LDW FUNCTION SPECIFICATION
LDW 功能描述

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History

Date	Author	Description	Version
21/11/2019	Zhongyan Bi Xiaohui Hu	Initial	1.0

Abbreviations

Abbreviations	Description
ABS	Anti-lock Braking System
ESP	Electrical Stability Program
EPS	Electrical Power Steering
LDW	Lane Departure Warning
TCS	Traction Control System
TSA	Trailer Stability Assist

1 Function Requirements 功能要求

1.1 Function Description 功能介绍

The LDW function assists the driver in an unwanted leaving of the ego lane. If the driver gets closer to the lane marking without turning on the indicator in the corresponding direction, the LDW function supports the driver with a visual, haptical and audible feedback in order to get the attention of the driver back. The function can come alone or in combination with the Lane Departure Protection in the egovehicle as a first stage feedback to the driver.

LDW 功能在驾驶员发生无意识道路偏离时进行辅助。当车辆的一侧转向灯未开启，且正在往此方向偏离时，LDW 会通过报警（视觉，触觉，听觉）引起驾驶员的注意。该功能可以单独或与 LDP 功能结合使用。

1.2 Function Conditions 状态迁移条件

1.2.1 Function Activation Condition 功能激活条件

Function Activation means that the function can be activated (switched on) so that it is available in principle for triggering a lateral intervention.

功能激活意味着功能激活并可以触发横向干预。

The LDW function Activation Condition shall be fulfilled and the function shall become activated or shall stay activated, if ALL of the following conditions are fulfilled:

若满足以下所有条件，则满足功能激活条件：

1. The LDW function is coded.
   功能已被配置
2. The LDW function is switched ON.
   功能由驾驶员打开

1.2.2 Function De-Activation Condition 功能未激活条件

Function De-Activation means that the function can NOT be activated or needs to be de-activated (switched off) so that the function is not allowed to trigger a lateral intervention.

功能未激活意味着不允许触发横向干预。

The LDW function **De-Activation Condition** shall be fulfilled and the function shall become de-activated or shall stay de-activated, if **AT LEAST ONE** of the following conditions are fulfilled:

若满足以下任意条件，则满足功能未激活条件：

1. The LDW function is NOT coded

功能未被配置

2. The LDW function is NOT **switched** ON.
   功能未被打开

1.2.3 Function Availability Condition 功能可用条件

Function Availability means that the function is in principle available for triggering a lateral intervention. The Function Availability Condition is devided into side-independent and side-dependent (left/right) conditions.

功能可用说明功能满足横向介入的预先条件。功能可用状态分为与方向无关的和与方向有关（左/右）的可用条件。

NOTE: Function Availability requires that the Function Activation Condition is fulfilled.

注意：功能可用需要满足功能激活条件

- If the Function Activation Condition is not fulfilled, the function can only be in function De-Activation state.

若功能激活条件未满足，则功能只能处于功能未激活状态

1.2.3.1 Side-Independent Availability Condition 与方向无关的可用条件

The LDW function **Side-Independent Availability Condition** shall be fulfilled and the function shall become available or stay available **side-independent**, if **ALL** of the following pre-conditions are fulfilled:

若满足以下所有条件，则满足与方向无关的可用条件

1. The function **Activation Condition** is fulfilled.
   功能激活条件满足
2. The ego-vehicle **speedometer velocity** is in the valid velocity range
   自车的速度表速度在有效的速度范围内

   (cLDW_VehicleSpeedMin_mps <= VehSpd <= cLDW_VehicleSpeedMax_mps).

   If the velocity has been in the above valid velocity range before, the condition shall also use a hysteresis, which requires the velocity
   若速度之前已在有效的速度范围内，则该条件考虑滞后，并要求速度满足
   (cLDW_VehicleSpeedMin_mps - cLDW_VehicleSpeedMinHyst_mps <= VehSpd <= cLDW_VehicleSpeedMax_mps + cLDW_VehicleSpeedMaxHyst_mps)
3. If two lane markings are available, which describe the ego-vehicle lane, the ego-vehicle lane width shall be equal/above cLDW_LaneWidthMinTrigger_met **AND** equal/below cLDW_LaneWidthMaxTrigger_met.
   若存在两条代表自车车道的车道线，则该条车道的宽度需大于等于 **cLDW_LaneWidthMinTrigger_met** 且小于等于 **cLDW_LaneWidthMaxTrigger_met**

If only one lane marking is available for a certain side (left/right), the condition shall be only fulfilled for the certain side.

若仅有一条车道线，则该条件自动满足

NOTE: The ego-vehicle lane is described by the two lane markings, which:

注意：自车车道的车道线需满足：

- Are not located under the ego-vehicle.
  不在自车车下
- Are the lane markings with smallest lateral distance to the ego-vehicle on each side (left/right) of the ego-vehicle.
  离自车的横向距离最近
- Have lateral y-distance to the ego-vehicle lateral center not bigger than **cLDW_LaneWidthMaxTrigger_met + cLDW_LaneWidthHystTrigger_met**.
  离自车横向中心的距离小于 **cLDW_LaneWidthMaxTrigger_met + cLDW_LaneWidthHystTrigger_met**

4. The ego-vehicle's **hazard lights** is NOT activated.
   警示灯未被激活
5. The ego-vehicle is **driving forward**.
   自车向前行驶
6. The ego-vehicle longitudinal acceleration is less than the threshold
   自车的纵向加速度小于阈值 **cLDW_VehLongAccelerationThEnabledActive_mpss.**
7. The ego-vehicle longitudinal deceleration is less than the threshold
   自车的纵向减速度小于阈值 **cLDW_VehLongDeccelerationThEnabledActive_mpss**.
8. The ego-vehicle **absolute lateral acceleration** is less than the threshold

   自车的横向加速度的绝对值小于阈值 **cLDW_VehLatAccelerationThTrigger_mpss**.

9. The **ABS** function is NOT deactivated and is available.
   ABS 激活且可用
10. The **ABS** function is NOT performing an intervention.
    ABS 没有进行干预
11. The **ESC** function is NOT deactivated and is available.
    ESC 激活且可用
12. The **ESC** function is NOT performing an intervention.
    ESC 没有进行干预
13. The **TCS** function is NOT deactivated and is available.
    TCS 激活且可用
14. The **TCS** function is NOT performing an intervention.
    TCS 没有进行干预

1.2.3.2 Side-Dependent Availability Condition 与方向有关的可用条件

The LDW function **Side-Dependent Availability Condition** shall be fulfilled and the function shall become available or stay available for a **certain side** (**left** or **right**), if **ALL** of the following pre-conditions are fulfilled:

若满足以下所有条件，则满足某一边（左/右）与方向有关的可用条件：

1. The **lane marking** is **available** on the **certain side** (left/right).
   某一边（左/右）存在可用的车道线
2. The **lane marking** on the certain side (left/right) is steady and does not show unsteady characteristics.
   若某一边（左/右）车道线稳定且未有不稳定的特性
3. The ego-vehicle **turn indicator** is NOT activated into the direction of the **certain side** (left/right).
   若某一边（左/右）转向灯未被激活
4. The ego-vehicle **absolute lateral approaching velocity** with regard to the available lane marking (left/right) on the **certain side** (left/right) is equal/below the threshold **cLDW_VelLatThresMax_mps**.
   自车在该方向上的横向速度需小于等于 **cLDW_VelLatThresMax_mps**.

