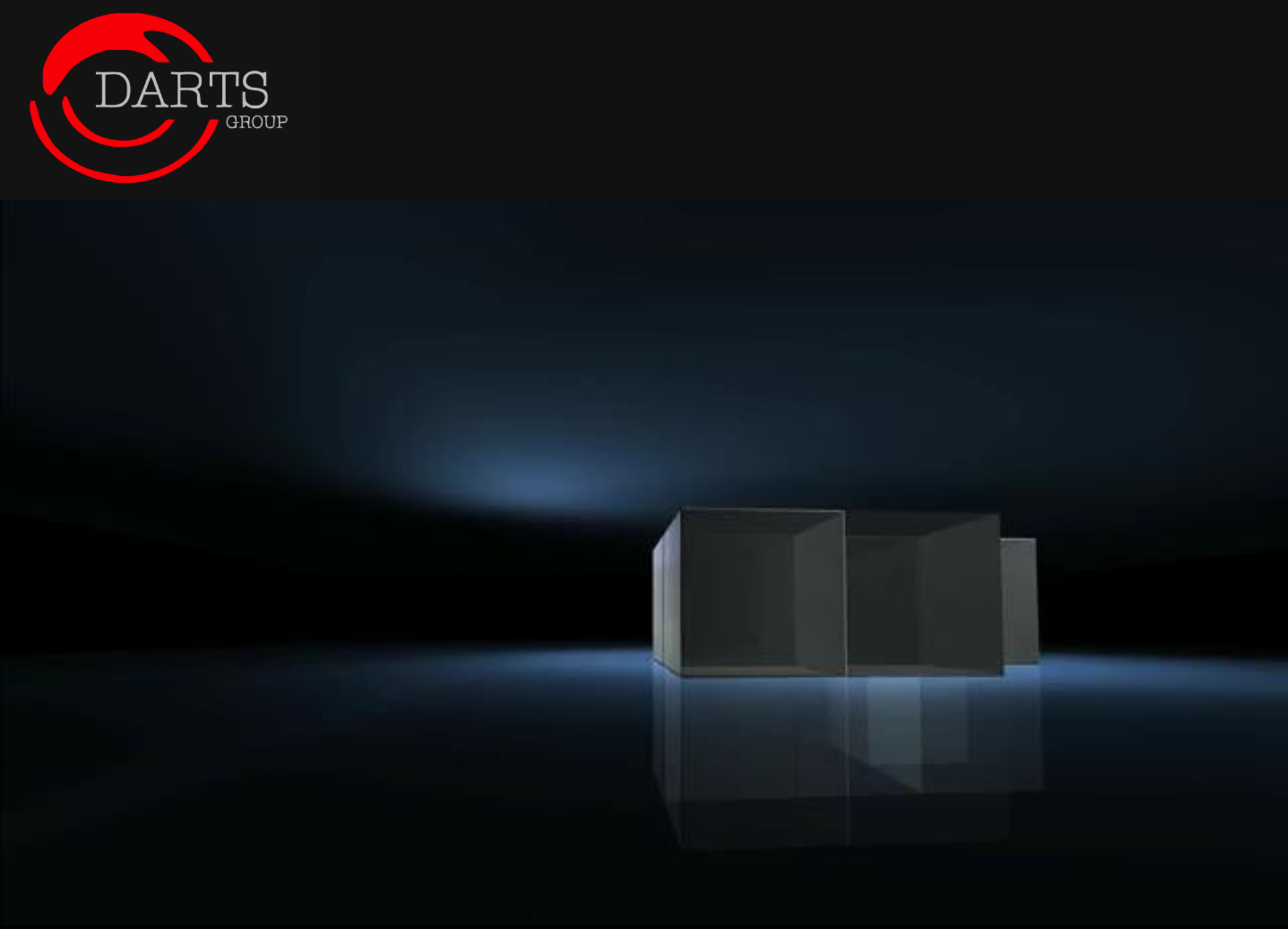

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Digitalna forenzika osebnih vozil

SIDARTS Jože Škrilec dipl. inž.

BOSCH CDR Operator
ANALYST
CERTIFICATE

This is to certify that

Jože Škrilec

has successfully completed the Bosch approved 32 hour European Crash Data Retrieval (CDR) Data Analyst Course of the CDR Operator Certification.

M.M.J. Bot
TrDARTS Netherlands
Organization & Development

J. van Essen
TrDARTS Netherlands
Approved CDR Instructor

Course Location:	Barcelona Spain	Student number:	201410033
Course Completion date:	December 4, 2014	Approved CDR Instructor:	Jeroen van Essen
Contact hours:	32	Support CDR Instructor:	Aart Spek
CDR software version coverage:	14.2		

TRDARTS NETHERLANDS
Official Bosch Training Organization
WWW.EUDARTS-GROUP.COM

BOSCH CDR Operator
Technician
CERTIFICATE

This is to certify that

Jože Škrilec

has successfully completed the Bosch approved 8 hour European Crash Data Retrieval (CDR) course which is the prerequisite for the European Crash Data Retrieval (CDR) Data Analyst Course, part of CDR Operator Certification.

M.M.J. Bot
TrDARTS Netherlands
Organization & Development

J. van Essen
TrDARTS Netherlands
Approved CDR Instructor

Course Location:	Barcelona Spain	Student number:	201410033
Course Completion date:	December 1, 2014	Approved CDR Instructor:	Jeroen van Essen
Contact hours:	8	Support CDR Instructor:	Aart Spek
CDR software version coverage:	14.2		

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Kako se je začelo

ROTTERDAM-RIJNMOND

RR

«waakzaam en dienstbaar»

BOSCH

POLITIE
Rotterdam-Rijnmond

Kako se je začelo

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Začetki digitalne forenzike vozil

- 2011- projekt CrashCube
- V projekt vključena slovenska policija- PPP Ljubljana , PPP Celje in PPP Maribor (testiranje naprav Bosch CDR in CrashCube).
- 2014- formira se skupina EU Darts

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SIDARTS: Crash Test & Digital Forensics Seminar was a succes

Jože Škrilec ; May 2017

On september 28th and 29th 2017 Crash tests and digital forensics seminar have take place in Murska Sobota, Slovenia. Multiple crash tests with data readout from vehicles EDR was demonstrated using Bosch CDR crash data retrieval tool. The two day event, where multiple cars were crashed in several different ways, creating deployment and non deployment events that will be read using Bosch CDR and Launch Crash Cube for freeze frame data comparison. The event was followed by 180 spectators.

Item on News in Slovenia

Click on picture to see it

SIDARTS is a successfully growing company, part of EUDARTS group, specializing in car crash analysis, reconstruction and digital forensics. We have great results determining the course of a crash and a possibility of physical injury occurrence. Within our work we are using the most modern and sophisticated techniques and tools like Analyzer Pro software and tools for car diagnostics and crash data retrieval like Bosch CDR.




Poskusni trki vozil

S forenziko do podatkov o nesrečah

Prometni strokovnjaki so v murskosoboškem Centru varne vožnje proučevali podatke, ki jih ob trku z

Zmotno je razmišljanje, da je vožnja z zelo modernim jeklenim konjičkom, polnim sistemov aktivne in pasivne varnosti, varna in da bo morebitna nevarnost minila brez posledic. Človeški dejavnik je po policijski statistiki najpogostejši vzrok za nesrečo. Vozniki smo namreč tisti, ki ne upoštevamo dobronamerno napisanih prometnih pravil in nekaterih drugih pravil, ki jih večinoma sicer poznamo, a največkrat zanemarjamo ali ne upoštevamo. Človek s svojim nepravilnim ravnanjem v prometu je torej eden od glavnih vzrokov za nesreče, prav tako avtomobili in njihovo slabo tehnično stanje.

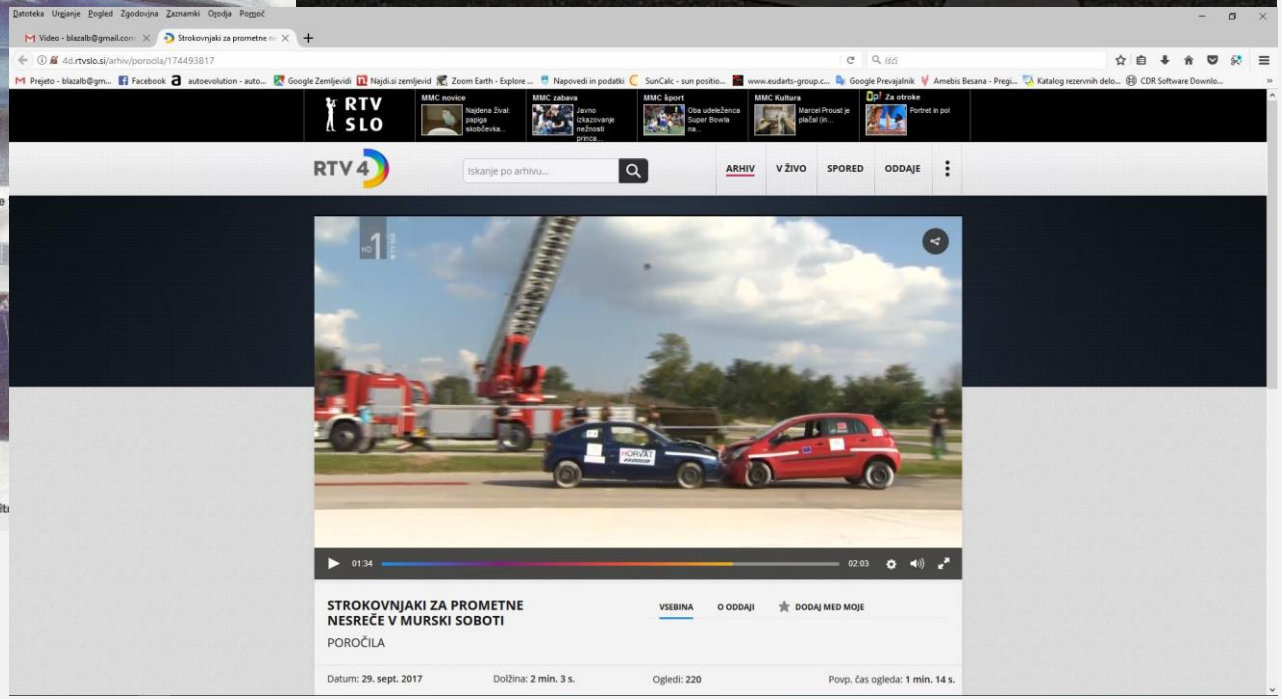
Tudi zato so od preteklega četrtka do sobote na poligonu Centra varne vožnje v Murski Soboti potekali poskusni trki vozil. Prometni strokovnjaki, med drugim iz Hrvaške in Nizozemske, so v trkih, ki so potekali pri hitrostih 50 kilometrov na uro, proučevali podatke, ki jih ob trku zapišejo vozila. Po besedah Roberta Spudića, ki je na Hrvaškem eden najbolj cenjenih sodnih izvedencev za področje prometnih nesreč, so v trkih iskali podatke v krmilniku zračnih blazin, ki podatek o hitrosti vozila potrebuje za svo-

Jože Škrilec, sedi v avtu, je s sodelavci pripravil poučne poskusne

S trki so iskali podatke v krmilniku zračnih blazin, ki podatek o hit potrebuje za svojo aktivacijo. FOTOGRAFIJA JURE ZAUNEKER

ČE SI UDELEŽENEC ALI PRIČA V PROMETNI NESREČI, ČE SI ŽRTEV ALI OČIVIDEC . KRIMINALNEGA DEJANJA, ČE MISLIŠ, DA JE MOTEN TVOJ MIR, ALI ČE MENIŠ, DA LAHKO POLICIJA NA DRUG NAČIN POSKRBI ZA TVOJO VARNOST,

POTEM KLIČI 113!



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Validacija podatkov s pomočjo poskusnih trkov

