

# **New Mobility and Connectivity: ITS innovations as a foundation for urban applications**

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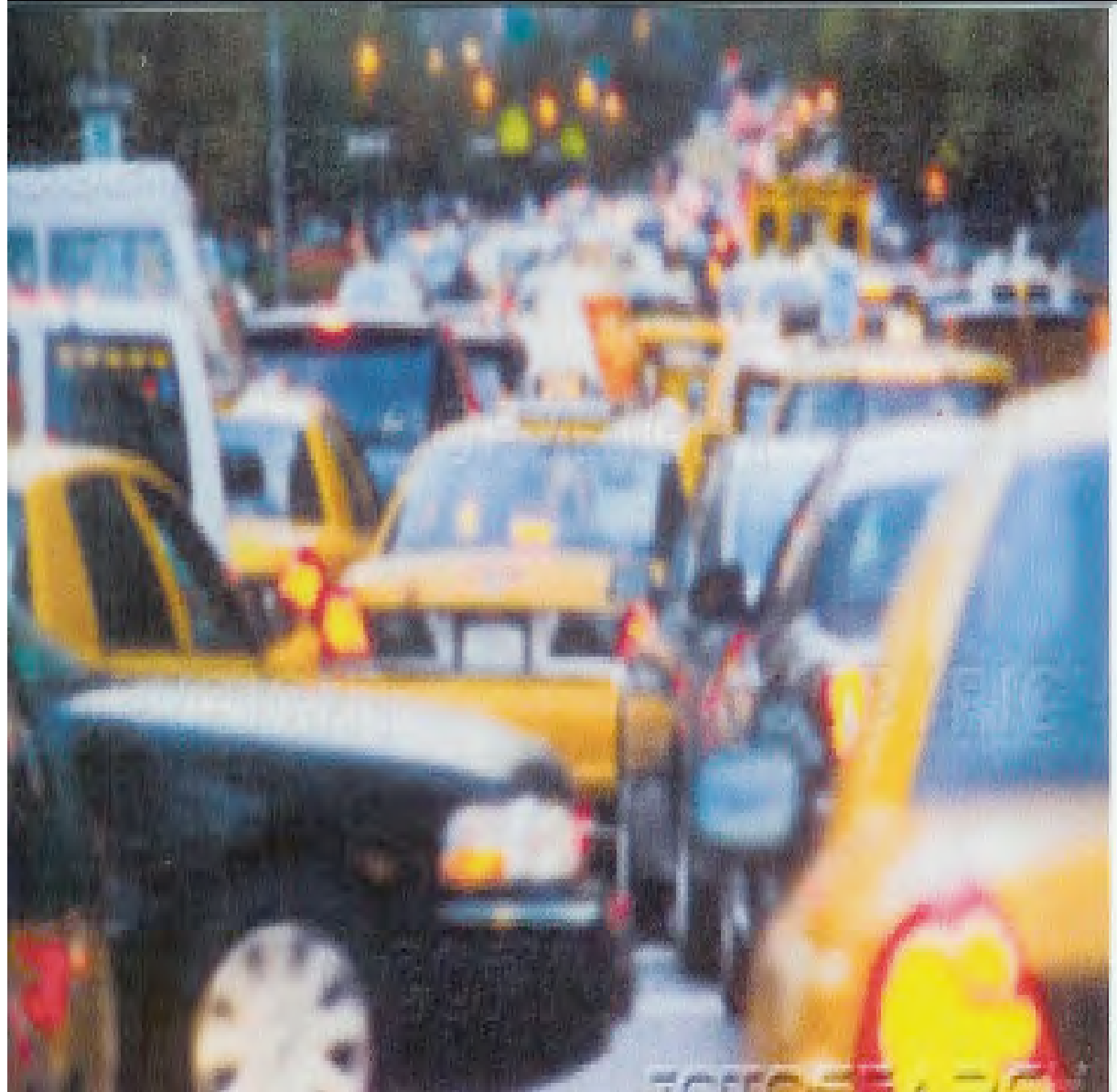
# Outline

- **Technology in transportation**
  - We have some useful experience
- **Innovation requires iteration**
- **Connectivity offers solutions**
  - Intelligent Transportation Systems (ITS) – can they finally deliver?
  - Can help address congestion, safety, energy, carbon emissions
- **ITS in urban applications**
  - Tolling and pricing
  - Service delivery
  - Freight throughput

# Technology will overcome

*What is wrong with this  
statement?*

*Why won't this happen?*



Why not?...