1.2.4 Function Un-Availability Condition 功能不可用条件

Function Un-Availability means that the function is not available for a certain or both sides (left/right) for triggering a lateral intervention. The Function Un-Availability Condition is divided into side-independent and side-dependent (left/right) conditions.

功能不可用说明功能不能够提供横向介入。功能不可用条件分为与方向无关的和与方向有关的不可用条件。

NOTE: Function Un-Availability requires that the function Activation Condition is fulfilled.

注意：功能不可用需要满足功能激活条件

- If the function Activation Condition is not fulfilled, the function can neither be in function Available or Un-Available state but only in function De-Activation state.

若功能激活条件未满足，则功能只能处于功能未激活状态

1.2.4.1 Side-Independent Un-Availability Condition 与方向无关的不可用条件

The LDW function **Side-Independent Un-Availability Condition** shall be fulfilled and the function shall become un-available or stay un-available **side-independent**, if **AT LEAST ONE** of the following conditions is fulfilled:

若满足以下任一条件，则满足与方向无关的不可用条件

1. The ego-vehicle **speedometer velocity** is not in the valid velocity range considering a hysteresis. This is the case, if the ego-vehicle velocity is below (**cLDW_VehicleSpeedMin_kph** - **cLDW_VehicleSpeedMinHyst_kph**) or above (**cLDW_VehicleSpeedMax_kph** + **cLDW_VehicleSpeedMaxHyst_kph**).
   考虑滞后，自车的速度未在有效的速度范围内 。即速度小于 (cLDW_VehicleSpeedMin_kph - cLDW_VehicleSpeedMinHyst_kph)，或大于 (cLDW_VehicleSpeedMax_kph + cLDW_VehicleSpeedMaxHyst_kph)
   。

2. The ego-vehicle's **hazard lights** is activated.
   警示灯被激活
3. The ego-vehicle is NOT **driving forward**.
   自车非向前行驶
4. The ego-vehicle longitudinal acceleration is bigger than the threshold
   自车的纵向加速度大于阈值 cLDW_VehLongAccelerationThEnabledActive_mpss + cLDW_VehLongAccelerationThHyst_mpss
5. The ego-vehicle longitudinal decceleration is bigger than the threshold
   自车的纵向减速度大于阈值 cLDW_VehLongDeccelerationThEnabledActive_mpss + cLDW_VehLongDecelerationThHyst_mpss
6. The ego-vehicle **absolute lateral acceleration** is bigger than the threshold
   自车的横向加速度的绝对值大于阈值 cLDW_VehLatAccelerationThTrigger_mpss + cLDW_VehLatAccelerationThTriggerHyst_mpss
7. The **ABS** function is deactivated or is NOT available.
   ABS 未激活且不可用
8. The **ABS** function is performing an intervention.
   ABS 正在进行干预
9. The **ESC** function is deactivated or is NOT available.
   ESC 未激活且不可用
10. The **ESC** function is performing an intervention.
    ESC 正在进行干预
11. The **TSC** function is deactivated or is NOT available.
    TSC 未激活且不可用
12. The **TSC** function is performing an intervention.
    TSC 正在进行干预

1.2.4.2 Side-Dependent Un-Availability Condition 与方向有关的不可用条件

The LDW function **Side-Dependent Un-Availability Condition** shall be fulfilled and the function shall become un-available or stay un-available for a **certain side** (**left** or **right**), if **AT LEAST ONE** of the following condition is fulfilled:

若满足以下任一条件，则满足某一边（左/右）的与方向有关的不可用条件

1. No relevant **lane marking** is available on the certain side (left/right).
   某一边（左/右）不存在可用的车道线
2. The LDW function shall be un-available for a **certain side** (left or right), if the ego-vehicle turn indicator is activated into the direction of the certain side.
   在某一边（左/右）自车的转向指示灯被激活，功能不可用
3. If two lane markings are available, which describe the ego-vehicle lane, the ego-vehicle lane width shall be smaller **cLDW_LaneWidthMinTrigger_met - cLDW_LaneWidthHystTrigger_met OR** above **cLDW_LaneWidthMaxTrigger_met + cLDW_LaneWidthHystTrigger_met.**

若存在两条表明自车车道的车道线，车道的宽度小于 **cLDW_LaneWidthMinTrigger_met - cLDW_LaneWidthHystTrigger_met** 或大于 above **cLDW_LaneWidthMaxTrigger_met + cLDW_LaneWidthHystTrigger_met**

If only one lane marking is available for a certain side (left/right), the condition shall be not fulfilled for the side, on which no lane marking is available.
若仅有存在一侧车道线，则在没有车道线的方向该条件不满足

4. The **lane marking** on the certain side (left/right) is unsteady and shows unsteady characteristics.
   在某一边（左/右）车道线不稳定且表现出不稳定特性
5. The LDW function shall be un-available for a certain side (left or right), if the ego-vehicle lateral approaching velocity with regard to a certain lane marking (left or right) is above the threshold **cLDW_VelLatThresMax_mps + cLDW_VelLatThresHyst_mps.**

   LDW 功能在某方向不可用，若自车在该方向的横向速度大于 **cLDW_VelLatThresMax_mps** + **cLDW_VelLatThresHyst_mps**

1.2.5 Function Control-Start Condition 功能控制开启条件

Function Control-Start means that the function initiates a lateral intervention. In the case of the LDW function, an intervention means not a lateral control, but a warning request.
功能控制开启表明功能开始横向介入。对于 LDW 功能，介入不是指横向控制，而是警告请求。

NOTE: Function Control-Start requires that the Function Activation Condition and Function Availability Condition are fulfilled.
注意：功能控制开启需要功能激活条件和功能可用条件满足

- If the Function Activation Condition is not fulfilled, the function can only be in function De-Activation state.
  若功能激活条件为满足，则功能只能处于功能未激活状态
- If the Function Activation Condition is fulfilled, but the Function Availability Condition is not fulfilled, the function can only be in function Un-Availability state.
  若功能激活条件满足，但功能可用条件未满足，则功能只能处于功能不可用状态

The LDW function Control-Start Condition shall be fulfilled and the function shall only be allowed to start warning request respecting a certain side (left/right), if ALL of the following conditions are fulfilled:

若满足以下所有条件，则满足某一边的报警请求开启条件：

1. The function **Side-Independent Availability Condition** is fulfilled
   满足与方向无关的可用条件

2. The function **Side-Dependent Availability Condition** is fulfilled for a certain side (left/right), for which the control is started.
   满足某一边的与方向有关的可用条件
3. The conditions of at least one **relevant use-case** are fulfilled for a certain side (left/right). Relevant use-cases are: **Departure Warning - Lane Departure**
   满足某一边的相关用例的条件。相关用例是：偏离预警-车道偏离。
4. The **blocking time** of **cLDW_WarningRequestBlockingTime_sec** has been passed since the last LDW control has been stopped.
   与上一 LDW 控制的间隔时间大于 cLDW_WarningRequestBlockingTime_sec

1.2.6 Function Control-Finish Condition 功能控制结束条件

Function Control-Finish means that the function stops an ongoing lateral intervention regulary. The Function Control-Finish Condition is a good-case condition and defines the expected function performance.
功能控制结束表明功能正常地停止了正在进行的横向控制。控制结束条件为预期的功能表现。

The LDW function Control-Finish Condition shall be fulfilled and the function shall only be allowed to finish warning request respecting a certain side (left/right), if ALL of the following conditions are fulfilled:
若满足以下所有条件，则功能能够结束某一方向的报警请求：
- The function **Side-Independent Availability Condition** is fulfilled.
  功能与方向无关的可用条件满足
- The function **Side-Dependent Availability Condition** is fulfilled for the certain side, for which the control was started (left/right).
  功能与某一方向相关的可用条件满足
- The warning request time is smaller or equal the maximum control time, which is defined for the use-case, for which the warning request was started.
  报警请求时间未超过最大控制时间限值

NOTE: The warning request time is the passed time duration, since the warning request was started.

