

## »»» Abstract

The invention is about an autonomous vehicle platoon, consisting of individual vehicles following a leader with no explicit human input, improving throughput, transportation efficiency and safety of land connections by combining the advantages of sensing the environment and making information available beyond driver's knowledge through radio frequency and VLC-based data communication; between the members through a special security protocol ensuring network integrity over data transmission using radio frequency and visible light communication.

Vehicular ad-hoc networks (VANET) and autonomous vehicle platoons as a subset come with several proposed types of intervehicular communication solutions/frameworks, among them digital signature approach, certification based security and cryptographic key distribution management. Next to this, the majority of them employ radio frequency protocol IEEE 802.11p, which has many problems such as radio frequency scarcity caused by increased wireless data traffic from rapidly growing wireless mobile devices creating pressure on the radio frequency (RF) spectrum. Furthermore, IEEE 802.11p suffers from security problems due to the usage of omnidirectional antennas added to the high transmission range of which makes this technology vulnerable to adversaries blocking and interrupting the communication among the vehicles, leading to vehicular network instability and vulnerability.

## »»» Problem solved with the technology

Vehicular network instability and vulnerability in intervehicular communication.

Primary object of the present invention is to provide an autonomous platoon with four distinct maneuvering/formation capabilities; a system for data transmission including a hybrid security protocol incorporating both IEEE 802.11p and visible light communication (VLC) as media, therefore establishing stability and improved security against attack from malicious entities such as packet forgery and jamming.



## **Potential Application**

Automotive Industry

Autonomous vehicle platoon with VLC (visible light communication). VLC is a recently proposed alternative communication technology that could see use in achieving a secure communication protocol in vehicle platoons by the exploitation of its distinguishing propagation characteristics. The secure data communication of VLC and high data rate/transmission range of IEEE 802.11p are complementary to each other in vehicle platooning.

Types of intervehicular communication solutions/frameworks

## **Customer Benefits**

Stability and improved security against attack from malicious entities such as packet forgery and jamming

## **Market Trends**

The semi-autonomous and autonomous vehicles market, in terms of volume, is projected to grow at a CAGR of 21.36% from 2017 to 2022 and 68.94% from 2025 to 2030 respectively. The market is estimated to be 8.9 Million Units in 2016 for semi-autonomous vehicles and 0.2 Million Units in 2024 for autonomous vehicles. In this study for semi-autonomous vehicles, 2016 has been considered as the base year and 2017–2022 as the forecast period for estimating the market size. However, for autonomous vehicles, 2024 has been considered the base year and 2025–2030 as the forecast period for estimating the market size. (Markets and Markets)

## **Additional Technical Information**

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