

# EXPLORATORY ADVANCED **RESEARCH**



## **Federal Highway Administration Exploratory Advanced Research**

Presentation for the  
**AHD30, Structures Maintenance Committee**  
January 16, 2013



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**Federal Highway Administration**

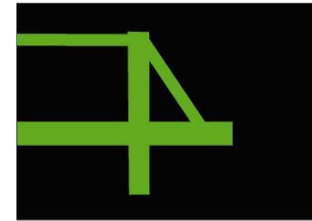
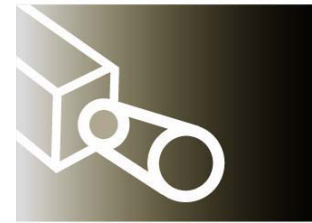
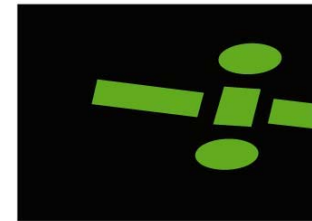
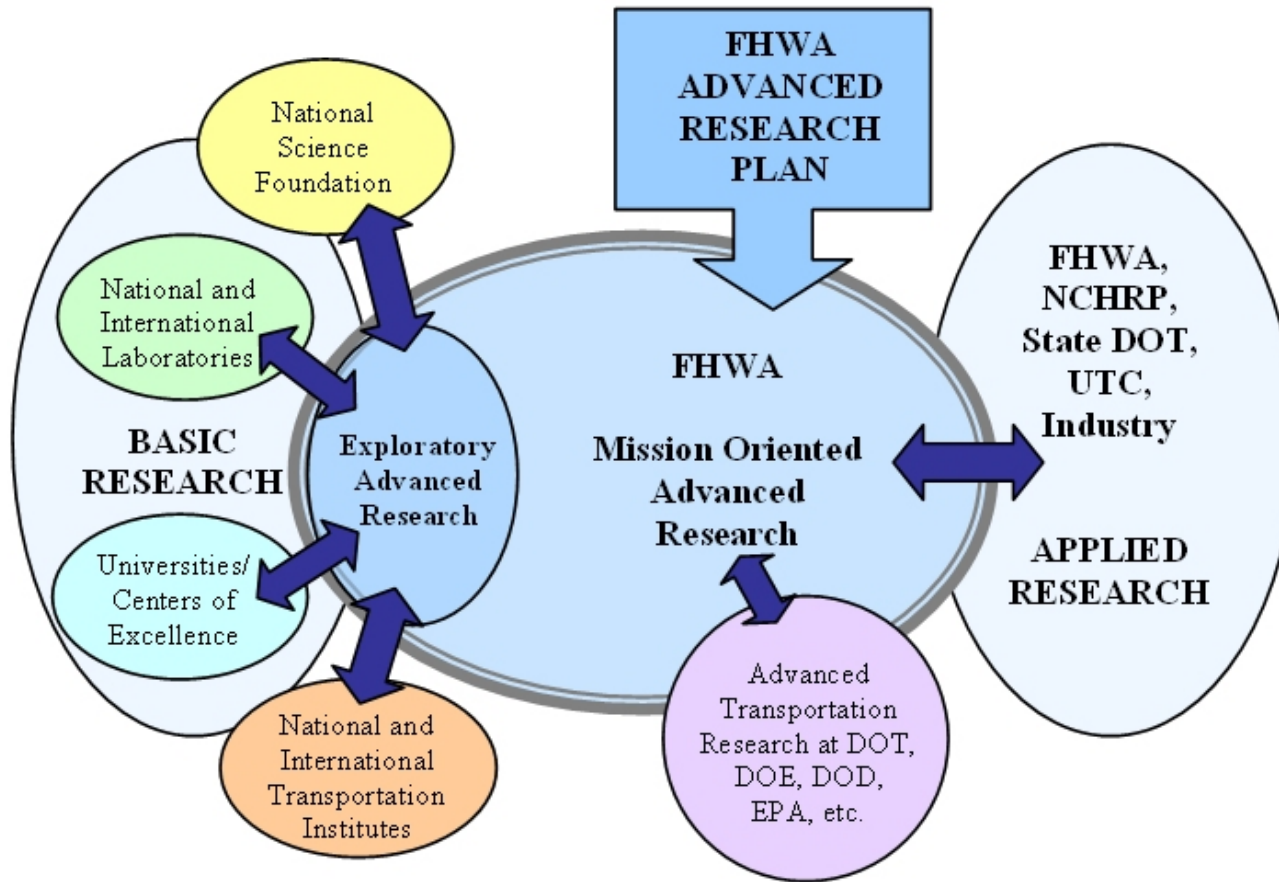
# Presentation Objectives

- EAR Program Background
- EAR Program Focus on Structural Maintenance
- Longer Term Vision



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# What is EAR?



