





Introduction



Highway transportation research is a critical national investment with the potential for tremendous, long-term benefits that will support the national economy and improve infrastructure design and operation, road safety, and mobility across the United States.

The Federal Highway Administration (FHWA) Office of Research, Development, and Technology (RD&T) made significant strides in enhancing mobility and developing solutions to many of the Nation's most pressing highway transportation needs. This *Performance Plan Fiscal Year 2006–2007* outlines the research and goals that RD&T will strive to accomplish over the next 2 years.

The challenge for RD&T will be to continue focusing on opportunities for creative collaboration with partners and stakeholders to leverage available resources and to facilitate the delivery of technology and innovation.

For some time, FHWA has sought to commit resources and broaden its research program to address more long-term, high-risk research—and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) passed by the U.S. Congress in 2005 includes provisions that will enable FHWA to pursue the Advanced Research Program agenda. Advanced research has the potential to dramatically change the way the transportation industry builds, maintains, and safely operates the Nation's transportation system.

SAFETEA-LU also incorporates other important changes for the highway research and technology program, such as the creation of parallel program structures for pavements, bridges, and structures research and development. For example, there is now a Long-Term Bridge Performance program as well as a Long-Term Pavement Performance program. More information about SAFETEA-LU, including section-by-section analyses, program fact sheets, and funding tables, is available at www.fhwa.dot.gov/safetealu/index.htm.

The success of the RD&T program over the past 2 years is a testament to the hard work and quality of the researchers and support staff at FHWA's Turner-Fairbank Highway Research Center. The goal of the staff is to continue to provide outstanding products and services, and this document provides an overview of what to expect from the RD&T research program, including projects, national research and technology services, and research program contacts. By working closely with customers, stakeholders, and partners, RD&T employees will continue to develop and execute a comprehensive research, development, and technology program that addresses the needs of the American public.

As always, RD&T welcomes customer feedback on this plan through the Turner-Fairbank Highway Research Center Web site at www.tfhrc.gov.

Dennis Judycki

Associate Administrator for
Research, Development, and Technology

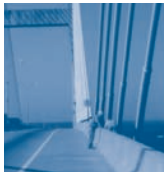


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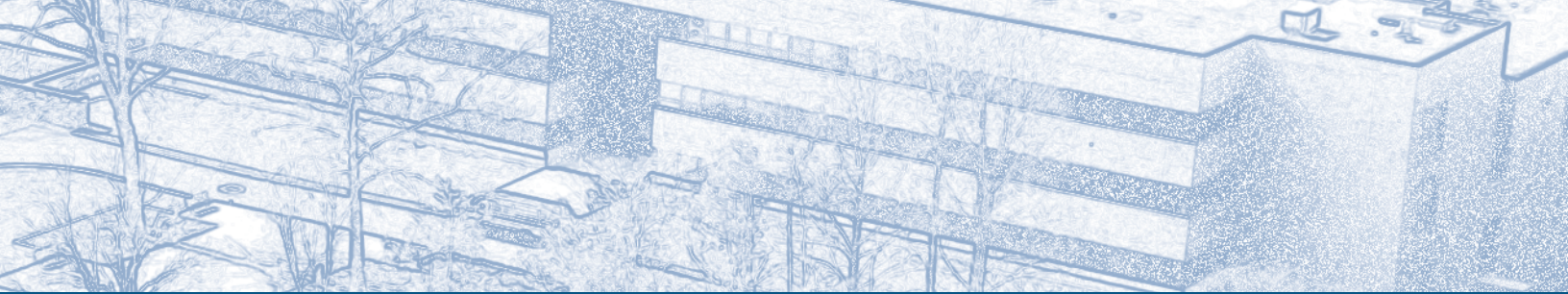


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The Strategic Framework

The Federal Highway Administration (FHWA) Office of Research, Development, and Technology (RD&T) Performance Plan is a 2-year plan that serves as a roadmap for our research program and directs efforts to improve operations and enhance services. The RD&T Program directly supports the strategic goals of FHWA and the U.S. Department of Transportation (USDOT) and helps FHWA achieve its mission of enhancing mobility through innovation, leadership, and public service. The *RD&T Performance Plan* describes the research, services, and other activities we conduct in support of the FHWA Research and Technology (R&T) Program. The *RD&T Performance Plan* also illustrates how our activities are aligned with the strategic goals and objectives of FHWA and USDOT. The plan includes a detailed list of projects and target completion dates developed in conjunction with headquarters and field offices as part of multiyear research and technology program plans.

Federal Highway Administration Mission and Goals

FHWA is charged with the broad responsibility of ensuring that America's roads and highways continue to be safe and technologically up to date. FHWA's R&T Program helps achieve the USDOT and Agency strategic goals and is stakeholder driven. Stakeholders are engaged throughout the entire R&T process from agenda setting through the conduct of research, technology and innovation (T&I) deployment, implementation, and customer feedback.

FHWA Vision...

Improving Transportation for a Strong America

FHWA Mission...

Enhancing Mobility through Innovation, Leadership, and Public Service

FHWA Roles...

Leaders for National Mobility
Stewards for National Highway Programs
Innovators for a Better Future

FHWA Strategic Goals...

FHWA aggressively pursues its vision and mission by focusing on six strategic goals:

Safety—Continually improve highway safety.

Mobility and Productivity—Preserve, improve, and expand the Nation's highway transportation system while, at the same time, enhancing the operation of the existing highway system and intermodal connectors.

Global Connectivity—Promote and facilitate a more efficient domestic and global transportation system that enables economic growth.



Environment—Protect and enhance the natural environment and communities affected by highway transportation.

National Homeland Security—Improve highway security and support national defense mobility.

Organizational Excellence—Advance FHWA's ability to manage for results and innovation.

Corporate Research and Technology

FHWA developed an Agencywide plan for R&T called the *Corporate Master Plan (CMP) for Research and Deployment of Technology & Innovation*. The plan outlines FHWA's corporate strategy for investing in and conducting cooperative research with partners and stakeholders. The CMP includes 7 guiding principles and 26 Agency commitments, which are designed to increase the effectiveness of all FHWA offices, as well as our partners and stakeholders, in determining research priorities and deploying T&I.

In implementing the plan, the Agency is committed to developing a more robust advanced research agenda; using functional area, multiyear plans (roadmaps); employing a merit review process; evaluating research and deployment activities; engaging stakeholders; and effectively communicating the R&T Program. The CMP is available on the FHWA Web site at <http://www.fhwa.dot.gov/legsregs/directives/policy/cmp/03077.htm>.

Multiyear Program Plans

FHWA's research activities are identified in multiyear program plans (roadmaps) that are developed with stakeholder input and tied to the FHWA and USDOT strategic goals. The plans include long-term goals and interim milestones, which are revisited on a periodic basis.



The Turner-Fairbank Highway Research Center

Who We Are and What We Do

The Turner-Fairbank Highway Research Center (TFHRC) is a federally owned and operated research facility in McLean, VA. TFHRC is home to FHWA's Office of RD&T, which coordinates an ambitious program of innovative research and development and T&I deployment that addresses the needs of the national highway system. Research conducted at TFHRC fosters better highway design, enhances traffic safety, and helps improve the condition, durability, and performance of our Nation's roadways and bridges.

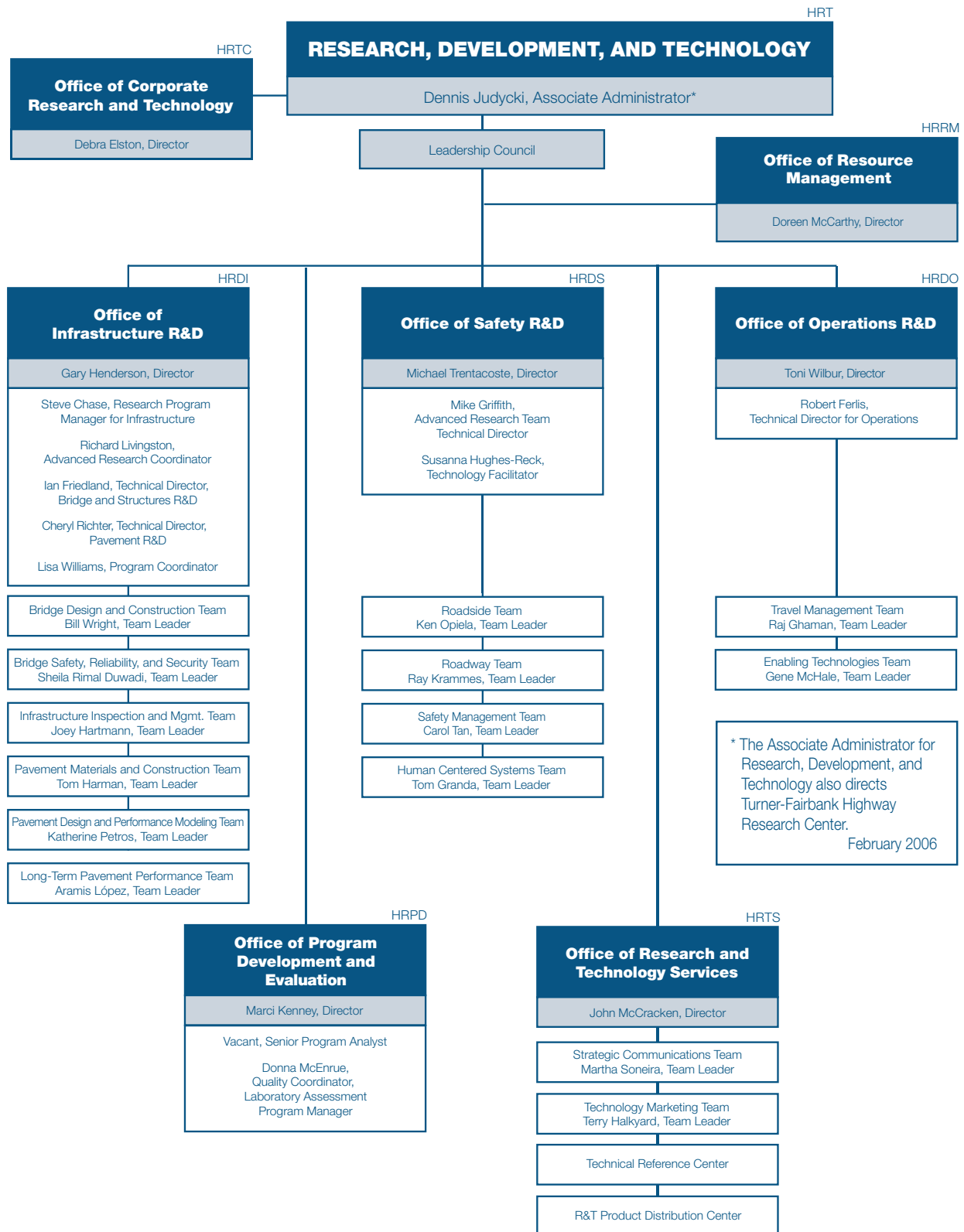
Our organization comprises seven offices responsible for conducting research and development (R&D) and critical program support activities. The three R&D offices at TFHRC serve as the focal point for the investigation of new and innovative technologies to improve the highway system. The RD&T Program support offices execute vital internal program support functions and also work with USDOT, other FHWA offices, and with our partners in State and local governments, academia, industry, and professional organizations to develop the national highway R&T agenda, disseminate the results of our research to the highway community where it may be implemented, and strengthen partnerships and enhance opportunities to leverage resources through programs such as the National Cooperative Highway Research Program (NCHRP) and the Transportation Pooled Fund (TPF) Program.

