

Mechanical Engineering Department Seminar

3:30pm November 11, 2009
1130 Mechanical Engineering



Another One Rides the Bus

Vehicle Technology to Improve Transit in the Twin Cities

Craig Shankwitz

Research Associate Professor, Department of Mechanical Engineering, University of Minnesota

As a recipient of the US DOT's Urban Partnership Agreement (UPA), Minnesota is providing a multi-faceted approach to address the UPA four "Ts": Technology, Transit, Tolling, and Telecommuting. One of the projects within the Minnesota UPA program is a Driver Assist System for narrow bus-only-shoulder operation. Under this UPA program, the Intelligent Vehicles Lab (IV Lab) at the University of Minnesota will install its drive assist system on 10 Minnesota Valley Transit Authority (MVTA) buses which provide express service between Apple Valley (a southern Metro suburb) to downtown Minneapolis. It should be noted that MVTA will be the first transit agency in the nation to deploy in actual passenger service a driver assist system.

The driver assist system uses Dual Frequency, Carrier-Phase DGPS system as the primary positioning technology, and a high-accuracy map database to provide road-relevant data. Collision avoidance is facilitated using multi-plane laser scanners mounted on the front and both sides of the vehicles. Driver feedback is provided through a multi-modal driver interface consisting of graphical, haptic, and tactile displays. Augmentation of the DPGS system provides robust, seamless system operation in difficult GPS environments.

The design, implementation, and performance of the system as it operates on the narrow bus-only shoulder express route corridor will be presented. Specific attention will be given to sensors, control algorithms and performance, DGPS augmentation, data acquisition, and driver interfaces. After the seminar, the research bus used by the IV Lab and provided by MVTA will be available for demonstration rides on the University of Minnesota Transitway.



CURB SIDE

Bio Dr. Craig Shankwitz is the director of the Intelligent Vehicles Laboratory (IV Lab) at the University of Minnesota. He earned the BSME at Iowa State, the MSME at the University of Illinois, Urbana-Champaign, and the PhD in Control Science and Dynamical Systems at the University of Minnesota. The IV Lab develops and deploys technology designed to simultaneously improve both mobility and safety on the nation's highways. IV Lab deployment projects include driver assistive systems for snowplows (snowplows using this technology are in operation in Minnesota and Alaska), driver assistive systems for narrow-lane guidance for transit vehicles (Minneapolis, MN), and intelligent intersections for rural expressway intersections (Minnesota and Wisconsin). Research projects (performed in conjunction with the Human-FIRST program at the University of Minnesota) include in-vehicle teen driver assistance system specification, development, and test and a NHTSA-sponsored study (using dosed riders on an instrumented motorcycle) to determine the effects of Blood Alcohol Concentration (BAC) on motorcyclists.