

Michigan IntelliDriveSM Working Group Meeting Packet

December 13, 2010

- 1. Agenda**
- 2. Meeting Notes**
- 3. Presentations**

MICHIGAN INTELLIDRIVE WORKING GROUP

Monday, December 13, 2010
Ricardo's Detroit Technical Center
40000 Ricardo Drive
Van Buren Township, MI 48111

MEETING AGENDA

(1) Welcome, Introductions, and Focus of the Working Group
- if we're a working group, let's do some work!

(2) V2V Safety Pilot
- a substantive group discussion concerning the upcoming US DOT advertisement for a large-scale pilot program and what it will take for Michigan to win. DON'T MISS this opportunity to help set the direction!

(3) 2014 ITS World Congress
- coming to Detroit in 2014, hear ITS Michigan's plans for attracting global interest in this event

(4) Test Beds in Michigan
- a group discussion to better establish a vision for the future, and a plan for carrying out that vision collaboratively

(5) iQ Telematics
- a presentation by Mouhamad Naboulsi, who was unable to make the prior Working Group meeting but would like to share a few brief thoughts on the future of vehicle-vehicle communication.

(6) Regulation & Deployment
- do existing legislative or regulatory models provide guidance or insight with respect to development and deployment of connected vehicle technologies? - hear from the expert, Paul Laurenza with Dykema Gossett PLLC

(7) Tour of Ricardo

Michigan IntelliDriveSM Working Group Meeting Notes

Meeting Location: Ricardo, Van Buren Township, MI

Date: December 13, 2010

Paul Laurenza from Dykema Gossett in Washington, D.C., was not able to make the meeting due to weather, but he will be invited to the next working group meeting to speak on regulatory issues

- Chris Domin and Andrew Smart, both of Ricardo, welcomed the group to their facilities.
- Richard Wallace from the Center for Automotive Research (CAR) spoke of the need for greater automaker and supplier involvement in the IntelliDriveSM working group. Suggestions for participation, from Richard and the group, were:
 - Detroit 3 – Important for Michigan efforts
 - Tier 1 Suppliers – in many cases, they are the ones developing IntelliDriveSM equipment for in-vehicle installation
 - Delphi
 - Valeo
 - TARDEC
 - IBM and Intel – they represent the computing “cloud”
 - Google and Microsoft – they are both interested in this technology and would likely want to participate
- Will ask an automaker to host the next working group meeting, slated for March, 2011
- Richard next summarized the USDOT Pre-Solicitation notice regarding the forthcoming RFP for a V2V Safety Pilot Field Test (see attached slides).
- Peter Sweatman of UMTRI gave an update of what he knows about the forthcoming USDOT V2V Pilot Test based on a meeting he had attended in DC the previous week.
 - USDOT prefers one, unified response per state
 - MDOT will support only one team proposing Michigan as the site for the Pilot
 - UMTRI is going to lead a proposal team and encourages those who want to participate to contact him or another UMTRI representative
 - Ann Arbor appears to be a good location for the Pilot, because it offers one of the best multi-modal environments in Michigan
 - Use university fleet vehicles, also perhaps UPS, FedEx, and USPS vehicles?
- Richard facilitated a discussion of why Michigan is the best location for the Pilot
 - Auto companies are here
 - More *IntelliDrive* infrastructure is already deployed than in any other state (and more is coming)
 - Diverse weather conditions exist
 - Several universities are present with significant automotive research activities
 - Diverse road infrastructure
 - Progressive transit agency in Ann Arbor (AATA)

- Leverage the communication capabilities in the state
 - This is an opportunity to promote Michigan as environmentally-friendly, instead of only CA
 - Michigan already possesses tools for processing *IntelliDrive* data due to its DUAP program
 - Michigan International Speedway available for “orchestrated testing” to ensure high number of V2V interactions in traffic scenarios of high interest. Furthermore, not belonging to a specific vehicle manufacturer or the like, MIS is a neutral course open for business to all would-be users.
- Response needs to fulfill what the USDOT asks, but it also should go behind safety and offer all pieces that Michigan can offer.
 - Jim Barbaresso, representing ITS Michigan, gave a review of how ITS America selected Detroit to host the 2014 ITS World Congress and solicited help from those willing to participate in planning the event (see attached slides).
 - Lee Mixon of Mixon-Hill gave an update on plans for updating and operating the USDOT *IntelliDrive* testbed (the DTE) in the Novi area (see attached slides).
 - Dmitri Khijniak provided an update on the SPaT testing project on Telegraph Road (see attached slides)
 - Mouhamad Naboulsi presented on what iQ Telematic has to offer to the *IntelliDrive* community (see attached slides).
 - Just prior to the meeting commencing, Jason Gutting of MDOT reiterated the Department’s position that it will back a single Michigan-based proposal, and he strongly encouraged the group to collaborate, led by UMTRI, to produce that single best proposal.

Michigan IntelliDriveSM Working Group

Ricardo North America
Van Buren Township, MI
December 13, 2010

Agenda for This Morning

1. Welcome, Introductions, and Focus of the Working Group
2. V2V Safety Pilot
3. 2014 ITS World Congress
4. Test Beds in Michigan
5. IQ Telematics Presentation
6. Regulation and Deployment
7. Tour of Ricardo Facility

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 IntelliDriveSM research, deployment, and operations.
 - Benefit our state and our industry (automotive and more)
 - Enhance safety and mobility in Michigan and beyond

Automaker and Supplier Involvement

- This group would benefit greatly from greater vehicle manufacturer and supplier participation
 - Identified as a critical gap at our last meeting at MIS
 - Does the group see most value in approaching industry organizations (such as CAMP) or individual companies (or both)?
 - Who specifically (by name) should we have here?
- Seeking a manufacturer to host the next (March) meeting; any suggestions or alternative offers?

USDOT V2V Safety Pilot

Making the Safety Pilot Happen in Michigan

Key Phrases from Pre-Solicitation Notice

- This deployment is intended to be a real world multi-modal operating environment, supported by a diverse team of industry, public agencies, and academia.
- Contractor will:
 - Identify and define a model deployment site and operating environment, along with partnering agencies and organizations
 - Install infrastructure components, equip 2,000-3,000 vehicles with "Here-I-Am" and aftermarket safety devices, arrange for the installation of Roadside Equipment Devices, conduct a system interoperability test, and resolve any interoperability problems.
 - Coordinate and conduct testing of cooperative systems among vehicles of various types as well as with the roadside infrastructure.
 - Collect and archive data involving the model deployment operating environment. Provide the processed data to the John A. Volpe National Transportation Center and assist them in administering surveys and conducting focus groups.
 - Demonstrate applications that leverage the vehicle-based "Here-I-Am" data and infrastructure broadcasted data.

