FMCSA R&T: Today and Tomorrow

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U.S. Department of Transportation
Federal Motor Carrier Safety Administration

TRB

Vehicle Infrastructure Integration (VII)

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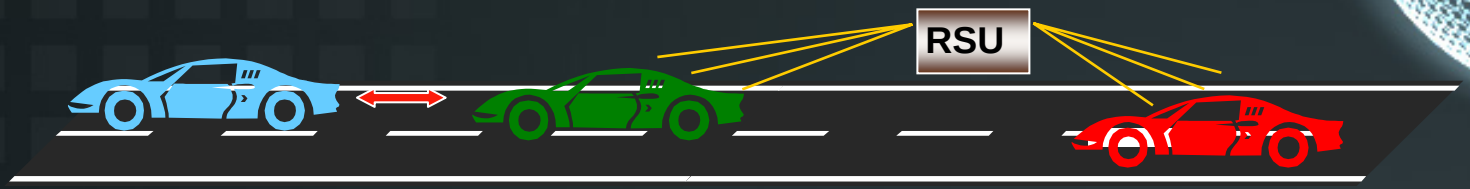
TRB

Topics Covered

- What is VII?
- What are the applications and opportunities of VII?
- What are the options for deployment?
- What are the issues affecting deployment?
- What is the plan for advancing VII?

What is VII?

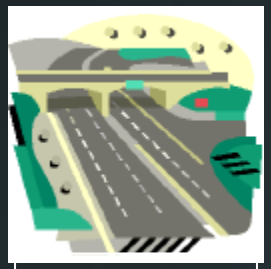


- VII = an enabling communications infrastructure
- Vehicles equipped with “onboard units” (OBUs)
- Infrastructure equipped with “roadside units” (RSUs)
- Wireless communication between OBUs & RSUs to exchange data

