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ITS-Michigan

Intelligent Transportation Society

July 2006

President's Message

The Intelligent Transportation Society of Michigan is a force to proactively unite Michigan resources for planning, development and deployment on Intelligent Transportation Systems. During the first 11 years of our existence, the Society has had some notable successes. We hosted the ITS America annual meeting in Detroit in 1998. We won the Best State Chapter Award from Intelligent Transportation Society of America. We have provided a forum for the "Car Guys" to talk to the "Road Guys" and this has led to a better understanding on how these two elements of the transportation system fit together.

Successful chapters of ITS America are ones that involve the State Department of Transportation in a major way. During the last few years, the Michigan Department of Transportation's (MDOT) emphasis on Intelligent Transportation Systems has increased significantly. Statewide ITS Program Manager, Greg Krueger, has been a champion for ITS activities at MDOT. He has brought the department to a fuller understanding of transportation operations activities, and a more significant financial commitment to ITS in the department has been the result.

ITS Michigan provided a forum for the first discussions of Vehicle Infrastructure Integration in Michigan. The ITS Michigan committee on Vehicle Infrastructure Integration led to the early discussions between the automobile manufacturers, MDOT, and the Road Commission for Oakland County (RCOC). As a result, Michigan is home to several Vehicle Infrastructure Integration

field tests and the state is increasingly being recognized as the leader in Vehicle Infrastructure Integration activities in the nation.

Over the last few years, ITS Michigan has been fortunate to be able to support an Executive Director and staff with its own resources and a contract from MDOT. We understand that the MDOT contract will be significantly modified at the end of September. As a result, more of the ITS Michigan activities will be done by volunteers and less will be done by staff. One of the benefits of increased member involvement in ITS Michigan will be increased member commitment to making ITS Michigan a proactive force for planning, development and deployment of Intelligent Transportation Systems throughout Michigan.

Our three day annual conference in June 2006 at Ford Field in Detroit featured an outstanding program with an emphasis on Vehicle Infrastructure Integration, and attracted more than 200 delegates. MDOT Director Kirk Steudle highlighted the Vehicle Infrastructure Integration test beds already in place in Michigan. We expect to continue this combined meeting with the MDOT Vendor Exhibition in 2007. During the coming year we expect to begin discussions with Automation Alley and its members to discover the job creating potential of the ITS industry in Michigan.

Richard F. Beaubien, P.E., P.T.O.E.
President, ITS Michigan





Carmine Palombo welcomes attendees on behalf of ITS Michigan.

ITS Michigan 11th Annual Meeting and MDOT Vendor Exhibition

The 2006 ITS Michigan Annual Conference was held at Ford Field in Detroit in conjunction with the Michigan Department of Transportation Vendor Exhibition June 13-15. Combining the two events allowed 60 Michigan Department of Transportation (MDOT) employees to attend and gain exposure to ITS technologies both on the exhibit floor and in the conference room. The attendance of 260 set a record for an ITS Michigan Annual Conference.

Exhibitors included: Actron Integrated Security Systems, Adaptive Displays, Alcatel, American Signal Company, Atlantic Scientific, Blackhawk Enterprises, CoreTec, Daktronics, EIS Inc., Garrett.com, International Fiber Systems, Microwave Data Systems, Motorola, Open Roads Consulting, Proxim Wireless, Skyline, Traffic Control Group, Transdyn, Utility Sales Associates, Vbrick Systems, and Wavetronics.

MDOT Director Kirk Steudle began the presentations by explaining his department's interest in reducing traffic crashes. He noted that ITS technologies such as Vehicle Infrastructure Integration (VII) have the potential to reduce crashes and provide better measures of transportation system performance. Test beds with this technology are in place in Auburn Hills, Southfield, and Farmington Hills. An expansion to Novi is planned by the end of the year. Michigan has been selected for proof of the concept, and a VII demonstration is planned for the fall of 2008. The MDOT



Downtown Detroit and Ford Field served as the backdrop for the 2006 Annual Meeting.

project on VII Data Use Analysis and Processing – what to do all the data – begins in the summer of 2006. Daimler-Chrysler expects to have 2800 vehicles operating in the VII test bed by the end of the year.

