Why it Matters? Vehicle Security from Digital Forensic Point.

AE. **Paragraph 7.3.7.**

"7.3.7. The vehicle manufacturer shall implement measures for the vehicle type to:

(a) detect and prevent cyber-attacks against vehicles of the vehicle type;

(b) support the monitoring capability of the vehicle manufacturer with regards to detecting threats, vulnerabilities and cyber-attacks relevant to the vehicle type;

(c) provide data forensic capability to enable analysis of attempted or successful cyber-attacks."

Explanation of the requirement

The intention of this requirement is to ensure that there are specific measures implemented for the vehicle type to monitor for changes in the threat landscape, detect and prevent cyber-attacks and have the capability to forensically support the analysis of any attempted or successful attack.

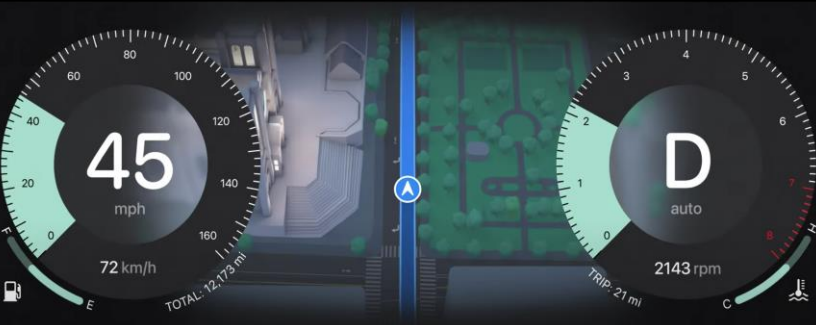*The following clarifications should be noted:* **UNECE WP29**

FutureCrime Researcher
CHRISLIFE@PM.ME

CHANGE NOW

Current Trip
- 0 hr 40 min — Duration
- 32 mpg — Fuel Economy
- 54 mi — Distance

Monday
6
Tomorrow

Design Sync
10:00 - 11:00 AM

Weekly Goal Sync
2:30 - 3:30 PM

Oakland
Air Quality
37
Good

UV Index
0
Low

My Home
Garage Door
Closed

The Next Generation of CarPlay – Reveal (WWDC22, 4K)

Network

Functional Safety

42 mph — 68 km/h — TOTAL: 12,173 mi
D auto
Compass 315° NW — Elevation 210 FT
2114 rpm — TRIP: 21 mi

