

# Intelligent Transportation Systems

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# What We'll Cover:

- ITS: What & Why
- RCOOC Fleet Management Program
- FAST-TRAC
- Connected-Vehicle initiative
- World Congress 2014

# RCOC: Serving 1.2 mil. + 300K commuters

- ⇒ 379 employees (32% less than in 2007)
- ⇒ \$103 million budget (FY 2013)
- ⇒ 2nd largest road system in the state with 2,700+ miles of roads (2nd only to state highway system)
- ⇒ Nearly 800 miles = still gravel
- ⇒ Maintains nearly all 230 miles of state highways in county
- ⇒ Maintains 90% of all signals (1,500)
- ⇒ Maintains 150,000 road signs
- ⇒ Oakland roads are among the safest in the world for an area its size and population
  - ⇒ - Traffic fatality rate = 0.54 fatalities per 100 million miles of travel.

# Why Intelligent Transportation Systems (ITS)?

- In 1985: We met with all communities for first time & asked about anticipated development.
- The amount of development coming was overwhelming.
- In some years, 1/2 of state's new jobs were in Oakland County.
- We're not only dealing with our residents, but also 300,000 other residents commuting to Oakland.
- There will never be enough money to build our way out of congestion. We needed to get more capacity from our existing road system.

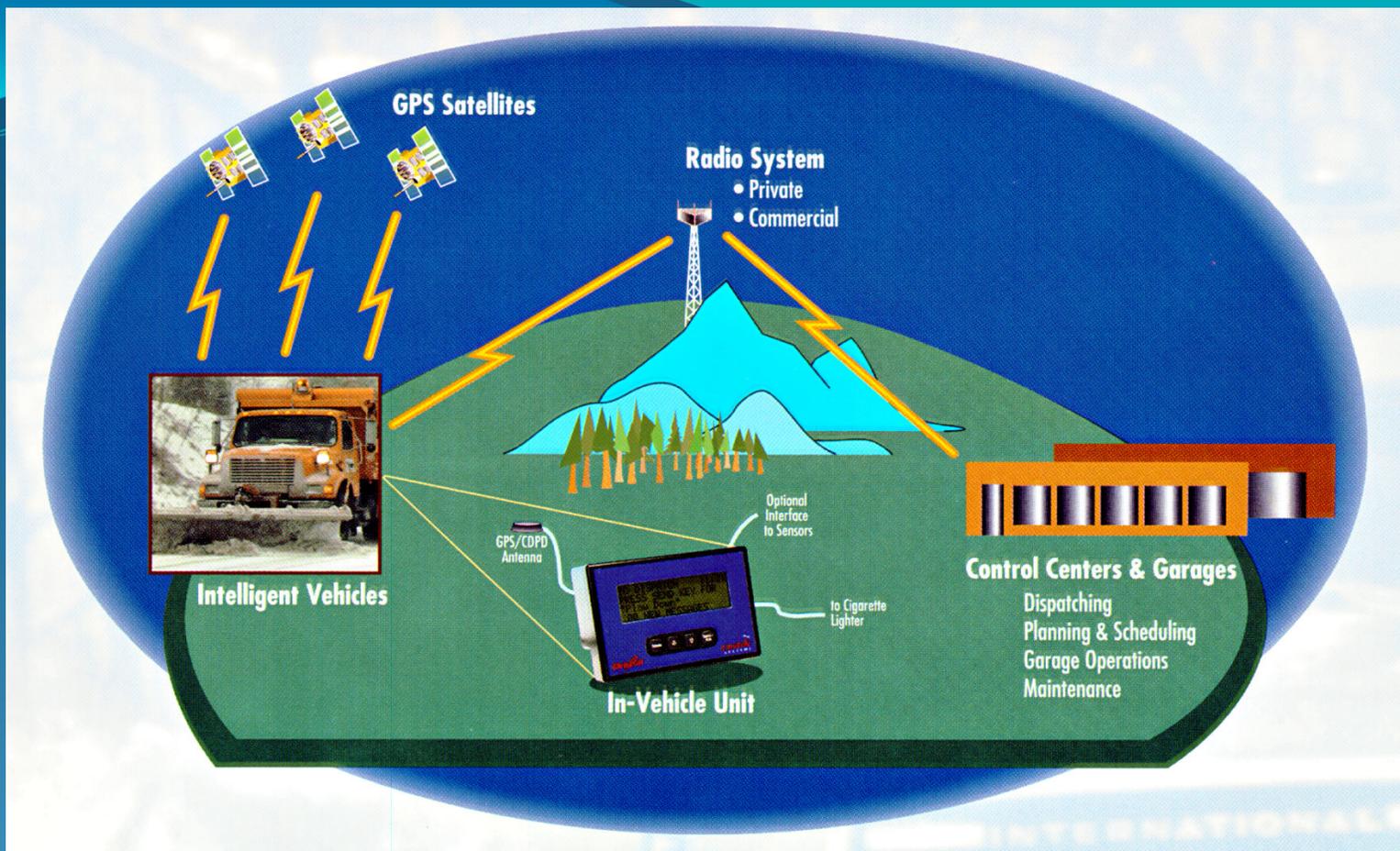
# RCOC's ITS Investment

- RCOC has invested more than \$100 million in ITS in last 20-plus years.
- Dollars were mainly special federal transportation technology funds.
- RCOC's match has often been labor. With staff reductions, we're struggling to provide that match.