# 1. What do people really want?

- They know what they don't want



What  
problem  
does this  
solve?

# **They don't know enough about these beneficial technologies**

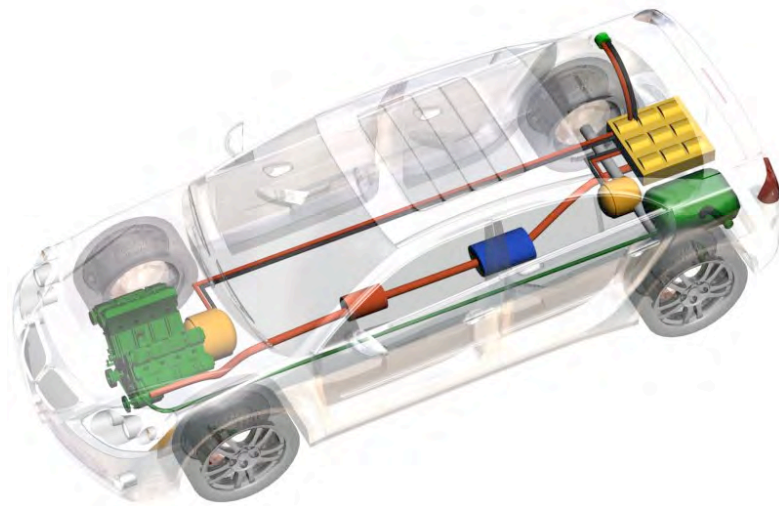
- **Electronic Stability Control (ESC) reduces single vehicle crashes by 40 – 50 %**
  - **Would probably want it if they knew this**
- **Adaptive traffic signals save fuel and lives**
  - **They're invisible**
  - **New lanes look more like progress**

Solving known problems: infrequent, incremental

# They are interested in what this transformational technology can do for the country

## ■ Plug-in-Hybrid Electric Vehicle (PHEV)

- *To reduce dependence on foreign oil*



Addressing a clear and growing threat

Why not?...

## **2. ITS must be a lot more robust**

- **Transparent alcohol interlocks would need to be a lot better than 6 sigma reliability**
  - **Billions of trips every day!**
- **Credibility of the technology**
  - **Lane departure warning is verifiable and therefore has credibility**
  - **False alerts are anathema**

Why not?...

