



UNITED STATES
DEPARTMENT OF TRANSPORTATION

U.S. DOT Support to the President's Innovation Agenda

Briefing and Discussion

**Inter-Agency Working Group on
Innovation and Information Policy**

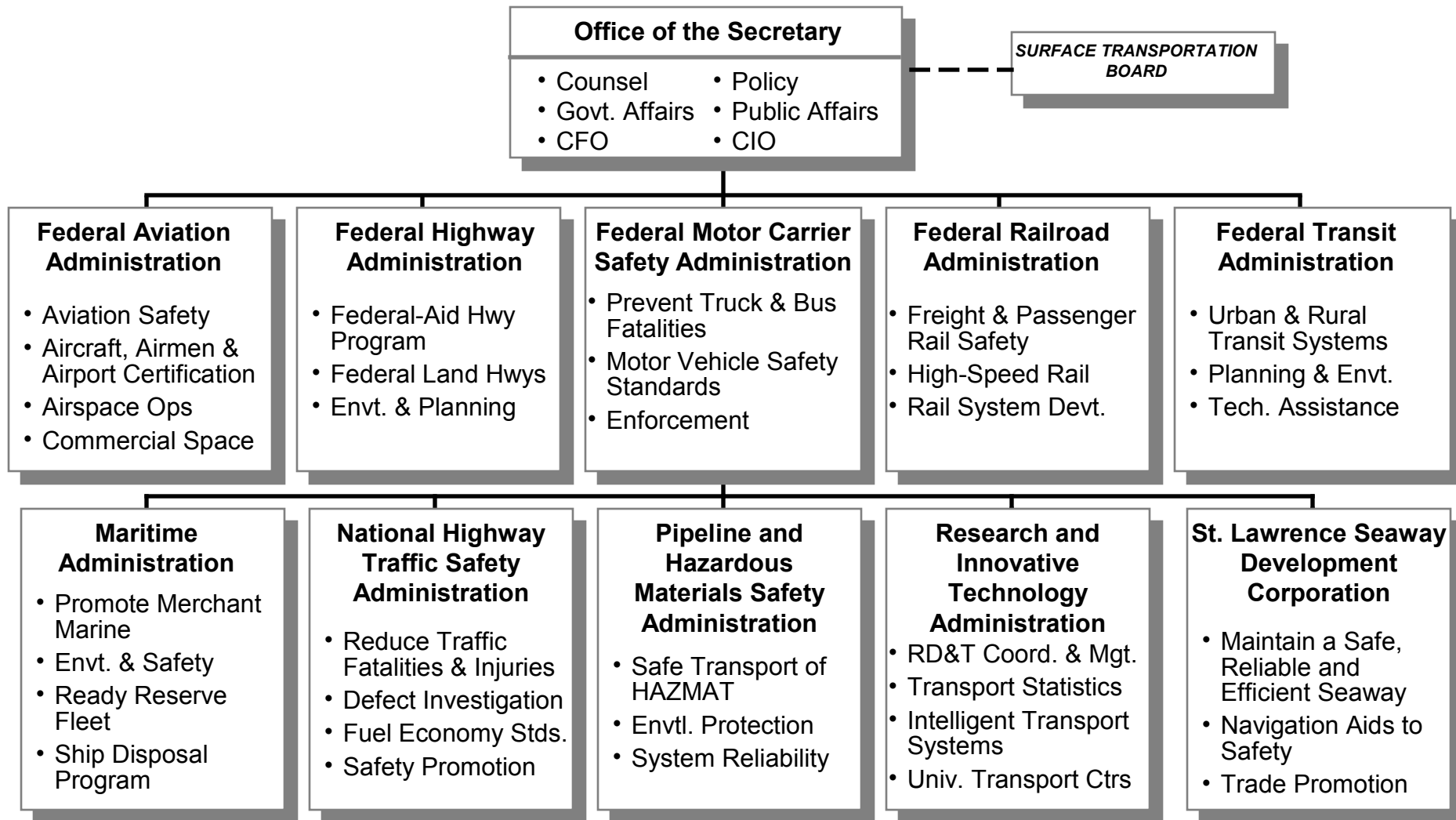
July 27, 2009

Today's Briefings and Discussion

- 1. Introduction and Overview of DOT Organization, Mission, and Goals**
(Peter Appel, RITA)
- 2. White House Perspective on Innovation** (Tom Kalil, OSTP)
- 3. Briefings on Highlighted Innovations**
 - Intelligent Transportation Systems (Shelley Row, RITA)
 - Fatality Analysis Reporting Systems (FARS) Mapping
(Umesh Shankar, NHTSA)
 - Federal Highway Administration Decision Support System (Michael Trentacoste, FHWA)
 - Next Generation Air Transportation System (NextGen) (Karlin Toner, FAA)
 - Traveler Information Systems (Vincent Valdes, FTA)
- 4. Other Innovative Research/Technology at DOT**
- 5. Overview of Open Government Initiatives**
- 6. Questions and Discussion**



DOT Mission By Operating Administration



DOT Strategic Goals

- **Safety**
 - Improve public health and safety by eliminating transportation-related deaths and injuries
- **Livable Communities**
 - Foster transportation investments that are centered on people and their communities
- **Economic Competitiveness**
 - Invest in transportation infrastructure that brings lasting economic and social benefit to the Nation
- **Environmentally Sustainable Transportation**
 - Lead the transportation sector in demonstrating the necessity for and viability of sustainable mobility