# RCOC's

# Fleet Management Program

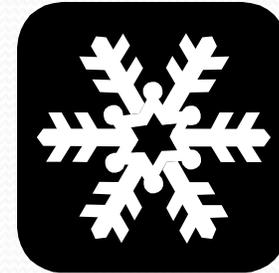




Using Global Positioning System (GPS), each truck is tracked by satellite & continually provides data to base station via SMART radio system.

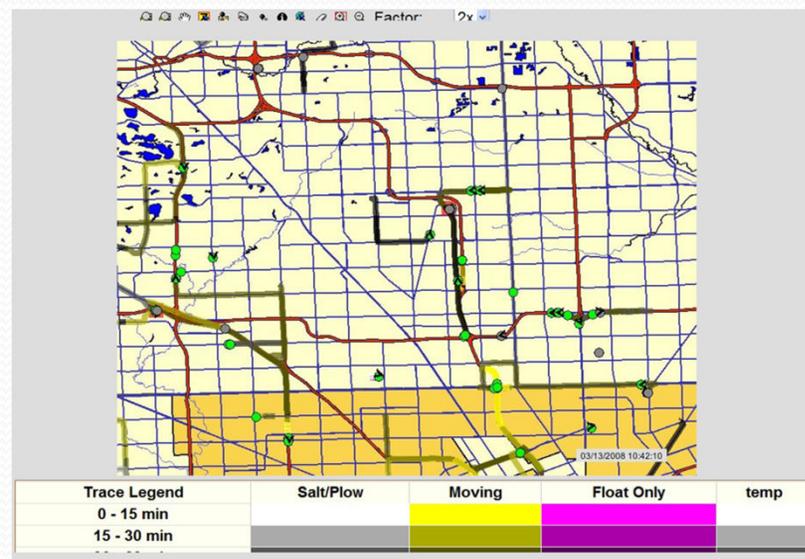
# Program Goals:

- Reduce costs
- Increase safety
- Provide more efficient management of the fleet.
- Reduce environmental impact



# Fleet Management Program's Web-Based Application

- First system of its kind to utilize Web-based fleet monitoring
- Access from office, home or vehicle



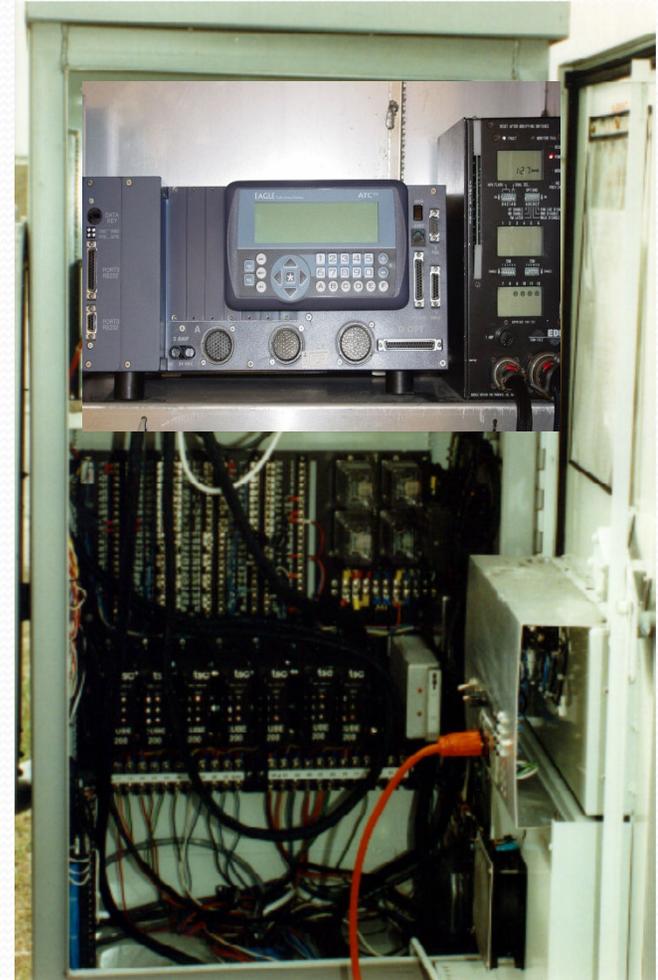
# The Road Commission for Oakland County's