RD&T Organization

The staff at TFHRC is known for its customer-focused, scientific, and engineering expertise. The engineers, scientists, psychologists, and transportation specialists at TFHRC have expertise covering more than 20 transportation-related disciplines. Fifty percent of the Federal staff at TFHRC has advanced degrees, with 20 percent holding one or more doctoral degrees.

A significant change in the RD&T workforce over the years has been the increased use of contractor support to accomplish its mission. Two-thirds of the employees at TFHRC are contractors who work with our Federal staff in the areas of materials technology, pavements, structures, operations and intelligent transportation systems (ITS), human centered systems, and safety, as well as in a number of vital administrative and facilities support functions.







RD&T Corporate Missions and Functions

RD&T performs several key functions to champion the advancement of highway technological innovation. The following examples illustrate some of the unique functions carried out by RD&T in its effort to support the Agency's role as "innovators for a better future."

Highway Research and Development

- Research and innovation.
- Technical assistance.
- Forensic evaluation.

Corporate R&T

- Support of the FHWA R&T Leadership Team in the development of multiyear R&T roadmaps.
- Development of a process for establishing an Agency advanced research agenda.
- Advancement of priority, market-ready technologies and a process for tracking their deployment.
- Expansion of stakeholder involvement in advanced and applied research and deployment through the development of an integrated R&T information management system.

Strategic Planning and Budget

- R&T budget development.
- Legislative monitoring and analysis of R&T issues.
- Agency input into the USDOT RD&T Plan.

R&T Performance Measurement

- Implementation of the Federal R&D investment criteria.
- Preparation, coordination, and response for the Office of Management and Budget (OMB) Program Assessment Rating Tool (PART) evaluation of the Agency R&D program.
- R&T Performance Measure Framework.
- Lab Assessment Program.

Outreach, Communication, and Consultation

- Research of liaison and partnership activities (American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on Research (SCOR), AASHTO Research Advisory Committee (RAC), Transportation Research Board (TRB) Research and Technology Coordinating Council (RTCC), USDOT RTCC, etc.).
- Research and technology marketing.
- FHWA-wide media publications.
- RD&T facility tours.



R&D Office Projects and Milestones

Infrastructure R&D

The Office of Infrastructure R&D focuses on improving the performance of highway infrastructure and significantly reducing associated long-term costs. The comprehensive and coordinated Infrastructure research program conducts R&D that cuts across the boundaries of pavements, structures, and materials technology.

In the pavement area, researchers develop models, procedures, and processes that help transportation specialists predict pavement performance and select designs to optimize pavement performance and life cycle costs. They pursue increased pavement life by developing a better understanding of asphalt and portland cement concrete (PCC) paving materials and the pavement construction process, and by developing better predictive tools for use in the laboratory and on the roadway. The Long-Term Pavement Performance (LTPP) program aims to increase the understanding of why some pavements perform better than others. This information is one key to building and maintaining a cost-effective highway system. Advanced infrastructure research focuses on nanoscience technology and computational structural mechanics for the improvement of highway materials and structural performance.

In the structures arena, researchers employ a systems approach to integrate design, construction, durability, maintenance, inspection, and long-term performance into the bridge systems of the future. They work to ensure that highway structures are safe and reliable for all service conditions, including potential structural, environmental, and human-generated threats. Structural researchers also study and develop technologies to detect, measure, assess, and control all processes and mechanisms that limit the useful life of highway structures, and they develop applications to better preserve, maintain, and manage the Nation's highway bridges.

At TFHRC, we are constantly looking for new materials and methods to improve the quality of our Nation's highway system. Our efforts involve in-house and contract-sponsored research covering areas such as bridge coatings, asphalt concrete, and asphalt binders; PCC; high-performance materials for bridge construction; and waste and byproduct materials, to name a few.



Key Infrastructure R&D Projects and Milestones for FY 2006 and 2007

Office of Infrastructure R&D		
Office Director: Gary Henderson, Gary.Henderson@fhwa.dot.gov, 202-493-3022		
Project	Goal	Anticipated Completion
Pavement Design and Analysis—Team Leader: Katherine Petros, Katherine.Petros@fhwa.dot.gov, 202-493-3154		
Fiber-Reinforced Polymer (FRP) in Concrete Pavement Develop guidelines for the design and use of second-generation FRP dowels in jointed pavements and FRP reinforcement in continuously reinforced concrete pavements.	Mobility and Productivity	Mar 2006
Impact of Hydraulic Cement Concrete (HCC) Input Parameters on Mechanistic-Empirical (M-E) Pavement Design Guide Conduct an indepth sensitivity analysis of several key parameters for HCC that have been identified based on preliminary evaluation of the <i>M-E Pavement Design Guide</i> . This will provide stakeholders with insight regarding their relative importance in the design and construction processes.	Mobility and Productivity	Oct 2006
Impact of Dynamic Modulus on Prediction Models Investigate the dynamic modulus obtained on field, production, and laboratory samples to improve understanding of the impact of dynamic modulus on prediction models.	Mobility and Productivity	Dec 2006
Integration of LTPP Binder (LTPPBind) v 3.0 in AASHTO M320 Help highway agencies and contractors select the most suitable Superpave® performance grade of asphalt binder for a given project.	Mobility and Productivity	Dec 2007
Pavement Materials and Construction—Team Leader: Tom Harman, Tom.Harman@fhwa.dot.gov, 202-493-3072		
Asphalt Pavement Performance Prediction Symposium Participate in this 2-day session, organized annually by the Western Research Institute in Laramie, WY, as part of its congressionally mandated research contract with FHWA.	Mobility and Productivity	Annually in June or July
Compatibility of Mixture Components Develop guidance, including test procedures, to enable early identification of potential compatibility problems in paving concrete mixtures.	Mobility and Productivity	Jan 2006
Concrete Pavement (CP) Road Map Incorporate the key elements of the CP Road Map, a nationally vetted strategic long-range plan for HCC pavements, into the FHWA Pavements Roadmap. Foster and support the establishment of the executive committee structure.	Mobility and Productivity	May 2006
Evaluation of Mixless Calibration Techniques for the Superpave Gyrotory Compactor Conduct a detailed evaluation of new tools for calibration of the gyrotory compactor. Provide guidance and recommendations to the AASHTO Subcommittee on Materials.	Mobility and Productivity	Aug 2006