注意：报警请求时间从报警请求开始时计时

1.2.7 Function Control-Cancel Condition 功能控制取消条件

Function Control-Cancel means that the function cancels an ongoing lateral intervention. The Function Control-Cancel conditions are semi-good-case conditions and are relevant for the cases, for which the function shall stop the lateral intervention, because of a non-regular event.
功能控制取消表明功能取消正在进行的横向报警，该条件针对于非常规情况。

The LDW function **Control-Cancel Condition** shall only be fulfilled and the function shall only be allowed to cancel warning request respecting a certain side (left/right), if **AT LEAST ONE** of the following conditions is fulfilled:
若满足以下任一条件，则满足报警请求取消条件

1. The function **De-Activation Condition** is fulfilled.
   满足功能未激活条件
2. The function **Side-Independent Un-Availability Condition** is fulfilled.
   满足与方向无关的不可用条件
3. The function **Side-Dependent Un-Availability Condition** is fulfilled for the certain side, for **which the lateral control was initiated**.
   满足某一边的与方向有关的不可用条件
4. The warning request time is bigger as the maximum control time, which is defined for the use-case, for which the warning request was started..
   驾报警请求时间大于最大值。
5. The ego-vehicle **overrides** the **hazardous lane marking** with the outside of the ego-vehicle front wheel by more than **cLDW_InterventionCancelDistHazardousSide_m** meter.
   自车前轮越过危险车道线 **cLDW_InterventionCancelDistHazardousSide_m** 米

NOTE: The hazardous lane marking is the lane marking, which was approached by the ego-vehicle, when starting the lateral control.

注意：危险车道线为功能控制开启时，自车接近的车道线

1.2.8 Function Error Condition 功能错误条件

Function Error means that the function detected an error and any function control needs to be prohibited.

功能错误条件表明功能检测到错误，且禁止任何功能控制。

The LDW **Function Error Condition** shall only be fulfilled and the function shall show an error, if **AT LEAST ONE** of the following conditions is fulfilled:

若满足以下任一条件，则满足功能错误条件

1. The **error handling** of the LDW function detected an error, which requires the LDW function to immediately switch off the function.
   LDW 的错误处理检测到错误，需要立即关闭该功能
   NOTE: Relevant errors are
   注意：相关的错误是
   1. Mandatory input signal quality failure
      必须的输入信号质量故障
   2. Mandatory input signal communication failure.
      必须的输入信号通信故障

1.3 Function States 功能状态

The LDW function realizes the following states:

LDW 功能实现以下状态：

1. De-Activated State
   未激活状态
2. (Activated and) Un-Available State
   （激活）不可用状态
3. (Activated and) Available Both Sides State
   （激活）双边可用状态
4. (Activated and) Available One Side State
   （激活）单边可用状态
5. (Activated, Available and) Controlling State
   （激活，可用）控制状态
6. Stopping Control State
   停止控制状态
7. (Activated and) Error State
   （激活）错误状态

1.3.1 Function De-Activated State 未激活状态

1.3.1.1 Conditions 条件

The LDW function shall be in the **Function De-Activated State**, if the **Function De-Activation Condition** is fulfilled.

若满足功能未激活条件，则 LDW 处于未激活状态

1.3.1.2 Function Behavior 功能行为

If the LDW function is in the **Function De-Activated State**, it shall realize the following behavior:

若功能处于未激活状态，则需要实现以下行为

1. The LDW function shall show on ego-vehicle **HMI** level that it is **de-activated**.
   LDW 功能需在 HMI 上显示未开启
2. The LDW function shall NOT request any warning request.
   LDW 功能不应发送报警请求

1.3.2 Function Un-Available State 不可用状态

1.3.2.1 Conditions 条件

The LDW function shall be in the **Function Un-Available State**, **IF** the **Side-Independent Un-Availability Condition** is fulfilled **AND IF** the **Side-Dependent Availability Condition** is NOT fulfilled for both sides (left and right).

若满足功能与道路边界无关的不可用条件，且不满足两边的与道路边界有关的可用条件，则 LDW 处于不可用状态

1.3.2.2 Function Behavior 功能行为

If the LDW function is in the **Function Un-Available State**, it shall realize the following behavior:

若功能处于不可用状态，则需要实现以下行为

1. The LDW function shall show on ego-vehicle **HMI** level that it is **activated**, but **not available** for lateral control support.LDW
   功能需在 HMI 上显示开启，但横向报警不可用
2. The LDW function shall NOT request any warning request
   LDW 功能不应发送报警请求

1.3.3 Function Available Both Sides State 双边可用状态

1.3.3.1 Conditions 条件

The LDW function shall be in the **Function Available Both Sides State, IF** the **Side-Independent Availability Condition** is fulfilled **AND IF** the **Side-Dependent Availability Condition** is fulfilled for both sides (left and right).

若满足功能与车道边界无关的可用条件，且满足两边的与车道边界有关的可用条件，则 LDW 处于双边可用状态

1.3.3.2 Function Behavior 功能行为

If the LDW function is in the **Function Available Both Sides State**, it shall realize the following behavior:

若功能处于双边可用状态，则需要实现以下行为：

1. The LDW function shall show on ego-vehicle **HMI** level that it is **activated** and **available** for warning request support **on both sides** (left and right).
   LDW 功能需在 HMI 上显示开启和双边的报警请求可用
2. The LDW function shall **NOT** request any warning request, as long as the ego-vehicle is **NOT** under a function **use-case condition** for starting a warning request.
   当自车不符合用例条件，LDW 功能不应发送任何报警请求
3. The LDW function shall **initiate warning request** for a certain side (left or right) into counter-direction of road departure, as soon as the **Function Control-Start Condition** is fulfilled.
   一旦功能控制开启条件满足，LDW 功能需发送报警请求

1.3.4 Function Available One Side State 单边可用状态

1.3.4.1 Conditions 条件

The LDW function shall be in the **Function Available One Side State**, **IF** the **Side-Independent Availability Condition** is fulfilled **AND IF** the **Side-Dependent Availability Condition** is fulfilled **only** for **one** side (left XOR right).

若满足与道路边界无关的可用条件，且仅满足某一边的与道路边界有关的可用条件，则 LDW 处于单边可用状态

1.3.4.2 Function Behavior 功能行为

If the LDW function is in the **Function Available One Side State**, it shall realize the following behavior:
若功能处于单边可用状态，则需要实现以下行为：

1. The LDW function shall show on ego-vehicle **HMI** level that it is **activated** and **available** for warning request support only for the **certain side** (left XOR right), for which the **Side-Dependent Availability Condition** is fulfilled.
   LDW 功能需在 HMI 上显示开启和满足和道路边界有关的可用条件的那一边的报警请求可用
2. The LDW function shall **NOT** request any warning request, as long as the ego-vehicle is **NOT** under a function **use-case condition** for starting a warning request.
   当自车不符合用例条件，LDW 功能不应发送任何报警请求
3. The LDW function shall initiate a warning request for the certain side (left XOR right), for which it shows availability, as soon as the Function Control-Start Condition is fulfilled for the certain side.
   一旦某一边的功能控制开启条件满足，LDW 功能需发送报警请求。

1.3.5 Function Controlling State 功能控制状态

1.3.5.1 Conditions 条件

The LDW function shall be in the **Function Controlling State**,

IF the **Function Control-Start Condition** was fulfilled for one certain side for at least one point in time

AND IF the **Function Control-Finish Condition** is NOT fulfilled

AND IF the **Function Control-Cancel Condition** is NOT fulfilled.

