

## ABSTRACT

*Vehicle undercarriage checking is necessary when vehicles enter high-security areas such as airports, seaports, train stations, and government buildings. Traditional under vehicle checking requires a lot of personnel, time, and the under vehicle view is not captured. Technologies that support under-vehicle checking, such as UVSS (Under Vehicle Screening System), which synchronizes car speed with under-vehicle image capture and then scans the under-vehicle, have efficient performance, reduced personnel, and data capture, but the cost of implementing this technology is very expensive. This research will contain the design of tools and analysis of the under-vehicle checking system, which can support simple needs in checking under the vehicle and has a low implementation cost. This system uses an ESP32-CAM as a surveillance camera and microprocessor and uses ultrasonic sensors to detect passing vehicles. The system will be tested using ultrasonic sensor value validation testing, validation of images generated, and Quality of Service (QoS) testing. This system will be based on the Internet of Things (IoT), where, in addition to the image results stored on the monitoring computer, they will also be sent on the Telegram platform for better security and data recap. Based on the test results, the sensor validation value is obtained, which has an average percentage accuracy of 10 tests with a multiple of 10 cm, namely 98.179 percent, which indicates that the sensor has good accuracy. The data results from image validation show that in order for the image to achieve a clear image, the vehicle is driven at a speed of 2 km/h, and if it is faster than that, the resulting results will be blurry or even unable to do image stitching. Quality of Service (QoS) testing results in an average delay of 0.00566 seconds and packet loss of 0 percent, which indicates that delivery is running well based on ITU T G.1010 standardization.*

**Keywords:** *ESP32-CAM, IoT, Vehicle Inspection, Ultrasonic Sensor, Telegram, Quality of Service (QoS)*