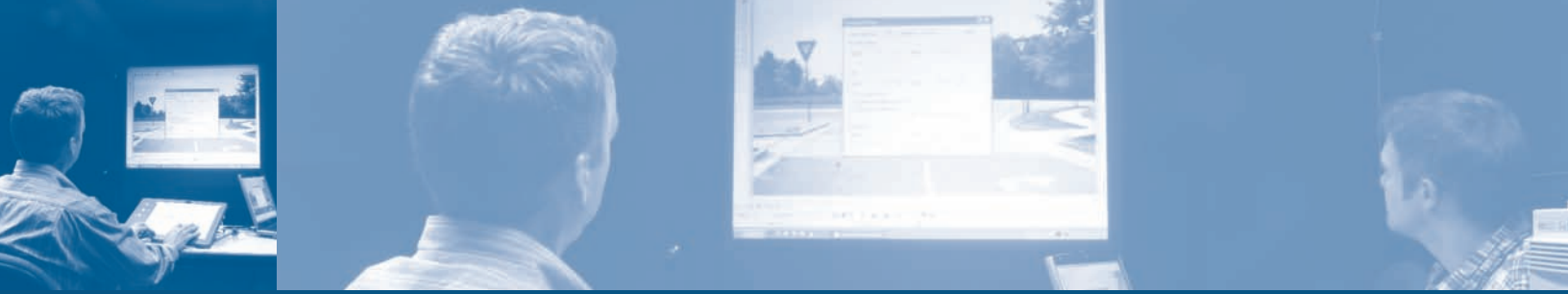
Project	Goal	Anticipated Completion
Pavement Materials and Construction (continued)—Team Leader: Tom Harman, Tom.Harman@fhwa.dot.gov, 202-493-3072		
Future of Full-Scale Accelerated Performance Testing Establish an international partnership and stakeholder group to formulate strategies to maximize resource allocation and identify mutual areas for collaboration.	Mobility and Productivity	Aug 2006
Concrete Mix Optimization Software Develop computer-based guidelines for job-specific optimization of paving concrete to help materials engineers and suppliers make day-to-day decisions about how to best proportion a mix to meet their desired criteria.	Mobility and Productivity	Oct 2006
CP Road Map: Mix Design Track—Phase I Advisory Structure Take the leadership role in establishing the expert task group to coordinate and conduct the HCC pavement mix design research track defined in the CP Road Map.	Mobility and Productivity	Dec 2006
Guidance on the Use of Acid Modification for Asphalt Binders Provide State agencies with clear guidance on the effective use of acid modification for asphalt binders. Clearly identify inappropriate uses, which can lead to performance issues.	Mobility and Productivity	Dec 2006
Intelligent Construction System (ICS)—Computer-Based Field Curing Tool for Concrete Pavement Develop prototype system, based on High Performance Pavement (HIPERPAV®) and curing guidelines, to provide real-time assessment of curing conditions for the paving contractor.	Mobility and Productivity	Dec 2006
Low-Temperature Binder Characterization Refine further the Superpave binder specification based on a detailed assessment of current and innovative laboratory low-temperature characterization procedures.	Mobility and Productivity	Dec 2006
Enhancement of HIPERPAV II Software Program Extend the HIPERPAV software for concrete pavement performance prediction to provide features to help engineers determine the timing of concrete placement to achieve optimum performance.	Mobility and Productivity	Apr 2007
Full-Scale Accelerated Performance Testing for Superpave and Structural Validation: Phase II—Loading Refine national Superpave binder specification to fully capture the benefit of modified binders. Pooled fund study TPF-5 (019) is in partnership with the TRB Superpave Binder Expert Task Group.	Mobility and Productivity	May 2007
Procedures for the Detection and Quantification of Lime in Asphalt Pavements Develop procedures for State agencies for forensic detection and quantification of lime used as an antistripping agent in asphalt pavements.	Mobility and Productivity	May 2007
Procedures for the Detection and Quantification of Polymer Modifiers in Asphalt Pavements Develop procedures for State agencies for forensic detection and quantification of polymer used to enhance performance in asphalt pavements.	Mobility and Productivity	May 2007



Project	Goal	Anticipated Completion
Pavement Materials and Construction (continued)—Team Leader: Tom Harman, Tom.Harman@fhwa.dot.gov, 202-493-3072		
Lithium Technology Research for Mitigation of Alkali-Silica Reactivity (ASR) in Concrete Conduct and evaluate field trials using lithium-based technologies for the prevention and mitigation of ASR to identify and document the benefits of lithium in transportation structures. Provide guidance to State agencies for use of lithium.	Mobility and Productivity	Sep 2007
Adequate Air Void System, measured by the Air Void Analyzer (AVA), for Freeze-Thaw Resistance Evaluate the AVA sampling and operation procedures for measuring air voids in paving mixes. Correlate the AVA parameters with rapid laboratory freeze-thaw durability (AASHTO T 161 and American Society for Testing and Materials (ASTM) C 666) and with scaling characteristics as exhibited in the rapid freeze-thaw tests, possibly using deicer scaling tests (ASTM C 672 both using visual ratings and mass loss). Conduct fundamental research on the spacing factor, based on AVA results.	Mobility and Productivity	Dec 2007
CONcrete Extrusion Workability (CONEW) Device Design a new type of device that can be used to determine a property of concrete that gives a direct measure of the workability, focusing on paving concrete mixtures.	Mobility and Productivity	Dec 2007
ICS—Smart Rollers Assess the potential of enhanced rollers in the compaction of base and asphalt materials as part of a pooled fund study.	Mobility and Productivity	Dec 2007
Full-Scale Accelerated Performance Testing for Superpave and Structural Validation: Phase III—Evaluation and Recommendations Refine the national Superpave binder specification to fully capture the benefit of modified binders. This is being done under pooled fund study TPF-5 (019) in partnership with the TRB Superpave Binder Expert Task Group.	Mobility and Productivity	Aug 2008
Understanding Moisture Damage in Asphalt Pavements—Phase I Establish and conduct fundamental research on moisture damage in asphalt pavements.	Mobility and Productivity	Dec 2008
Pavement Data and Performance—Team Leader: Tom Harman, Tom.Harman@fhwa.dot.gov, 202-493-3072		
Construction Quality Databases Develop guidelines for establishing and effectively using automated databases containing statewide construction data and information. This will improve the ability of State DOTs to develop specifications to achieve high construction quality and performance while minimizing life cycle costs.	Mobility and Productivity	Dec 2008



Project	Goal	Anticipated Completion
Long-Term Pavement Performance—Team Leader: Aramis López, Aramis.Lopez@fhwa.dot.gov, 202-493-3145		
Variability of Smoothness Measurements Allow for improved pavement measurements made at highway speeds. Determine accelerometer performance for inertial profilers at speeds from 24 to 113 kilometers (15 to 70 miles) per hour.	Mobility and Productivity	Jan 2006
Enhancement of DataPave Online Enhance this Web application, which provides access to all releasable LTPP data via the Internet. Data can be extracted (exported) to a number of popular file formats for analysis.	Mobility and Productivity	Oct 2006
Frost Determination of Seasonal Monitoring Program (SMP) Sites Complete the interpretation of frost penetration measurements at SMP sites and add results to the LTPP database.	Mobility and Productivity	Oct 2006
Moisture Determination of SMP Sites Complete the interpretation of time domain reflectometry measurements and provide estimates of moisture content for the LTPP SMP sites.	Mobility and Productivity	Oct 2006
Smoothness of Pavement at the Approaches to Weigh in Motion (WIM) Scales Develop specifications to be used when installing WIM equipment and/or to reduce calibration or check time. The specifications will provide a diagnostic tool to use when data change to assist with decisions on equipment reinstallation and/or pavement corrections.	Mobility and Productivity	Oct 2006
Anytime Weather Software Provide historical weather data for North America based on LTPP files and the National Oceanic and Atmospheric Administration. This provides reliability estimates on daily weather values for pavement design and evaluation.	Mobility and Productivity	Dec 2006
LTPP Program Assessment Perform a program assessment to evaluate the need for followup data collection after the conclusion of the planned 20-year monitoring effort and to determine whether remaining gaps in the database warrant further data collection efforts. Develop a post-LTPP plan for maintenance and dissemination of the program database and information.	Mobility and Productivity	Jan 2007
Bridge Design and Construction—Team Leader: Bill Wright, Bill.Wright@fhwa.dot.gov, 202-493-3053		
Enhanced Use of Shallow Foundations for Accelerated Construction Conduct load testing to determine the limitations in the use of shallow foundations for bridges to achieve accelerated construction goals.	Mobility and Productivity	Dec 2006
Synthesis Study on Risk and Vulnerability Assessment Methodologies for All Hazards Synthesize and clarify the state of the practice and determine the feasibility of reaching a consistent set of guidelines for evaluating risk and cost benefit for all hazards to support the safety, reliability, and security (SRS) goal of developing consistency in the level of risks used in design to safeguard structures from natural disasters and terrorist attacks.	Safety, Security	Dec 2006



Project	Goal	Anticipated Completion
Bridge Design and Construction (continued) —Team Leader: Bill Wright, Bill.Wright@fhwa.dot.gov, 202-493-3053		
Materials Spec-Accelerated Test-Based Specification—Repair Specification Develop critical AASHTO-level documents and data required for the implementation of FRP materials for bridge structures.	Mobility and Productivity	Sep 2007
Design Enhancements for Bridge Superstructure and Substructure Interface Address a common and costly maintenance problem for typical short-span bridges—the interface, or joint, between the superstructure elements and substructure support system at the beginning and end of the bridge. This work will instrument scale- and full-size mockups with realistic dynamic loading patterns to determine an optimum interface design.	Mobility and Productivity	Dec 2007
Improved Fracture Toughness Specifications for High-Performance Steel (HPS) Maximize the design and performance benefits of advanced steels. Performance properties of HPS provide significant advantages in resistance to critical fractures not currently accounted for in design guidance.	Mobility and Productivity	Dec 2008
Performance Data for Ultra-High Performance Concrete (UHPC) Bridge Elements Conduct a series of experiments characterizing the benefits of UHPC in bridge applications. These experiments will be performed using standardized materials performance and durability tests as well as full-scale, instrumented load tests in the main structures lab. Performance data will lead to technical reports and eventually input directly into AASHTO guideline documents.	Mobility and Productivity	Dec 2008
Development of Uniform Risk and Vulnerability Assessment Methodologies for All Hazards Conduct this follow-on study, which would be the second step toward developing consistency in the level of risks used in design for all hazards.	Safety, Security	Dec 2009
Refinement of Load and Load Factors for the Design of Highway Bridges for Extreme Events Develop loads and load factors for extreme events not already in the Load and Resistance Factor Design (LRFD) specifications and improve on those that are already there to support the SRS goal of developing analysis and design methodologies for highway structures to prevent physical damage.	Safety, Mobility and Productivity	Dec 2009
Bridge Safety, Reliability, and Security—Team Leader: Sheila Rimal Duwadi, Sheila.Duwadi@fhwa.dot.gov, 202-493-3106		
Optimum Bridge Deck Shapes to Minimize Pressure Flow Scour Characterize streamlines and shear stresses on channel beds for a variety of bridge deck shapes and positions. The result will be a more rational procedure for estimating pressure flow scour with the potential for taking advantage of streamlined shapes.	Safety, Mobility and Productivity	Dec 2007
Survey and Review of Wind Load Criteria for Cable-Supported Structures Conduct research to serve as a basis for developing consistent procedures for establishing design wind loads.	Safety	Dec 2007