Chris Warren from Florida's Turnpike Enterprise described some of the VII activities in Florida. The Florida program is focused on safety, efficiency, and customer service. Early winners are mobile internet protocol, travel time notification, wet pavement warning, a barrier warning system, and speed monitoring.

Leighton James from Traffic Wales noted that intelligent transportation systems can be referred to as "Network Management". In Wales, emergency calls go to Traffic Wales rather than the police. He noted that the road agency cannot manage the road network on its own. Vehicles are part of the system, and information from vehicles can help to manage the system.

Joel Hoffman from Intel discussed the road ahead for CAR IT. Car IT makes



MDOT Statewide ITS Program Manager Greg Krueger provided details about Michigan's VII program.



Chuck Moore, Mark Dylewski, Amy Beaupre, Matt Klawon, and Joe Finch enjoy food, drink and networking at Comerica Park.

Matt Klawon, Traffic Department Engineer for the Road Commission of Macomb County, described the county's new Traffic Operations Center. It provides access to 300 of the traffic signals in the county. It also

transportation exhilarating and safe; it provides communication and information anywhere, anytime; and it provides entertainment (a home away from home). He expects more wireless choices in the future. Intel sponsored the food, drink, and networking at Comerica Park and the baseball game. ITS Michigan Executive Director Frank Cardimen guaranteed at Tiger victory, and Tiger pitcher Kenny Rogers delivered that victory.

On the second day Tammi Shepard described the "Wireless Oakland" project, and Uma Harithsa described the "Wireless Washtenaw" project. Mia Silver from MDOT discussed the use of ITS technologies in managing the traffic operations for the All-Star Baseball game and Super Bowl XL. Dynamic messages signs were one of the tools used to direct traffic for these events.

David Henry from Daimler-Chrysler described the DCX test bed for VII in Auburn Hills. There will be 2800 vehicles transmitting information by the end of 2006. Ralph Robinson from Ford Motor, President of the VII Consortium, described the National VII Consortium project. The nine key use cases are Electron Brake light Warning, Signal Violation Warning, In-vehicle Signage, Dynamic Traffic Information, Roadway Conditions, Traffic Management and Control, Alternative Route Guidance, Payment Transactions, and Provisioning and Security Management. The Proof of Concept will be in Southeast Michigan.

Susette Peplinski, the MDOT Grand Region Operations Engineer, provided an overview of ITS operations in the Grand Rapids area. Twenty-three miles of I-96 and I-196 are instrumented. The Traffic Operations Center operates during weekday peak hours and summer peak hours. The center provides the Michigan State Police, Grand Rapids Police, and TV stations with camera feeds from the closed circuit television cameras on the freeways.

provides access to MDOT CCTV cameras on the freeways in the county. RCMC also has access to its own CCTV at the Groesbeck/Cass intersection.

Neil Belitsky, General Manager of the Detroit Windsor Tunnel, described the use of ITS for International Border Crossings. The Tunnel carries 30% of the local NEXUS program that recognizes people making regular border crossings between Detroit and Windsor and provides expedited crossings. The Tunnel accepts credit cards and intends to upgrade to electronic tolls in the future. The Tunnel shares digital CCTV images with the Michigan Department of Transportation and provides tunnel audio, cellular, and radio services. He identified the need for better traveler information systems.

Dr. Peter Sweatman from the University of Michigan Transportation Research Institute (UMTRI) described his organization's ITS projects. These include the in-vehicle safety system, ITS integration, and a technology roadmap. ITS projects constitute 35% of UMTRI revenues.

The third day focused on Vehicle Infrastructure Integration (VII). Larry Tibbits, Chief Operating Officer for MDOT, de-



The MDOT Vendor Exhibition was held in conjunction with the ITS Michigan Annual Meeting.



UMTRI Director Peter Sweatman describes U-M ITS Program.

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Road Commission of Macomb County

Traffic Operations Center



Rendering of TOC design concept.