### **3. Technology tends to have an unproductive point of departure.....**

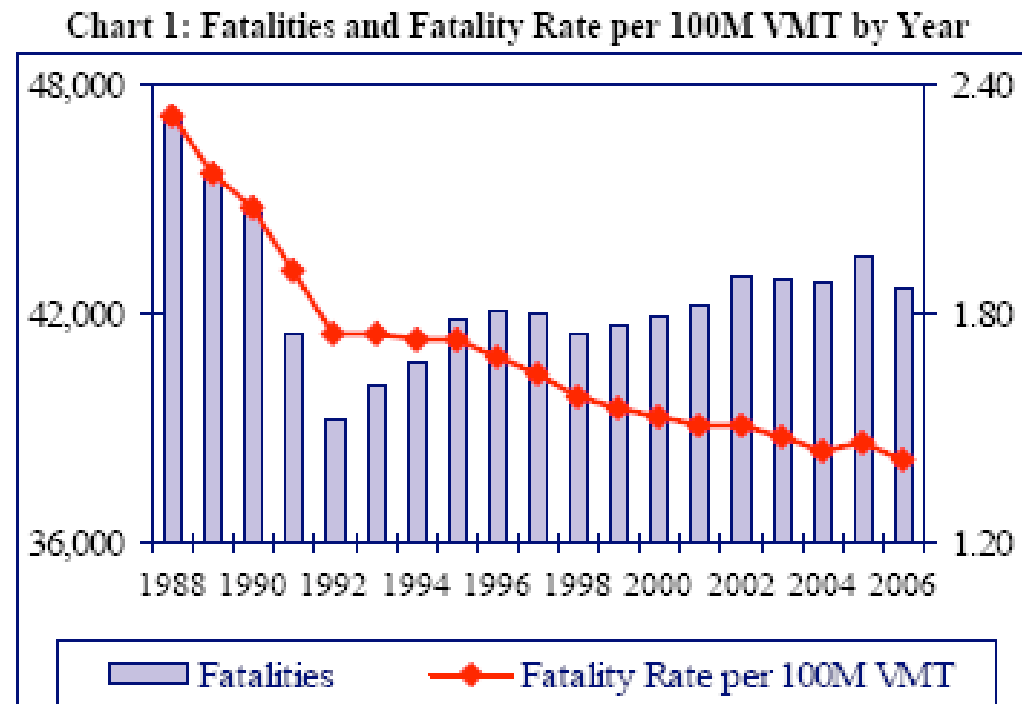
We design it to solve a known problem

Actually many problems



# Known problems in transportation - safety

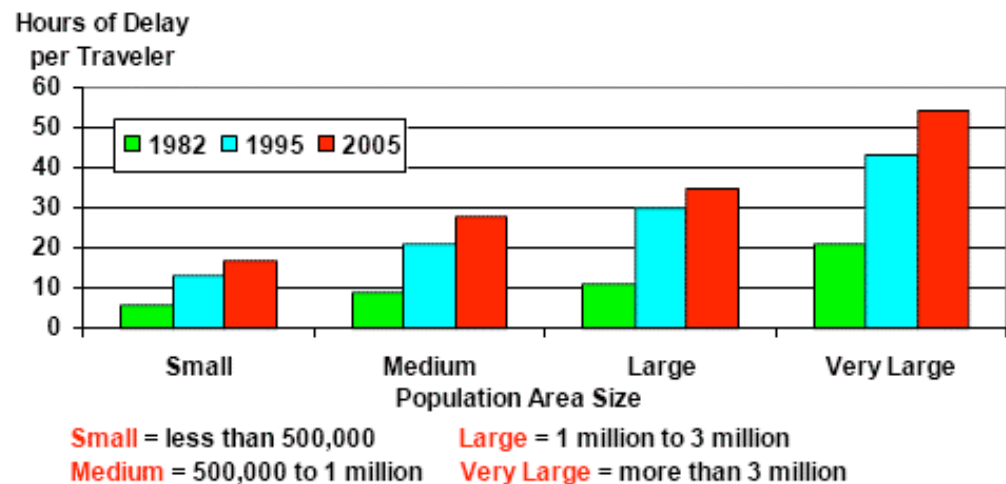
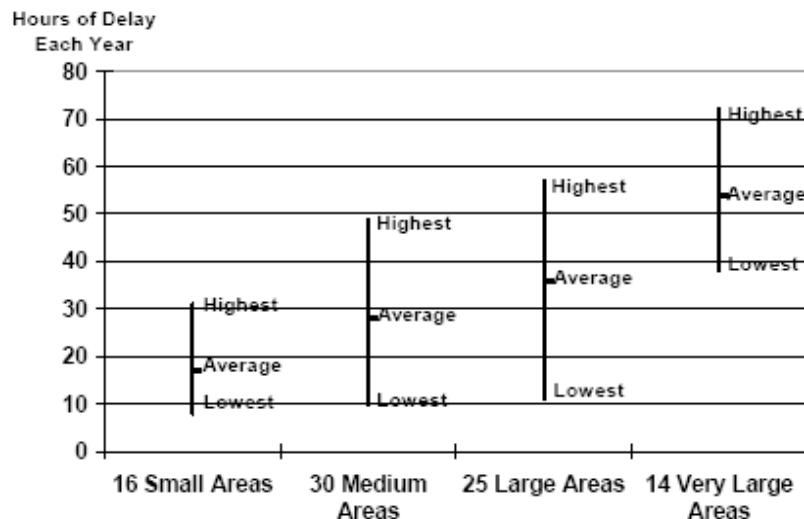
- 43,000 lives
- \$240 billion cost
- 40 % in urban areas