Project	Goal	Anticipated Completion
Bridge Safety, Reliability, and Security (continued)—Team Leader: Sheila Rimal Duwadi, Sheila.Duwadi@fhwa.dot.gov, 202-493-3106		
Assessment of Current Designs for Structural Vulnerability Against Multiple Hazards Assess current bridge designs for vulnerability for each extreme event loading. This study would be followed by subsequent studies to develop optimized designs and countermeasures for mitigating and hardening structures for extreme events.	Safety, Security	Dec 2008
Accelerated Repair and Restoration Techniques for Reconstruction After an Event Research innovative techniques that could be deployed rapidly for recovery and permanent reconstruction after an event.	Safety, Mobility and Productivity	Dec 2009
Development of Guidelines for Bridges Built Near Fault Lines Develop design and retrofit guidelines for structures close to fault zones, which can be affected by near-source ground motion.	Safety, Mobility and Productivity	Dec 2009
Sensing and Monitoring Technologies for Extreme Events Develop and evaluate technologies that can be incorporated into bridges and structures to monitor performance under extreme events, detect intruders, and help assess post-event capacity of structures.	Safety, Security	Dec 2009
Infrastructure Inspection and Management—Team Leader: Joey Hartmann, Joey.Hartmann@fhwa.dot.gov, 202-493-3059		
Alternative Bridge Deck Reinforcement Materials Evaluate the effectiveness of various metallic, nonmetallic, or coated/clad forms of passive bridge deck reinforcement subjected to the load and environment typical of highway bridges. Create reports and data syntheses.	Mobility and Productivity	Jun 2006
Holistic Corrosion Protection Strategies Develop and detail a corrosion protection strategy that could be incorporated into the AASHTO specifications and integrates dependent layers of technology to ensure 75-year bridge service lives. Develop design specifications.	Mobility and Productivity	Jun 2007
Nondestructive Testing/Evaluation Technologies Develop, evaluate, and demonstrate nondestructive methods for condition evaluation of inservice structures. Develop reports and training materials.	Mobility and Productivity	Jun 2007
Bridge Coatings Performance and Selection Use electrochemical techniques for determining single-coat, multiple-coat, and over-coat bridge coating systems performance. Create reports and selection manual.	Mobility and Productivity	Sep 2007
Performance-Based Bridge Management Tools Derive database tools from National Bridge Inventory data to assist in overall bridge program management.	Mobility and Productivity	Sep 2007
Long-Term Bridge Performance (LTBP) Program Accommodate and develop both general trend information and information specific to a variety of bridge types, locations, and environmental exposures to guide future bridge design and construction. Create reports.	Mobility and Productivity	Dec 2007



Operations R&D

The Office of Operations R&D conducts research to mitigate congestion and improve safety through the use of ITS and other advanced technologies to better manage and operate the surface transportation system. The Travel Management Team produces hardware and software tools to analyze operational improvements, reduce congestion on surface streets and freeways, and mitigate delays in work zones. The Enabling Technologies Team is developing infrastructure-based and vehicle-infrastructure cooperative systems that will warn motorists of potential intersection collisions; promoting safety by developing decision-support tools for winter weather maintenance; and supporting the development and use of safety-enabling technologies such as dedicated short-range communications (DSRC) and nationwide differential global positioning systems (NDGPS).

Operations research will focus on reducing congestion and effectively dealing with one-time, nonrecurring highway incidents that cause congestion. Activities also include refining techniques to measure and assess highway congestion and system performance. Research in this area also will examine the use of intelligent infrastructure to develop advanced traffic signal control systems that will reduce travel times and increase reliability by adapting signalization to changing traffic conditions. Research under the Cooperative Intersection Collision Avoidance Systems (CICAS) initiative will develop in-vehicle and infrastructure-based countermeasures to help prevent crashes at signalized and stop sign controlled intersections.

One of the key tools supporting Operations/ITS research and development is the Traffic Research Laboratory (TReL). TReL contains the visualization, simulation, communication, and control capabilities needed to effectively conduct traffic engineering R&D. The laboratory affords researchers the ability to conduct innovative real-time, hardware-in-the-loop evaluations and studies. Researchers at TReL develop and evaluate prototype adaptive traffic control systems before they are evaluated and demonstrated in field trials. Also available to our researchers is the TFHRC Intelligent Intersection. The Intelligent Intersection is connected to TReL via a fiber-optic communications link that supports full integration of the two research facilities, providing a controlled environment to test prototype systems before field trials. The Intelligent Intersection's advanced sensors and simulated DSRC wireless communications provide powerful tools enabling the integration and testing of vehicle-infrastructure integration, advanced infrastructure-based sensing technology, infrastructure-based safety threat assessment processing, and integration of CICAS with both legacy and emerging traffic control technology. In addition to the Intelligent Intersection, a Road Weather Information Station (RWIS) and a Global Positioning System Surface Observation System (GSOS) have been integrated with TReL to provide real-time weather information.



Key Operations R&D Projects and Milestones for FY 2006 and 2007

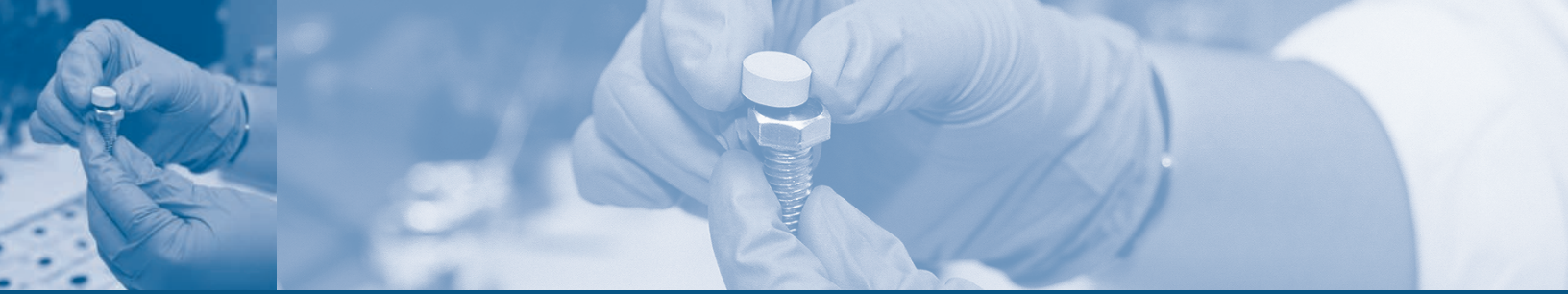
Office of Operations R&D		
Office Director: Toni Wilbur, Toni.Wilbur@fhwa.dot.gov, 202-493-3303		
Project	Goal	Anticipated Completion
Intersection Collision Avoidance (ICA) and Human Centered Systems Related Research—Team Leaders: Gene McHale, Gene.McHale@fhwa.dot.gov, 202-493-3275 and Tom Granda, Thomas.Granda@fhwa.dot.gov, 202-493-3365		
Transportation Management Center (TMC) National Pooled Fund Study Results Study operational and human centered issues common among agencies that manage and operate TMCs.	Safety, Mobility and Productivity	Ongoing
Work Zone ITS for Crash Avoidance—Phase II Develop prototype sensors to support work zone crash avoidance. A demonstration will be conducted at the Chrysler™ proving grounds.	Safety	Apr 2006
Real-Time Linux® Operating System for Advanced Traffic Controllers Connect the Linux real-time operating system to advanced transportation controllers to support the faster detector polling and information processing required for CICAS and Vehicle Infrastructure Integration (VII) research.	Mobility and Productivity	Sep 2006
Human Factors Assessment of Infrastructure-Based ICA Devices—Phase II Evaluate alternative infrastructure-based warnings to drivers to prevent collisions. This phase studies deceleration profiles and reaction time data for drivers responding to warnings that are given both close to and further away from the intersection. This study will be conducted on a closed test course (in conjunction with the Human Centered Systems Lab).	Safety	Sep 2006
Traffic Control Device Consortium Pooled Fund Study Evaluate innovative traffic control devices and disseminate the results for incorporation into the <i>Manual on Uniform Traffic Control Devices</i> (MUTCD). A consortium of State, regional, and local entities, FHWA, and other partners will work in conjunction with the Human Centered Systems Lab on this task.	Safety, Mobility and Productivity	Dec 2009
CICAS Infrastructure Consortium (IC) Design, develop, and test prototype CICAS in support of the USDOT ITS CICAS initiative. The CICAS IC will work jointly with a partnership of automobile manufacturers in this effort. Following testing of prototype systems, the CICAS IC will support field operational testing of CICAS systems.	Safety	Aug 2010



