



ECLIPSE SDV  
HACKATHON  
PORTO 2025

# HACKATHON

## Chapter III - 2025



ECLIPSE SDV  
HACKATHON  
BERLIN 2025





# HACKATHON



## PITCHING SESSION

*Porto Motive*



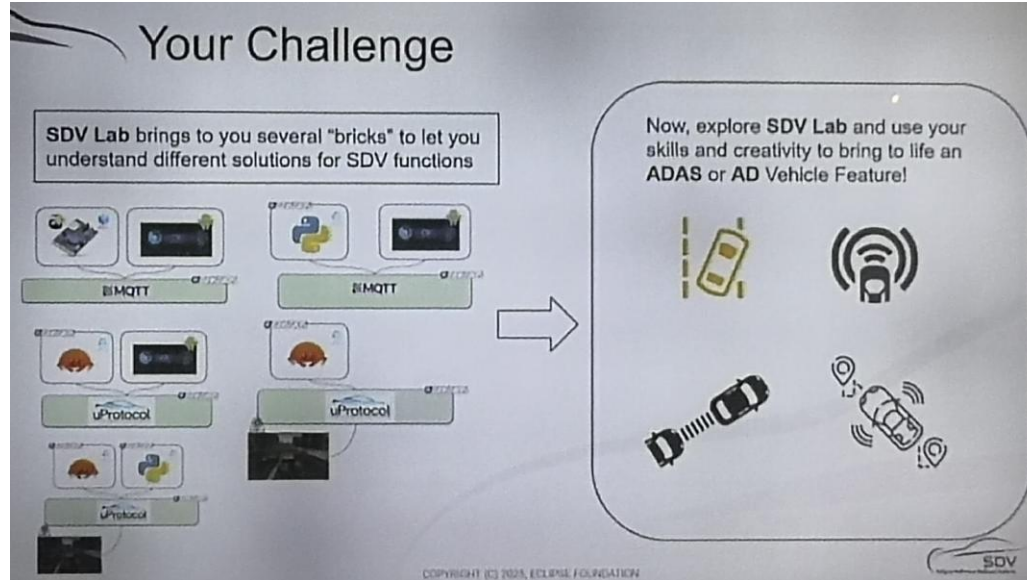
# The Plan

We chose the **SDV Lab**.

## Initial Situation

At the **Hackathon Eclipse SDV – Chapter Three**, we were challenged to choose between two different tracks:

1. **Software-Defined Vehicle (SDV) Lab**
2. **Mission: Update Possible**



## **Why?**

Because, having **no prior experience** in the **automotive** field, it seemed:

1. **more intuitive** for us to start with this challenge.
2. From a **learning perspective**, it also felt **more logical** to first understand how to implement car features before moving on to the update challenge (i.e., **learn first, update later**).

# The Plan



## Main Ideas

**1. Prevent rear-end collisions** by detecting when a vehicle approaches at high speed and effectively applying evasive maneuvers.

**2. Reduce the effects of collisions** if they are eminent (especially in traffic jams) by redistributing the impact across the queue of vehicles, using the same principle as Newton's cradle, ultimately **saving lives**, which is our primary goal.

1. We will implement an adaptive **Rear Collision Evasion System (RCES)** as a **proof of concept**, named **Backward Automotive Life-Saving System (or B.A.L.S.)**.

2. To achieve this, we used **CARLA** (the open-source driving simulator) and designed an algorithm that **uses RADAR to detect vehicles approaching from behind**. The system will then automatically trigger an evasive maneuver, deviating the car to the left or right (depending on available space).



# Team and Structure



Name	Role(s)
Bruno Miguel	Brainstormer
Rui Almeida	Developer
Miguel Biltes	Developer
João Silva	P.M. Developer
Bernardo Esteves	Conceptualization Architect



# The Product / Service / Added Value

## Rear Collision Evasion System (RCES)

### The problem

- In traffic jams, the risk of rear-end collisions is high.
- Most current systems only prepare occupants (tensioning seat belts, headrests, hazard lights)
- Active technology to evade the vehicle and prevent or mitigate the impact does not exist