**Faster And Safer Travel -  
Through Routing & Advanced Controls**

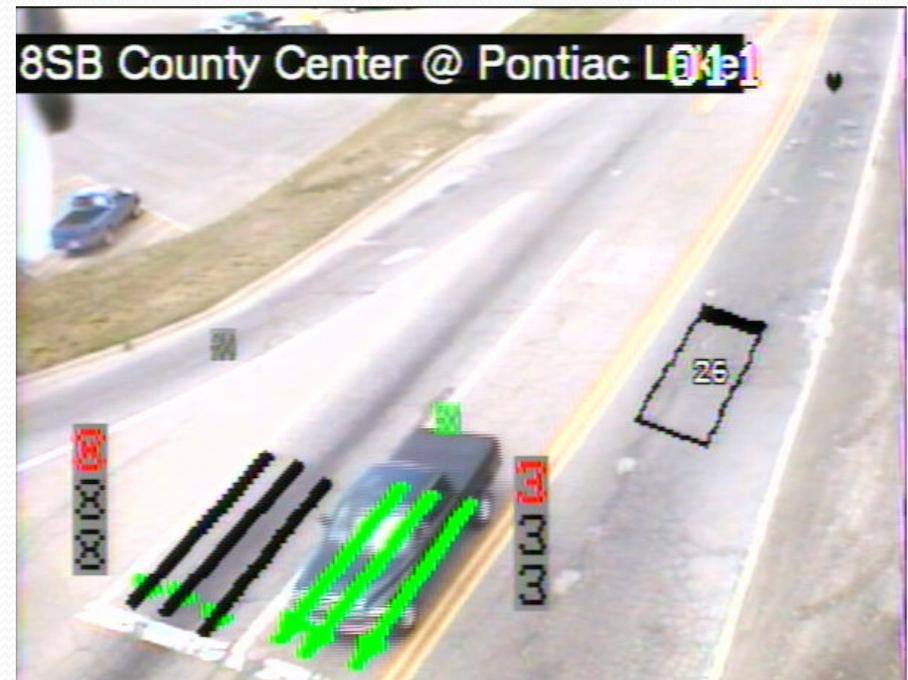
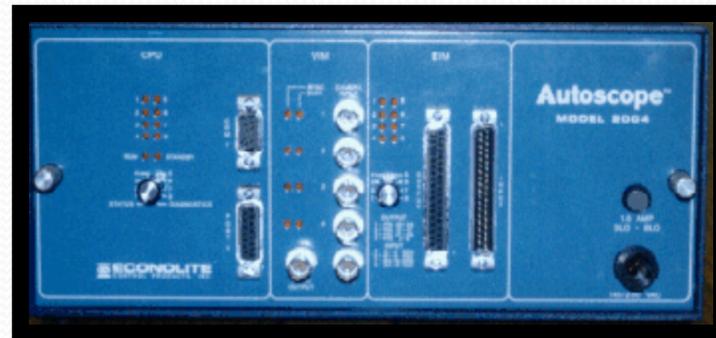
# SCATS Signal System

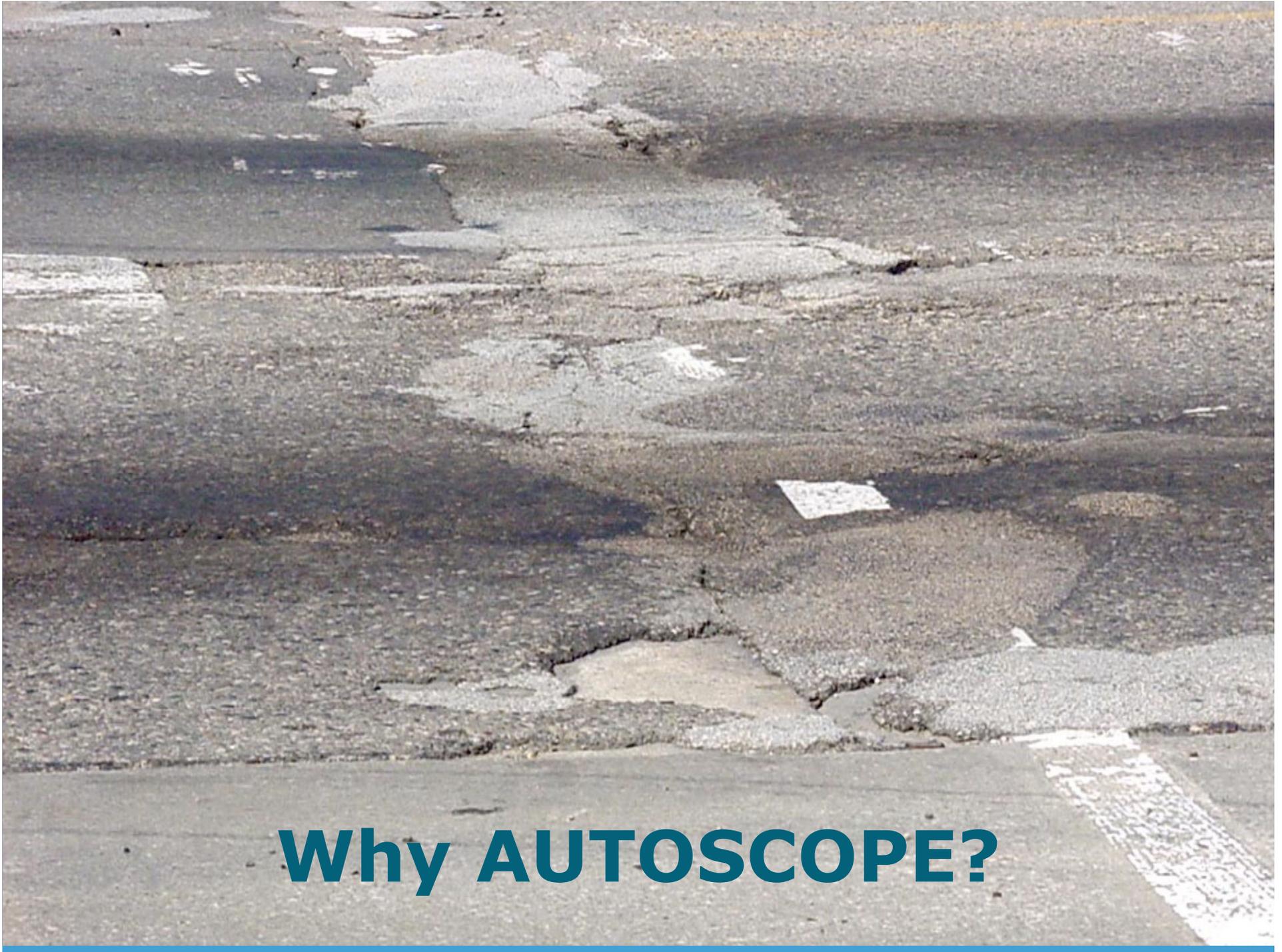
## Sydney Coordinated Adaptive Traffic System



