

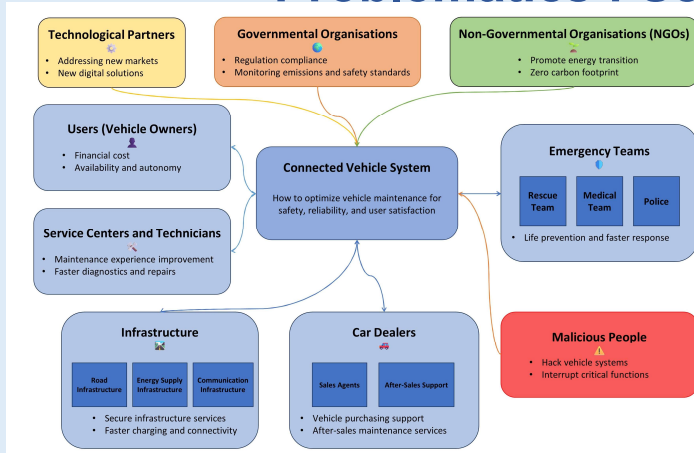
# MAINTENANCE :

keeping the vehicle in operational condition, minimizing unavailability

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## Problematics : Seize the Opportunity



### 1. Key Stakes

- Users (Vehicle Owners)
- Service Centers and Technicians
- Vehicle Sensors & Data Analysis Modules

### 2. Key KPIs

- User Safety: Timely Alerts and Fast Repairs
- Operational Reliability: Minimize Failures
- Maintenance Efficiency: Reduce Downtime

### 3. Objectives

- Ensure Safety and Ease of Use
- Minimize Downtime and Improve User Satisfaction
- Optimize Maintenance Efficiency

### 4. Concerns

- High Costs: Investment in maintenance systems
- Rising Accidents: Critical failures without monitoring
- Slow Adoption: Limited use of advanced systems

## Strategy

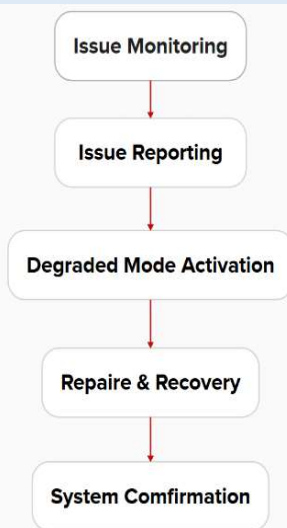
To address the issues of **slow maintenance efficiency** and **low customer satisfaction**, new ideas have been introduced to improve maintenance processes:

- 📡 Using sensors to monitor vehicle status in real time.
- 🔍 Analysis module provides timely feedback.
- 🕒 Clearly defining each role's responsibilities.

To optimize the maintenance process, vehicle conditions are categorized into three types:

- **Immo**: Critical Maintenance Function
- **Non- Immo**: Non-Critical Maintenance Functions
- **Degraded Model**: Limited Maintenance Functions

## Solution



- Sensors monitor the vehicle status, detect anomalies, and log fault information.
- The vehicle system reports faults to the owner or service center and schedules maintenance.
- The vehicle enters a safe mode, which limits certain functions to ensure safety.
- Technicians repair or replace damaged components to restore vehicle functionality.
- System diagnostics are performed to ensure the vehicle operates normally.

## Fault Management Process & Benefits

- Sensors monitor key systems (e.g., brakes, oil levels, battery) in real time. When an anomaly is detected, fault data is sent to the analysis module, which assesses severity and generates diagnostic codes.
- The system can automatically upload diagnostic data, alert the owner, and contact the service center, or the owner can manually schedule repairs via an app or phone. In the same time, the service center prepares the necessary tools, and the vehicle enters "Degraded Mode" to ensure safety.
- Technicians repair faulty parts, calibrate systems, and restore functionality. A full check ensures the issue is resolved, and maintenance records are updated. After repairs, the owner acknowledges completion and receives maintenance advice. Records are archived for future servicing.

## Conclusion

- The proposed vehicle maintenance process will effectively address maintenance scenarios through a structured framework. It will optimize workflows through:
- **Reduced Maintenance Time** — Real-time sensor monitoring and automated fault reporting enable the service center to prepare tools and parts in advance.
- **Enhanced Vehicle Safety and Reliability** — Degraded mode ensures safe vehicle operation. Systematic fault analysis provides timely and accurate diagnostics to prevent further damage.