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Demonstration of an Emergency Vehicle Priority System (Automated Green Corridor System) using Japanese V2X communication technology

ZERO-SUM, LTD.

In December 2019, ZERO-SUM, LTD., with the support from the Ministry of Internal Affairs and Communications, JAPAN and in collaboration with Connected Solutions Company, Panasonic Corporation and with approval from the Ahmedabad Municipal Corporation in INDIA, conducted a demonstration experiment showcasing an emergency vehicle priority system (Green Corridor System) that uses a UHF band based Japanese originated international standard V2X communication technology.

This experiment demonstrated the use of an emergency vehicle priority system in which an emergency vehicle such as ambulance and traffic signals communicate with each other through the UHF band using V2X communication technology originating from JAPAN. This is the first demonstration of its kind in the world on a public road.

Goal of the experiment

This experiment that uses the application of UHF band V2X communication technology, aims at addressing and solving one of the most important challenge faced by emergency vehicles such as ambulances today, i.e. reaching their destination in the quickest time permissible, which is sometimes not possible owing to traffic congestion. This has been undertaken by adopting and expanding the Japanese communication message specifications according to local conditions in INDIA. This technology controls traffic signals installed on the road to prioritize the passage for approaching emergency vehicles. Upon the detection of an emergency vehicle, the traffic signals in the route direction of the emergency vehicle will turn green so as to decrease any traffic congestion, thereby enabling the emergency vehicle to get free passage and reduce the travel time to its destination. Parallely, Variable Messaging Sign Boards such as traffic information boards will inform motorists on the road to make way for the priority passage of the emergency vehicle by flashing such messages, thereby enabling the emergency vehicle to run smoothly and reduce the travel time to its destination even more. The demonstration used UHF band frequency for the communication of information, which due to its high penetrability through buildings and natural obstructions and less interference from other devices is the most ideal for urban areas in ASIA where there is

a higher urban populace and buildings alongside the roads that are densely populated.

Outline of experiment

A V2X communication device was installed on an emergency vehicle, on traffic signals and on traffic information board. When an emergency vehicle equipped with a V2X communication device approaches the traffic signals and traffic information board on which a V2X communication devices are installed, the V2X devices communicate with each other, and as a result, traffic signals in the approaching direction of the emergency vehicle will turn green and the information that an emergency vehicle is approaching is immediately displayed on the traffic information board for the convenience of motorists on the road, enabling them to make way and allow the priority passage of the emergency vehicle.

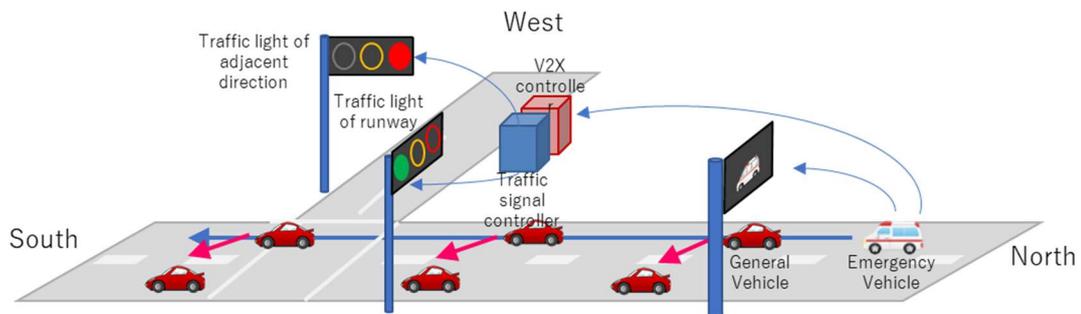


Image of experiment

Location of experiment

The experiment was conducted on the West Bank of the Riverfront Road in Ahmedabad, which is the capital of the western state of Gujarat in INDIA.

Results of the experiment

Upon completion of the demonstration it was found that the emergency vehicle priority system that uses UHF band and the V2X communication technology which is similar to the Japanese "700 MHz band Intelligent Transportation Systems Standard (ARIB STD -T109)" and "Inter-vehicle Communication Message Specifications (ITS Connect TD-001)" is very stable as the communication between the V2X devices was confirmed. Moreover, it was observed that, by controlling the traffic signals in the approaching direction of the emergency vehicle, the vehicle passed through the intersection smoothly and reduced the travel time to its destination. Furthermore, it was also observed that by displaying the emergency vehicle approaching information on the traffic information boards, most motorists move aside to give

priority passage to the emergency vehicle, thereby enabling the emergency vehicle to run smoothly and reduce the travel time even more. The UHF band used in the demonstration experiment was acquired under an experimental license from the Wireless Planning and Coordination (WPC) Wing of the Ministry of Communications, Department of Telecommunications, INDIA.



Image of smooth intersection passing utilizing vehicle priority system



Image of Traffic Information Board with V2X device showing emergency vehicle information

The next deployment

In the next phase of the experiment, we will consider expanding the experiment implementation area. Further, by showcasing this experiment to the relevant ministries and industry groups, we hope that the integration of such systems are standardized into the

specifications for future signaling systems and ITS (Intelligent Transportation System) ancillary components such as Variable Messaging Sign Boards and other such infrastructure to be implemented under smart city programs by city municipalities.

Contact information

ZERO-SUM, LTD.

Contact Person: Kenta KONISHI

Phone Number: +81-75-342-3881 (JAPAN)

Contact: <https://www.zero-sum.co.jp/en/contact/>

Zero-Sum ITS Solutions India Private Limited

Contact Person: Mallesh B.

Phone Number: +91-80-41486275 (INDIA)

Contact: <https://zero-sum-its.co.in/contact-us/>