Technology has helped, but not decisively

# Known problems in transportation - congestion

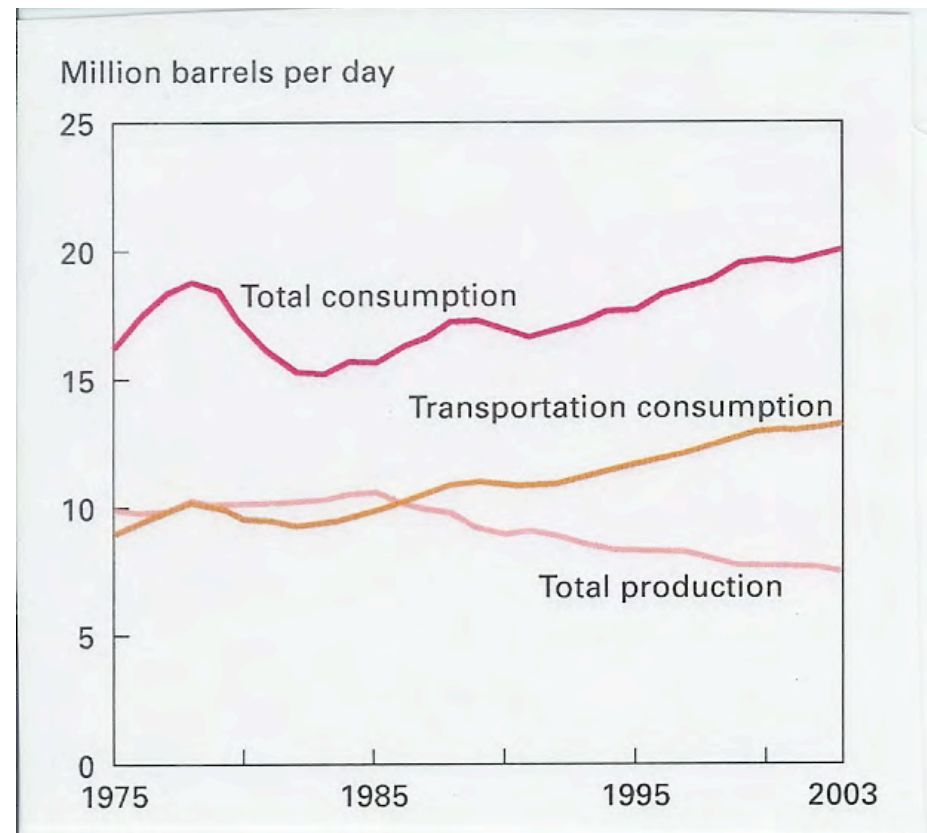
- Almost all urban
- 437 urban areas
- \$78 billion cost
- A sign of “success”?



