SUBSSAULT SWISSED24

MODEL-BASED CYBER SECURITY MANAGEMENT





AGENDA

Challenges and Model-based Solutions for Cyber Security Management

Threat Analysis and Risk Assessment-TARA

Conclusion and Benefits







CHAPTER 1

Challenges and Model-based Solutions for Cyber Security Management



CYBER THREATS ARE AMPLIFIED IN A SOS ENVIRONMENT





Of ransomware attack against industrial organizations in 2022

Connected vehicle's most common attack vectors 2022-2023

MODEL-BASED SAFETY AND SECURITY APPROACHES



(Source: IET - Cyber Security and Safety Code of Practice)



CHAPTER 2

Cyber Security Process: Threat Analysis and Risk Assessment (TARA)



CyberSecurity | Concepts

Risk scenario are numerous combinations of <u>multiple threats</u> exploiting <u>one or several vulnerabilities</u> of assets and could have <u>different impacts</u> (depending on the point of view)



A

ISO 21434: Road Vehicles – Cyber Security Engineering



TARA process | Main concepts & implementation based on RAAML



ISO 21434 THREAT ANALYSIS and RISK ASSESSMENT project template





Asset: an object that has value or contributes to value. It is in the context of an item

Damage Scenario

Adverse consequence involving a vehicle or vehicle function and affecting a road user

#	Name	Name Failure		Operational Situation	Safety Impact	Financial Impact	Operational Impact	△ Privacy Impact
<u>ار ا</u>	Bad visibility as the headlamp always remains at . low beam	No sufficient light for driving	Malfunction of the headlamp system	\delta Night, Driving	⊙ Major	 Moderate 	 Major 	🗢 Negligible
2	DS-1 vehicle cannot be driven at night because the headlamp function was inhibited while parked	🙇 inhibition of lights	Vehicle is not visible and cannot provide visibility	\delta Night, Parked	• Severe	Severe	• Severe	Negligible
3	Front collision with a narrow stationary object Set DS-2 caused by unintended turning-off headlamp during night while driving	🐐 inhibition of lights	Vehicle is not visible and cannot provide visibility	🚴 Night, Driving	• Severe	Severe	• Severe.	🗢 Negligible



The assessment should be done according to the definition given in ISO/SAE 21434:2021(annex F)

(Source: RAAML, v1.1, Object Management Group, 2024)

Threat Scenario

Potential cause of compromise of cybersecurity properties of one or more assets in order to realize a damage scenario





The assessment should be done according to the definition given in ISO/SAE 21434:2021(annex G)

(Source: RAAML, v1.1, Object Management Group, 2024)





#	△ Name	Threat Type	Impacted Asset	Damage Scenarios	Global Risk Value	Safety Risk Value	Financial Risk Value	Operational Risk Value	Privacy Risk Value	Risk Treatment Decision	Cybersecurity Goals	Controls	Claims
1	Spoofing of a signal leads to loss of integrity of the data communication of the "Lamp TS-1 Request" signal to the power switch actuator ECU, causing the headlamp to turn off unintentionally	Spoofing	AS-1 PowerSwitch+InputCANBUS	DS-2 Front collision with a narrow stationary object caused by unintended turning-off headlamp during night while driving DS-1 vehicle cannot be driven at inght because the headlamp function was inhibited while parked	5	5	5	5	1	«» Reduce [Dependency]	CG-1 Prevent Spoofing of lamp request	10 M1018-User Cont Management 2 M1047-Audit 1 M1051-Update Software	the user shall be informed for software Update
2	Denial of service of oncoming car information TS-2	Denial of Service	AS-1 PowerSwitch +InputCANBUS AS-2 Body Control Switch	DS-2 Front collision with a narrow stationary object caused by unintended turning-off headlamp during night while driving DS-1 vehicle cannot be driven at inght because the headlamp function was inhibited while parked	3	3	3	3	1	«» Reduce (Dependency)	© CG-2 Prevent DoS of incoming car info	8 M1035-Limit Ø Access to Resource Over Network	
3	TS-3 Tampering of a signal leads to low beam	Tompering	● AS-3 Camera	DS-3 Bad visibility as the headlamp always remains at low beam	1	1	1	1	1	«» Reduce [Dependency]	CG-3 Prevent Tampering of sensor	7 M1054-Software Configuration 10 M1018-User Account Management 9 M1022-Restrict Fil and Directory Permissions	2
			Situation.allns -affects : Proj	«stereotype» ControllingMeasure [Dependency] {- supplier of the ControllingMe stances().base_Class->includesAll(self.bas oerty [0.*]	easure must se_Depende	be a Situat ncy.supplie	tion er)}						
				Â						Risk v	alues are	e derive	d from
				«stereotype»						impa	ct rating a	and feas	ibility ratir
				[Dependency]						based	d on the r	isk mat	rix
										descr	ibed in IS	O 2143	4
	(Source: RAAML, v1.1, Object Ma	nagement Gro	wup, 2024) (stereotype) Avoid [Dependency]	«stereotype» Reduce [Dependency]	«stereotype Share Dependency	» /]	«stere Ref	tain dency]		Risk =	= 1 + Impa	act x Fea	asibility.



Cybersecurity Goal, Requirements & Claim

CHAPTER 3

Conclusion and Benefits



CONCLUSION

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Design-build-test methodology



Model-analyze-build methodology



Single Authoritative Source of Truth

BENEFITS OF MODEL-BASED CYBER SECURITY MANAGEMENT