45 mph — 72 km/h — TOTAL: 12,173 mi
D auto
2143 rpm — TRIP: 21 mi

9:41 — 5G

1.4 mi
Turn Right

SPEED LIMIT 30

90.5 FM KSJS
Ground Zero Radio

Auto
Wave Racer

MAX A/C — SYNC

74 — 74

n Francisco Bay Trail
ETA 56 min 40 mi

0:20 / 0:22 — Scroll for details

Case #	Year	Date	Country	State	Description	Deaths	Tesla driver	Tesla occupant	Other vehicle	Cyclists/ Peds	TSLA+ / peds
254	2022	8/16/2022	Germany		Tesla car crashes into tree, burns	2			-	-	2
253	2022	8/15/2022	USA	CA	Tesla veers into oncoming traffic	4	1	3	-	-	4
252	2022	8/14/2022	Finland		Unlicensed driver hits pedestrian	1	-	-	-	1	1
251	2022	8/2/2022	USA	FL	Man in wheelchair hit crossing road	1	-	-	-	1	1
250	2022	7/27/2022	USA	ME	Tesla crashes at high speed	1	1	-	-	-	1
249	2022	7/24/2022	USA	UT	Tesla hits motorcycle	1	-	-	1	-	1
248	2022	7/16/2022	USA	PA	Tesla goes airborne and crashes	1	1	-	-	-	1
247	2022	7/12/2022	China		Out of control Tesla hits pedestrians	2	-	-	-	2	2
246	2022	7/8/2022	USA	CA	3-car accident involving Tesla	1	-	-	1	-	1
245	2022	7/8/2022	USA	HA	Motorcycle crashes into Tesla	1	-	-	1	-	1
244	2022	7/7/2022	USA	CA	Motorcycle hit by Tesla	1	-	-	1	-	1
243	2022	7/6/2022	USA	FL	Tesla hits parked tractor-trailer	2	1	1	-	-	2
242	2022	7/5/2022	USA	GA	Tesla strikes pole, burns	1	1	-	-	-	1
241	2022	6/26/2022	USA	CA	Tesla drives into opposite lane	1	-	-	1	-	1
240	2022	6/20/2022	USA	AL	Tesla crashes into car	1	-	-	1	-	1
239	2022	6/20/2022	USA	PA	Tesla hit and run	1	-	-	-	1	1
238	2022	6/20/2022	Canada		Tesla runs into overpass	1	1	-	-	-	1
237	2022	6/17/2022	USA	CA	Head-on collision	2	1	1	-	-	2
236	2022	6/14/2022	USA	CA	Tesla moves into opposite lane and head-on crashes	1	-	-	1	-	1
235	2022	6/13/2022	USA	CA	Two-car collision	1	1	-	-	-	1
234	2022	6/7/2022	USA	CA	DUI crash	1	-	-	-	1	1
233	2022	6/3/2022	USA	NV	Motorcycle crashes into Tesla	1	-	-	1	-	1
232	2022	5/28/2022	USA	NY	Tesla DUI crash	1	-	-	1	-	1
231	2022	5/28/2022	USA	OR	Tesla loses control and crashes into car	2	1	-	1	-	1
230	2022	5/28/2022	USA	CA	Speeding tesla crashes into tree	1	1	-	-	-	1
229	2022	5/25/2022	USA	OR	Tesla crashes into pole	1	-	1	-	-	1
228	2022	5/23/2022	USA	AZ	Tesla driver hit in multicar accident	1	1	-	-	-	1
227	2022	5/21/2022	China		Tesla hits pedestrian	1	-	-	-	1	1
226	2022	5/19/2022	USA	NJ	Tesla hits trees, ignites	1	1	-	-	-	1
225	2022	5/19/2022	USA	NJ	Multiple car crash on highway	1	1	-	-	-	1
224	2022	5/18/2022	USA	CA	Tesla hits pedestrian	1	-	-	-	1	1
223	2022	5/16/2022	USA	CO	Fiery crash	1	1				1
222	2022	5/12/2022	Australia		Tesla hit pedestrian who dies 5 days later from injuries	1	-	-	-	1	1
221	2022	5/11/2022	USA	CA	Tesla smashes into construction equipment	3	1	2	-	-	3
220	2022	5/7/2022	USA	UT	Tesla DUI involving another vehicle	2	-	-	2	-	
219	2022	5/1/2022	USA	PA	Tesla DUI hits pedestrian	1	-	-	-	1	1
218	2022	4/29/2022	USA	NC	Highway accident, Tesla goes airborne	1	1	-	-	-	1
217	2022	4/10/2022	UK		Two car accident	1	-	-	1	-	1
216	2022	4/8/2022	Netherlands		Head-on collision with truck and Tesla	1	-	-	-	1	1

