

# Empowering Automotive Transformation

Smart Mobility Solutions with IoT, ADAS  
& Embedded Intelligence



**Inthings**



# Automotive Mission



## Commitment to Innovation

- InThings drives automotive innovation using IoT, embedded systems, and autonomous tech expertise.



## Focus on Electric Vehicles

- Specializes in intelligent solutions tailored for electric vehicles enhancing their performance and connectivity.



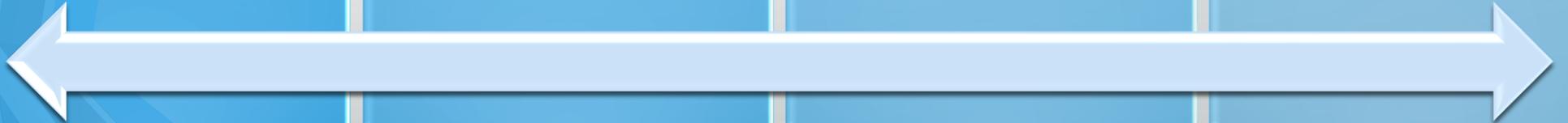
## Enhancing Safety and Diagnostics

- Improves vehicle safety and diagnostics through advanced autonomous driving research and hardware-software integration.

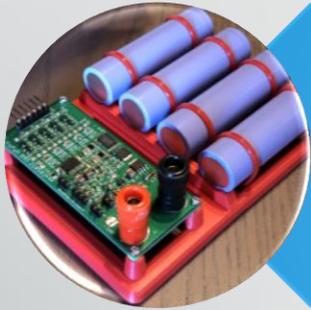


## Empowering Mobility Enterprises

- Delivers scalable, secure, data-driven automotive technologies addressing evolving transportation needs.



# Key Competencies



Battery  
management system



OpenPilot ADAS  
Integration



CARLA Simulator  
Integration



OBD & CANBus  
Expertise

# Battery Management System

## Real-Time Battery Monitoring

Monitors charge cycles, temperature, and voltage to maintain battery health continuously.

## Cloud Integration and Diagnostics

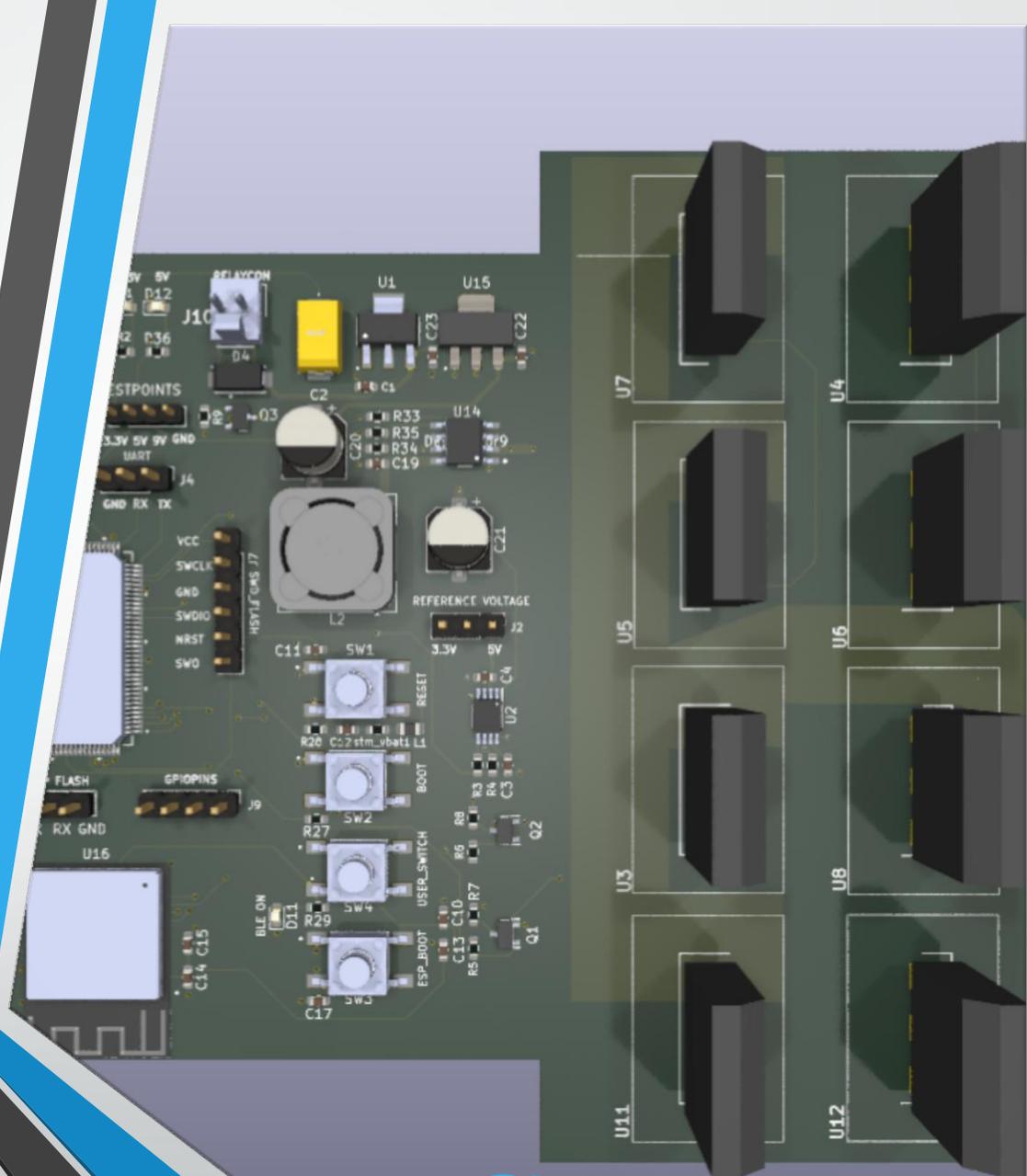
Enables remote diagnostics, predictive maintenance, and firmware updates through cloud connectivity.

