

A horizontal banner at the top of the slide features the text "FHWA Research and Technology" in a large, blue, sans-serif font. The background of the banner is a collage of various transportation-related images, including a road winding through a forest, a highway with a car, a bridge, a modern building, a person on a bicycle, and a road with a guardrail.

FHWA Research and Technology

Coordination of Highway Research with University Transportation Centers

Michael F. Trentacoste

Associate Administrator for Research, Development,
and Technology

Federal Highway Administration

Webinar on National Highway Research Priorities

March 28, 2012



A horizontal banner composed of several small images related to transportation: a road winding through a forest, construction workers in orange vests, a car on a road, a modern building, a person on a bicycle, and a road with a guardrail. The text "FHWA Research and Technology" is overlaid in a large, blue, sans-serif font.

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Webinar Series Topics and Dates

- 1- State of Good Repair, March 28th ← *today*
- 2- Economic Competitiveness, April 5th
- 3- Safety, May 8th
- 4- Livability and Sustainability, May 9th
- 5- Policy and Innovative Financing, May 10th



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Invited Participants

- New University Transportation Centers (UTCs)
- State Research Managers
- Federal Highway Administration (FHWA) Division Office Research Coordinators

Host and Presenters

- FHWA Research and Development (R&D) Offices and Program Offices



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Webinar Purpose

- Provide FHWA perspectives on *national challenges and highway research priorities*
- Opportunity for UTCs to consider highway research priorities in their research plans and initiatives
- Inform State Research Managers on priorities
- Provide FHWA contacts for follow-up communications and coordination



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Thanks for Your Participation

Thanks to the Research and Innovative
Technology Administration (RITA) for this
opportunity to communicate priorities to
the UTCs

For more information about UTC
participation, contact:

Debra Elston, 202-493-3181

www.fhwa.dot.gov/research



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The screenshot shows a browser window with the title "Federal Highway Administration Research and Technology". The address bar displays "http://www.fhwa.dot.gov/research/". The page content includes a search bar, a navigation menu on the left with items like "Research Home", "What's New", and "About R&T", and a main content area featuring a featured article titled "Deploying Innovations: Every Day Counts" with a photo of a worker measuring a road. Below this is a "News" section with a link to "Researchers" and a "Find an Expert" section with a "Research Highlights" link and a CD-ROM icon. The browser's status bar at the bottom shows "Trusted sites" and "100%".

Visit our Web Site at
www.fhwa.dot.gov/research

A horizontal banner composed of several small images related to transportation infrastructure: a road winding through a forest, a car on a road, a bridge, a building, a person walking, and a road with a building in the background. The text "FHWA Research and Technology" is overlaid in a large, blue, sans-serif font.

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State of Good Repair

Jorge E. Pagán-Ortiz

Director, Office of Infrastructure Research and
Development

Federal Highway Administration

Coordination of Highway Research with University Transportation Centers

March 28, 2012



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Topics to be Covered

- Background
- Grand Challenge and National Needs
- Infrastructure Research and Technology (R&T) Strategic Plan
- Infrastructure R&T Roadmap
- Initiatives with Work Plans Funded
- Initiatives for Future Work Plans
- Exploratory Advanced Research



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Background

- Most of the Nation's highway and bridge infrastructure is at or past its theoretical design life.
- Therefore, our infrastructure will be facing need of repairs or major rehabilitation.



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Grand Challenge

- Unprecedented fiscal challenges to operate, maintain, and invest in highway infrastructure to maintain the state of good repair and provide the improvements needed to support economic growth.



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National Needs

- Develop and apply innovative solutions to meet the needs of the traveling public.
- Focus on the necessary research and technology.