若满足某一边的功能控制开启条件，

且不满足功能控制结束条件，

且不满足功能控制取消条件，

则 LDW 处于功能控制状态

1.3.5.2 Function Behavior 功能行为

If the LDW function is in the **Function Controlling State**, it shall realize the following behavior:

若功能处于控制状态，则需要实现以下行为：

1. The LDW function shall show on ego-vehicle **HMI** level that it is **activated** and that it is **performing warning request** for the **certain side** (left XOR right), for which the warning request was started.
   LDW 功能需在 HMI 上显示开启和正在进行报警请求

2. The LDW function shall perform a warning request for the certain side, for which the warning request was started in order to warn the ego-vehicle driver about a potential hazardous lane departure.
   LDW 功能需发送报警请求， 用以提示自车驾驶员道路偏离

1.3.6 Function Stopping Control State 功能停止控制状态

1.3.6.1 Conditions 条件

The LDW function shall be in the **Function Stopping Control State**,

IF the function was in **Function Controlling State**

AND (

IF the **Function Control-Finish Condition** was fulfilled

OR IF the **Function Control-Cancel Condition** was fulfilled

)

若功能过去处于功能控制状态，且

（满足功能控制结束条件，

或满足功能控制取消条件），则 LDW 处于功能停止控制状态

1.3.6.2 Function Behavior 功能行为

Finish Condition:
结束条件：
If the LDW function switched into **Stopping Control State**, because of the **Function Control-Finish Condition** was fulfilled, it shall realize the following behavior:
由于功能控制结束条件已满足， LDW 进入停止控制状态，将实现以下行为：
- LDW function shall stop the warning request.
  LDW 应停止报警请求。

Cancel Condition:
取消条件：
If the LDW function switched into **Stopping Control State**, because of the **Function Control-Cancel Condition** was fulfilled, it shall realize the following behavior:
由于功能控制取消条件已满足， LDW 进入停止控制状态，将实现以下行为：
- LDW function shall stop the warning request.
  LDW 应停止报警请求。

1.3.7 Function Error State 功能错误状态

1.3.7.1 Conditions 条件

The LDW function shall be in the **Function Error State**, **IF** the **Function Error Condition** is fulfilled.

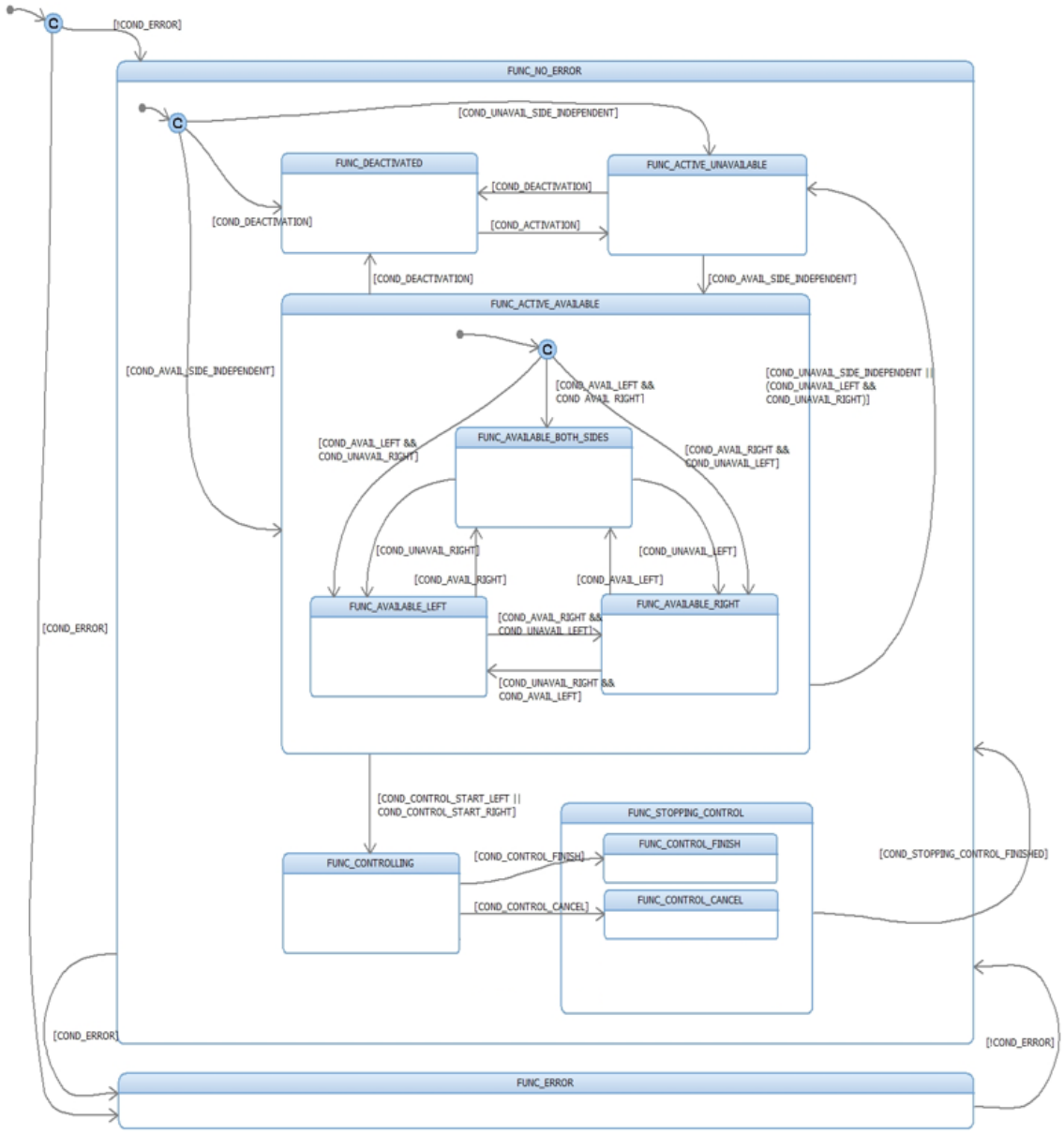
若满足功能错误条件，则 LDW 处于功能错误状态

1.3.7.2 *Function Behavior 功能行为*

If the LDW function is in the **Function Error State**, it shall realize the following behavior:
若功能处于错误状态，则需要实现以下行为：

1. The LDW function shall show on ego-vehicle **HMI** level that it is **not available** because of an **error**.
   HMI 显示由于错误不可用。
2. The LDW function shall NOT request any warning request.
   LDW 功能不应发送任何报警请求。

