Massive Unstructured Data in Highway Transportation

IEEE Big Data 2013

October 9

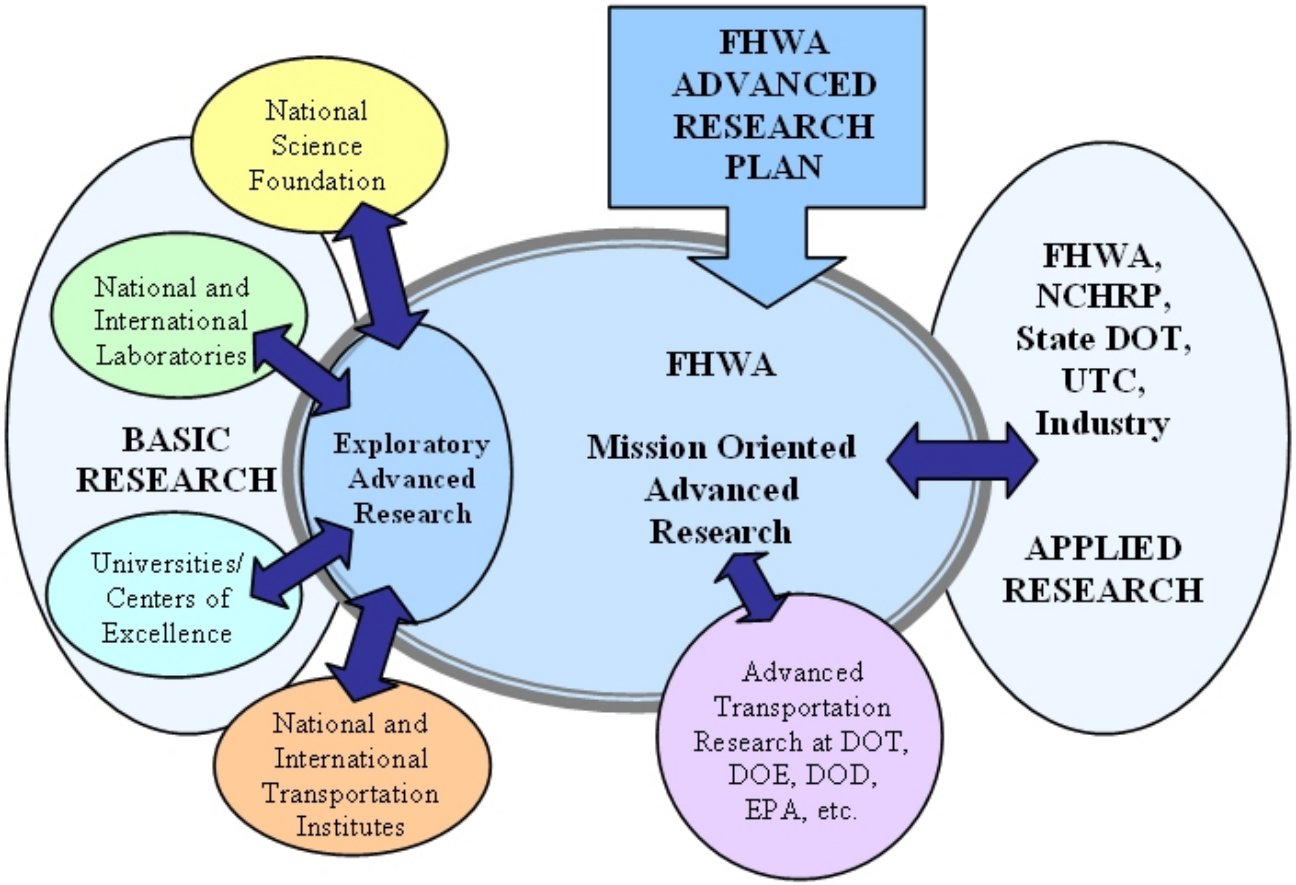
U.S. Department of Transportation
Federal Highway Administration

Presentation Outline

- EAR Program Background
- Why Big Data?
- Future Vision

U.S. Department of Transportation
Federal Highway Administration

What is the EAR Program?



