



National Science Foundation
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NSF 13-034

Dear Colleague Letter: NSF-FHWA Coordination on Cyber Physical Systems for Highway Transportation

Date: 01/02/13

The National Science Foundation (NSF) and the Federal Highway Administration (FHWA) have a shared interest in advancing basic and applied research in Cyber Physical Systems (CPS), which are systems in which physical processes are tightly intertwined with networked computing. For transportation, CPS will provide the foundation necessary for a safe, efficient highway transportation system connecting vehicles, infrastructure, people, and goods in a vibrant, competitive economy.

The goal of the NSF CPS Program (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503286) is to develop the core system science needed to engineer complex cyber-physical systems upon which people can depend with high confidence. The FHWA Exploratory Advanced Research (EAR) Program translates advances in basic science in order to solve mission critical issues for highway transportation through partnerships with and beyond traditional highway research stakeholders. Successful advances in cyber-physical systems are critical for the FHWA and the entire U.S. highway transportation industry to meet increasingly complex and difficult goals from increasing safety, to reduce energy dependence, to support sustainable economic growth and increased quality of life.

FHWA has identified specific technology-based requirements to support ongoing and anticipated research road maps including for multi-modal integrated corridor management, arterial traffic management, traffic signal management and control, traffic incident and event management, and passenger and freight data management. These requirements will advance system capabilities in positioning, timing, and navigation, onboard and infrastructure-based sensors and actuators, with the aim of improving environmental awareness and responding to changing conditions, vehicle-infrastructure communications, shared human-machine control systems, data management and system performance assessment, and energy efficiency. Consideration of integration with legacy systems and equipment will be a critical component.

Investigators seeking NSF funding under Program Solicitation 13-502 (<http://www.nsf.gov/pubs/2013/nsf13502/nsf13502.htm>) for basic scientific research in CPS also may be interested in an FHWA Exploratory Advanced Research (EAR) Program opportunity for funding in order to promote an effective transition from basic science to applied engineering in CPS for highway transportation. FHWA plans to post a broad agency announcement that includes the following cyber-physical system topics in early January 2013:

- High performance vehicle streams;
- New Approaches for Testing Connected Highway and Vehicle Systems;
- Innovative Applications for Emerging Real - Time Data; and
- Partial Automation for Truck Platooning.

Information about the announcement will be available under "Announcements" on the EAR Program web page (see <http://www.fhwa.dot.gov/advancedresearch/>) and will be listed on FedBizOpps (see <https://www.fbo.gov/>).

Should investigators who apply for a NSF CPS Program award be interested in complementary funding from and coordination with FHWA, they should submit an addendum with their proposal to FHWA. This addendum should include a description of how funding from both programs could benefit the transitioning of results into applied research and development, and may reference differences in key personnel or partners (including private and public sector partners that could participate in equipment and system field testing) between the proposed research under NSF and the complementary research under the FHWA broad agency announcement. The FHWA EAR Program would share the addenda with the NSF CPS Program. FHWA will provide more detailed information in the broad agency announcement.

Please note that work scopes should be complementary but not interdependent since awards by each agency will be independent. NSF and FHWA plan to conduct separate reviews and make separate funding decisions. If there are complementary NSF and FHWA awards to the same or similar teams, then NSF and FHWA would endeavor to closely coordinate to assist in the transition of basic research into highway transportation applications.

Signed:

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Dr. Farnam Jahanian, NSF Assistant Director for Computer and Information Science and Engineering (CISE)