more important in the winter.
**Key fields**
- Asset tag: VMS, 1-5 NB @ Perkins, Hwy 1, MP 261.88
- **Asset Details**
- **Asset tag#**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>0.0000</td>
</tr>
<tr>
<td>Supplier</td>
<td></td>
</tr>
<tr>
<td>Manufacturer</td>
<td></td>
</tr>
<tr>
<td>Model Number</td>
<td></td>
</tr>
<tr>
<td>Serial Number</td>
<td></td>
</tr>
<tr>
<td>Structure No.</td>
<td>19303</td>
</tr>
<tr>
<td>Structure Type</td>
<td>Bridge</td>
</tr>
<tr>
<td>Control Number</td>
<td>3VMDCL</td>
</tr>
<tr>
<td>US Traffic</td>
<td>VMS-LED-WI-CM-3LX18CH-7X</td>
</tr>
<tr>
<td>Latitude</td>
<td>45.0279001</td>
</tr>
<tr>
<td>Longitude</td>
<td>-122.9840201</td>
</tr>
<tr>
<td>Abutment</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Information**
- Click the button to see the Asset location on Google Maps.
- Use WGS84 Geo Coordinates.
Last time a preventative maintenance task was performed

Structure ID is traceable to bridge inspections

Used to describe they type of bridge, pole, facility
Links to Google Maps, making finding assets much simpler
MicroMain fills this in, bringing you to Google Maps as seen.
Specifications are used to track data about the asset or components of the asset.

<table>
<thead>
<tr>
<th>ID</th>
<th>Specification</th>
<th>Value (Text)</th>
<th>Value (Date)</th>
<th>Value Hi</th>
<th>Value Low</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>142</td>
<td>Firmware Version</td>
<td>UniCPU</td>
<td>4/23/2006 12:00:00 AM</td>
<td>1.234</td>
<td>0</td>
<td>Record Firmware version here</td>
</tr>
<tr>
<td>125</td>
<td>IP</td>
<td>167.131.135.133</td>
<td></td>
<td>0</td>
<td>0</td>
<td>Device IP</td>
</tr>
<tr>
<td>6086</td>
<td>IP Cellular</td>
<td>10.10.11.3</td>
<td>3/24/2010 12:00:00 AM</td>
<td>0</td>
<td>0</td>
<td>Verizon's fixed IP, only pertains to cellular routers</td>
</tr>
<tr>
<td>127</td>
<td>IP Subnet Mask</td>
<td>255.255.255.240</td>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>128</td>
<td>IP Switch</td>
<td>167.131.135.130</td>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5604</td>
<td>Sign Control Software</td>
<td>91</td>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
Make any necessary changes, then click Save.

Deletes specification entirely
Wild card search of specification name
Next screen
All equipment at a site is tracked as a part. This includes electronic equipment, mechanical hardware, consumables, anything that needs to be tracked to an asset.

<table>
<thead>
<tr>
<th>ID</th>
<th>Part</th>
<th>Description</th>
<th>Qty</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>362</td>
<td>Cabinet, 332</td>
<td>Full size Traffic Cabinet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>363</td>
<td>Cabinet, 332 Riser</td>
<td>Riser for 332, 334, 336 cabinets</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>364</td>
<td>Cabinet, Drawer</td>
<td>Rack mount drawer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>366</td>
<td>Cabinet, Locks, Best</td>
<td>Cabinet lock w/ Best cylinder</td>
<td>2</td>
<td>Red</td>
</tr>
<tr>
<td>367</td>
<td>Cabinet, Log Book</td>
<td>Notebook for cabinet notes</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4376</td>
<td>Filter, 12x16x1</td>
<td>Cabinet Filter, Ramp Meter, VMS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5114</td>
<td>Filter, 12x16x1</td>
<td>Cabinet Filter, Ramp Meter, VMS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4377</td>
<td>Filter, 3x6x1</td>
<td>Sign Filter for U.S. Traffic VMS</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>5164</td>
<td>Filter, 3x6x1</td>
<td>US Traffic VMS Housing Filter</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>2067</td>
<td>Modern, GDI, SM336, Stand alone</td>
<td>Stand Alone Modem</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>368</td>
<td>Network, Router, Cisco 2950</td>
<td>Cisco 2950</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>369</td>
<td>Network, Switch, Cisco 2600</td>
<td>Cisco 2600</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>388</td>
<td>Power, UPS, Minuteman</td>
<td>UPS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surge</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Wild card search of parts name