## Safety and Scalability

Designed for automotive safety standards and scalable to different vehicle types and sizes.

## Enhanced Battery Performance

Ensures optimal battery longevity and improves overall vehicle reliability and efficiency.



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# Battery Management System



Supports multiple cell chemistries (Li-ion, LiFePO<sub>4</sub>, etc.)



Customizable protection thresholds for voltage, temperature, and current



Passive cell balancing for improved battery life



ARM Cortex-M4 32-bit CPU for real-time processing



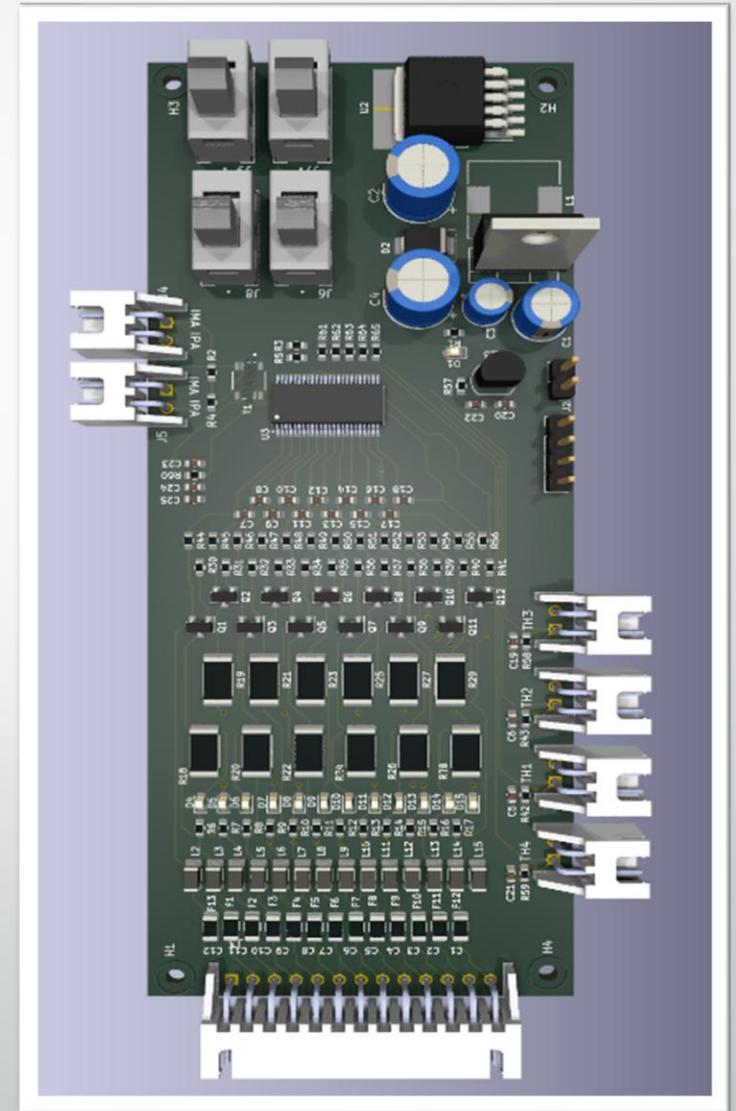
Advanced SOC (State of Charge) and SOH (State of Health) algorithms