# AUTOSCOPE

## Vehicle Detection





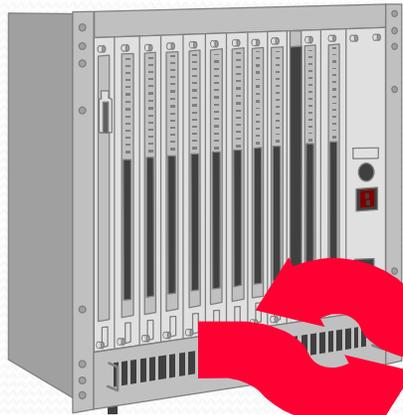
**Why AUTOSCOPE?**



**Why AUTOSCOPE?**

# FAST-TRAC Hardware Structure

Management  
Computer



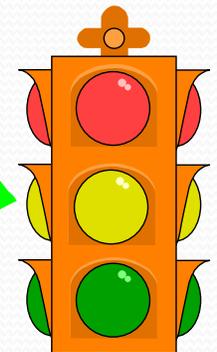
Regional  
Computer



FAST-TRAC  
Controller

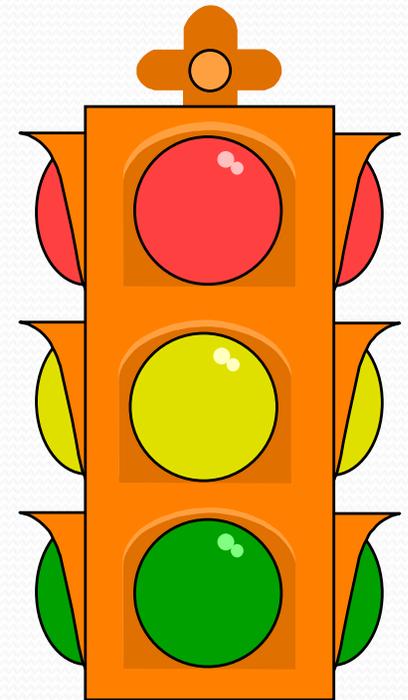


Autoscope



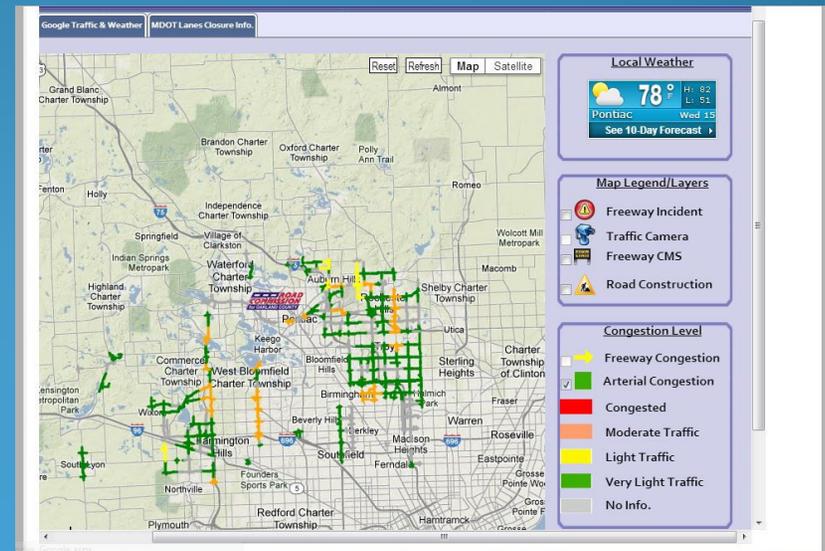
# Advantages of *FAST-TRAC* traffic signals

- Adaptive
  - Adjusts red/green cycle lengths
  - Ends phases early
  - Skips phases with no demand
- Continuous signal timing updates
- Central monitoring

