

INSTRUCTIONS:
Fill out the hazard analysis and risk assessment below.
HA-001 should be for the lane departure warning function as discussed in
HA-002 should be for the lane keeping assistance function as discussed in
Then come up with your own situations and hazards for the lane assistance function
When finished, export your spreadsheet as a pdf file so that a reviewer can

Hazard ID			
	Operational Mode	Operational Scenario	Environmental Details
HA-001	OM03 - Normal Driving	OS03 - Highway	EN06 - Rain (slippery road)
HA-002	OM03 - Normal Driving	OS02 - Country Road	EN01 - Normal conditions
HA-003	OM03 - Normal Driving	OS01 - City Road	EN01 - Normal conditions
HA-004	OM03 - Normal Driving	OS06 - Off Road	EN01 - Normal conditions

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 ice system. Fill in the HA-003 and HA-004 rows.
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Situational Analysis		
Situation Details	Other Details (optional)	Item Usage (function)
SD02 - High speed		IU01 - Correctly used
SD02 - High speed		IU02 - Incorrectly used
SD03 - Low speed		IU01 - Correctly used
SD03 - Low speed	Obstacle on the road	IU01 - Correctly used

Situation Description	Function	Deviation
Normal Driving on Highway during Rain (slippery road) with High speed and correctly used system.	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	DV04 - Actor effect is too much
Normal driving on country roads during normal conditions with high speed (the driver is misusing the lane keeping assistance function as a fully autonomous function)	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV03 - Function always activated
Normal Driving on City Road during Normal conditions with Low speed	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV02 - Function unexpectedly activated
Normal Driving on Off Road during Normal conditions with Low speed (Obstacle on the road)	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV02 - Function unexpectedly activated

Hazard Identification		
Deviation Details	Hazardous Event (resulting effect)	Event Details
The LDW function applies an oscillating torque with very high torque (above limit)	EV00 - Collision with other vehicle	High haptic feedback can affect driver's ability to steer as intended. The driver could lose control of the vehicle and collide with another vehicle or with road infrastructure
The LKA function is always activated.	EV00 - Collision with other vehicle	The LKA function without limit for for the time its turned on, got the driver to believe the function as if it were meant for fully autonomous driving.
The LKA function is unexpectedly activated even when the driver turn on the blinkers.	EV05 - Front collision with ahead traffic	Vehicle crashes into the vehicle with injury to driver
The LKA function is unexpectedly activated even when the driver try to avoid obstacle)	EV05 - Front collision with obstacle	Vehicle crashes into the obstacle or road infrastructure with injury to driver and any others present

Hazardous Event Description	Exposure (of situation)	Rationale (for exposure)
The LDW function applies too high an oscillating torque to the steering wheel (above limit)	E3 - Medium probability	When the driver got too high an oscillating torque, the driver will be likely to lose control of the vehicle.
The driver treats the LKA function as if it were meant for fully autonomous driving.	E2 - Low probability	At this point, full autonomous driving is not common. So it is less likely that the driver thinks the LKA function as if fully autonomous driving.
The driver fails to lane change as expected and crashes with ahead vehicle.	E2 - Low probability	Majority of drivers will be likely to avoid the accident by braking.
The driver tries to avoid obstacles but failed and crashes.	E2 - Low probability	Majority of drivers will be likely to avoid the accident by braking.

Hazardous Event Classification		
Severity (of potential harm)	Rationale (for severity)	Controllability (of hazardous event)
S3 - Life-threatening or fatal injuries	On highway speed of vehicle is expected to be high	C3 - Difficult to control or uncontrollable
S3 - Life-threatening or fatal injuries	On highway speed of vehicle is expected to be high	C3 - Difficult to control or uncontrollable
S2 - Severe and life-threatening injuries	In city traffiic, speed of vehicle is expected to be low, but car accident may cause severe injuires	C2 - Normally controllable
S1 - Light and moderate injuries	In offload, speed of vehicle is expected to be very low	C2 - Normally controllable

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Rationale (for controllability)	ASIL Determination
When driving on highway, the level of control of vehicle is required higher level than low speed condition.	C
When driving on highway, the level of control of vehicle is required higher level than low speed condition.	B
At city speed, most drivers will be able to control the situation by applying brakes	QM
At Off road speed, most drivers will be able to control the situation by applying brakes	QM

ation of ASIL and Safety Goals

Safety Goal

<p>The oscillating steering torque from the lane departure warning function shall be limited.</p>

<p>The LKA function shall be limited and additional steering torque shall end after a given time interval so that the driver cannot misuse the system for autonomous driving.</p>

<p>The LKA function shall not be activated when the driver turn on the blinkers</p>

<p>The LKA function shall not be activated when the vehicle on the off road (without lane)</p>
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