	A	B	C	D	E	F
1	VIN	Model	Report Date	Incident Date	Location	NHTSA Complaint
2	5YJSA1DN0DF****		12-November-19	22-January-15	LOS GATOS, CA	11279662
3	5YJXCDE24KF****		6-October-19	2-October-19	BAKERSFIELD, CA	11266551
4	5YJ3E1EA4KF****		8-October-19	29-September-19	WEXFORD, PA	11267131
5	5YJ3E1EA2JF****		14-October-19	24-September-19	FREMONT, CA	11268280
6	5YJSA1E28KF****		21-October-19	18-October-19	GERMANTOWN, TN	11269912
7	5YJXCBE44KF****		31-October-19	19-October-19	ORLANDO, FL	11277294
8	5YJ3E1EA0KF****		1-October-19	28-August-19	BEAVERTON, OR	11265452
9	Not Reported		11-March-16	1-March-16	SAN FRANCISCO, CA	10846206
10	5YJ3E1EB1KF****		10-May-19	10-May-19	VALENCIA, CA	11206931
11	5YJ3E1EB0KF****		15-Jul-19	14-Jul-19	COLUMBIA, MD	11231846
12	5YJ3E1EA8KF****		1-Aug-19	26-Jul-19	SAN JOSE, CA	11241215
13	Not Reported		1-Mar-19	1-Feb-19	PLEASANTON, CA	11183334
14	5YJXCDE27JF****		27-Nov-18	17-Nov-18	SAN CLEMENTE, CA	11154380
15	5YJXCBE47JF****		23-Oct-18	23-Oct-18	TAMPA, FL	11142282
16	5YJXCBE27JF****		15-Jul-18	14-Jul-18	SEATTLE, WA	11111431
17	5YJXCDE2XJF****		8-May-18	27-Apr-18	TUSTIN, CA	11092528
18	5YJSA1E22JF****		23-May-19	12-May-19	MAPLE GROVE, MN	11209483
19	5YJSA1E24JF****		1-Jul-19	2-May-19	PLYMOUTH, MN	11228597
20	5YJSA1E24JF****		1-Mar-19	20-Feb-19	PALO ALTO, CA	11183545
21	5YJSA1E23JF****		3-Dec-18	2-Dec-18	WALNUT, CA	11155579
22	5YJSA1E23JF****		18-Jun-18	17-Jun-18	SAN DIEGO, CA	11102347
23	5YJSA1E25JF****		6-Jun-18	20-Apr-18	BUENA PARK, CA	11100216
24	5YJ3E1EA7JF****		7-May-19	6-May-19	ATLANTA, GA	11206155
25	5YJ3E1EA2JF****		22-May-19	24-Apr-19	MCLEAN, VA	11209238
26	5YJ3E1EA6JF****		16-Apr-19	30-Mar-19	SNELLVILLE, GA	11196764
27	5YJ3E1EAXJF****		15-May-19	26-Feb-19	SAN DIEGO, CA	11207877
28	Not Reported		4-Jan-19	1-Jan-19	UNION CITY, CA	11165284
29	5YJ3E1EB4JF****		30-Dec-18	30-Nov-18	BURLINGAME, CA	11164094
30	5YJ3E1EA6JF****		26-Nov-18	26-Nov-18	UPPER ARLINGTON, OH	11154132
31	5YJ3E1EB1JF****		3-Oct-18	3-Oct-18	LEXINGTON, MA	11133222
32	5YJ3E1EA1JF****		28-Sep-18	26-Sep-18	SIMI VALLEY, CA	11132177
33	5YJ3E1EA7JF****		2-Sep-18	1-Sep-18	RIVERSIDE, CA	11124067
34	5YJ3E1EA7JF****		22-Apr-19	20-Aug-18	PLACITAS, NM	11202909
35	5YJ3E1EA3JF****		14-Aug-18	2-Aug-18	SAN FRANCISCO, CA	11119991
36	5YJ3E1EA9JF****		3-Aug-18	27-Jul-18	DUBLIN, CA	11115496
37	5YJ3E1EA0JF****		10-May-18	10-May-18	DOVER, DE	11092830
38	5YJ3E1EA5JF****		22-May-18	5-May-18	PHOENIX, AZ	11097159
39	5YJ3E1EA6JF****		4-May-18	4-May-18	CHANDLER, AZ	11091970