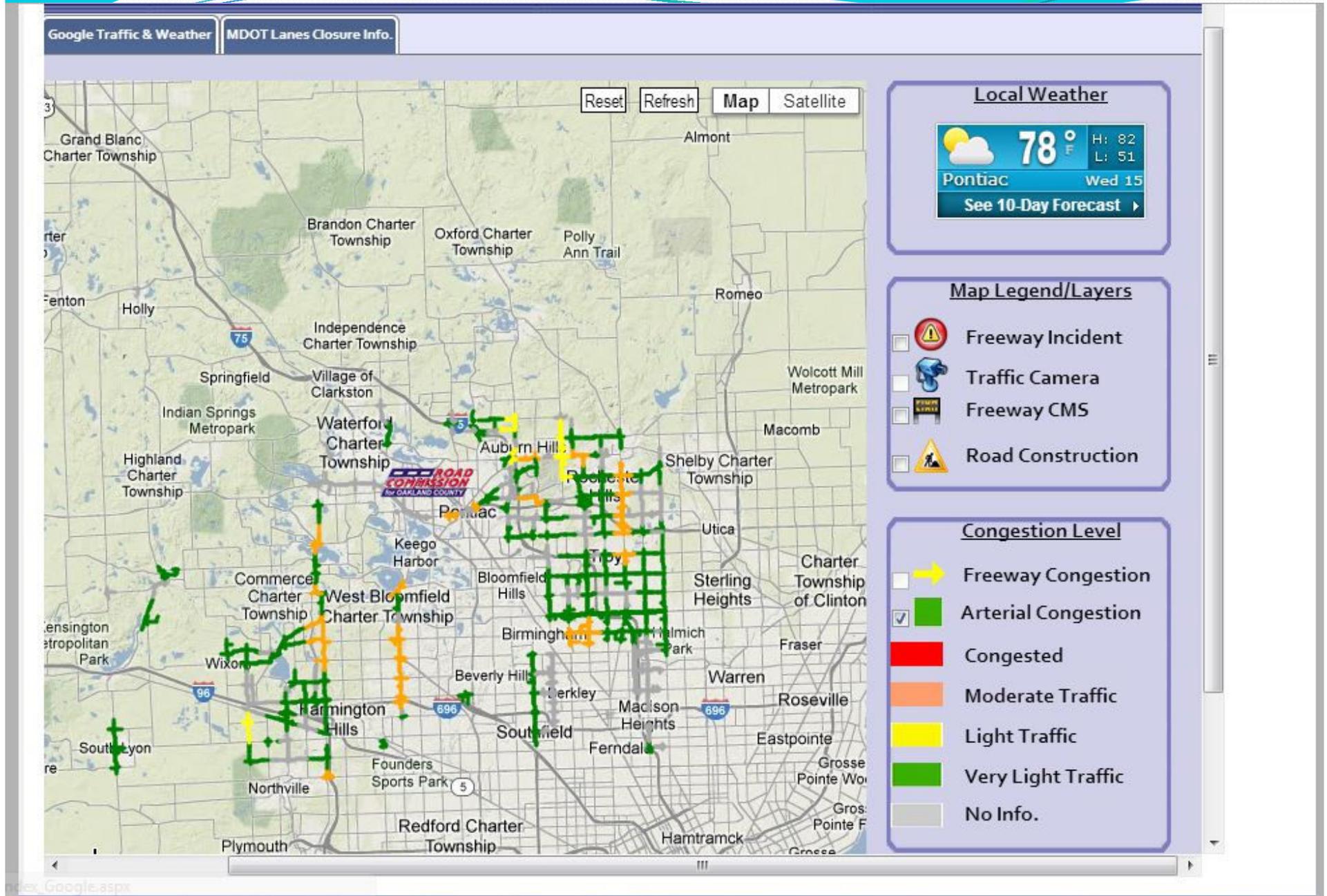


# FAST-TRAC:

- Approx. 675 intersections = **2<sup>nd</sup> Largest “adaptive” signal system in the US.**
- 2,000-plus AUTOSCOPE cameras = **Largest video vehicle detection system in the world.**
- **First online real-time traffic congestion display for non-freeway roads in the US.**



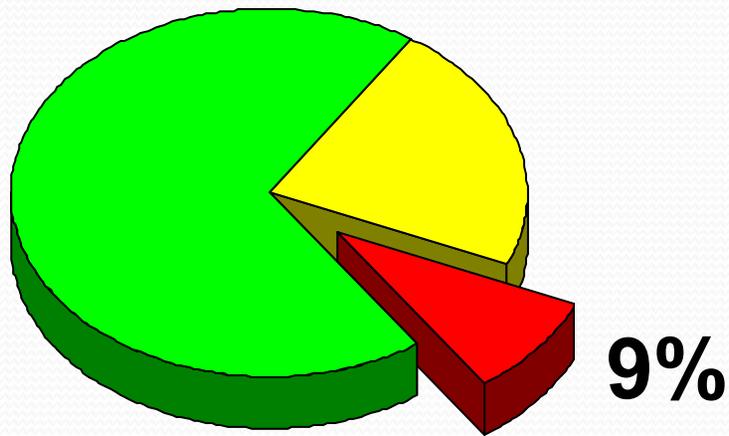
# RCOC Real-Time Traffic Map



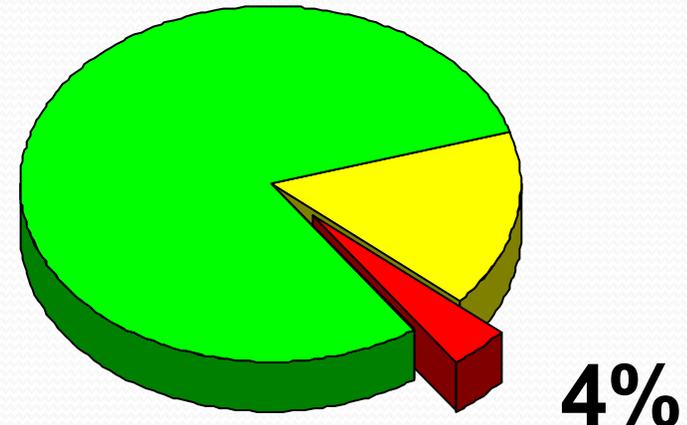
# FAST-TRAC BENEFITS

## *Accident Severity Analysis*

**BEFORE**



**AFTER**



-  *Possibly Injured*
-  *Non-Incapacitating*
-  *Incapacitating*

# BENEFITS

## ***Stopped-Delay Improvements*** *(South Lyon)*

**Before FAST-TRAC**

**12.6**  
**veh-hrs**

**After FAST-TRAC**

**10.1**  
**veh-hrs**



# BENEFITS

## *Travel Time Improvements*

*(NB Orchard Lake Rd; vs. optimized fixed-time signals)*

**AM Peak**

**-20%**

**Off-Peak**

**-32%**

**PM Peak**

**-7%**



# FAST-TRAC Event Manager

SCATS Event Manager

Connection Help

Palace

Legend

- Congestion
- Lowest
- Highest
- Flashing
- Error
- No Comms

Update

Plans

Click on map item to filter plans

- Reset everything to normal operation
- Light inbound signal plan
- Light outbound signal plan
- Medium inbound signal plan
- Medium outbound signal plan
- Heavy inbound signal plan
- Heavy outbound signal plan