# Known problems in transportation – oil dependence

- 60 % of travel in urban areas
- More than 60 % of fuel consumed

Only 12% of world population owns an auto, but 97% are running on oil



# Known public and private roles



Seed funding, research & evaluation, legislation, ratings

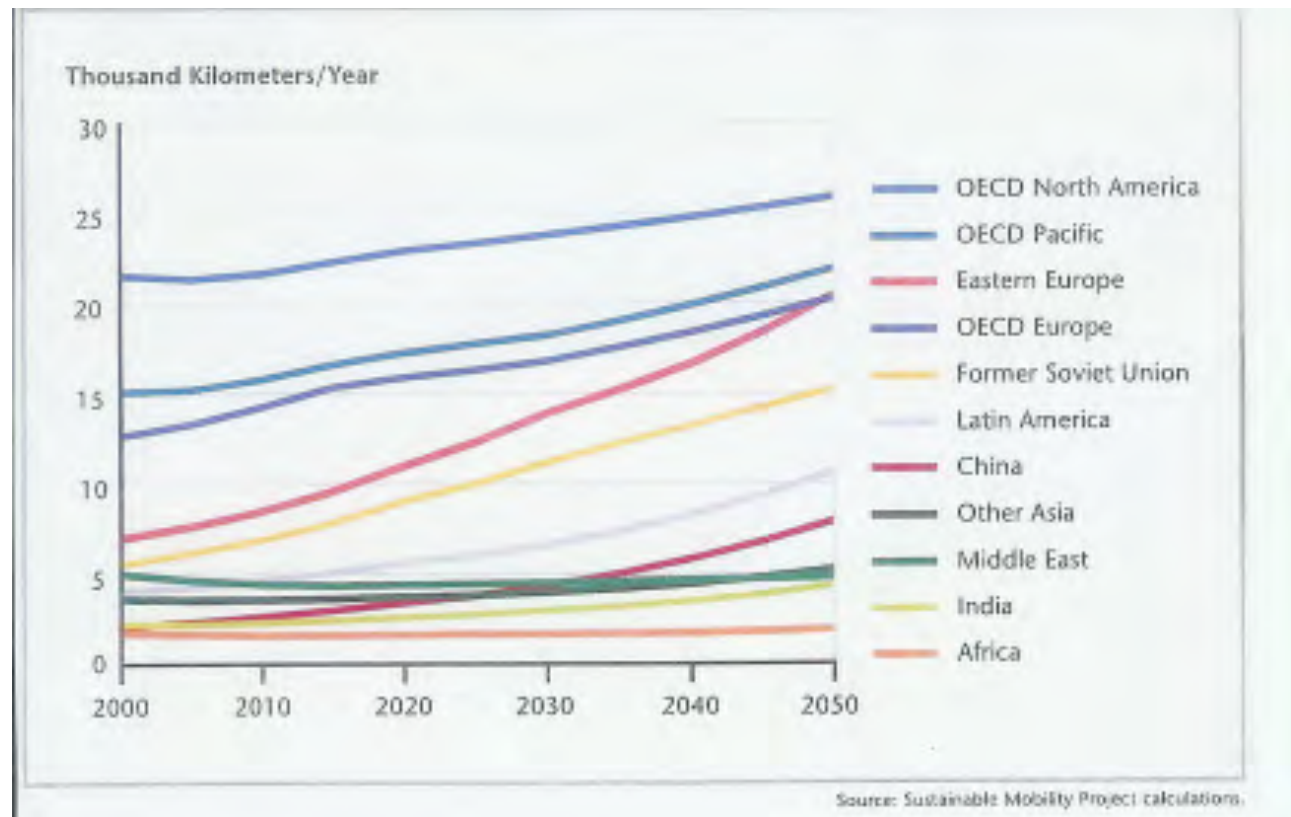


Proprietary technology  
Investment for mass market



# Meanwhile demand keeps increasing.....

- Reflective of the economy
- Increases exposure to problems
- From 1977 – 2001, VMT increased by 151 % while the population increased by 30 %
  - High fixed costs but low marginal cost of extra travel
  - Smaller households, more free time
- Only 27 % of trips are work-related



