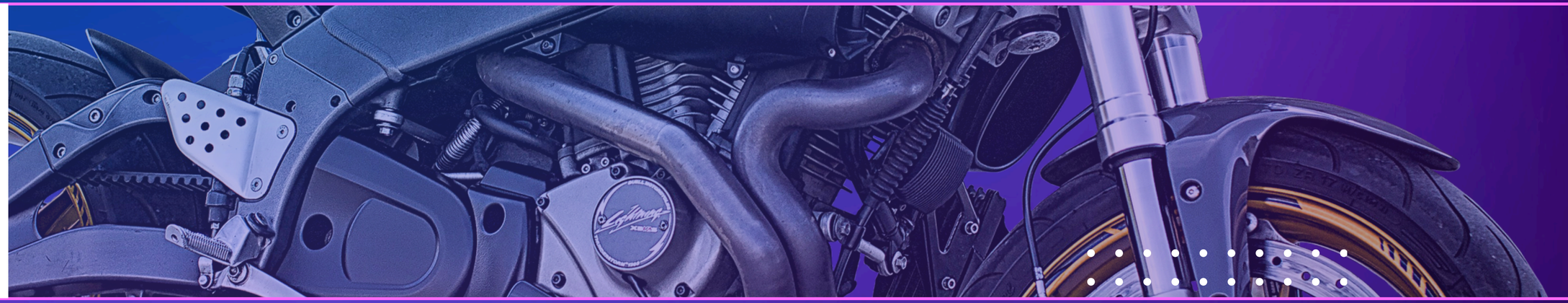
TEAM 2STROKE



Halo Helmet

APRIL
2024

Overview of the Problem

01. NHTSA statistics

02. Bikers are hard to see

03. Bikers struggle to see

04. Hazardous environment for bikers

05. Current solutions are lacking

06. Current solutions are bulky and expensive

Approach to Solve the Problem

01

Fig. 1 Adapted from [1]

Visibility

Flexible LED Matrix

02

Fig. 2 Adapted from [2]

Sensing

Ultrasonic Blind Spot Monitoring

03

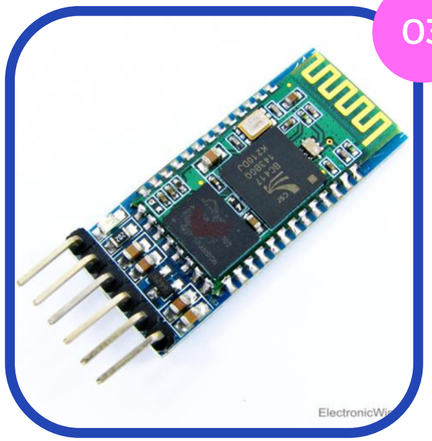


Fig. 3 Adapted from [3]

Ease of Use

Wireless Connectivity

04

Fig. 4 Adapted from [4]

Portability

Rechargeable Batteries

Constraints

Social	DOT Regulations for lighting/safety		Welfare	User protection from electric shock
Economic	Production costs do not exceed $1000		Safety	Original helmet safety is not compromised
Environmental	Interchangeable system reduces waste		Health	Lightweight system avoids causing neck strain

Engineering Standards

IP-X3	Ingress Protection Standard 60529	Heavy rain does not cause device malfunctions
USB	USB Implementers Forum Standards	Rechargeable batteries using USB interface
Modular Transmitters	Code of Federal Regulations 47 CFR 15.212	Internal wireless communication using Bluetooth