OVERVIEW OF PROJECT

Population growth and economic development are causing severe traffic congestion problems in Macomb County. As a result, improved traffic management and roadway safety are of paramount concern to the Road Commission of Macomb County (RCMC). The Road Commission operates and maintains more than 900 traffic control devices on 1,700 miles of roads in Macomb County. The majority of the signals operate on fixed timing plans based on time of day. The timing plans accommodate recurring traffic on major corridors during normal peak hours. The timing plans cannot accommodate non-recurring congestion.

RCMC developed a two-prong approach to have safer roads by improving the signal system. First, RCMC awarded a contract to install closed-loop traffic signal systems on 15 of the most heavily traveled corridors in the county and secondly they selected Hubbell, Roth & Clark, Inc. (HRC) to design and build a high-tech Traffic Operations Center (TOC) and to develop an Intelligent Transportation Systems (ITS) Master Plan to guide the Road Commission's future investments in technologies and equipment.

The closed loop system involved wirelessly interconnecting 144 intersections to 17 on-street master controllers to form 17 closed-loop systems covering approximately 70 miles of major arterials. An additional 125 signalized cross-overs at boulevards were hard wired to adjacent intersections. Each on-street master communicates with centralized computer via a dedicated phone line.

The new TOC was created in 2,100 SF of unused space in the vacated administrative building adjacent to RCMC's new administrative offices. HRC provided RCMC with 3-D video graphics and a simulated walk-through of their proposed TOC layout, which gave them a glimpse of their future TOC. Based on HRC's past experience and thorough understanding of RCMC's functional and spatial needs, the up-front

investment of time and effort to produce the detailed images resulted in a final TOC layout that was essentially unchanged, expediting construction document preparation and accommodating a tight construction schedule. As the design/builder, HRC contracted directly with other specialty consultants, the building contractor, furniture, material, and equipment suppliers, and communication specialists to perform the work. The TOC was designed, built-out, equipped and furnished nine months after receiving a notice to proceed.

The TOC includes a control room with a console accommodating three workstations, a rear-projection system with a 96-inch screen and two 50-inch plasma monitors. A conference room was placed adjacent to the control room to allow direct viewing of the screens and PC displays. This arrangement facilitates incident and emergency management meeting involving numerous agencies. An equipment room houses the computer servers, communication equipment and switches; the space was designed to accommodate future growth. RCMC's LAN, internet service, phone system, radio system and cable service were extended to the TOC and connected to the workstations.

The advanced traffic management system implemented by RCMC is a subset of Intelligent Transportation Systems (ITS), which promote the use of communications and computers to manage transportation systems. To guide future transportation operations investments and ITS deployments, an ITS Master Plan was prepared for RCMC by Hubbell, Roth & Clark, Inc. and Dunn Engineering Associates, P.C. A Systems Engineering approach was used to develop the plan. Efforts were focused on the concept of operations, high level requirements and some high level design. A major component of the ITS Master Plan was the communications plan, which is a significant expense in deploying ITS. Dunn Engineering conducted an exhaustive review of local public and private communication providers. The technologies included leased phone or cable lines, leased or owned fiber optic, owned wireless and hybrid systems. The candidate technologies were compared by scalability, reliability, maintainability and life-cycle costs.

The TOC conference room has a view of the control room.



BENEFITS OF THE PROJECT

*** Model for a small TOC for local applications.**

Most TOCs have been built to monitor state-wide freeway systems or even multi-state interstate corridors. They are huge facilities with 24/7 operations running complex software and hardware systems. RCMC's TOC was designed to be modular for installations in areas with limited square footage. The configuration of rooms can be modified by adding or subtracting rooms depending upon the local needs. The TOC design dealt with all the building systems and thus is an excellent model for other communities or road agencies.

*** Space for incident response teams.**

The TOC was designed to serve as a back-up Command and Control Center in the event of a major incident – traffic, security or natural disaster. The console was built to accommodate an additional non road commission person at the console to operate the CCTV cameras, the signal system software, and cable service. The conference room was designed to have clear viewing of the monitors in the control room and to provide privacy for strategic planning. The entire TOC is connected to a back-up generator in case of power outage.