Why Michigan?

- Let's begin building the story...



2014 ITS WORLD CONGRESS

Destination Detroit



Presentation Outline

- ▣ ITS Michigan Board Action
- ▣ Site Selection
- ▣ The Win
- ▣ Future Actions

ITS Michigan Board Action

- ▣ November 2009 – Board approves resolution to prepare 2014 ITS World Congress bid
- ▣ Ad hoc subcommittee established
 - Gerry Conover, PRC
 - Brent Bair, RCOC
 - Peter Sweatman, UMTRI
 - Jim Schultz, MDOT
 - Trudy Bahr, UMTRI

Site Selection

- ▣ Enlistment of others
 - Cheryl Ollila, DMCVB
 - Gary Krause, MEDC
 - David Austin, Cobo
 - Craig Bryson, RCOC Public Information Officer
 - Jim Barbaresso, HNTB (ITS Michigan President)
- ▣ Host Committee created

Site Selection

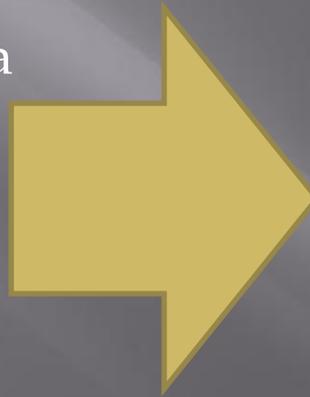
- ▣ Pursuit Plan
 - Prepare bid
 - Obtain letters of support
 - ▣ Governor Granholm
 - ▣ City of Detroit
 - ▣ Automakers
 - 2010 ITS America Annual Meeting
 - ▣ Detroit exhibit
 - ▣ Reception and presentation



The Bidders

Initial Bidders

- Anaheim, California
- Detroit, Michigan
- Las Vegas, Nevada
- Los Angeles, California
- Miami, Florida
- Montreal, Quebec, Canada
- Orlando, Florida
- Phoenix, Arizona
- Quebec City, Quebec, Canada
- Reno, Nevada
- Santiago, Chile
- Toronto, Ontario, Canada
- Vancouver, BC, Canada



Final Four

- Anaheim
- Detroit
- Los Angeles
- Toronto

Site Visits



Detroit Selected!

- ▣ Keys to Selection:
 - Host Committee efforts
 - Presence of the auto industry and suppliers
 - ITS deployment
 - ▣ In place
 - ▣ Future commitment
 - Cobo Hall attributes and bid
 - Accessibility
 - Affordability
 - Passion, Plan, Places, People



The "Michigan 8" Automakers



Detroit Knows How to Host Big Events



DETROIT



Goals

- ▣ Boost Attendance > 10,000
- ▣ Establish Sustainable Deployment of IntelliDrive Technology
 - 2013 regulatory determination
 - Commitment from City of Detroit
 - Grant application for MDOT deployment
- ▣ New Partnerships
- ▣ Establish Michigan as the Unparalleled World Leader in IntelliDrive and ITS – Renaissance and Reinvention



The Convergence of ITS and EVs

- By 2014, every automaker will have battery-electric EVs on the road.
- In 2013, NHTSA will make a regulatory determination about V2V and perhaps V2I.
- All the “Michigan 8” major automakers already have autonomous ITS systems deployed in their cars and light trucks.



Nissan LEAF Battery Electric



Chevy Volt Plug-In Hybrid

Action Plan

- ▣ Promotion and Marketing Plan
 - Branding
 - Subcommittee established
 - Preliminary plan prepared
 - Real push begins in Orlando, 2011
- ▣ Establishment of Organizing Committee
- ▣ Business Plan
 - Cooperative effort with ITSA
 - Funding and sponsorships

Action Plan

- ▣ IntelliDrive Deployment Projects
 - Sustainable urban deployment
 - Multi-modal
- ▣ Partnerships
 - TARDEC
 - SAE
 - IEEE
 - SEMA



Action Plan

HELP WANTED!



Welcome to Detroit !!!

