

Smart Work Zone System

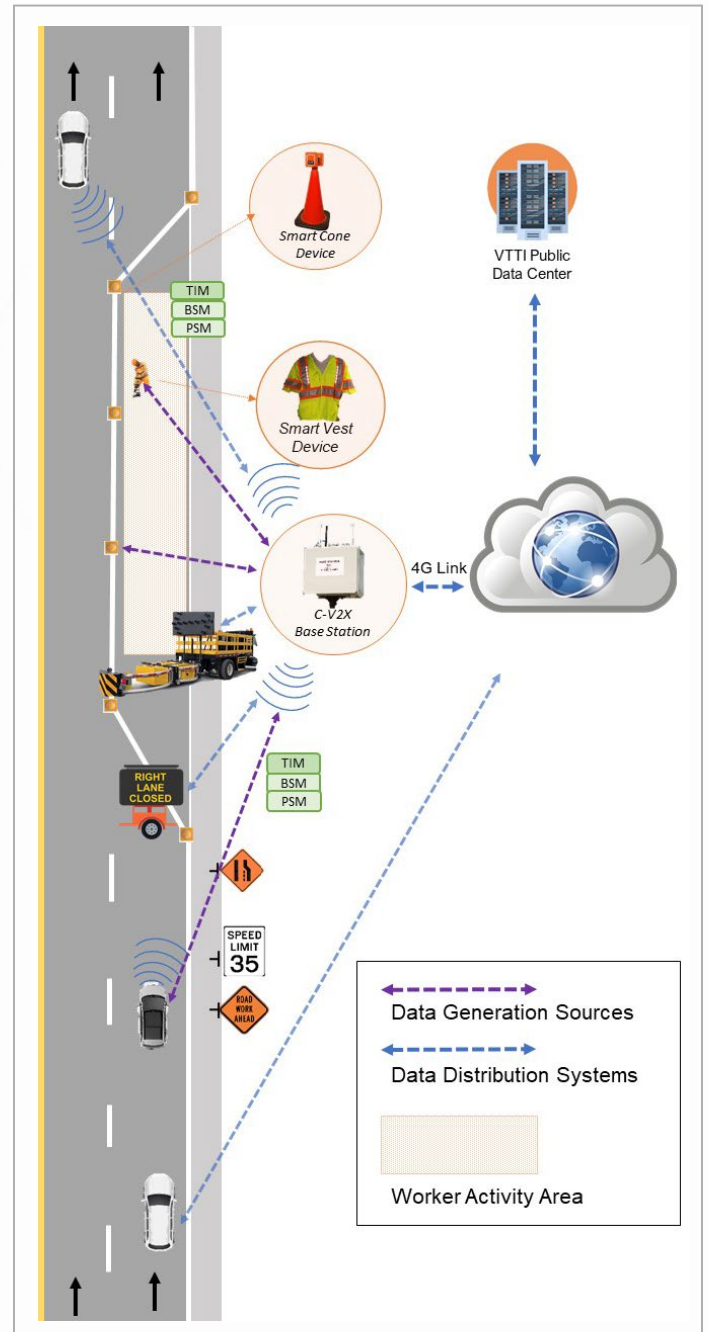
VTIP 22-015: “Smart Work Zone System”

THE CHALLENGE

Roadside work zones present imminent safety hazards for roadway workers as well as passing motorists. In 2016, 764 fatalities occurred in work zones in the United States due to motor vehicle traffic crashes, and in 2017, a work zone crash occurred once every 5.4 minutes in the U.S., adding up to almost 100,000 work zone crashes, a 7.8% increase over 2014 and a 42% increase over 2013. Vehicle collisions are the second most common cause of worker fatalities in roadside work zones. Decreasing injuries and fatalities in roadside work zones hinges on early detection of threats and quickly informing workers and drivers of dangers.

OUR SOLUTION

Researchers at the Virginia Tech Transportation Institute have developed a Smart Work Zone System, consisting of a C-V2X Base Station linked to Smart Vests and an array of Smart Cones. The C-V2X Station acts as the core of the system by communicating with the vests and cones. Connected and automated vehicles approaching a work zone can communicate with the station over a 4G network to receive information regarding the location and configuration of the work zone. The Smart Vests, worn by road workers, transmit information regarding worker location to the base station. The vests also provide auditory, visual, and tactile feedback to alert the wearers of a potential collision threat or work zone boundary crossing. The Smart Cone array is an add-on component that can be attached to work zone drums or cones to define the boundary of the work zone for the Smart Vest and Base Station. This Smart Work Zone System has tremendous potential to improve road construction safety by increasing worker and vehicle awareness of threats in the work zone.



Schematic diagram of the Smart Work Zone System.



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