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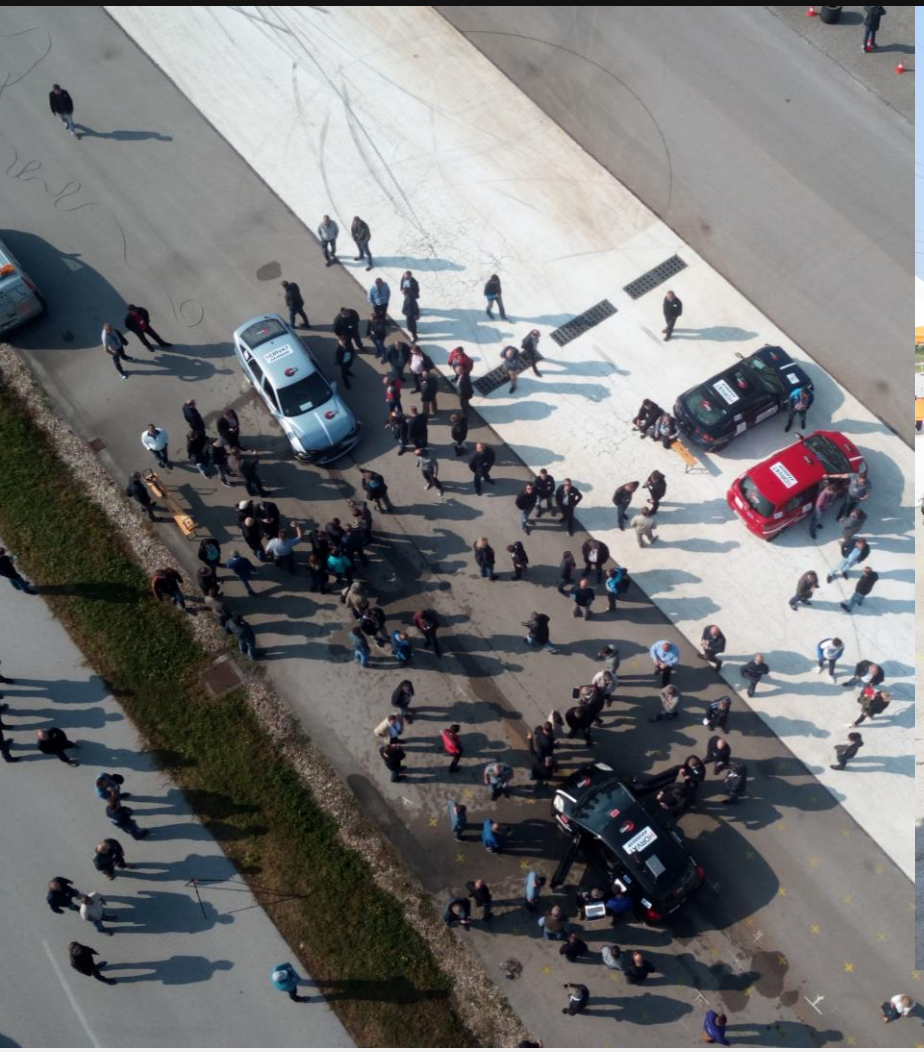
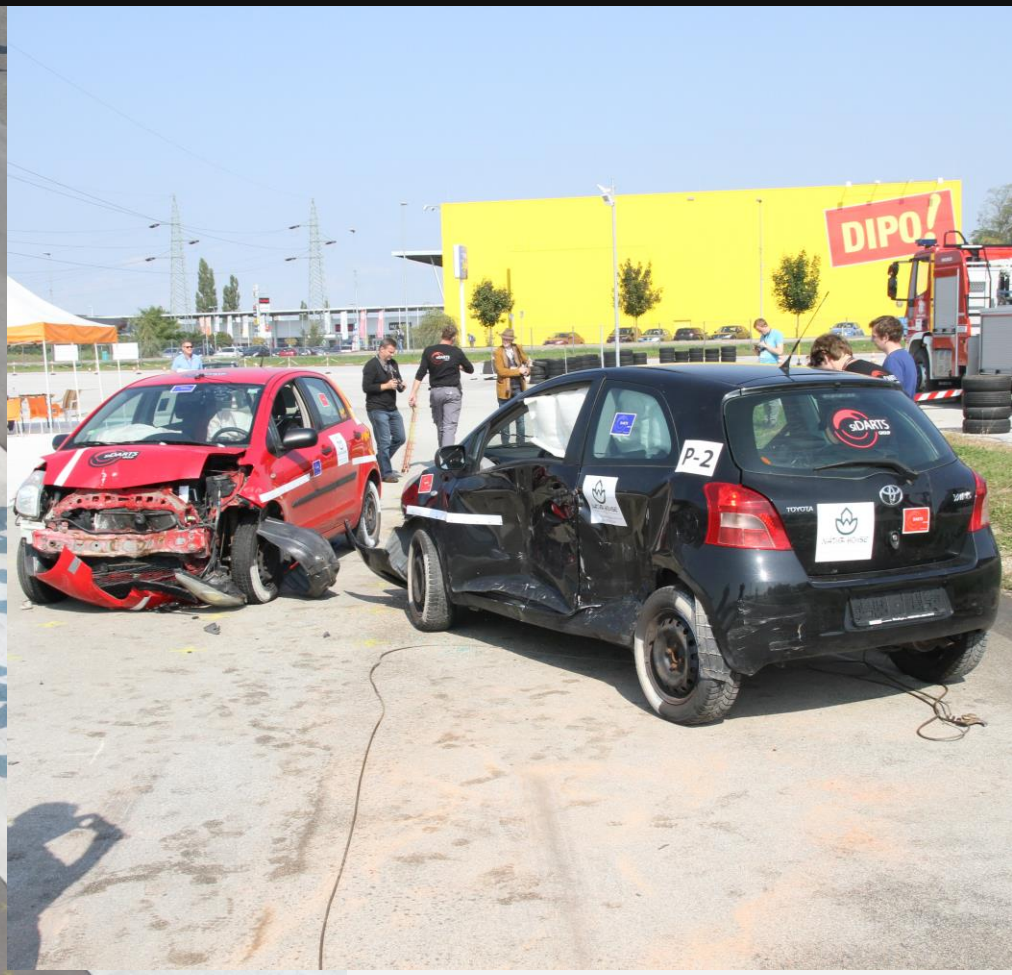
Validacija podatkov s pomočjo poskusnih trkov





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Validacija podatkov s pomočjo poskusnih trkov

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Razvoj EU leto 2011

EVROPSKI PARLAMENT Poročevalec Dieter-Lebrecht Koch: "Varnost v cestnem prometu v Evropi 2011-2020"

Poziva Komisijo, naj pripravi zakonodajni predlog, vključno s časovnim razporedom innatančen postopek odobritve, do konca leta 2012, ki predvideva postopno uvajanje,sprva v najetih vozilih in posledično tudi v poslovnih in zasebnih vozilih, integriran sistem snemalnika nesreče s standardiziranem odčitavanjem, ki beleži ustrezne podatke pred,med in po nesreči *('**Event Data Recording**');*

Poudarja potrebo po varovanju osebnih podatkov posameznikov in uporabo podatkov izključno za raziskovanje nezgod;

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Razvoj EU

***2011.06.20**: Sprejeto v EP TRAN (Odbor za Transport in Turizem)*

***2011.09.25**: EP plenarno zasedanje (razprava)*

***2011.09.26**: EP plenarno zasedanje (pozitivno glasovanje)*

Rezultati: Nastal bo zakonodajni predlog, vključno s časovnim razporedom in natančen postopek odobritve do konca leta 2012, ki predvideva postopno uvajanje EDR

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September 26, 2011

Manchester, UK

Policija 30-ih držav

“Kaj se pričakuje od EDR”

Raziskava:
Določiti dodatne nacionalne zahteve in prošnje v skladu z integracijo EDR v Evropi

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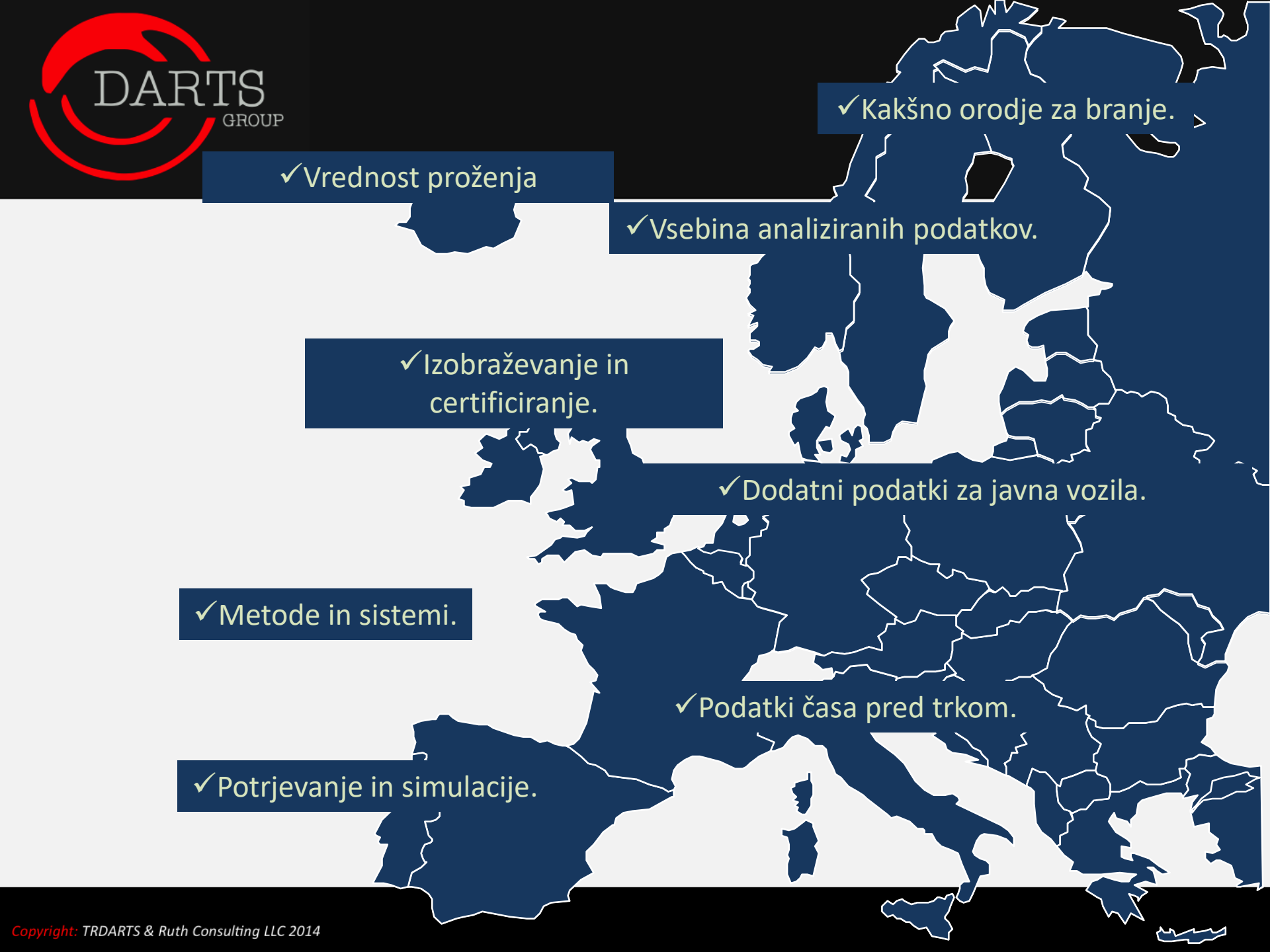

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Dodatne nacionalne zahteve za vse policije EU v zvezi z integracijo EDR v motorna vozila bodo združena.

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CRASHCUBE PROJECT

Tehnološki razvoj se je pričel s projektom CRASHCUBE. Projekt ki ga je vodila Nizozemska Policija se je končal januarja 2013;

- *Projekat je bil podprt s strani;*
  - *Nizozemskega Forenzičnega Inštituta,*
  - *Directorat-General for Public Works and Water Management (RWS)*
  - *RDW / LIV (Driver and Vehicle Licensing Agency);*
- *V sodelovanju z ;*
  - *Automobilskimi proizvajalci,*
  - *Automobilskimi prodajnimi mrežami ;*
- *V sodelovanju z Univerzami;*
  - *UCD Univerza Dublin (e-učenje,)*
  - *Vrije Univerza Amsterdam (pravo).*

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TRDARTS & ASDARTS

Po tem projektu se pojavi veliki interes po nadgradnji in novih tehnologijah. Zaradi velikega interesa se projekt nadaljuje pod imenom DARTS Group.

*Leta 2014 se formira **TR**DARTS (trening) in **AS**DARTS (hardware in software).*

***D**ATA **A**NALYSIS **R**ESEARCH **T**RAINING & **S**ERVICES*

Ustanovni člani smo kolegi ki smo delali na projektu Crash i Vin Cube. Skupina dela na preiskovanju prometnih nezgod in na področju kriminalitete vezane na osebna vozila. Skupina dela tudi na razvoju opreme za digitalno forenziko vozil.

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EU DARTS SKUPINA

EUDARTS - Netherlands – Jeroen van Essen, EUDARTS - Belgium – Roul Duuring, EUDARTS - Italy - Mattia Millo, EUDARTS - Spain - David Cami, EUDARTS - Italy - Mattia Millo, EUDARTS - UK - James Long, EUDARTS - Ireland –Mark Maguire, EUDARTS - East Europe – Joze Skrilec

EUDARTS - Greece / Cyprus – Dimitri Mageritas, EUDARTS - Norway – Simen Huse

EUDARTS SKUPINA(ZDRUŽENJE) je mreža raziskovalcev ki delajo v javnem in privatnem sektorju, na razvoju in kreiranju novih idej in iniciativ na področju znotraj discipline "Forensic Automotive Information Technology".

Pričnemo s tremi glavnimi cilji

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Evropska aktivacija EDR

Razvoj novega orodja FDR-Crash in Vin Cube

Trening in analiziranje odčitanih podatkov iz vozil

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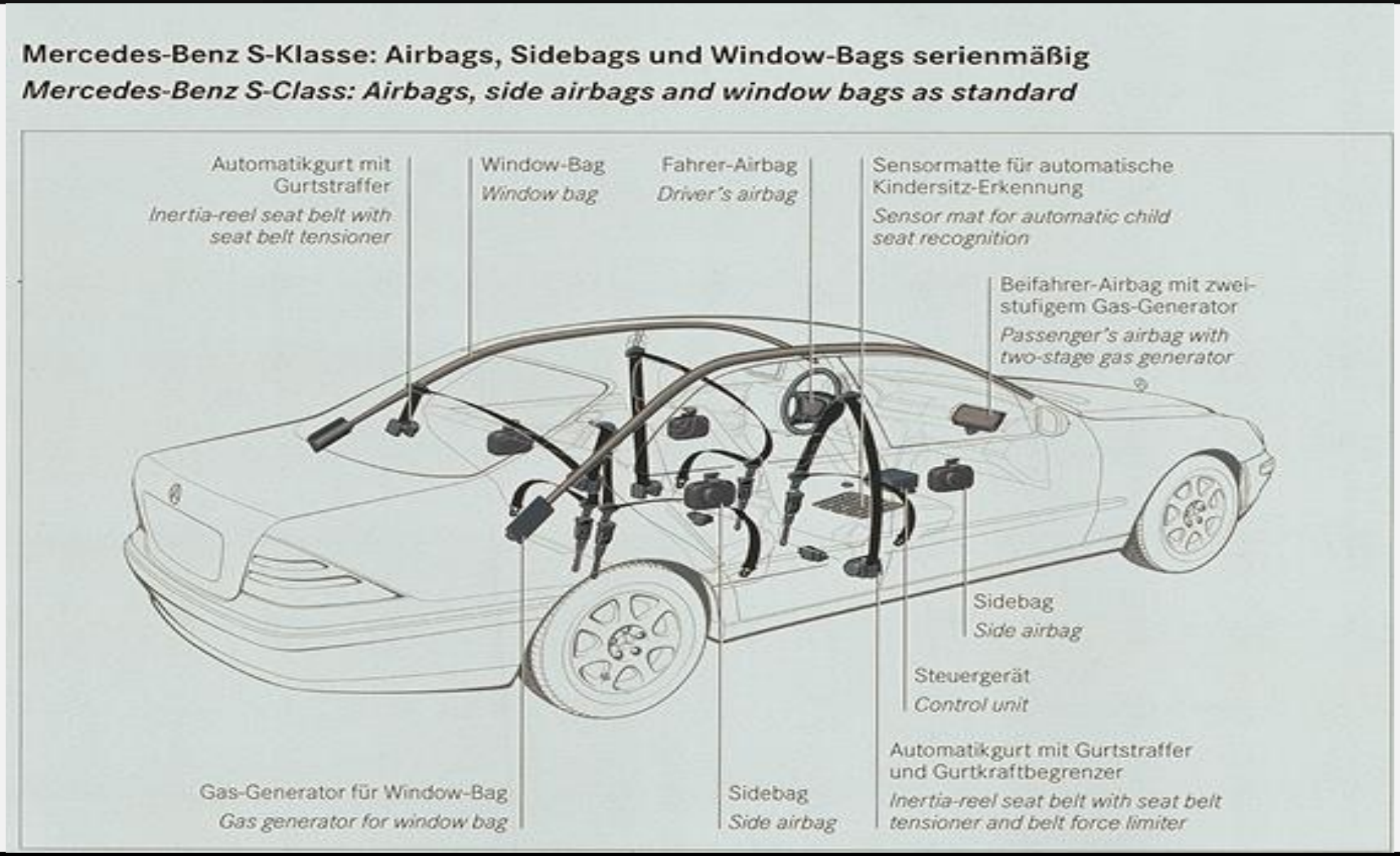
Komponente modernega sistema pasivne varnosti