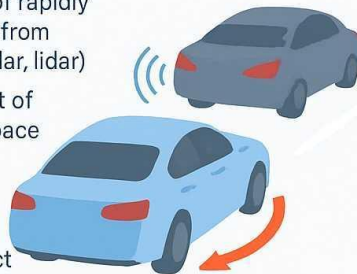
### Benefits

- Increased safety in traffic jams and highways
- Real innovation: from passive to active protection against rear-end collisions
- Potential for patent and competitive differentiation
- Scalable for future autonomous vehicles and cooperative driving systems

### Our solution

#### RCES – Rear Collision Evasion System

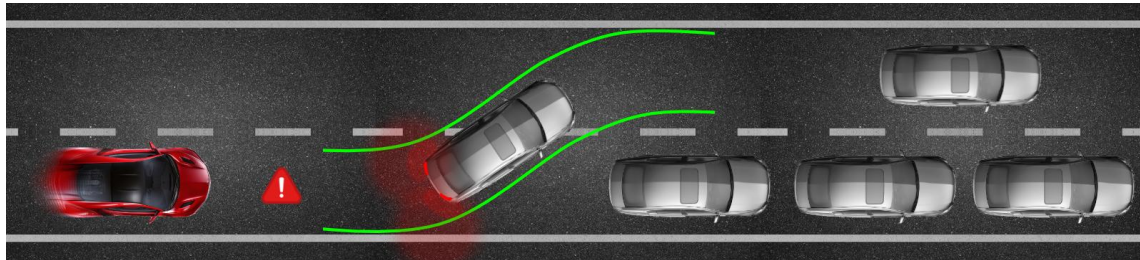
- Intelligent detection of rapidly approaching vehicles from the rear (cameras, radar, lidar)
- Real-time assessment of lateral and forward space
- Automatic micro-evasions to the left/right (when safe) to reduce or avoid impact
- Integration with V2V (Vehicle-to-Vehicle Communication): **surrounding vehicles** collaborate to open space for evasive maneuver



**If you can't avoid the traffic jam,  
avoid the impact.**

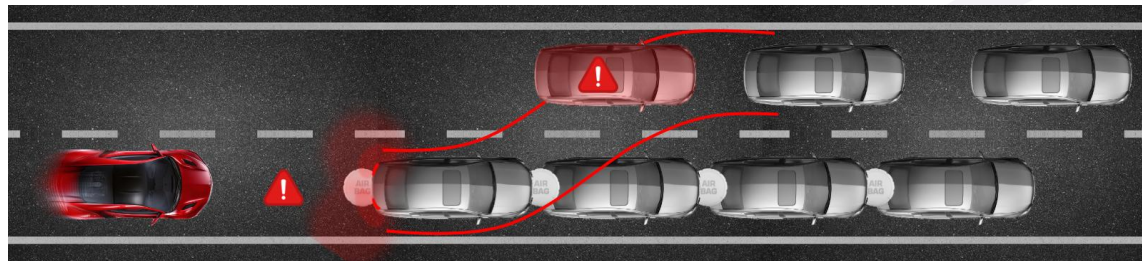
***Besides being a revolutionary solution, not yet implemented anywhere else, the real added value is this system can also effectively save lives.***

# How it works



If there are vehicles in front of the car, the **system will attempt to steer the car into an adjacent lane** (either to the right or left), if that lane is available for the maneuver.

If no adjacent lane is available, the **cars will prepare for the collision by unlocking the brakes** and attempting to **distribute the force** of the impact across all involved vehicles, **minimizing the damage**.