Power and energy calculations for accurate monitoring



Communication Interfaces: UART, SPI, I<sup>2</sup>C, CAN for seamless integration with external systems



# CARLA Simulator Integration



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## High-Fidelity Simulation Environment

CARLA offers a realistic virtual space for thorough autonomous vehicle testing.

## Sensor and Camera Integration

Integration supports dual cameras, IMU, and GPS for comprehensive sensor simulation.

## OpenPilot Vehicle Control

OpenPilot enables lane keeping, adaptive cruise, and emergency braking in the simulator.

## Safe Algorithm Validation

Developers test control algorithms and driver monitoring in a fault-tolerant loop.

# Real-Time Object Detection with CARLA & Jetson Nano

## Simulation Environment

- CARLA simulator generates realistic driving scenarios for training and testing models.

## Edge Device Processing

- Jetson Nano platform enables fast, low-latency inference at the edge for real-time detection.

## AI Model Deployment

- YOLOv8 model trained on custom dataset detects critical road objects accurately and quickly.

## Video Analytics Pipeline

- NVIDIA DeepStream processes RTSP video stream for efficient real-time analytics on edge devices.



Traffic light detection in the CARLA simulation environment



Crosswalk detection in the CARLA simulation environment

# OpenPilot ADAS Integration



## OpenPilot Integration

InThings incorporates OpenPilot into automotive solutions for advanced driver assistance.

## Adaptive Driving Features

OpenPilot provides adaptive cruise control, lane centering, and automated driving.

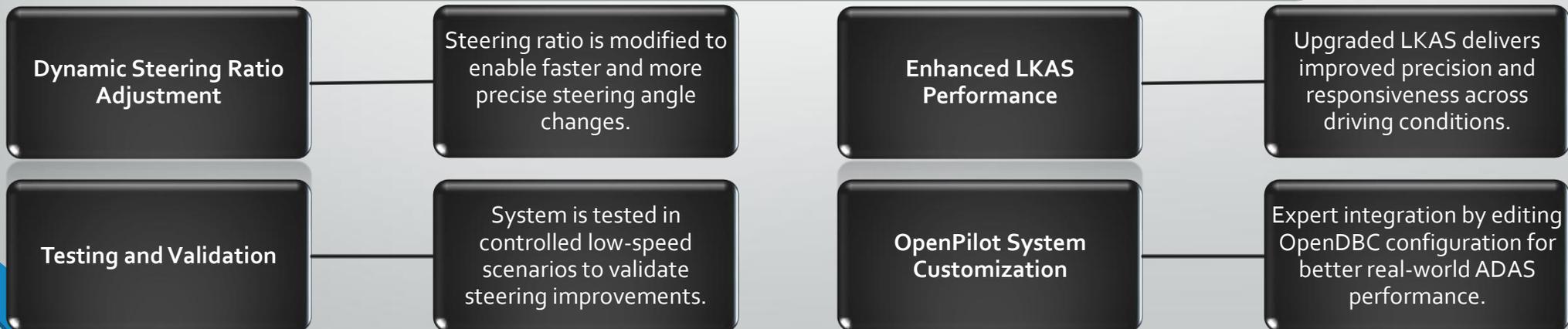
## Seamless Mode Transition

Supports smooth transitions between manual and autonomous driving for safety and experience.