Click here to add part to asset

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Location</th>
<th>Class</th>
<th>Manufacturer</th>
<th>Maintenance Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modem, 33.6K, US Robotics</td>
<td>33.6 Kbit/s modem, white in color</td>
<td>BOM</td>
<td>US Robotics</td>
<td>Modem</td>
<td></td>
</tr>
<tr>
<td>Modem, 56K US Robotics</td>
<td>56Kbps modem white in color</td>
<td>BOM</td>
<td>US Robotics</td>
<td>Modem</td>
<td></td>
</tr>
<tr>
<td>Modem, 56K, 3COM</td>
<td>Stand Alone Modem</td>
<td>TSSU</td>
<td>Modern</td>
<td>3COM</td>
<td>Modem</td>
</tr>
<tr>
<td>Modem, 56K, D-Series Modem, DCB</td>
<td>56k baud modem</td>
<td>BOM</td>
<td>DCC</td>
<td>VMS</td>
<td></td>
</tr>
<tr>
<td>Modem, ACM 2011, Cable Modem</td>
<td>Asynchronous Cable Modem</td>
<td>BOM</td>
<td>ACM</td>
<td>Modem</td>
<td></td>
</tr>
<tr>
<td>Modem, Cable Modem</td>
<td>Comcast broadband</td>
<td>BOM</td>
<td>Network</td>
<td>Network</td>
<td></td>
</tr>
</tbody>
</table>
Fill in Qty and any comments for the parts, then click save.
Next screen
Preventative maintenance tasks assigned to this asset

<table>
<thead>
<tr>
<th>ID</th>
<th>Task</th>
<th>Type</th>
<th>Priority</th>
<th>Last Done</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1221</td>
<td>VMS PM, Annual (Region 2)</td>
<td>Preventive</td>
<td>High</td>
<td>6/24/2009 2:41:24 PM</td>
<td>Minimum Requirement</td>
</tr>
<tr>
<td>1154</td>
<td>Annual PM, VMS</td>
<td>Preventive</td>
<td></td>
<td></td>
<td>Minimum Requirement</td>
</tr>
</tbody>
</table>
### Asset Task

<table>
<thead>
<tr>
<th>ID</th>
<th>Task</th>
<th>Type</th>
<th>Priority</th>
<th>Last Done</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1221</td>
<td>VMS PM, Annual (Region 2)</td>
<td>Preventive</td>
<td></td>
<td>6/24/2009 2:41:24 PM</td>
<td>Minimum Requirement</td>
</tr>
<tr>
<td>4154</td>
<td>Annual PM, VMS</td>
<td>Preventive</td>
<td></td>
<td></td>
<td>Minimum Requirement</td>
</tr>
</tbody>
</table>

**Search For Task**

Enter Task: [Input field]

or Select Task: VMS PM, Annual (Region 3) [Dropdown]

[Search] [Clear]

**Task Results 1 - 1**

<table>
<thead>
<tr>
<th>Task</th>
<th>Class</th>
<th>Type</th>
<th>Shop</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMS PM, Annual (Region 3)</td>
<td>Minimum Requirement</td>
<td>Preventive</td>
<td>Region 3 ITS</td>
</tr>
</tbody>
</table>

---

*Wild card search for task*

*Click to add task to asset*
Choose a priority, then click save to associate the task with the asset.
Intelligent Transportation Systems

xmWEB™
Web-based Work Requests

Asset: VMS, I-5 NB @ Perkins, Hwy 1, MP261.88

Cost: $0.0000
Install Date: 5/1/2004
Last Maintained: 6/24/2009
Structure No.: 19303

Supplier: US Traffic
Manufacturer: US Traffic
Model Number: VMS-LED-WI-CM-9LX18CH-7x
Serial Number: 3VM06CL

Click the button to see the Asset location on Google Maps. Lat/Long units above, should use WGS84 Geo Coordinates.