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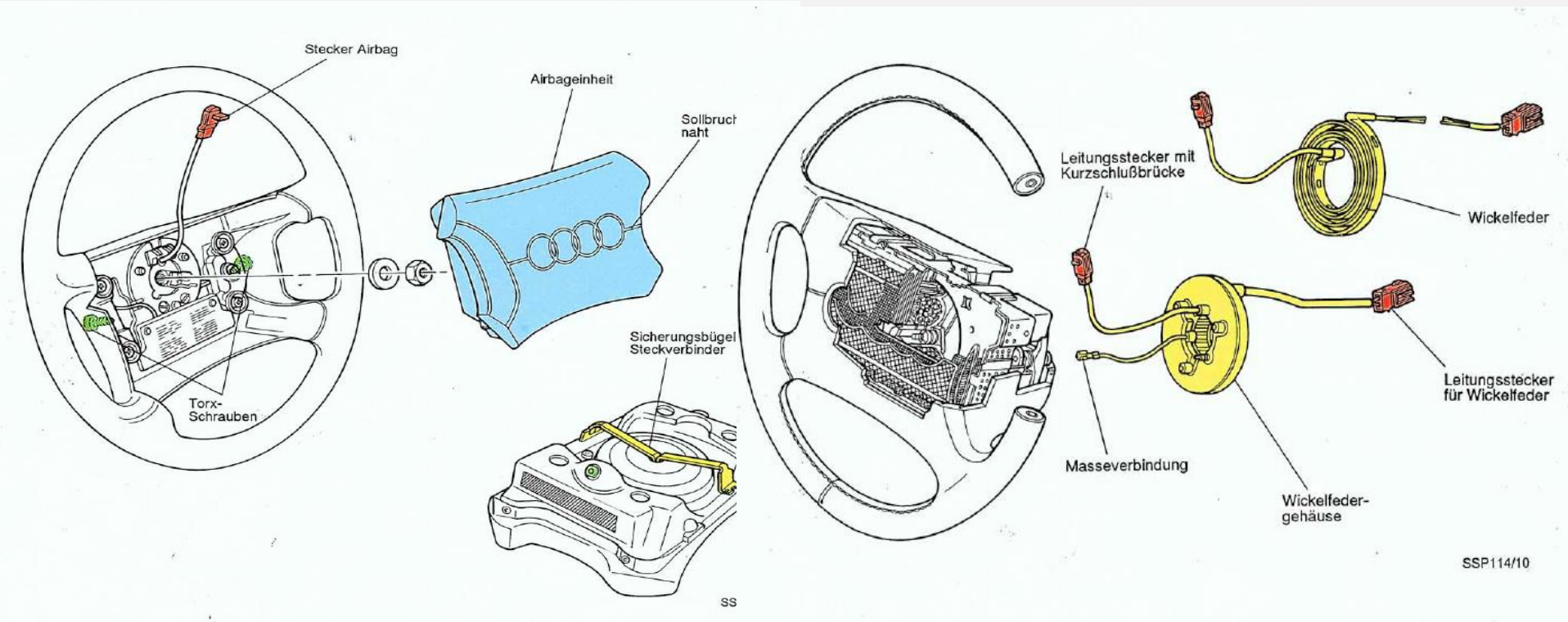
Volanska zračna blazina



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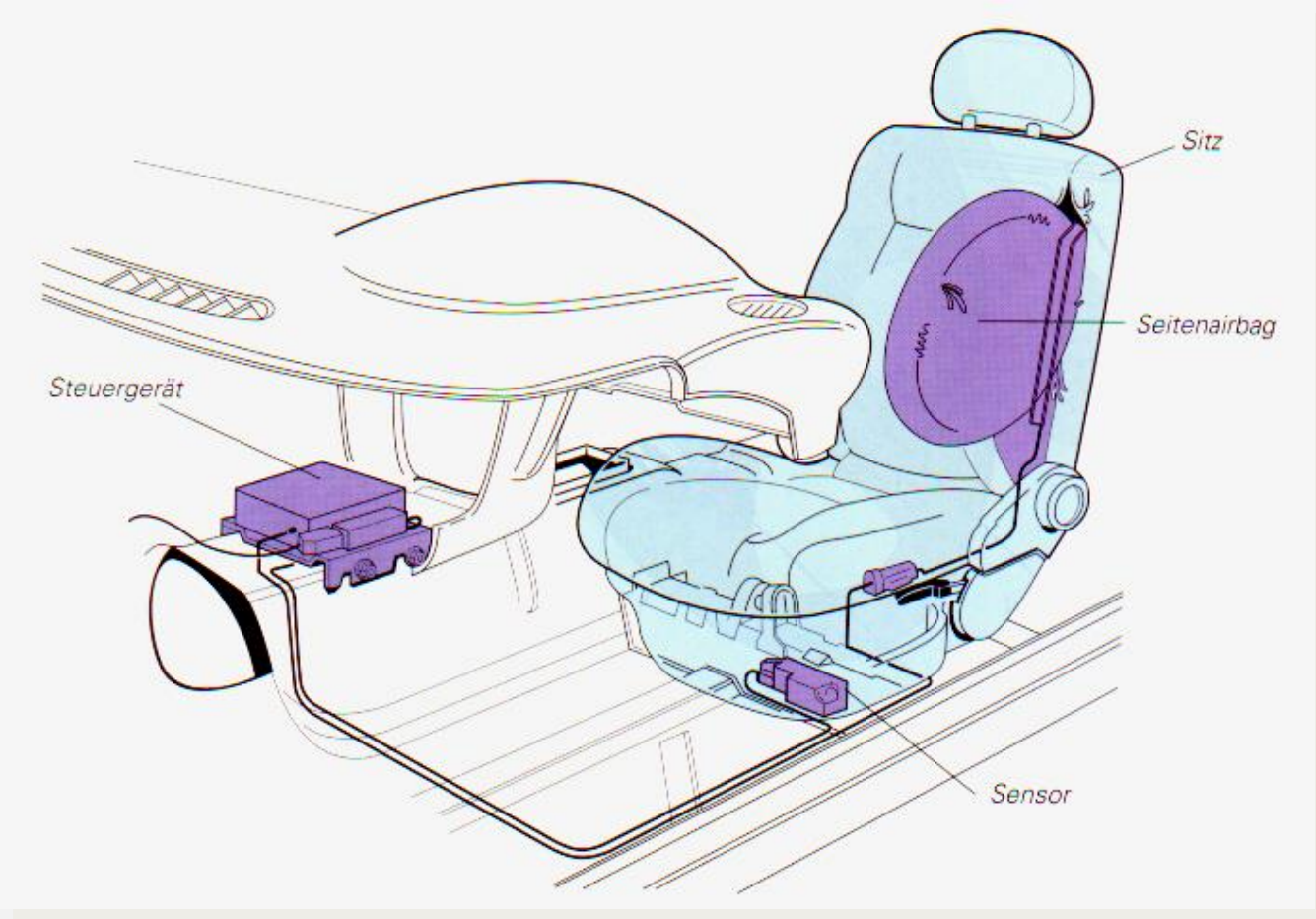
Primer postavitve krmilnika zračne blazine, senzorja in zračne blazine za bočni trk.



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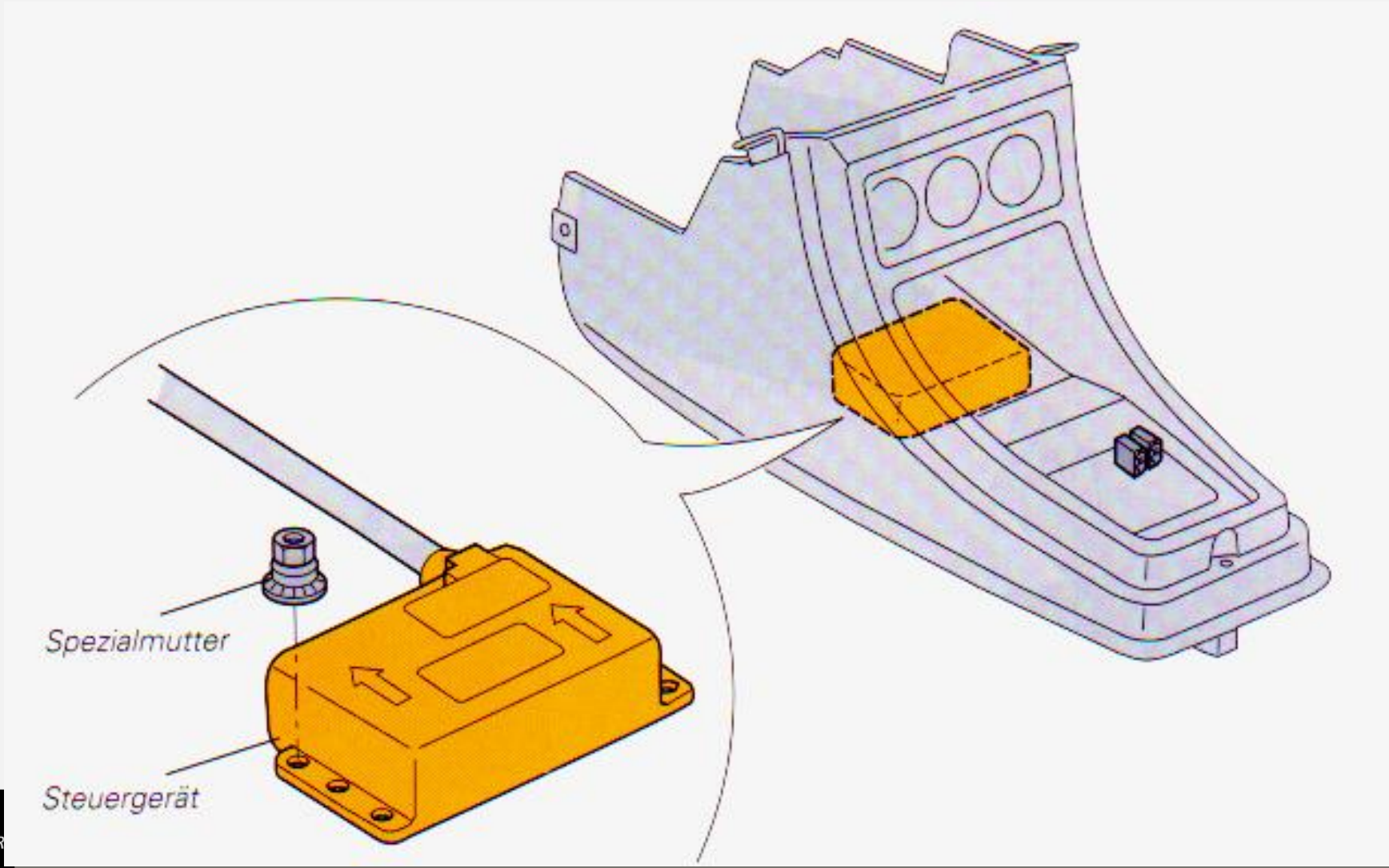
Postavitev krmilnika zračnih blazin



