EXPLORATORY ADVANCED **RESEARCH**

Data Science Challenges and Opportunities in Highway Transportation

IEEE Big Data

October 29, 2014

U.S. Department of Transportation
Federal Highway Administration

Presentation Outline

- EAR Program Background
- Investments in Data Science for Highway Research
- Opportunities and Challenges

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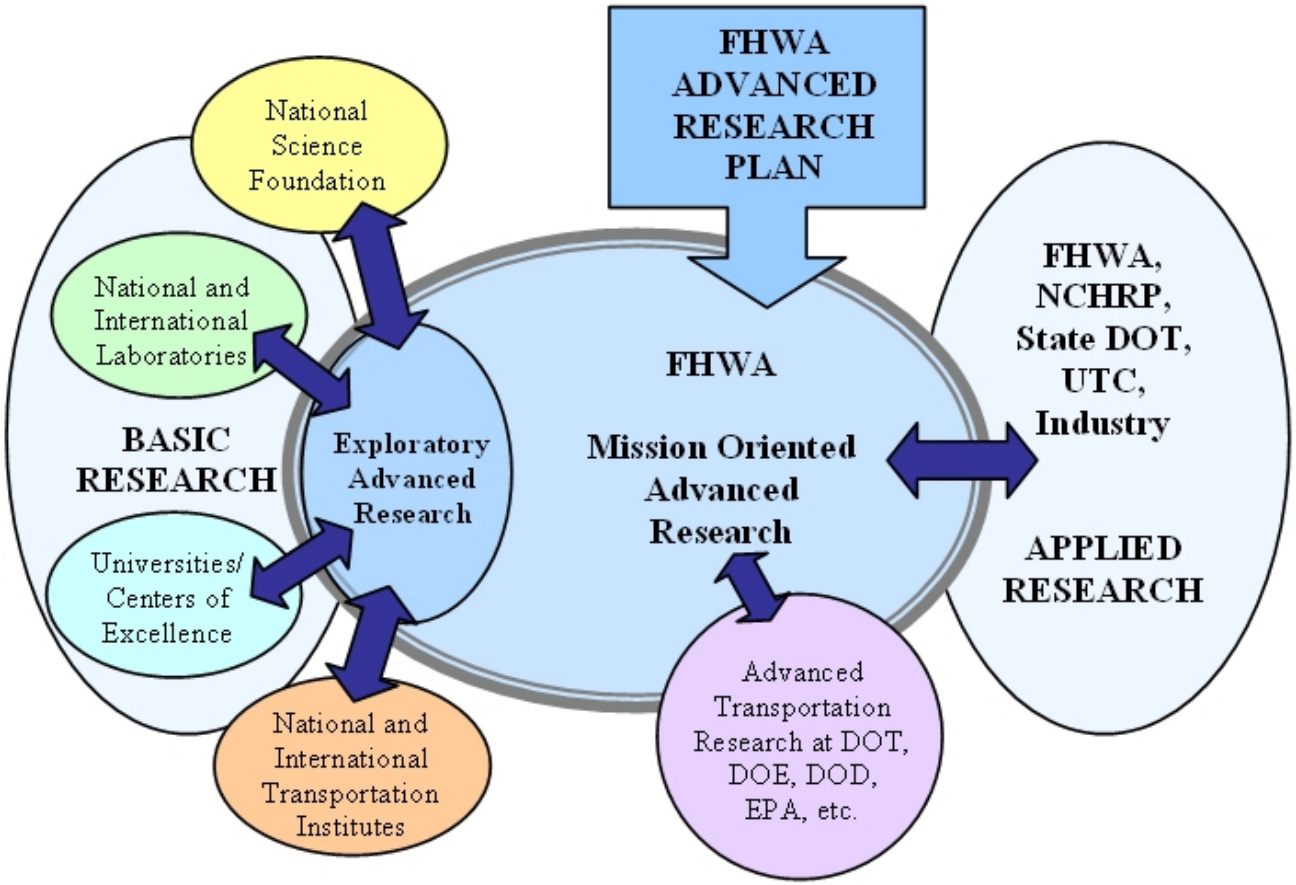
What is the EAR Program?



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Key Processes

- Focus on high-risk, high payoff research
- Merit review is used to enhance the quality of research processes and results
- Research stakeholders are involved throughout
- Commitment to successful project handoff

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Program Status

- 200+ Initial stage investigations
- Seven solicitations resulting in
  - 75 projects awarded; 36 ongoing
  - $72M federal, $26M match
- 8th closed in 2014
  - Topics: Structural assessment, safety data, freight data, freight modeling

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Focus Areas

Connected highway system concepts

Breakthrough concepts in material science

Human behavior and travel choices

New technology and advanced policies for energy and resource conservation

Technology for assessing performance

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Connected Highway Systems

- New Data
  - Real time data, data fusion, data analytics
- New Communications
  - DSRC, Cellular, etc.
- Enabling Technologies
  - Localization and mapping
  - Extended situational awareness
  - Adaptive control systems

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Human Behavior

- Massive New Data
  - Naturalistic driving studies
  - Communications metadata
  - Social networking
- Enabling Technologies
  - Automation
  - Predictive modeling
  - Real time, large scale markets

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Assessing Performance

- Massive New Data
  - Roadside sensors
  - Vehicle based sensors
  - Structural monitoring
- Predictive Modeling
  - Actionable information

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Opportunities

- Use of data to improve
  - Highway safety
  - Asset conditions
  - System reliability, efficiency
  - Energy, resource sustainability

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Challenges

- Scientific
  - Valid
  - Reproducible
- Operational
  - Actionable
  - Efficient
  - Accessible
  - Secure
  - Flexible

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Thank You

EAR Program website

www.fhwa.dot.gov/advancedresearch

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