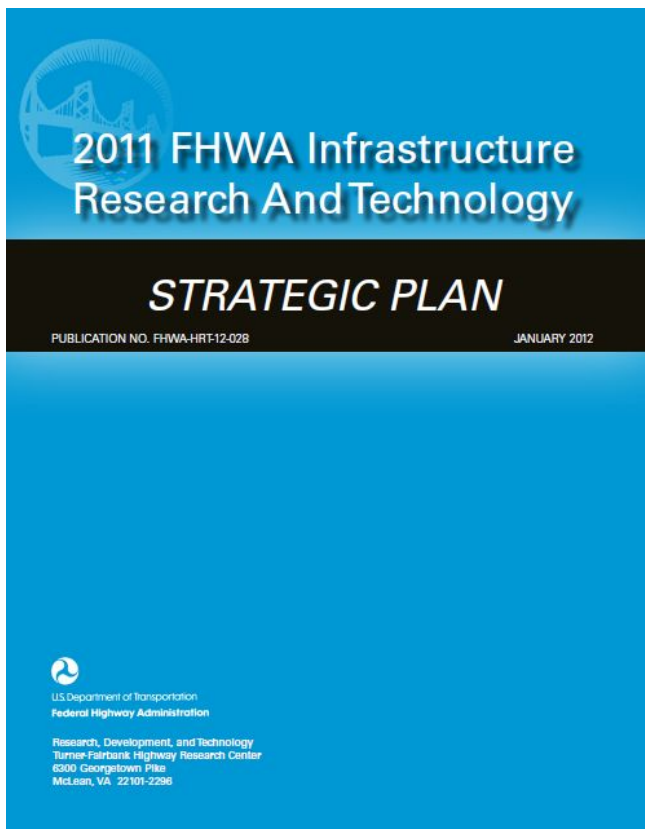
A horizontal banner composed of several small images related to infrastructure: a road winding through a forest, construction workers in orange vests, a car on a road, a modern building, a person on a bicycle, and a road with a guardrail. The text "FHWA Research and Technology" is overlaid in a large, blue, sans-serif font.

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Infrastructure Research and Technology Strategic Plan

- One, unified plan to provide strategic direction for all Infrastructure related research and technology efforts at FHWA.
 - For the next 5 years and beyond





<http://www.fhwa.dot.gov/publications/research/infrastructure/12028/index.cfm>

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Guiding Principles

- FHWA R&T Process, from research to implementation, is systematic and begins with the end in mind.
- Stakeholders are engaged throughout the process – communication of programs and projects is effective.
- Performance of initiatives is measured and evaluated.



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Objectives and Strategies

- 7 Objectives and 28 Strategies
 - Objectives to achieve expected outcomes to support the goals of the FHWA Strategic Plan and U.S. Department of Transportation (USDOT) Strategic Plan.
 - Strategies to describe and define the work required to achieve objectives and outcomes and, ultimately, the FHWA and USDOT strategic goals.
 - FHWA Strategic Plan:
<http://www.fhwa.dot.gov/publications/research/infrastructure/12028/index.cfm>
 - USDOT Strategic Plan: Approved by Office of Management and Budget (OMB), but not posted yet



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Strategic Plan Objectives

1. **Highway Safety** - Reduce the number of fatalities attributable to infrastructure design characteristics and work zones.
2. **Infrastructure Safety and Security** - Improve the safety and security of highway infrastructure.
3. **Infrastructure Management** - Improve the management of infrastructure assets and advance the implementation of a performance-based program for the National Highway System (NHS).
4. **Project Delivery** - Improve the ability of transportation agencies to deliver projects that meet expectations for timeliness, quality and cost.
5. **Mobility** - Reduce user delay attributable to infrastructure system performance, maintenance, rehabilitation and construction.
6. **Infrastructure Performance** - Improve highway condition and performance through increased use of design, materials, construction and maintenance innovations.
7. **Environmental Sustainability** - Reduce the life-cycle environmental impacts of highway infrastructure (design, construction, operation, preservation, and maintenance).



Strategic Plan Structure Example

- **Objective 6 – Infrastructure Performance:**
Improve highway condition and performance . . .
 - **Strategy 6.2** - Develop and deploy design and preconstruction technologies and innovations to . . .
 - **Initiative 6.2.1** - Deploy existing and proven criteria, technologies and procedures to design infrastructure to . . .
 - **Initiative 6.2.2** - Research and develop the next generation of analysis and design tools . . .
 - **Initiative 6.2.3** - Develop and deploy contracting procedures . . .



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Infrastructure R&T Roadmap

- The Infrastructure R&T Process identified 76 Initiatives.
- Developed 7-year work plans for 14 of the 76 Initiatives.
 - Projects and activities of national importance.
- UTCs may consider undertaking research in one or more of the 14 Initiatives.



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14 Initiatives with Work Plans Funded

- **2.2.2 - Hazard Mitigation and Adaptation Countermeasures**
(Sheila Duwadi, 202-493-3106)
- **2.4.1 - Rapid Infrastructure Assessment**
(Joey Hartmann, 202-366-4599)
- **3.1.1 - Infrastructure Performance Standards**
(Steve Gaj, 202-366-1336)
- **3.1.5 - Durable and Long Lasting Infrastructure**
(Katherine Petros, 202-493-3154)
- **3.2.1 - Infrastructure Condition Assessment**
(Aramis Lopez, 202-493-3145)
- **3.2.2 - Non-Destructive Evaluation Tools, Software and Guidance**
(Firas Ibrahim, 202-493-3053)
- **4.1.2 - Effective Quality Assurance**
(Tom Harman, 410-962-0134)
- **5.2.2 - Accelerated Construction & Preservation**
(Rob Elliott, 404-562-3941)



A banner for FHWA Research and Technology featuring a collage of transportation-related images: a road with a car, construction workers, a bridge, a modern building, a person on a bicycle, and a road with trees.