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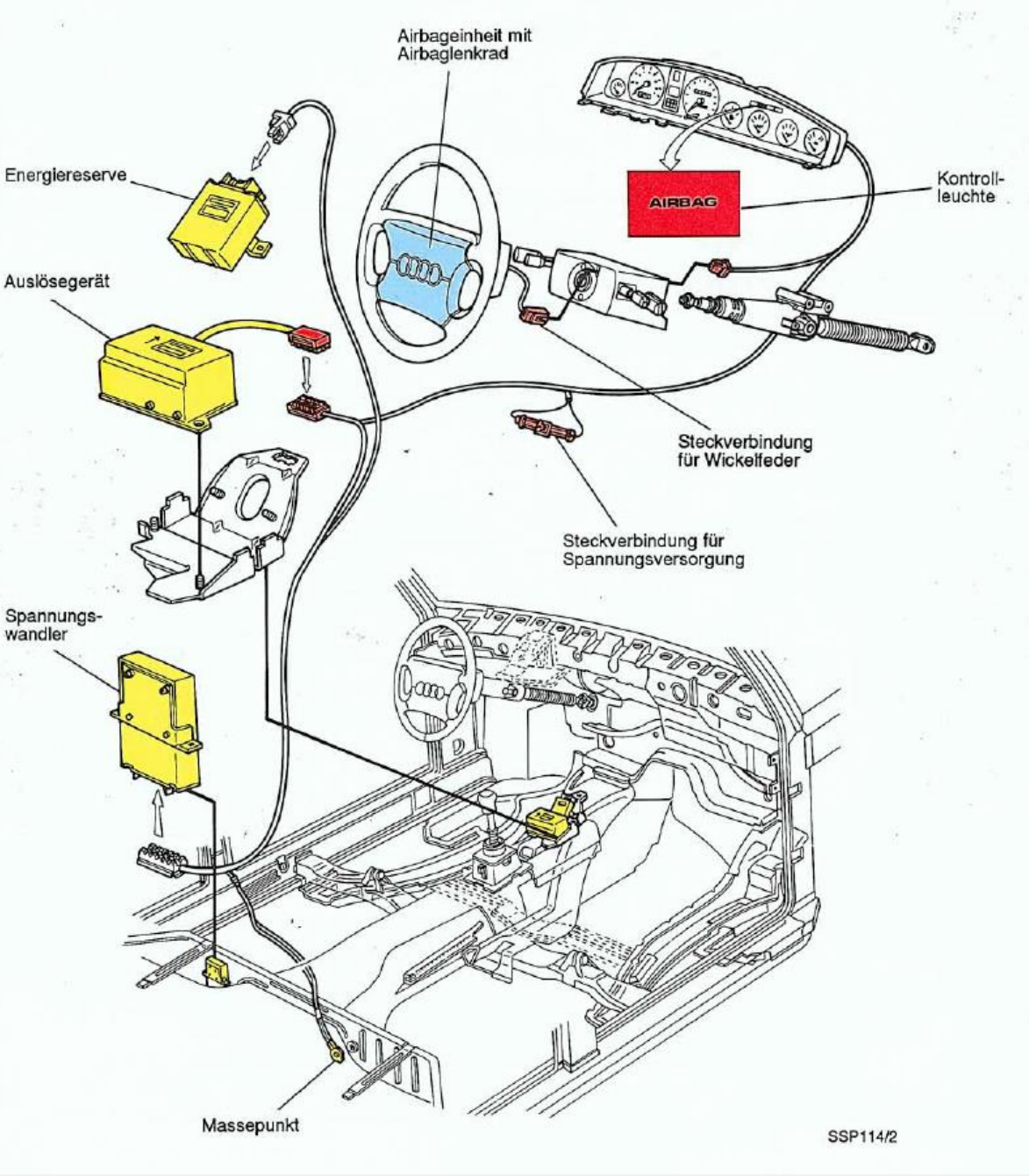

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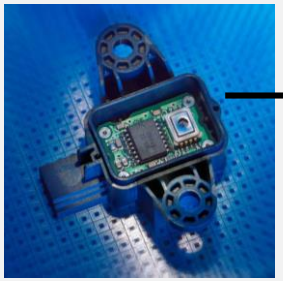
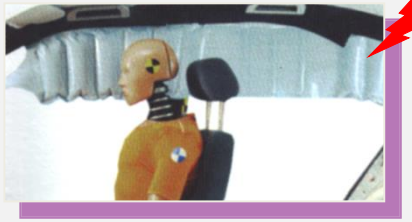
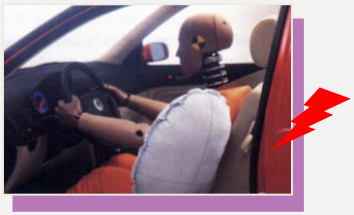
Shema delovanja sistema

Senzorji tlaka



Elektronika
zračnih blazin
Krmilna enota.





Senzorji pospeška

Napajanje,kontrola
signala
Shranjevanje informacij,
aktiviranje zračnih blazin

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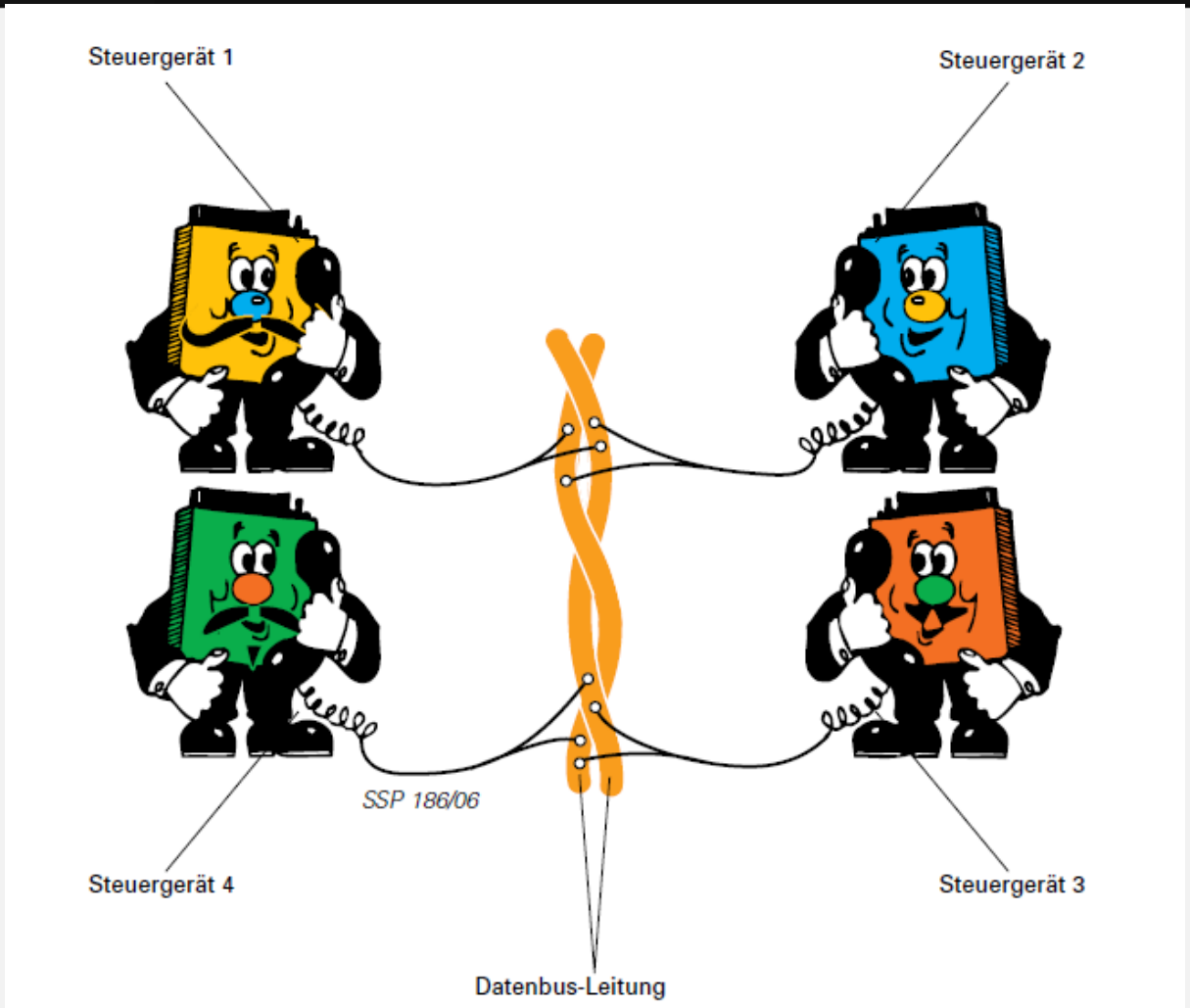
Komuniciranje modulov v vozilih



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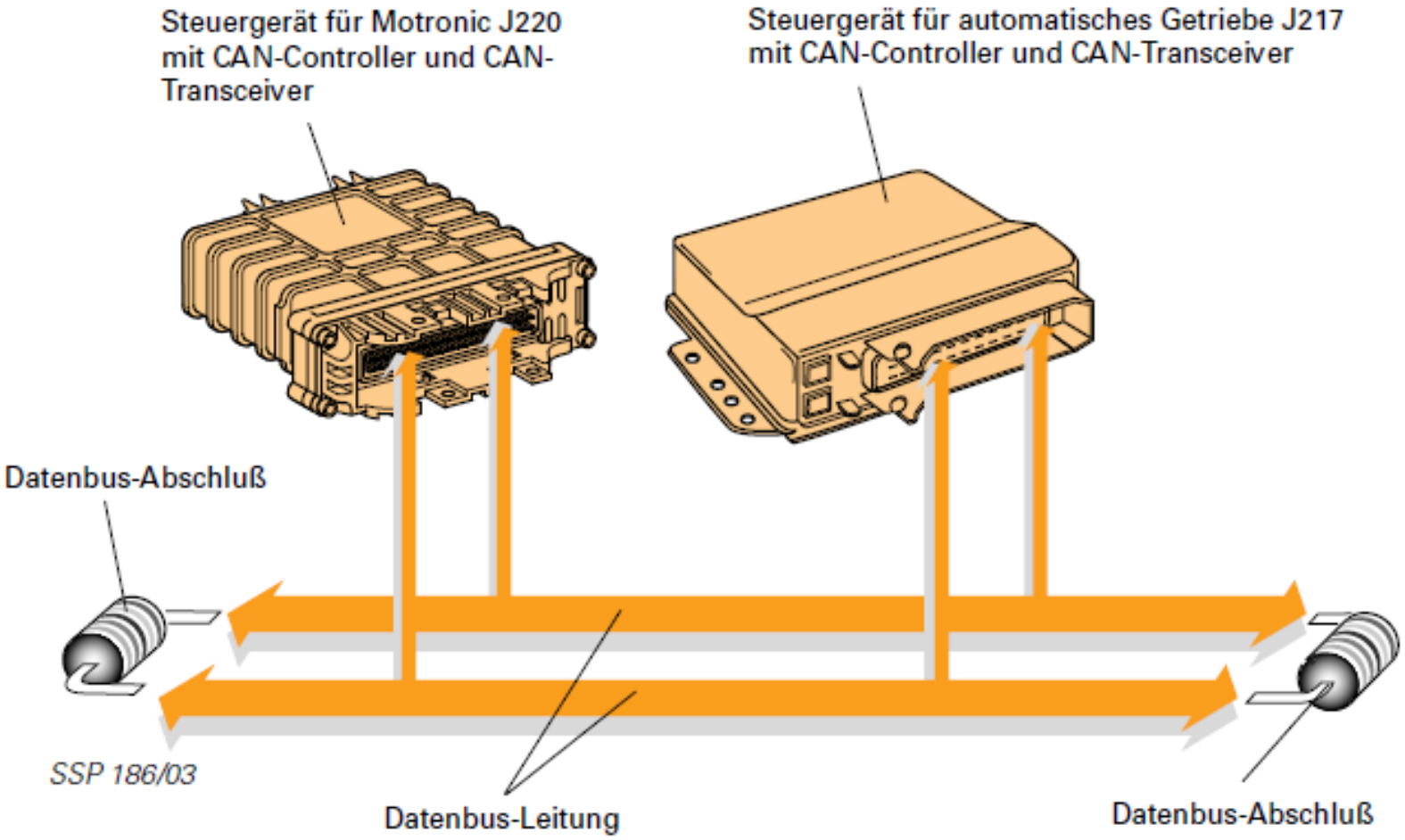
Komuniciranje modulov v vozilih



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EDR

Event Data Recorder (EDR) je funkcija ali naprava vgrajena v vozilu, katera snema tehnične informacije in informacije reagiranja voznika kratek čas pred, med in po trku.

Ti podatki so potrebni za nadzor varnostnih sistemov vozila. *(definition by NHTSA)*

Copyright: TRDARTS & Ruth Consulting LLC 2014

EDR-Event Data Recovery

Copyright: TRDARTS & Ruth Consulting LLC 2014

EDR

Razlika med EDR-om in črno skrinjico-"black box".

*"**EDR**" je vgrajen v vozilo, da bi snemal tehnične podatke vozila le za **kratek časovni period v primeru prometne nezgode.***

***"Črne skrinjice"** so precizne naprave za snemanje, ki se uporabljajo v letalih, vlakih in ladjah, za snemanje podatkov tekom cele uporabe vozila ali plovila. Snema se dosti več podatkov kot pri EDR-u.*

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ZAKAJ EDR?

