

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				
	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)
HA-001	OM03 - Normal driving	OS04 - Highway	EN06 - Rain (slippery road)	SD02 - High speed		IU01 - Correctly used	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	The LDW function applies an oscillating torque with very high torque (above limit)	EV00 - Collision with other vehicle	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 during rain is quite often	S3 - Life-threatening or fatal injuries	Collison with other vehicle at high speed is life-threatening
HA-002	OM03 - Normal driving	OS03 - Country road	EN01 - Normal conditions	SD02 - High speed		IU02 - Incorrectly used	Normal driving on a country road during normal conditions with high speed and incorrectly used system	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV03 - Function is always activated	Lane Keeping function is always activated	EV00 - Collition with other vehicle	Driver use the function as if the car was a self-driving car and lose driving attention	The driver do not use the lane keeping function properly	E2 - Low probability	The combination of on a country road and misusing the system does not happen often	S3 - Life-threatening or fatal injuries	Collison with other vehicle at high speed is life-threatening
HA-003	OM03 - Normal driving	OS04 - Highway	EN04 - Snowfall (degraded view)	SD02 - High speed		IU01 - Correctly used	Normal driving on highway during snowfall(degraded view) 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	DV19 - Sensor detection is wrong	The camer sensor incorrectly detect lane departure due to poor view caused by snowfall	EV05 - Front collision with ahead traffic	Oscillating steering torque can distract driver, which causes driver react too slow to vehicles ahead of the ego vehicle	The camera system is not able to handle snowfall with degraded view	E2 - Low probability	The probability of driving during snowfall is smaller than 1%	S3 - Life-threatening or fatal injuries	Collison with front vehicle at high speed is life-threatening
HA-004	OM03 - Normal driving	OS04 - Highway	EN04 - Sun blares (degraded view)	SD02 - High speed		IU01 - Correctly used	Normal driving on highway sun blares(degraded view) with high speed and correctly used system	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV01 - Function not activated	The camer sensor is not able to detect lane departure due to poor view caused by sun blares	EV02 - Side collision with other traffic	Driver reply on lane keeping system to steering if necessary but the function is not activated when it should	The camera system is not able to handle sun blares with degraded view	E3 - Medium probability	Sun blares during driving is quite often	S3 - Life-threatening or fatal injuries	Collison with side vehicle at high speed is life-threatening

tion		Determination of ASIL and Safety Goals	
Controllability (of hazardous event)	Rationale (for controllability)	ASIL Determination	Safety Goal
C3 - Difficult to control or uncontrollable	Strong swing of steering wheel at high speed is difficult to control for normal drivers	ASIL C	The oscillating steering torque from from LDW shall be limited
C3 - Difficult to control or uncontrollable	In the case that drivers taking both hands off the wheel at high speeds, a vehicle accident would not be controllable	ASIL B	The Lane Keeping Assistance function shall be time limited, and additional steering torque shall end after a given time interval so the driver cannot misuse the system for autonomous driving
C2 - Normally controllable	Most of drivers can handle unexpected oscillating steering torque	ASIL A	The camera system should be able to detect snowfalls and deactivat the lane assistance system
C1 - Simply controlable	99 % or more of all drivers or other traffic participants are usually able to avoid accidents	ASIL A	The camera system should be able to detect sun blares and deactivat the lane assistance system