Innovation Agenda for the 21st Century

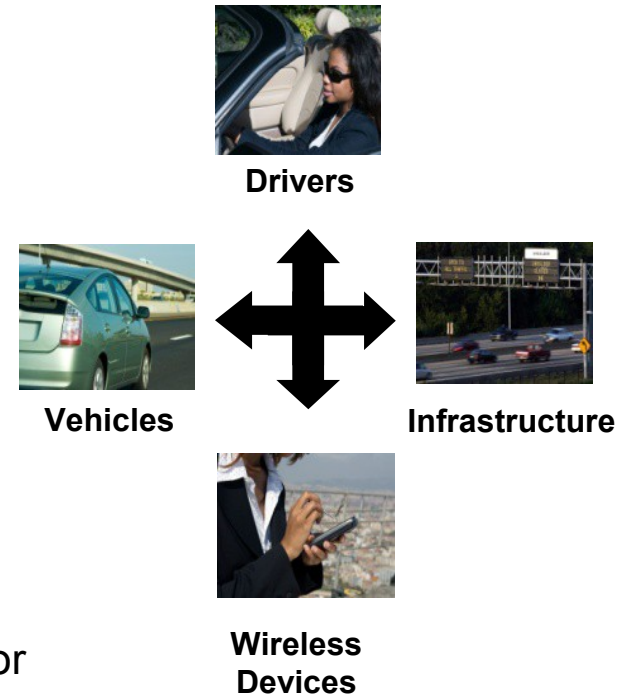
Innovation is the key to economic growth, job creation, and prosperity. The Obama Administration is committed to spurring innovation through the following approach.

- I. Improve the Environment for Private Sector Innovation** (e.g. IP, Prizes, R&D Tax Credit)
- II. Increase the Competitiveness of America's Knowledge-Intensive Industries** (e.g. Broadband, Spectrum, Clean Energy)
- III. Encourage Innovative People** (e.g. Education, Training, Immigration)
- IV. Invest in Research and Development** (e.g. High-risk, High-return Research, University/Industry Collaborations)
- V. Improve Public Sector Innovation** (e.g. Transparency, Participation, and Collaboration)



Intelligent Transportation Systems: IntelliDrive

- **Challenge:** Vehicular crashes (i.e. fatalities and injuries), system-wide congestion, environmental issues
- **Concept:** Use wireless technology to enable innovative transportation applications
 - With and between vehicles (V2V);
 - Between vehicles and roadway infrastructure (V2I);
 - Among vehicles, infrastructure and wireless consumer devices.
- **Description:** A suite of technologies and applications that uses wireless vehicular connectivity
- **Transformational Technology:** V2V and V2I applications that prevent crashes; provide complete data on road network performance from vehicle data
- **Benefits:** Fewer fatalities, complete transportation data for managers and travelers, improved system efficiency and performance



IntelliDrive Safety Benefits



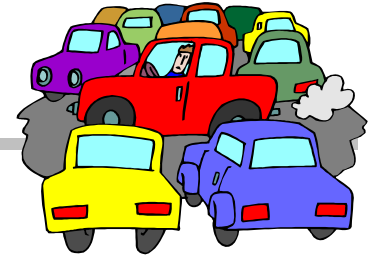
Opportunity

- **IntelliDrive** could potentially address **82%** of the vehicle crash scenarios involving unimpaired drivers.
- At full coverage and full effectiveness, IntelliDrive could **save thousands of lives per year.**
- This technology represents a new era for vehicle safety

Imagine

- Your vehicle can **“see”** and **react** to other vehicles, including those you can't see
- Your vehicle knows **roadway conditions** that you can't see
- Your vehicle knows the **speed** and **location** of approaching vehicles and potentially other users (i.e. pedestrians, bicycles)

IntelliDrive Mobility Benefits



Opportunity

IntelliDrive can provide transportation agencies:

- Dramatically improved quality and quantity of **real-time traffic and road condition data**;
- Which would make it easier to **manage transportation systems performance**.

IntelliDrive can provide consumers:

- Real time info for **rerouting**.
- Real time info on **modal options**.

Imagine

- **Managing** the system if you knew where every vehicle was in real time
- Planning for **growth patterns** when you can see the complete traffic patterns around development
- Planning your **travel** if you knew real-time conditions on all roads along your route