- *Fizični dokazi (sledi zaviranja) zaradi ABS;ESP;ASR itd. niso vidni*
- *Napako voznika ali okvaro opreme je nemogoče odkriti brez EDR-a;*
- *Uvajanje telematike (ITS) v vozila kot je zaznavanje pešcev, komunikacija med vozili,... povečuje potrebo po EDR-u.*

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EDR DATA

BOSCH

CDR CRASH DATA RETRIEVAL SYSTEM

IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

CDR File Information

User Entered VIN	1D3HV13T69J506012
User	jeroen van Essen / hans Bot
Case Number	2009 438468-13
EDR Data Imaging Date	woensdag, januari 27 2010
Crash Date	zaterdag, december 26 2009
Filename	DODGE 4-VBH-27 1D3HV13T69J506012 ACM.CDR
Saved on	woensdag, januari 27 2010 at 10:43:05
Collected with CDR version	Crash Data Retrieval Tool 3.4
Reported with CDR version	Crash Data Retrieval Tool 3.4
EDR Device Type	airbag control module
Event(s) recovered	Most Recent Event

Comments

nieuwe uitlezing ivm softwareupdate 3.4

bandenmaat 275 / 60 R20

Data Limitations

AIRBAG CONTROL MODULE (ACM) DATA LIMITATIONS:

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Pre-Crash Data (Most Recent Event - table 1 of 5)

(the most recent sampled values are recorded prior to the event)

Time Stamp (sec)		Speed, Vehicle Indicated (MPH [km/h])		Engine Throttle, % Full	Accelerator Pedal, % Full	Raw Manifold Pressure (kPa)	Service Brake	Brake Switch #2 Status	Brake Lamps On
-5,0		91 [147]		9,8	0,0	54	Off	Open	No
-4,9		91 [147]		8,7	0,0	30	Off	Open	No
-4,8				8,3	0,0	22	Off	Open	No
-4,7				7,9	0,0	19	Off	Open	No
-4,6				7,5	0,0	18	On	Closed	Yes
-4,5	Complete	3.648	90 [145]	7,1	0,0	16	On	Closed	Yes
-4,4	Complete	3.552	89 [144]	6,7	0,0	15	On	Closed	Yes
-4,3	Complete	3.328	89 [143]	6,3	0,0	14	On	Closed	Yes
-4,2	Complete	3.072	88 [142]	5,5	0,0	14	On	Closed	Yes
-4,1	Complete	2.816	88 [141]	5,1	0,0	14	On	Closed	Yes
-4,0	Complete	2.560	86 [139]	4,3	0,0	14	On	Closed	Yes
-3,9	Complete	2.528	86 [138]	3,9	0,0	15	On	Closed	Yes
-3,8	Complete	2.496	85 [137]	3,9	0,0	15	On	Closed	Yes
-3,7	Complete	2.496	84 [135]	3,9	0,0	16	On	Closed	Yes
-3,6	Complete	2.496	83 [134]	3,9	0,0	16	On	Closed	Yes
-3,5	Complete	2.464	82 [132]	3,9	0,0	16	On	Closed	Yes
-3,4	Complete	2.400	81 [131]	3,9	0,0	16	On	Closed	Yes
-3,3	Complete	2.272	81 [130]	3,9	0,0	16	On	Closed	Yes
-3,2	Complete	2.176	80 [128]	3,5	0,0	17	On	Closed	Yes
-3,1	Complete	2.080	80 [128]	3,5	0,0	17	On	Closed	Yes
-3,0	Complete	2.016	80 [128]	3,5	0,0	18	On	Closed	Yes
-2,9	Complete	1.984	79 [127]	3,5	0,0	18	On	Open	Yes
-2,8	Complete	1.952	79 [127]	3,1	0,0	18	Off	Open	No
-2,7	Complete	1.952	79 [127]	3,1	0,0	18	Off	Open	No
-2,6	Complete	1.952	78 [126]	3,1	0,0	17	Off	Open	No
-2,5	Complete	1.920	78 [126]	5,9	4,7	18	Off	Open	No
-2,4	Complete	2.112	78 [126]	9,1	11,4	25	Off	Open	No
-2,3	Complete	2.240	78 [126]	10,2	12,6	34	Off	Open	No
-2,2	Complete	2.240	78 [126]	10,6	12,6	42	Off	Open	No
-2,1	Complete	2.208	78 [125]	10,6	12,6	46	Off	Open	No
-2,0	Complete	2.208	78 [125]	10,2	12,6	49	Off	Open	No
-1,9	Complete	2.144	78 [125]	10,2	12,6	43	Off	Open	No
-1,8	Complete	2.112	78 [125]	8,7	9,8	35	Off	Open	No
-1,7	Complete	2.112	78 [125]	4,3	0,0	30	On	Closed	Yes
-1,6	Complete	2.112	77 [124]	4,3	0,0	26	On	Closed	Yes
-1,5	Complete	2.080	76 [123]	3,9	0,0	22	On	Closed	Yes
-1,4	Complete	2.080	76 [122]	3,5	0,0				
-1,3	Complete	2.016	74 [119]	3,1	0,0				
-1,2	Complete	1.952	72 [116]	3,1	0,0	21	On	Closed	Yes
-1,1	Complete	1.888	69 [111]	3,1	0,0	19	On	Closed	Yes
-1,0	Complete	1.824	66 [106]	2,8	0,0	18	On	Closed	Yes
-0,9	Complete	1.760	67 [108]	2,8	0,0	18	On	Closed	Yes
-0,8	Complete	1.696	64 [103]	2,8	0,0	18	On	Closed	Yes
-0,7		58 [93]		2,8	0,0	18	On	Closed	Yes
-0,6		56 [90]		2,4	0,0	18	On	Closed	Yes
-0,5		53 [86]		2,4	0,0	18	On	Closed	Yes
-0,4				2,4	0,0	18	On	Closed	Yes
-0,3				2,4	0,0	18	On	Closed	Yes
-0,2				2,4	0,0	18	On	Closed	Yes
-0,1				2,4	0,0	19	On	Closed	Yes

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Pre-Crash Data (Most Recent Event - table 2 of 5)

(the most recent sampled values are recorded prior to the event)

Time Stamp (sec)	Panic Brake Assist Active (If equip.)			ESP Lamp (If equip.)	ESP Lamp Flashing Requested (If equip.)	ESP Disabled (If equip.)	Traction Control Button (If equip.)	ESP Active (If equip.)
-5,0	No			No	No	No	Off	Yes
-4,9				No	No	No	Off	Yes
-4,8				No	No	No	Off	Yes
-4,7				No	No	No	Off	Yes
-4,6				No	No	No	Off	Yes
-4,5				No	No	No	Off	Yes
-4,4				No	No	No	Off	Yes
-4,3				No	No	No	Off	Yes
-4,2				No	No	No	Off	Yes
-4,1				No	No	No	Off	Yes
-4,0	No	Off	Off	No	No	No	Off	Yes
-3,9	No	Off	Off	No	No	No	Off	Yes
-3,8	No	Off	Off	No	No	No	Off	Yes
-3,7	No	Off	Off	No	No	No	Off	Yes
-3,6	No	Off	Off	No	No	No	Off	Yes
-3,5	No	Off	Off	No	No	No	Off	Yes
-3,4	No	Off	Off	No	No	No	Off	Yes
-3,3	No	Off	Off	No	No	No	Off	Yes
-3,2	No	Off	Off	No	No	No	Off	Yes
-3,1	No	Off	Off	No	No	No	Off	Yes
-3,0	No	Off	Off	No	No	No	Off	Yes
-2,9	No	Off	Off	No	No	No	Off	Yes
-2,8	No	Off	Off	No	No	No	Off	Yes
-2,7	No	Off	Off	No	No	No	Off	Yes
-2,6	No	Off	Off	No	No	No	Off	Yes
-2,5	No	Off	Off	No	No	No	Off	Yes
-2,4	No	Off	Off	No	No	No	Off	Yes
-2,3	No	Off	Off	No	No	No	Off	Yes
-2,2	No	Off	Off	No	No	No	Off	Yes
-2,1	No	Off	Off	No	No	No	Off	Yes
-2,0	No	Off	Off	No	No	No	Off	Yes
-1,9	No	Off	Off	No	No	No	Off	Yes
-1,8	No	Off	Off	No	No	No	Off	Yes
-1,7	No	Off	Off	No	No	No	Off	Yes
-1,6	No	Off	Off	No	No	No	Off	Yes
-1,5	No	Off	Off	No	No	No	Off	Yes
-1,4	No	Off	Off	No	No	No	Off	Yes
-1,3	No	Off	Off	No	No	No	Off	Yes
-1,2	-1,1	No		No	No	No	Off	Yes
-1,1	-1,0	No		No	No	No	Off	Yes
-1,0	-0,9	No		No	No	No	Off	Yes
-0,9	-0,8	Yes		No	No	No	Off	Yes
-0,8	-0,7	Yes		No	No	No	Off	Yes
-0,7	-0,6	Yes		No	No	No	Off	Yes
-0,6				No	No	No	Off	Yes
-0,5				No	No	No	Off	Yes
-0,4				No	No	No	Off	Yes
-0,3	Yes	Off	Off	No	No	No	Off	Yes
-0,2	Yes	Off	Off	No	No	No	Off	Yes
-0,1	No	Off	Off	No	No	No	Off	Yes

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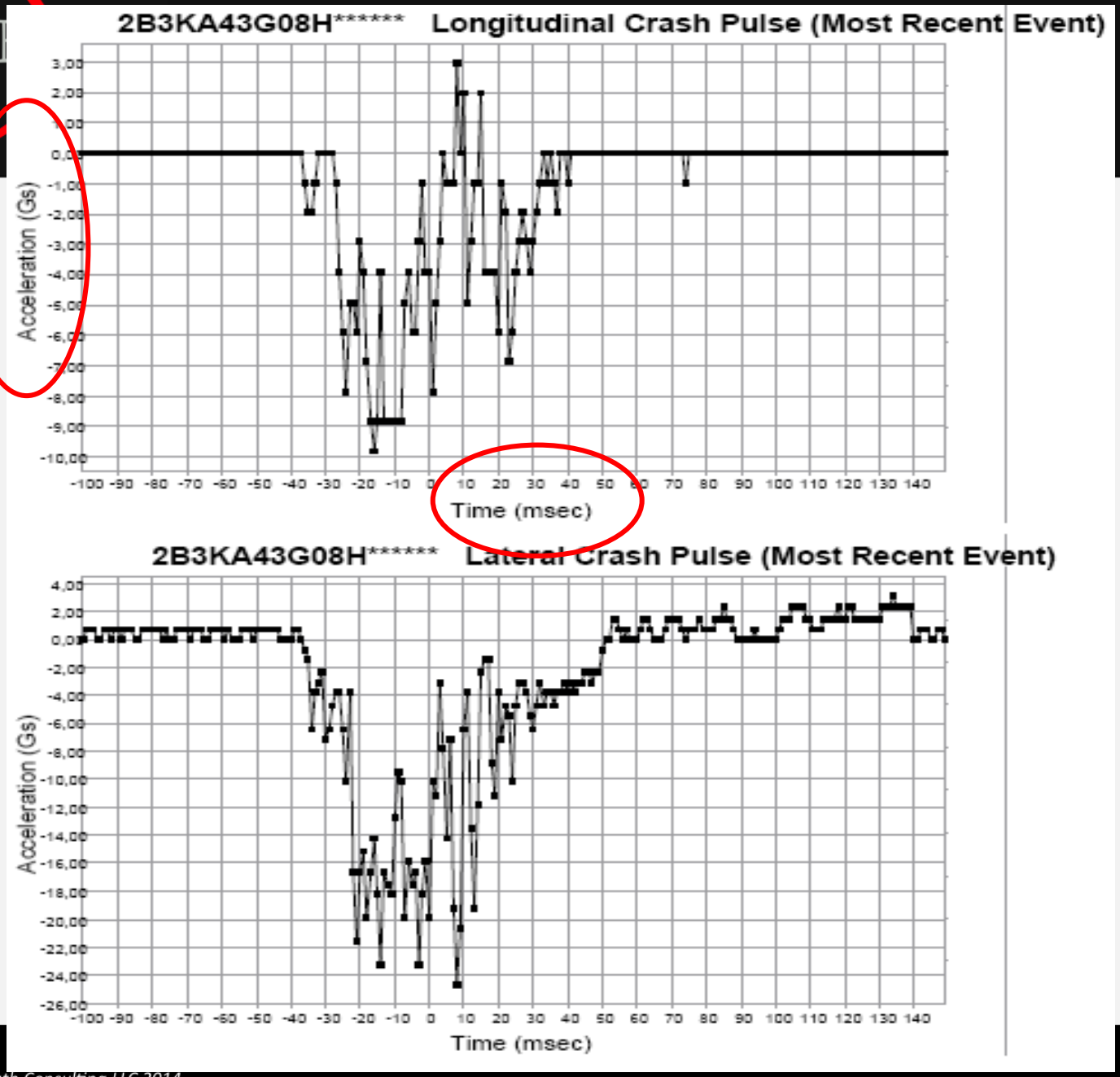

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FREEZE-FRAME DATA RECORDING

*Razvoj forenzičnega orodja s podjetjem **LAUNCH** za odčitavanje podatkov o prometni nezgodi za Evropska i Azijska vozila, katera še nimajo vgrajenega **EDR***

Status:

- *Razvojna faza- aktivna.*
- *Testna faza – v letu 2015 .*
- *Testna mednarodna faza – Oktober 2015.*

Razvoj:

- *Faza izobraževanja.*
- *Začetek predstavitve novega orodja.*

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Zaključek

1. *FDR je bil sprejet kot dokaz na sodišču;*
2. *Uvedba FDR bo postal pomemben del analiziranja in rekonstruiranja prometnih nezgod;*
3. *FDR bo pomagal pri razumevanju zakaj prihaja do nastanka prometnih nezgod.*

Več informacij o napravah za odčitavanje in FDR treningih najdete na naslednji povezavi:

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STRUKTURA IZOBRAŽEVANJA

Pripravlja se struktura izobraževanja znotraj EUDARTS združenja. Vizija EUDARTS združenja je, da se ustvari poseben portfelj rešitev s področja elektronike s področja elektronskih sklopov vozil, katera bodo na voljo določenim strankam in potrebam policije.

