

Michigan Connected and Automated Vehicle Working Group Meeting Packet

July 10, 2014

- 1. Agenda**
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- 4. Handouts**
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MICHIGAN CONNECTED AND AUTOMATED VEHICLE WORKING GROUP

Thursday, July 10, 2014

COMTEC
117 S. Groesbeck Highway
Mount Clemens, MI 48043

MEETING AGENDA

1:00 PM Introductions, Valerie Brugeman and Qiang Hong, CAR

1:10 PM Welcome to and Overview of COMTEC, John Abraham, Traffic Operations Manager, Macomb County Department of Roads

1:20 PM Overview of ITS World Congress, Jim Barbaresso, HNTB and Chair, ITS WC

1:35 PM Preview of ITS WC Technology Showcase, Michele Mueller, MDOT

1:50 PM Preview of Youth Connection Showcase at ITS WC, Barb Land, Square One Education Network

2:00 PM Preview of ITS WC Technical Tours, Dick Beaubien, Beaubien Consulting

2:15 PM Preview of Technical Program at the ITS WC, Matt Smith, MDOT

2:30 PM NETWORKING BREAK

2:45 PM Preview of Entrepreneurial Opportunities at the ITS WC, Jim Barbaresso, HNTB

3:00 PM Detroit Test Beds for the ITS WC, Greg Krueger, Leidos

3:30 PM Tour of the COMTEC Facility, Jonathan Coleman, Project and Operations Manager [of COMTEC], URS

4:00 PM Adjourn

MICHIGAN CONNECTED AND AUTOMATED VEHICLE WORKING GROUP

The Summer 2014 meeting of the Michigan Connected and Automated Vehicle Working Group was held at the Macomb County Communications and Technology Center (COMTEC) in Mount Clemens, Michigan, on July 10, 2014.

MEETING NOTES

Valerie Sathe Brugeman and Qiang Hong of the Center for Automotive Research (CAR) gave a brief welcome and began introductions around the room. Valerie then covered the meeting agenda, the working group mission statement, and noteworthy news. She discussed the Ann Arbor Safety Pilot expansion, the University of Michigan Mobility Transformation Center, Google's automated vehicle pilot program, and California's automated vehicle testing rules. Valerie also discussed upcoming connected and automated vehicle events, including the Macomb County ITS World Congress Dinner Cruise.

Qiang then invited John Abraham of the Macomb County Department of Roads to speak about COMTEC. John gave a brief overview of the transportation infrastructure of Macomb County and then discussed the creation of COMTEC, which was opened in December 2013. Approximately two thirds of the funding for construction was provided by state and federal sources, with the rest provided by the county and the sheriff's office. The center operates from 6:00 am to 6:00 pm on weekdays. It currently collects performance reports, and the information from these reports eventually will be made public.

Following John's presentation, the focus of the meeting shifted towards a discussion of the upcoming ITS World Congress (September 7-11, 2014), beginning with a presentation from Jim Barbaresso of HNTB. Jim discussed the main pillars of the World Congress—the technical program, special features, the exhibition at Cobo Center, networking events, technical tours, and the technology showcase. He briefly described the program for the event and noted how full each day would be. Jim mentioned that the program contained more than 250 sessions. In addition to general sessions and technical sessions, there will be special features, such as the entrepreneurial "Inventors and Investors" program, the "Youth Connections" program, a Michigan Senate Transportation Committee hearing, and the presentation of awards.

Jim was followed by Michele Muller of the Michigan Department of Transportation (MDOT), who focused on the ITS World Congress Technology Showcase. The showcase will be located in three different areas—Belle Isle, the Atwater Parking Lot, and Cobo Center. Michelle showed a layout of the 24 planned demonstrations on Belle Isle and noted that certain areas (e.g., pedestrian overpasses and bleachers) on the island would be open to the public; thus, those not attending the ITS World Congress will still be able to view the demonstrations. Michele also shared a map of the Atwater Parking Lot, which will host another 10 demonstrations. She described the shuttle bus system, which will link the three locations, with no more than a 10-minute wait between buses. Michele also described the Technology Showcase Launch area (for booths with previews of demonstrations) and the Traffic Management Center Showcase (displaying live and staged traffic operations), both of which will be located at Cobo Center.

Following Michele's presentation, Barb Land of Square One Education Network spoke about the Youth Connections Showcase. This showcase has three strategic objectives: to showcase the talent of Michigan youth to the world, to introduce 1,000 youths to intelligent transportation technology,

and to create a replicable model of youth involvement for future ITS World Congress events. A code-a-thon event will be held on September 6th and 7th, and during the ITS World Congress, each day Square One will lead 250 students on a tour of the show floor. Barb mentioned that Square One was still looking for interested companies to make a short presentation to groups of kids during tour stops during the show. Barb asked attendees to promote involvement at area schools. Michigan high school and college students can register to participate at www.squareonenetwork.org.

Barb was followed by Dick Beaubien of Beaubien Engineering, who made a presentation on the ITS World Congress technical tours. The tours he discussed included the Michigan PrePass Operations, the GM OnStar Call Center, the Southeast Michigan Transportation Operations Center (SEMTOC), the Ann Arbor Safety Pilot & University of Michigan Mobility Transformation Center, the City of Windsor Traffic Operations Centre, and COMTEC. Dick also announced that you could contact him about volunteering opportunities.

Following Dick's presentation, Matt Smith of MDOT discussed the ITS World Congress technical program. Matt described the various sessions (e.g., plenary, special interest, technical/scientific, and interactive). He also noted that the ITS World Congress was not just about vehicles, but that the event would cover several tracks, such as data, smart cities, and economic growth, as well.

After a brief networking break, Jim Barbaresso made a presentation on entrepreneurial opportunities at the ITS World Congress. He discussed two major efforts, the Inventors & Investors matching event and the Entrepreneurial Village. The investor matching event will give early- and mid-stage startups the opportunity to pitch their business plans to possible investors. The Entrepreneurial Village is also designed for early- and mid-stage startups. It provides small spaces on the exhibition floor for 12 early-stage startups and 10 mid-stage startups. In addition to housing booth space, the Entrepreneurial Village also will include a meeting area.

Jim was followed by Greg Krueger of Leidos, who presented on the Detroit Test Bed for the ITS World Congress. He provided a diagram on the architecture for the Southeast Michigan Test Bed (see handouts section of this packet) and gave a basic overview of the system and showed the layout of the 17 roadside units that are installed between Cobo Center and Beaubien Street. Greg showed a visualization of data that was collected from a vehicle driving through the test bed. He noted that the Detroit Test Bed is unique, because an urban test bed environment does not exist anywhere else (test beds in Orlando, Palo Alto, Novi, and Ann Arbor are all more suburban, open areas). The Detroit Test Bed provides features, such as an "urban canyon" and the tunnel under the Millinder Center, that will challenge the existing technologies. The outcomes of such testing have unique value to future connected vehicle applications.

The meeting concluded with a tour of the COMTEC facility. In addition to the main room containing COMTEC's 20 foot by 50 foot video wall, the facility contains the original traffic operations center, which is used for training purposes and labs to test and repair equipment. More information can be found in the COMTEC pamphlet, which was handed out during the tour (see handouts section of this meeting packet).

MICHIGAN CONNECTED AND AUTOMATED VEHICLE WORKING GROUP

ATTENDANCE LIST

First	Last	Organization	Email
John	Abraham	Macomb County	jabraham@rcmcweb.org
Jim	Barbaresso	HNTB	jbarbaresso@hntb.com
Dick	Beaubien	Beaubien Engineering	rfbeaubienpe@gmail.com
Michael	Blicher	Autotalks	mike.blicher@auto-talks.com
Valerie	Brugeman	CAR	vbrugeman@cargroup.org
Patrick	Brunett	Cohda Wireless America	patrick.brunett@cohdawireless.com
Bowen	Chen	University of Michigan	chenboli@umich.edu
Jonathan	Coleman	URS Corporation	jcoleman@rcmcweb.org
Steve	Crain	Integral Blue	stevecrain@integral-blue.com
Joshua	Cregger	CAR	jcregger@cargroup.org
Brian	Daugherty	Visteon	bdaughe1@visteon.com
Danielle	Deneau	RCOC	ddeneau@rcoc.org
Eric Paul	Dennis	CAR	epdennis@cargroup.org
Jennifer	Dukarski	Butzel Long	dukarski@butzel.com
Angela	Fortino	DRC	afortino@detroitchamber.com
Aaron	Galbraith	Vector CANtech, Inc.	aaron.galbraith@vector.com
Shari	Herman	Siemens	shari.herman@siemens.com
Bradley	Heuft	Mitsubishi Motors	bradley.heuft@na.mitsubishi-motors.com
Colleen	Hill-Stramsak	HRC	chill@hrc-engr.com
Robert	Hoepfner	Macomb County	bhoepfner@rcmcweb.org
Morrie	Hoevel	FHWA - MI Division	morris.hoevel@dot.gov
Qiang	Hong	CAR	qhong@cargroup.org
Ahmad	Jawad	RCOC	ajawad@rcoc.org
Jack	Johns	Macomb County	jack.johns@macombgov.org
Greg	Krueger	Leidos	gregory.d.krueger@leidos.com
Barb	Land	Square One	barb@squareonenetwork.org
Jun	Lin	Vector CANtech, Inc.	jun.lin@vector.com
Bernd	Luebben	Cohda Wireless	bernd.luebben@cohdawireless.com
Michele	Mueller	MDOT	muellerm2@michigan.gov
Frank	Perry	Leidos	frank.perry@leidos.com
Gary	Piotrowicz	RCOC	gpiotrowicz@rcoc.org
Kunwar	Rajendra	MSU	rajendr2@msu.edu
Stan	Richard	Integral Blue	srichard@integral-blue.com
Anne	Rogers	Minacs	anne.rogers@minacs.com
Jim	Salter	Persis Consulting Co.	jsalter@persisconsulting.com
Frank	Sgambati	Robert Bosch LLC	frank.sgambati@us.bosch.com
Bill	Shreck	MDOT	shreckw@michigan.gov
Andrew	Sivulka	ADS Tech Solutions	andrew.sivulka@gmail.com
Matt	Smith	MDOT	smithm81@michigan.gov
Amine	Taleb	Valeo	amine.taleb@valeo.com
Bill	Tansil	MDOT	tansilw@michigan.gov
Steve	Verkest	Integral Blue	steveverkest@integral-blue.com
Mike	Wroblewski	URS	mike.wroblewski@urs.com

**MICHIGAN CONNECTED AND AUTOMATED VEHICLE WORKING GROUP
HANDOUTS**



#ITSWC14



Join us for the 21st ITS World Congress
"Reinventing Transportation in our Connected World"

Sept. 7-11, 2014 | Detroit, Michigan | www.itsworldcongress.org

ITS America is proud to host the 2014 World Congress on Intelligent Transport Systems, September 7-11, 2014 in partnership with ERTICO-ITS Europe and ITS Asia-Pacific.

Featuring ITS America's Annual Meeting and Exposition, the 2014 ITS World Congress will host interactive technology showcases with live demonstrations on Michigan's Belle Isle, more than 250 programmatic panels, roundtables, and interactive town hall sessions, a 350,000 square-foot exhibit area in the newly refurbished Cobo Hall, as well as numerous networking events with transportation and technology leaders from across the world. We'll see you in Detroit!

April 1, 2014

Early bird registration opens.

June 16, 2014

Full price registration begins.