October 20-24, 2014





Update of the Michigan IntelliDrivesm Test Bed

December 13, 2010

Michigan IntelliDrive Working Group



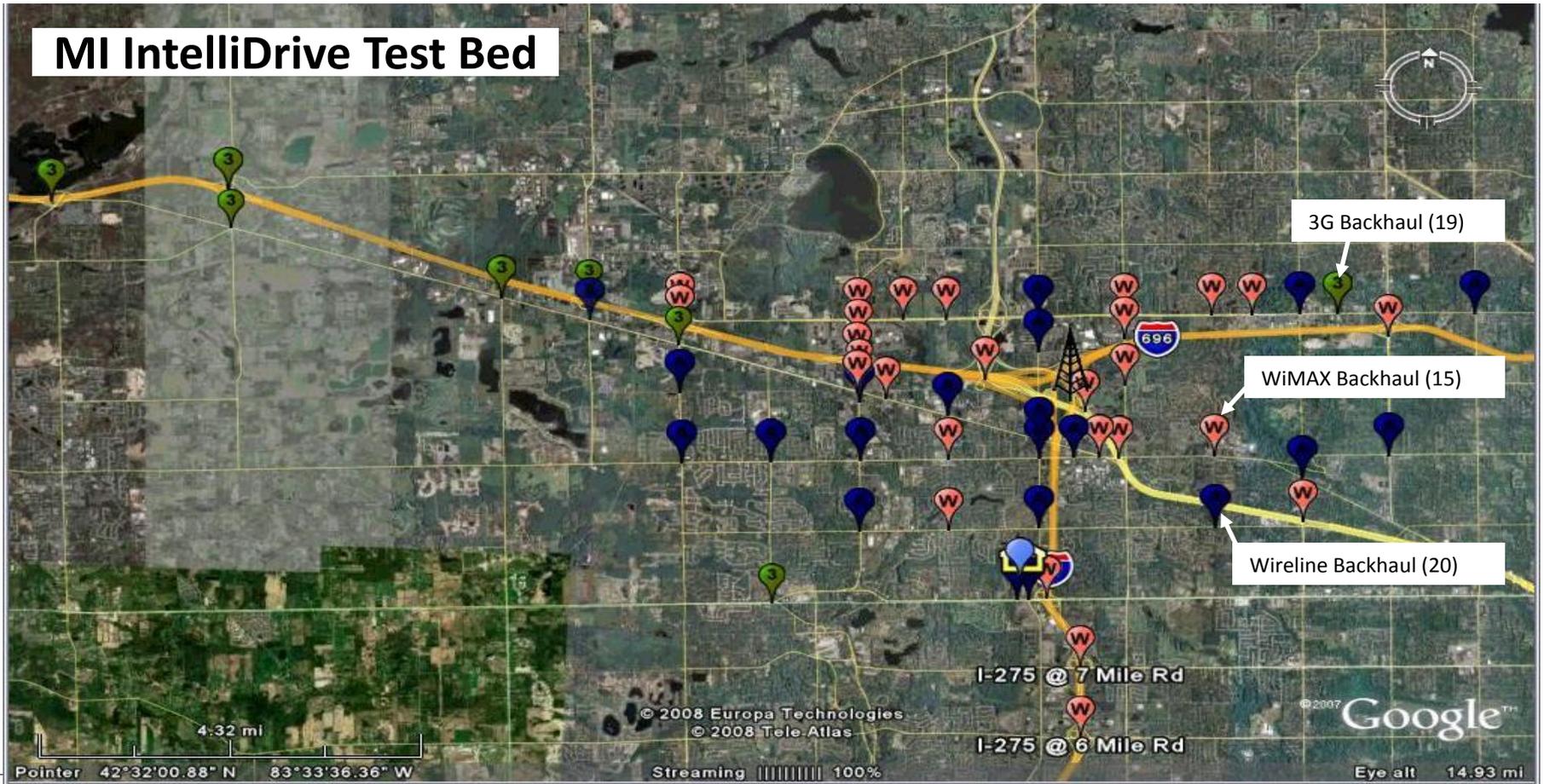
IntelliDrive Test Bed Partners

- **US DOT**-Sponsors continuing network and application design, deployment, and testing
- **MDOT**-Donated communication tower space, Roadside Equipment space, and general space
- **Road Commission for Oakland County (RCOC)**- Donated Roadside and Back-office Equipment space, installed the Roadside Equipment, and manages one of the communication service providers

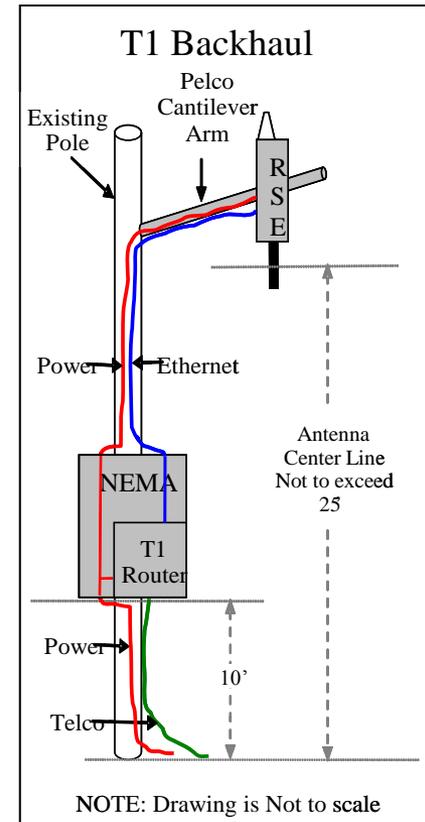
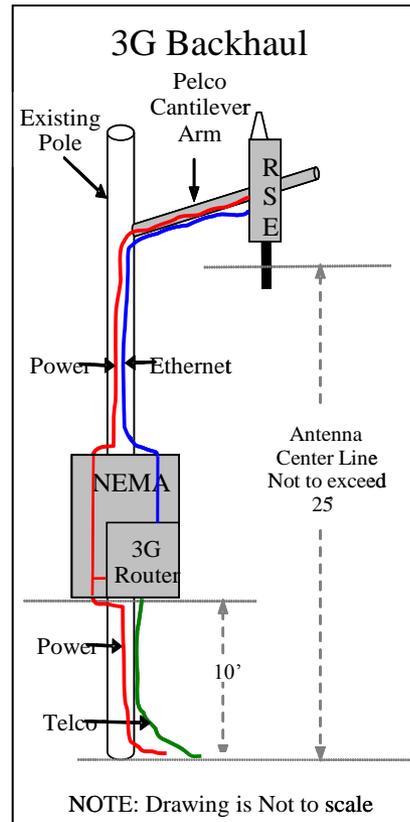
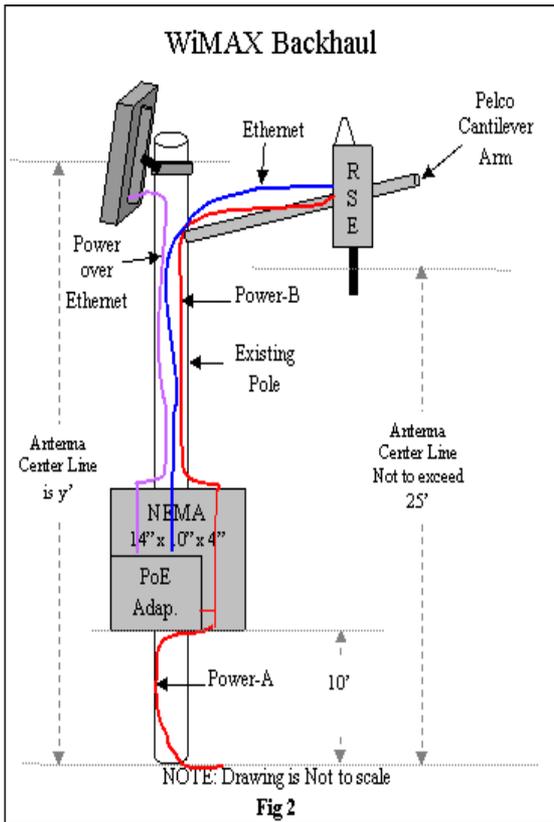
IntelliDrive Test Bed Overview

- The **MI IntelliDrive Test Bed**, built in **Oakland County, MI**, served as the Development Test Environment (DTE) for the VII Proof-of-Concept (POC)
- **54 Roadside Equipment (RSE) sites**
 - 12 freeway
 - 42 signalized intersections
- Over 45 square miles covered
- **75 center-line miles of roadway**
 - **Interstate and divided highway:** ~32 center-line miles
 - **Signalized intersections:** ~43 center-line miles
- **Service Delivery Node (SDN)** located in the RCOC Traffic Operations Center (TOC)
- **Enterprise Network Operation Center (ENOC)** and SDN in SAIC's Oak Ridge, TN facility

IntelliDrive Test Bed



RSE and Backhaul Equipment



RSE and Backhaul Equipment



Test Bed Activities

- Transition Plan (Aug-Sept)
- Training (Aug-Oct)
- Equipment Audit (Sept-Nov)
- Equipment Transfer (Sept-Oct)
- Build and Verification (Oct-Nov)
- Operations and Maintenance (Dec 2010-2015)