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14 Initiatives with Work Plans Funded (continued)

- **6.1.2 - Infrastructure Preservation** (Bryan Cawley, 202-366-1333)
- **6.2.1 - Proven Infrastructure Design Deployment** (Mark Swanlund, 202-466-1323)
- **6.2.2 - Next Generation Infrastructure Design** (Lou Triandafilou, 202-493-3059)
- **6.4.1 - Material Characterization** (Jack Youtcheff, 202-493-3090)
- **6.4.3 - Innovative Materials** (Suneel Vanikar, 202-366- 0120)
- **7.6.1 - Renewable, Reusable, Recycled Materials** (John Bukowski, 202-366-1287)



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Project Examples

- Geosynthetic Reinforced Soil-Integrated Bridge Systems
- Ultra High-Performance Concrete
- Reclaimed Asphalt Pavement
- Long-Term Bridge Performance
- Long-Term Pavement Performance



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Project Examples (continued)

- Life-Cycle Assessment of Pavements
- Energy Production within Highway Right of Way
- Flooded Pavement Assessment



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Initiatives for Future Work Plans

- 13 Initiatives (from the original 76 Initiative list)
 - No projects and activities have been identified for these initiatives.
 - UTCs may consider undertaking research in one or more of these initiatives.



Initiatives for Future Work Plans (continued)

- **1.2.1 - *Enhancing friction/ texture on new and existing surfaces***
(Katherine Petros, 202-493-3154)
- **3.2.5 - *Data quality management and control effects from data variability***
(Aramis Lopez, 202-493-3145)
- **3.3.1 - *Overall integrated asset management approach***
(Katherine Petros, 202-493-3154)
- **3.3.2 - *Project and program level management decisions***
(Aramis Lopez, 202-493-3145)
- **3.4.1 - *Health of the highway system***
(Katherine Petros, 202-493-3154;
Firas Ibrahim, 202-493-3053)
- **4.2.1 - *Improved, streamlined and refined analysis, design, and construction procedures***
(Katherine Petros, 202-493-3154)
- **4.2.2 - *Innovative project delivery methods***
(Katherine Petros, 202-493-3154)
- **4.2.3 - *Quality and maintainability of accelerated construction projects***
(Lou Triandafilou, 202-493-3059)



Initiatives for Future Work Plans (continued)

- **4.3.2 - Payment and acceptance to long-term performance and quantities to minimize agency risk**
(Katherine Petros, 202-493-3154)
- **5.2.1 - Techniques for prefabricated construction of the infrastructure**
(Lou Triandafilou, 202-493-3059)
- **6.1.3 - Enhance the effectiveness of rehabilitation and reconstruction activities**
(Katherine Petros, 202-493-3154)
- **7.1.2 - Assessing sustainability in project-level decision-making**
(Katherine Petros, 202-493-3154)
- **7.1.3 - Adaptation to the impact of Climate Change**
(Katherine Petros, 202-493-3154;
Sheila Duwadi, 202-493-3106)

Initiatives will be posted on the FHWA Research Home Page!



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Exploratory Advanced Research

- Goal:
 - Conduct research on longer term and higher risk breakthrough research.
- Contact: David Kuehn, 202-493-3414
- Potential opportunities for future UTC involvement:
 - Breakthrough Concepts in Material Science
 - Technology for Assessing Performance



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Breakthrough Concepts in Material Science

- This focus area leverages new approaches in material science.
 - Goal: Produce innovative new highway materials that enable
 - Functionality
 - Constructability
 - Sustainability and
 - Cost effectiveness of highway infrastructure and system monitoring sensors



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Breakthrough Concepts in Material Science (continued)

- Investigating new topics in this focus area.
 - Alternative and supplementary cementitious materials.
 - Environmentally resilient structures and pavements.
 - Adaptive materials.



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Technology for Assessing Performance

- Seeking novel approaches and breakthrough technology.



Technology for Assessing Performance (continued)

- Investigating new topics in this focus area.
 - Utilization of environmental chambers for structural research.
 - Active wireless sensors for structural or pavement health monitoring.
 - Nondestructive evaluation virtual laboratory.



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Any questions?

For more information, contact:
Jorge E. Pagán-Ortiz, 202-493-3022
jorge.pagan@dot.gov



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