# How it works – Video 1





# How it works – Video 2



# The Market & The Competition

## 1. Market & Market Size

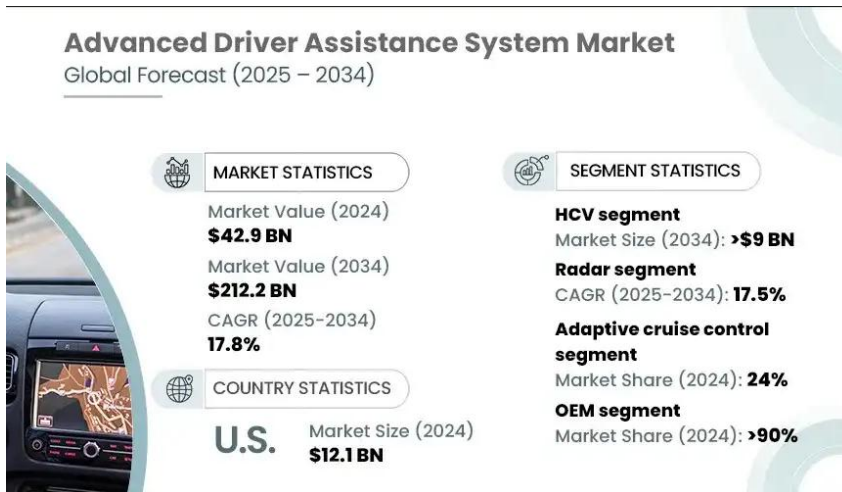
### Market Opportunity

#### • Automotive Safety Systems Market (ADAS & Active Safety)

- Global market size (2024): **\$42B+**
- Expected growth: CAGR **~10% until 2030**
- Driven by regulation (EU NCAP, NHTSA, UN ECE standards) and consumer demand for safer vehicles.

### Competitors

- **Indirect:** Current ADAS providers (Bosch, Mobileye, Continental) focus on **front/side collision avoidance** and **emergency braking**, not **rear collision evasion**.
- **Direct:** None offering an **active rear collision avoidance maneuvering system** — this is a **white space** opportunity.



# The Market & The Competition

## Target Customers

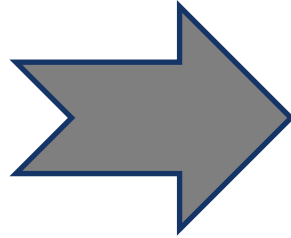
- **OEMs (Original Equipment Manufacturers):**  
Car makers like Mercedes, BMW, Tesla, Toyota, VW, Hyundai.
- **Tier 1 Suppliers:**  
Bosch, Continental, ZF, Valeo – companies that integrate new safety tech into vehicles.
- **Aftermarket & Fleet Operators:**  
Possibility of retrofitting fleet vehicles (taxis, logistics, ride-sharing).



# The Market & The Competition

## Our Differentiation:

- **Active evasion system** → prevents or reduces the collision
- **B.A.L.S. integrates communication** for cooperative safety
- **Adaptive real-time micro-maneuvers** (steering & brake release to maximize force distribution.



## (Business) Opportunity

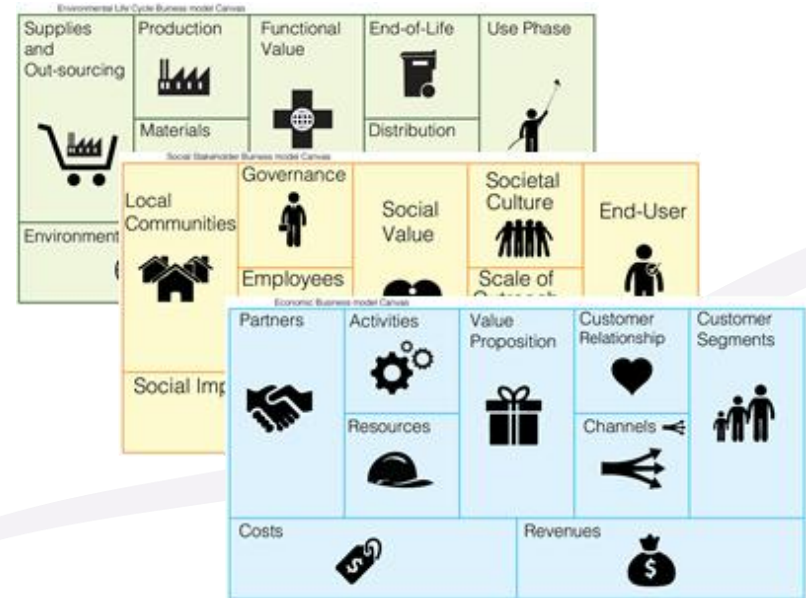
- Current solutions are **passive** → they only *prepare occupants* (seatbelts, headrests, hazard lights)
- Governments and insurers increasingly demand **safety-first technology**
- Global push for **road safety and autonomous driving Technologies**
- Increasing adoption of **ADAS (Advanced Driver Assistance Systems)** in all vehicle segments
- Potential integration into **future autonomous cars** and **fleet management systems**