Future – Encourage & Support IntelliDrive Development

- Open for anyone to develop IntelliDrive-based applications, services, components, etc.
- Upgrade the test bed itself to be open
- Upgrade to encourage test bed use
- Enable the use of other technologies

IntelliDrive Test Bed Expansion Telegraph Road SPaT/GID Upgrade

MICHIGAN INTELLIDRIVE WORKING GROUP



Dmitri Khijniak
Kapsch TrafficCom

December 13, 2010



Presentation Outline

- Project purpose
- Deployment overview
- Messages and standards
- Project partners and timeline
- Why project matters to Michigan

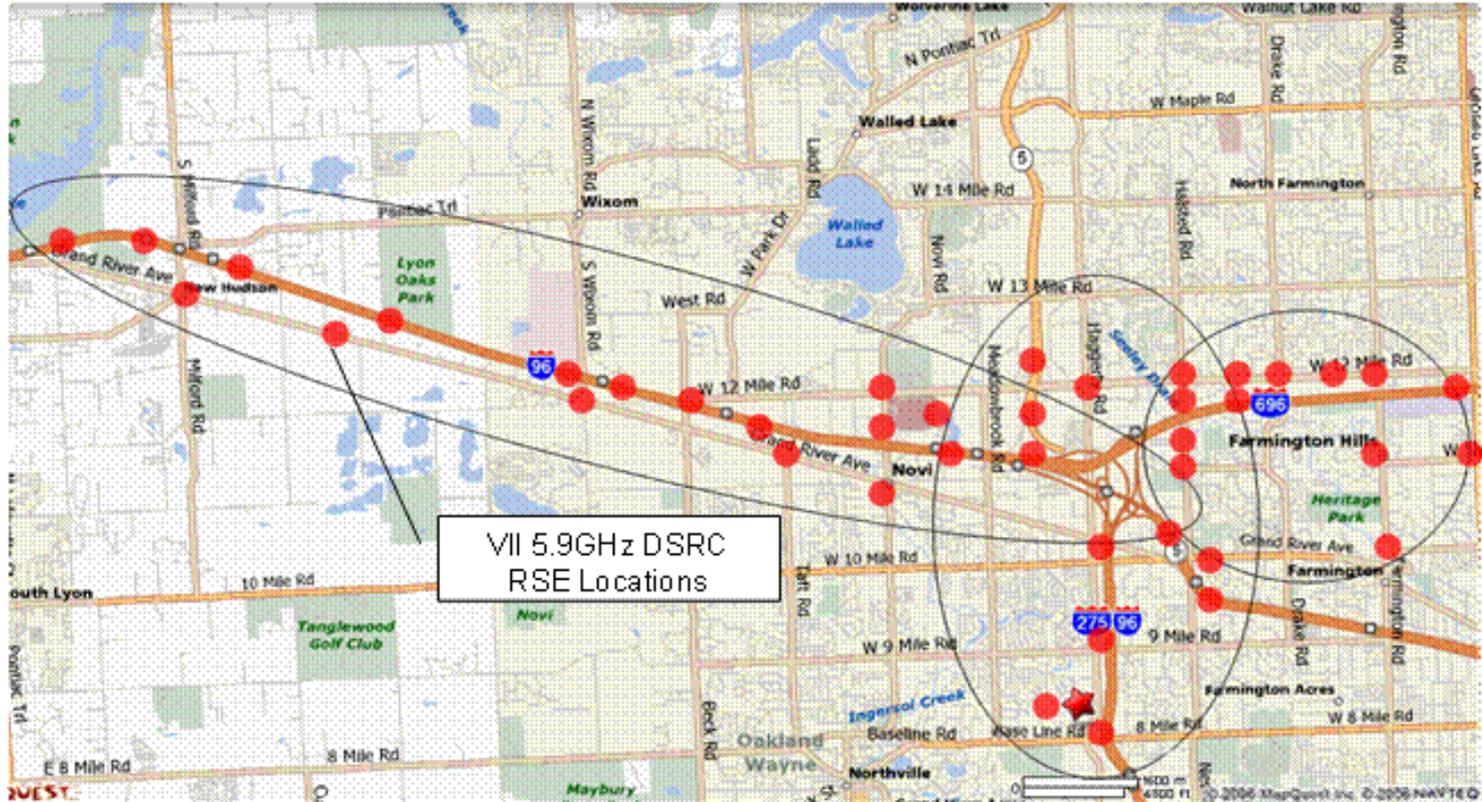
Major IntelliDrive Objectives

- Move aggressively on vehicle to vehicle communications
 - Regulatory Decision on In-Vehicle Equipment by 2013
- Accelerate in-vehicle technology
 - “Here I Am” messages
 - Aftermarket Safety Systems
 - Enables safety and active traffic management
- Accelerate infrastructure communications capability
 - Signal Phase and Timing (SPaT) as initial focus
 - Enables safety, mobility, and environmental applications
- On road multi-modal pilot deployments for high-value applications
- Monitor and evaluation of driver distraction issues
- Understand benefits and communications needs (DSRC/other) of transformative mobility applications

Why IntelliDrive Test Bed Expansion on Telegraph Road

- Largest deployment of SPaT system (to date)
- Public road environment
- Open Test Bed for public / private R&D
- New V2I applications
- Experience in SPaT infrastructure operation