Year	Date	Country	State	Make / Product	Fatalities	Description
2022	8/17/2022	Germany			2	Tesla hits tree
2022	8/15/2022	USA	CA			Car catches fire on freeway and spreads to brush
2022	8/10/2022	USA	FL			Car catches fire while driving
2022	8/8/2022	USA	NJ			Two Tesla explode next to garage filled with ammo
2022	8/5/2022	USA	MA			Car spontaneously catches on fire at Tesla store
2022	7/27/2022	USA	ME			Car crashes into tree at high speed
2022	7/27/2022	China		3		Tesla spontaneously ignites
2022	7/22/2022	China				Taiwanese celebrity hits pole with Tesla, car catches on fire
2022	7/22/2022	China				Fire erupts after Tesla crashes into barrier
2022	7/20/2022	Iceland				Parked car burns
2022	7/9/2022	Canada				Tesla burns at service center
2022	7/9/2022	China		Y		Tesla catches fire
2022	7/5/2022	USA	GA		1	Fiery crash
2022	6/22/2022	USA	CA	S		Totalled Tesla at junkyard ignites 3 weeks later
2022	6/20/2022	Slovania				Tesla hits traffic light and catches fire
2022	6/17/2022	USA	CA		2	Head-on collision
2022	5/23/2022	USA	IL			Tesla catches fire
2022	5/22/2022	Canada		Y		Car shuts down while driving and ignites
2022	5/22/2022	USA	FL	3 Teslas		Parked Tesla in lot ignites
2022	5/20/2022	Canada		3		Tesla spontaneously catches fire at stop light
2022	5/19/2022	USA	NJ		1	Tesla hits trees, ignites
2022	5/14/2022	USA	CA	3		Parked Tesla spontaneously combusts
2022	5/12/2022	USA	CA			House burns down from Tesla spontaneous fire
2022	5/11/2022	USA	CA		3	Tesla smashes into construction equipment
2022	4/28/2022	USA	NY			Trash fire spreads to Tesla
2022	4/18/2022	Germany				Parked Tesla ignites
2022	4/10/2022	USA	NH			Tesla catches on fire after crash

How to build in forensic-sound logs in your designs?
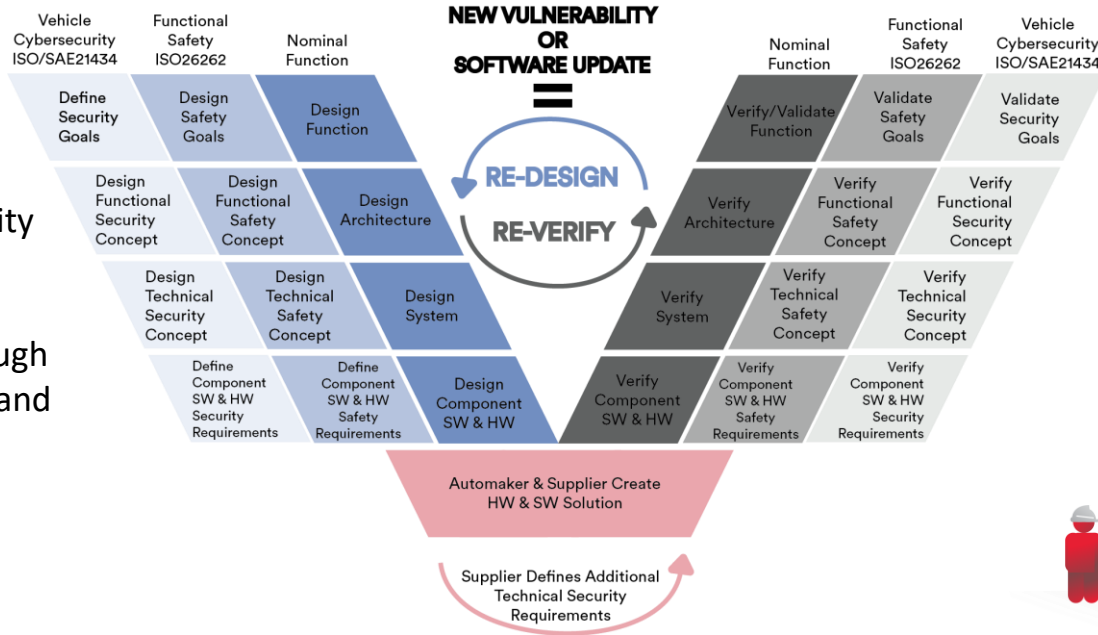
Vehicle cybersecurity designers define cybersecurity requirements through a "Threat Analysis and Risk Assessment" (TARA) and a corresponding Cybersecurity Concept.

