

Emergency Vehicle Traffic Signal Preemption

PURPOSE

Connected vehicle traffic signal preemption systems are designed to transfer the normal operation of traffic signals to provide multiple emergency vehicles with prioritized access at intersections to allow safe passage and to mitigate the risk of collisions. These enhanced systems leverage Vehicle to Infrastructure (V2I) capabilities.

BENEFIT

Traffic signal preemption systems will expedite emergency vehicle response to an incident and reduce the risk of loss of life, injuries, and property damage associated with intersection collisions involving emergency vehicles. These collisions are common risks when operating vehicles under emergency conditions.

USE CASE

An ambulance is responding to a possible cardiac arrest involving a child at a local swimming pool. A fire engine company staffed with paramedics is also responding to the incident. Through Connected Vehicle technologies, traffic management systems detect the approaching emergency vehicles traveling with their emergency equipment activated. Traffic signals are automatically prompted to provide the emergency vehicles with the right-of-way. This expedites their safe response to the life-threatening emergency.

CASE STUDY

Maricopa County, Arizona, leveraging a CV testbed, conducted an Emergency Vehicle Preemption (EVP) study to examine the challenges and efficiencies of various EVP technologies. The study found that CV technology can engage with multiple emergency vehicles approaching a controlled intersection, evaluate multiple criteria, prioritize vehicle access through the intersection, and provide direction back to emergency vehicle operators. Source: Maricopa Association of Governments (MAG) Emergency Vehicle Preemption State of the Practice Study (July 2016)



Use of emergency vehicle signal preemption in Fairfax County, VA resulted in a 30 to 45 second reduction in time of transit through high traffic density intersections.

(Traffic Signal Preemption for Emergency Vehicles, A Cross-Cutting Study, FHWA January 2006)

Use of emergency vehicle signal preemption in Plano, TX, has reduced intersection crashes from 2.3 per year to less than 1 every five years.

(Traffic Signal Preemption for Emergency Vehicles, A Cross-Cutting Study, FHWA January 2006)

FOR MORE INFORMATION

Transportation Safety Advancement Group (TSAG): www.tsag-its.org; Intelligent Transportation Systems Joint Program Office: www.its.dot.gov; ITS America: itsamerica.org

Players: Fire and EMS
Priority: High
Integration: Traffic signal preemption systems have the ability to deconflict the intersection clearance of Connected Responder vehicles using V2V and V2I alerts and warnings. These systems are also integrated to expedite emergency responders while mitigating intersection collisions between responders and non-responders.



During 2011, public safety related motor vehicle crashes resulted in **34 fatalities** involving ambulances, **14 fatalities** involving fire equipment, and **83 fatalities** involving law enforcement vehicles.



INTERSECTIONS are the most common location across all disciplines for public safety motor vehicle crashes.

FEMA/USFA. "Emergency Vehicle Safety Initiative," February 2014