For more information, contact:

Sponsorship

Valerie Forbai
vforbai@itsa.org
202.721.4205

Exhibit Sales

Carly DiVito
carly@corcexpo.com
312.541.0567

Program

Morgan Ouellette
mouellette@itsa.org
202.721.4215

Hosted by:



Co-Hosts:



Fueling the Transformation in Tech & Transport

The global transportation market is expecting exponential growth.



Grand Opening

543,000 new businesses are created each month in the U.S.

Michigan is the fastest growing state for venture capital investments.



Companies in their first five years of life account for virtually all net growth in the U.S. economy.



Micro firms (firms with 1-4 employees) account for an average of 20% percent of new jobs.



More than 50% of the working population, or 120 million individuals, work in a small business.



DETROIT 2014

INTELLIGENT TRANSPORT SYSTEMS

Transportation for Tomorrow: Investors and Inventors

The 2014 World Congress on Intelligent Transport Systems brings together leading transportation policymakers, researchers, high-tech innovators, and business professionals from around the globe to share the latest ITS solutions.

This year's ITS World Congress will highlight the best and brightest innovators and game changers in the transportation industry.

Showcase your company on the exhibit floor, or pitch your ideas to a panel of premier financial investors.

Get Involved

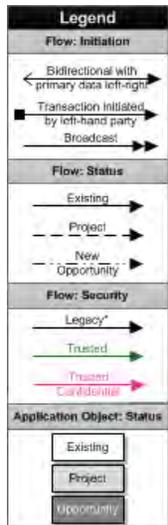
www.itsworldcongress.org/investormatching

Bring your best pitch, and meet us in Detroit, Michigan, September 7-11, 2014.

#ITSWC14

www.itsworldcongress.org

Hosted by: ITS AMERICA



*Legacy flows may be trusted or made confidential by existing means, but are not secured using the SCMS

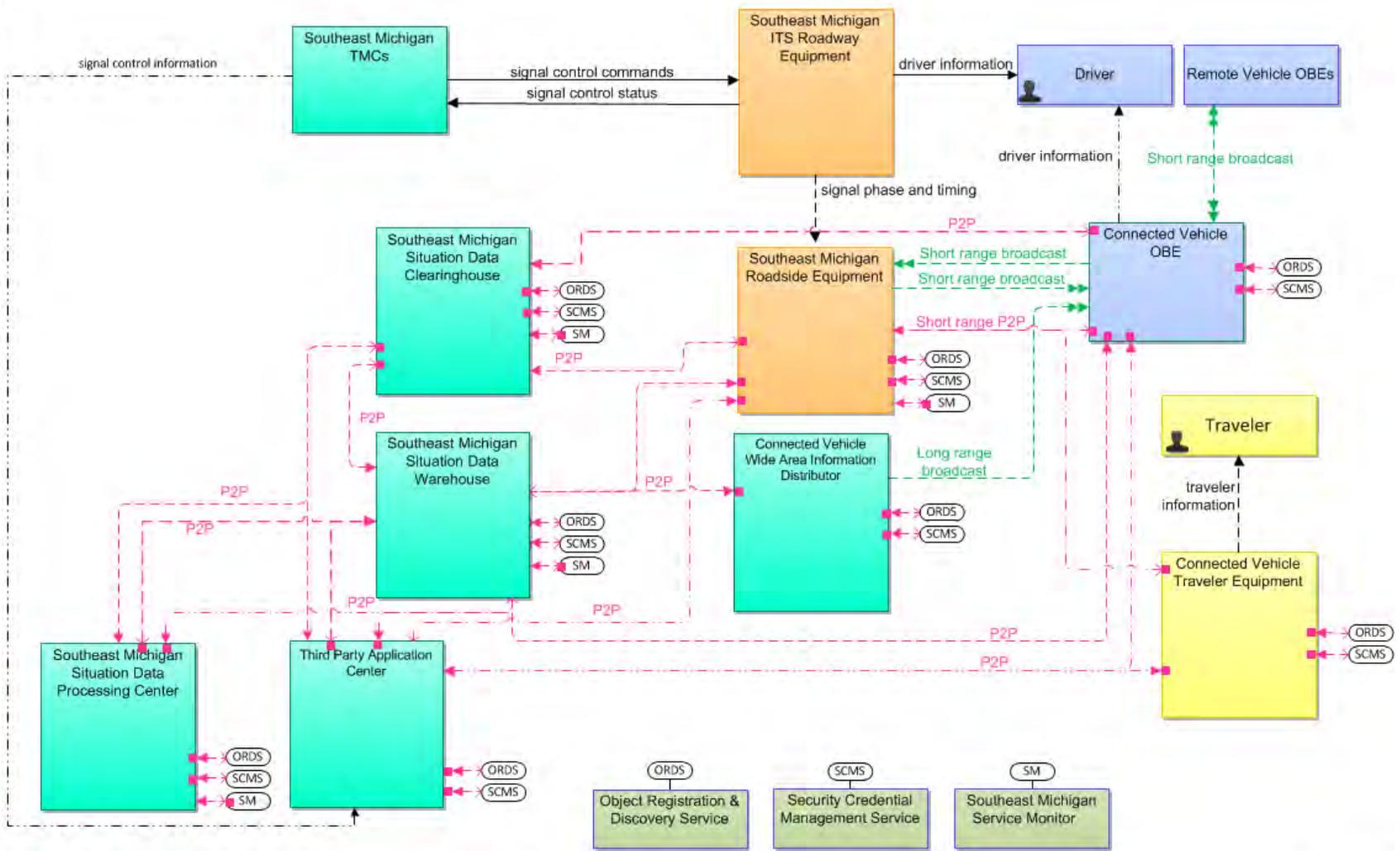




Photo Source: USDOT

CONNECTED VEHICLE PILOT DEPLOYMENT PROGRAM



The U.S. Department of Transportation's (USDOT's) connected vehicle research program is a multimodal initiative to enable safe, interoperable, networked wireless communications among vehicles, infrastructure, and personal communications devices. The USDOT and others are researching connected vehicles because of the potentially transformative capabilities of the technology to make surface transportation safer, smarter, and greener. Federal connected vehicle research has produced a considerable body of work to support pilot deployments, including concepts of operations and prototyping for more than two dozen applications. Concurrent federal research efforts are developing critical cross-cutting technologies and other enabling capabilities required to integrate and deploy applications.

Based on the successful results of the connected vehicle research program, and the recent decision by the National Highway Traffic Safety Administration to pursue vehicle-to-vehicle communications safety technology for light vehicles, the USDOT is pursuing a robust Connected Vehicle Pilot Deployment Program. This program will serve as a mechanism to expedite the implementation of connected vehicle technology. The pilots will be initial deployments of connected vehicle technology in real-world settings with the aim of delivering near-term safety, mobility, and environmental benefits to the public.

Vision

The Connected Vehicle Pilot Deployment Program seeks to spur innovation among early adopters of connected vehicle application concepts, using best available and emerging technologies. The pilot deployments are expected to integrate connected vehicle research concepts into practical and effective elements, enhancing existing operational capabilities. The intent of these pilot deployments is to encourage partnerships of multiple stakeholders (e.g., private companies, states, transit agencies, commercial vehicle operators, and freight shippers) to deploy applications using data captured from multiple sources (e.g., vehicles, mobile devices, and infrastructure) across all elements of the surface transportation system (i.e., transit, freeway, arterial, parking facilities, and tollways) to support improved system performance and enhanced performance-based management.

The pilot deployments will support an impact assessment and evaluation effort that will inform a broader cost-benefit assessment of connected vehicle concepts and technologies. Pilot deployments offer an opportunity for stakeholders and partners to develop operational systems that exist well beyond the life of the program.

SAMPLE APPLICATIONS

Please visit the Connected Vehicle Pilot Deployment Program website for a complete list of connected vehicle applications.

Mobility

- Speed Harmonization and Queue Warning
- Multi-Modal Intelligent Traffic Signal System
- Dynamic Transit Operations
- Freight Traveler Information Systems
- Response, Emergency Staging, Communications, Uniform Management, and Evacuation
- EnableATIS

Environment

- Eco-Approach and Departure at Signalized Intersections
- Eco-Traffic Signal Timing
- Eco-Speed Harmonization

Vehicle-to-Infrastructure Safety:

- Red Light Violation Warning
- Curve Speed Warning
- Stop Sign Gap Assist
- Reduced Speed/Work Zone Warning
- Smart Roadside

Vehicle-to-Vehicle Safety

- Emergency Electronic Brake Lights
- Forward Collision Warning
- Intersection Movement Assist

Agency Operations

- Probe-based Pavement Maintenance
- Probe-enabled Traffic Monitoring
- Vehicle Classification-based Traffic Studies

Road Weather

- Enhanced Maintenance Decisions Support System
- Vehicle Data Translator
- Weather Responsive Traffic Information



U.S. Department of Transportation

Proposed Program Schedule

The Connected Vehicle Pilot Deployment Program envisions a procurement action for multiple pilot deployments with an initial wave starting in calendar year 2015 (See Table 1). Before an initial wave of pilot deployments are selected, the Intelligent Transportation Systems Joint Program Office (ITS JPO) will host a series of outreach activities including workshops, meeting briefings, and webinars. Please check the ITS JPO and Connected Vehicle Pilot Deployment Program websites for upcoming outreach activities.

TABLE 1 Proposed Connected Vehicle Pilot Deployment Schedule

Schedule Item	Date
Regional Pre-Deployment Workshop/ Webinar Series	Summer–Fall 2014
Solicitation for Wave 1 Pilot Deployment Concepts	Early 2015
Wave 1 Pilot Deployments Award(s)	September 2015
Solicitation for Wave 2 Pilot Deployment Concepts	Early 2017
Wave 2 Pilot Deployments Award(s)	September 2017
Pilot Deployments Complete	September 2020

Focus of Pilot Deployments

The pilot deployments should address the following research questions:

- Can connected applications be successfully deployed as a part of operational practice, leveraging vehicles and mobile devices (in the vehicle or outside of the vehicle) both as data sources and application platforms?
- Can system productivity, environmental impact, traveler mobility, and transportation safety be measured and enhanced in innovative and meaningful ways by combining existing and emerging mobile data sources (e.g., by using vehicles and mobile devices as data sources)?
- To what extent can connected vehicle technologies and data be used to support real-time, performance-based management of roadways, transit systems, and freight carriers?
- What are the institutional, legal, and technical issues that may help or hinder the use of connected vehicle technologies?
- What wireless and other communications media can be combined to make large-scale data capture and mobility applications cost effective?

- How can diverse data sources be efficiently integrated and used?
- Can customer satisfaction with demonstrated applications be measured?
- Are state and local agencies prepared to implement and maintain connected vehicle technologies?
- How effective is a security credential management system in enabling connected vehicle communications?

How to Get Involved

This is an opportunity for your community to be on the cutting edge of new technology. But start planning now, because there will be a limited time to submit proposals.

The following are some key resources to help you prepare for the Connected Vehicle Pilot Deployment Program:

- Learn more about the program:
 - Review briefing materials presented at recent workshops and public meetings on the Connected Vehicle Pilot Deployment Program
 - Visit the program’s website: www.its.dot.gov/pilots
 - Contact the USDOT with questions
- Form partnerships and identify needs, such as:
 - Create partnerships with transit agencies, neighboring jurisdictions, traveler information service providers, private sector device and equipment manufacturers, local trucking firms, state and local roadway operators, and advocacy groups (among other potential stakeholders)
 - Identify the highest-priority needs across the community partners (mobility, safety, and environmental)
- Assess connected vehicle technologies and applications:
 - Match community needs to connected vehicle applications
 - Consider the potential benefit of an integrated deployment of two or more applications in your community
 - Create a pilot deployment concept that community stakeholders support in preparation for the first wave of deployment solicitations in early 2015. Use of the Connected Vehicle Reference Implementation Architecture (CVRIA) to construct project architectures is encouraged. Please visit www.iteris.com/CVRIA/ for tools and information.