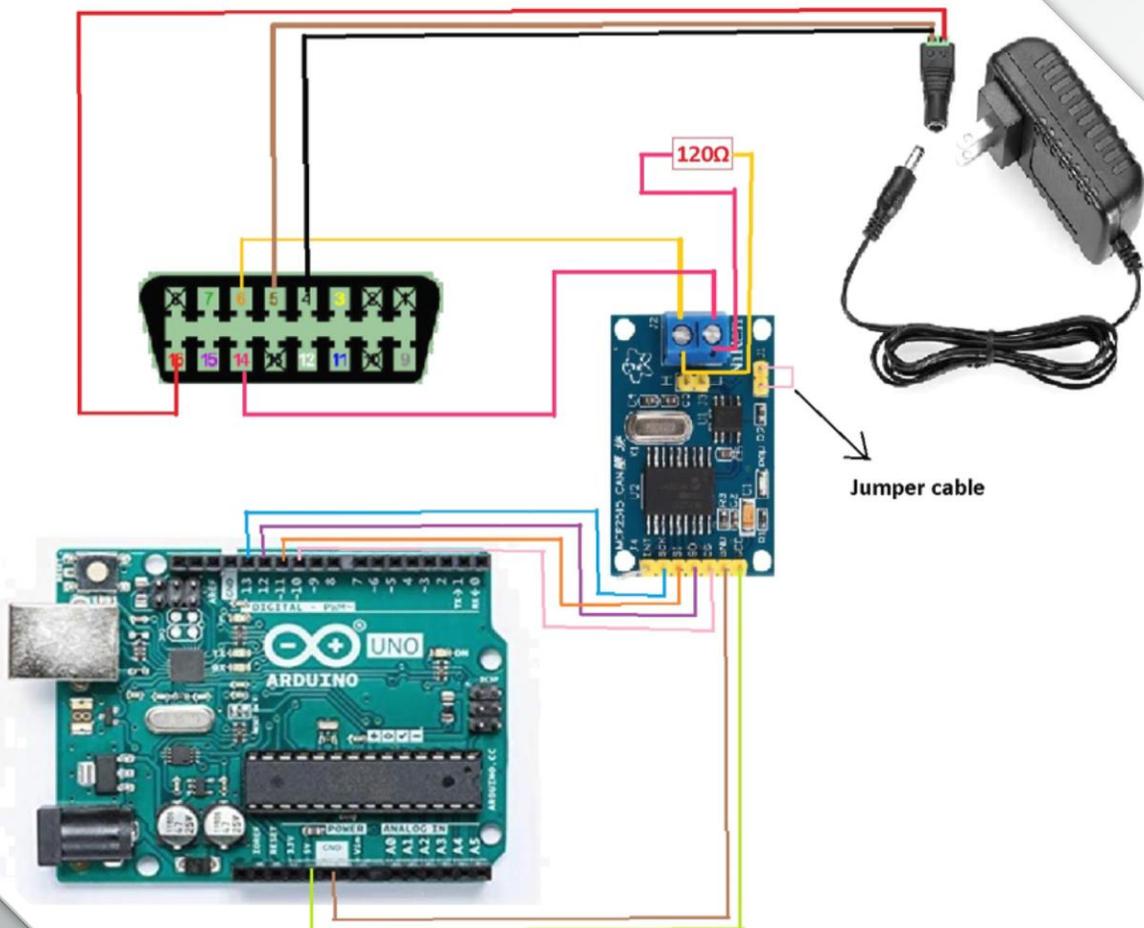
## Testing and Validation

Simulation and real-world tests ensure robust performance in diverse driving scenarios.

# Enhancing LKAS Steering Response with OpenPilot



# OBD Simulator Development



## Simulates Vehicle OBD Output

- The simulator replicates actual vehicle OBD signals for comprehensive device testing without physical cars.

## Supports Multiple OBD-II Protocols

- The tool is compatible with various OBD-II communication protocols for versatile testing scenarios.

## Enables Developer Testing

- Provides a controlled environment for developers and testers to validate device functionality efficiently.

## Cost-Effective Product Development

- Eliminates the need for physical vehicles, reducing development costs and time for diagnostic products.

# Embedded OBD Data Acquisition



## Embedded System Expertise

- InThings Technologies specializes in embedded systems for vehicle OBD data acquisition.

## Key Vehicle Parameters

- Systems capture speed, location, RPM, fuel level, and engine status from the vehicle.

## CANBus Integration

- Embedded solutions interface with CANBus networks for real-time data accuracy.

## Fleet Management Benefits

- Data supports analytics, route optimization, and vehicle health monitoring.

# Automotive Use Cases

## **Battery Performance Optimization**

BMS systems improve electric vehicle battery efficiency and longevity.

## **Autonomous Driving Research**

Integration with CARLA and OpenPilot supports testing autonomous vehicle algorithms.

## **Fleet Management Enhancement**

OBD simulators and embedded data systems enable improved telematics and fleet tracking.

## **Advanced Driver Assistance Systems**

Technologies contribute to safer and smarter transportation through ADAS development.



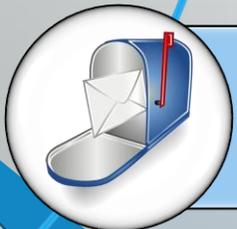
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