1.3.8 Function State Chart 功能状态图



Current State	Target State	Conditions	CAN signals Involved(Suggested)
LDW_DEACTIVATED 功能未激活状态	LDW_ACTIVE_UNAVAILABLE 功能不可用状态	COND_ACTIVATION 功能激活条件 COND_UNAVAIL 功能不可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_ERROR 功能错误状态	COND_ERROR 功能错误条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
LDW_ACTIVE_UNAVAILABLE 功能不可用状态	LDW_AVAILABLE_BOTH_SIDES 功能双边可用状态	COND_AVAIL_SIDE_INDEPEDENT 功能与边无关的可用条件 且 COND_AVAIL_LEFT 与左侧边有关的可用条件 且 COND_AVAIL_RIGHT 与右侧边有关的可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_AVAILABLE_LEFT 功能左侧边可用状态	COND_AVAIL_SIDE_INDEPEDENT 功能与边无关的可用条件 且 COND_AVAIL_LEFT 与左侧边有关的可用条件 且 COND_UNAVAIL_RIGHT 与右侧边有关的不可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_AVAILABLE_RIGHT 功能右侧边可用状态	COND_AVAIL_SIDE_INDEPEDENT 功能与边无关的可用条件 且 COND_UNAVAIL_LEFT 与左侧边有关的不可用条件 且 COND_AVAIL_RIGHT 与右侧边有关的可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_ERROR 功能错误状态	COND_ERROR 功能错误条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_DEACTIVATED 功能未激活状态	COND_DEACTIVATION 功能未激活条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
LDW_AVAILABLE_BOTH_SIDES 功能双边可用状态	LDW_AVAILABLE_LEFT 功能左侧边可用状态	COND_UNAVAIL_RIGHT 功能右侧边不可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable

			0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_AVAILABLE_RIGHT 功能右侧边可用状态	COND_UNAVAIL_LEFT 功能左侧边不可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_CONTROLLING 功能控制状态	COND_CTRLSTRT_LEFT 功能左侧边控制开启条件 或 COND_CTRLSTRT_RIGHT 功能右侧边控开启条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_ACTIVE_UNAVAILABLE 功能不可用状态	COND_UNAVAIL_SIDE_INDEPENDENT 功能与边无关的不可用条件 或 (COND_UNAVAIL_RIGHT 与左侧边有关的不可用条件 且 COND_UNAVAIL_LEFT 与右侧边有关的不可用条件)	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_ERROR 功能错误状态	COND_ERROR 功能错误条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_DEACTIVATED 功能未激活状态	COND_DEACTIVATION 功能未激活条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
LDW_AVAILABLE_LEFT 功能左侧边可用状态	LDW_AVAILABLE_BOTH_SIDES 功能双边可用状态	COND_AVAIL_RIGHT 功能右侧边可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_AVAILABLE_RIGHT 功能右侧边可用状态	COND_UNAVAIL_LEFT 功能左侧边不可用条件 且 COND_AVAIL_RIGHT 功能右侧边可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_CONTROLLING 功能控制状态	COND_CTRLSTRT_LEFT 功能左侧边控制开启条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved

	LDW_ACTIVE_UNAVAILABLE 功能不可用状态	COND_UNAVAIL_SIDE_INDEPENDENT 功能与边无关的不可用条件 或 (COND_UNAVAIL_RIGHT 与左侧边有关的不可用条件 且 COND_UNAVAIL_LEFT 与右侧边有关的不可用条件)	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_ERROR 功能错误状态	COND_ERROR 功能错误条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_DEACTIVATED 功能未激活状态	COND_DEACTIVATION 功能未激活条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
LDW_AVAILABLE_RIGHT 功能右侧边可用状态	LDW_AVAILABLE_BOTH_SIDES 功能双边可用状态	COND_AVAIL_LEFT 功能左侧边可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_AVAILABLE_LEFT 功能左侧边可用状态	COND_UNAVAIL_RIGHT 功能右侧边不可用条件 且 COND_AVAIL_LEFT 且功能左侧边可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_CONTROLLING 功能控制状态	COND_CTRLSTRT_RIGHT 功能右侧边控开启条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_ACTIVE_UNAVAILABLE 功能不可用状态	COND_UNAVAIL_SIDE_INDEPENDENT 功能与边无关的不可用条件 或 (COND_UNAVAIL_RIGHT 与左侧边有关的不可用条件 且 COND_UNAVAIL_LEFT 与右侧边有关的不可用条件)	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_ERROR 功能错误状态	COND_ERROR 功能错误条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_DEACTIVATED 功能未激活状态	COND_DEACTIVATION 功能未激活条件	LDWSysSts: 0x0=Off 0x1=Available

			0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
LDW_CONTROLLING 功能控制状态	LDW_CONTROL_FINISH 功能控制结束状态	COND_CTRLFNSH 功能控制结束条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_CONTROL_CANCEL 功能控制取消状态	COND_CTRLCNCL 功能控制取消条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_ERROR 功能错误状态	COND_ERROR 功能错误条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
LDW_CONTROL_FINISH 功能控制结束状态	LDW_ACTIVE_AVAILABLE 功能可用状态	COND_AVAIL 功能可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
LDW_CONTROL_CANCEL 功能控制取消状态	LDW_ACTIVE_AVAILABLE 功能可用状态	COND_AVAIL 功能可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
	LDW_ACTIVE_UNAVAILABLE 功能不可用状态	COND_UNAVAIL 功能不可用条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved
LDW_ERROR 功能错误状态	LDW_NO_ERROR 功能无错误状态	! COND_ERROR 功能错误条件	LDWSysSts: 0x0=Off 0x1=Available 0x2=Unavailable 0x3=Control 0x4=Rampout 0x5=Error 0x6~0x7=reserved

1.4 Function Use-Cases 功能用例

1.4.1 Departure Warning - Lane Departure 偏离预警-车道偏离

The LDW function **Departure Warning - Lane Departure** use-case is the function use-case, which motivated the LDW function development.

LDW 的偏离预警-车道偏离。

1.4.1.1 General Behavior 行为

The LDW function shall realize the following behavior when addressing the **Departure Warning - Lane Departure** use-case:

当 LDW 功能在处理偏离预警-车道偏离时，需实现以下行为：

1. In case of a lane marking approach of the ego-vehicle, the LDW function perform a lateral warning request.
   The lateral warning request shall start at sufficient distance to an approached lane marking within the Warning Start Zone, in order to allow the driver to prevent the ego-vehicle from departing the lane.
   当自车接近道路边界，LDW 功能需开始发送报警请求
   为了阻止自车偏离道路，报警请求功能须在与所接近的道路边界的一定距离开启
2. In case of a lane marking approach of the ego-vehicle, the LDW function shall initiate the lateral warning request before the ego-vehicle overrides the approached lane marking with the outside of its corresponding front wheel by more than 0.30 m, which is the Latest Warning Line.
   LDW 功能应在车前轮外侧与车道线的距离大于 0.3m（最迟报警线）之前开启报警请求。
3. In case of a lane marking approach of the ego-vehicle, the LDW function shall NOT initiate the lateral warning request before the outside of the ego-vehicle's front wheel passes the Earliest Warning Line distance D.
   LDW 不应在车前轮外侧与车道线距离大于 D（最早报警线）时开启报警请求。
4. In case of an applied lateral warning request is applied, the warning request shall stop, if the ego-vehicle overrides the lane marking, for which the warning was initiated

   当自车越过车道线时，之前已触发的报警请求需停止

5. In case of an applied lateral warning request is applied, the warning request shall stop, the lane departure is prevented either by the ego-vehicle driver or another corrective steering function
   当车道偏离被自车驾驶员或其他纠偏功能制止时，之前已触发的报警请求需停止