*** Use of “off-the-shelf” products and systems.**

RCMC utilized readily available technology and software in support of their main mission to provide and maintain the public with a quality road system. The products researched and purchased by HRC for the RCMC's TOC operation are readily available components such as a NEC rear projection system, Pelco Spectra Dome Camera, Trango Falcon Plus wireless system, etc. The components were all delivered and installed at the same time and began operating without special software or integration. It was a “plug-and-play” situation which met RCMC's goals. Utilization of “off-the-shelf” technology and products eliminates the need for long term, costly service agreements for the RCMC, and simplifies procurement, installation and maintenance of the systems.

*** Advantages of wireless communication technology.**

HRC designed a CCTV camera system demonstration using discrete and relatively inexpensive components. Because communications with the camera can be complicated and expensive, spread spectrum radio wave technology was selected. The advantages of this technology are many: low cost and easy installation, no recurring utility charges, durable, does not require an operating license and provides a high quality video feed. In addition, all the equipment can be maintained by RCMC staff.

*** ITS planning process forges interagency cooperation**

The process of developing the ITS Master Plan involved a

number of stakeholders. RCMC invited other public agencies to discuss their mutual needs and resources. Representatives of law enforcement, emergency management, transit, other road agencies, Federal Highway Administration and the regional planning council were invited to participate in exercises that reviewed existing levels of cooperation, areas for improvement, and future needs. The discussions forged a relationship that did not exist previously and yielded a commitment to cooperate more in the future. Contact information was exchanged and roles clarified in the event of incident or emergency. From these meetings, a local ITS architecture was developed that described how information flows between agencies now and how it will in the future.

*** Interfaces with regional agencies and programs**

The TOC is linked via the internet to receive vital traffic information across jurisdictional boundaries from the Road Commission for Oakland County, the Michigan Department of Transportation ITS Center in Detroit and Southeast Michigan Snow and Ice Management Program, an advanced vehicle locator system installed on the Road Commission's trucks allows the tracking of snow plows for more effective winter road management.

*** Improve Traffic Operations without Increasing Capacity**

RCMC's two prong approach promotes the use of technology to reduce commuter delays without building new roadways. RCMC now has the ability to monitor and control from a central location approximately 300 interconnected traffic signals in real time and make changes as needed to increase roadway efficiency and safety.

The initial traffic control system provides coordinated traffic signals to move vehicles. RCMC is planning to bring another 660 traffic signals into the TOC. Future implementations will migrate towards responsive signals and in the final phase, adaptive signals that control traffic based on real-time road conditions.

CONCLUSION

According to its Mission Statement, the Road Commission of Macomb County “promotes a cooperative role with local governments to manage land use by implementing improvements based upon the objective assessment of system needs and environmental impact.” The creation of the TOC and ITS Master Plan supports the RCMC's stated role. The county signal system will be under coordinated and centralized control, which will improve traffic flow and mobility and reduce air pollution.

Matt Klawon and Adam Merchant use the workstations in the new control room.





MDOT
Director Kirk Steudle
kicks off the confer-
ence with a discussion
of Smart Highways and
Vehicle Infrastructure
Integration .

MDOT VII Update

Director Kirk Steudle gave an overview of the Michigan Department of Transportation direction in the area of Vehicle Infrastructure Integration (VII). One of the benefits that may be realized from VII in Michigan is the ability to measure the performance of the transportation system. One motorist benefit from VII may be avoidance of rear-end collisions.

MDOT has developed a concept of operations for Michigan's VII program. Michigan will be the site of the proof of concept for the national VII program.

MDOT and its partners, CAMP, UM-

TRI, OEMs and the VII Consortium, are in the process of installing test beds applications in Auburn Hills, Southfield, Farmington Hills, Novi, Warren and Dearborn. The systems when complete will represent a pseudo Dedicated Short Range Communications (DSRC) system. MDOT expects to have a VII Demonstration in Fall 2008.

The test bed sites will be generating large amounts of data. DaimlerChrysler expects to have 2000-3000 vehicles equipped to communicate with the VII test beds sites by the end of 2006. The VII Data Use Analysis and Processing project will begin in summer 2006.

