Driverless Cars in 2022:
A Follow-On Session
To the Driverless Car Summit

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6 August 2012

Turner-Fairbank Highway Research Center

The Transportation Problem

Safety
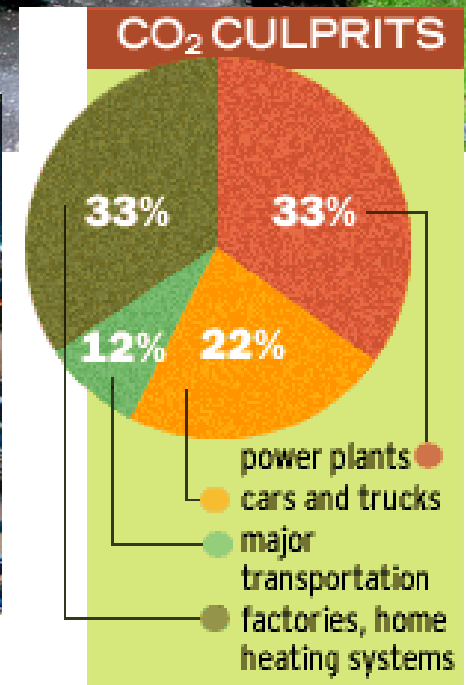- ❑ 32,788 highway deaths in 2010
- ❑ 6,000,000 crashes/year

Mobility
- ❑ 4,200,000,000 hours of travel delay
- ❑ $80,000,000,000 cost of urban congestion

Environment
- ❑ 2,900,000,000 gallons wasted fuel

CO_2 CULPRITS

33%   33%

12%   22%

power plants
cars and trucks
major transportation
factories, home heating systems

But, A Big Problem is…….

<u>The Driver</u>!

- ❏ **Causes over 90% of crashes**

- ❏ **Has very poor awareness of traffic:**
    - ❏ **Near – Surrounding cars, trucks, buses**
    - ❏ **Mid – A mile down the road**
    - ❏ **Far - Regional**

The Role of the US Department of Transportation

- Develop policies and programs that contribute to transportation that is:

  - Safe

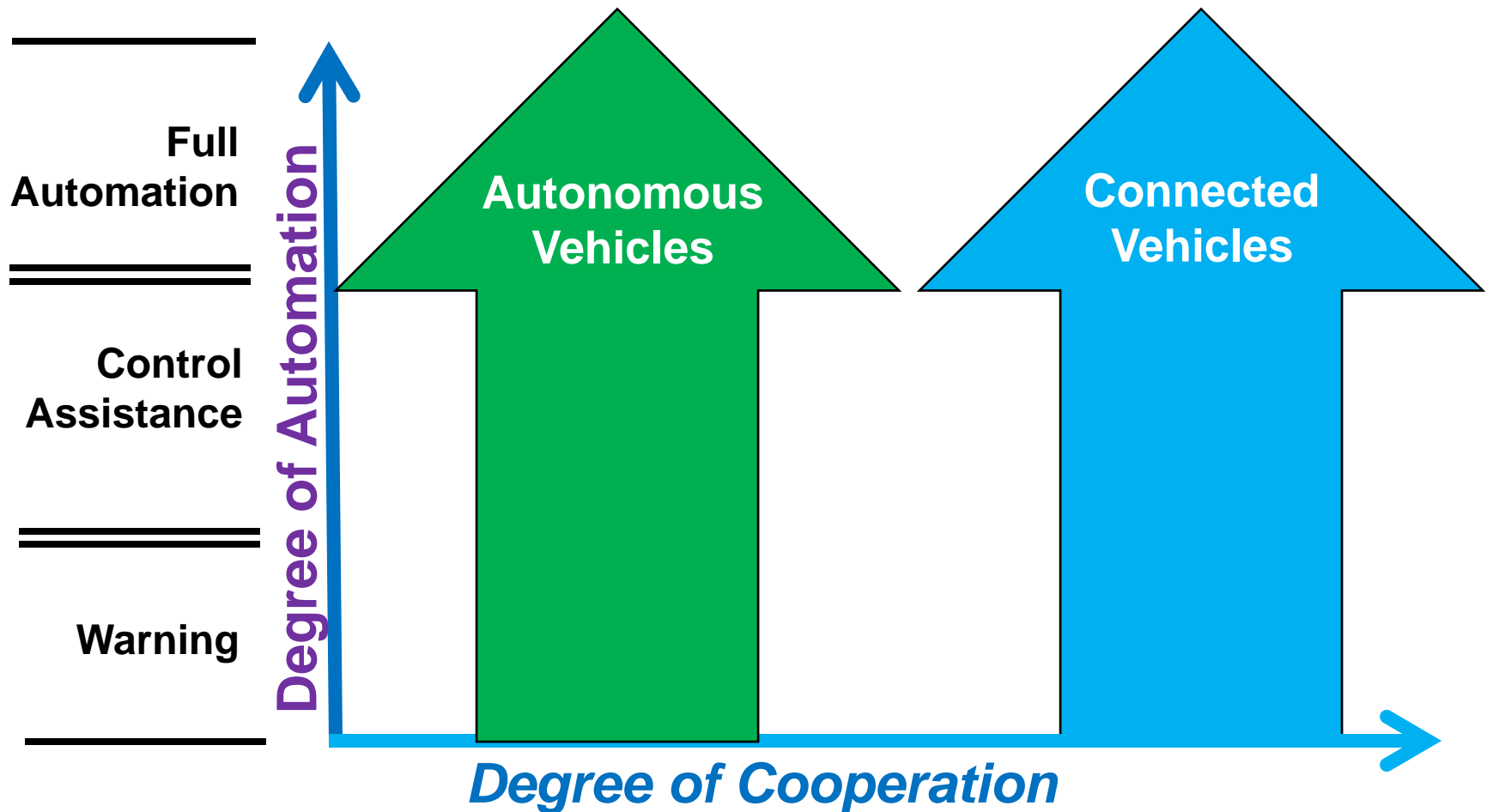 - Fast

  - Efficient

  - Convenient

Automation As The Solution

Automation: The use of electronic or mechanical devices to replace human labor

Recent Discussion Framework*

Degree of Automation

- Full Automation
- Control Assistance
- Warning

Autonomous Vehicles

Connected Vehicles

Degree of Cooperation

* Adapted from Shladover, UC PATH (Presentation at TRB Automation Workshop, July 25-26, 2012

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Challenges to Deployment of Automation

- ❑ **Public Policy**
- ❑ **Driver-Vehicle Interaction**
- ❑ **Information Architecture and Operational Concepts**
- ❑ **Technology Needs and Constraints**
- ❑ **Transition and Deployment Strategies**
- ❑ **Legal, Liability, and Risk**
- ❑ **Vehicle Safety and Security**

* From TRB Workshop, July 25-26, 2012

ITS Research Program Components

Applications	Safety			Mobility		Environment	
	V2V	V2I	Safety Pilot	Real Time Data Capture & Management	Dynamic Mobility Applications	AERIS	Road Weather Applications

Technology
- Harmonization of International Standards & Architecture
- Human Factors
- Systems Engineering
- Certification
- Test Environments

Policy
- Deployment Scenarios
- Financing & Investment Models
- Operations & Governance
- Institutional Issues

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Events Since Driverless Car Summit

- **FHWA Exploratory Advanced Research Workshop (July 24, 2012): "Early Automation Deployment Opportunities in Managed Lane Operations"**

- **Transportation Research Board Joint Committee Workshop (July 25-26, 2012): "Road Vehicle Automation"**

- **US Army - US DOT Coordination Meeting (August 3, 2012)**

Approach: Moving Forward

- **Connected Vehicle Program Milestones**
  - **Safety Pilot Begins August 2012**
  - **NHTSA Decision expected in 2013**
  - **Mobility and Environment Applications Development and Testing Continues**
- **Vehicle Automation Research Program**
  - **Continue work on USDOT Vehicle Automation Research Plan and Roadmap**
- **TRB Workshop Proceedings and Next Steps**
- **Accessible Transportation Research**

Growing Opportunity for Benefits of Automation

54.4 Million People with Disabilities

- ❏ 20% US population; 63% Unemployed
- ❏ Income: $38,400 vs. $61,000
- ❏ Poverty: 24.7% vs. 9.0%
- ❏ Fed Cost: $226 B (2002); $357 B (2008)