Vehicle cybersecurity testers verify that the implementation meets it requirements and validate that the design is good.
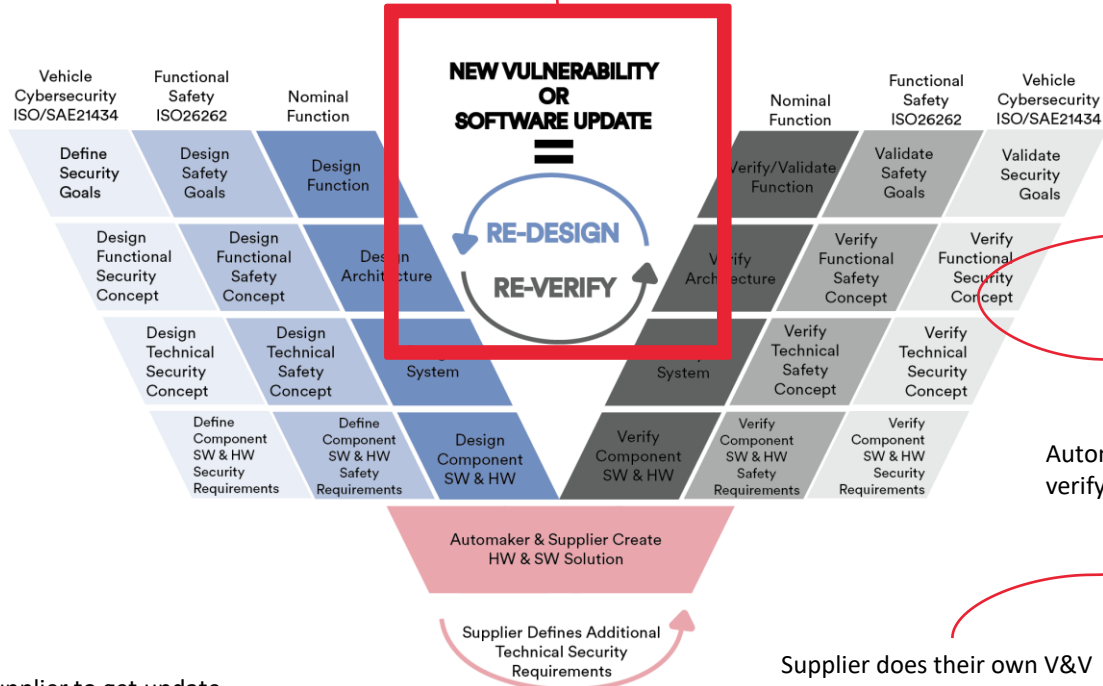
Component suppliers & automakers implement the products.

Vehicle Type Auditor

UN R155 Mitigations

How to build in forensic-sound logs in your designs?

Determine if new vulnerability or update impacts cybersecurity

Work with supplier to get update or patch created

Patch/change is released… how many days later?

Automaker needs to verify/validate the change.

Supplier does their own V&V

ISO/SAE 21434 & UNECE WP.29 R155

Requirements flow to supply chain

Vehicle Cybersecurity Management System (CSMS)

ISO/SAE 21434: Vehicle Cybersecurity Engineering CSMS – ensures the vehicle was designed and implemented to address threats to the vehicle.

Infrastructure Security: systems to ensure the vehicle's related infrastructure (e.g. cloud, V2X, EV) is secured properly.

Organizational Security: the systems setup to protect from attacks like insider attackers or rogue employees.

