Connected Corridors
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Topic: 2. Cooperative ITS Deployment Challenges
SIS27-G: Enabling interaction between traffic management and mobility services
# Reality: Demand is Greater than Supply

<table>
<thead>
<tr>
<th>Year</th>
<th>Public Road Mileage</th>
<th>Lane Miles</th>
<th>Vehicle-Miles of Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>4.0</td>
<td>7.5</td>
<td>2.5</td>
</tr>
<tr>
<td>1990</td>
<td>4.5</td>
<td>8.0</td>
<td>3.0</td>
</tr>
<tr>
<td>2000</td>
<td>5.0</td>
<td>8.5</td>
<td>3.5</td>
</tr>
<tr>
<td>2010</td>
<td>5.5</td>
<td>9.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**Graph:**

- **Lane Miles**
- **Vehicle-Miles of Travel**
- **Public Road Mileage**

**X-axis:** Year

**Y-axis:** Public Road Mileage, Lane Miles, and Vehicle-Miles of Travel, 1980 - 2010

**Legend:**
- Lane Miles (Green line)
- Vehicle-Miles of Travel (Blue line)
- Public Road Mileage (Red line)
Trends: How We Move...

Population Increase
2015: 320 million people
2045: 390 million people
In 30 years our population is expected to grow by about 70 million... that's more than the current populations of NY, TX, FL.

Older Americans — Redefining Longevity
By 2045, the number of Americans over age 65 will increase by 77%.
About one-third of people over 65 have a disability that limits mobility. Their access to critical services will be more important than ever.

Millennials — Shaped by Technology
There are 73 million Millennials aged 18 to 34. They are the first to have access to the internet during their formative years and will be an important engine of our future economy.

Bumper-to-Bumper
On average, we spend over 40 hours stuck in traffic each year.
The annual financial cost of congestion is $121 billion.

Income Inequality
10% of the population takes home one-third of our national income. Transportation is the second-largest expense for U.S. households.

Megaregions and Shifts in Population Centers
11 megaregions are linked by transportation, economics, and other factors. They represent over 75% of our population and employment.
In 2014, 365,000 people moved to the South—up 25% from 2013—and moves to the West doubled.

Towards Intelligent Mobility
Better use of space
Trends: How We Move ...

Population Change Projections by Commuting Zone, 2010-2030
Trends: How We Move Things ...

Transportation and the Economy
By 2045, the U.S. economy is forecast to grow by 115% to $36.7 trillion—and the transportation sector will represent about $1.6 trillion of total Gross Domestic Product.

Global Demand for U.S. Products
Global trade is one of the brightest spots in our economy.
U.S. exports reached $2.3 trillion in 2013, setting a new record for the 4th straight year.

$1 billion in exports = 5,000 U.S. jobs

The U.S. energy boom is placing unprecedented demand on our transportation system.

Crude oil production is up 50% since 2008
Rail carried 400,000 carloads of crude oil in 2013

42x the 9,500 carloads of crude oil in 2008

Freight Movement is Multimodal
Every mode of transportation moves freight, but trucking is the primary mode of freight travel.

<table>
<thead>
<tr>
<th>Mode</th>
<th>2012 (in tons)</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck</td>
<td>13.2 billion</td>
<td>+43%</td>
</tr>
<tr>
<td>Rail</td>
<td>2.0 billion</td>
<td>+37%</td>
</tr>
<tr>
<td>Waterborne</td>
<td>975 million</td>
<td>+10%</td>
</tr>
<tr>
<td>Air</td>
<td>15 million</td>
<td>+250%</td>
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<tr>
<td>2040</td>
<td>18.8 billion</td>
<td></td>
</tr>
<tr>
<td>2.8 billion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 billion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>53 million</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

System Performance and the Cost of Congestion
By 2040, nearly 30,000 miles of our busiest highways will be clogged on a daily basis.
Truck congestion wastes $27 billion in time and fuel annually.

Towards Intelligent Mobility
Better use of space
Trends: How We Move Things better

More and more, the transportation sector is relying on data to drive decisions, and on technology to reimagine how we move people and goods.

**Connected Vehicles**
Vehicles that communicate are the latest innovation in a long line of successful safety advances.

The motor vehicle fatality rate has dropped by **80%** over the past 50 years.

Connected vehicles and new crash avoidance technology could potentially address **81%** of crashes involving unimpaired drivers.

**Robotics**
Advances in robotics are changing transportation operations and will impact the future transportation workforce.

Robots will perform vital transportation functions, such as critical infrastructure inspection.

**NextGen**
GPS and new technologies are leading to a safer, more efficient U.S. airspace.

By 2020, one-second updates will pinpoint the aircraft location and speed of 30,000 commercial flights daily.

**Real-time Travelers**
Mobile access to everything from traffic data to transit schedules informs our travel choices.

**90%** of American adults own a mobile phone.

**20%** use their phones for up-to-the-minute traffic or transit information.

Smartphones are regularly used for turn-by-turn navigation.

**Big data** is all around us. Global data generated is projected to grow by **40%** annually.

Data enables innovative transportation options, such as car-sharing, ride-sharing, and pop-up bus services, and more rapid delivery of goods.

**TOWARDS INTELLIGENT MOBILITY**
Better use of space
SHIFTING TRANSPORTATION NORMS

TRADITIONAL

I own and use my own transportation

Suburban Rural

TRENDING

I own my transportation and/or access shared mobility options

Urban Core

FUTURE

I access a menu of mobility options to meet my needs

Urban Core Suburban Rural

Source: Shared Use Mobility Center
USDOT Mobility on Demand (MOD) Vision

- Traveler Centric/Consumer Driven
  - Quality and Carefree personal mobility choice for individuals
- Data Connected/Platform Independent
  - Technology doesn’t change the MOD vision
- Mode Agnostic/Multimodal
  - ALL modes and resources to support personal mobility choice
- USDOT Intermodal Offices Collaboration
Role of PUBLIC Transportation

MOBILITY AS A SERVICE
What is Mobility on Demand (MOD)?

- Long term strategic vision for a multimodal, integrated and connected transportation network system.
- A concept which imagines mobility as a commodity and a service.

**Conceptual Notions of MOD:**
- Promotes choice in personal mobility
- Promotes Intelligent Transportation Systems
- Advances connected vehicles
- Advances vehicle automation
- Leverages emerging technologies
- Leverages data exchange
- Encourages multimodal connectivity
- Encourages system interoperability
Fully Connected Vehicles

Vehicle Data:
- Latitude, Longitude, Speed, Brake Status, Turn Signal Status, Vehicle Length, Vehicle Width, Bumper Height

Infrastructure Data:
- Signal Phase and Timing,
  Drive 35 mph,
  50 Parking Spaces Available
Connected Travelers

A system of "connected vehicles", roads and infrastructure, and mobile devices will provide a wealth of transportation data, from which innovative and transformative applications will be built. These apps will make travel not only safer, but smarter and greener. The possibilities are boundless.
Integrated Corridor Management

An opportunity exists to realize significant improvements in the efficient movement of people and goods through integrated and proactive management of major multimodal transportation corridors.
Active management throughout the Trip Chain

ATDM approaches provide travelers with choices throughout the trip chain leading to network performance optimization and increased efficiency.

Key Takeaway: Active management occurs before, during, and at the end of the trip chain.
Who’s here today? Who’s missing?

- Academia
- Professional Organizations
- Roadway Agencies
- Planning Organizations
- Private Sector
- Transit Agencies
- Activity Centers
- Fleet Operations
- Public Safety
- Other agency departments
- Traveler
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