But mileage has declined in the past 6 months

# Innovation in transportation

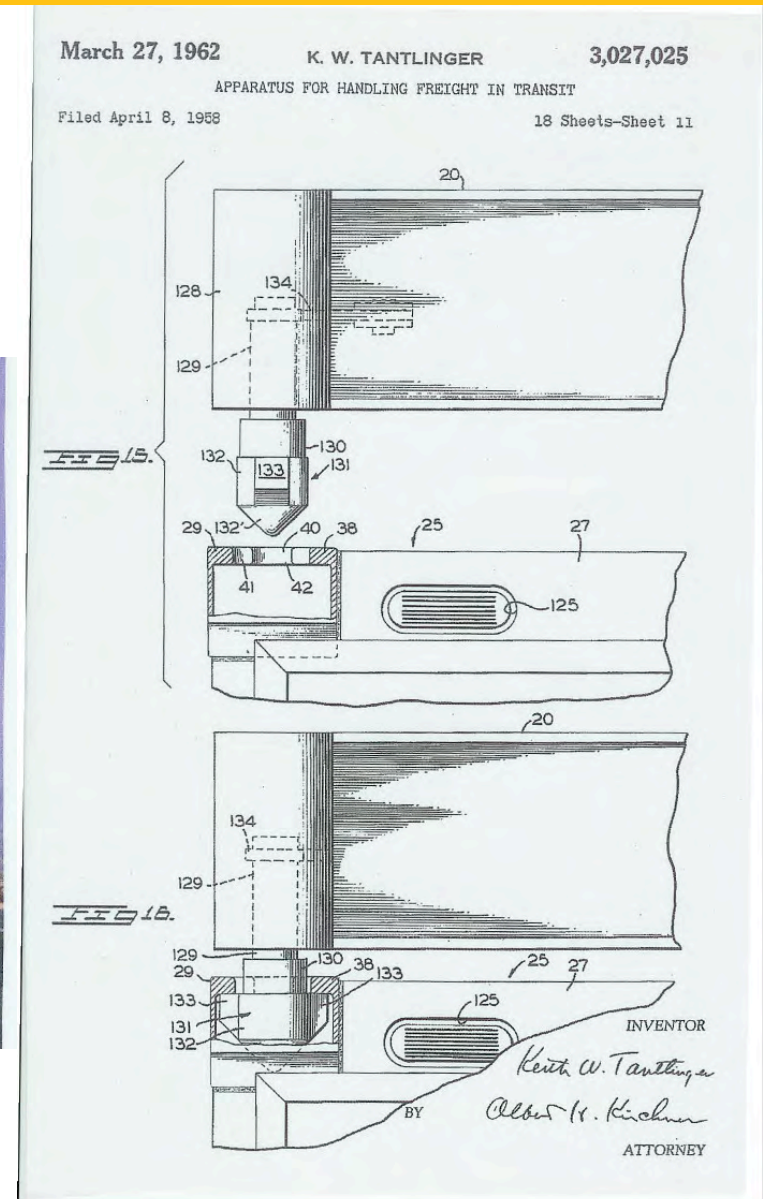


Clear objectives – immediate post-war - military origins

# Iteration needed to get it right



Entrepreneurs invented the twistlock to allow tight stacking



# Federal intervention needed to get it right



## U.S. Interstate System



# Enter connectivity



Credible Information + Use Data

# VII: a much better point of departure

- Objectives can be stated
  - Not the military
  - Not solving lists of current problems
  - A space for entrepreneurs conversant with the adjectives of new mobility
- Credibility is a prerequisite
- An arena to get it right - iteration
- *The government will provide the wireless communication backbone*

**Vehicle Infrastructure Integration**


**Definition:** The establishment of vehicle-to-vehicle and vehicle-to-roadside communication capability nationwide.

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

*Connecting vehicles and Infrastructure*



*Creating an "enabling communication infrastructure"*



?



# But we need to be vigilant: VII created a long list of potential applications....

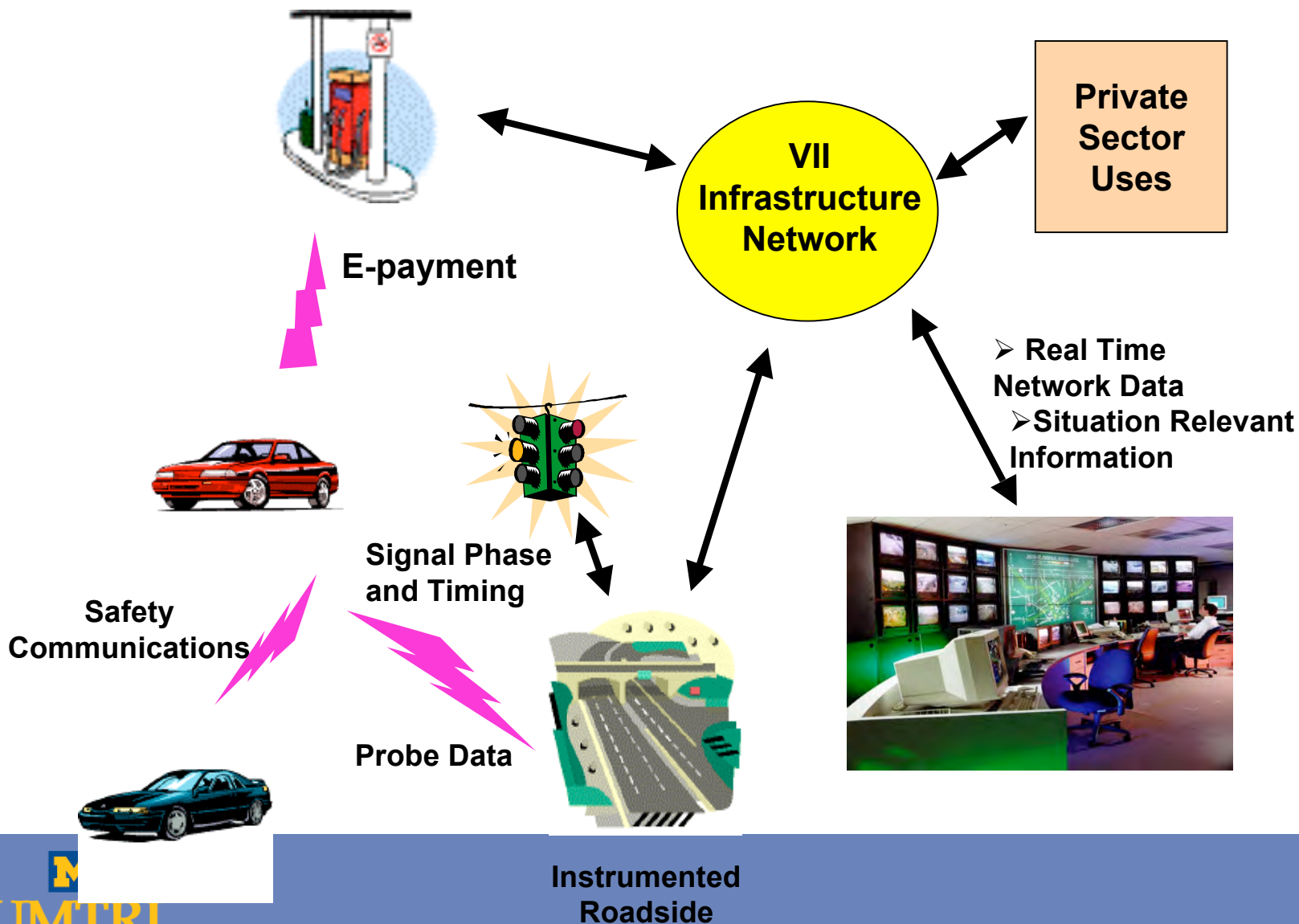
## Technical Implementation - Applications

