Wireless Blind Spot Detection for Motorcycles

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The Problem

Motorcycle accidents account for 15% of all traffic deaths; 60% of which, were multi-vehicle accidents. This a is a staggering number considering only 2% of vehicles are motorcycles. When traveling at speeds of 70 mph a motorcyclist, when merging, who looks in their blind spot for 2 seconds travels 200 ft in that time.

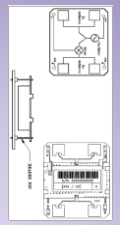
Solution

To assist motorcyclists and improve their safety, we designed a blind spot detection system which can be mounted on the driver’s motorcycle and helmet. Upon turn signal activation the subsystems will work in tandem to instantaneously sense if there is an object in the motorcycle’s blind spot. If a detection is made the system will alert the driver via wireless LEDs implanted in the helmet.

Overview of Detection Methods:

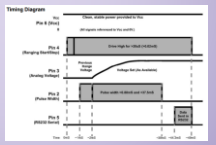
Radar Module:

The radar module consists of an HB100 microwave transceiver operating at 10.525Ghz. At 5V the sensor has an operational range of 10m.



Sonar Module:

The Sonar Module consists of a MaxSonar MB1010 ultrasonic module operating at 42Khz. The sensors optimal operating range is 7m.



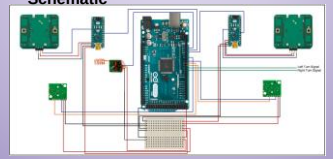
Transmit and Receive Module:

The transmitter and receiver consist of an XY-MK-5V and XY-FST pair running at 433Mhz.

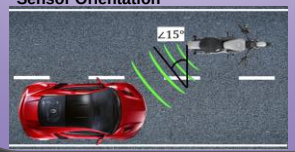
Design

The enclosure was designed to be installed on the back of a motorcycle while the receiver and warning system is integrated into the operator’s helmet.

Schematic



Sensor Orientation



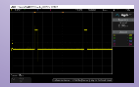
Data/Observations

Radar

Radar Effective Range: 10m
Radar Positive Detection Speed: 7-35 MPH

Sonar

Sonar Effective Range:: 6.5m
Sonar Positive Detection Distance: 4m



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