1.4 Million Disabled Veterans

- ❏ $1 Billion Claims in 2006
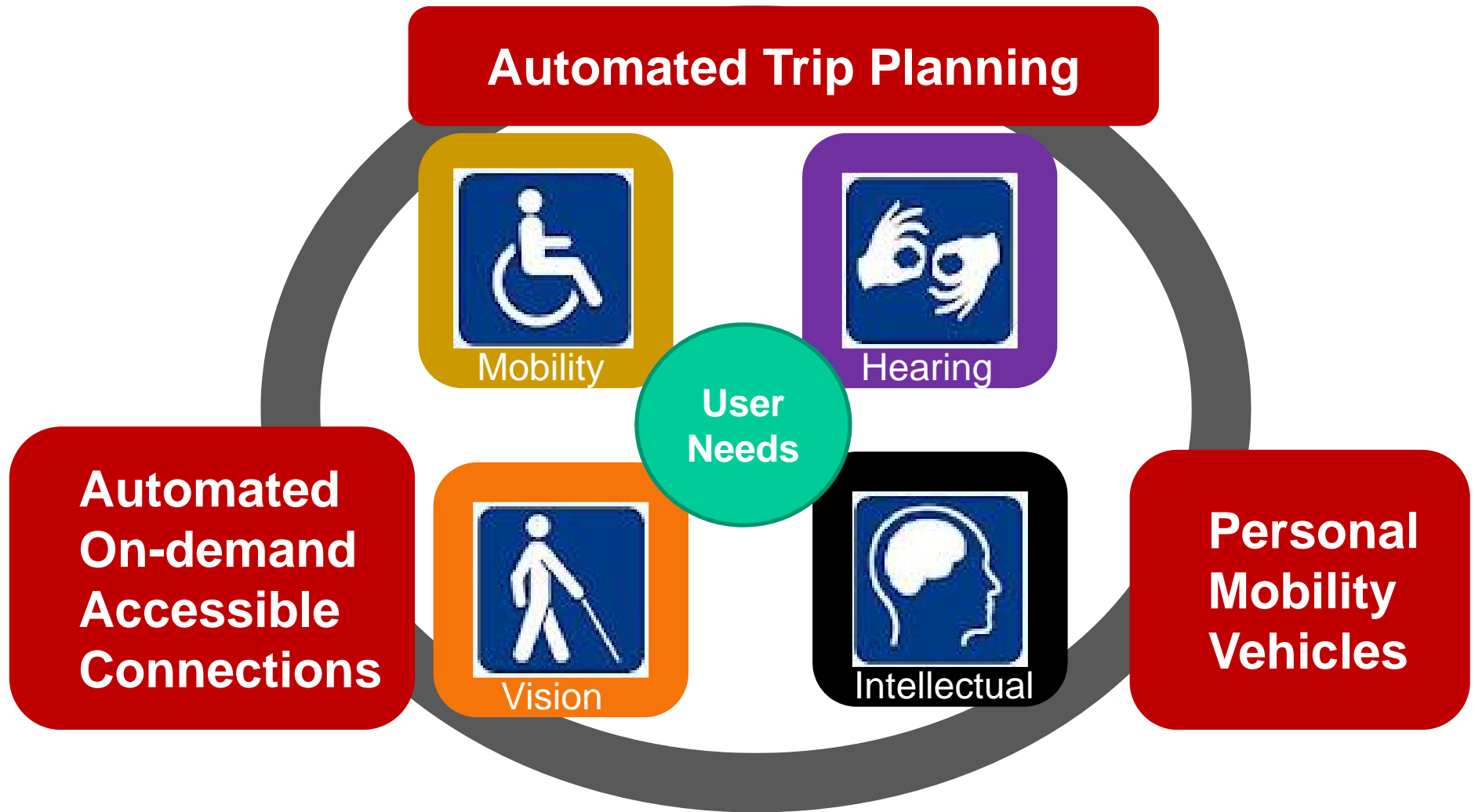- ❏ $6 Billion Claims in 2012

Seniors Age 65 +

- ❏ 35 million in 2004
- ❏ 72 million by 2025

Persons with Disabilities

Veterans with Disabilities

Seniors/Aging

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Where Automation Can Take Us...