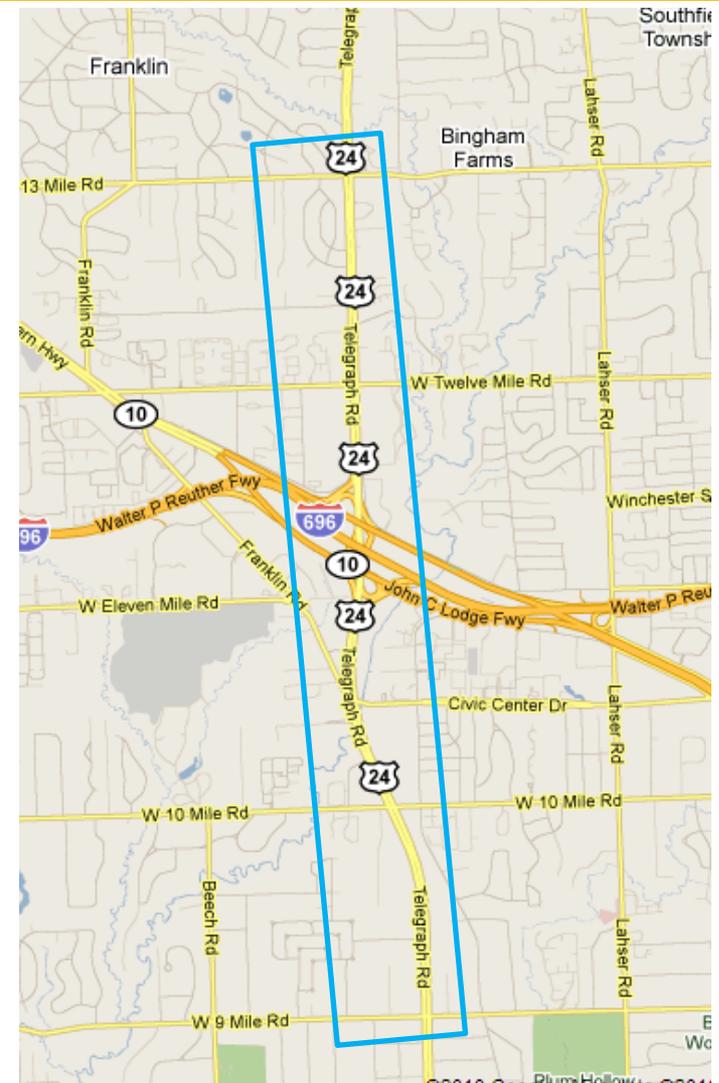
Existing IntelliDrive Test Bed



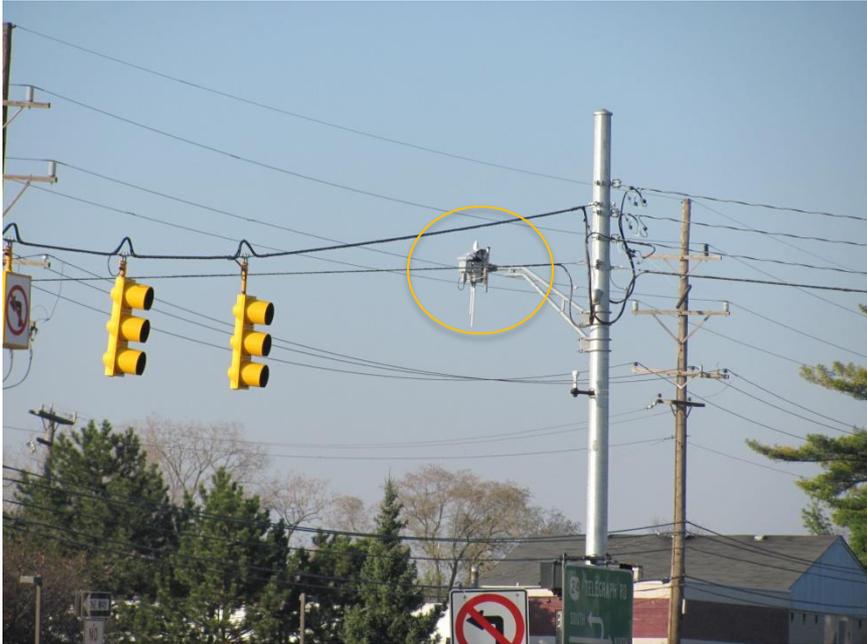
Over 50 locations with 5.9GHz DSRC capabilities

IntelliDrive Test Bed Expansion Telegraph Road Expansion

- Additional 22 intersections
 - Between 9 Mile Rd and 13 Mile Rd
- Major intersections and cross-over lanes



RSEs on Telegraph Road



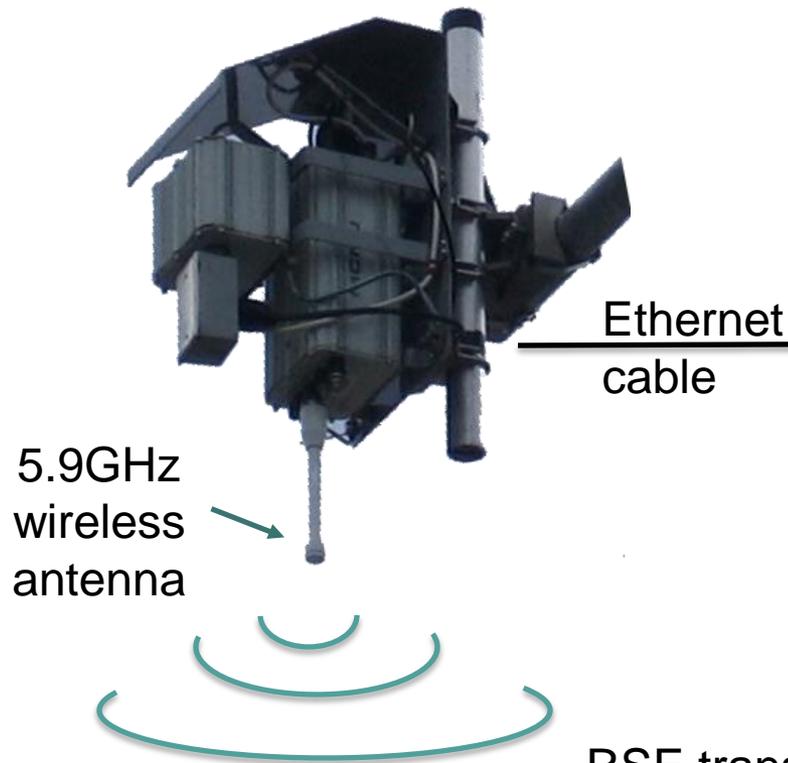
9 Mile Rd & Telegraph



Cross over north of 9 Mile Rd & Telegraph Rd

- RSE platform: The same as IntelliDrive Test Bed – Kapsch RSEs
- Applications: The same as IntelliDrive Test Bed + SPaT
- RSE backhaul: None, to be available in the future

RSE Setup for SPaT



5.9GHz
wireless
antenna

Ethernet
cable

RSE transmits SPaT and GID
(Intersection MAPs) messages

Traffic Cabinet

Traffic Signal Controller
(Siemens Eagle M52)



Applications using SPaT information

- Display Signal Phase (and Timing) to a driver
- Speed advisories
- Left Turn Assist
- Pedestrian intersection crossing assist
- Transit Signal Priority for transit applications
- Transit Signal Preemption for vehicle emergency applications