IntelliDrive Environmental Benefits



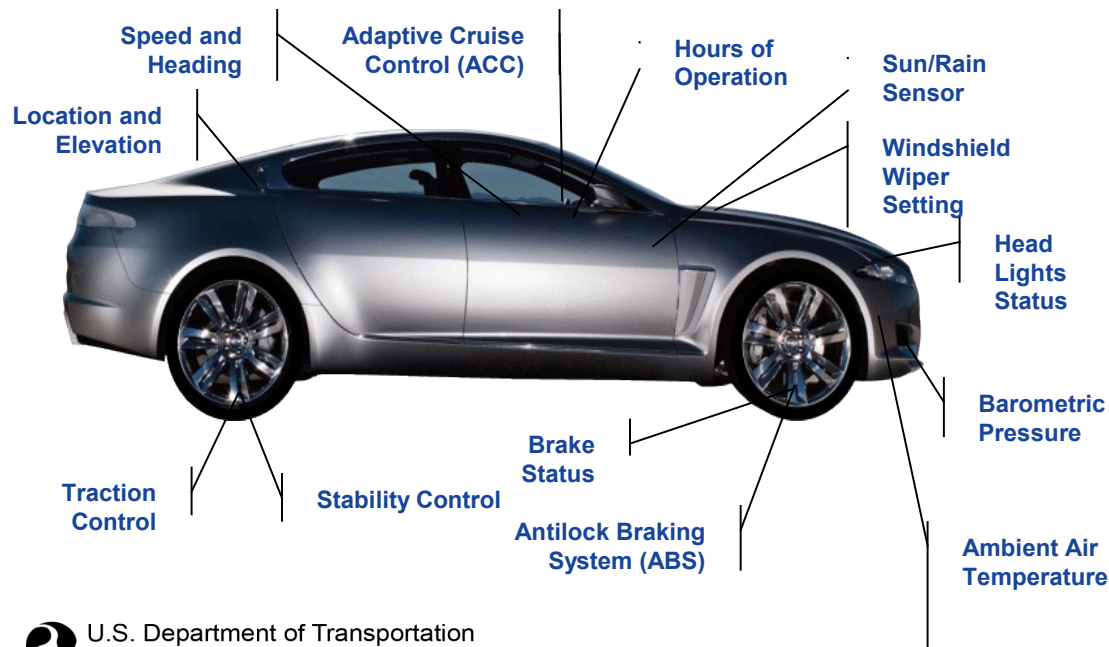
Opportunity

IntelliDriveSM can provide **transportation agencies:**

- New information on **real-time environmental** status of vehicles;
- New information from vehicle sensors for **road weather management**.

IntelliDriveSM can provide **consumers:**

- Real time info on **vehicle status (fuel/emissions)**.
- Real time info on **road conditions**.



Imagine

- **Managing** the system if you had real-time vehicle emissions data
- Managing the road for **weather** events if you had vehicle info
- **Planning your travel** based on real-time weather on all roads along your route

Opportunities to Advance IntelliDrive

Opportunity for High-Level Involvement

- **Automotive manufacturers**
 - Raise visibility to higher levels within companies
- **Creative financing options**
 - Explore innovative ways to pay for infrastructure needs
- **FCC and/or telecommunications providers**
 - Deployment and/or financing may require engagement with FCC and telecommunications providers

Open Government Opportunity

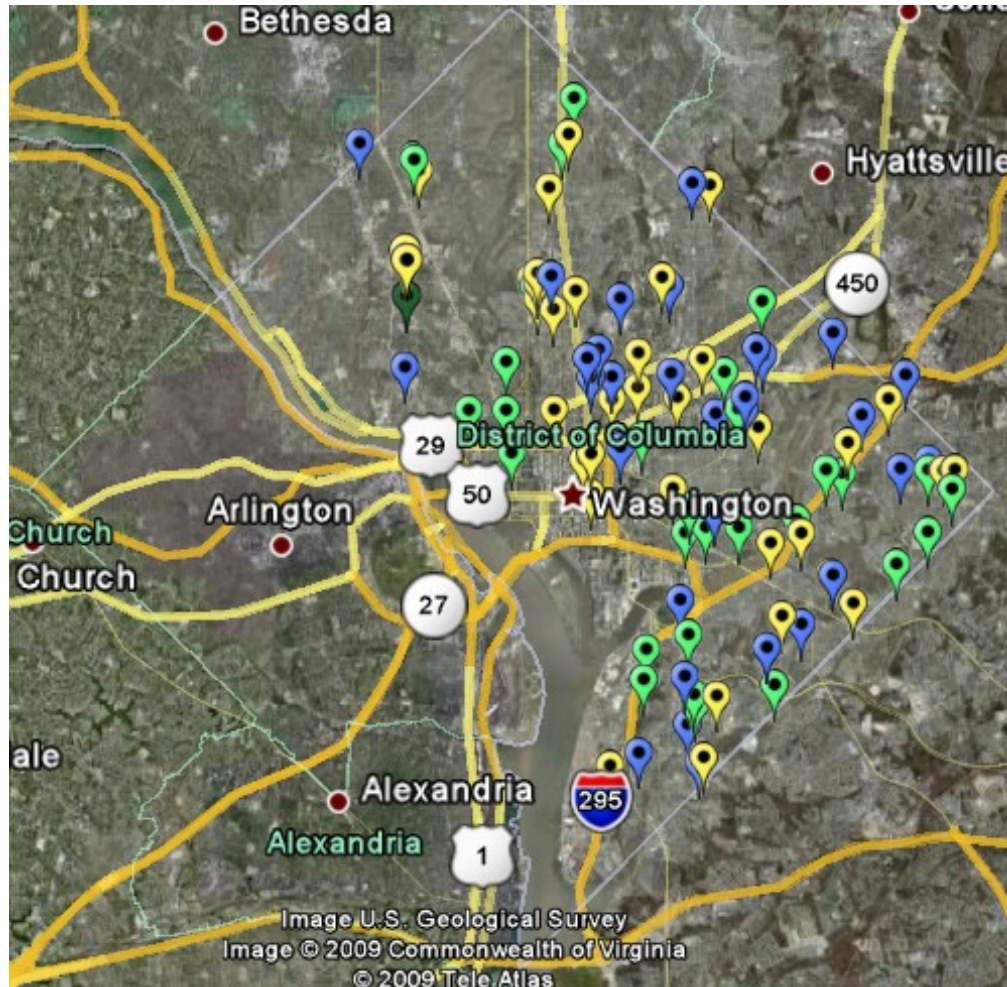
- **IntelliDrive Test beds**
 - Capture and share data on [Data.gov](#)
 - Create a competition/prize for [public sector applications](#):
 - Safety
 - Mobility
 - Environment
 - Freight / Security
 - Transit
- **Traveler information for consumers**
 - Incentives for [private sector investment](#)
 - Develop innovative [consumer applications](#)