Automated Trip Planning

Automated On-demand Accessible Connections

Mobility

Hearing

User Needs

Vision

Intellectual

Personal Mobility Vehicles

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Surface Transportation System: Independently Managed Today

Author: Ed Schipul

Author: Hunter Sunrise

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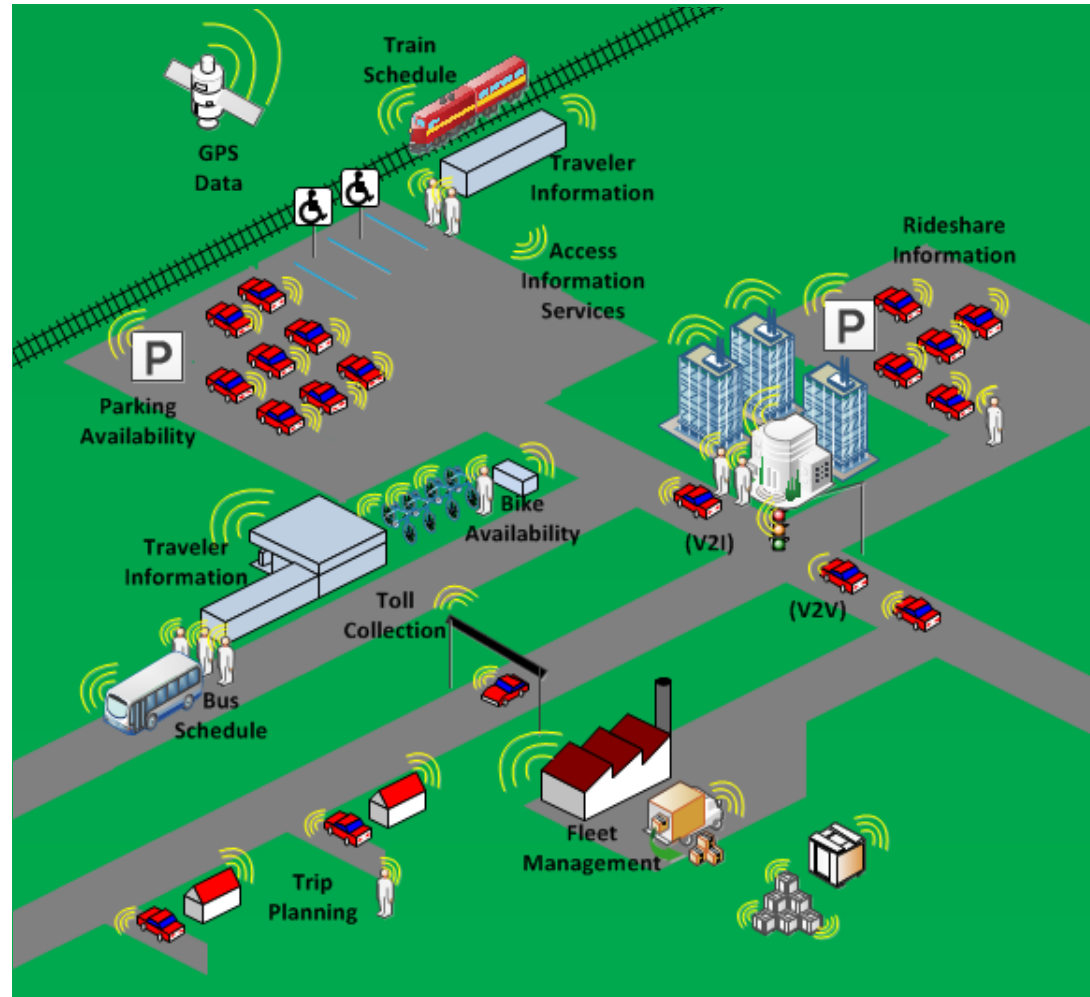
Author : dbking

Author: Agamitsudo

Moving toward Integrated Multimodal Operations

Integrated Goals:
- *Safety*
- *State of Good Repair*
- *Economic Competitiveness*
- *Livable Communities*
- *Environmental Sustainability*

Integrated System:
- *Payload*
- *Vehicles*
- *Infrastructure*
- *Terminals*
- *Connectivity*

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