

INSTRUCTIONS:
Fill out the hazard analysis and risk assessment below.
HA-001 should be for the lane departure warning function as discussed in the lecture.
HA-002 should be for the lane keeping assistance function as discussed in the lecture.
Then come up with your own situations and hazards for the lane assistance system. Fill in the HA-003 and HA-004 rows.
When finished, export your spreadsheet as a pdf file so that a reviewer can easily see your work.

Hazard ID	Situational Analysis							Hazard Identification					Hazardous Event Classification								Determination of ASIL and Safety Goals	
	Operational Mode	Operational Scenario	Environmental Details	Situation Details	Other Details (optional)	Item Usage (function)	Situation Description	Function	Deviation	Deviation Details	Hazardous Event (resulting effect)	Event Details	Hazardous Event Description	Exposure (of situation)	Rationale (for exposure)	Severity (of potential harm)	Rationale (for severity)	Controllability (of hazardous event)	Rationale (for controllability)	ASIL Determination	Safety Goal	
HA-001	Normal Driving	Highway	Rain(Slippery road)	High Speed		Correct	Normal driving on a Highway road during rainy and road is slippery at high speed and using the system correctly	Lane Departure Warning (LDW) function shall apply an oscillating torque to provide the driver with haptic feedback	Actor effects is too much	The LDW function applies an oscillating torque with very high torque (above limit).	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 LDW function applies too high an oscillating torque to the steering wheel (above limit).	E3 - Medium probability	Driving on highway while raining raining may happen between 1% to 10% of average operating time	S3 - Life threatening or fatal injuries	Severe and life-threatening injuries(survival probable)	C3 - Difficult to Control or uncontrollable	Difficult to hold on to the steering wheel to avoid accidents since road is slippery and in high speed	ASIL C	The oscillating steering torque from lane departure function shall be limited	
HA-002	Normal Driving	Country road	Normal Conditions	High Speed		Incorrect	Normal driving on a country road during normal conditions at high speed and using the system incorrectly	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	Function always activated	Lane keeping assistance always activated	Collision with other vehicle	Driver takes both hands off of the steering wheel and treats the vehicle as if it were autonomous however, the lane keeping assistance function was not designed to drive the vehicle with full autonomy.	The driver is misusing the lane keeping assistance function as a fully autonomous function	E2 - Low probability	During on country road and misusing the system may happen less than 1% of average operating time	S3 - Life threatening or fatal injuries	Severe and life-threatening injuries(survival probable)	C3 - Difficult to Control or uncontrollable	Because hands aren't on the wheel at high speeds, a vehicle accident would not be controllable	ASIL B	The lane keeping assistance function shall be time limited and the additional steering torque shall end after given time interval	
HA-003	Normal Driving	Highway	Normal Conditions	High Speed		Correct	Normal driving on a Highway road during normal at high speed and using the system correctly	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	Function not activated	The LDW is not activated because camera sensor is stopped working	Collision with other vehicle	Driver thinks system provides warning if vehicle is not close to the center of the lane and doesn't takes any action to steering back to the center of the lane	System failed provide lane departure warning to the driver and doesn't informed its failure state status	E2 - Low probability	Failure of the system may happen less than 1% of average operating time	S3 - Life threatening or fatal injuries	Severe and life-threatening injuries(survival probable)	C3 - Difficult to Control or uncontrollable	May be too late to react at high speed, a vehicle accident would not be controllable	ASIL B	Display LDW system failure status to the driver if cameras sensor stopped working	
	Normal Driving	Highway	Normal Conditions	High Speed		Correct	Normal driving on a Highway road during normal at high speed and using the system correctly	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	Actor action too late	Lane keeping assistance activated with delay	Collision with other vehicle	Driver already may reacted to Lane Departure warning to bring the vehicle to center of the Lane and Lane Keeping Assistance (LKA) function shall apply the steering torque after some delay	Unnecessary to apply the steering torque since vehicle is already in the center of the lane	E2 - Low probability	Delay in the system may happen less than 1% of average operating time may during high load of the system	S3 - Life threatening or fatal injuries	Severe and life-threatening injuries(survival probable)	C2 - Normally controllable	Normally controllable since driver is still hold on to the steering wheel	ASIL A	The lane keeping assistance function shall be activated within defined timeout. And function shall not be activated after timeout	