EXPLORATORY ADVANCED RESEARCH

U.S. Department of Transportation
Federal Highway Administration

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

U.S. Department of Transportation
Federal Highway Administration

Program Status

- 150+ Initial stage investigations
- Six solicitations resulting in
  - 52 projects awarded; 23 ongoing
  - $43M federal, $17M match
- 7th closed October 2012
  - Topics: Novel binders, low-powered, wireless sensors
- 8th closed March 2013
  - Topics: Connected highways, video analytics for highway safety

U.S. Department of Transportation
Federal Highway Administration

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

Cross-cutting

Nanoscale research

Information sciences

U.S. Department of Transportation
Federal Highway Administration

Connected Highway Systems

- New Data
- New Communications
  - V2X, V2V
  - DSRC, Cellular, etc.
- Enabling Technologies
  - Localization and mapping
  - Extended situational awareness

EXPLORATORY ADVANCED RESEARCH

U.S. Department of Transportation
Federal Highway Administration

Human Behavior

- Massive New Data
  - Naturalistic driving studies
  - Communications metadata
  - Social networking
- But
  - Unstructured and unrelated
  - Emerging and evolving uses

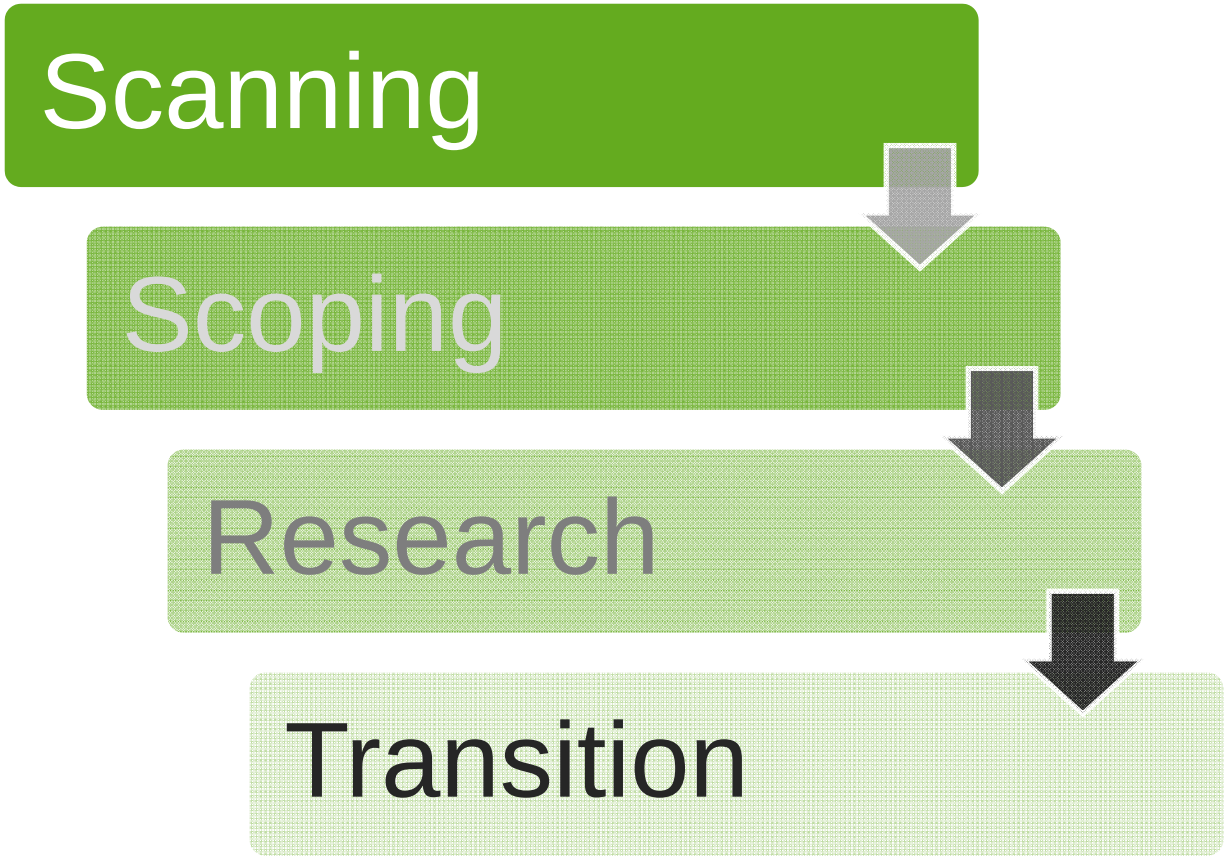
U.S. Department of Transportation
Federal Highway Administration

Assessing Performance

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

U.S. Department of Transportation
Federal Highway Administration

Program Coordination



EXPLORATORY ADVANCED RESEARCH

U.S. Department of Transportation
Federal Highway Administration

Potential Impact

- Use of data improves safety
  - Understanding behavior provides improved design, regulation, & active crash avoidance systems
- Use of data improves mobility
  - Real-time, automated system management frees owners & operators to focus on strategy
  - Improved energy efficiency

U.S. Department of Transportation
Federal Highway Administration

Thank You

EAR Program website

www.fhwa.dot.gov/advancedresearch

David Kuehn
Program Manager
(202) 493-3414
david.kuehn@dot.gov

U.S. Department of Transportation
Federal Highway Administration