Fatality Analysis Reporting System (FARS)

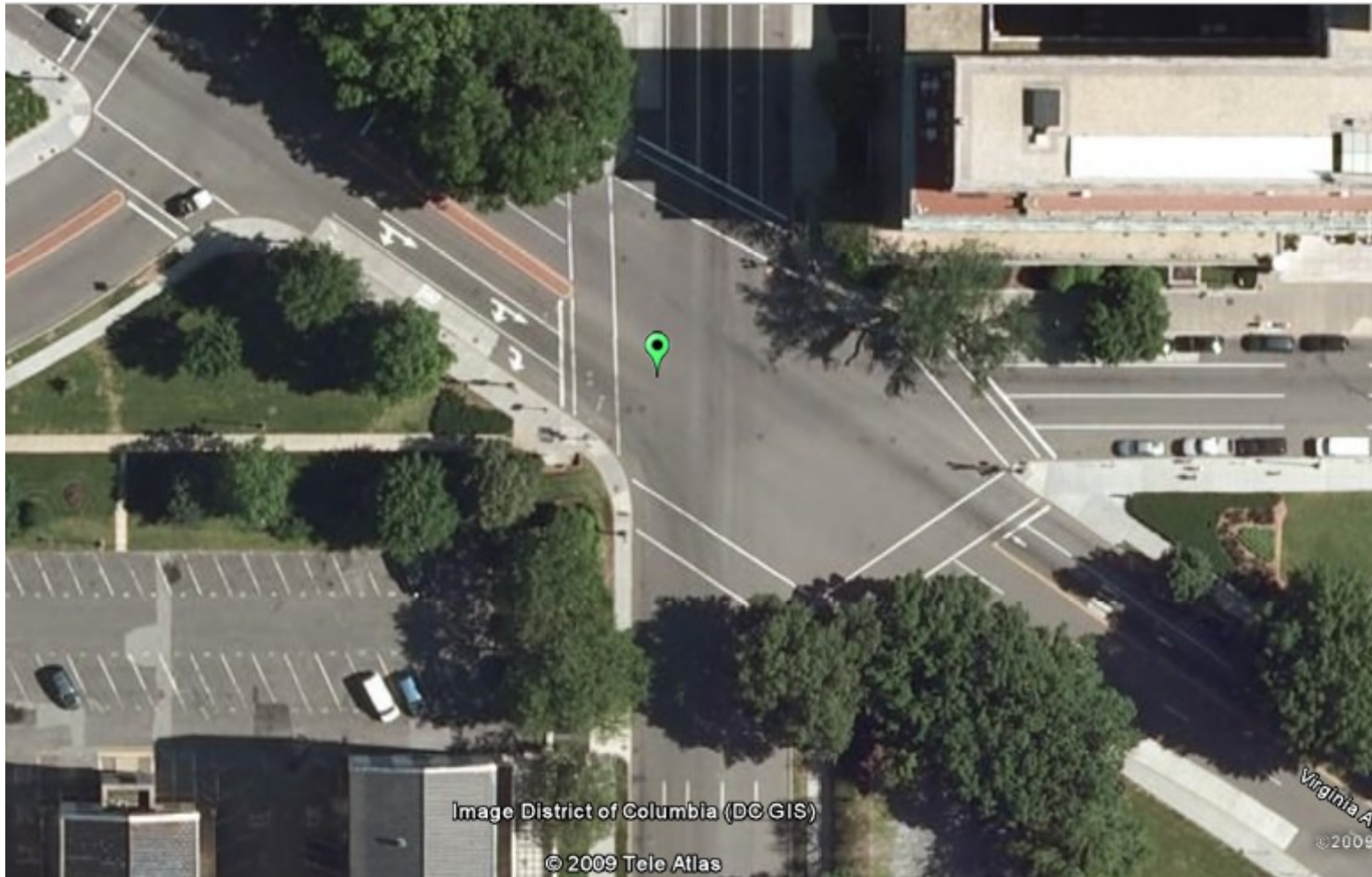
GIS Mapping

- **Challenge:** Provide interactive online maps of fatal motor vehicle crashes
 - No new investment. Use only currently available resources.
 - Need for a stable, timely, low maintenance solution.
- **Concept:** Leverage free online mapping tools
 - No need to maintain a local map server
 - Simple overlay of crash locations on online maps
- **Transformational Technology:** Google Earth web browser plug-in
 - No need to maintain underlying maps and software
 - Take advantage of public familiarity with Google Maps
- **Benefits:** Mapping tool for traffic safety community
 - Identify areas of high incidence of fatal crashes
 - Design location-based traffic safety countermeasures

FARS: Maps Displayed Via Web Browser



FARS: Zoom to Street Level



FARS: Key Statistics Provided as an Overlay

U.S. Census Bureau

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State & County QuickFacts

Select a State USA QuickFacts What's New FAQ

District of Columbia counties - [selection map](#)
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District of Columbia, District of Columbia

Further information Want more? [Browse data sets for](#)