1.4.1.2 Scenario 1: Departure Warning on Roads with two Lane Markings
场景 1：双车道线的偏离预警

1.4.1.2.1 Scenario 场景

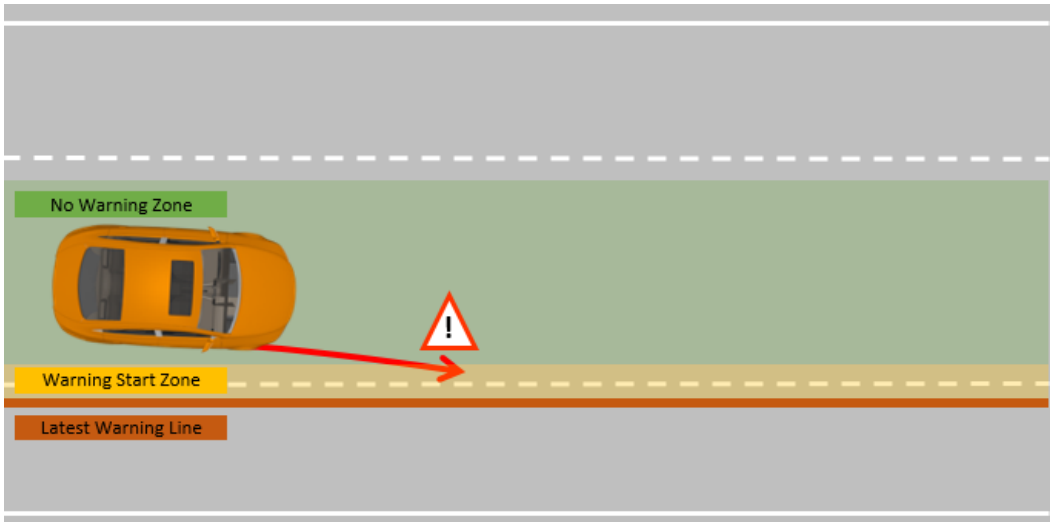
Departure Warning on Roads with two Lane Markings describes the basic scenario for the LDW function, for which the LDW function shall warn the ego-vehicle driver, because of an unintended lane departure may occur. The certain characteristic of this scenario is that the ego-lane is described by two lane markings; one on each side (left/right). The scenario is

devided into characteristic sub-scenarios, which have differences in their lateral control strategies.

该场景为 LDW 功能的基本场景，由于道路偏离行为的发生，LDW 功能对其进行报警以引起驾驶员注意。该场景的双车道分别位于左右两边。针对不同的横向控制策略，该场景又被分为以下几个子场景。

1.4.1.2.2 Sub-Scenario 1.1: Departure Warning on Roads with two Lane Markings - Straight Road Departure

子场景 1.1：双车道线-直路偏离预警

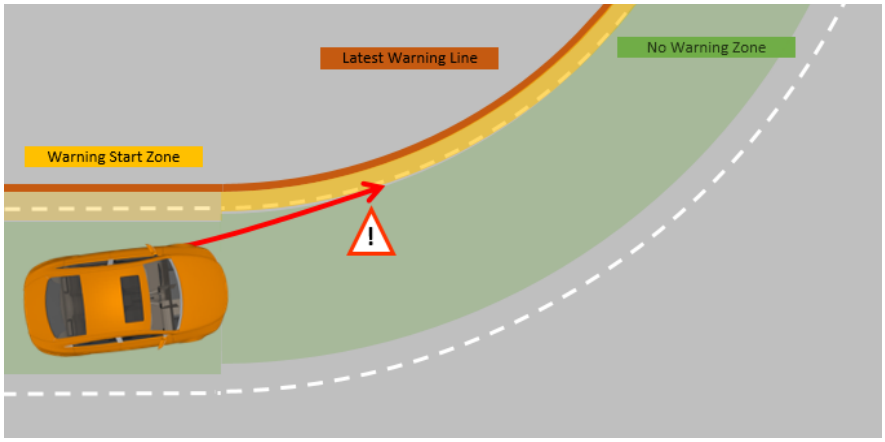


1.4.1.2.2.1 Characteristic Conditions 特征条件

1. The Departure Warning on Roads with two Lane Markings - Straight Road Departure sub-scenario shall be relevant for straight roads only.
   车道为直道

1.4.1.2.3 Sub-Scenario 1.2: Departure Warning on Roads with two Lane Markings - Inner Curve Departure

子场景 1.2：双车道线-内车道线偏离预警

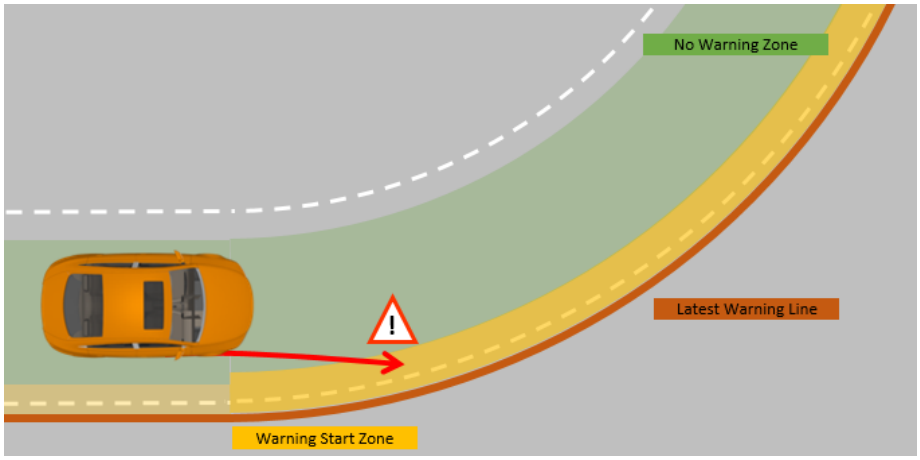


1.4.1.2.3.1 Characteristic Conditions 特征条件

1. The Departure Warning on Roads with two Lane Markings - Inner Curve Departure sub-scenario shall be relevant for roads with a minimum road curve radius (equal to maximum road curvature). It shall not be relevant for roads with smaller curve radius.
   该子场景仅针对于具有不超过最大车道曲率值的车道。
2. The ego-vehicle is approaching a lane marking on the inner marking of the curve.
   自车正在往内弯偏离

1.4.1.2.4 Sub-Scenario 1.3: Departure Warning on Roads with two Lane Markings - Outer Curve Departure

子场景 1.3：双车道线-外车道线偏离预警



1.4.1.2.4.1 Characteristic Conditions 特征条件

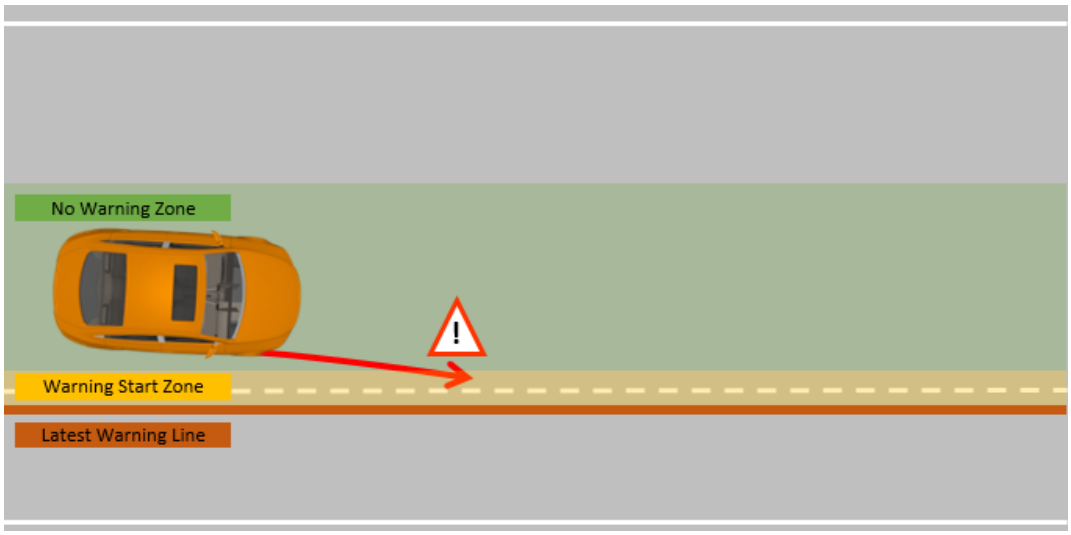
1. The Departure Warning on Roads with two Lane Markings - Outer Curve Departure sub-scenario shall be relevant for roads with a minimum road curve radius (equal to maximum road curvature). It shall not be relevant for roads with smaller curve radius.
   该子场景仅针对于具有不超过最大车道曲率值的车道
2. The ego-vehicle is approaching a lane marking on the outside marking of the curve.
   自车正在往外车道线偏离