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# Focus Areas

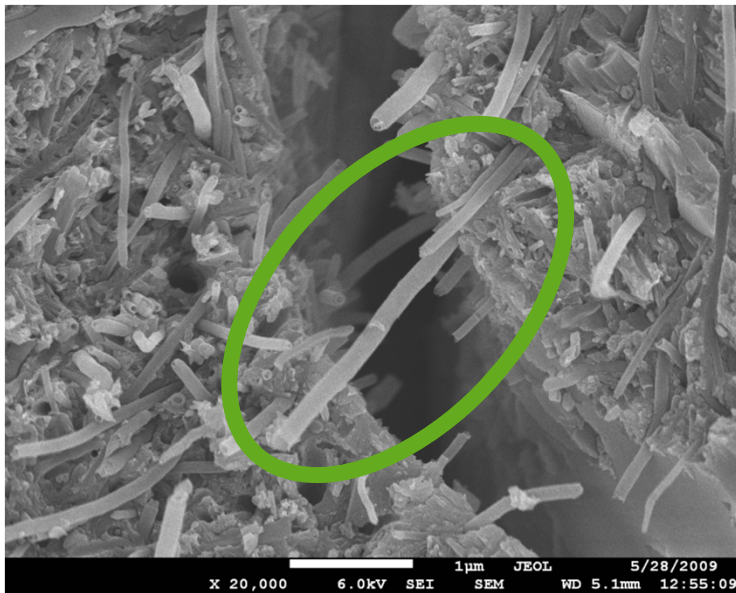
- Connected highway and vehicle systems
- Breakthrough concepts in material science
- Human behavior and travel choices
- New technology and advanced policies for energy and resource conservation
- Technology for assessing performance  
Cross cutting
- Nanoscale research
- Information sciences



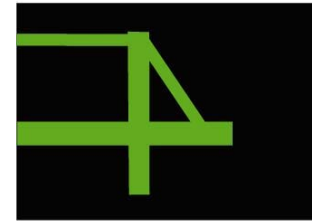
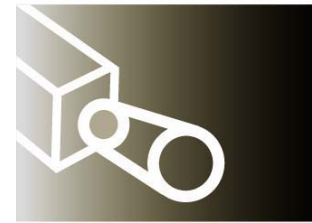
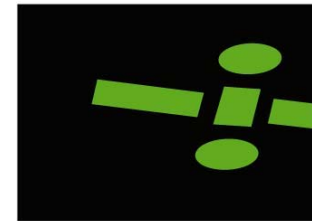
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# New Materials

- Potential for advances in
  - Reduced cracking
  - Increased corrosion resistance



SEM Image from Zach Grasley, TAMU



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# Assessing Performance

- Demonstrated advances in
  - Application of new technology for sensor systems
  - Methods for signal analysis and predictive modeling



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# EAR Program Methods

- 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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# Breadth with Depth

- All projects begin with initial stage investigations
  - Reference searches, scanning trips, convening workshops, etc.
- Assure leverage of the most recent, relevant and advanced research from all fields
- Not all initial stage investigations lead to (or are expected to lead to) follow-on or actionable results



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# Experts and Partners

- Experts and research stakeholders are involved throughout
  - From topic generation and scoping, through evaluation of proposals, ongoing research
- Stakeholders include
  - Academic
  - Government (federal, state, and local)
  - Industry (businesses, associations)
  - International



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# Project Handoff

- Continued Commitment to projects transitioning out of Program
  - Focused outreach of project results
  - Meetings, demonstrations with potential new funders



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# EAR Program Payoff

- Encouraging original ideas
- Connecting with new partners
- Growing scientific capacity and pushing disciplinary frontiers
  - Building tools that accelerate discovery, allow for new measurements, concepts
- Pointing the way to new technology, applications



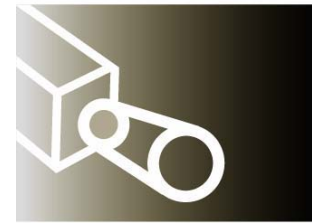
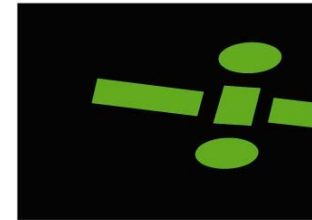
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# Longer-Term Impact



Photo of casting structural element from Purdue University

- New Materials
  - Faster, better, less expensive construction
  - Increased long-term durability



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# Longer-Term Impact

- Moving from assessing performance to *controlling* performance
  - At the material level, adaptive, multi-functionality, self-sensing, self-healing
  - At the structural level, self-sensing, predictive, resilient, evolving



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# Thank You

EAR Program website

[www.fhwa.dot.gov/advancedresearch](http://www.fhwa.dot.gov/advancedresearch)

David Kuehn

Program Manager

(202) 493-3414

[david.kuehn@dot.gov](mailto:david.kuehn@dot.gov)



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