*Create an initial set of applications to demonstrate/justify VII*

- **Day 1 Applications Identified:**
  - *Emergency Brake Warning*
  - *Curve Speed Warning*
  - *Traffic Signal and Stop Sign Violation Warning*
  - *In-Vehicle Signing*
  - *Traveler Information*
  - *Electronic Payments*
  - *Signal Timing Optimization*
  - *Local Weather and Winter Maintenance*
- **Some application development underway; more to come.**
- **Benefit-Cost Analysis initiated**



# The Vehicle Infrastructure Integration Program is a key long term safety and mobility strategy



# The ultimate technological network

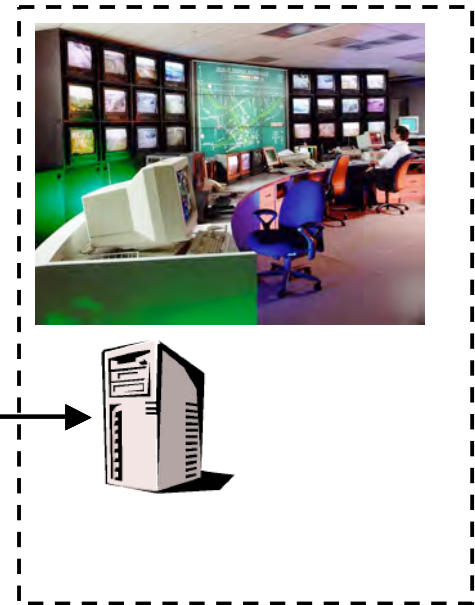
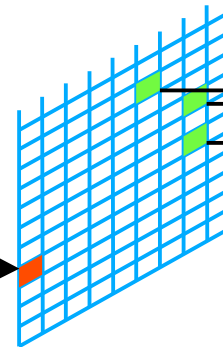