Obstajala bosta dva načina (TRDARTS) kot posamezniki in (EUDARTS) kot skupina. Struktura delovanja:

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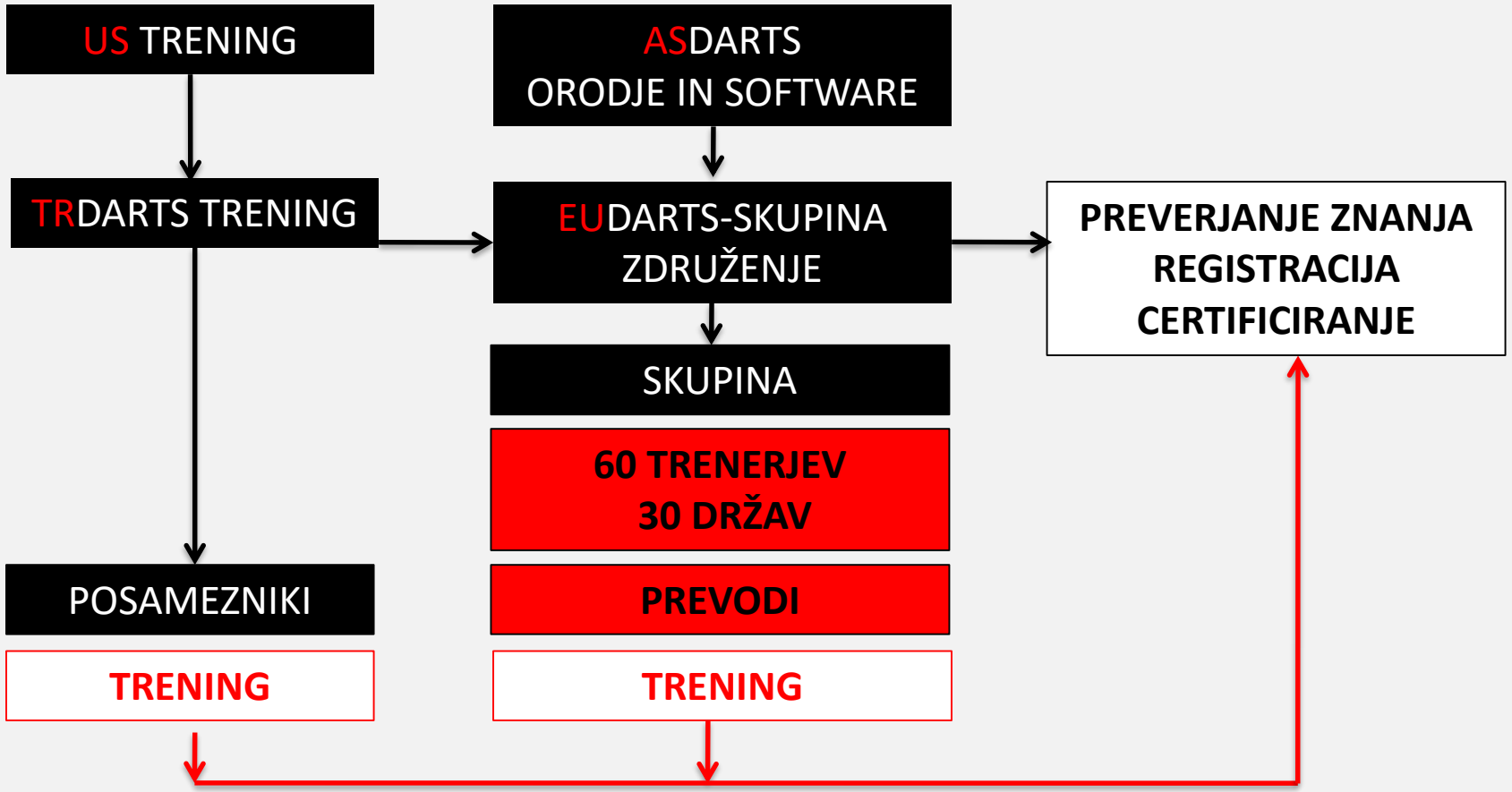
STRUKTURA IZOBRAŽEVANJA



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TESTIRANJE IN VREDNOTENJE PODATKOV

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POVZETEK

1. *EDR/CDR je bil sprejet na sodiščih kot dokaz;*
2. *Implementacija EDR bo postala ključna za analize in rekonstrukcije prometnih nezgod;*
3. *EDR bo pomagal pri razumevanju zakaj je do prometne nezgode prišlo in tako se bodo lahko uvajali novi ukrepi za izboljšanje prometne varnosti.*

Verč informacij o Bosch CDR napravah in CDR izobraževanjih poiščite na:
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US – ZNAMKE VOZIL EUROPA

USER COURSE

CHRYSLER

DODGE

RAM

DODGE

Jeep

Ford

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EUROPEAN ACTIVATION

USER COURSE

S60	S80/S80L	V60	V70	XC60	XC70
MY					
2011		2011			
2012		2012			
2013	2013	2013	2013	2013	2013
2014	2014	2014	2014	2014	2014
2015	2015	2015	2015	2015	2015

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EUROPEAN ACTIVATION

USER COURSE

Thema	Grand Voyager	Flavia	FIAT Freemont
Model Year			Model Year
2012	2012	2012	2012
2013	2013	2013	2013
2014	2014	2014	2014

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EUROPEAN ACTIVATION

CDR
USER COURSE

Toyota (Various MY2001 - MY2015, European Market)
Lexus CT200h, ES, GS, IS, LF-A, LS, LX, RX
Toyota 86, Auris, Avalon, Avensis, Ayg,
Celsior, Corolla, Corolla Verso, Dyna, ES/Camry, Harrier,
Hilux, Ist, LandCruiser/Prado, Prius, Ractis, RAV4/Vanguard,
Toyoace, Verso-S + Yaris.
*Some types from model **year 2001***

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EUROPEAN ACTIVATION

USER COURSE

V BLIŽNJI PRIHODNOSTI SE PRIČAKUJE AKTIVACIJA:

Pričakuje se tudi EU regulativa 2017 –

V prihodnje bo vse več znamk vozil aktiviralo EDR

Copyright: EUDARTS & TRDARTS & ASDARTS

EDR Primer

Rotterdam 26.12. 2009

Trk s smrtnim izzidom med
Dodge Ram in Ford Focus

Prve ugotovitve na kraju nesreče:

- *Dodge je vozil na prednostni cesti;*
- *Ford ni pustil prednosti;*
- *Začetni vtis:* ***Voznik FORDA je kriv***

Copyright: TRDARTS & Ruth Consulting LLC 2014

EDR Primer

Informacije pridobljene s kraja nesreče

- *4 mrtvi*
- *1 poškodovan*
- *Maksimalna hitrost: 30km/h*

Informacije pridobljene s CDR v Dodge Ram

- *Hitrost 5 sekund pred trkom: 147 km/h*
- *Hitrost ob trku: 86 km/h*

Voznik Dodge-a je kriv

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CDR Podatki

BOSCH

CDR CRASH DATA RETRIEVAL SYSTEM

IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

CDR File Information

User Entered VIN	1D3HV13T69J506012
User	jeroen van Essen / hans Bot
Case Number	2009 438468-13
EDR Data Imaging Date	woensdag, januari 27 2010
Crash Date	zaterdag, december 26 2009
Filename	DODGE 4-VBH-27 1D3HV13T69J506012_ACM.CDR
Saved on	woensdag, januari 27 2010 at 10:43:05
Collected with CDR version	Crash Data Retrieval Tool 3.4
Reported with CDR version	Crash Data Retrieval Tool 3.4
EDR Device Type	airbag control module
Event(s) recovered	Most Recent Event

Comments

nieuwe uitlezing ivm softwareupdate 3.4

bandenmaat 275 / 60 R20

Data Limitations

AIRBAG CONTROL MODULE (ACM) DATA LIMITATIONS:

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Pre-Crash Data (Most Recent Event - table 1 of 5)

(the most recent sar… …ent)

Time Stamp (sec)	Vehicle Event Recorde Status	Speed, Vehicle Indicated (MPH [km/h])			Accelerator Pedal, % Full	Raw Manifold Pressure (kPa)	Service Brake	Brake Switch #2 Status	Brake Lamps On
-5,0	Complete				0,0	54	Off	Open	No
-4,9	Complete				0,0	30	Off	Open	No
-4,8	Complete				0,0	22	Off	Open	No
-4,7	Complete				0,0	19	Off	Open	No
-4,6	Complete				0,0	18	On	Closed	Yes
-4,5	Complete				0,0	16	On	Closed	Yes
-4,4	Complete				0,0	15	On	Closed	Yes
-4,3	Complete	3.328	89 [143]	5,5	0,0	14	On	Closed	Yes
-4,2	Complete	3.072	88 [142]	5,5	0,0	14	On	Closed	Yes
-4,1	Complete	2.816	88 [141]	5,1	0,0	14	On	Closed	Yes
-4,0	Complete	2.560	86 [139]	4,3	0,0	14	On	Closed	Yes
-3,9	Complete	2.528	86 [138]	3,9	0,0	15	On	Closed	Yes
-3,8	Complete	2.496	85 [137]	3,9	0,0	15	On	Closed	Yes
-3,7	Complete	2.496	84 [135]	3,9	0,0	16	On	Closed	Yes
-3,6	Complete	2.496	83 [134]	3,9	0,0	16	On	Closed	Yes
-3,5	Complete	2.464	82 [132]	3,9	0,0	16	On	Closed	Yes
-3,4	Complete	2.400	81 [131]	3,9	0,0	16	On	Closed	Yes
-3,3	Complete	2.272	81 [130]	3,9	0,0	16	On	Closed	Yes
-3,2	Complete	2.176	80 [128]	3,5	0,0	17	On	Closed	Yes
-3,1	Complete	2.080	80 [128]	3,5	0,0	17	On	Closed	Yes
-3,0	Complete	2.016	80 [128]	3,5	0,0	18	On	Closed	Yes
-2,9	Complete	1.984	79 [127]	3,5	0,0	18	On	Open	Yes
-2,8	Complete	1.952	79 [127]	3,1	0,0	18	Off	Open	No
-2,7	Complete	1.952	79 [127]	3,1	0,0	18	Off	Open	No
-2,6	Complete	1.952	78 [126]	3,1	0,0	17	Off	Open	No
-2,5	Complete	1.920	78 [126]	5,9	4,7	18	Off	Open	No
-2,4	Complete	2.112	78 [126]	9,1	11,4	25	Off	Open	No
-2,3	Complete	2.240	78 [126]	10,2	12,6	34	Off	Open	No
-2,2	Complete	2.240	78 [126]	10,6	12,6	42	Off	Open	No
-2,1	Complete	2.208	77 [124]	10,6	12,6	43	Off	Open	No
-2,0	Complete	2.208	77 [124]	10,6	12,6	35	Off	Open	No
-1,9	Complete	2.144	77 [124]	10,6	12,6	30	On	Closed	Yes
-1,8	Complete	2.112	77 [124]	10,6	12,6	26	On	Closed	Yes
-1,7	Complete	2.112	77 [124]	10,6	12,6	22	On	Closed	Yes
-1,6	Complete	2.112	77 [124]	10,6	12,6	21	On	Closed	Yes
-1,5	Complete	2.080	76 [122]	10,6	12,6	20	On	Closed	Yes
-1,4	Complete	2.080	76 [122]	10,6	12,6	20	On	Closed	Yes
-1,3	Complete	2.016	75 [121]	10,6	12,6	20	On	Closed	Yes
-1,2	Complete	1.952	72 [116]	3,1	0,0	21	On	Closed	Yes
-1,1	Complete	1.888	69 [111]	3,1	0,0	19	On	Closed	Yes
-1,0	Complete	1.824	67 [107]	3,1	0,0	18	On	Closed	Yes
-0,9	Complete	1.792	64 [103]	3,1	0,0	18	On	Closed	Yes
-0,8	Complete	1.760	62 [100]	3,1	0,0	18	On	Closed	Yes
-0,7	Complete	1.728	60 [96]	3,1	0,0	18	On	Closed	Yes
-0,6	Complete	1.696	58 [93]	3,1	0,0	18	On	Closed	Yes
-0,5	Complete	1.664	56 [90]	3,1	0,0	18	On	Closed	Yes
-0,4	Complete	1.632	53 [86]	3,1	0,0	18	On	Closed	Yes
-0,3	Complete	1.600	51 [82]	3,1	0,0	18	On	Closed	Yes
-0,2	Complete	1.568	49 [79]	3,1	0,0	18	On	Closed	Yes
-0,1	Complete	1.536	47 [75]	3,1	0,0	19	On	Closed	Yes

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recent sample

Event - table 2 of 5)

orded prior to the event)

	Panic Brake Assist Active (If equip.)		MIL (If equip.)	ESP Lamp (If equip.)	ESP Lamp Flashing Requested (If equip.)	ESP Disabled (If equip.)	Traction Control Button (If equip.)	ESP Active (If equip.)
			ff	No	No	No	Off	Yes
			ff	No	No	No	Off	Yes
			ff	No	No	No	Off	Yes
			ff	No	No	No	Off	Yes
			ff	No	No	No	Off	Yes
			ff	No	No	No	Off	Yes
			ff	No	No	No	Off	Yes
			ff	No	No	No	Off	Yes
-4,2	No	Off	Off	No	No	No	Off	Yes
-4,1	No	Off	Off	No	No	No	Off	Yes
-4,0	No	Off	Off	No	No	No	Off	Yes
-3,9	No	Off	Off	No	No	No	Off	Yes
-3,8	No	Off	Off	No	No	No	Off	Yes
-3,7	No	Off	Off	No	No	No	Off	Yes
-3,6	No	Off	Off	No	No	No	Off	Yes
-3,5	No	Off	Off	No	No	No	Off	Yes
-3,4	No	Off	Off	No	No	No	Off	Yes
-3,3	No	Off	Off	No	No	No	Off	Yes
-3,2	No	Off	Off	No	No	No	Off	Yes
-3,1	No	Off	Off	No	No	No	Off	Yes
-3,0	No	Off	Off	No	No	No	Off	Yes
-2,9	No	Off	Off	No	No	No	Off	Yes
-2,8	No	Off	Off	No	No	No	Off	Yes
-2,7	No	Off	Off	No	No	No	Off	Yes
-2,6	No	Off	Off	No	No	No	Off	Yes
-2,5	No	Off	Off	No	No	No	Off	Yes
-2,4	No	Off	Off	No	No	No	Off	Yes
-2,3	No	Off	Off	No	No	No	Off	Yes
-2,2	No	Off	Off	No	No	No	Off	Yes
-2,1	No	Off	Off	No	No	No	Off	Yes
-2,0	No	Off	Off	No	No	No	Off	Yes
-1,9	No	Off	Off	No	No	No	Off	Yes
-1,8	No	Off	Off	No	No	No	Off	Yes
-1,7	No	Off	Off	No	No	No	Off	Yes
-1,6	No	Off	Off	No	No	No	Off	Yes
-1,5	No	Off	Off	No	No	No	Off	Yes
-1,4	No	Off	Off	No	No	No	Off	Yes
-1,3	No	Off	Off	No	No	No	Off	Yes
-1,2	No	Off	Off	No	No	No	Off	Yes
				No	No	No	Off	Yes
				No	No	No	Off	Yes
				No	No	No	Off	Yes
				No	No	No	Off	Yes
				No	No	No	Off	Yes
				No	No	No	Off	Yes
				No	No	No	Off	Yes
				No	No	No	Off	Yes
				No	No	No	Off	Yes
				No	No	No	Off	Yes
				No	No	No	Off	Yes

