

V2V Communication Protocol:

Truck Platooning utilizes V2V communication technology, which enables trucks to wirelessly share data regarding their speed, location, and trajectory. This real-time exchange of information, transmitted omnidirectionally up to 10 times per second, provides trucks with a 360-degree "awareness" of their surroundings. Trucks equipped with the necessary software can use this data to detect potential collision risks, with drivers receiving warnings through visual, tactile, or audio alerts. These warnings help drivers take evasive actions to prevent accidents. Importantly, V2V communication can uncover hidden risks obscured by factors like heavy traffic, terrain, or adverse weather conditions, and it can transmit messages over distances exceeding 300 meters.

V2V technology serves as a valuable complement to existing collision avoidance systems that rely on radars and cameras, extending their capabilities. It not only aids drivers in surviving collisions but also helps prevent them. To enhance their visibility to drivers, trucks employ communication technologies, with a focus on maintaining driver and vehicle privacy and security.

Effective V2V technology requires powerful onboard computers for data analysis and alert generation, with the computing requirements scaling up for additional applications. These computer systems are robust and capable of operating in various temperature conditions. For example, Axiomtek's PICO880 serves effectively as a V2V computer.

This technology relies on Vehicular Ad Hoc Networks (VANETs), which are wireless networks that enable trucks to communicate and share information about their driving behaviors. V2V communication allows trucks to send, receive, and retransmit signals through a wireless mesh network, creating a connected ecosystem for safer and more efficient transportation.

The SARTRE project, known as Safe Road Trains for the Environment, employs V2V technology to form groups of trucks. These groups consist of a lead truck driven by a person and following trucks that operate autonomously. Recently, the project achieved a major milestone by demonstrating how a group of three trucks can collaborate on the road. This innovation enhances road safety, reduces fuel consumption, and improves transportation efficiency. In SARTRE's vision, a platoon comprises a manually driven lead truck and multiple automatically controlled following trucks. The V2V communication system enables these trucks to exchange vital data, such as vehicle speed. The project has shared performance data from its initial V2V system prototype, a critical component of the platooning experiment within the SARTRE project. Tests have revealed the benefits of two antenna positions: one in front of the driver cabin on the lead truck and the other on top of the container at the tail, particularly for distances exceeding 70 meters. Overall, the SARTRE project represents a significant advancement in making roads safer and transportation more efficient.