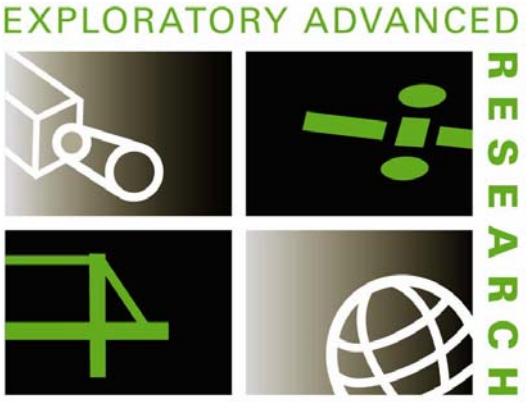

Broad Agency Announcement for Fifth Round of Exploratory Advanced Research

Closes 4:00 pm EST September 15, 2011

The Federal Highway Administration issued a Broad Agency announcement soliciting proposals that address Exploratory Advanced Research topics. During 2009 and 2010 FHWA engaged stakeholders from within and outside the traditional highway research community to identify topics of research that promise transformation and possible breakthroughs in highway technology, processes and policies. FHWA is moving forward with three of the topic areas that had a strong scientific and technical basis through the issuance of this BAA. The three topic areas include:

- **Modeling Cement Hydration Kinetics** - Hydration of portland cement is the cornerstone of the process responsible for microstructure development in concrete and ultimately controls the dynamics of all material properties that make concrete such a useful product for society. Recent advances in both experimental and computational technology are providing unprecedented insights into the nature of cement hydration. While a comprehensive theory is not yet available, recent progress suggests that what were once thought to be the most elusive hurdles are now within reach. A number of simulation platforms are now available along with emerging modeling strategies that could provide multi-scale linkages for the development of engineering models and computational research tools. Similarly, newer experimental strategies are yet to be fully exploited although are now positioned to offer real insights and breakthroughs. This research will begin to undertake the task of developing a comprehensive understanding and model for cement hydration that could conceivably enable new applications and discoveries.

- **Video Decoding and Feature Extraction Automation for Highway Research** - The initial phase of this project would (1) scan for recently completed and ongoing research supporting improvements in automated feature extraction generally and video decoding in particular, (2) assess the potential of different approaches to feature extraction and video decoding for transportation applications, then (3) provide a detailed work plan for testing one or more promising approaches. The initial phase would provide knowledge of state-of-the-art and future-art approaches to feature extraction being used by researchers already active in highway research. The intention is that the first phase will highlight the potential of advanced video coding and feature extraction technologies, ideally including automated feature obscuration to prevent personally identifiable information from storage without adequate security, in order to support and accelerate critical highway

research activities. The initial phase also should provide information for the transportation industry about research gaps and technology development needs. A subsequent phase of the research would test one or more feature extraction approaches to further understand the potential of this technology for transportation applications.

- **New Technology Solutions for Wayfinding and Navigation Guidance for People with Vision Impairment and other Disabilities** – The objective of this research is to develop concepts and prototypes that use new technologies such as robotics, artificial intelligence, and sensors that could improve Event Horizons related to wayfinding and navigation guidance. For purposes of this research, assume that broadband wireless technology, Intelligent Transportation Systems, GPS, DSRC, etc, are widely available. The concepts should be futuristic and focus on one or more of the following key areas of Event Horizon: (1) sensing with laser, cameras, computer vision, robotics, artificial intelligence or any other technology, (2) human interface that decides how much information to be presented, at what time, and in what form, and (3) algorithms that help plan the event and layout the scope for the whole event. The concept should be flexible to extend this research to find accessible transportation solutions for people with other disabilities such as sensory, cognitive and mobility and those who are aging.

The Broad Agency Announcement (number DTFH61-11-R-00027) is open until 4:00 pm EST, September 15, 2011; Information is posted on *http://www.fhwa.dot.gov/advancedresearch/rfp.cfm*. For more information about the EAR Program, please contact David Kuehn at (202) 493-3414 (email: david.Kuehn@dot.gov) or Terry Halkyard at (202) 493-3467 (email: terry.halkyard@dot.gov) or visit http://www.fhwa.dot.gov/advancedresearch/. For more information about the solicitation process, please contact Contracting Officer: Robin Hobbs at (202) 366-4004 (email: Robin.Hobbs@dot.gov).

U.S. Department of Transportation
Federal Highway Administration