1.4.1.3 Scenario 2: Departure Warning on Roads with only one Lane Marking

场景 2：单边车道线有效的偏离预警

1.4.1.3.1 Sub-Scenario2.1: Departure Warning on Roads with only one Lane Marking - Straight Road Departure

子场景 2.1：单边车道线有效的偏离预警-直道偏离预警



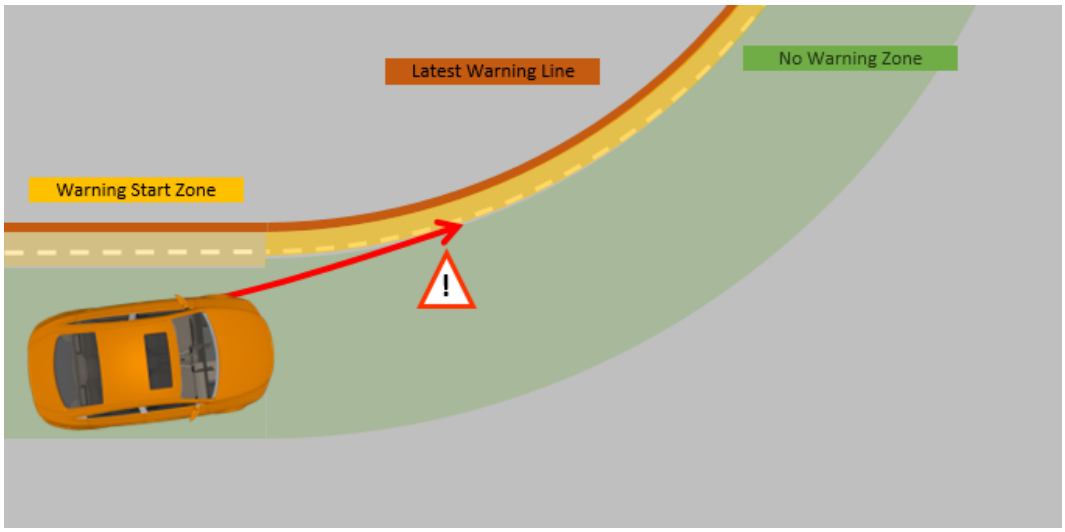
1.4.1.3.1.1 Characteristic Conditions 特征条件

- The Departure Warning on Roads with only one Lane Marking - Straight Road Departure sub-scenario shall be relevant for straight roads only.

车道为直道。

1.4.1.3.2 Sub-Scenario 2.2: Departure Warning on Roads with only one Lane Marking – Inner Curve Departure

子场景 2.2：单边车道线有效的偏离预警-内车道线偏离预警



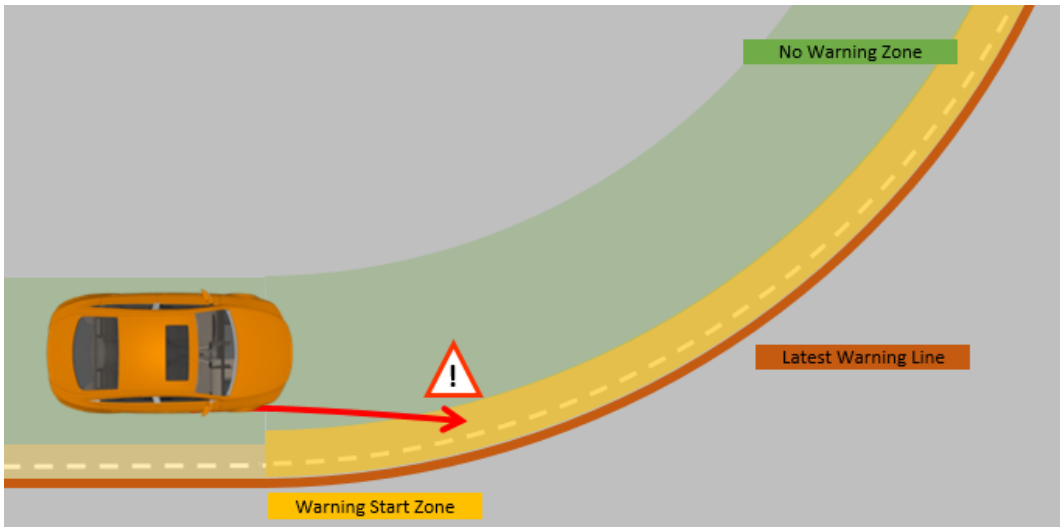
1.4.1.3.2.1 Characteristic Conditions 特征条件

- The Departure Warning on Roads with only one Lane Marking - Inner Curve Departure sub-scenario shall be relevant for roads with a minimum road curve radius (equal to maximum road curvature). It shall not be relevant for roads with smaller curve radius.

该子场景仅针对于具有不超过最大车道曲率值的车道。

- The ego-vehicle is approaching a lane marking on the inner marking of the curve.
自车正在往内弯道偏离

1.4.1.3.3 Sub-Scenario 2.3: Departure Warning on Roads with only one Lane Marking – Outer Curve Departure
子场景 2.3：单边车道线有效的偏离预警-内车道线偏离预警



1.4.1.3.3.1 Characteristic Conditions 特征条件
- The Departure Warning on Roads with only one Lane Marking - Inner Curve Departure sub-scenario shall be relevant for roads with a minimum road curve radius (equal to maximum road curvature). It shall not be relevant for roads with smaller curve radius.

该子场景仅针对于具有不超过最大车道曲率值的车道

- The ego-vehicle is approaching a lane marking on the outside marking of the curve.

自车正在往外弯道偏离

1.5 Handling of System Limits 系统极限处理

1.5.1 Supported Road Types and conditions
支持的道路类型和条件

1.5.1.1 Road Class Definition
道路分类定义

Road Class 1: Dedicated vehicle roads (highways, freeways, high-speed roads) having a non-traversable separation (e.g. guardrail, concrete barrier) to oncoming traffic.

Road Class 1：有隔离带的专用道路（公路，高速公路）

Road Class 2: Main vehicle roads with center lane marking and side lane markings (national roads, country roads).

Road Class 2：有中心线和侧方车道线的主要道路（国道，乡村道路）

Road Class 3: Other paved vehicle roads with visible lane markings but limited width (service roads, urban roads). Center lane marking not mandatory.