For more information about this initiative, please contact:

Kate Hartman, Connected Vehicle Pilot Program Lead
ITS Joint Program Office | (202) 366-2742 | kate.hartman@dot.gov | www.its.dot.gov

Or, visit the following websites:

Connected Vehicle Pilot Deployment Program Website: www.its.dot.gov/pilots
ITS JPO Website: www.its.dot.gov/

COMTEC allows four Macomb County departments to be strategically placed and partnered within the same building:

Macomb County Department of Roads

Traffic Operations Center (TOC) staff are responsible for addressing traffic signal service requests from motorists and stakeholders as well as operating and maintaining the Intelligent Transportation Systems (ITS) communication network.

Macomb County Emergency Management

The Office of Emergency Management serves as an advisor or coordinator to ensure that all phases of Emergency Management are addressed by the participating jurisdictions/organizations.

Macomb County Sheriff Dispatch

Sheriff dispatch staff answer 911 calls and dispatch emergency personnel for the following jurisdictions: Mount Clemens, Village of New Haven, Clinton, Bruce, Lenox, Harrison, Macomb, Armada and Washington Townships.

COMTEC also has space for growth to support the dispatch function of other agencies who may also find value in utilizing the many COMTEC resources.

Macomb County Information Technology

Information technology implementation and support for County departments are provided by the Macomb County Information Technology team.

WHAT DOES COMTEC PROVIDE?

COMTEC provides:

- ⇒ County-wide Emergency Operations Center (EOC)
- ⇒ 20' x 50' video wall accessible to the Roads Department, Sheriff's Dispatch and the EOC
- ⇒ Eight (8) traffic monitoring stations
- ⇒ 25 Sheriff and police dispatch stations
- ⇒ Centralized County IT data center
- ⇒ Emergency generator backup power
- ⇒ Computer lab/training room facility
- ⇒ Integrated communications and technologies (radio/voice/data/video)

For more information visit:
comtec.macombgov.org



117 South Groesbeck Highway
Mount Clemens, MI 48043
(586) 493-6700

**MACOMB COUNTY
COMMUNICATIONS & TECHNOLOGY
CENTER**



**MACOMB COUNTY
DEPARTMENT OF ROADS
TRAFFIC OPERATIONS
CENTER**



COMTEC FACTS

COMTEC opened in late 2013 and is a 25,000 square-foot state-of-the-art facility that provides 24/7 situational awareness for the county's residents, businesses and first responders.

COMTEC goals:

- ⇒ Making optimum use of the county's roadway system by employing effective roadway management techniques
- ⇒ Making efficient use of each agency's resources
- ⇒ Providing a safe environment for transportation users
- ⇒ Keeping roadways clear to maintain mobility for not only first responders but also the general public



TOC FUNCTIONS

Under the direction of the Macomb County Department of Roads (MCDR), the Traffic Operations Center (TOC) serves as the centralized hub of activity for operation, maintenance and monitoring of the various countywide deployments of advanced traffic signal systems, cameras and the countywide Intelligent Transportation System (ITS) communications network including, but not limited to, real-time monitoring of traffic operations (planned and unplanned events), traffic flow, signal operations and special event traffic coordination.

The mission of the TOC is accomplished by working together and sharing resources, such as the video wall, with Emergency Management, Sheriff Dispatch, and other stakeholders.

TOC MISSION

The Macomb County Department of Roads (MCDR) Traffic Operations Center (TOC) is to provide and maintain a reliable real-time traffic operations system which is operated from a joint facility in coordination with stakeholders to deliver a safe, efficient and informative traveling experience to the public.

TOC FACULTIES

Traffic operations engineers, operations technicians, and Information Technology (IT)/ITS technicians work together at the TOC to efficiently and effectively operate the Macomb County road network.



Two labs are located on the premises and utilized by the TOC staff: the ITS test lab and the auxiliary traffic signal lab. The traffic signal lab is utilized to test traffic signal timings in a clean, controlled environment prior

to implementing in the field. The ITS lab is utilized to test ITS equipment such as cameras, radios, antennae and port switches.

TOC accomplishments and initiatives:

- ⇒ 6AM–6PM weekday operations
- ⇒ Standard operating procedures
- ⇒ Construction coordination meetings
- ⇒ Monthly performance measures reports
- ⇒ Employee training plan and certification
- ⇒ Real-time traffic management
- ⇒ Network analysis and optimization

**MICHIGAN CONNECTED AND AUTOMATED VEHICLE WORKING GROUP
PRESENTATIONS**

Michigan Connected and Automated Vehicle Working Group

Macomb County COMTEC

Mount Clemens, MI

July 10, 2014

Agenda for This Afternoon

- 1:00 PM Introductions, Valerie Brugeman and Qiang Hong, CAR
- 1:10 PM Welcome to and Overview of COMTEC, John Abraham, Traffic Operations Manager, Macomb County Department of Roads
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- 4:00 PM Adjourn

Working Group Mission

- Cooperatively pursue projects and other activities that are best accomplished through partnerships between multiple agencies, companies, universities, and other organizations and that ultimately advance Michigan's leadership position in connected and automated vehicle research, deployment, and operations.
 - Benefit our state and our industry (automotive and more)
 - Enhance safety and mobility in Michigan and beyond

Noteworthy News

- In light of NHTSA V2V announcement in February 2014, UMTRI and partners announce plans to expand Safety Pilot
 - <http://www.mlive.com/news/ann-arbor/index.ssf/2014/04/transportation.html>
- University of Michigan breaks ground on Mobility Transformation Center with six initial industry partners announced (GM, Ford, Toyota, Bosch, Xerox, and Econolite)
 - <http://www.mtc.umich.edu/>
- Google has announced plans to have 100 self-driving vehicles built by Roush in Michigan. These will be neighborhood electric vehicles and have no brake pedal, steering wheel, or accelerator pedal.
 - <http://www.autonews.com/article/20140528/OEM06/140529864/roush-tapped-to-build-googles-autonomous-prototypes-sources-say>
- California has promulgated more details of its automated vehicle testing rules.
 - <http://www.engadget.com/2014/05/21/california-autonomous-regulations/>

Upcoming Connected and Automated Vehicle Events

- TRB/AUVSI Automated Vehicle Symposium, July 15-17, San Francisco Airport
- CAR Management Briefing Seminars, August 4-7, 2014, Acme, MI
- 2014 ITS World Congress, September 7-11, 2014, Detroit, MI
- CVTA Summit on the Future of the Connected Vehicle, September 10-11, Detroit, MI
- SAE Convergence, October 21-22, Detroit, MI
- Telematics West Coast, October 30-31, San Diego, CA
- Connected Fleets, November 20-21, Atlanta, GA
- Annual Meeting of the Transportation Research Board, January 11-15, 2015, Washington, D.C.
- Automotive World Megatrends, March 17, 2015, Dearborn, MI

Macomb County ITS WC Dinner Cruise

- The Macomb County Dinner Cruise will pick up guests at the Detroit Port Authority located minutes from the Cobo Center. Guests will experience an unforgettable three-hour cruise up the Detroit River to Lake St. Clair as they learn more about our region and international waterways. Guests will be able to network, enjoy dinner, listen to Motown blues and experience the fabulous views.
- **Date:** Monday, 8 September
- **Price:** \$125
- **Board Time:** 6:30 p.m. **Cruise Time:** 7:00 pm – 10:00 pm
- **Meals(s) Provided:** Dinner
- **Participant Requirements:** 300 maximum
- For more information, contact: Vicky Rad vicky.rad@macombgov.org

MACOMB COUNTY COMMUNICATIONS & TECHNOLOGY CENTER



MACOMB COUNTY DEPARTMENT OF ROADS

TRAFFIC OPERATIONS CENTER

W E L C O M E !!

Macomb County Department of Roads



“..dedicated to providing the public with a quality county road system, with a focus on safety and convenience for motorists and the community, environmental responsibility, and financial accountability..”

- Maintains more than 1,700 miles of roads
- Maintains more than 900 traffic signals
- Maintains more than 60,000 signs

COMTEC'S HISTORY



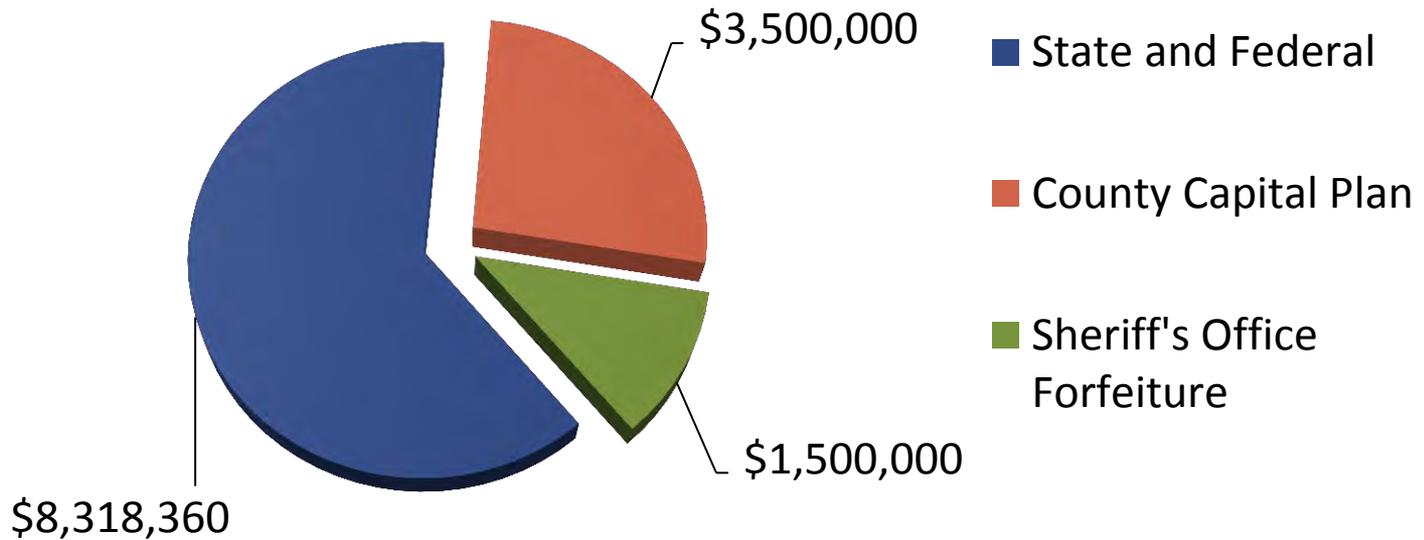
- Concept to reality
- Fast-track design and construction
- Maximizing services-sharing technology & resources
- Stakeholder efforts
 - Emergency Management, Public Safety, the Department of Roads and IT services
- Project results:
 - On time
 - Under budget
- Grand Opening: December 2013



FUNDING SOURCES



Construction funding provided by three main sources:



EXECUTIVE SUPPORT



“COMTEC integrates Emergency Management, public safety, the Department of Roads [TOC] as well as IT services under one roof. This one-of-a-kind, state-of-the-art facility is a model of intergovernmental cooperation and today this vision has become a reality.”

