University Transportation Center Conference for the Southeastern Region

Innovative Solutions Needed to Address Transportation Challenges

Michael F. Trentacoste
Associate Administrator for Research, Development & Technology
Federal Highway Administration

March 26, 2015
Birmingham, AL
Today’s Transportation Challenges

**Safety**
- 33,561 highway deaths in 2012
- 5.615 million crashes in 2012
- Leading cause of death for ages 4, 11-27

**Mobility**
- 5.5 billion hours of travel delay
- $121 billion cost of urban congestion

**Environment**
- 2.9 billion gallons of wasted fuel
- 56 billion lbs of additional CO₂

Data Sources:
2011 Annual Urban Mobility Report, Texas Transportation Institute (Feb 2013)
Beyond Traffic: U.S. DOT's 30 Year Framework for the Future

http://www.dot.gov/beyondtraffic
Framework: Questions and Solutions

1. **How will we move?**
   - Increase infrastructure capacity
   - Reduce congestion
   - Promote public transit, biking and walking

**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.**

**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]
Framework: Questions and Solutions

2. How will we move things?
   – Improve freight planning
   – Target policies to resolve congestion
   – Encourage innovative strategies

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 2008

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

Intermodal Freight

Intermodal freight, one of the fastest growing sectors of the freight market, involves the transportation of goods in containers using multiple modes of transportation.
3. How will we move better?
   – Technological changes and innovation to transform vehicles, infrastructure, logistics, services
   – Address regulatory barriers to technology deployment
   – Support research and development
   – Maintain paramount focus on safety
Framework: Questions and Solutions

4. How will we adapt?
- Reduce transportation emissions
- Design and build resilient infrastructure
- Align costs and incentives

5. How will we align decisions and dollars?
- Ensure adequate revenues
- Reduce spending to match revenues
- Prioritize investments based on performance
Research and Technology Lifecycle

MAP-21 provided, and GROW AMERICA would continue, a comprehensive research program, covering all facets of the Innovation Lifecycle:

• Agenda setting
• Conduct of Research
• Evaluation and testing
• Implementation and deployment
• Training and Education
FHWA Research and Technology Agenda

Describes how the FHWA is addressing six of the Nation’s key highway challenges through Research and Technology

Key Highway Challenges:
• Advancing Safety
• Enhancing System Performance
• Improving the Mobility of People and Goods
• Maintaining Infrastructure Integrity
• Promoting Environmental Sustainability
• Preparing for the Future

www.fhwa.dot.gov/research/fhwaresearch/agenda/
FHWA addresses the Nation's critical transportation challenges:

Advancing Highway Safety
Reducing fatalities and serious injuries through a diverse suite of programs and initiatives.

Learn more >>

Envision highways with less congestion, fewer injuries and deaths, and that actually make it easy to get from here to there. The FHWA Research and Technology Agenda is solving the Nation’s critical transportation challenges: Advancing Highway Safety, Improving the Mobility of People and Goods, Maintaining Infrastructure Integrity, Enhancing System Performance, Promoting Environmental Sustainability, and Preparing for the Future.

By conducting research of national significance and putting our knowledge into practice, FHWA is finding ways to improve the highway environment and advance the development of new transportation technologies. The Research and Technology Agenda aligns with the Moving Ahead for Progress in the 21st Century Act (MAP-21), which establishes policy, principles, and planning practices for a flexible national research and technology program.
Conduct of Research

• Exploratory Advanced Research
• Highway Research and Development (Infrastructure, Safety, Policy, Planning and Environment, Operations)
• State Planning and Research
  o NCHRP
  o Transportation Pooled Fund
• University Transportation Centers
• Intelligent Transportation Systems
Infrastructure Research

Exploratory: New Materials
• Improve measurement and modeling of materials at multiple scales
• Supplementary cementitious materials

Applied: RABIT™ (LTBP)
• Rutgers University
• Bridge inspection tool
• Integrates multiple non-destructive evaluation technologies
Safety Research
Exploratory: Video Decoding
Safety Research
Applied: STAC (SHRP2)
Mobility Research

Exploratory: Wayfinding
- Auburn University
- Wayfinding and navigation for blind and vision impaired pedestrians

Applied: Connected Vehicle Environment
- Speed Harmonization
- Truck Platooning
Policy Research

Exploratory: Behavioral Economics

- Partners: UCF, GSU, LSU and others
- Examines when and why drivers choose a tolled facility versus an un-tolled but congested parallel route

Applied: FHWA “Data In the Cloud”

- Seeks alternative approaches to strategically position public data with analytic and computational capabilities
- Data must remain free to the public in its original form; be easily accessible and visible
- Hosting partner may establish and charge for new value-added services and products
Technology Deployment

• Every Day Counts
  – Market-ready innovations

• State Transportation Innovation Council (STIC) Incentives
  – Technical assistance and funds to standardize innovative practices

• Accelerated Innovation Deployment Demonstration
  – Funding for transportation projects using innovations
  – Test and evaluate
  – Champion outcomes
Highway Trust Fund: The Dilemma

**Highway Account**
End of Month Balances; $ Billions

**Fuel Efficiency**
New Passenger Cars, MPG

**Total VMT**
Trillions of Miles

**Decreasing Value of 18.3 cents gas tax**
GROW AMERICA

- Building on DOT’s Legacy of Safety
- Closing the Infrastructure Deficit
- Modernizing U.S. Transportation System Using Technology & Process Innovation
MAP-21
- TOTAL: $55B
- FHWA: $41B (45% of Growth)
- FTA: $11B
- FMCSA & NHTSA: $1.4B
- FRA: $1.4B
- OST (TIGER): $500M

GROW AMERICA
- TOTAL: $80B
- FHWA: $53B (29% of Growth)
- FTA: $19B
- FMCSA & NHTSA: $1.8B
- FRA: $4.7B
- OST (TIGER): $1.2B

Footnote: Annual Averages
Recap: Challenges, Innovations, and Investments

- Going Beyond Traffic, with a clear framework and forward-looking policies
- Creating and Deploying Innovative Solutions through Research and Technology Programs and Partnerships
- Investing with certainty to maintain and improve our transportation system