

Improve the safety and efficiency of roadway maintenance phase I: Developing a robotic roadway message painter prototype

It is proposed to develop, build, and test a full-sized prototype for a robotic roadway message painter. The system will be a gantry-style robot capable of painting a nine-by-nine foot area and will be based on off-the-shelf linear motion components and readily available servo control hardware. The system will be mounted on a wheeled structure that will be manually rolled around for positioning and will be equipped with a standard pavement striping powered paint sprayer. Software will be developed for the system that will enable it to paint a variety of characters and symbols on the roadway. An operator interface will also be developed that will allow an operator to easily select the painting operation to be conducted and to monitor and control the actual painting process. The software will reside in a laptop computer that will communicate with the robotic painting system in real-time using a dedicated Ethernet connection. The system will be used to explore various paint application techniques, to determine the feasibility of painting with or without stencils, and to develop an automated path generation system and determine the effects of path selection on final quality. The system will be tested in actual painting operations by painting on paper and canvas fabric and also by applying markings to pavement. The system will be developed over 12 months for a total cost of \$60,700, and will eventually enable states, counties, and municipalities to improve the safety, productivity, and flexibility of their pavement marking operations.