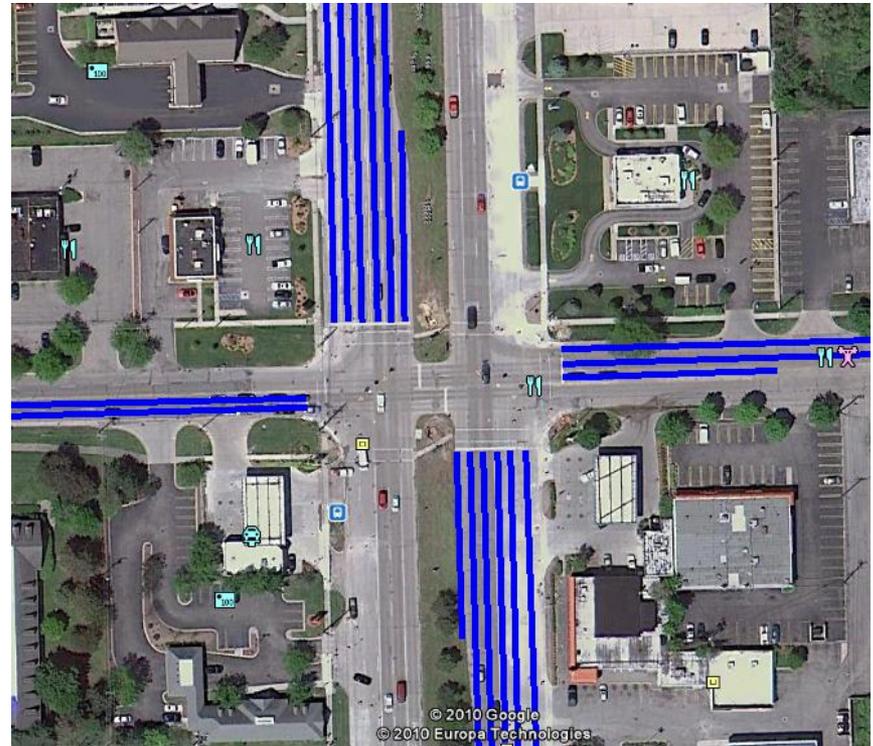
Signal Phase and Timing (SPaT) message

- Current signal phase
 - Green, Amber, or Red
- Remaining time until change of phase
- Covers all movements/approaches
 - Reference to GID message
- Information is generated by signal controller
 - Synchronized with intersection timing plan



GID - Geographic Information Description Intersection Map

- Intersection ID
- Intersection geometric layout
- Coordinates of lane centers
- Lane attributes
- Referenced in SPaT message

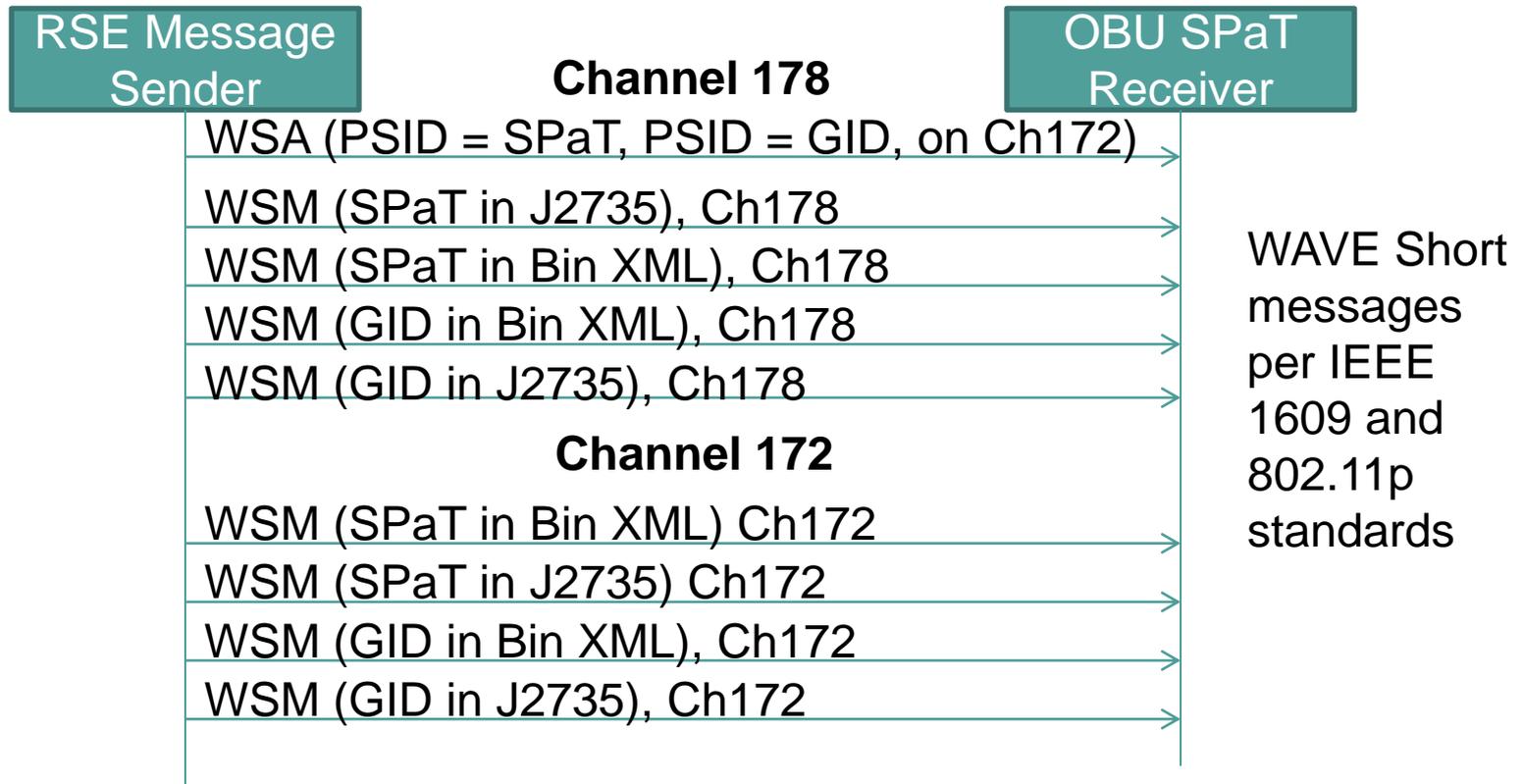


GID layout for 9 Miles and Telegraph Rd

Standards SAE J2735 and CICAS-V

- **SAE J2735 Standard**
 - **MSG_SignalPhaseAndTiming Message**
 - Defined as ASN.1 objects, encoded using BER/DER
 - **MSG_MapData (MAP)**
 - Defined as ASN.1 objects, encoded using BER/DER
- **Cooperative Intersection Collision Avoidance System (CICAS-V) Specification**
 - **SPaT message**
 - Binary XML format
 - **GID message**
 - Binary XML format