Lighting Test

Test for Effective Projected Luminous Lens Area

Position Helmet Away from Wall and View Projected Area

Lighting Test Photos

Lighting Testing Results

Stop Signal

MEASURED:
480 INCHES

REQUIRED:
3.5 INCHES

Left Turn Signal

MEASURED:
528 INCHES

REQUIRED:
3.5 INCHES

Right Turn Signal

MEASURED:
624 INCHES

REQUIRED:
3.5 INCHES

Bluetooth Testing

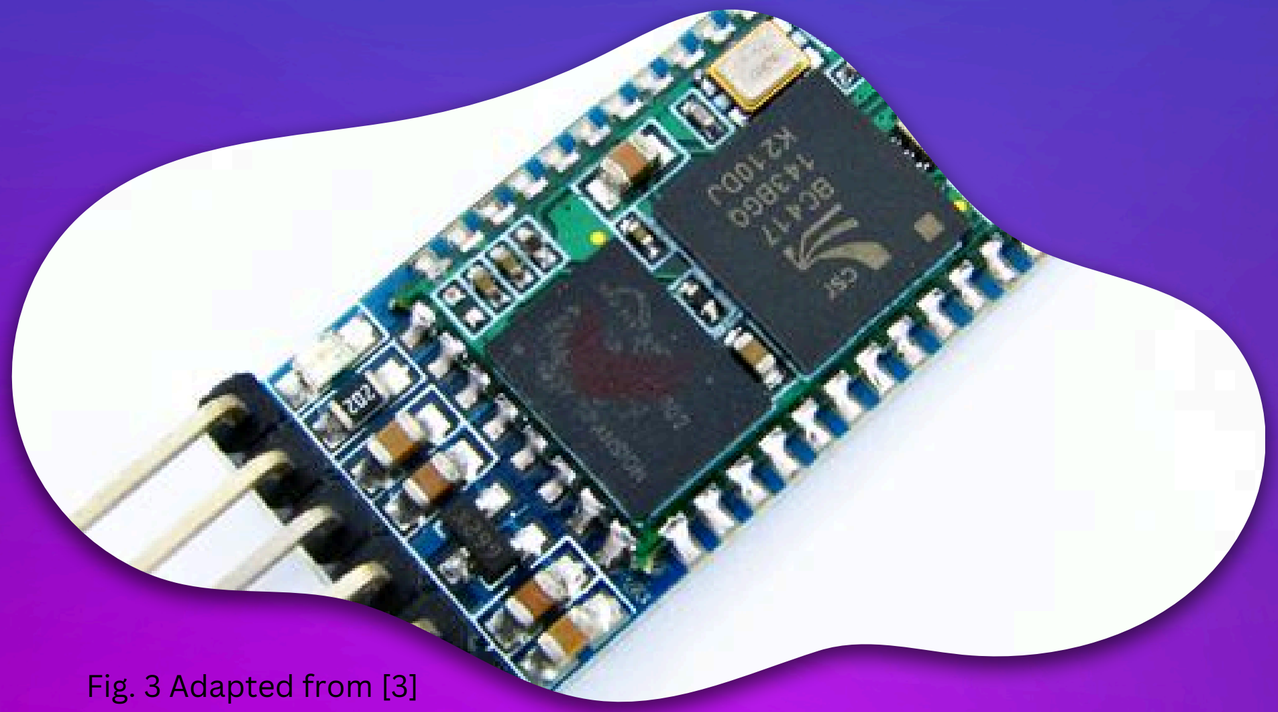


Fig. 3 Adapted from [3]

- DISTANCE TESTING
- WATERPROOFING
- CFR47C 15.212

Bluetooth Testing Results

Distance

COMMANDS ACCEEPTED AT 10 FEET

Ingress Protection

NONE AT A BASE LEVEL

SOLVED WITH HELMET AND WATER TIGHT CASE

CFR47C 15.212

RATED FROM FACTORY

MAINTAINS LAWFULNESS WITH FCC

Sensor Testing

- DISTANCE TESTING
- RESPONSE TIME
- INGRESS PROTECTION

Fig. 2 Adapted from [2]

Sensor Testing Results

Distance

"LARGE OBJECT" DETECTED AT 10 FEET

PEDESTRIAN DETECTED RELIABLY AT 8 FEET

Response Time

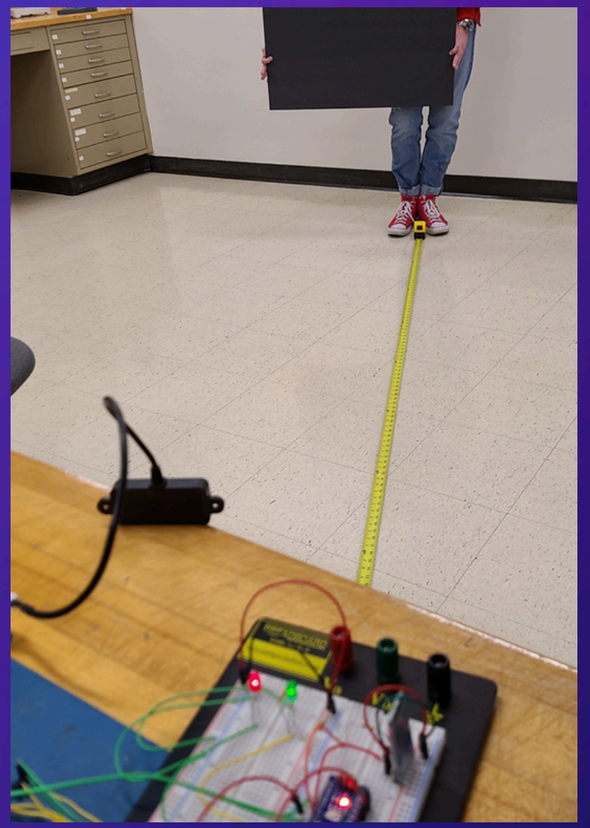
SENSORS QUICKLY REPORT DETECTIONS

SLIGHT RESPONSE TIME INCREASE DURING COMPLEX USE

Ingress Protection

SENSORS FACTORY RATED AT IP-67

WIRE CONNECTIONS SAFE INSIDE HELMET



Cost/Margin

	Cost
LED Matrix	$16.99
Bluetooth Modules	$15.99
Ultrasonic Sensor	$37.24
Battery Pack	$51.90
Total	$122.12

With the price of Halo Helmet being $200.00, the estimated gross margin is 38.94%

Packaging

IDENTITY

OUR LOGO

SIMPLISTIC DESIGN

RIDGIDITY

ABLE TO BE SHIPPED GLOBALLY WITHOUT DAMAGING ELECTRONICS

ECONOMICAL

NEEDS TO REMAIN LOW COST TO KEEP A COMPETATIVE PRICE POINT

ENVIROMENTAL IMPACT

AIM TO USED RECYCLED MATERIALS

ELIMINATE WASTE

01

MINIMALIST
DESIGN

02

HUB
CONNECT

PCB Reliability

Design Constraints Met

FOLLOWED DOT REGULATIONS	LOW COST COMPARED TO BUDGET	REPLACE PARTS INSTEAD OF SYSTEM
ISOLATED WIRING	NO DRILLING REQUIRED	MINIMAL ADDITIONAL HELMET WEIGHT

Demo Video

References

[1] Amazon, WESIRI 8x32 LED Matrix 256 Pixels WS2812B Digital Flexible LED Panel
[2] DFRobot, A02YYUW Waterproof Ultrasonic Sensor Wiki
[3] ElectronicWings, Sensors Modules Bluetooth Module Hc 05 | Sensors Modules.
[4] Elegant Themes, BACKSTOPCAMERAMOUNTS.COM.