People QuickFacts	District of Columbia
Population, 2008 estimate	591,833
Population, percent change, April 1, 2000 to July 1, 2008	3.5%
Population estimates base (April 1) 2000	572,053
Persons under 5 years old, percent, 2007	6.2%
Persons under 18 years old, percent, 2007	19.3%
Persons 65 years old and over, percent, 2007	11.9%
Female persons, percent, 2007	52.7%
White persons, percent, 2007 (a)	39.4%
Black persons, percent, 2007 (a)	55.2%
American Indian and Alaska Native persons, percent, 2007 (a)	0.4%

Innovative and Automated Highway Safety Decision Support Tools

- **Challenge:** Inadequate safety knowledge systems to support roadway infrastructure investment decisions.
- **Concept:** Provide decision makers with tools and knowledge systems to explicitly address safety in a more rigorous manner.
- **Description:** A comprehensive set of tools that provide highway agencies the safety implications of different options, economic results, and guidance involving different actions.
- **Transformational Technology:** Systems that provide the ability to assess and visualize different highway designs and treatments with a “test-drive” feature.
- **Benefits:** Fewer deaths and injuries on the nation’s highways.

Highway Safety Decision Support Tool: Interactive Highway Safety Manual

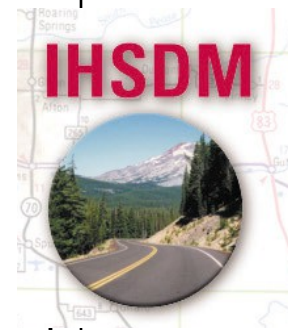
SafetyAnalyst Software

- Network screening
- Diagnosis & treatment selection
- Economic appraisal and priority ranking
- Countermeasure evaluation



Interactive Highway Safety Design Module

- Project/site-specific safety assessment
- Automated/expert sys. road safety audit
- Crash, design policy, traffic, driver-vehicle, and design consistency analysis



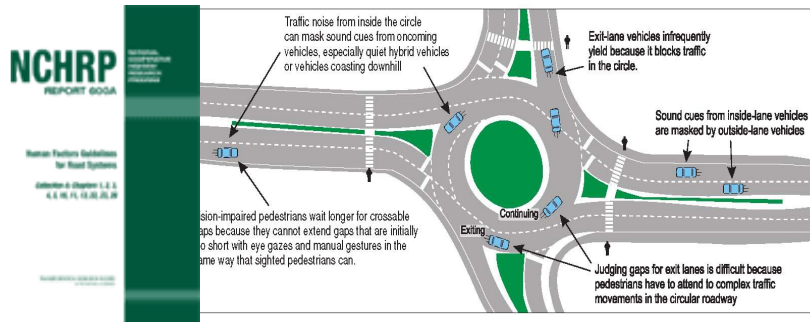
Crash Reduction Factor Clearinghouse

Online search tool supporting highway safety manual

Highway Safety Decision Support Tool: Human Factor Considerations

Human Factor Guidelines

- Guidance to optimize design
- Help in solving problems
- Information to support decisions



Highway Driving Simulations



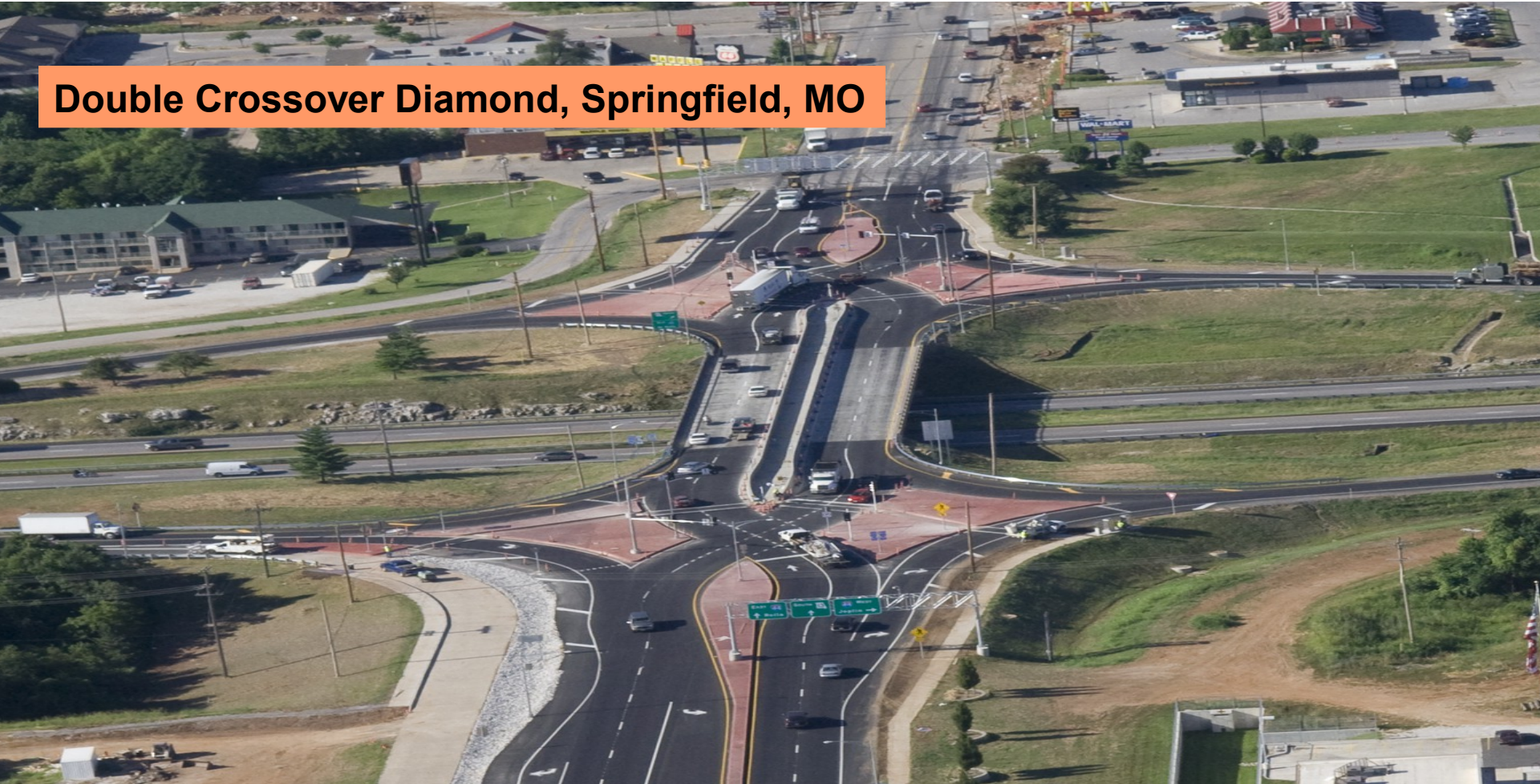
- Visualization of concepts by design engineers
- Safe and systematic user evaluation of innovative designs
- Public education/communication