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Asset comments appear on every work request for the asset if the box is checked.

Works well for noting special circumstances for an asset such as difficult parking or access, times when the asset is intentionally offline, and intermittent construction impacts.
Project info helps technicians and engineers find documents such as plans and drawings during construction and after.

[Link to server location storing plans]
Event log is used as an audit trail for changes to the database.

<table>
<thead>
<tr>
<th>Event</th>
<th>Event Time</th>
<th>UserName</th>
<th>WO</th>
<th>WOnumber</th>
<th>Asset</th>
<th>Labor</th>
<th>Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset Spec - Updated</td>
<td>5/4/2010 10:03:02 PM</td>
<td>ODOTYsd100</td>
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<td>0</td>
<td>VMS, I-5 Nb @ Perkins, Hwy1, MP261.08</td>
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<td>Region 2</td>
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<tr>
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</tbody>
</table>
ODOT maintains a full development and test environment for MicroMain (and other Apps).
Conclusion

- Challenges Addressed
- Successful Design Decisions
- Areas ODOT Could Improve
- Areas to Avoid
- Lessons Learned
Challenges Addressed

• Work Flow & Request Process
• Communication of Work Request Status and Prioritization
• Coordination of Effort
• Workload Prioritization
• Preventative Maintenance Scheduling and Tracking
• Change Notification
• Micromain (and our adherence to standards) helps make statewide after hours support possible.
Challenges Addressed

- Asset Inventory Management
- Asset Repair History
- Asset Prioritization
- Asset Condition Rating
- Asset Expenditure Account Tracking
Successful CMMS Design Decisions

• Very simple, fast Request For Work form
  – TOC
  – Technicians on the road

• Focusing on benefits to users in requirements phase
  – Timesheets
  – Asset work history
  – Asset info availability

• Naming convention designed for quick selection
Areas of Future Focus / Improvement

• Performance Measures
• Maintenance Cost Tracking
• Asset Inventory Detail
• Database Housekeeping
Areas to Avoid / Pitfalls

• PDA
  – Synchronization
  – PDA Table updates
  – Version conflict with client

• Barcode Reader
  – Printing barcodes
  – Web form much faster

• Spare Parts Management
  – Administration
Lessons Learned

- Use the Application’s Business Rules
- Keep Modifications to a Minimum
- Maintain a Separate Test Environment
# Naming Convention

<table>
<thead>
<tr>
<th>MicroMain</th>
<th>Generic ODOT</th>
<th>Specific Example</th>
<th>Template [Required], {Optional}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site</td>
<td>ODOT</td>
<td>ODOT</td>
<td>[Database Owner]</td>
</tr>
<tr>
<td>Property</td>
<td>Region</td>
<td>Region 1</td>
<td>[Logical Divisions]</td>
</tr>
<tr>
<td>Asset (Area)</td>
<td>District</td>
<td>District 2B</td>
<td>[Subdivisions]</td>
</tr>
<tr>
<td>Asset (Area)</td>
<td>Field Location</td>
<td>I-5 @</td>
<td>[Highway Name] @ [Nearest or Monument]</td>
</tr>
<tr>
<td>Asset (Equipment)</td>
<td>Camera</td>
<td>Camera, I-205 @ , Hwy64 MP19.1</td>
<td>[Asset Group], [Hwy Name] [Direction of Traffic Flow] @ [Nearest or Monument], {Hwy #}, {Milepoint}</td>
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<tr>
<td>Asset (Vehicle)</td>
<td>PVMS</td>
<td>PVMS, RE052900, P2-03-02</td>
<td>[Asset Class], [Vehicle ID], [Sign Designation]</td>
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<tr>
<td>Part</td>
<td>Part</td>
<td>RWIS, Flash Card, 6061-4042, 5025 ESP</td>
<td>[Asset Group], [Part Name], {Manufacturer part#}, {Firmware rev}</td>
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</tbody>
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