Mark A. Hackel
Macomb County Executive



TOC ACCOMPLISHMENTS



- 6AM – 6PM Weekday Operations
- Standard Operating Procedures
- Performance Measure Reports
- Construction Coordination
- Traffic Management:
 - Unplanned Events
 - Planned Events



Macomb County Department of Roads
Traffic Operations Center

Standard Operating Procedures

Prepared for:

Prepared by:

The complex block contains a title, two photographs (exterior and interior of the center), a sub-header for "Standard Operating Procedures", two more photographs (workers and traffic lights), and two logos at the bottom.

CONNECTED AND AUTOMATED VEHICLE WORKING GROUP

July 10, 2014

Jim Barbaresso, Vice President, HNTB
Chair of the 2014 ITS World Congress

www.itsworldcongress.org | #ITSWC14





Reinventing Transportation in our Connected World

Cobo Center

September 7-11, 2014

www.itsworldcongress.org | #ITSWC14

ITS AMERICA

ERTICO
ITS EUROPE



Pillars of the World Congress

- Technical Program
- Special Features
- Exhibition at Cobo Center
- Networking Events
- Technical Tours
- Technology Showcase

www.itsworldcongress.org | #ITSWC14



Time	Saturday 9/6	Sunday 9/7	Monday 9/8	Tuesday 9/9	Wednesday 9/10	Thursday 9/11
7:00 AM						
7:30 AM			Legislative Breakfast	ITS America Award Breakfast	Innovation Breakfast	
8:00 AM	Registration		Plenary (Ford)	Plenary (Verizon)	General Sessions	General Sessions
8:30 AM		America's Rep to WCBOB Meeting		Break: 10:00-10:15 Ribbon Cutting: 10:15-10:30	Break	Break
9:00 AM				General Sessions	General Sessions	General Sessions
9:30 AM				Lunch	General Sessions	General Sessions
10:00 AM				C.T.O. Summit Plenary	Lunch	Lunch
10:30 AM					WTS Lunch	Town Hall Session
11:00 AM		WC BOD Meeting		Break	General Sessions & CTO Session	General Sessions
11:30 AM				General Sessions	Break	Break
12:00 PM				General Sessions	US DOT Plenary	General Sessions
12:30 PM				Break	Incident Management	General Sessions
1:00 PM			General Sessions	General Sessions	General Sessions	
1:30 PM			Exhibitors Welcome & Regional Receptions in Exhibit Hall	ITS Michigan & MEDC-Sponsored Michigan Festival	General Sessions	
2:00 PM					General Sessions	
2:30 PM					General Sessions	
3:00 PM					General Sessions	
3:30 PM					General Sessions	
4:00 PM					General Sessions	
4:30 PM					General Sessions	
5:00 PM					General Sessions	
5:30 PM					General Sessions	
6:00 PM					General Sessions	
6:30 PM					General Sessions	
7:00 PM					General Sessions	
7:30 PM					General Sessions	
8:00 PM					General Sessions	

PROGRAM AT A GLANCE

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Program Highlights

- Opening & Closing Ceremonies
- State DOT & Ministerial Roundtable
- Chief Technology Officer Summit
- U.S. DOT Plenary
- Town Hall Sessions
- Keynotes by:
 - Bill Ford, Ford Motor Company
 - Lowell McAdam, Verizon
 - Kirk Steudle, Michigan DOT
 - Rodney O'Neal, Delphi
 - Rob Slimp, HNTB



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Program Summary

- More than 250 total sessions
 - Special Interest Sessions – 93
 - Technical/Scientific Sessions –
 - More than 600 papers reviewed and accepted
 - 119 technical sessions
 - ITSA, IBEC, Middle East, Africa & Pan American Sessions

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Special Features

- Transportation for Tomorrow – Inventors and Investors Program
- “Youth Connections” Activities
- Legislative Breakfast
- Michigan Senate Transportation Committee hearing
- Awards Presentations

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Fueling the Transformation in Tech & Transport

The global transportation market is expecting exponential growth.

2013	2018
\$28.09 billion	\$57.46 billion

Grand Opening

543,000 new businesses are created each month in the U.S.

Michigan is the fastest growing state for venture capital investments.



Companies in their first five years of life account for virtually all net growth in the U.S. economy.



Micro firms (firms with 1-4 employees) account for an average of 20% percent of new jobs.

Help Wanted



More than 50% of the working population, or 120 million individuals, work in a small business.



DETROIT 2014
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ER Day at the 2014 ITS World Congress

This September in Detroit, Michigan, more than 10,000 of the world's leading transportation professionals from around the world will gather at the 21st World Congress on Intelligent Transport Systems with the goal of bringing greater levels of safety, efficiency, sustainability and connectivity to transportation systems worldwide.

As part of this program, emergency responders from across the country have been invited to participate in special events held **Tuesday, September 9**. These events will serve to highlight the latest transportation technology available to our emergency responders.



September 7-11, 2014

Detroit, Michigan

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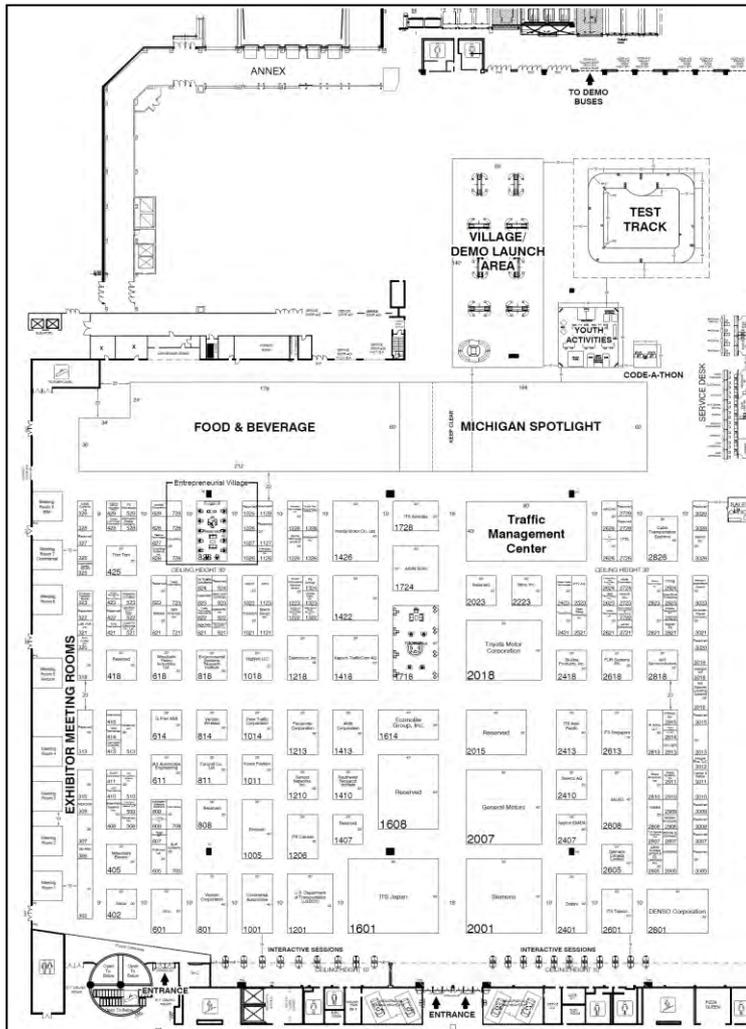
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Exhibition

- Themed pavilions
 - “Youth Connections”
 - “Entrepreneurial Village”
 - “New Mobility”
- Theater for special announcements and awards in the Cobo Atrium
- Indoor track for youth challenges
- Multi-modal, next generation TMC
- Technology Showcase launch pavilion



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Exhibition

- Wayne and Oakland Halls reserved
- >300,000 gross square feet
- 95% of space sold or on hold

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Opening Ceremony & Reception



- Cobo Center Riverview Ballroom
- Sunday, September 7th
- Featured Speakers
- Entertainment
- Networking Opportunities

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Macomb County Dinner Cruise



Monday, September 8, 7-10PM

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MICHIGAN FESTIVAL



“FLAVOR OF MICHIGAN”

- Belle Isle, Tuesday, September 9th
- Demonstrations
- Special Events

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World Congress Gala



- Cobo Center
- Wednesday, September 10th
- Food and Beverages
- Entertainment by the Contours
- Networking

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Technology Showcase Planning Update July 10, 2014



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Three Main Groups...

- Belle Isle
 - Static and Dynamic Demonstrations, Taste of Michigan Festival, Emergency Responders Day
- Atwater Parking Lot
 - Ride-N-Drive Demonstrations
- Cobo Hall
 - Launch Area, TMC Showcase, Youth Connections, Indoor Track

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Belle Isle

- 24 Different Demonstrations
- Variety of experiences
 - Static, watch-n-learn, hands-on, ride-on
 - Connected vehicles, autonomous vehicles, ITS advancements, tolling technology
 - Schedule in advance, in Cobo Hall, or on-site (if available)

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Emergency Responders

- Tuesday Sept 9, 2014
- Large-scale incident mock-up including truck roll-over, multi-agency response, and medi-flight landing
- Kicks-off the Taste of Michigan Festival

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Taste of Michigan Festival

- DJ
- Cass Tech Marching Band
- Michigan-based beer/wine tasting
- Food trucks with various Michigan-centric food tasting
- Networking
- Demonstrations
- Busses bring people from Cobo
- Busses go to hotels after event
- Attendees get tickets with registration, plus can purchase additional tickets at event

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Atwater Parking Lot

- 10 Demonstrations
- Next to RenCen
- Staging area for all Ride-N-Drive Demonstrations that utilize streets and freeways in and around Detroit
- NextEnergy Center, Toyota, Honda, BMW/GEWI, Delphi, and Peloton
- NextEnergy has multiple demonstrations at their nearby facility, Peloton has large trucks,