Countermeasure Pooled-Fund Project

State- and FHWA-supported evaluation of safety countermeasures

Highway Safety Decision Support Tool: Simulation for Design and Subject Testing

Double Crossover Diamond, Springfield, MO



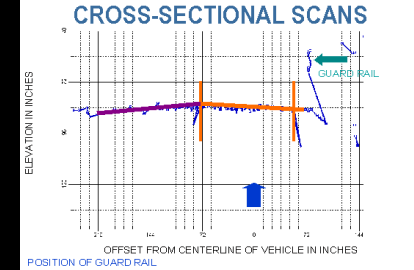
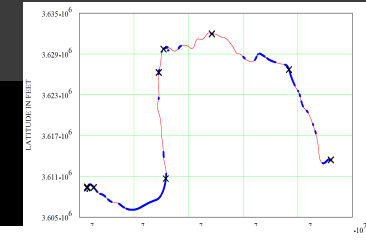
Highway Safety Simulation/Visualization for Public Review of Actual Road Features Redesigns



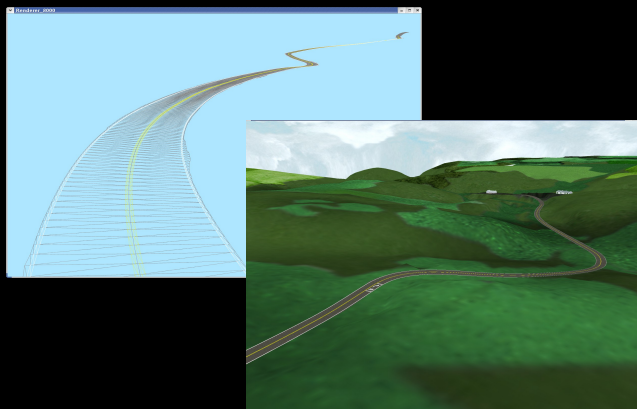
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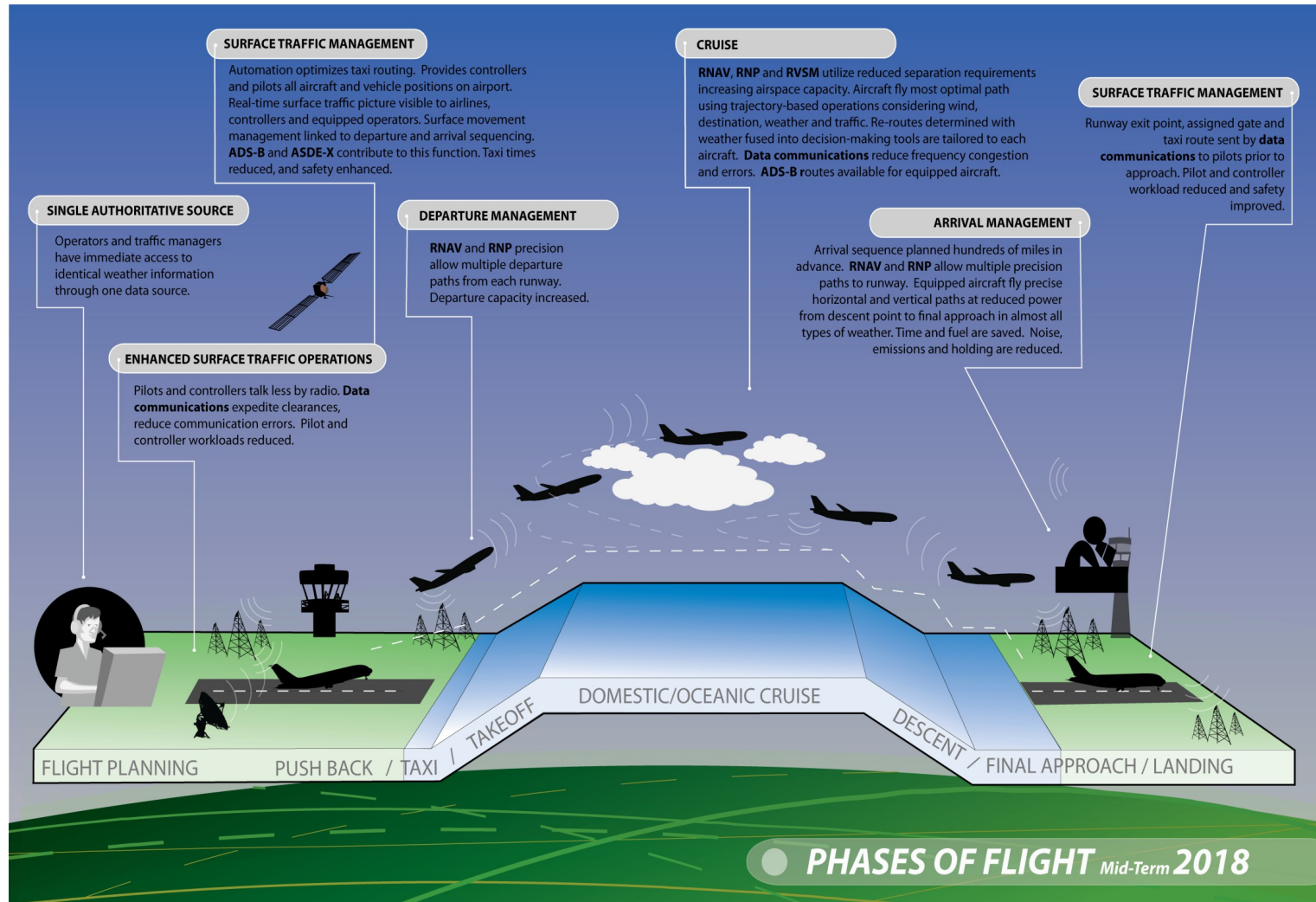
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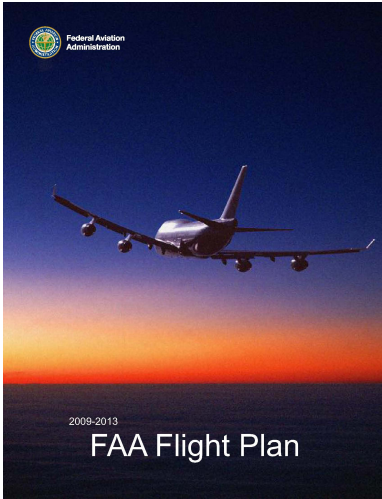
Next Generation Air Transportation System (NextGen)