Display All Reset All Execute

Log

```
9:45:01 AM - There are 0 Counter control
9:45:01 AM - There are 0 queries
9:45:01 AM - SCATS Event Manager started
9:45:02 AM - Connecting
9:45:03 AM - Connected
9:45:08 AM - Facility: Palace
9:45:08 AM - User: deneaud
9:45:08 AM - There are 1 regions
9:45:08 AM - There are 10 intersections
9:45:08 AM - There are 10 intersection c
9:45:08 AM - There are 10 intersections
9:45:08 AM - There are 3 Counter control
9:45:08 AM - There are 12 queries
9:45:08 AM - Querying...
9:46:01 AM - Querying...
```

Add Entry

Status 88

Cong	Phase	CL	Alarms
Lowest	C->A	65	DA,SI

Connected 5/4/2004 9:46 AM



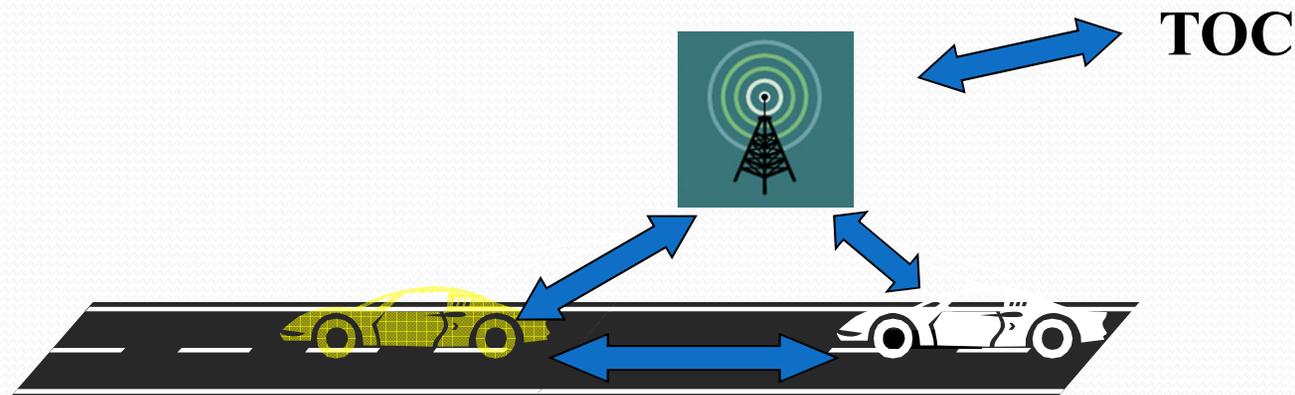
**Today and Tomorrow:**

**Connected Vehicle**

# Connected Vehicle

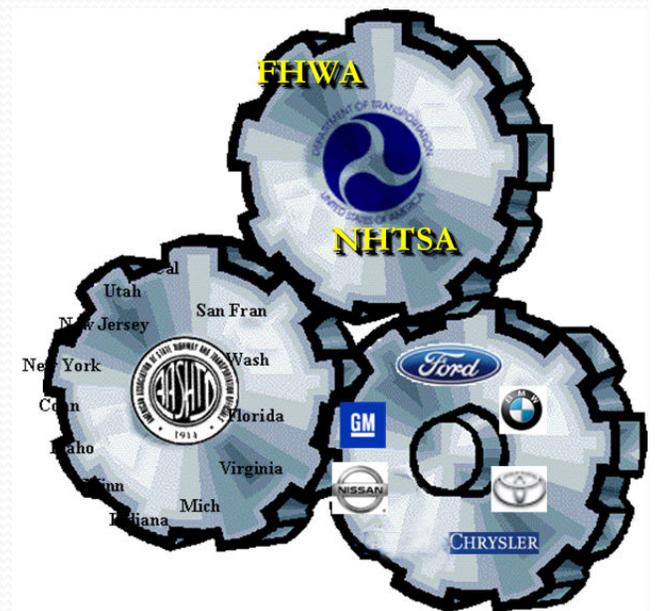
Definition: To create an “Enabling Communication Infrastructure” to support Vehicle-to-Vehicle and Vehicle-to-Infrastructure Communications... the “*Wireless Superhighway*”

Purpose: To enable a number of new applications that provide significant safety, mobility, and commercial benefits



# Who is Connected Vehicle?

- USDOT – FHWA, NHTSA, FMCSA
- Automakers –Chrysler, Ford, GM, Honda, Nissan, Toyota, VW, BMW
- State DOTs and Local Agencies
- Auto Suppliers
- Contractors