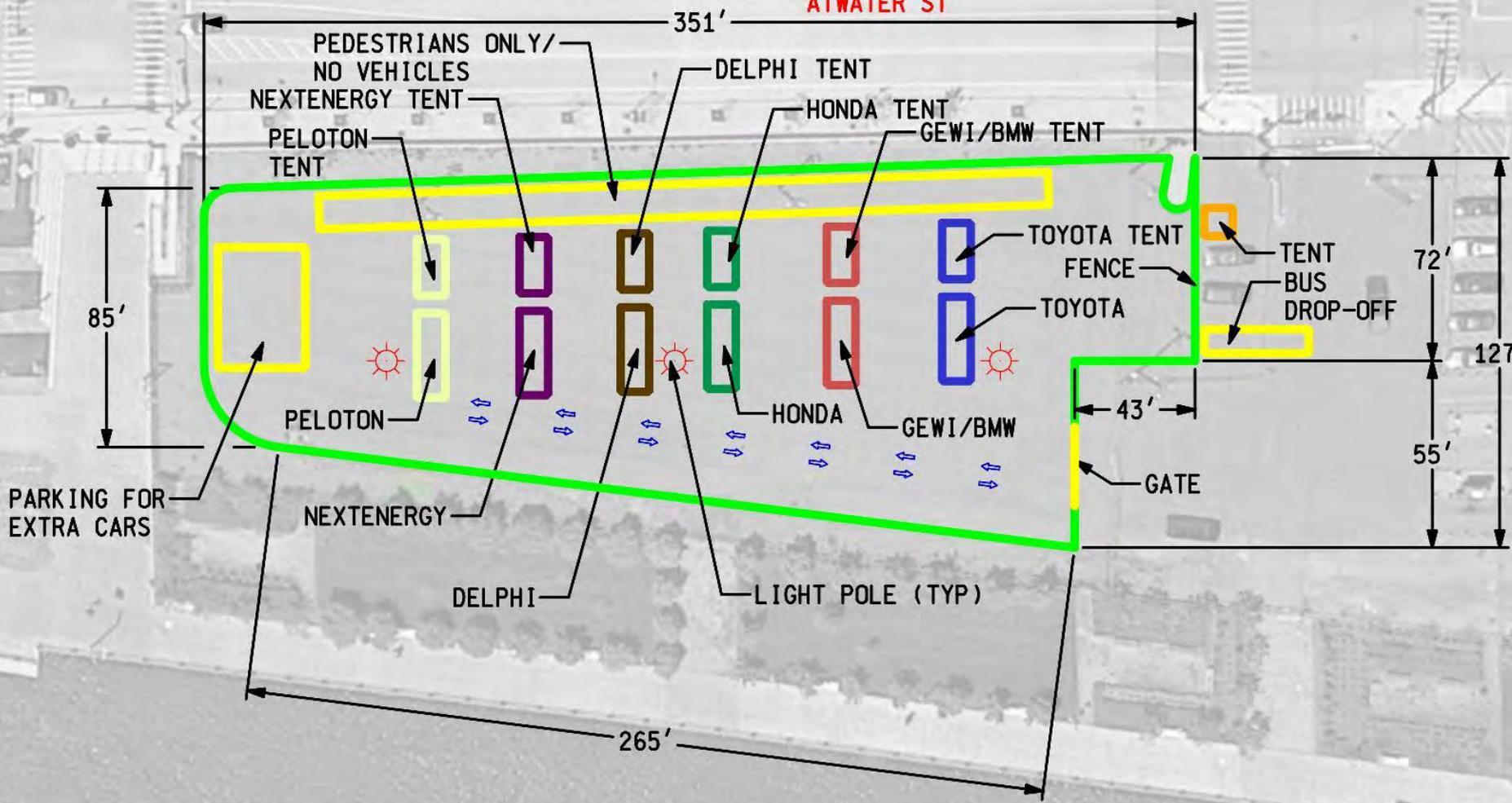
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BEAUBIEN ST

ST ANTOINE ST

ATWATER ST



Shuttle Bus

- Shuttle buses will run between Cobo Hall, Atwater Street Parking Lot and Belle Isle throughout the conference.
- Anyone riding the shuttle buses will need to be badged for the event
- Additional staff transportation shuttles will be provided before and after operating hours

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Shuttle Bus Route



Shuttle Bus Route (zoom in)



Launch Area in Cobo Hall

- Each demonstrator is provided a launch kiosk at Cobo Hall
- Opportunity to learn more about demonstrations and (if available) ask questions of representatives
- Central registration area for on-site registration and to view available time slots on big screen

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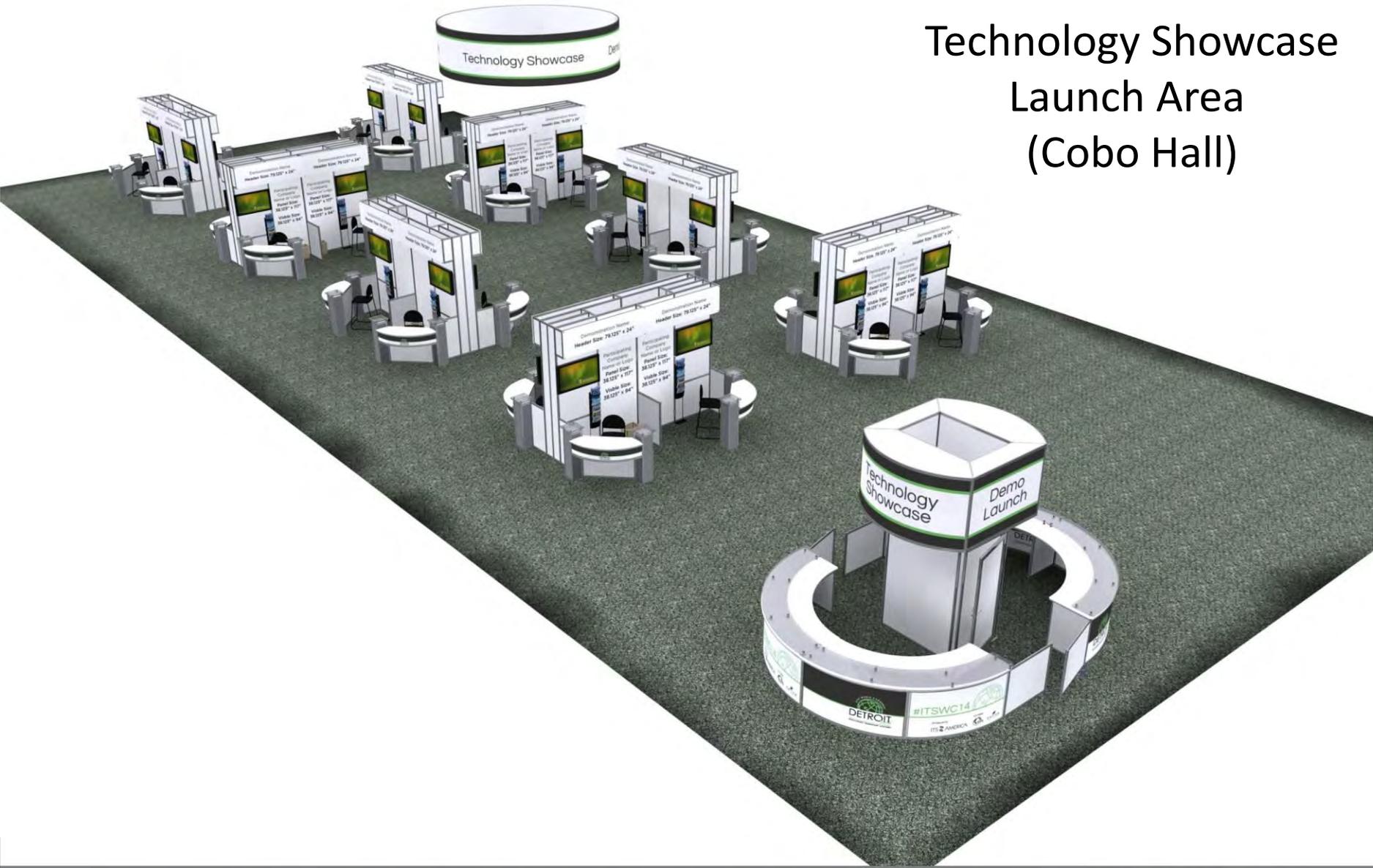
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Technology Showcase Launch Area (Cobo Hall)



Designer: Amanda Lembke

Project : ITS 2014 / 273184 / Tech Showcase-Village-Demo Launch
Event Location / Date : Cobo Conference Center, 9.7 - 9.11.2014
Revised on May 28, 2014

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F R E E M A N

TMC Showcase

- Mix of live & staged operations
- Interactive attendee area in middle
- Partners include:

Michigan DOT

Michigan State Police

Amtrak

Michigan Tech Univ

Alfred Benesch

Blue Water Bridge

Ministry of Transport (Ontario)

Detroit-Windsor Tunnel

Oakland County

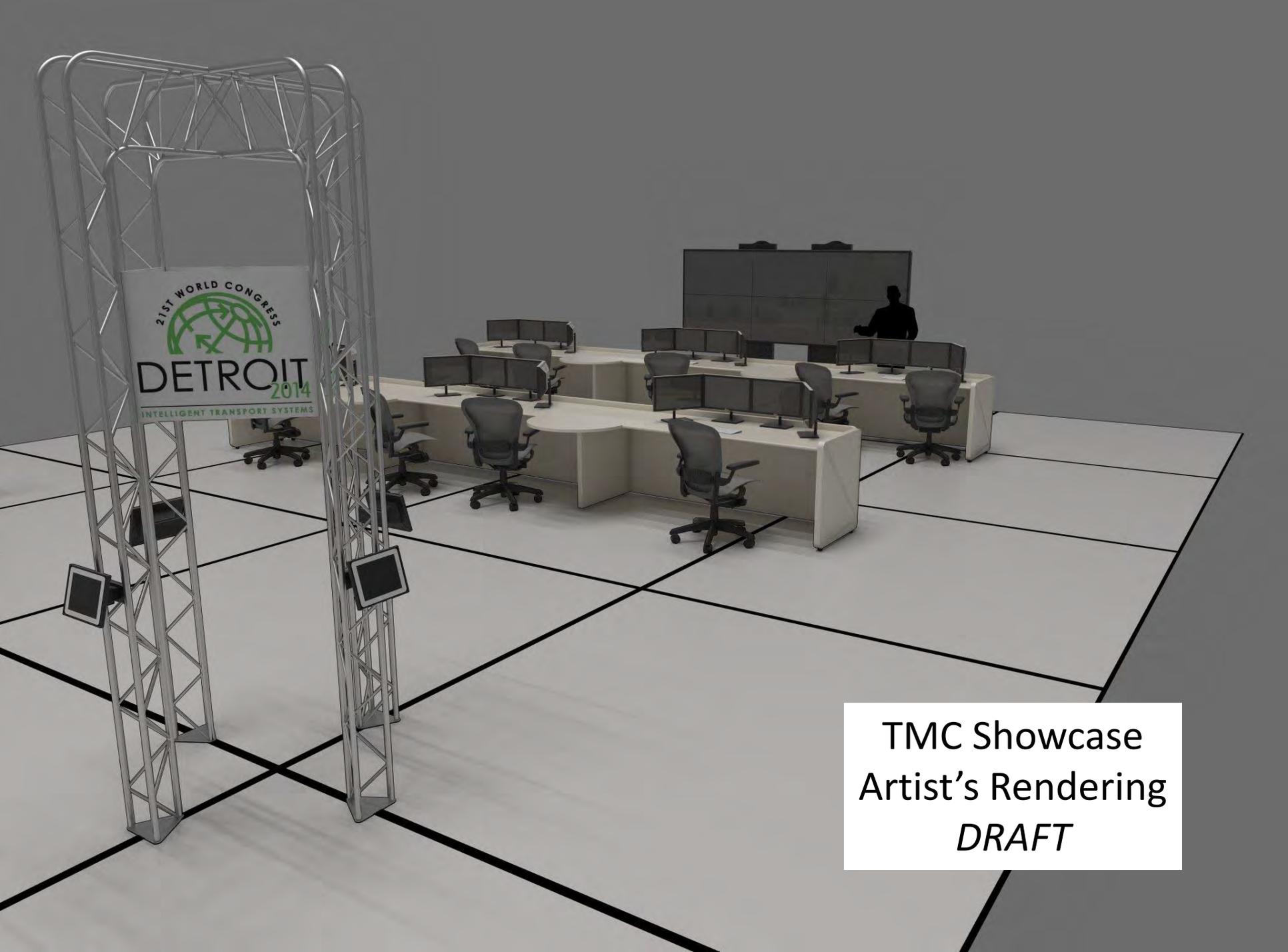
Macomb County

Wayne County

City of Detroit

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TMC Showcase
Artist's Rendering
DRAFT

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Explore www.itsworldcongress.org

The screenshot shows the website header with the Detroit 2014 logo, the date 'SEPTEMBER 7-11, 2014', and social media icons for Facebook, Twitter, LinkedIn, and YouTube. A search bar is also present. Below the header is a navigation menu with links for REGISTER, PROGRAM, EXHIBIT, SPONSOR, TRAVEL, NEWS, ABOUT, and PROGRAM SUBMISSIONS. The main content area features a large video player with a play button and the text 'THERE'S SOMETHING ABOUT A COMEBACK...'. To the right of the video is a 'NEWSLETTER SIGN-UP' form with input fields for 'FIRST NAME', 'LAST NAME', and 'EMAIL', and a green 'SIGN-UP' button.