Project	Goal	Anticipated Completion
Traffic Control and Operations—Team Leader: Raj Ghaman, Raj.Ghaman@fhwa.dot.gov, 202-493-3270		
<p>Integrated Corridor Management (ICM) Initiative—Phase I: Foundational Research Conduct foundational research to initiate the ICM program with stakeholder input in the areas of ICM definitions, corridor delineation, ICM concepts and operational strategies development, ICM analysis tools assessment and development, and identification and alignment of gaps and needs with program objectives.</p>	<p>Safety, Mobility and Productivity</p>	<p>Oct 2005</p>
<p>Traffic Detector Handbook Complete this handbook, which explains how to design, use, and maintain traffic loops and magnetometers and how to select and use video and radar sensors.</p>	<p>Safety, Mobility and Productivity, Environment</p>	<p>Dec 2005</p>
<p>Adaptive Control Software (ACS) “Lite”—Field Test Conduct remaining field tests of three brands of controllers: Eagle controllers in Houston, TX, Peek® controllers in St. Petersburg/Tampa, FL, and McCain® controllers in San Diego, CA. Econolite® brand controller testing has been completed in Gahanna, OH.</p>	<p>Mobility and Productivity</p>	<p>Jan 2006</p>
<p>Identify Service Concepts and Technologies for Emergency Transportation Operations Define potential service concepts and technologies where vehicle-infrastructure cooperation can enable or improve emergency transportation operations.</p>	<p>Safety, Mobility and Productivity</p>	<p>Jan 2006</p>
<p>Integration of DynaMIT, CLAIRE, and Advanced Incident Detection Algorithm (AIDA) for Real-Time Traffic Management on Arterials—Field Test in Los Angeles, CA Integrate DynaMIT, one of the two prototypes for the real-time Traffic Estimation and Prediction System (TrEPS) developed under the Dynamic Traffic Assignment (DTA) research project, to provide traffic estimation and predictive information based on real-time traffic data and help traffic engineers at TMCs implement proactive traffic management strategies on arterials in real time.</p>	<p>Mobility and Productivity</p>	<p>Apr 2006</p>
<p>Winter Weather Maintenance Decision Support System (MDSS) Pooled Fund Study Tailor the MDSS system to the particular needs of the eight States that are participating in this pooled fund study.</p>	<p>Safety, Mobility and Productivity, Environment</p>	<p>Jun 2006</p>
<p>Traffic Detector Video Develop a video to show the proper installation of loop detectors.</p>	<p>Safety, Mobility and Productivity</p>	<p>Sep 2006</p>
<p>Winter Weather MDSS Deployment Assistance Help deploy MDSS techniques and technology guidance tools to assist winter maintenance managers with treatment recommendations. The tools have the potential to keep roadways safer by improving mobility in adverse weather and promoting efficiencies in the use of chemicals, equipment, and staff. This project provides deployment assistance to encourage technology transfer to the private sector.</p>	<p>Safety, Mobility and Productivity, Environment</p>	<p>Sep 2006</p>



Project	Goal	Anticipated Completion
Traffic Control and Operations (continued)—Team Leader: Raj Ghaman, Raj.Ghaman@fhwa.dot.gov, 202-493-3270		
ICM Initiative—Phase II: Operations and Systems Development Identify and conduct initial ICM operations and systems development activities to support early development of ICM management schemes, corridor operational strategies, analysis tools development, systems interfaces, and limited field testing.	Safety, Mobility and Productivity	Sep 2007
Pedestrian Stereo Imaging Sensor Investigate the uses of stereo imaging to detect and trace pedestrians near intersections.	Safety, Mobility and Productivity	Sep 2007
Clear Roads Pooled Fund Study Rigorously test winter maintenance materials, equipment, and methods for use by highway maintenance crews.	Safety, Mobility and Productivity, Environment	Dec 2007
Integration of DYNASMART-X, CLAIRE, and RHODES® for Real-Time Traffic Management—Field Test in Houston, TX Integrate DYNASMART-X, one of the two prototypes for the real-time TrEPS developed under the DTA research project, to provide traffic estimation and predictive information based on real-time traffic data and help traffic engineers at TMCs implement proactive traffic management strategies on freeways in real time.	Mobility and Productivity	Dec 2007
Surface Transportation Security and Reliability Information System Model Deployment Deploy the iFlorida model to demonstrate and evaluate how security, reliability, and safety can be enhanced through the widespread availability of real-time information.	Safety, Mobility and Productivity, Security	Jun 2008
Unmanned Aerial Vehicle (UAV) for Aerial Surveillance Research the parameters and characteristics of remotely piloted vehicles for incident management and traffic surveillance.	Safety, Mobility and Productivity	Sep 2008
Traffic Analysis Tools/Simulation and Modeling—Team Leader: Raj Ghaman, Raj.Ghaman@fhwa.dot.gov, 202-493-3270		
Strategic Work Zone Analysis Tools (SWAT) Provide the Work Zone Delay Impact Analysis Spreadsheet (QuickZone) and an Expert System Software Program (Impacts Assessment Tool) as part of SWAT, a set of tools for the design and operation of work zones that addresses mobility and safety impacts.	Mobility and Productivity	Dec 2005
CORSIM Application Guidelines Provide guidelines to assist users of the CORSIM traffic simulation software in conducting transportation analyses.	Mobility and Productivity	Jan 2006
Next Generation Simulation Modeling (NGSIM) Develop and freely distribute valid microscopic traffic simulation algorithms and real-world traffic data sets.	Mobility and Productivity	Dec 2007



Project	Goal	Anticipated Completion
Enabling Technologies—Team Leader: Gene McHale, Gene.McHale@fhwa.dot.gov, 202-493-3275		
Identify Mobility Applications for Vehicle Infrastructure Integration (VII) Identify promising mobility applications that will be enabled by the anticipated VII infrastructure. Candidate applications will include evolutions of current services and technologies such as adaptive cruise control and new concepts that use vehicle control technologies to achieve significant future improvements in mobility.	Mobility and Productivity	Jan 2006
High-Accuracy NDGPS Provide the capability to broadcast corrections to the global positioning system over long ranges to achieve a better than 10-centimeter (3.94-inch) accuracy throughout the coverage area.	Safety, Mobility and Productivity, Environment, Security	Dec 2007
DSRC/Wireless Access for Vehicular Environment Develop telecommunications technology to include spectrum allocation from the Federal Communications Commission, licensing rules, standards, prototypes, and initial deployment.	Safety, Mobility and Productivity, Environment, Security	Dec 2008
Telecommunications Interface Model for Predicting Ionospheric Changes Develop and evaluate an ionospheric model to predict interference levels to telecommunications systems.	Safety, Mobility and Productivity, Environment, Security	Dec 2008



Safety R&D

The Office of Safety R&D aims to reduce highway crashes and related fatalities and injuries by developing and implementing a program of safety innovations through a nationally coordinated R&T partnership. The focus is on FHWA's priority objectives for highway safety improvements related to preventing and mitigating roadway departures, managing safety, improving intersections, and protecting pedestrians. This office provides transportation officials and practitioners with improved understanding, information, and state-of-the-art tools to aid informed decisions on highway safety improvements. The office also conducts advanced research to determine new ways to solve highway safety problems and challenges.

Planned initiatives include the development of a tool to evaluate countermeasures to prevent roadway departure crashes on two-lane rural highways, work to improve the retroreflectivity of pavement markings and work zone traffic control devices, and development of roadway lighting systems and safety structures. This includes work on speed management to encourage wider adoption of safe travel speeds appropriate for road and travel conditions; safety management to ensure that resources are allocated to assure maximum returns in reducing the severity and frequency of crashes; human centered systems to incorporate human factor considerations into all aspects of highway design; work zone safety improvements; and a variety of outreach efforts.

Key Safety R&D Projects and Milestones for FY 2006 and 2007

Office of Safety R&D		
Office Director: Michael Trentacoste, Michael.Trentacoste@fhwa.dot.gov, 202-493-3260		
Project	Goal	Anticipated Completion
Run-Off-The-Road Prevention: Design—Team Leader: Ray Krammes, Ray.Krammes@fhwa.dot.gov, 202-493-3312		
Driver Performance Effects from Innovative Applications of Pavement Markings and Raised Retroreflective Pavement Markers (RRPM) (Field Study) Test driver response in a field experiment in Delta, PA, to innovative applications of markings and markers (in conjunction with the Human Centered Systems Lab).	Safety	Jun 2006
Interactive Highway Safety Design Model (IHSDM)—Two-Lane Rural Highway Update Release Update a public release of software that will help highway planners and designers estimate the safety and operational effects of geometric design decisions on two-lane rural highways.	Safety	Sep 2006