- **Challenge:** Upgrade the National Airspace System so we can reduce today's delays while preparing to meet projected demand for air transportation
 - Nearly 20% of flights at major airports are delayed by 15 minutes or more
 - System must meet national needs for civil aviation, defense and homeland security
- **Concept:** Use operational data to track NextGen via key performance metrics
 - System will be safe, more capable and more environmentally responsive
 - Meeting national needs requires alignment of R&D across Government agencies
- **Transformational Technology:** Make performance measurements available to operators and the traveling public
 - Build upon data sources and sensors available today
 - Develop new techniques for dealing with unavoidable problems, like weather
- **Benefits:** Shows in a clear and understandable format the effect that NextGen has on the aviation system
 - Timely access to performance measures based on verifiable operational data
 - Businesses and traveling public will have information to make better decisions about how to move people and products

NextGen in the Mid-Term



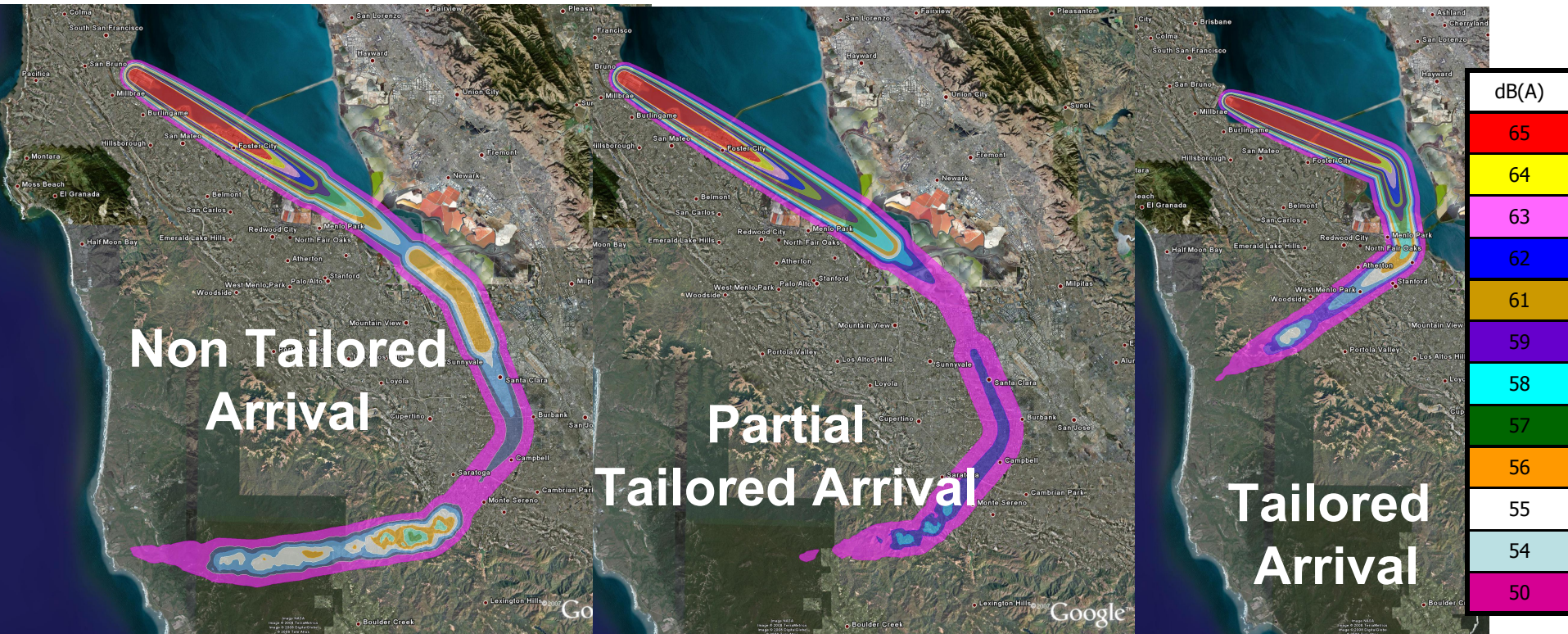
Measuring NextGen Performance



- Today, progress toward FAA's operational goals is evaluated using data
 - Increasing the reliability and on-time performance of scheduled carriers
 - Increasing capacity to meet projected demand and to reduce congestion
 - Improving aviation's environmental performance
- NextGen performance goals and measures are being refined
 - Inputs include operational, historical and forecast data
 - Modeling and simulation allows for continuous validation and refinement

Example: NextGen Environmental Performance

Measure how NextGen will increase aviation's environmental performance



Transit: Traveler Information Systems

- **Challenge:** To provide comprehensive and accurate information to transit travelers for the purpose of improved trip planning
 - Assist transit users with pre-trip itinerary planning
 - Provide riders with real-time information on system status
- **Concept:** Using the latest Intelligent Transportation System technology and information software, provide transit users with information via the web, handheld devices or information kiosks
 - Immediate information on train and bus arrivals
 - On-board announcements
- **Transformational Technology:** Software and IT combined to provide travelers with immediate and accurate data
 - Travelers can receive information in a variety of ways
 - Information is precise and instantaneous
- **Benefits:** Users can make informed travel decisions based on real data
 - Chicago RTA – goroo.com
 - Denver RTD – Talk-n-ride

Transit: Mobility Services for All Americans

- **Challenge:** To provide more effective, better coordinated public – human services transportation networks for the transportation disadvantaged
 - Demonstrate coordinated services of the poor, elderly, and handicapped
 - Use technology to simplify access to human service transportation
- **Concept:** Use ITS technology to establish a “one-stop” resource for coordinated human service transportation
 - Integrated vehicle tracking and dispatching
 - Electronic payment and billing systems
- **Transformational Technology:** Application of a suite of ITS technologies to facilitate transportation coordination and efficiency