A horizontal timeline with three date markers: 'JAN 8 Best of ITS Nominations Open', 'JAN 15 Draft Scientific and Technical Papers Due', and 'JAN 15 Special Interest Session Proposals Due'.

See you in September!

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Karl Klimek: Square One Education Network

UPDATE FROM YOUTH CONNECTIONS SHOWCASE

Strategic Objectives:

- Showcase the talent of Michigan Youth to the World
- Introduce 1,000 youth to Intelligent Transportation technology
- Create a replicable model of youth involvement for future ITS World Congress Events

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Youth Connection Pillars of Focus

Developing Technology AND Talent that is...

○ Innovative

- Innovative tools and people will lead this industry

○ Connected

- The technology and the people working with it will be connected in expected and unexpected ways

○ Mobile

- Mobile technologies will be created by globally mobile talent

○ Inspiring

- The technologies and the talent will be inspiring beyond our imagination

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Update:

Registration for Michigan High School and College students is **underway**: www.squareonenetwork.org

Please feel free to promote involvement at area schools.

Code-a-thon will be held Sep. 6 & 7 at



Sponsorships are going **fast**...details are available through ITS America

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Competing Student Teams

Innovative Connected-Electric Vehicles:

William D Ford Tech Center, Wayne-Westland
Berry Career Tech Center, Dearborn

Electric Vehicle Speed Build Challenges:

Cody High School, Detroit
Melvindale High School, Melvindale
Huron Technical High School, Bad Axe
Chippewa Valley
Oak Park High
Hazel Park High
Clinton High School, Clinton
Portage Central High School, Portage



Wireless Hands-On Applied

Mechatronics Demonstrations:

Waterford-Kettering High School, Waterford
Lakeshore High School
Lakeview High School
Armada Schools, Armada
Southeastern High School, Detroit
Chippewa Valley



College Code-A-Thon Challenge:

Hosted at Grand Circus
Presentations and Demos each day

Intelligent Ground Vehicle

Demonstrations

Oakland University
University of Michigan Dearborn
Lawrence Tech

MDOT TRAC Bridge and Mag-Lev competition:

Teams from across the State!



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The Competitions



INNOVATIVE VEHICLE DESIGN

the future starts with us
www.squareonenetwork.org



NANKIN
HARDWARE & HOBBY



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Needs:

Youth Connections Showcase Exhibit: Assistance with display

“Tour Stop” Interested Companies... Short visits by small groups of students – Share your connections to V2X

DENSO



Remaining Sponsorships!

Contacts:

Chair: Karl Klimek / 313-590-4000 / karl@squareonenetwork.org

Co-chair: Barb Land / 248-736-7537 / barb@squareonenetwork.org

Sponsorships: Len Becker / 313-549-1347 / lebecker@HNTB.com

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Michigan Connected and Automated Vehicle Working Group

- July 10, 2014
- Dick Beaubien, Beaubien Engineering
- Chair of the Local Arrangements Subcommittee

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ITS World Congress

Technical Tours – September 2014



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Monroe, Michigan PrePass Operations

- PrePass is a national deployment of ITS technology that allows safe and qualified commercial vehicles to bypass state weigh stations or inspection facilities.
- These carriers are prescreened and receive bypass or pull in signals via a transponder located in the cab of the truck.
- The technology, funded by HELP Incorporated, the non-profit public/private partnership, includes both weigh-in motion integration with an IRD WIM system and compliance readers to ensure proper bypass compliance.
- To date, trucks that have been e-cleared and pre-qualified for PrePass have completed 915,734 safe bypasses at Monroe, saving motor carriers more than \$7.9M.

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Monroe, Michigan PrePass Operations (cont)

- Also on display at Monroe will be the 360SmartView electronic screening system. 360SmartView provides officers with additional tools to make informed, data-driven inspection selection decisions. Utilizing license plate and DOT readers, officers can screen all commercial vehicles on over 20 safety and compliance factors.
- Michigan plans to expand its PrePass operations at Monroe with renovations to the southbound facility expected to begin in summer 2014.
- HELP Inc.'s PrePass service is North America's largest vehicle-to-infrastructure program, with over 470,000 trucks qualified to bypass 304 operational sites in 31 states.

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GM OnStar Call Center



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OnStar Command Center Tour

- The OnStar Command Center, located inside the General Motors World Headquarters at the Renaissance Center, is a 24/7, state-of-the-art operations hub where staff members coordinate the delivery of OnStar services to our nearly 7 million subscribers.
- The Command Center team uses crucial business planning tools to ensure OnStar call centers are properly staffed and maintained, calls are routed properly, and business metrics are met.
- Staffers also monitor real-time weather conditions, current events and crisis situations that could impact subscribers across the United States, Canada and Mexico.

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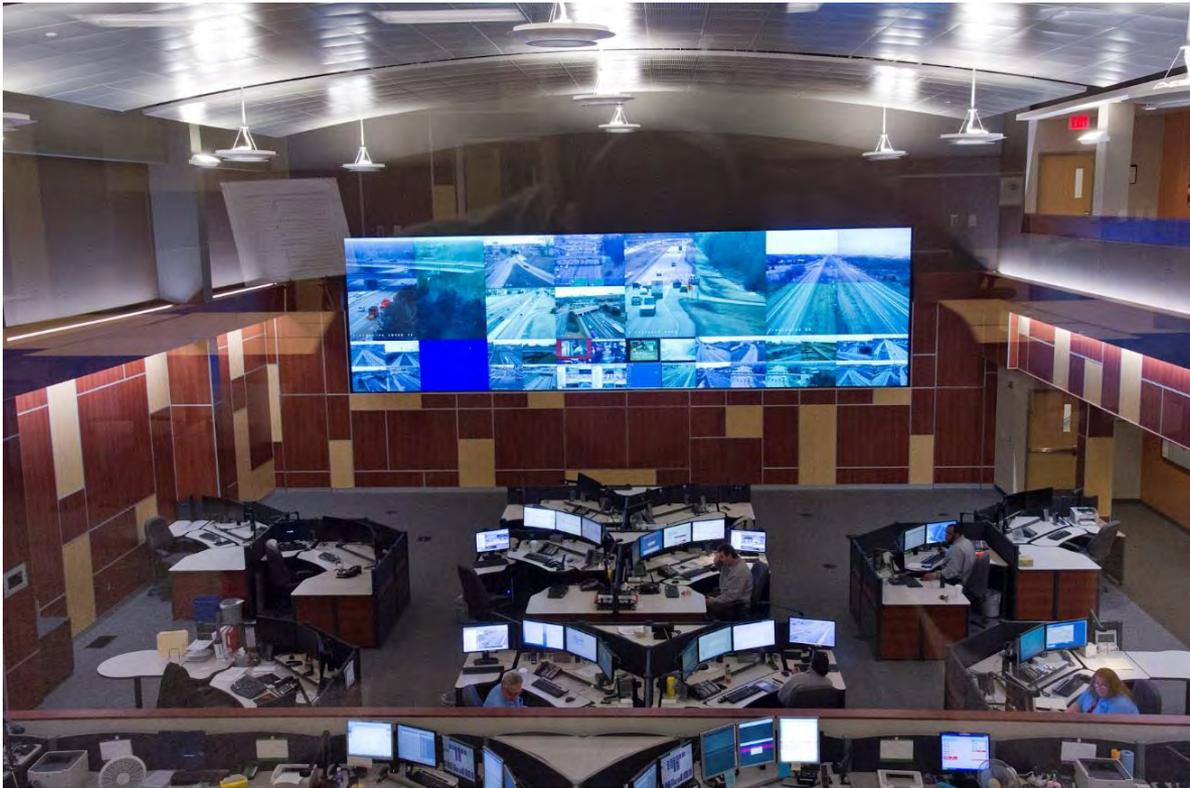
Southeast Michigan Transportation Operations Center (SEMTOC) Tour

- SEMTOC is the hub of ITS technology applications at the Michigan Department of Transportation. It is a world-class traffic management center where staff oversees a traffic monitoring system composed of 400 freeway miles instrumented with more than:
 - 270 Closed Circuit TV Cameras
 - 95 Dynamic Message Signs
 - 200 Microwave Vehicle Detection Sensors in conjunction with Probe Traffic Detectors.
- SEMTOC uses an integrated software system that includes device control, incident management functions, ATIS capabilities, and a complex hybrid communications system comprised. SEMTOC facilitates area-wide management of traffic through shared connections with The Road Commission for Oakland County Traffic Operations Center and local media partners.

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Southeast Michigan Transportation Operations Center



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Safety Pilot Connected Vehicle Model Deployment & Mobility Transformation Center

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Safety Pilot Model Deployment (SPMD)

- Participants will be given an exclusive “back lot” tour of the largest connected vehicle test bed in the world at UMTRI in Ann Arbor.
- While on the bus, participants will learn about SPMD- everything from the vehicle and infrastructure technology utilized in the pilot, to discussion about participants’ experience.
- Upon arrival, participants will be given a deep dive into the nearly 30 billion basic safety messages gathered to date
- Get a sneak-peek of the test facility, and learn about exciting “next steps,” including the Ann Arbor Connected and Automated Vehicle Network, a custom-designed integrated network of 2,000 connected, coordinated, automated and shared vehicles.

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Ann Arbor Safety Pilot



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City of Windsor Traffic Operations Centre

(bring your passport)

- The Traffic Operations Centre houses the Advanced Traffic Management System (ATMS) and the Signals Division.
- The City is currently converting the entire communications system to high-speed IP communications and deploying hundreds of new VIVDS to facilitate next-generation traffic control and management applications including adaptive control, incident management, and arterial performance reporting.
- The new ITS technologies will facilitate smooth traffic flows between the U.S. and Canada, ensuring economic prosperity at the most utilized border crossing.
- Functionalities of the Centre and the ATMS also include Congestion Management at the tunnel border crossing caused by border delays.

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City of Windsor Traffic Operations Centre



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Macomb County Communications and Technology Center (COMTEC)

- The Macomb County Communications and Technology Center is a brand new, \$11 million, state-of-the-art operations and communications center that is the first of its kind in Michigan.
- The 25,000 square-foot center combines communication between several Macomb County departments such as the Sheriff's Office dispatch, the Roads Department Traffic Operations Center, the Information Technology Data Center and the Emergency Management & Communications Department.

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Macomb County COMTEC



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Technical Program



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Technical Program

- Over 250 individual sessions
- Over 600 individual presentations/speakers
- 30+ Michigan-related topics/speakers

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Sessions

- Plenary Sessions – Featured Speakers
- CTO Sessions – Company Chief Technical Officer reps
- Executive Sessions – Agency, organization and company executive roundtables and presentations
- Town Hall Sessions – Designed to be interactive.
- Special Interest Sessions – Specific topic with expert speakers
- “Regional” Sessions
- Technical / Scientific Sessions – Individual papers grouped together loosely on topics.
- Annual Meeting Sessions – Organized by ITS America / USDOT
- Interactive Sessions – On Exhibit Hall floor

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Tracks

- Automated Transportation
- Data
- Connected Vehicles/Cooperative Systems
- Driver Behavior
- Economic Growth
- Freight
- International Cooperation
- ITS Rules and Standards
- New Mobility
- Public Transit
- Smart Cities
- Sustainability

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You won't want to miss this! We'll see you in Detroit!