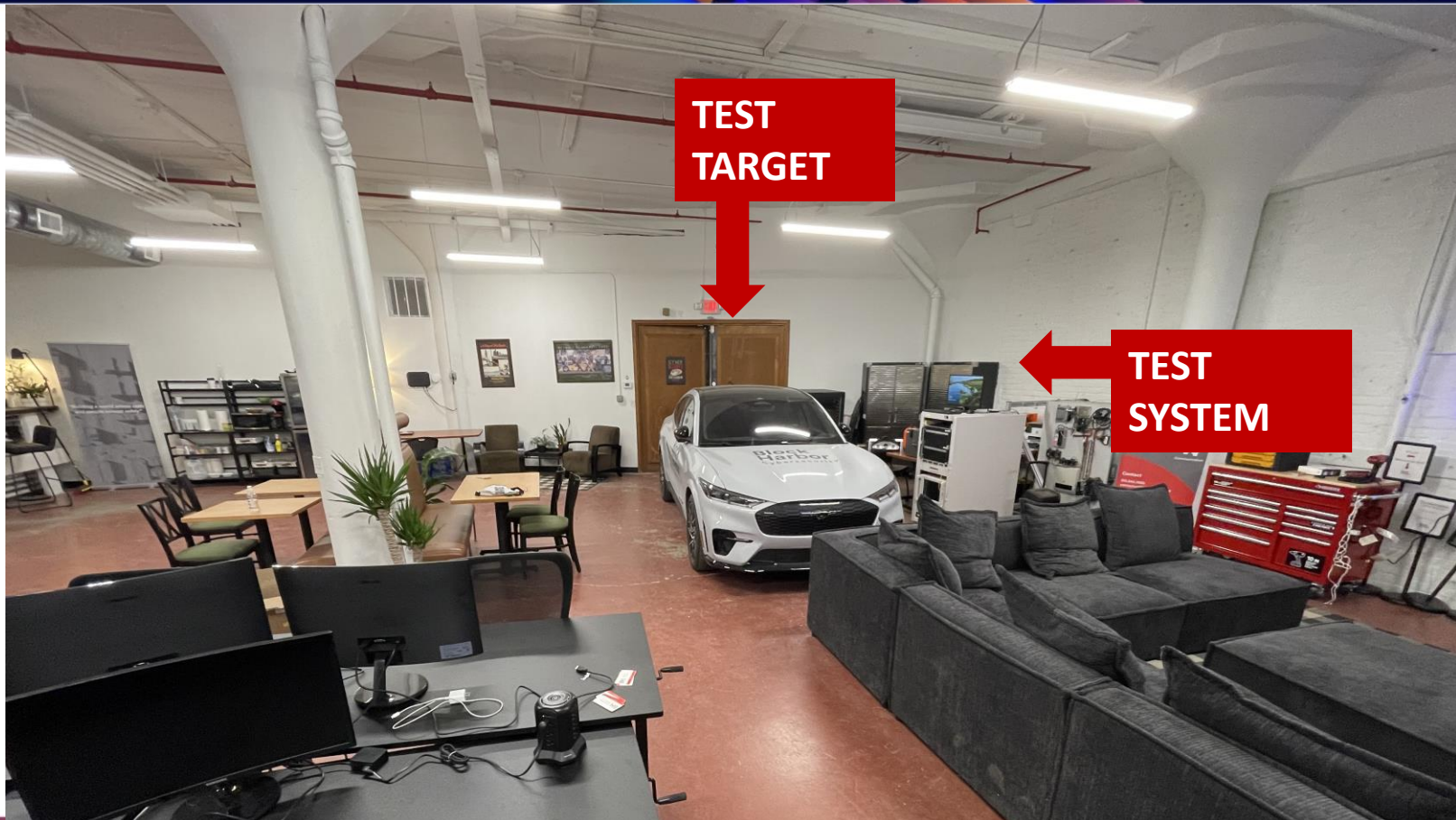CSMS Auditor

Documentation from specific vehicle type

(Including independent testing)

Vehicle Type Auditor

Vehicle Type Approval: Vehicle Type is Approved ✓

The real problem is...

How could we locally help our automotive supply chain?

Taiwan needs local testing environment for EV Security.

Let's setup your cybersecurity lab to combat on-going global risks.

Q & A

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