Deployment Example

OBUs

DSRC
@ 5.9GHz



RSUs

Network
Management/Router

Internet

Private Companies

OEMs

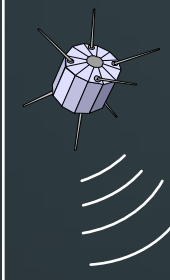
OBU – Onboard Unit

RSU – Roadside Unit

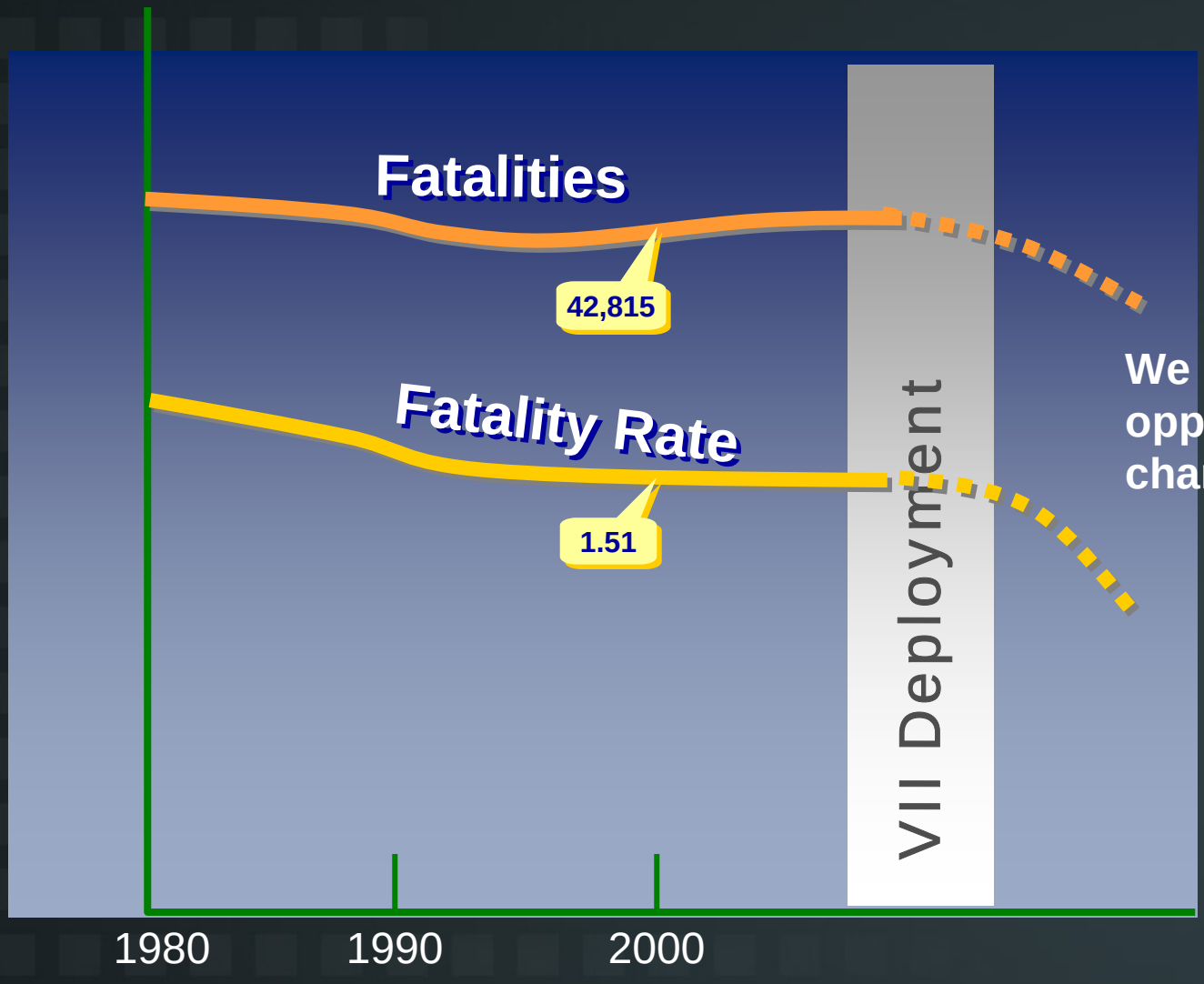
Public Sector

Satellite-to-Vehicle

Vehicle-to-Cellular

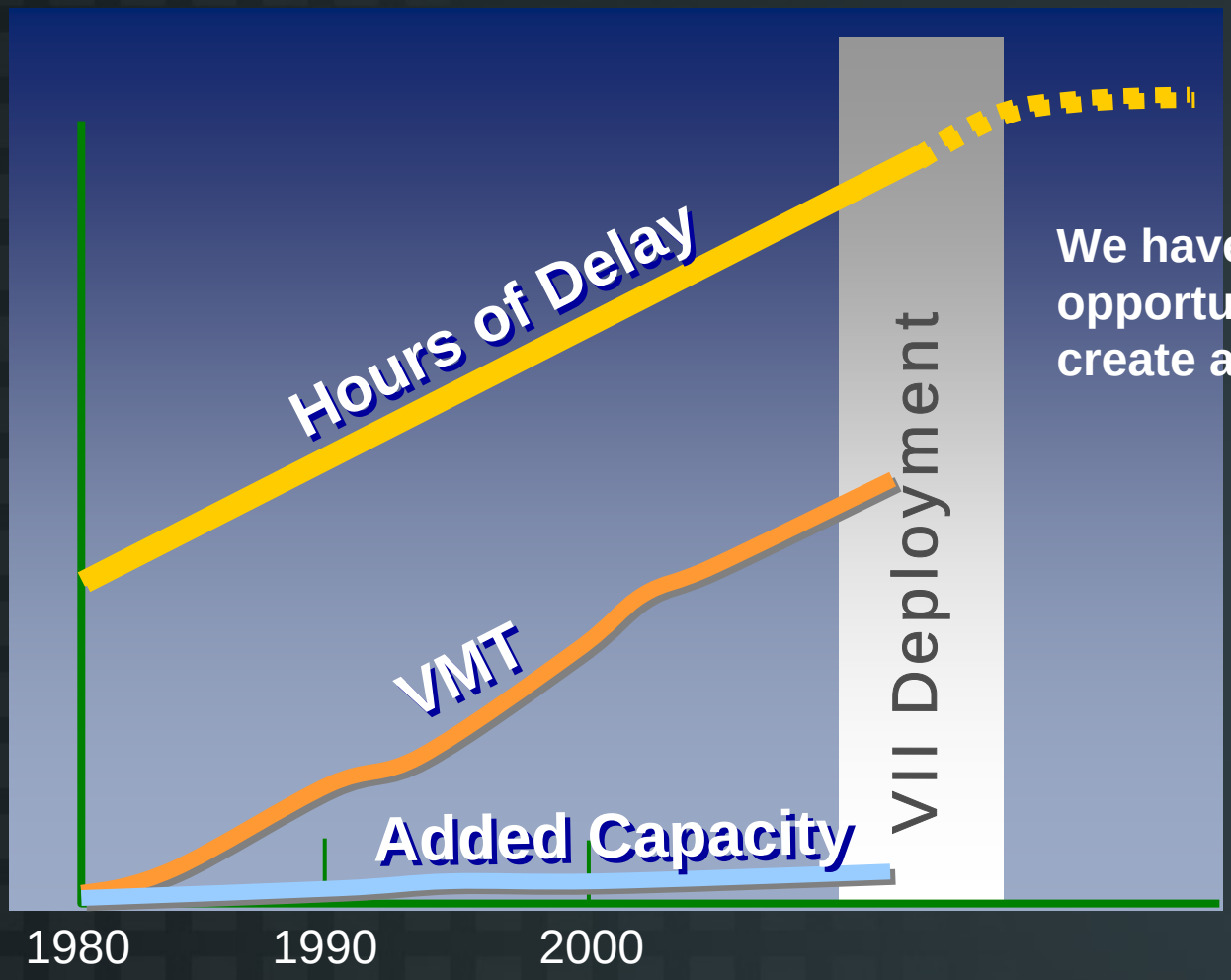


Driving Forces: Safety



We have the opportunity to change the trend

Driving Forces: Mobility



We have the opportunity to create a turning point

Potential Applications

- Cooperative safety systems
- Active probe vehicles
- Telematics
- Mobility management

Cooperative Safety Systems

Primary Examples

- Intersection collision avoidance
- Road departure warning

Other Opportunities

- Work zone management
- In-vehicle signing
- Commercial vehicle safety data

Probe Vehicles

- Vehicle to roadside communication would enable vehicles to act as active probes
- Data from existing vehicle based sensors could be communicated to roadside
- Potential coverage of every road and street
- Example Information
  - Average speed and travel time
  - Incident detection
  - Onset of precipitation
  - Road condition

Telematics

A wide range of commercial services will be enabled

- Dynamic route guidance
- Electronic payment for services
- Fleet management

Mobility Management

- VII could be an enabling technology for a new generation of direct traffic assistance or control
- Possibilities Include:
  - Queue management
  - Dynamic intersection control
  - Merge assistance

Technology

- DSRC at 5.9 GHz
  - Primary technology under consideration
  - Specifically designed to support a number of use cases
  - 5.9 GHz spectrum recently approved by FCC for DSRC
- Other potential technologies:
  - Cellular
  - WiFi

Deployment Options

- Three basic modes of communication
  - Vehicle to vehicle
  - Local vehicle to roadside
  - Network vehicle to roadside
- Communication modes could be deployed individually (e.g., just veh-veh) or in combination
- Each could be deployed using various communication technologies
- Some may require public sector involvement

USDOT VII Initiative

Motivation:

- Potential of VII is clear
- No one use may justify deployment
- No one entity may cause deployment
- A cooperative venture is probably needed
  - Determining this arrangement is a major focus of VII

Milestone:

- Deployment decision (2008)

VII Working Group (Coalition)

Purpose:

- Work towards a decision on defining a VII system and the set of actions necessary to deploy it

Working Group in Place:

- USDOT, AASHTO, auto companies

As VII matures . . .