Project	Goal	Anticipated Completion
Run-Off-The-Road Prevention: Design (continued)—Team Leader: Ray Krammes, Ray.Krammes@fhwa.dot.gov, 202-493-3312		
Driver Performance Effects from Innovative Applications of Pavement Markings and RRPMS (Lab Study) Test driver response in the Highway Driving Simulator to innovative applications of markings and markers (in conjunction with the Human Centered Systems Lab).	Safety	Dec 2006
Wet Night Visibility of Pavement Markings Examine the performance of various types of pavement markings while saturated and during recovery.	Safety	Mar 2007
Updated Minimum Levels for Pavement Marking Retroreflectivity Investigate the effects of newer headlights, increased numbers of older drivers, changes in the vehicle fleet, and new marking materials to generate new minimum retroreflectivity levels.	Safety	Sep 2007
Guidelines for Maintaining Night Visibility of Pavement Markings Develop a document that will provide guidance and detailed procedures for pavement marking inspection and management programs.	Safety	Sep 2007
Run-Off-The-Road Mitigation: Severity Reduction—Team Leader: Ken Opiela, Kenneth.Opiela@fhwa.dot.gov, 202-493-3371		
Mailbox Surrogate Test Develop a low-cost test using finite-element analysis (FEA) to evaluate lightweight mailboxes. In high-speed crash tests, mailbox supports have been observed to fly back and impact the windshield with the potential to cause injuries and fatalities. This low-cost test will be a surrogate for more expensive full-scale tests.	Safety	June 2006
Guardrail Blockout Surrogate Test Develop a new surrogate test to reduce costs for blockouts, which minimize the potential for wheel or bumper snagging on strong-post guardrail systems, and still provide a realistic loading condition for proposed blockouts made of recycled plastic, rubber, and wood.	Safety	Sep 2006
Cable Median Barrier Development Develop FEA models for various types of cable barrier systems, and conduct crash simulations using the various FEA vehicle models available. These efforts may require full-scale crash tests to validate model results. The results will be used to recommend guidelines for the placement of cable median barriers. The National Crash Analysis Center (NCAC) will oversee these efforts.	Safety	Sep 2006
Vehicle Impacts for Median Landscape Treatments Develop FEA models for various types of roadway median planter treatments and undertake crash simulations using the various FEA vehicle models available. These efforts may require full-scale crash tests to validate model results. The results will be used to recommend guidelines for the design and placement of such median treatments in context sensitive designs. NCAC will oversee these efforts.	Safety	Dec 2006



Project	Goal	Anticipated Completion
Intersections—Team Leader: Ray Krammes, Ray.Krammes@fhwa.dot.gov, 202-493-3312		
Design and Performance Analysis of Pedestrian Crossing Facilities for Continuous Flow Intersections Explore considerations for pedestrian accommodations, signal settings, and level of service performance.	Safety	Jan 2006
Operational Evaluation of the New Jersey Jughandle Intersection Perform an operational comparison between typical New Jersey jughandles and conventional intersections using traffic simulation modeling for three types of designs.	Safety	Jan 2007
Safety Evaluation of the New Jersey Jughandle Intersection Perform a safety comparison between typical New Jersey jughandles and conventional intersections in the same State.	Safety	Jan 2007
Safety Impact of Urban Freeway Interchange Spacing Develop a preliminary evaluation of interchange spacing from statistical modeling of California freeway data.	Safety	Jan 2007
Novel Intersections—Diverging Diamond Interchanges Perform a human factors evaluation of signage and markings for diverging diamond intersections. The evaluations will include assessment of signs and markings, which may be followed by developing, testing, and evaluating alternative signage and markings if safety deficiencies in current practice are identified (in conjunction with the Human Centered Systems Lab).	Safety	May 2007
Safety Analysis of Interchanges Develop preliminary computational tools for safety evaluation and for development of a research plan.	Safety	Aug 2007
Pedestrians and Bicyclists—Team Leader: Tom Granda, Thomas.Granda@fhwa.dot.gov, 202-493-3365		
Tier 2: ITS Technologies to Reduce Pedestrian Injuries and Fatalities Identify current technology for pedestrian detection and warning systems and develop a project work plan for a possible Tier 1 initiative. The project is an exploratory initiative funded by the ITS Joint Program Office.	Safety	Mar 2006
Evaluation of Safety Design and Operation of Shared-Use Paths Develop tools/methodologies used to evaluate the operational and safety effectiveness of various design alternatives for shared-use paths. The products may be used to supplement the existing procedures in the “Bicycles” and “Pedestrians” chapters of the <i>Highway Capacity Manual</i> .	Safety	Apr 2006
University Course on Pedestrians and Bicyclists Develop Version 2 of the University Course on Pedestrians and Bicyclists.	Safety	Apr 2006
Development of Design Guidelines for Crosswalk Lighting Quantify the improvement in detection and recognition of pedestrians in and adjacent to crosswalks through placement of the lighting pole. The intent is to develop a guideline for installing crosswalk lighting both separately and as part of a continuous fixed roadway lighting system.	Safety	May 2006



Project	Goal	Anticipated Completion
Pedestrians and Bicyclists (continued)—Team Leader: Tom Granda, Thomas.Granda@fhwa.dot.gov, 202-493-3365		
Pedestrian Bicycle Crash Analysis Tool (PBCAT) V 2.0 Update the PBCAT software to help State and local pedestrian/bicycle coordinators, planners, and engineers improve walking and bicycling safety by analyzing crashes between motor vehicles and pedestrians or bicyclists. The updated version of PBCAT will be in a familiar Microsoft® Windows® interface, provide more user options and greater customization, and offer enhanced countermeasures information.	Safety	May 2006
In-Roadway Warning Lights Study Collect data to examine pedestrian safety and whether the effects of in-roadway warning lights at crosswalks are long lasting or the result of novelty.	Safety	Jun 2006
Segway® Human Transporter Evaluate the stopping performance of experienced Segway riders (Phase 1—“An Evaluation of Segway Riders’ Stopping Performance on a Closed Course”). Compare the ability of novice and experienced riders to navigate typical sidewalk conditions (Phase 2—“Performance of Expert and Novice Segway Riders Under Varying Sidewalk Conditions”).	Safety	Jun 2006
Hazard Index for Assessing Pedestrian and Bicyclist Safety at Intersections Develop hazard indices that will enable planners, engineers, and other practitioners to easily identify features, or combinations of features, at intersections that place pedestrians and bicyclists at risk. Intersection indices will be helpful in influencing future intersection design, as well as accommodating the needs of pedestrians with disabilities.	Safety	Sep 2006
Speed Management—Team Leader: Ray Krammes, Ray.Krammes@fhwa.dot.gov, 202-493-3312		
Results of Field Tests on Impacts of Setting and Enforcing Rational Speed Limits Undertake a complete and systematic evaluation of the effects of establishing, publicizing, and enforcing rational speed limits in a number of dedicated participating communities during a 2-year period.	Safety	Dec 2006
Safety Management Systems—Team Leader: Carol Tan, Carol.Tan@fhwa.dot.gov, 202-493-3315		
Rollover Causation Study Identify the guidelines available for identifying sites with high rollover potential.	Safety	Sep 2006
SafetyAnalyst Incorporate state-of-the-art safety management approaches into computerized analytical tools for guiding the decisionmaking process to identify safety improvements. Develop a systemwide program of site-specific improvement projects.	Safety	Nov 2006



Project	Goal	Anticipated Completion
Safety Management Systems (continued)—Team Leader: Carol Tan, Carol.Tan@fhwa.dot.gov, 202-493-3315		
Evaluation of the Safety Edge This is a pooled fund study to determine the scope, develop the work plan, and collect the “before” data related to the effectiveness of the safety edge to prevent pavement edge dropoff related crashes.	Safety	Jun 2007
Advanced Research—Digital Highway Measurement Vehicle An FHWA-led pooled fund study designed to advance the use of technologies to perform real-time data collection of roadway and roadside features at highway speeds.	Safety	Dec 2007
Evaluation of Low-Cost Safety Improvements Determine the effectiveness of a number of low-cost safety improvements from the AASHTO Strategic Highway Safety Plan. This is a pooled fund study.	Safety	Jun 2007
Human Centered Systems—Team Leader: Tom Granda, Thomas.Granda@fhwa.dot.gov, 202-493-3365		
Sign Assessment for Infrastructure Systems Initiate and monitor projects intended to address evaluation of the infrastructure signs for the MUTCD (in conjunction with the Office of Operations R&D).	Safety, Mobility and Productivity	Ongoing
Infrastructure-Cooperative Systems ICA (Simulator Study 2) Examine driver reaction times to infrastructure-based warnings about red light violators. Unlike the first simulator study, this study will involve other vehicles on the roadway (in conjunction with the ITS Joint Program Office).	Safety, Mobility and Productivity	Sep 2006
Traffic Control Device Consortium Pooled Fund Study Projects Evaluate novel traffic control devices through this consortium of regional, State, and local entities; appropriate organizations; and FHWA. Results will be disseminated for incorporation in the MUTCD (in conjunction with the Office of Operations R&D).	Safety, Mobility and Productivity	Dec 2009
Transportation Management Center (TMC) Pooled Fund Study Projects Study operational topics related to TMCs through this consortium of regional, State, and local entities; appropriate organizations; and FHWA (in conjunction with the Office of Operations R&D).	Mobility and Productivity	Dec 2009



Program Support Services

Office of Corporate Research and Technology

The Office of Corporate Research and Technology supports the Agency’s commitment to implement the CMP to strengthen FHWA’s role as a leader in national highway R&T. Created in the summer of 2004, the office has since taken a lead role in facilitating various Agencywide R&T activities, such as the development of functional area R&T multiyear roadmaps to advance FHWA strategic goals; development of a process for establishing an Agency Advanced Research Agenda; advancement of priority market-ready technologies (MRT) and a process for tracking their deployment; expansion of stakeholder involvement in advanced and applied research and deployment through the development of an integrated R&T information management system; and preparation of a draft Corporate R&T report. The Office of Corporate Research and Technology champions R&T leadership initiatives in collaboration with FHWA field and program offices, State and local highway agencies, and other key internal and external stakeholders. This includes collaborative review and implementation of authorized research initiatives under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