RSE transmission plan for SPaT and GID messages



- Transmissions on two channels: Control channel (178) and Service channel (172)
 - SPaT messages transmitted 10 msg/second
 - GID messages transmitted 1 msg/second

What's in the vehicle

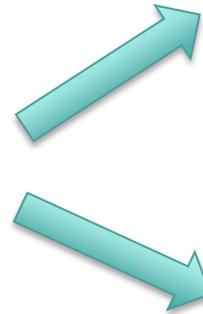
GPS / RF
antenna



5.9 DSRC Radio



Human Machine Interface

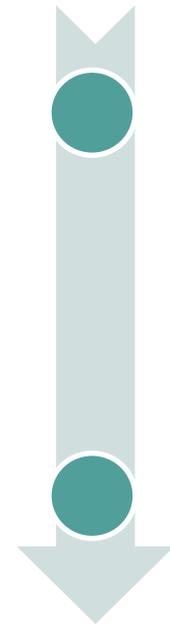


Project partners (alphabetical order)

- **Booze Allen Hamilton and SAIC**
 - IntelliDrive Test Bed system operation
 - RSE configuration
- **Kapsch TrafficCom**
 - SPaT/GID software for RSEs
 - Preparation of GID maps
 - In-vehicle setup
 - System testing
- **RCOC and Michigan DOT**
 - RSE installation
- **Siemens**
 - Signal controller
- **USDOT**
 - Project sponsor

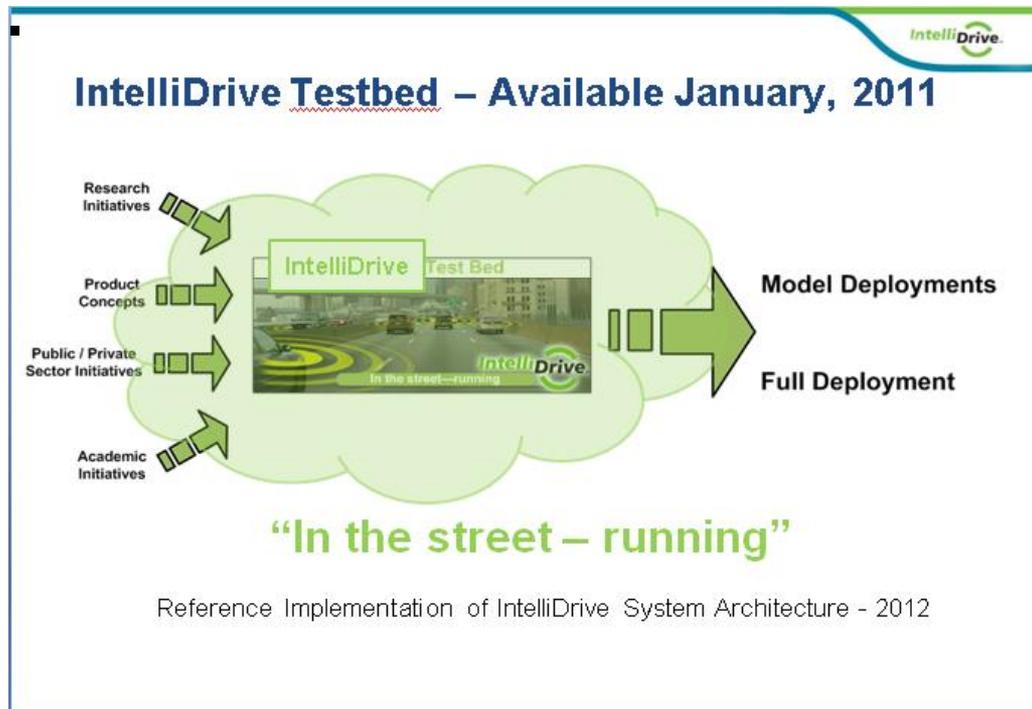
Project
started
Sep 2010

Project will
end
Feb 2011



Why Telegraph Road expansion matters

- Largest IntelliDrive Test Bed in the U.S.
- 2013 NHTSA decision
- US DOT Safety Pilots
- 2011 ITS World Congress



Source: IntelliDrive Mobility and Environment Workshop
November 30, 2010

Dmitri Khijniak

Kapsch TrafficCom | System Engineering and Product Management
2035 Corte del Nogal, Suite 105 | Carlsbad, CA 92011 | USA

Tel. +1 760 650 5880
dmitri.khijniak@kapsch.net
www.kapsch.net

© 2010 Kapsch TrafficCom

Please Note:

The content of this presentation is the intellectual property of Kapsch TrafficCom U.S. Corp and all rights are reserved with respect to the copying, reproduction, alteration, utilization, disclosure or transfer of such content to third parties. The foregoing is strictly prohibited without the prior written authorization of Kapsch TrafficCom U.S. Corp. Product and company names may be registered brand names or protected trademarks of third parties and are only used herein for the sake of clarification and to the advantage of the respective legal owner without the intention of infringing proprietary rights.

Target intersections

Target Location
Telegraph NB & X/O S of 9 Mile
Telegraph & 9 Mile
Telegraph SB & X/O N of 9 Mile
Telegraph SB & Garner (9 1/2 Mile)
Telegraph NB & X/O S of 10 Mile
Telegraph & 10 Mile
Telegraph SB & X/O N of 10 Mile
Telegraph NB & Raleigh Office Center (N of 10 Mile)
Telegraph SB & Crossover/Denso Dr
Telegraph & Civic Center/10 1/2 Mile
Telegraph SB & Swanson
Telegraph NB & Crossover/11 Mile Service Dr
Telegraph SB & Northwestern Service Dr
Telegraph SB & x/o 11 Mile - New Signal
Telegraph NB & X/O S of 12 Mile/Tel 12 Dr
Telegraph & 12 Mile
Telegraph SB & X/O N of 12 Mile
Telegraph NB & 12 1/2 Mile
Telegraph SB & X/O N of Rushmore Circle
Telegraph NB & X/O S of 13 Mile
Telegraph & 13 Mile
Telegraph SB & X/O N of 13 Mile