VII Areas of Concern – Supplier's Perspective

Scott McCormick, President of the Connected Vehicle Trade Association™ Inc. gave a presentation at the Annual Meeting entitled "The Michigan VII Program-The Supplier's Perspective". Scott highlighted the following areas of concern about the Vehicle Infrastructure Integration (VII) program:

- VII, in the broadest sense, should be a public-private partnership, but there are none.
- Most DOT and automaker programs in the US tend to put the suppliers in a contractor or grant status
- Business model discussions are not involving all the stakeholder groups
- All the risk tends to be one-sided, all the dialog behind closed doors
- Long term strategies to build upon the foundations being developed are being explored
- We are not employing the best practices of Europe or Asia, or even what the US accomplished in the past

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MDOT Chief Operations Officer Larry Tibbits discusses VII Test Beds in Michigan.

scribed the Department's interest in VII. MDOT intends to expand the "test beds" to the western part of the state. Michigan intends to retain its national leadership in the VII initiative. The program in Michigan will emphasize improvements in safety and reductions in traffic congestion. The Department continually asks the question, "Are we on the right track?" MDOT partners are important in answering this question. The motto is, "Partner or Perish". The use of car information can make the roadway network operate more safely and efficiently.

Greg Krueger, the Statewide ITS Manager for MDOT, described the Michigan VII program in more detail. VII is expected to enhance traveler safety, efficiency, and convenience. Information expected from VII includes link travel times, link speeds, travel time, average stops, operations information at "high crash" locations, and the identification of locations for potential crashes. VII should also help with network performance measure calculations. MDOT has allocated \$4 million for its data use program.

Brian Cronin, Congestion Program Coordinator for the US Department of Transportation, discussed his department's perspective on Michigan's VII Program. Ralph Robinson, Ford Motor Co. representative to the VII Consortium, indicated that VII is likely to go forward. The field tests will confirm the technical feasibility with a proof of concept demonstration. Scott McCormick from the Connected Vehicle Trade Association noted that Michigan is a leader in VII because of the program scope, the financial commitment, and the demonstrations of the concept. One of his areas

of concern was that we need to bring operations and management people into the program to assure its success.

During the Panel Discussion of VII, David Henry from Daimler-Chrysler noted that we need to assure ourselves that the public will buy into VII. His question is, "Can we sell it?" Dr. Steve Underwood from the Center for Automotive Research stated that mobile communications will provide a wide range of services. Many actors need to work together. It is important to partner because VII is going to happen. VII will succeed if we can show value to the individual.

Joe Avercamp from Sprint described the existing wireless network. For 16% of users, wireless is their only telephone service. He expects information to flow to the wireless handset first and to the car second.

Dave Acton from Connexis discussed the safety implications for future infostructure. We need to be aware of next generation 911. There are 7000 Public Safety Answering Points (PSAP) in the U.S. today, and their capabilities vary greatly. Emergency situations generally overwhelm 911 operators, and this issue must be addressed so that public safety can be handled during emergency situations.

Other speakers included Harry Voccola (Navteq) and Brent Bair (RCOC) speaking on their advisory committees to the congressional ITS Caucus, and Neil Schuster of ITS America noted that Michigan was a leader among ITS America chapters.



Outgoing ITS Michigan President Carmine Palombo happily turns over the gavel to incoming President Dick Beaubien.

Ford's Ralph Robinson explains Vehicle Infrastructure Integration Consortium.





ITS-Michigan

Intelligent Transportation Society

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ITS Michigan Quarterly Meetings

- August 22, 2006, 9:00AM-Noon at UMTRI, contact: Peter Sweatman (sweatman@umich.edu or 734-764-6505) for more information or to register.
- November 2006, Farmington Hills

Special thanks to John Abraham for photographs from the ITS Michigan Annual Meeting and MDOT Vendor Exhibition.

Thanks to Hubbell, Roth & Clark, Inc. for the preparation of this newsletter.

Upcoming Events

ITS Michigan Board of Directors Meetings

- July 20, 2006, 9 AM—HRC Bloomfield Hills Office
- September 12, 2006, 9 AM—Automation Alley, 2675 Bellingham, Troy, MI 48083

Rural ITS Conference

- September 2007, Traverse City