Identifying and scoping topics
Research may include conducting research, disseminating new findings, building capacity.

An example is a project entitled "Increased Understanding of Driver Visibility Requirements," in which investigators are developing a rational, theoretical framework for determining the quantity and quality of visual information needed by drivers to navigate the roadway safely and effectively. This work will assist in future safety research.

In addition to sponsoring EAR projects that advance the development of highway infrastructure and operations, the EAR Program is committed to promoting cross-fertilization with other technical fields, furthering promising lines of research, and deepening vital research capacity.

• Cross-fertilization. Research may include the application of scientific and technological discoveries in other fields to transportation. An example is a project entitled "Intelligent Multisensor Measurements to Enhance Vehicle Navigation and Safety Systems," in which researchers are developing a robust and reliable vehicle-positioning system capable of providing accurate, high-update-rate, lane-level measurements for future vehicle navigation and control. In this project, investigators are applying technology developed and tested in other industries, including aerospace, to improve highway safety.

• Disseminating new findings. Each EAR project includes a transition plan for finding appropriate research followup activities through disseminating new findings and pursuing the potential for continued research. Where the findings suggest the value of further investigation, the EAR Program identifies appropriate activities to engage interested stakeholders who may want to continue the research. For example, when new technologies developed in a project are meeting anticipated objectives, there may be interest in applied research at FHWA or among State departments of transportation, Transportation Research Board cooperative research programs, or private industry. Other research projects may lead to unexpected findings or clarification about questions and approaches, which could suggest continued investigation under the EAR Program.

• Building capacity. The EAR Program also furnishes value by increasing the capacity of organizations and individuals to conduct research. For example, the EAR Program supports the National Research Council Research Associateship Program, which provides postdoctoral and senior scientists and engineers with opportunities to conduct research on projects that complement other EAR Program research.

GETTING INVOLVED WITH THE EAR PROGRAM
To take advantage of a broad variety of scientific and engineering discoveries, the EAR Program involves both traditional stakeholders (State department of transportation researchers, University Transportation Center researchers, and Transportation Research Board committee and panel members) and nontraditional stakeholders (investigators from private industry, related disciplines in academia, and research programs in other countries) throughout the research process. From 2006 through 2011, the EAR Program involved stakeholders throughout the following program activities:

• Identifying and scoping topics as part of over 30 meetings and scanning trips.

• Reviewing proposals and projects. More than 200 experts provided assessments of proposals, ongoing projects, or possible new projects. Most reviewers are from academic institutions and, in descending order, State and local departments of transportation, other Federal agencies, private companies, and the international community.

• Conducting research. The program has awarded 44 research projects on 34 different topics between 2007 and 2011. The research awards include work by multidisciplinary teams at 26 academic institutions, 15 private companies, 10 State and local agencies, and 7 Federal laboratories.

LEARN MORE
For more information, see the EAR Program Web site at www.fhwa.dot.gov/advancedresearch. The site features information on research solicitations, updates on ongoing research, links to published materials, summaries of past EAR Program events, and details on upcoming events.

For additional information, contact David Kuehn, 202-493-3414 (email: david.kuehn@dot.gov); Terry Halkyard, 202-493-3467 (email: terry.halkyard@dot.gov); or Zachary Ellis, 202-493-3193, (email: zachary.ellis@dot.gov).
The FHWA EAR Program engages stakeholders in the EAR Program from evaluating potential research topics through communicating research results. The FHWA identifies and scope topics through extensive initial-stage investigation. The EAR Program has supported scanning trips and meetings involving more than 50 national and international technology assessors. The most recent advances in science and engineering.

The FHWA uses expert panels to ensure the technical quality of sponsored research. The panels are composed of Federal, State, academic, and international scientific and engineering experts who are vetted to avoid conflicts of interest. The panels frequently include members from multiple disciplines to assure that cross applications and novel approaches to research are fully assessed.

International Collaboration
Access to international expertise is critical for the EAR Program. In some research areas, governments, industries, and universities in other parts of the world have developed important advances that could be applied to U.S. highway transportation. The FHWA EAR Program has engaged international experts by sponsoring scanning tours, convening forums, inviting expert reviewers, and offering postdoctoral research fellowships. FHWA expects to continue these ad hoc collaborations and to formalize longer term relationships.

EAR PROGRAM FOCUS AREAS
The EAR Program funds research across a range of issues that are critical to the transportation industry:

- **Integrated Highway System Concepts**
  Emphasizes the need to link highway infrastructure with future vehicle and personal mobile technology to reach critical FHWA safety and mobility goals. This focus area includes development of theories and assessment of feasibility for systems that leapfrog current technological approaches.

- **Nanoscale Research**
  Cuts across all functional areas and takes advantage of higher magnitudes of investment from other agencies in support of greater highway system resilience, improved safety and operations, and reduced environmental impacts. This focus area encompasses modeling and measuring phenomena to increase understanding of properties as well as applying scientific advances from other fields that are critical to improving the safety, reliability, and resilience of the highway system.

- **Human Behavior and Travel Choices**
  Leverages research concepts from the social sciences, including psychology and economics, with more traditional research for improving safety, reducing congestion, and improving the livability of the Nation’s communities.

- **New Technology and Advanced Policies for Energy and Resource Conservation**
  Cuts across infrastructure, operations, and societal and complex natural systems to support innovative methods for reducing highway industry costs and moving toward sustainability.

- **Information Sciences**
  Takes advantage of paradigm-shifting breakthroughs found across academia, government, and the private sector in the computer and information technology fields, including automation, data processing and management, computing, and electronic systems for communication, visualization, and control.

- **Breakthrough Concepts in Materials Science**
  Leverages new approaches in materials science to produce innovative highway materials and new system-monitoring sensors. The search is for materials that can enhance the functional-

Research Leading to Environmentally Sustainable Transportation
The EAR Program funds research that will help the transportation industry to reach sustainability goals, for example:

- Greatly Increased Use of Fly Ash in Hydraulic Cement Concrete for Pavement Layers and Transportation Structures
- Innovative and Environmentally Beneficial Infrastructure Materials
- Next Generation Energy Efficient Traffic Control Devices

EAR PROGRAM RESULTS
The EAR Program strives to develop partnerships with the public and private sectors because the very nature of EAR is to apply ideas across traditional fields of research and stimulate new approaches to problem solving. Through five solicitations, the EAR Program has awarded 44 projects involving both government and academic researchers. These projects represent the investment of $32 million in FHWA funds and leverage $16 million in matching funds.

The EAR Program bridges basic research (e.g., academic work funded by National Science