iQ-Telematics

It's Smart to be safe™

IntelliDriveSM in a Box



Safe and Smart Mobility since 1985

Eyes On the Road and Hands On the Wheel

P 1

Copyright 2010

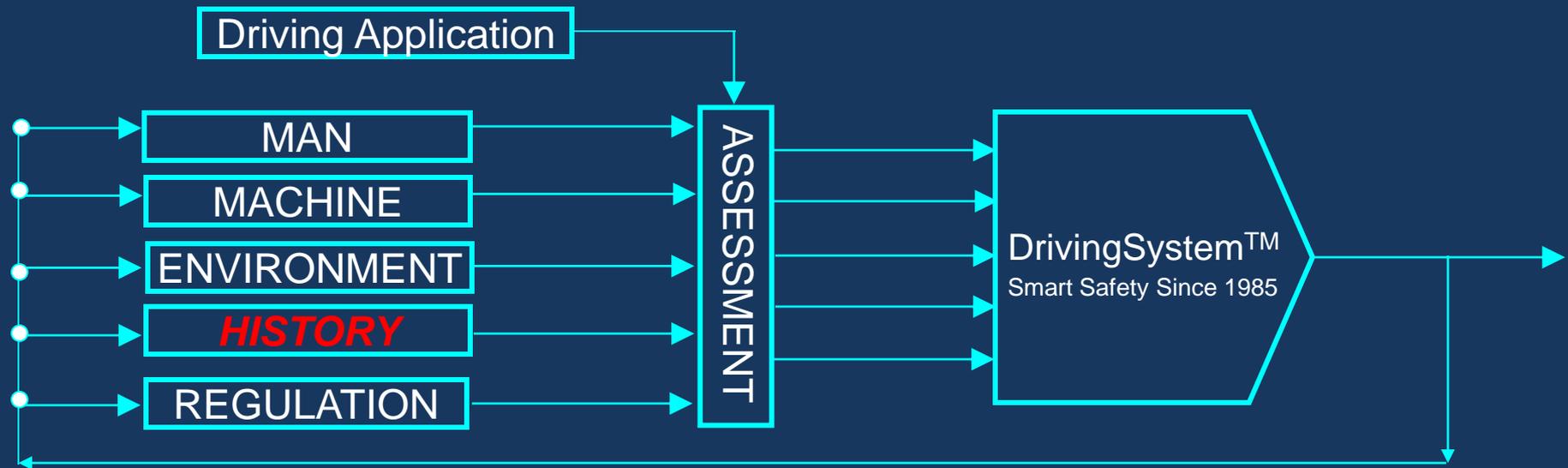
www.iQ-Telematics.com

US & Foreign patents granted or pending

Solution: Why & How We Can?

Patented Integrated Driving System

Adaptive Active Workload Management and Distraction Mitigation



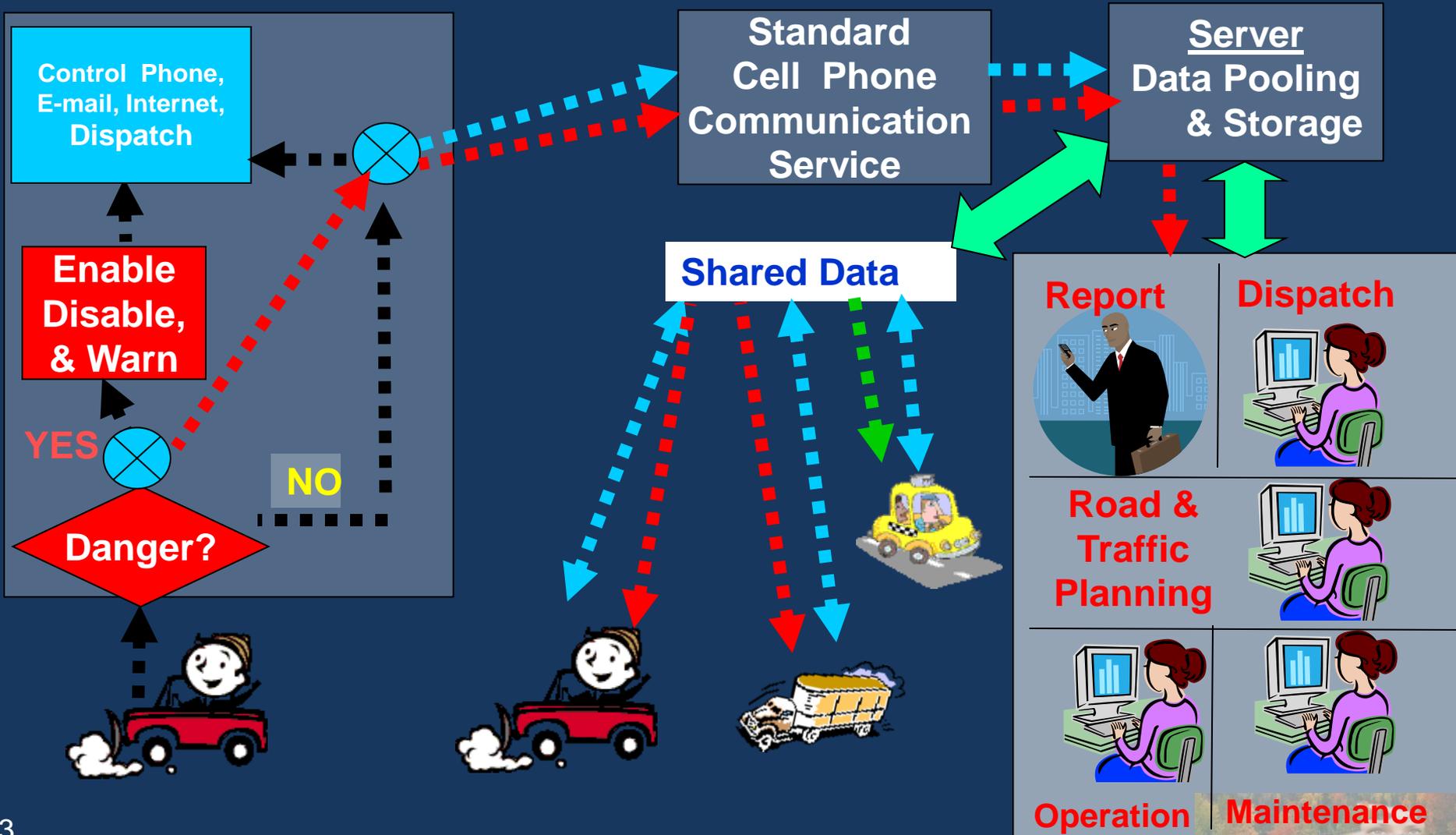
US Patent #6731925 and other US and International Patents Pending

Key Research Articles: What is Distraction?. The Driving System·

Programmable Risk Assessment based on Driving Application



How it works on the road !!!



Advantage

- No need for extensive infrastructure
- No need for exposed infrastructure
- Authenticate participants
- Failure of one Vehicle / Station does not effect other vehicles or system integrity
- Memory is shared with others outside of immediate area and without time frame limitation with “temporal and geographical context”
- Provide tangible value to users outside ITS scope

