

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	Slippery Road	High Speed		Correctly used	Normal Driving on Highway on wet slippery road at high speed with correctly used system	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	Actor effect is too much	The LDW function applies an oscillating torque with high torque	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).	E4- High probability	Normal driving on highway at high speed and wet road is a often encountered scenario	S3- Life Threatening	Can lead to collision at high speeds and death	C3-Uncontrollable	The high torque may make it uncontrollable	C	The Oscillating steering torque from the lane departure warning function shall be limited.
HA-002	Normal Driving	Country Road	Normal conditions	High speeds		Incorrectly used	Normal driving on Country road in Normal conditions at high speeds with incorrectly used system	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	Function always activated	The LKA function is active even after lane keeping and acts as Autonomous driving feature	collision with other vehicle	The LKA when used as a autonomous driving feature can lead to collision with environment or other vehicles	The LKA function keeps on for too long a time.	E2- Low Probability	The exposure happends seldom	S3- Life Threatening	Can lead to collision at high speeds and death	C3-Uncontrollable	The misuse can lead to life threatening accidents	B	The Lane keeping assistance function shall be time limited and the additional steering torque shall end after a given time interval so that the driver cannot misuse the systems for autonomous driving
HA-003	Normal Driving	Highway	Normal conditions	High Speeds		Correctly used	Normal Driving on Highway on normal conditions at high speed with correctly used system	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	Actor effect is wrong	The LKA function applies a wrong torque due to vibrations caused by driving on lane markings	Car comes off the road	The LKA feature can lead to wrong steering. In worst case could lead to accident with other vehicle	The LKA function doesn't take into account the vibrations due to driving on the lane markings	E4- High probability	Driving on lane markings happen all the time	S2- Severe injuries	Can lead to collision at high speeds and death	C2- Normally controllable	The incorrectness in driving direction when minimal can easily be rectified	B	The LKA function shall take into account the vibrations caused by driving on the lane markings so that the correct heading direction be maintained.
HA-004	Normal Driving	Country Road	Snowfall (degraded v	High Acceleration		Correctly used	Normal Driving on country road in snowfall with high aceleration	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	Actor effect is wrong	The LKA behaves inaccurately due to non visibility of roads		The LKA would lead to wrong steering and incorrect steering	The LKA drives in wrong direction due to non visibility of roads	E3- Medium probability	Driving on snow roads happends often in winters	S2- Severe injuries	Can lead to collision at high speeds and death	C2- Normally controllable	The wrong driving direction can be corrected	A	The LKA function shall not be activated during snow or when the visibility of road is poor.