

## FSRs and applicable safety tactics

Functional architecture component	Functional Safety Requirement & associated ASIL	Functional Safety Goals	Applicable Safety Tactics
Actuation Sensor	A failure in Actuation Sensor shall not cause incorrect sensor information  <b>ASIL D</b>	VG1 VG2 VG10 VG11 VG12 VG13 VG14	Sanity Check Condition Monitoring Comparison Repair Degradation Override Masking
Actuation Sensor	External interference shall not invalidate/corrupt data from actuation sensors  <b>ASIL D</b>	VG1 VG2 VG10 VG11 VG12 VG13 VG14	Sanity Check Comparison Diverse Redundancy Redundancy Voting Masking Override Barrier Heartbeat
Actuator	Corruption of signals to Actuator shall not interfere with the correct working of actuators  <b>ASIL C</b>	PG1 PG2 PG3 PG4 PG5 PG6 PG11	Simplicity Substitution Sanity Check Condition Monitoring Diverse Redundancy Redundancy Repair Voting Masking Override
Actuator	A failure in Actuator shall not cause incorrect propagation of control signals to hardware actuators  <b>ASIL D</b>	VG1 VG2 VG6 VG7 VG8 VG9 VG10 VG11 VG12 VG14	Sanity Check Condition Monitoring Repair Heartbeat
Actuator	Corruption of control signals from Actuator shall not interfere with the correctness of control signals at target hardware components  <b>ASIL D</b>	VG1 VG2 VG6 VG7 VG8 VG9 VG10 VG11 VG12 VG14	Sanity Check Condition Monitoring Barrier

Environment Perception Sensors	Incorrect information going into Environment Perception Sensors shall not cause known perception information to be incorrect as well <b>ASIL D</b>	VG1 VG2 VG6 VG9 VG10 VG11 VG12 VG13 VG14	Sanity Check Comparison Diverse Redundancy Redundancy Voting Masking Override Barrier Heartbeat
Environment perception sensors	Failure of environment perception sensors shall not result in the generation of incorrect information on distance to the surrounding vehicles and objects. <b>ASIL C</b>	PG1 PG2 PG3	Sanity Check Condition Monitoring Comparison Diverse Redundancy Redundancy Repair Degradation Voting Masking Override Barrier
Host Tracking	A failure in Host Tracking shall not cause incorrect self-tracking <b>ASIL D</b>	VG13	Sanity Check Condition Monitoring Comparison Diverse Redundancy Redundancy Repair Degradation Voting Masking Override Heartbeat Rollback
Sensor Fusion (Vehicle State Estimator, Host Tracking, Target Tracking)	A failure in Sensor Fusion shall not cause incorrect interpretation of raw sensor data <b>ASIL C</b>	PG1 PG2 PG3 PG11	Simplicity Sanity Check Condition Monitoring Comparison Diverse Redundancy Redundancy Replication Redundancy Repair Degradation Voting Masking Override Rollback
Sensor Fusion (Vehicle State Estimator, Host Tracking, Target Tracking)	Corruption of signals from Sensor Abstraction to Sensor Fusion shall not interfere with the correctness of data provided to Sensor Fusion <b>ASIL C</b>	PG1 PG2 PG3 PG11	Sanity Check Condition Monitoring Comparison Diverse Redundancy Redundancy Repair Voting

			Masking Override
Target Tracking	A failure in Target Tracking shall not cause it to not track a vehicle that shall be tracked  <b>ASIL D</b>	VG1 VG6 VG9 VG10 VG11 VG12 VG13 VG14	Condition Monitoring Diverse Redundancy Redundancy Repair Degradation Override Masking Heartbeat
Target Tracking	A failure in Target Tracking shall not cause it to track a vehicle that shall not be tracked  <b>ASIL D</b>	VG7 VG14	Condition Monitoring Diverse Redundancy Redundancy Repair Override Masking Barrier
V2V Communication	Corruption of signals of Vehicle Control to V2V shall not interfere with the correctness of information at V2V Communication  <b>ASIL A</b>	PG1	Simplicity Substitution Sanity Check Condition Monitoring Diverse Redundancy Redundancy Repair Voting Masking Override
V2V communication	Incorrect arrival of V2V signals at a V2V station shall not interfere with the correct of information at another V2V station  <b>ASIL D</b>	PG1 PG2 PG3 PG4 PG5 PG6 PG7 PG8 PG9 PG10	Simplicity Sanity Check Condition Monitoring Comparison Replication Redundancy Redundancy Repair Degradation Voting Masking Override Barrier Heartbeat
V2V Communication	A failure in V2V shall not cause incorrect information to be sent to other vehicles  <b>ASIL A</b>	PG1	Condition Monitoring Repair Override Masking Barrier Rollback
V2V Communication	Incorrect information going into V2V shall not cause known information about other vehicles to be incorrect  <b>ASIL D</b>	VG1 VG2 VG3 VG4 VG5 VG6 VG7	Sanity Check Comparison Replication Redundancy Redundancy Voting Masking