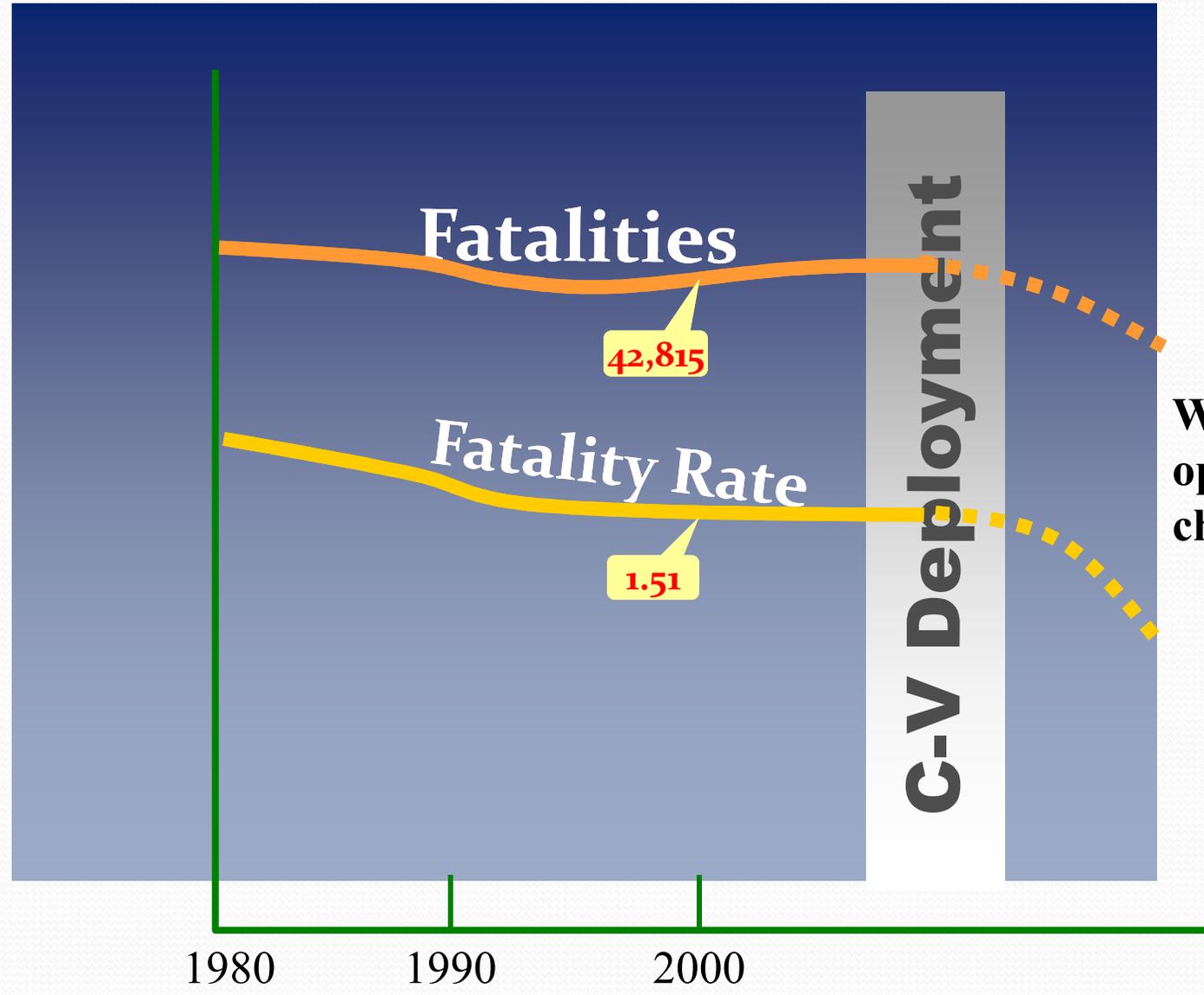


# What's Changed?

- For 100 years, auto engineers & road engineers did not talk.
- Now, they are talking.
- What's changed? We each have information the other wants.

**The Power of Information!**

# Driving Forces: Safety



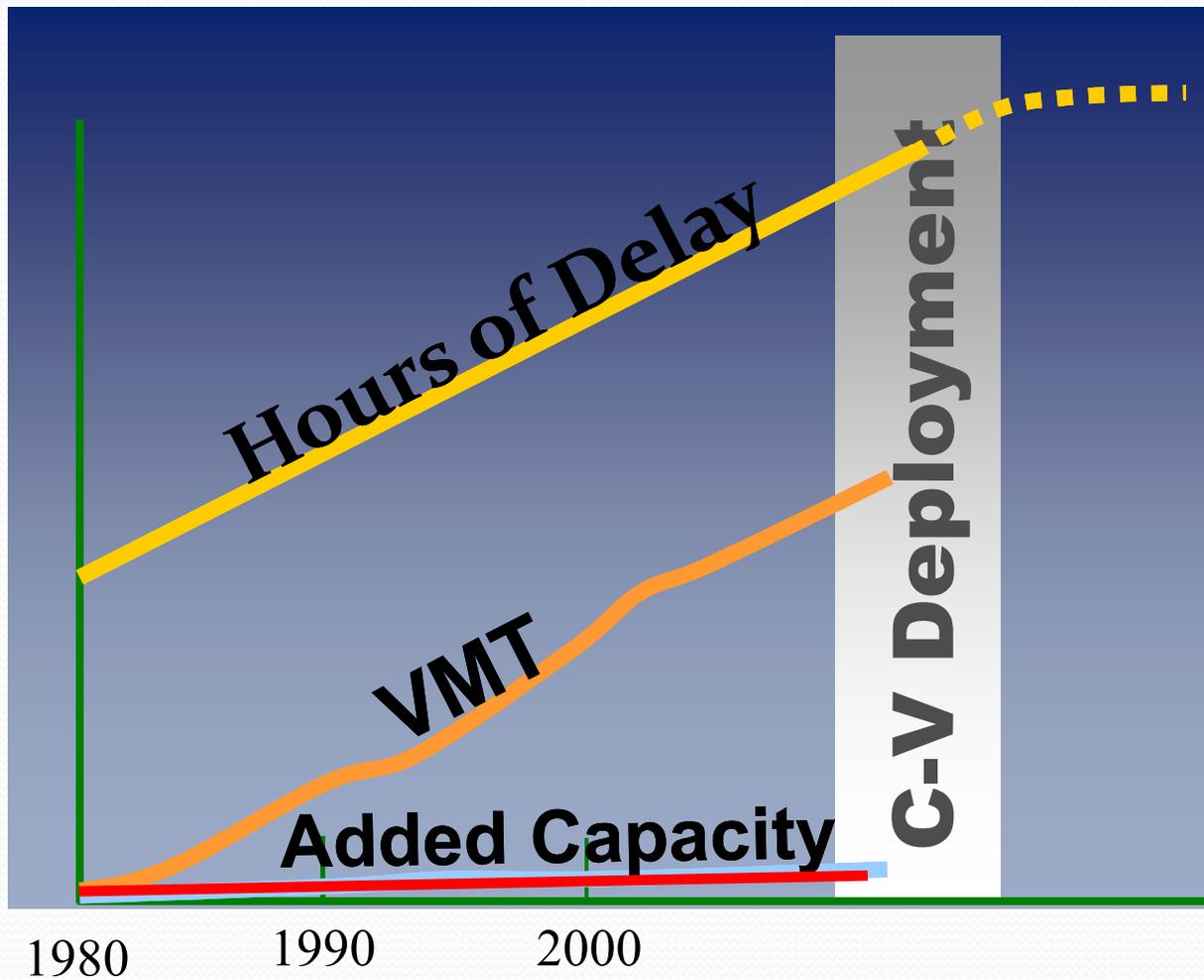
**We have the opportunity to change the trend.**

