

## **An Automated Raised Pavement Marker Installation System Work Plan Description**

The project will be conducted in a period of two years (November 1, 2007 – October 31, 2009) in two phases. The work in Phase I (15 months) will focus on redesign, refinement, and initial testing of the system; the work in Phase II will emphasize on actual applications and product evaluation. In Phase I, the four sub-systems that form the entire system will be redesigned and rebuilt.

- 1) The delivery sub-system: The delivery sub-system includes a robotic arm which takes a marker from the storage stack at the back of the truck, delivers it to the right location, and places it on the roadway.
- 2) Adhesive sub-system: Adhesive flows through a hose to the tip that is positioned near the roadway and discharges the adhesive on the ground. The hose must maintain an approximate 500 degree temperature internally to enable the material to flow freely. Heat loss is a big factor which slows down the placement of the RPMs.
- 3) The control subsystem: The control panel is the brain of the entire system. It instructs what to do for each component; it also controls the sensors to determine the status of the components in the system. This panel must be able to handle all the components in the system; it must also be light, portable and easy to use.
- 4) The platform subsystem: The platform sub-system provides the space to mount the hardware components. It can be attached to a construction vehicle when there is a need for placing RPMs. When an RPM job is done, the user can easily take the system off the vehicle and store it until it's needed, and the vehicle can be released for other purposes.

Field tests will be conducted by a construction crew at the end of Phase I in a parking lot and remote roads with the following purposes: 1) training the construction crew, 2) testing working conditions of the system, and 3) making adjustments as needed for the equipment to meet the conditions for full scale applications. The equipment must meet a certain reliability and safety criteria before it's deployed for actual applications.

In Phase II, at least two actual RPM installation projects will be selected to employ the equipment for installing RPMs on the roadways. One project will be selected from Stay Alert's project pool, and the other one will be performed in collaboration with a partnering contractor. DOT engineers will be invited to observe the actual applications. Detailed engineering and operating parameters of the equipment will be collected to fully evaluate the equipment.