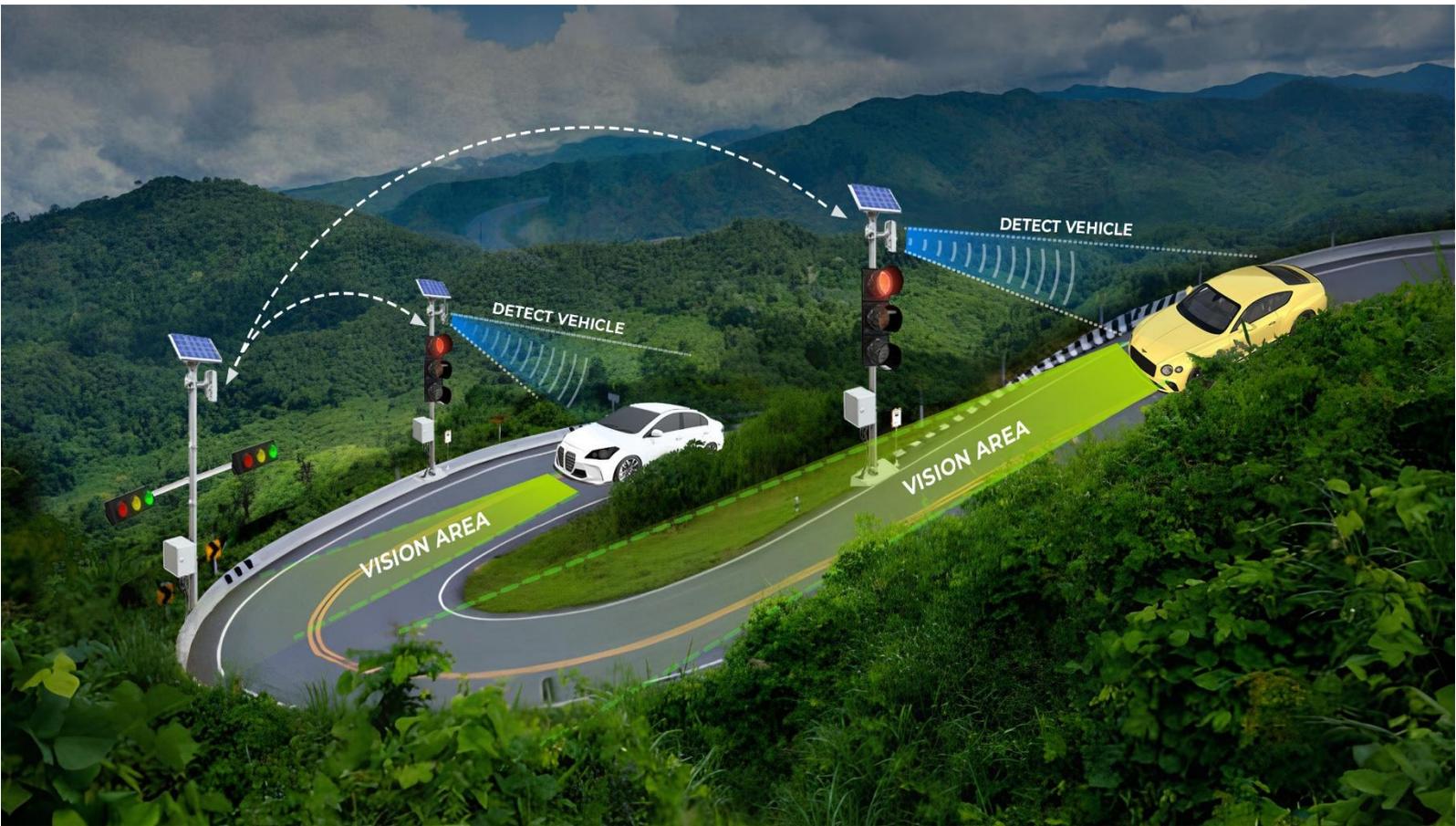# Curve Alert System

Smart Safety for Blind Curves in Mountainous Roads

Overview

The Curve Alert System is an autonomous, solar-powered safety solution designed to prevent accidents on blind curves in hilly terrains. Developed with cutting-edge sensor fusion (including Lidar), embedded control electronics, real-time logic algorithms, and solar-powered roadside infrastructure to detect traffic hazards and to actuate Red-Yellow-Green signals and audible alerts for collision prevention. This system eliminates the need for human oversight or grid infrastructure, offering a reliable safety net in some of the most dangerous road environments.

Key Features

- ✅ **Autonomous Operation** – No manual intervention required
- ✅ **Solar-Powered & Off-Grid** – Ideal for remote and rugged terrains
- ✅ **Bidirectional Vehicle Detection** – Real-time, dual-end monitoring
- ✅ **Smart Visual & Auditory Alerts** – High-visibility lights and sirens
- ✅ **Environment Adaptive** – Performs in fog, rain, and low-light conditions
- ✅ **Fail-Safe Logic** – Red signal on both sides in case of simultaneous detection

How It Works

1. **Detection:** Lidar-camera modules detect vehicles approaching from either side.
2. **Decision Logic:** The system compares the time of detection (DT). The earlier detected vehicle is granted passage.
3. **Signalling:** Traffic lights and sirens alert drivers based on system decisions.
4. **Energy Management:** Solar panels power the system and charge internal batteries for 24/7 uptime.

System Components

- **Sensor-Fusion Module:** Solid-State Lidar (16-150m range, ±3 cm accuracy), weatherproof

- **Solar Panel (100W):** High-efficiency monocrystalline, tilt-mounted

- **Battery Backup (40Ah):** 36–48 hours backup with smart BMS

- **Controller Board:** Real-time microcontroller with onboard logic

- **Siren System:** 95–110 dB warning system

- **LED Traffic Lights:** Visible up to 200m, energy-efficient

Use Case Scenarios

Scenario	Side A Signal	Side B Signal	Siren
No vehicles detected	Green	Green	Off
Vehicle on **Side A** only	Green	Blinking Amber	Side B Only
Vehicle on Side B only	Blinking Amber	Green	Side A Only
Both sides (conflict)	Red	Red	All On
Both sides (safe time diff.)	One side Green	Other Warned	Controlled

Applications

- Military roads in border regions (Ladakh, Sikkim, Arunachal)
- Tourism zones in mountain towns
- Wildlife and forest roads
- Emergency rescue and disaster corridors
- Smart infrastructure under PMGSY, MoRTH, and Gati Shakti schemes

Proven Reliability

- **TRL 9–10**
- **Prototype tested with the Indian Army**
- **Demonstrated in controlled terrain simulation**
- **Sustainable and scalable infrastructure**

Competitive Advantage

Feature	Curve Alert System	Other Systems
Fully Autonomous	✅	❌
Solar & Off-Grid	✅	❌
Specific to Blind Curves	✅	❌
Real-Time Traffic Decision Logic	✅	❌
Dual-End Vehicle Detection	✅	❌
Combined Audio-Visual Alert	✅	❌

Our Clients

Contact Us

Eulerian Bots Pvt. Ltd.

📧 **Email:** sales@eulerianbots.com | praveen@eulerianbots.com

📞 **Phone:** +91 99305 55002

🌐 **Website:** https://eulerianbots.com/