 - Geographic information systems
 - Automated vehicle location
 - Integrated communication systems
- **Benefits:** Simplified and efficient access to transportation for employment, healthcare, education and other community activities – Three agencies have begun work on regional Travel Management Coordination Centers (TMCC)
 - Lower Savannah Council of Governments
 - Paducah Area Transit System
 - Camden County Workforce Investment Board

Other Innovative Research/Technology

Initiative	Description
Maritime Safety and Security Information System	Allows participating governments to view real-time vessel locations from around the world in a range of geographic display options, to improve maritime safety, security, commerce and environmental stewardship
Intelligent Compaction for Highway Infrastructure Construction	Application of advanced IT and GPS systems to facilitate highly accurate compacting of soil, aggregate and asphalt on GPS-referenced design plans; cuts construction costs and increases infrastructure life by up to 50%
Transportation Curriculum Coordination Council	Free delivery of distance learning courses on technical transportation topics; builds and maintains state and local workforce transportation competencies
Next Generation 911	Will establish the foundation for public emergency communications services in a wireless mobile society; enhance driver safety and mobility by enabling motorists to send quicker, more accurate, and more useful forms of information about incidents to emergency dispatch centers
Integrated Corridor Management Systems	Leverages intelligent transportation technologies, unused capacity (parallel routes, non-peak direction on roadways, single-occupant vehicles and transit services) and the commitment of network partners (freeways, arterials, rail and bus) to reduce congestion and transform the way corridors are operated and managed



Open Government Initiatives: Examples

Initiative	Description
Public Engagement in Rulemaking Using Web 2.0	Uses blogs, forums, social networking and/or other Web 2.0 applications to further engage the public in the rulemaking process
ARRA Fund Mapping Website	Interactive Web-based map provides the public with a customized view of ARRA transportation funding and projects at a local level
FAA National Wildlife Strike Database	Publicly searchable database allows users to understand wildlife strike hazards at the nation's airports and develop ways of reducing the risk of injuries and fatalities
Data.gov Transportation Databases	<ul style="list-style-type: none"> • Airline On-Time Performance and Causes of Flight Delays • North American TransBorder Freight Data • <i>Coming</i>: Vehicle Miles Traveled, Fatality Analysis Reporting System, Census of Ferry Operators
Research Collaboration through the Online National Transportation Library	<ul style="list-style-type: none"> • Includes research collaboration sites (external Sharepoint), social networking venues (Ning; LinkedIn groups), wikis, Twitter • Transportation Knowledge Networks: Coordinated information sharing across transportation libraries and data sources • <u>MashTrans.org</u>: Examining how Web 2.0 tools are/could be used for transportation
Data and Product Delivery via Twitter	Bureau of Transportation Statistics and National Transportation Library “followers” receive real-time notifications of new online data and assets