Panic Brake Assist Active (If equip.)
No

-1,1	No
-1,0	No
-0,9	No
-0,8	Yes
-0,7	Yes
-0,6	Yes

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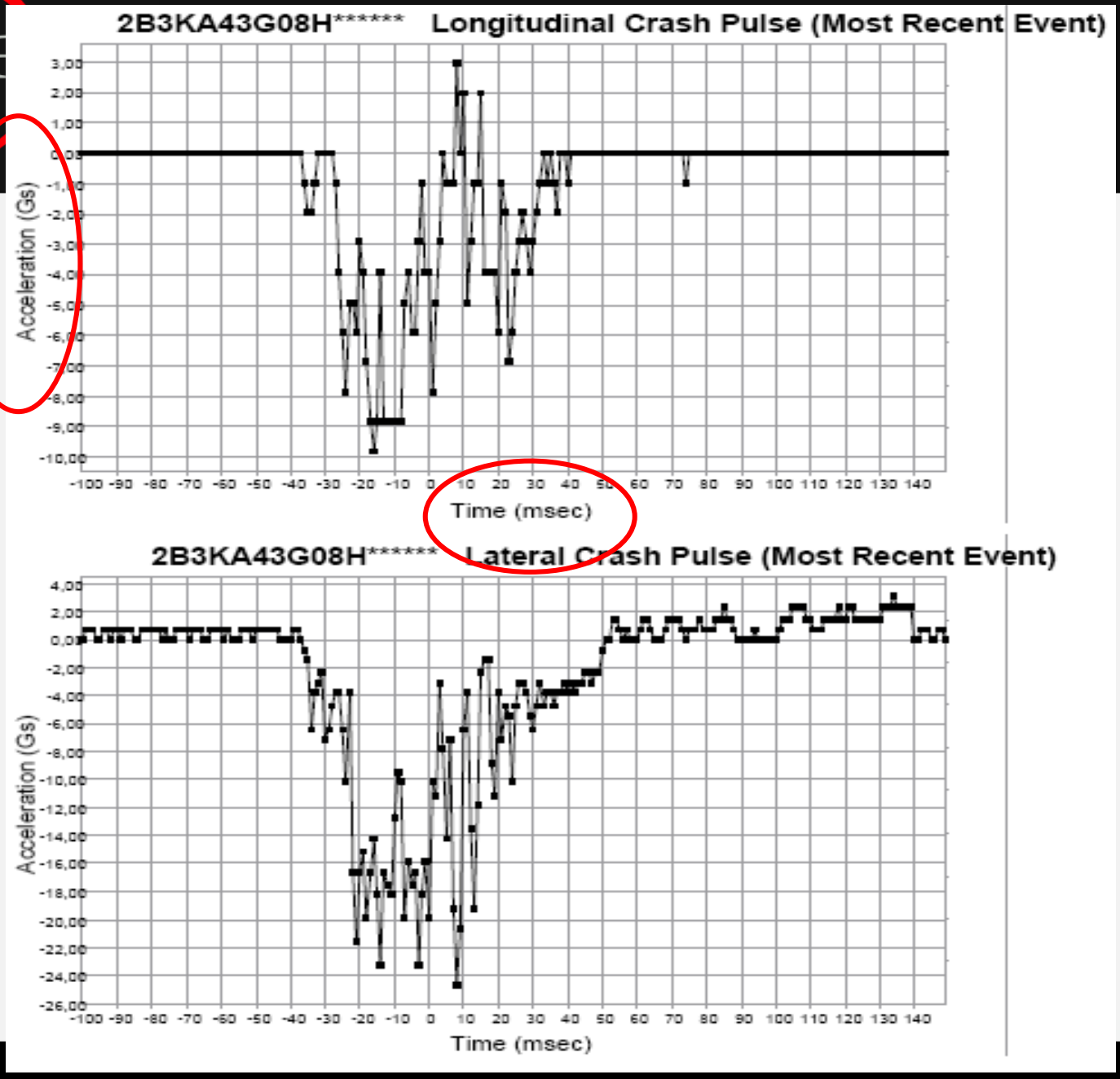

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Potrjevanje podatkov

- *Za potrditev podatkov s tehnologijo EDR je bila izvedena popolna rekonstrukcija gibanja vozila;*
- *Lokacija: vzlotno-pristajalna steza starega vojaškega letališča;*
- *V sodelovanju z NFI, TRW(ECU dobavitelj Dodge);*
- *Povabljeni so bili tudi preiskovalni sodnik, tožilec in odvetnik obtoženega*

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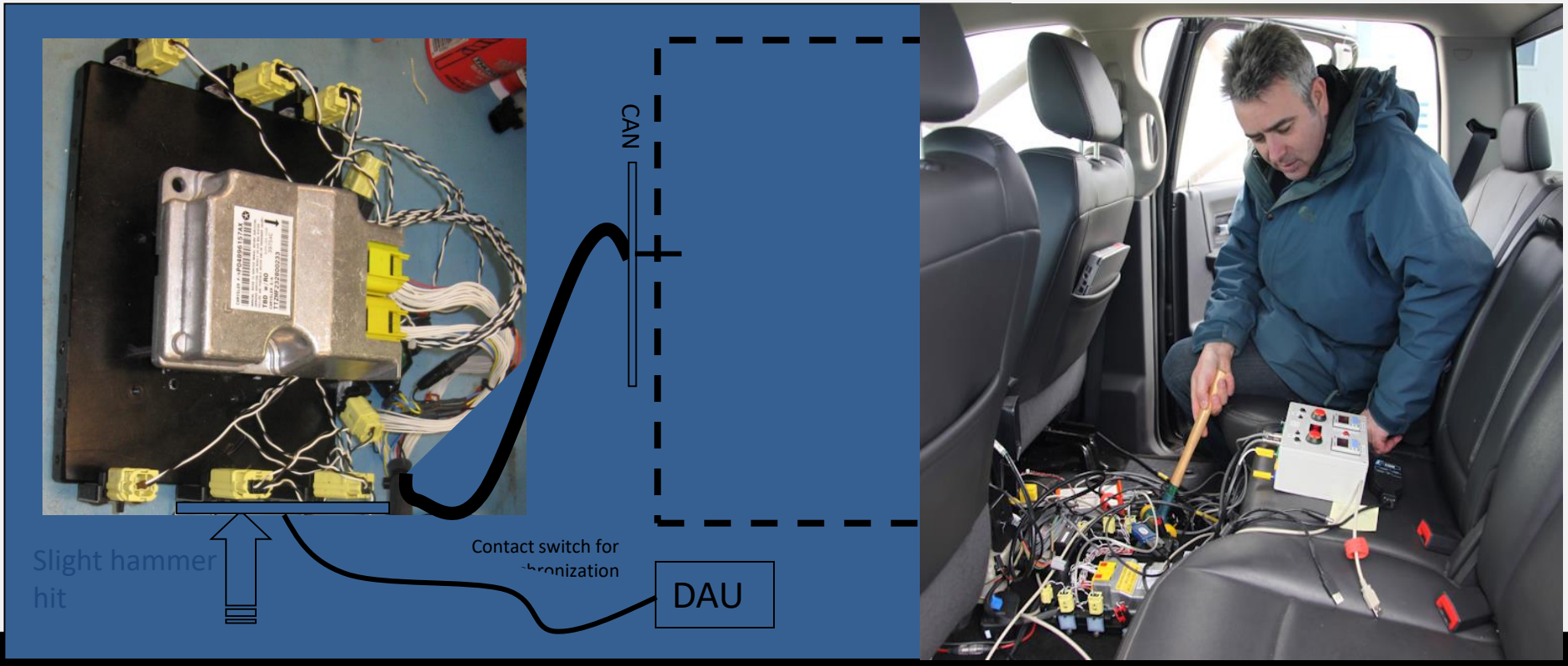
Potrjevanje podatkov

- *Ustvarjeni so bili enaki podatki pri hitrosti 147 km/h.*
- *Računalnik vozila dela pri hitrosti 500 kBps in pošilja 16 bit podatkovne baze.*



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Potrjevanje podatkov

Prenos podatkov v dejanski hitrosti z zunanjim CAN BUS omrežjem

500KPS Optično merjenje

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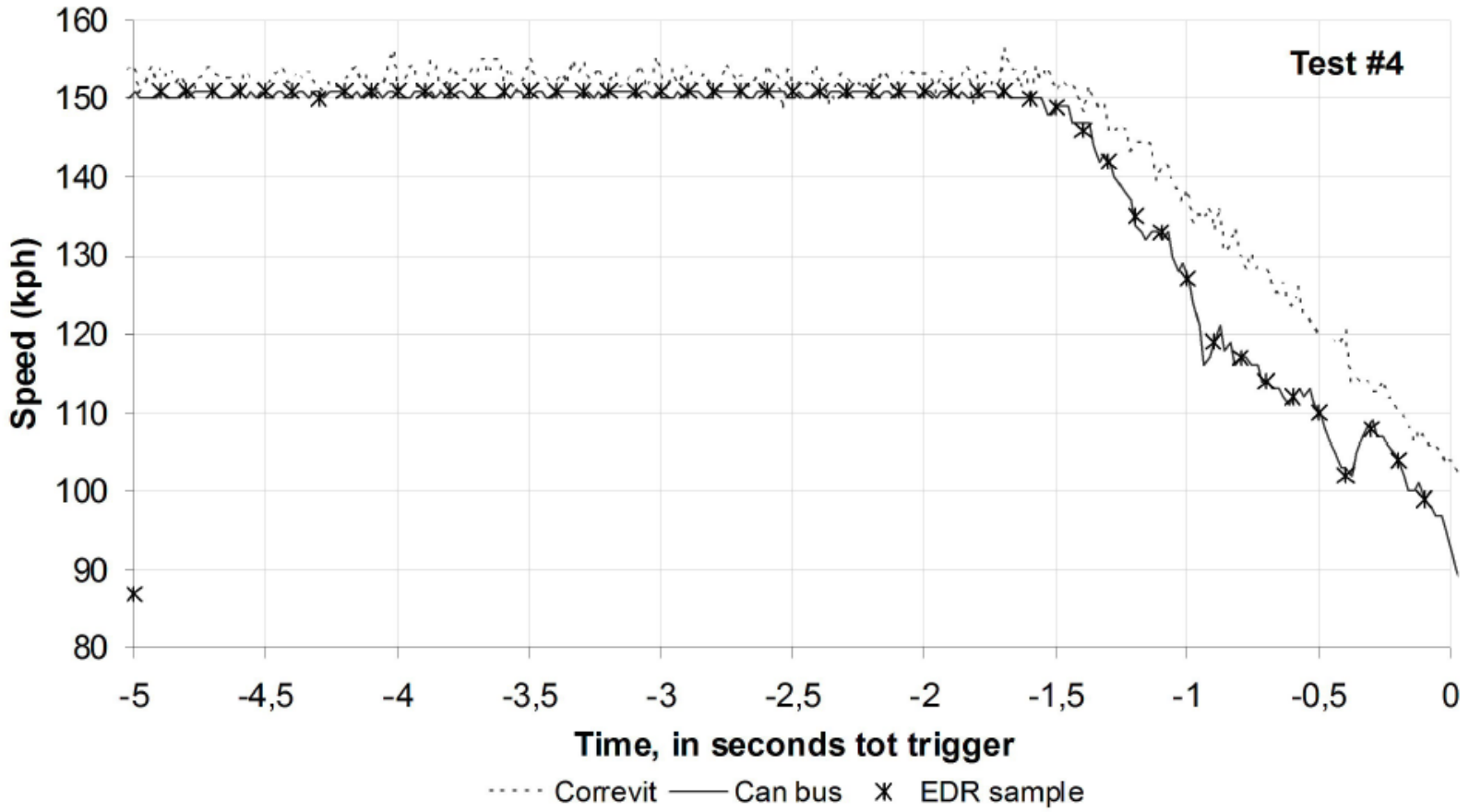
Potrjevanje podatkov

Prenos podatkov v dejanski hitrosti z zunanjim CAN BUS omrežjem



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Primeri iz prakse-

uporaba orodja za odčitavanje podatkov iz vozil

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Digitalna forenzika vozil

Zakaj digitalna forenzika

- Znano je, da standardne metode rekonstruiranja prometnih nezgod imajo svoje omejitve.

- Znano je, da elektronski sistemi v vozilih vsebujejo zelo pomembne podatke vezane na prometno nezgodo in identiteto samega vozila. Zelo je pomembno, da se pridobljeni podatki interpretirajo na pravi način in z veliko mero previdnosti, da ne bi prihajalo do napak in lažnih interpretacij.

- **Uporaba orodja za digitalno forenziko vozil,** je bodočnost za rekonstrukcije prometnih nezgod in za odkrivanje prevar pri zavarovalnicah.

- Brez inovativnih pristopov je nemogoče dokazovati prevare pri zavarovalnicah.

- S pomočjo orodja za digitalno forenziko se lahko odkrijejo prevare, katere bi, brez tega novega pristopa, ostale neodkrite.

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Odčitavanje z napravo Bosch CDR

BOSCH

CDR CRASH DATA RETRIEVAL

IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

CDR File Information

User Entered VIN	SB1BE76L00E005436
User	Jože Škrilec
Case Number	Toyota test
EDR Data Imaging Date	10/25/2014
Crash Date	09/10/2014
Filename	SB1BE76L00E005436_ACM.CDRX
Saved on	Saturday, October 25 2014 at 11:37:09
Collected with CDR version	Crash Data Retrieval Tool 14.1
Reported with CDR version	Crash Data Retrieval Tool 14.1
EDR Device Type	Airbag Control Module
Event(s) recovered	Side (1)

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Data Element Sign Convention:
The following table provides an explanation of the sign notation of data elements that may be included in this CDR report.