Key Activities and Milestones for FY 2006 and 2007

Office of Corporate Research and Technology		
Office Director: Debra Elston, Debra.Elston@fhwa.dot.gov, 202-493-3181		
Key Activities	Goal	Anticipated Completion
Facilitate updating and communication of the Agency list of Priority, Market-Ready Technologies and Innovations.	All Goal Areas	Dec 2005
Manage development of FHWA Advanced Research Agenda and program management options.	All Goal Areas	Dec 2005
Develop and market the integrated FHWA Corporate R&T Web site.	Organizational Excellence	Jan 2006
Facilitate, distribute, and market updated multiyear functional area R&T roadmaps.	All Goal Areas	Jan 2006
Manage implementation of FHWA Advanced Research Agenda program.	All Goal Areas	Mar 2006
Produce and publish an FHWA 2006 Corporate R&T report.	Organizational Excellence	May 2006
Identify and communicate deployment status of MRT.	Organizational Excellence	Sep 2006
Conduct corporate R&T functional area program review.	Organizational Excellence	Mar 2007
Manage coordination of Scientific Peer Review procedures.	All Goal Areas	Semiannual



Office of Program Development and Evaluation

The Office of Program Development and Evaluation champions the RD&T Program and those it serves by developing and executing policy, budget, program management, and evaluation tools to further a national highway R&T program. Program development activities include the development of legislative and budget proposals and a budget delivery plan. The office is the focal point for FHWA's participation in cooperative research activities, such as NCHRP, and encourages partnerships to leverage resources through the TPF Program, which enables FHWA and State DOTs to pool resources to pursue projects of mutual interest. The Office of Program Development and Evaluation also manages FHWA participation in the Small Business Innovation Research Program and works with the Research and Innovative Technology Administration to support the University Transportation Center Program. In the area of evaluation, the office compiles the *RD&T Performance Plan*, the performance section of the annual *TFHRC Profile*, and manages a lab assessment program.

Key Activities and Milestones for FY 2006 and 2007

Office of Program Development and Evaluation		
Office Director: Marci Kenney, Marci.Kenney@fhwa.dot.gov, 202-493-3117		
Key Activities	Goal	Anticipated Completion
Develop a Legislative Implementation Plan for the research provisions in SAFETEA-LU.	Organizational Excellence	Dec 2005
Develop an R&T Budget Delivery Plan.	Organizational Excellence	(Annually) Jan 2006 Jan 2007
Develop FHWA's portion of the USDOT R&D Strategic Plan.	Organizational Excellence	Jul 2006
Identify and adopt FY 2008 R&D budget priorities.	Organizational Excellence	Jul 2006
Provide a summary of FHWA R&T activities and funding for USDOT annual performance reports on RD&T required by SAFETEA-LU.	Organizational Excellence	(Annually) Jul 2006 Jul 2007
Conduct FY 2006 lab assessments; complete lab assessments for Aerodynamics Lab, Coatings and Corrosion Lab, and Crash Analysis Labs.	Organizational Excellence	Sep 2006
Provide summary of R&T activities and funding for RD&T annual report.	Organizational Excellence	(Annually) Oct 2006 Oct 2007
Identify and adopt FY 2009 R&D budget priorities.	Organizational Excellence	Jul 2007
Conduct FY 2007 lab assessments; complete lab assessments for the Geotechnical Lab, Highway Safety Information Systems and Design Lab, Bridge Management Information Systems Lab, and Nondestructive Evaluation and Pavement Surface Analysis Lab.	Organizational Excellence	Sep 2007



Office of Resource Management

The Office of Resource Management provides critical management support services that contribute to the Office of RD&T's research and deployment of T&I activities. The Office of Resource Management staff provides assistance and support for a wide range of activities and operations. These include financial management of R&T and general operating expenses funding; acquisition planning and contract administration for research programs and research support activities; human resource management and employee development; information technology support for research and business applications; accountable property management and disposition; and RD&T facilities management—including emergency planning, FHWA continuity of operations support, and physical security.

Key Activities and Milestones for FY 2006 and 2007

Office of Resource Management		
Office Director: Doreen McCarthy, Doreen.McCarthy@fhwa.dot.gov , 202-493-3173		
Key Activities	Goal	Anticipated Completion
Implement the Management Cost Accounting System.	Organizational Excellence	Jun 2006
Assess and improve the annual RD&T Workforce Succession Plan.	Organizational Excellence	Jul 2006
Develop the TFHRC Capital Improvement Plan.	Organizational Excellence	Sep 2006
Implement E-travel.	Organizational Excellence	Sep 2006



Office of Research and Technology Services

The Office of Research and Technology Services leads in leveraging T&I deployment, one of the Agency's key business processes. The office also provides various marketing and communication services Agencywide, as well as within the Office of RD&T. These include planning and executing the FHWA-wide exhibit program; administering the R&T Products Distribution Center; editing, publishing, and distributing RD&T research reports; overseeing RD&T Web pages; and publishing periodicals, such as *Public Roads*, that reach customers worldwide. The office also supports the implementation of the CMP.

Key Activities and Milestones for FY 2006 and 2007

Office of Research and Technology Services		
Office Director: John McCracken, John.McCracken@fhwa.dot.gov , 202-493-3422		
Key Activities	Goal	Anticipated Completion
<p>Coordinate the National Exhibit Program, including maintaining and updating the exhibits database:</p> <ul style="list-style-type: none"> • Ship 30 exhibits and related publications annually to 20 Division Offices in support of marketing efforts. • Ship 45 exhibits and related publications annually for the Resource Center and program offices. • Coordinate FHWA presence at the TRB Annual Meeting including shipping, setup, staffing, and take down of approximately 80 exhibits and related publications. • Coordinate FHWA presence at the AASHTO Annual Meeting including design, shipping, setup, staffing, and take down of the exhibits. • Ship 25 exhibits annually to national exhibitions that are of a crosscutting nature (involve multiple FHWA offices). 	All Goal Areas	(Annually) Sep 2006 Sep 2007
<p>Operate the R&T Product Distribution Center to distribute approximately 300,000 items (reports, CDs, videos, National Highway Institute course materials):</p> <ul style="list-style-type: none"> • Provide online access to the Product Distribution Center database. 	All Goal Areas	(Annually) Sep 2006 Sep 2007
<p>Continue improvements to the RD&T Technical Reference Center to enhance the collections and access to the resources, including reference and research services:</p> <ul style="list-style-type: none"> • Provide online access to the Technical Reference Center database. 	All Goal Areas	(Annually) Sep 2006 Sep 2007



Key Activities	Goal	Anticipated Completion
Office Director: John McCracken, John.McCracken@fhwa.dot.gov, 202-493-3422 (continued)		
Provide technical meeting support services for at least 30 meetings for various FHWA offices nationwide.	All Goal Areas	(Annually) Sep 2006 Sep 2007
Provide writing and editorial services for 200 FHWA projects annually.	All Goal Areas	(Annually) Sep 2006 Sep 2007
Solicit articles, edit, and print R&T periodicals: <ul style="list-style-type: none"> • <i>Public Roads</i>—at least 6 issues per year. • <i>Focus</i>—12 issues per year. • <i>Transporter</i>—12 issues per year. 	All Goal Areas	(Annually) Sep 2006 Sep 2007
Coordinate at least 50 external outreach and information exchange events each year.	All Goal Areas	(Annually) Sep 2006 Sep 2007
Improve the RD&T publication process.	All Goal Areas	Sep 2006
Improve the RD&T communication plan process.	All Goal Areas	Sep 2006



RD&T Performance Management

The performance planning process for the Office of RD&T supports the Agency R&T planning process and enables RD&T to carry out its research functions in support of a nationally coordinated R&T Program. The RD&T Office of Program Development and Evaluation is responsible for leading the development of the *RD&T Performance Plan*, with the support of the RD&T Leadership Council and Performance Management Working Group.

The RD&T Leadership Council is composed of the Associate Administrator for RD&T and the RD&T office directors and team leaders. The RD&T Leadership Council functions in an advisory capacity to effect organizational process improvements on a wide range of issues including program planning, performance management, program planning, and quality of work-life.

Reporting to the Leadership Council is an RD&T Performance Management Workgroup. The RD&T Performance Management Workgroup helps the Leadership Council develop the *RD&T Performance Plan*, develop performance measures, monitor results, and undertake initiatives to improve organizational performance. The Performance Management Workgroup is chaired by the Office of Program Development and Evaluation and includes representatives of all seven RD&T offices.

Use of the R&D Investment Criteria

Developed as an initiative of the President’s Management Agenda, the Federal R&D investment criteria are used to help improve program management, inform funding decisions, and increase public understanding of the potential benefits of investment in Federal research. FHWA RD&T program managers work to ensure that research investments are mission oriented, support Agency goals, and meet the needs of our customers and stakeholders. The criteria are:

- **Relevance.** RD&T program managers must be able to articulate why an investment is important, relevant, and appropriate. Our research activities, products, and services outlined in this plan are designed to support the Agency’s goals and address customer needs.
- **Quality.** RD&T program managers must justify how funds will be allocated to ensure quality research. Programs allocating funds through means other than a competitive, merit-based process must justify these exceptions and document how quality will be maintained. Quality also is assessed periodically through independent lab assessments.
- **Performance.** RD&T program managers must be able to monitor and document how well this investment is performing. Program managers track R&T projects to determine whether the projects are on time and within budget, and assess whether to increase or redirect funding. Customer feedback mechanisms and retrospective benefit studies also provide important information on performance.



