# FTA of Lane Departure Warning

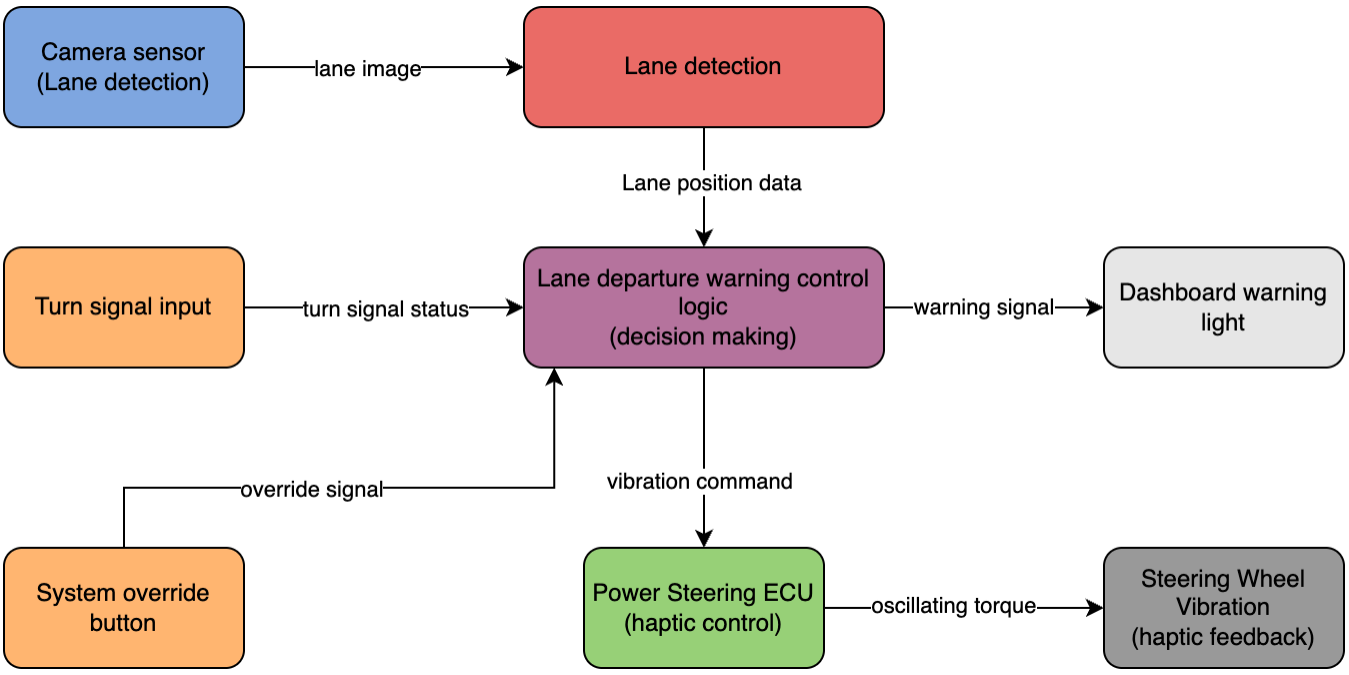
## Item Definition

The Lane Departure Warning (LDW) system is an Advanced Driver Assistance System (ADAS) function designed to alert the driver when the vehicle unintentionally drifts from its designated lane. The system provides haptic feedback through steering wheel vibration and visual feedback via dashboard warning light to enhance driver awareness and prevent potential lane departure incidents.

### System Boundaries

The LDW item encompasses:

- **Camera sensor** for lane marking detection
- **Lane detection processing unit** (Camera ECU)
- **Lane departure warning control logic** (decision-making algorithms)
- **Power steering ECU** (haptic feedback generation)
- **Dashboard warning light** (visual alert)
- **Override mechanisms** (turn signal and manual override inputs)




### External Interfaces

- Driver interface: Steering wheel haptic feedback, dashboard visual warning
- Vehicle systems: Turn signal status, power steering system, vehicle electrical system
- Environmental interface: Road surface lane markings, ambient lighting conditions

## HARA

Here's a **HARA (Hazard Analysis and Risk Assessment)** example for the **Lane Departure Warning (LDW)** function, formatted in Markdown:

**Hazard: Vehicle unintentionally departs from lane without warning.**

**Malfunction: LDW fails to activate (no steering wheel vibration).**

**Hazardous Scenario: Driver is on a highway, unintentionally drifting out of lane, and LDW does not alert the driver.**

### Risk Parameters

| Parameter | Assessment |
|---|---|
| **Severity (S)** | **S2** – Moderate injuries possible due to side collision or road departure. |

| | |
|---|---|
| **Exposure (E)** | **E4** – Happens frequently (e.g., highway driving, long trips). |
| **Controllability (C)** | **C2** – Most drivers can recover, but not all (especially if distracted). |
| **ASIL Rating** | **ASIL B** – Based on S2, E4, C2. |

Safety Goal: The LDW function shall reliably detect unintended lane departures and provide timely haptic and visual warnings to the driver.

## FTA (static)