		VG8 VG9 VG10 VG11 VG12 VG14	Override Barrier Heartbeat
V2V Communication	Failure in V2V communication shall not transmit incorrect information to or receive incorrect information from a vehicle joining or leaving a platoon.  <b>ASIL D</b>	PG2 PG3 PG4 PG5 PG6 PG7 PG8 PG9 PG10	Simplicity Sanity Check Comparison Replication Redundancy Redundancy Voting Masking Override Heartbeat Rollback
Vehicle Control	Corruption of signals from V2V to Vehicle Control shall not interfere with the correctness of data provided to Vehicle Control from V2V  <b>ASIL D</b>	PG1 PG2 PG3 PG4 PG5 PG6 PG7 PG8 PG9 PG10	Simplicity Substitution Sanity Check Condition Monitoring Diverse Redundancy Redundancy Repair Voting Masking Override
Vehicle Control	A failure in Vehicle Control shall not cause lack of generation of required signals  <b>ASIL D</b>	PG1 PG2 PG5 PG6 PG7 PG9 PG11	Simplicity Substitution Sanity Check Condition Monitoring Diverse Redundancy Redundancy Repair Degradation Voting Masking Override Rollback
Vehicle Control	A failure in Vehicle Control shall not cause generation of improper control setpoints  <b>ASIL D</b>	VG1 VG8 VG10 VG12 VG13 VG14	Simplicity Substitution Sanity Check Condition Monitoring Comparison Diverse Redundancy Redundancy Repair Degradation Voting Masking Override Barrier Rollback

Vehicle Control	A failure in vehicle control shall not cause control setpoints to not be properly forwarded <b>ASIL D</b>	VG1 VG2 VG10 VG11 VG12 VG14	Simplicity Sanity Check Condition Monitoring Repair Barrier Heartbeat
Vehicle Control	A failure in Vehicle Control shall not cause the lack of generation of control setpoints <b>ASIL D</b>	VG2 VG11	Condition Monitoring Diverse Redundancy Redundancy Repair Degradation Voting Masking Override Heartbeat Rollback
Vehicle Control	A failure in Vehicle Control shall not cause the control mode (platooning or manual driving) to remain the same while it shall be changed <b>ASIL C</b>	VG5 VG6 VG9	Simplicity Condition Monitoring Diverse Redundancy Redundancy Repair Voting Masking Override Heartbeat
Vehicle Control	A failure in vehicle control shall neither inhibit nor modify the input from driver to further pass on. <b>ASIL D</b>	PG5 PG6 PG9	Simplicity Sanity Check Condition Monitoring Comparison Replication Redundancy Redundancy Barrier
Vehicle Control	A failure in vehicle control shall not cause a switch to manual drive mode while in platooning mode <b>ASIL D</b>	VG2 VG3 VG4 VG8 VG10 VG11 VG12 VG13 VG14	Simplicity Sanity Check Comparison Repair Override Masking Barrier Rollback
Vehicle Control	A failure in vehicle control shall not cause generation of incorrect actuation signals <b>ASIL C</b>	VG3	Condition Monitoring Override Masking Barrier
Vehicle State Estimator	A failure in Vehicle State Estimator shall not cause the known vehicle state to be incorrect <b>ASIL D</b>	VG1 VG13	Sanity Check Condition Monitoring Diverse Redundancy Redundancy Repair Degradation Voting Masking

			Heartbeat Rollback
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