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TRANSPORTATION FOR TOMORROW – INVENTORS AND INVESTORS PROGRAM

July 10, 2014

Jim Barbaresso, Vice President, HNTB
Chair of the 2014 ITS World Congress

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Two-Part Program

- Investor Matching Event
- Entrepreneurial Village

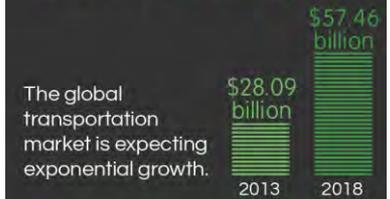
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Fueling the Transformation in Tech & Transport



Grand Opening

543,000 new businesses are created each month in the U.S.

Michigan is the fastest growing state for venture capital investments.

Companies in their first five years of life account for virtually all net growth in the U.S. economy.

Micro firms (firms with 1-4 employees) account for an average of 20% percent of new jobs.



More than 50% of the working population, or 120 million individuals, work in a small business.

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Program Goals

- Highlight the best and brightest innovators in the transportation
- Fuel growth in transportation technology sector
 - Match innovators and investors
 - Create innovative transportation solutions
 - Capitalize on Michigan's unique strengths
 - Stimulate job high-tech job growth

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Help Wanted

More than 50% of the working population, or 120 million individuals, work in a small business.

Inventors & Investors – The Metrics

- Global market is growing exponentially – expected to exceed \$57 billion by 2018
- 543,000 new businesses are created each month in the U.S.
- Small firms account for 20% of new jobs
- More than 50% of workers – 120 million people – work in small business

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Transformation in
Tech & Transport

The global transportation market is expecting exponential growth.

Year	Value
2013	\$28.09 billion
2018	\$57.46 billion

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The Michigan Market

- Michigan is the fastest growing state for venture capital investments
- Michigan's high-tech workforce is the 4th largest in the country with:
 - 65,000 engineers
 - 70,000 R&D professionals
 - 181,000 skilled tradespeople
- 200,000 new jobs in past 4 years
- Emerging and quickly growing tech sector

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Fueling the Transformation in Tech & Transport

The global transportation market is expecting exponential growth.



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Investor Matching

- Sponsored by Fontinalis Partners and Econolite Corporation
- “Shark Tank” type event
- Company requirements include:
 - In business less than 6 years
 - Have an exciting and competitive business plan
 - No more than \$5 million in current funding
- Successful applicants get to pitch their business plans to possible investors

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Entrepreneurial Village

Early-Stage Startup – 12 Companies	Mid-Stage Startup – 10 Companies
<ul style="list-style-type: none"> • Be less than 4 years old 	<ul style="list-style-type: none"> • Be less than 6 years old
<ul style="list-style-type: none"> • Have an exciting and competitive business plan 	<ul style="list-style-type: none"> • Have an exciting and competitive business plan
<ul style="list-style-type: none"> • Have no more than \$2 million in funding 	<ul style="list-style-type: none"> • Have no more than \$5 million in funding
<ul style="list-style-type: none"> • Have never before exhibited at an ITS America event 	<ul style="list-style-type: none"> • May or may not have exhibited at an ITS America event

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Entrepreneurial

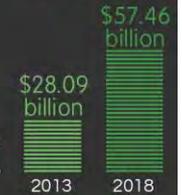
Entrepreneurial Village

629	729	10'
628	728	
627	CloudParc	20'
626	726	



Fueling the Transformation in Tech & Transport

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543,000 new businesses are created each month in the U.S.

Michigan is the fastest growing state for venture capital investments.



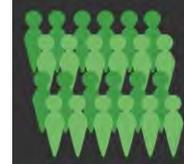
Companies in their first five years of life account for virtually all net growth in the U.S. economy.



Micro firms (firms with 1-4 employees) account for an average of 20% percent of new jobs.



More than 50% of the working population, or 120 million individuals, work in a small business.



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City of Detroit Connected Vehicle Test Bed Overview

**Michigan CAV Quarterly Briefing
July 10, 2014**

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Agenda

- **USDOT Connected Vehicle Services Available at City of Detroit Facility**
- **Detroit Connected Vehicle Test Bed**
 - **System Objectives**
 - **Design**
 - **Implementation**



USDOT Connected Vehicle Services Available at the City of Detroit Facility

Security Credential Management System (SCMS)

- Generates IEEE 1609.2 security credentials
- Devices use security credentials to digitally sign and/or encrypt messages
- Each message type (BSM, SPaT, Map, TIM, etc.) requires a unique certificate
- Certificates are anonymous protecting the privacy of the vehicle and its occupants
- Vehicle certificates change on a periodic bases to preserve anonymity

Roadside Unit Monitoring System (RMS)

- Monitors the health and status of connected RSUs
- Provides a tabular and graphical interface for system operators to view and monitor their devices
- RSUs are segmented by Test Bed and dedicated logins ensure system operators only have access to their devices
- Provide alerts directly to the system operator in the event of a critical outage.

Data Management System (DMS)

- Collects, parses, and distributes data from Basic Safety Messages broadcast by vehicles in the vicinity of connected RSUs
- Collects, parses, and distributes data from SPaT messages broadcast by connected RSUs.
- Operators and researchers can subscribe to data for use with local traffic management systems, operations and general research.

Connected Vehicle Reference Architecture (CVRIA)

- USDOT Southeast Michigan 2014 Project compliance
- IP Connections to USDOT Back Office data systems (Situation Data Clearinghouse and Warehouse)
- Ability to push data to (and receive data from) Application developers through the warehouse architecture



Detroit Connected Vehicle Test Bed-Objectives

Provide an environment for Intelligent Transportation System (ITS) Connected Vehicle (CV) Hardware and Software developers to demonstrate leading edge technology during the 2014 ITS World Congress

- Around\Near Cob Hall (Convention Center)
- Provide Demonstrators with access to USDOT Services
- Support 3rd Party Applications and Services

Provide a unique urban environment in which hardware and software developers can advance Connected Vehicle research and development beyond the 2014 World Congress

- Operate and Maintain the System

Integrate Connected Vehicle technology into the City of Detroit's day-to-day traffic operations and management.

- Connect to the City's Traffic Management Center (TCM)
- TMC connects to USDOT Connected Vehicle Services

Serve as a pilot deployment for a future City-wide deployment if the National Highway Traffic Safety Administration (NHTSA) mandates devices in all vehicles.

- Design should be consistent with National Architecture

Detroit CVTB-Design

“Core” Services

- Provides general IPv6 connectivity
- Broadcasts Signal Phase and Timing (SPaT) DSRC Messages
- Supports integration of 3rd Party Roadside Hardware

Test Bed Environment

- Urban Canyon loop beginning/ending in front of COBO Hall
- Tunnel under Millander Center

O&M

- USDOT RSU Monitoring System (RMS)
- USDOT Data Management System (DMS)
- Integration and compatibility with USDOT Southeast Michigan 2014 Architecture

Existing Infrastructure

- City’s existing Communication Backbone with enhancements as needed

Security and Privacy

- Using US DOT Privacy by Design principals
- USDOT SCMS



Detroit CVTB-“Core” Services

IPv6

- Traffic Management Center (TMC)
- USDOT Services
 - DMS / RMS
 - SCMS
 - USDOT Southeast Michigan 2014 Program
- 3rd Party Application and Services

Signal Phase & Timing Message

- Infrastructure-to-Vehicle
- Broadcast from signalized intersections up to 10x per second
- Contains the current Phase (color of each light) and a count down until change for each lane
- Receiving vehicles use the information to
 - assess potential of vehicle not able to stop safely
 - Manage the powertrain system to save fuel
- Messages are digitally signed by the sender and verified by the receiver

Map Message

- Infrastructure-to-Vehicle
- Broadcast from signalized intersections up to 1x per second
- Contains a digital vector map of the intersection for use with the SPaT message
- Messages are digitally signed by the sender and verified by the receiver



Detroit CVTB-Implementation

17 RSUs

Deployed at Signalized Intersections

Broadcast SPaT and Map Messages

New dedicated Backhaul connection

Connects to: City's Traffic Management Center
USDOT RMS & DMS
USDOT SCMS
USDOT SDC and SDW

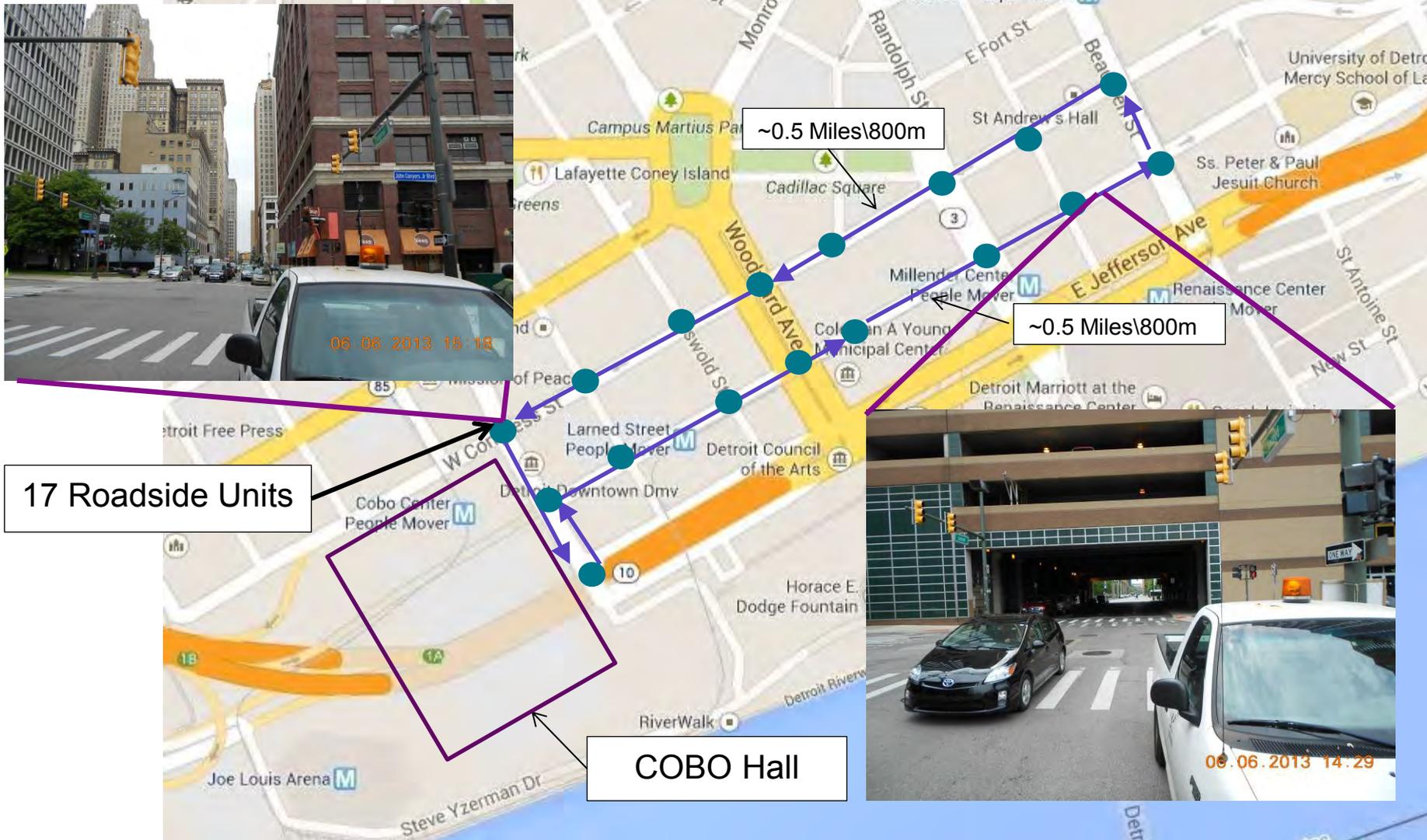
Forwards Basic Safety Messages (BSM) to Data Management System (DMS)