# Business Model \* Plan & Funds

## 2. Business Model

- **Licensing to OEMs:** License RCES software + hardware integration kits to car manufacturers.
- **Partnerships with Tier 1 suppliers:** Collaborate with Bosch, Continental, ZF, or Valeo to embed RCES into their existing ADAS platforms.
- **Retrofit Kits** (long-term): Hardware/software retrofit for fleet vehicles (logistics, taxis, ride-hailing, buses).
- **Revenue Streams:**
  - Licensing fees per vehicle
  - Long-term royalties (per unit sold with RCES)
  - Potential SaaS extension for V2V communication (subscription for fleet connectivity).



# Business Model \* Plan & Funds

## 3. Implementation Plan

### Phase 1 – Concept & Prototype (0–12 months)

- Simulation in **CARLA** + AI-based trajectory planning.
- Proof-of-concept with RADAR + camera + micro-evasive maneuvering algorithms.

### Phase 2 – Pilot & Testing (12–24 months)

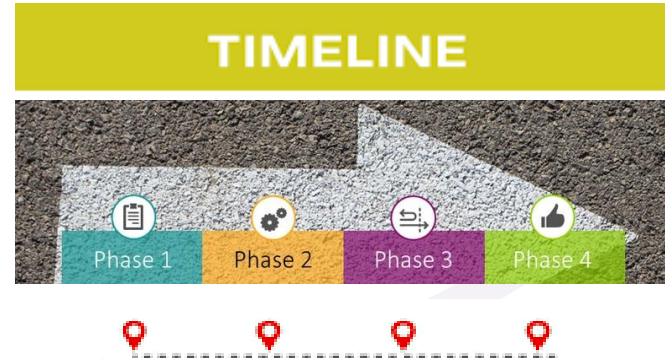
- Build partnerships with **universities / automotive labs**.
- Test on real vehicles (retrofit kit with RADAR + ECUs).
- Safety validation under EuroNCAP crash test protocols.

### Phase 3 – Industrial Partnerships (24–36 months)

- Collaborate with **Tier 1 suppliers** for system integration.
- File **patents** on RCES algorithms and V2V integration.
- Begin pilot integration with 1–2 **OEMs**.

### Phase 4 – Commercial Rollout (36+ months)

- Launch RCES as an embedded system in new vehicles.
- Retrofit kits for fleets in parallel.




# Business Model \* Plan & Funds

## 4. Investment Needs



### Seed Stage (Year 1–2): ~€2–3M

- **R&D & Talent:** Hire AI engineers, automotive software developers, safety experts.
- **Hardware:** RADAR, LIDAR, ECUs, testing vehicles.
- **Simulation & Validation:** CARLA infrastructure, real-world prototyping.
- **IP Protection:** Patent filing and legal costs.

- 
- 40% – Research & Development
  - 30% – Pilot testing & certification with partners
  - 20% – Business development & partnerships
  - 10% – Legal, patents & regulatory approvals



### Series A (Year 2–3): ~€10–15M

- **Pilot Programs** with OEMs and Tier 1 suppliers.
- **Regulatory Compliance** (EuroNCAP, NHTSA validation).
- **Scaling R&D** for V2V integration.



### Series B (Year 3–5): ~€30M+

- **Commercial Partnerships** with OEMs.
- **Mass production** readiness.
- **Retrofit solutions** for fleet market.

# Business Model \* Plan & Funds



- **Market:** €40B+ growing, with a **white space** (no active rear collision evasion tech today).
- **Clients:** OEMs, Tier 1 suppliers, fleets.
- **Business Model:** Licensing + partnerships + retrofit kits.
- **Plan:** Prototype → Pilot → Partnerships → Commercial launch.
- **Investment:** Initial €2–3M for R&D + IP, scaling to €30M+ for commercial rollout.

## Sources:

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# Contact

Name	GitHub
Bruno Miguel	@Bruno0798
Rui Almeida	@Rmsa42
Miguel Biltres	@Biltres
João Silva	@jpjpcs
Bernardo Esteves	@berestv





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# Thank You!

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