# Paradigm Shift for Roadway Safety

- Move from “passive safety” to “active safety”
- “While crashworthiness...will continue to be very important, we are reaching the point of diminishing returns....The biggest return on investment in terms of lives saved...in the future will come from...crash-avoidance technologies”

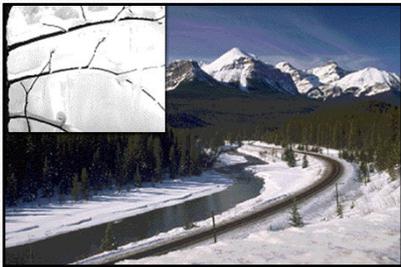
**– Dr. Jeffrey Runge, former Administrator of NHTSA**

# Driving Forces: Mobility



We have the opportunity to create a turning point.

# Connected Vehicle Potential Applications



.....also

- In-Vehicle Signing
- Emergency Vehicle Alerts
- Curve Warnings
- Slippery Pavement Alerts
- Over 100 other applications



# Chrysler Video-Collision Avoidance

## Intersection Collision Avoidance

DaimlerChrysler Research & Technology North America, Inc.



# Chrysler Video/Hazard Warning

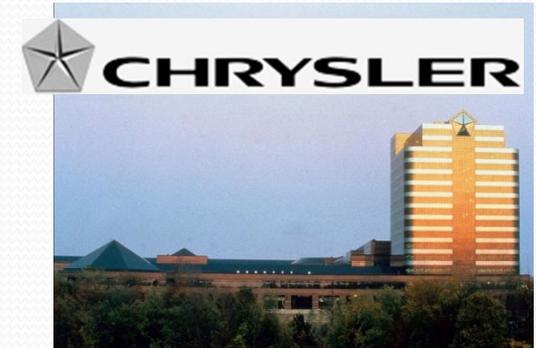
## Inter-Vehicle Hazard Warning

DaimlerChrysler Research & Technology North America, Inc.



# Connected-Vehicle Deployments

- Chrysler HQ: Installation of wireless network on traffic signals
- Cooperative Intersection Collision Avoidance System
  - Group of automakers doing safety research in pre-competitive environment
- National C-V test bed (located in Oakland County)
- Data Use Analysis and Processing (DUAP)
  - Answer the question “how can public agencies use C-V data?”



# Why Connected Vehicle For RCOC?

- Safety – We are the leader and want to stay that way
- Data – Planning, safety & studies
- Customer Service – Higher expectations
- Jobs – New industry
- Funding – New money will be required to make C-V happen
- ITS Experience – RCOC has the leadership and is a significant partner

# Safety Pilot Connected-Vehicle Model Deployment

- University of Michigan Transportation Research Institute (UMTRI), working with USDOT, has established a model deployment of Connected-Vehicle equipment & applications.
- Deployment is real-world, multi-modal (trucks, busses, cars) operating environment, supported by a diverse team of industry, public agencies and academia.
- Nearly 3,000 vehicles are equipped with connected-vehicle technology.
- 29 field sites are equipped.
- The data collected by UMTRI will be used by the USDOT to support an agency decision in 2013.



# Summary

- We got into ITS in the early 1990s to improve safety & mobility.
- What we've seen: ITS is very effective at improving both.
- The next step: Cars that talk to each other and to the infrastructure.
- We plan to be a key player in the Connected-Vehicle world.

# Save the Date



Cobo Center Michigan

September 7-11, 2014

Reinventing  
Transportation in  
Our Connected World

**DETROIT**<sub>2014</sub>  
INTELLIGENT TRANSPORT SYSTEMS

CO-HOSTED BY:





**QUESTIONS?**