200 million  
Vehicle  
units

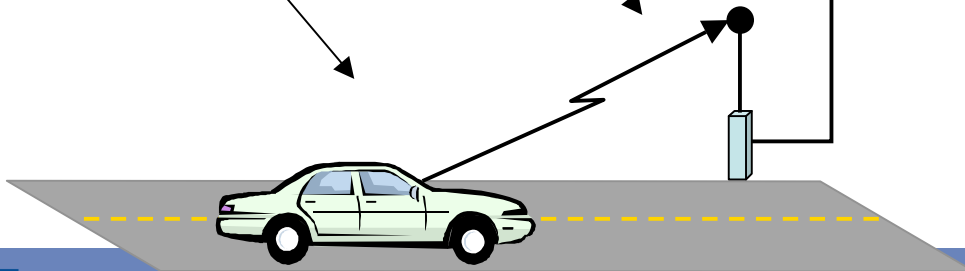


250 thousand Roadside  
units

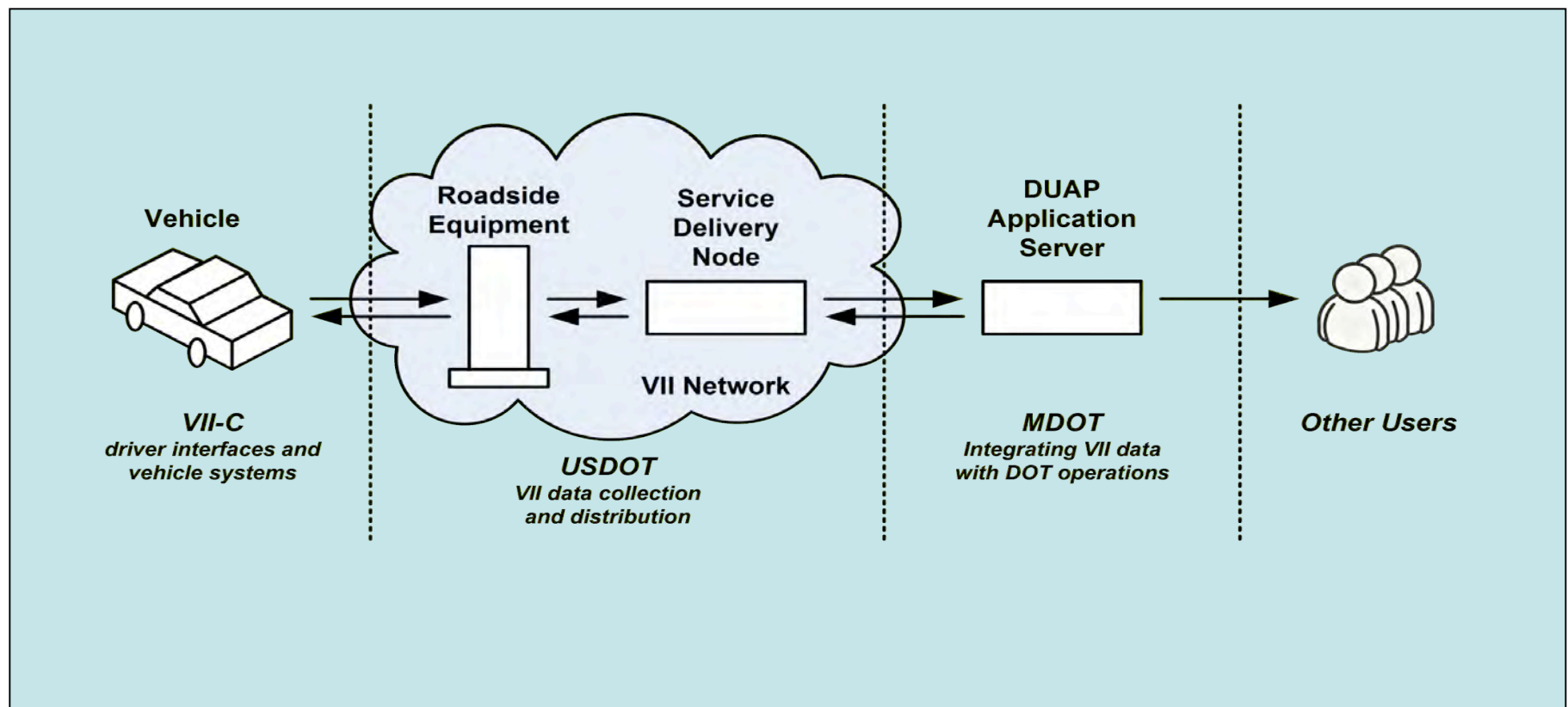
Data Server



**information relayed  
back to drivers**



# Michigan's unique effort to use VII data to manage the infrastructure



## **What could entrepreneurs do? VII as the backbone of New Mobility**

- **Vision: a growing market for diverse transportation services which enable sustainable deployment of transportation modes, vehicles, technology and infrastructure while reducing costs and risks for urban individuals**



# The VII sandbox



- **Real time traveler information**
  - ❑ Cross-modal schedule information
  - ❑ PDAs for door to door wayfinding
  - ❑ Time of trip predictor for multi-modal trips
  - ❑ Fare payment and pricing
- **The clearinghouse for business transactions including:**
  - ❑ Integrated transportation services
  - ❑ Communication services
  - ❑ Data services for system operation, charging and development
  - ❑ Data services for electric vehicle charging, credits etc

## What is ITS, anyway?

**ITS technologies use communications, electronics, sensors, and computer hardware and software to improve the performance or safety of freeway and transit systems that are designed to improve traffic flow (GAO 2005)**



Plus what you entrepreneurs want to make it