Road Class 3：其他有可见车道线，但宽度受限的道路。中心线可以没有。

Road Class 4: Other paved vehicle roads with limited lane marking quality (e.g. washed out or covered markings).

Road Class 4：其他车道线质量有限的道路

Road Class 5: Other paved vehicle roads without lane markings.

Road Class 5：其他没有车道线的道路

1.5.1.2 Bad Road Conditions
不良道路条件

The below road conditions define bad road conditions for which the LDW function is not expected to provide a lateral request support within its required KPI performance:
在以下道路条件下，不期望 LDW 功能提供横向请求支持：

1. Friction rate <= 0.3 (low μ, e.g. black ice, snow, aquaplaning, ...)
   摩擦系数<=0.3（雪，冰，水）
2. Bumpy roads with potholes
   坑洼不平的道路
3. Roads with any bad conditions that affect the ego-vehicle driving behavior in a way that the driver has to correct the vehicle's course
   道路不良条件会影响自车驾驶行为，需驾驶员纠正车辆行驶线路

The function shall offer support for all highway scenarios, national roads and country roads, which provide at least a minimal road width and are relevant for the velocity range of the ego-vehicle regarding the activation of the LDW function. This excludes:
对于所有具有最小道路宽度和符合 LDW 激活速度范围的公路，国道和乡村道路，功能需提供支持。这不包括：

1. Urban roads
   城市道路
2. Secondary roads, Service roads
   二级公路，服务道路
3. Dirt roads
   泥路
4. Parking lots, Parking garages, Driveways
   停车场，车库，私人车道
5. Entry/Exit Ramps
   出入口

The function shall offer support for the following Road Classes (see *Road Class Definition*):
功能需在以下的道路分类提供支持：

1. Road Class 1
2. Road Class 2
3. Road Class 3

For the following Road Classes, the function may activate but is not supposed to reach the required KPIs:
对于以下道路类别，功能可被激活，但不能够提供有效控制：

Road Class 4

The function shall not offer support for the following Road Classes (see Road Class Definition):
功能不支持以下道路类别

Road Class 5

1.5.2 Supported Lane Marking Types 支持的车道标识线种类

In case the lane markings are present in the scenario the LDW function shall offer support for all lane marking types, which show a continuous course behavior. This excludes special lane markings, which are not supposed to define a road course (e.g. like zik-zak lines, which show forbidden driving areas).

在出现车道线的情况下，LDW 功能需对所有连续车道线提供支持。这不包括特殊的车道标识线（如锯齿形的标识线）

Supported lane marking type set includes:

支持的车道标识线包括：

1. Single line straight/dotted
   单实/虚线
2. Double line straight/dotted
   双实/虚线
3. Triple line straight/dotted
   三实/虚线
4. Combinations of before mentioned lane markings
   以上标识线的组合

1.5.3 Supported Lane Marking Colors 支持的车道标识线颜色

In case the lane markings are present in the scenario the LDW function shall offer support for all lane marking colors, which are commonly used.

在出现车道线的情况下，LDW 功能需对所有常见的车道线颜色提供支持。

Supported lane marking colors basically includes:

支持的车道标识线颜色包括：

1. White lines
   白线
2. Yellow/orange lines
   黄/橙线

3. Red lines
   红线
4. Blue lines
   蓝线

1.5.4 Supported Curve radius 支持的弯道半径

The LDW function shall work properly for road curvatures in the interval of [(-1) * TCurvatureThreshold, TCurvatureThreshold] 1/m. The TCurvatureThreshold value shall depend on the ego-vehicle velocity (defined by the lookup mapping **cLDW_LaneMarkingCurvThTrigger_1pm**).
LDW 功能应在满足曲率阈值的弯道上工作。该阈值取决于自车的速度。

1.5.5 Supported Environmental conditions 支持的环境条件

Environment conditions like rain, sunlight do affect the LDW function performance directly, since they affect the detection of the road edges and lane markings. Nevertheless, for little environment limitations the LDW function shall provide reliable performance.

类似雨和阳光照射的环境条件的确会影响 LDW 功能的性能，由于它们会影响道路边界和车道线的检测。但是在较小的环境限制下，LDW 功能应提供可靠的表现。

The LDW function is allowed to show limited performance, if one of the following environment restrictions or a combination of them applies

若以下任意环境限制或它们的组合发生，则允许 LDW 功能出现有限的性能：

1. Fog with visual range less than 50 meters
   可见度小于 50 米的雾
2. Heavy rain/mist at day
   白天的大雨/薄雾
3. Normal rain/mist at night
   夜晚的雨/薄雾
4. Glare from sunlight (deep sun on sunrise or sunset)
   太阳强光（日出或日落）
5. Snow/ice on the road.
   路上的雪/冰
6. Snowfall at day and night.
   白天和夜晚的降雪
7. Light reflection from wet or salty road surface
   来自潮湿或含盐的道路表面的光照反射

2 Parameters 参数

Function's parameters used in the function have influence on the behavior of the function. These parameters are used to optimize the function's performance depending on the country, the used vehicle's model and some customer specific requirements.

功能使用的参数对功能的性能有影响。根据国家、所使用的车辆模型和客户具体的要求，这些参数用来优化功能的性能。

2.1 Function parameters

Function parameters are placeholders for constants, which are used to describe the functional behavior.

功能参数为常数，用以描述功能行为。

Sl. No.	Parameter	Description	Value and Unit
1	cLDW_VehicleSpeedMin_mps	Minimum allowed value of the displayed longitudinal velocity for the LDW 最小速度	50 km/h
2	cLDW_VehicleSpeedMax_mps	Maximum allowed value of the displayed longitudinal velocity for the LDW 最大速度	145 km/h
3	cLDW_VehicleSpeedMinHyst_mps	Hysteresis below the minimal threshold of the ego-vehicle's velocity 最小速度滞后	5 km/h
4	cLDW_VehicleSpeedMaxHyst_mps	Hysteresis above the maximal threshold of the ego-vehicle's velocity 最大速度滞后	5 km/h
5	cLDW_LaneWidthMinTrigger_met	Minimum allowed value of the lane width for the LDW 最小车道宽度	2.5 m
6	cLDW_LaneWidthMaxTrigger_met	Maximum allowed value of the lane width for the LDW 最大车道宽度	5.5 m
7	cLDW_LaneWidthHystTrigger_met	Hysteresis about the lane width. 车道宽度滞后	0.1 m
8	cLDW_VehLongAccelerationThEnabledActive_mpss	Tolerated max. longitudinal acceleration to allow LDW to start a lateral intervention. 最大纵向加速度	2.95 m/s^2
9	cLDW_VehLongDeccelerationThEnabledActive_mpss	Tolerated max. longitudinal deceleration to allow LDW to start a lateral intervention. 最大纵向减速度	-2.95m/s^2
10	cLDW_VehLatAccelerationThTrigger_mpss	Maximum allowed value of the lateral acceleration for the LDW. 最大横向加速度	2.45 m/s^2
11	cLDW_VelLatThresMax_mps	Maximum allowed value of the lateral velocity for the LDW. 最大横向速度	1 m/s
12	cLDW_WarningRequestBlockingTime_sec	Duration of the blocking time between two LDW warning request. 功能报警请求间隔时间	2 s
13	cLDW_InterventionCancelDistHazardousSide_m	The distance to hazardous side about function cancel. 功能取消时距离危险边距离	0.987 m
14	cLDW_LaneMarkingCurvThTrigger_1pm	The threshold curvature for lane marking. 车道线的曲率阈值	LUT