Provides IPv6 access to cloud based 3rd party Applications and Services through USDOT Situation Data Clearinghouse (SDC)

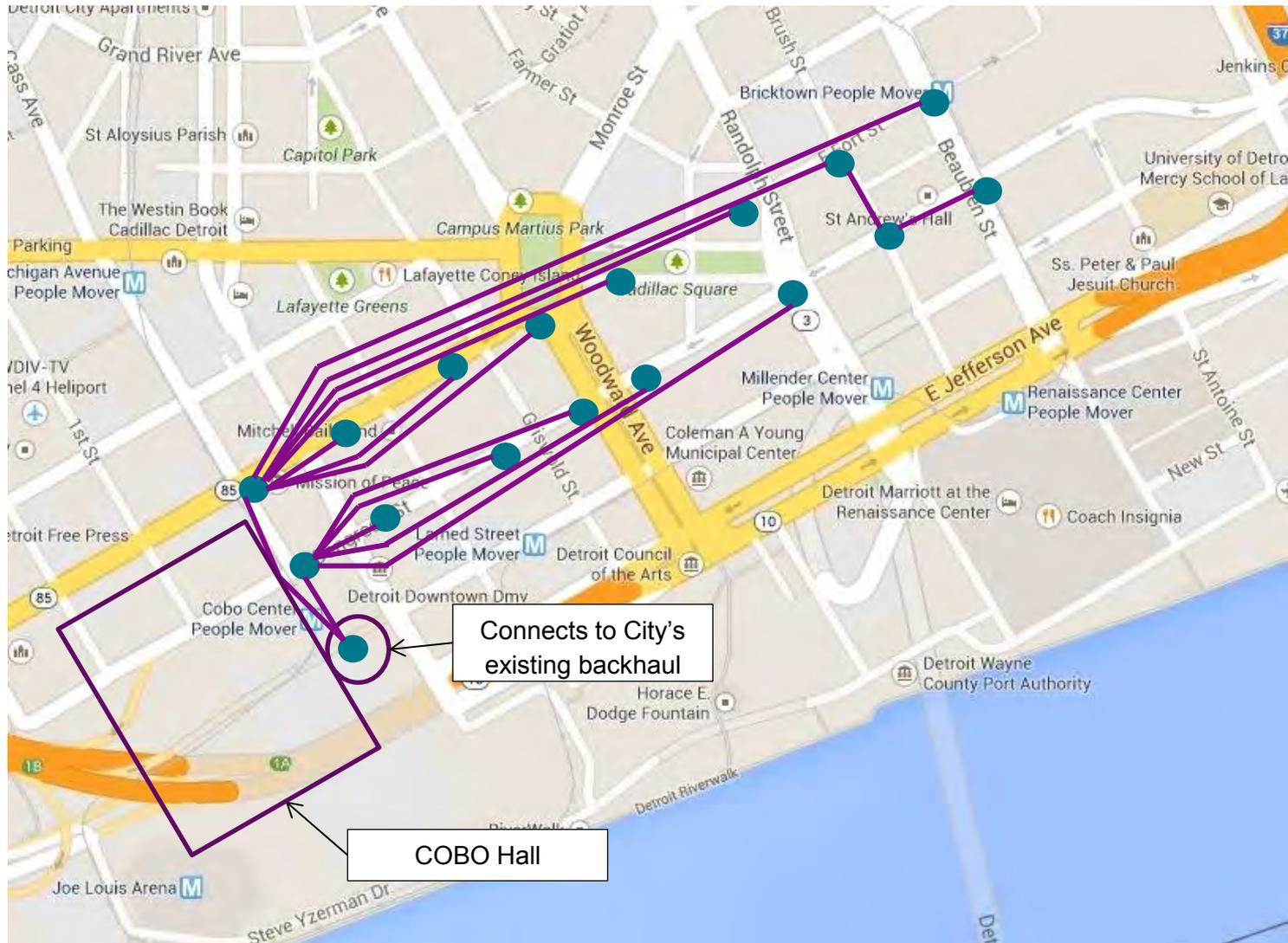
Supports the broadcast of 3rd Party Messages and compatibility with US DOT Traveler Information message (TIM) generator



Detroit CVTB-Deployment Area



Detroit CVTB-RSU Backhaul



Detroit CVTB-Deployment Sites

17 Signalized Intersections

16 new Signal Controllers were required to support SPaT broadcasts

1 Controller required a firmware upgrade to support SPaT

Required the following supporting equipment

Backhaul Router

SPaT Encoder

Ethernet Switch

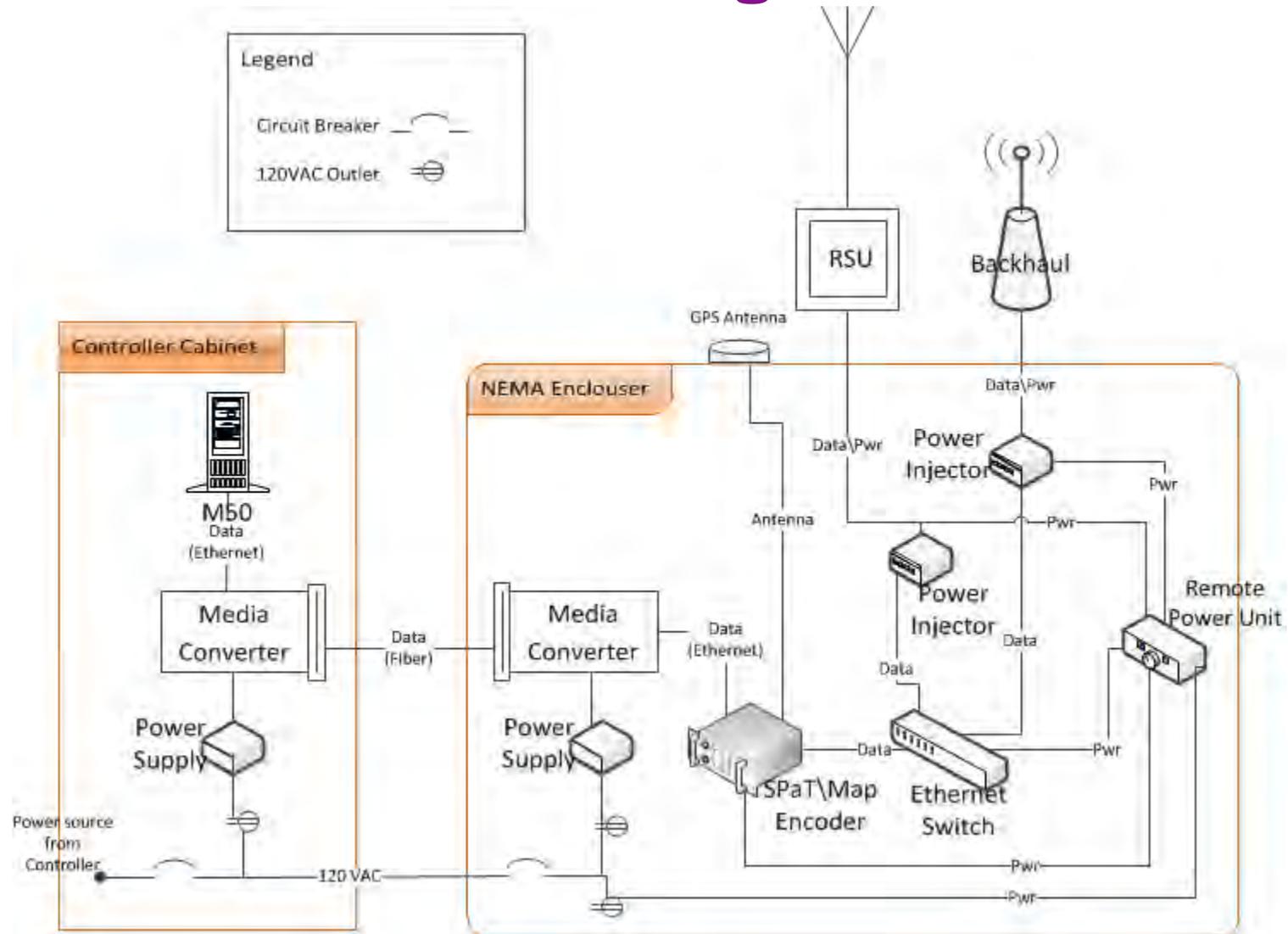
Remote Power Unit

NEMA 4x Enclosure to house supporting equipment

Fiber connection between the Controller Cabinet and the NEMA Enclosure



Detroit CVTB-Intersection Diagram



Demonstration of Live System



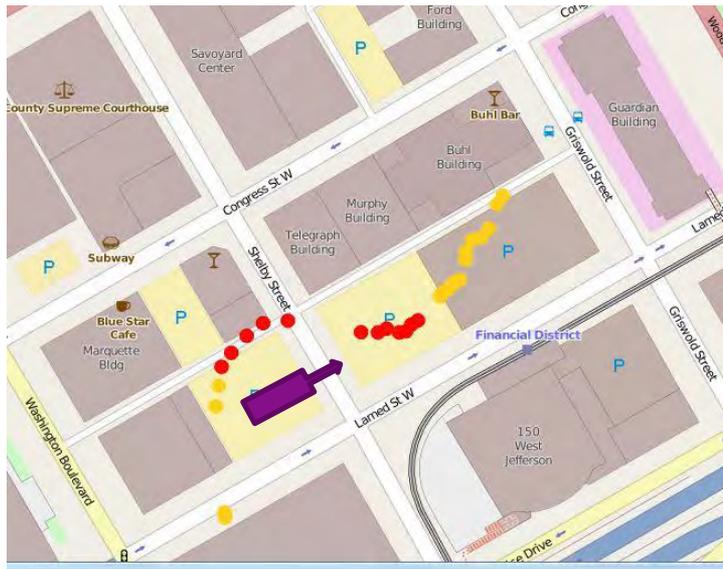
Lessons Learned

- **Industry is Advancing**
 - **Detroit CVTB Intersection Design has been used to support USDOT/AASHTO Footprint Analysis as the “Standard” intersection installation**
 - **First deployment with true “bid” costs**
 - > **Four total bidders**
 - > **Bid range was significant but will help to refine bid documents for future opportunities**
- **IPv6 is a challenge, but...**
 - **Coordination with Information Technology departments is a must!**
 - **Legacy hardware may be able to support IPv6 with the proper configuration and software**
 - **New IPv6 implementation options are being developed to ease transition**
 - **SIT Tunnel termination capabilities in RSUs are more widely available**
- **Integration of Connected Vehicle data into an existing backhaul needs to be carefully designed and implemented**
- **Integration of Connected Vehicle data into existing traffic management systems has not been addressed by industry – yet...**



Lessons Learned (continued)

- We have a lot to learn regarding accuracy of GPS in an urban canyon (which is one of the goals of this deployment)
 - Reduced number of satellites to lock on to
 - GPS signal re-acquisition after emerging from a tunnel



2014 Intelligent Transportation Systems World Congress

- September 07-11, 2014 in Downtown Detroit
- 30+ companies will be demonstrating devices and applications related to Connected Vehicle and Autonomous Vehicle Technology
- Traffic Management Center of the Future display



<http://www.itsa.org/events/2014-world-congress>



Thank You

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