Local government

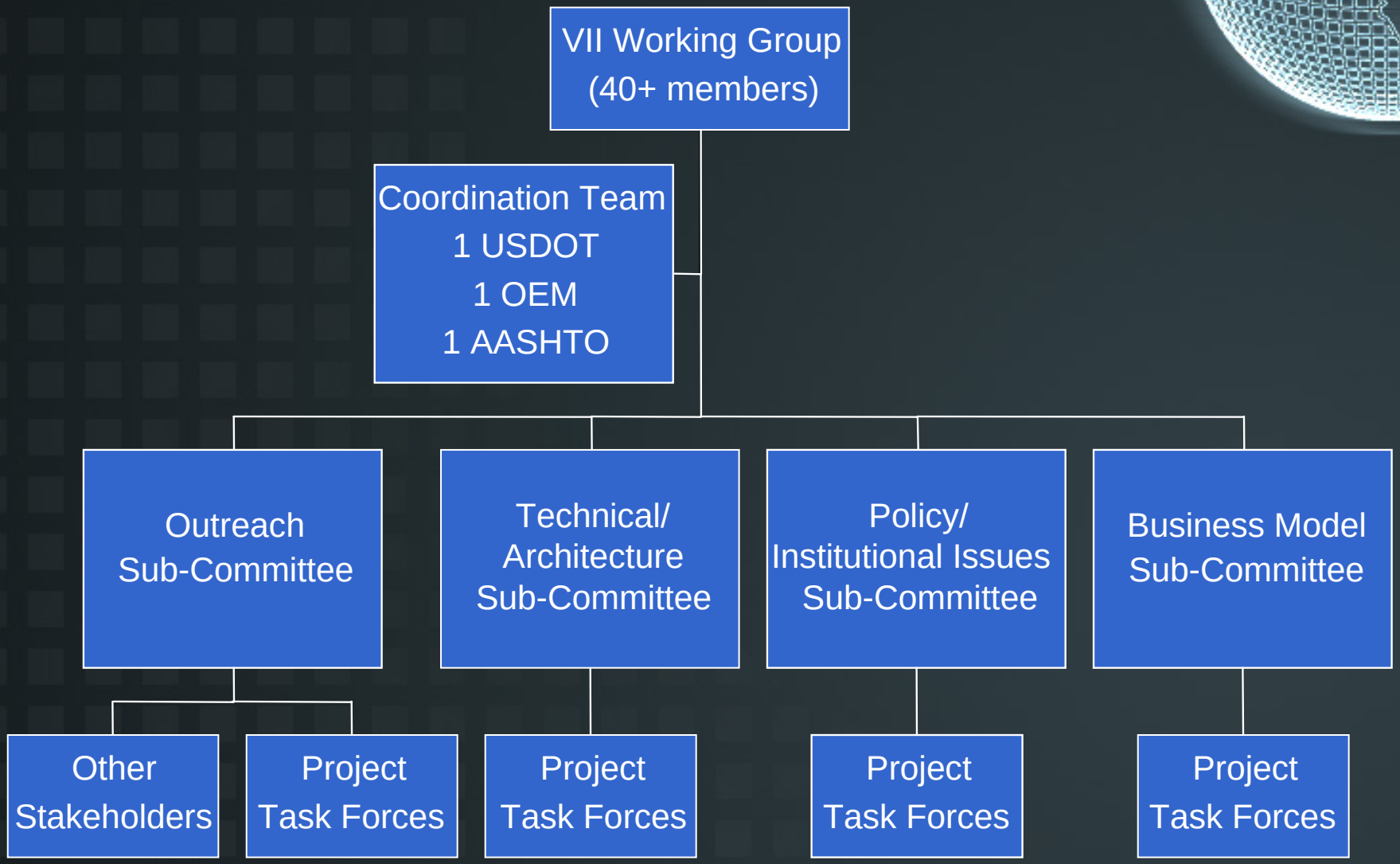
Telecommunications

Trucking

Telematics

Transit

Working Group Structure



Working Together!

Completed:

- Identified public sector use cases
- Defined high level requirements

Currently:

- Defining data and communication requirements
- Evaluating deployment options
- Conducting DSRC test program

Can We Deploy a VII System?

Several key issues will have to be resolved:

- Technical implementation
- Privacy and data ownership policy
- Business models public and private
- Information security

For more information:

Public meeting

- February 9-10, 2005 in San Francisco, CA
- Information and registration at http://www.itsa.org/vii_meeting.html

USDOT Joint Program Office

- Bill Jones, (202) 366-2128
- http://www.its.dot.gov
  - Click on “major initiatives”

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