USDOT agencies received a rating of “Green” in recent assessments of progress made under the Federal R&D Investment Criteria. Progress in this area is tracked and updated on a quarterly basis by USDOT. The President’s Management Council establishes the ranking criteria with input from experts throughout government and academia, including the National Academy of Public Administration.

Performance Planning and Reporting

The performance plan for FHWA’s RD&T Program is a 2-year plan that directly supports the strategic goals of FHWA and USDOT. The *RD&T Performance Plan* includes a detailed list of projects and anticipated completion dates. The listed projects are developed in conjunction with FHWA headquarters and field offices as part of multiyear R&T program plans. The *RD&T Performance Plan* is complemented by an annual report that highlights program performance. Copies of RD&T publications are available online at <http://www.tfhr.gov/index.html>.

The RD&T biennial performance plan directly addresses the research needs identified by our customers and stakeholders. It provides information on the products, services, and innovations that will be delivered during the plan years, as well as ongoing research activities and support services. This plan also is included in FHWA’s national performance planning database, known as the Shared Unit Performance Planning System.

The Lab Assessment Program

A lab assessment is an onsite, independent investigation by technical and scientific experts whose knowledge and expertise enable them to make credible and unbiased judgments regarding the conduct of research. The review provides a means to determine whether the research activities have high potential value and whether they are achieving their stated objectives. Additionally, the review produces a set of specific observations and recommendations for improvement of operations. FHWA has articulated the following four goals for the Lab Assessment Program:

- Enhance research quality, performance, and relevance by providing lab managers feedback and suggestions for improvements.
- Supply an opportunity for an exchange of views among technical experts.
- Offer increased opportunities for FHWA customers and stakeholders to provide input to research and related activities.
- Conduct a credible, professional, and objective assessment that further improves customer and stakeholder confidence in the conduct of research and the outcomes produced.

As part of its commitment to continually reevaluate the effectiveness and efficiency of its operations, TFHRC established a lab assessment process in 2003 that used external, independent evaluators from industry, academia, and government. Evaluations are programmed on a 4-year cycle for each of the labs at TFHRC. To date, seven labs have completed the assessment. Results of those assessments, as well as a detailed description of the program, are available on the TFHRC Web site at <http://www.tfhrc.gov/services/labassessmentprocess.htm>.

Labs Scheduled for Assessment in FY 2006 and 2007

Scheduled	Fiscal Year
Aerodynamics Laboratory	2006
Coatings and Corrosion Laboratory	2006
Crash Analysis Laboratories <ul style="list-style-type: none"> • NCAC at George Washington University • Federal Outdoor Impact Laboratory 	2006
Geotechnical Laboratories	2007
Highway Safety Information System (HSIS) and Design Laboratories <ul style="list-style-type: none"> • HSIS Laboratory • Geometric Design Laboratory 	2007
Bridge Management Information Systems Laboratory	2007
Nondestructive Evaluation and Pavement Surface Analysis <ul style="list-style-type: none"> • Nondestructive Evaluation Validation Center • Pavement Surface Analysis Lab 	2007

Performance Measurement

RD&T uses efficiency measures to link resource utilization with the results that were achieved. The measures are designed to answer questions such as, "Are we making progress? Are we falling behind? Are we achieving what we set out to achieve?"

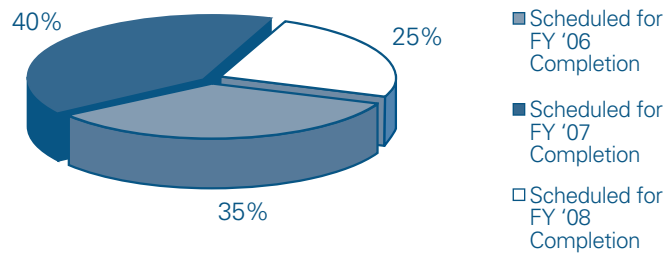
Tracking program efficiency measures allows RD&T to determine the extent to which multi-year program plan milestones are being met, and thus assess progress toward achieving long-term program goals. Additional information on our research results can be obtained in the *TFHRC Profile* available at <http://www.tfhrc.gov>.



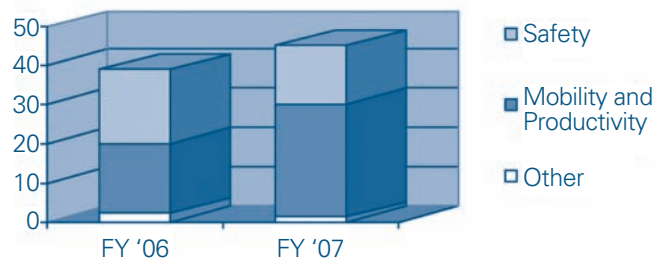
FY 2006/2007 Project Distribution

Currently, 35 percent of our projects are scheduled for completion in FY 2006, and 40 percent are scheduled for completion in FY 2007. There are 47 projects being conducted in support of the Mobility and Productivity goal area that are scheduled for completion in the FY 2006/2007 timeframe. In the Safety goal area, 34 projects are scheduled for completion during the same timeframe.

Project Distribution



Projects by Goal



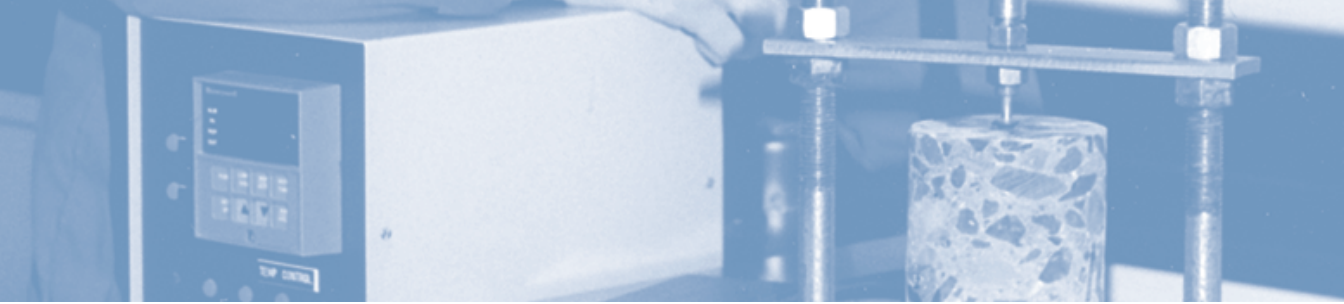


Appendix

Abbreviations

The following abbreviations are used in this document; this list is provided for quick reference.

AASHTO	American Association of State Highway and Transportation Officials
ACS	Adaptive Control Software
AIDA	Advanced Incident Detection Algorithm
ASR	alkali-silica reactivity
ASTM	American Society for Testing and Materials
AVA	air void analyzer
CICAS	Cooperative Intersection Collision Avoidance Systems
CMP	Corporate Master Plan for Research and Deployment of Technology and Innovation
CONEW	Concrete Extrusion Workability
CP Road Map	Concrete Pavement Road Map
DOT	department of transportation
DSRC	dedicated short-range communications
DTA	dynamic traffic assignment
DynaMIT	Prototype for the Real-Time Traffic Estimation and Prediction System (TrEPS)
DYNASMART-X	Prototype for the Real-Time Traffic Estimation and Prediction System
FEA	finite-element analysis
FHWA	Federal Highway Administration
FRP	fiber-reinforced polymer
FY	fiscal year
GSOS	Global Positioning System Surface Observation System
HCC	hydraulic cement concrete
HIPERPAV®	High Performance Paving Software
HPS	high-performance steel
HSIS	Highway Safety Information System
IC	Infrastructure Consortium
ICA	intersection collision avoidance
ICM	Integrated Corridor Management
ICS	Intelligent Construction System
IHSDM	Interactive Highway Safety Design Model
ITS	intelligent transportation system
LED	light-emitting diode
LRFD	load and resistance factor design
LTBP	Long-Term Bridge Performance
LTPP	Long-Term Pavement Performance
LTPPBind	LTPP Binder
MDSS	Maintenance Decision Support Systems
M-E	mechanistic-empirical



MUTCD	<i>Manual on Uniform Traffic Control Devices</i>
NCAC	National Crash Analysis Center
NCHRP	National Cooperative Highway Research Program
NDGPS	Nationwide Differential Global Positioning System
NGSIM	Next Generation Simulation
OMB	Office of Management and Budget
PART	Program Assessment Rating Tool
PBCAT	Pedestrian and Bicycle Crash Analysis Tool
PCC	portland cement concrete
R&D	research and development
R&T	research and technology
RAC	Research Advisory Committee
RD&T	research, development, and technology
RRPM	raised retroreflective pavement markers
RTCC	Research and Technology Coordinating Council
RWIS	Road Weather Information System
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SCOR	Standing Committee on Research
SMP	Seasonal Monitoring Program
SRS	Safety, Reliability, and Security
Superpave®	Superior Performing Asphalt Pavements System
SWAT	Strategic Work Zone Analysis Tools
T&I	technology and innovation
TDR	time domain reflectometry
TFHRC	Turner-Fairbank Highway Research Center
TMC	transportation management center
TPF	Transportation Pooled Fund Program
TRB	Transportation Research Board
TReL	Traffic Research Laboratory
TrEPS	Traffic Estimation and Prediction System
UAV	unmanned aerial vehicle
UHPC	ultra-high performance concrete
USDOT	United States Department of Transportation
VII	Vehicle Infrastructure Integration
WIM	weigh in motion