Data Element Name	Positive Sign Notation Indicates
Max. Longitudinal DeltaV	Forward
Longitudinal DeltaV	Forward
Max. Lateral DeltaV , B-Pillar Sensor	Outside to Inside
Max. Lateral DeltaV , C-Pillar Sensor	Outside to Inside
Lateral DeltaV , B-Pillar Sensor	Outside to Inside
Lateral DeltaV , C-Pillar Sensor	Outside to Inside
Lateral DeltaV , Airbag ECU Sensor	Left to Right
Roll Angle Peak	Clockwise Rotation
Roll Angle	Clockwise Rotation
Lateral Acceleration , Airbag ECU Sensor *	Right to Left

* For sensing a rollover

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System Status at Time of Retrieval

ECU Part Number	89170-05230
ECU Generation	02EDR
Recording Status, All Pages	N/A
Diagnostic Trouble Codes Exist	No
Total Number of Front/Rear Crash Events	0
Freeze Signal	ON

Side/Rollover Event Record Summary at Retrieval

Events Recorded	Recording Status
Side Crash	Not Supported

System Status at Side Event

Recorded Side	Right Side
Side Airbag Disable Status	Enable
Deployed Side	Right Side

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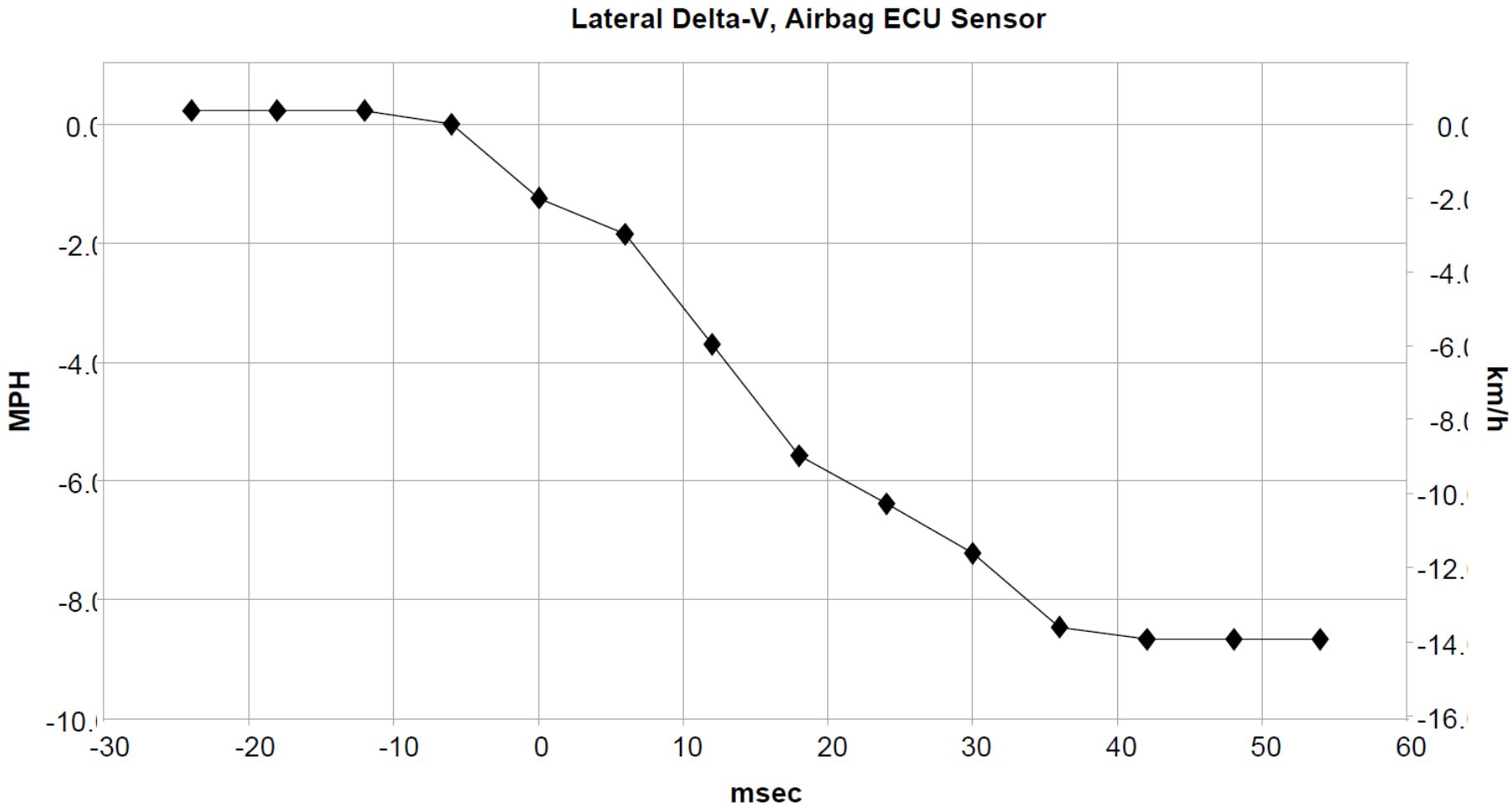
Lateral Crash Pulse for Side Event (table 1 of 2)

Max Lateral Delta-V, B-Pillar Sensor (MPH [km/h])	8.3 [13.3]
Max Lateral Delta-V, C-Pillar Sensor (MPH [km/h])	29.2 [47.0]



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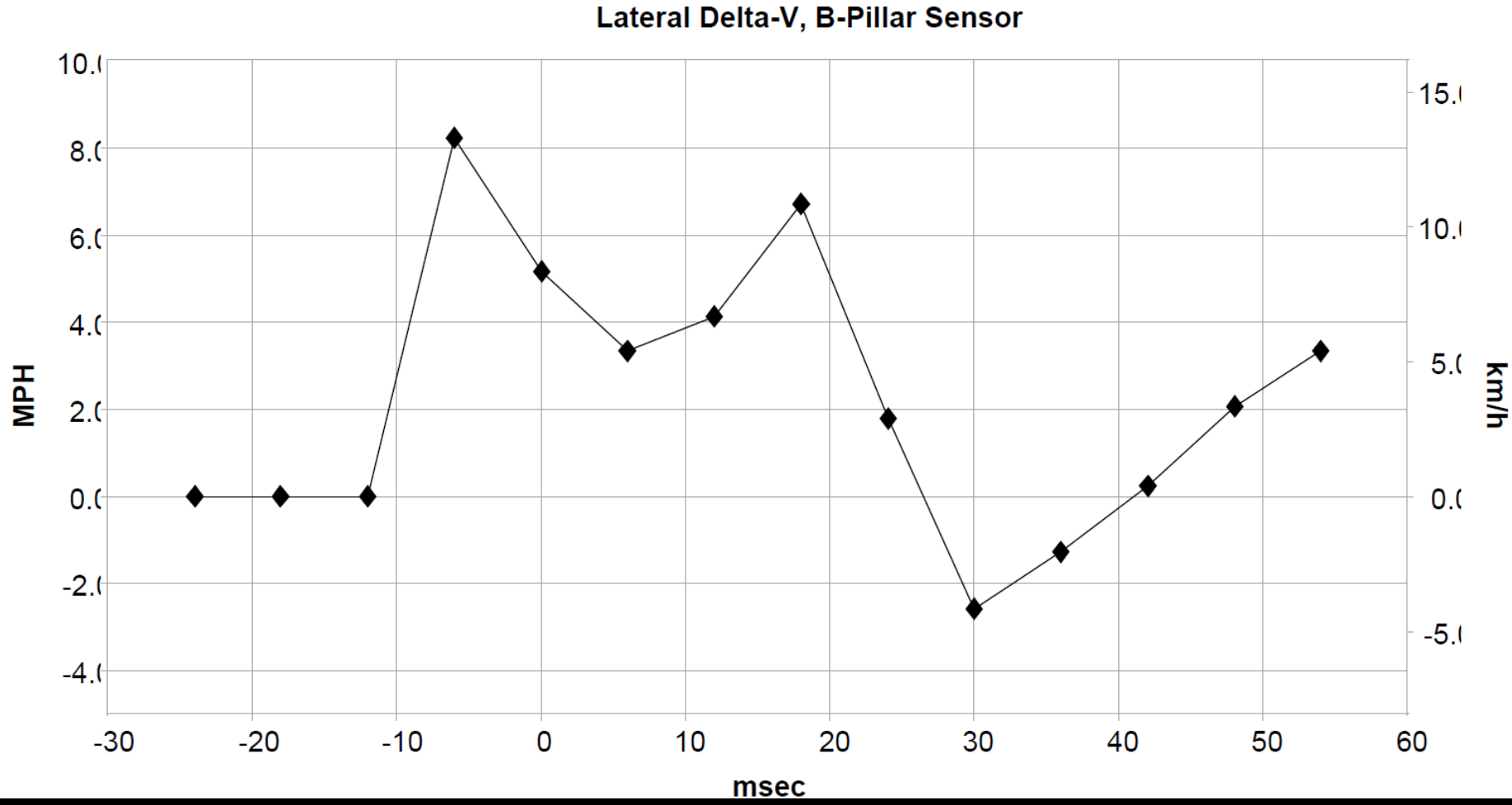

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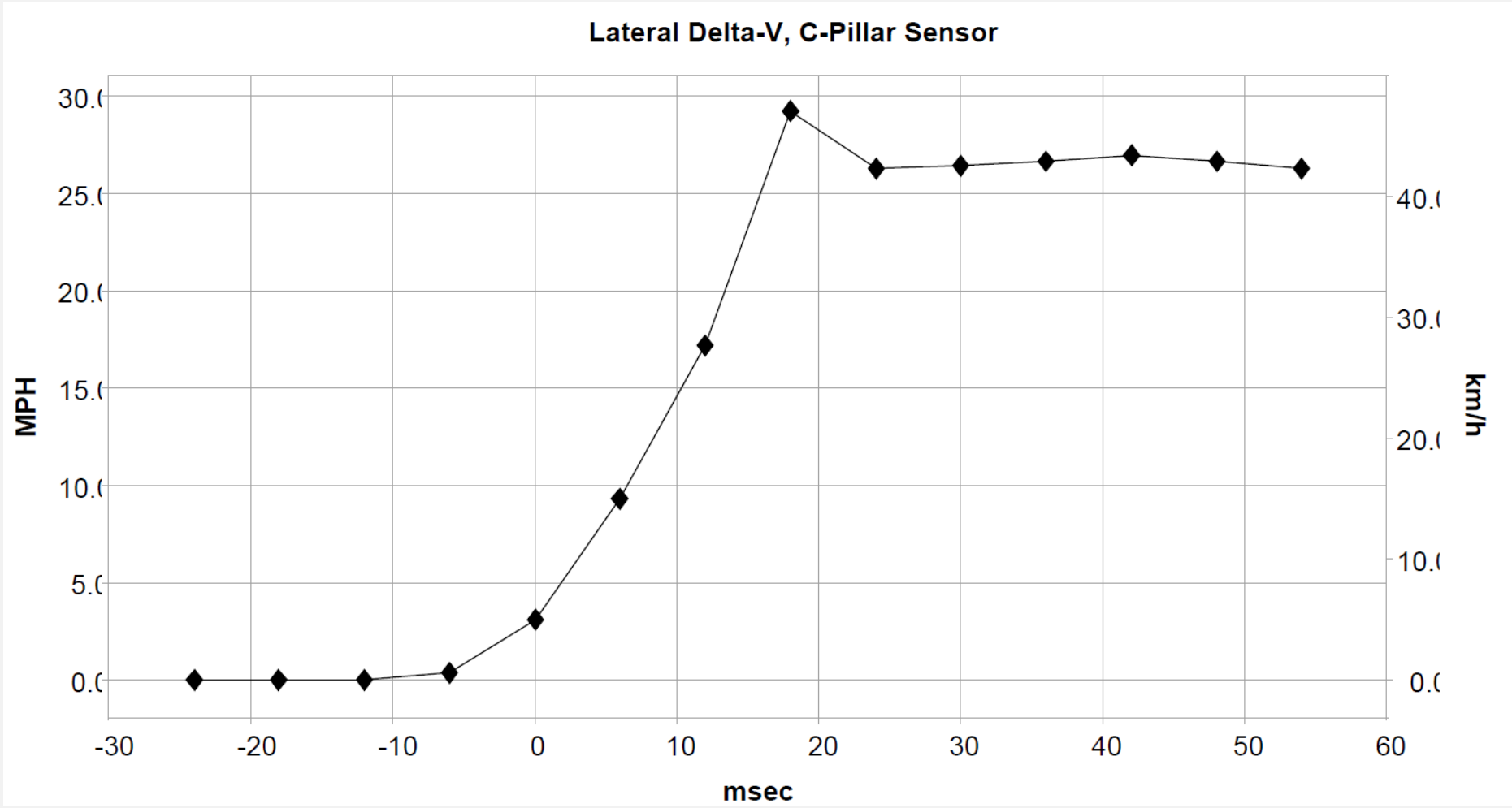

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Lateral Crash Pulse for Side Event (table 2 of 2)

Time (msec)	Lateral Delta-V, Airbag ECU Sensor (MPH [km/h])	Lateral Delta-V, B-Pillar Sensor (MPH [km/h])	Lateral Delta-V, C-Pillar Sensor (MPH [km/h])
-24	0.2 [0.3]	0.0 [0.0]	0.0 [0.0]
-18	0.2 [0.3]	0.0 [0.0]	0.0 [0.0]
-12	0.2 [0.3]	0.0 [0.0]	0.0 [0.0]
-6	0.0 [0.0]	8.3 [13.3]	0.3 [0.6]
0	-1.2 [-2.0]	5.2 [8.3]	3.1 [5.0]
6	-1.9 [-3.0]	3.4 [5.4]	9.3 [14.9]
12	-3.7 [-6.0]	4.1 [6.6]	17.2 [27.7]
18	-5.6 [-9.0]	6.7 [10.8]	29.2 [47.0]
24	-6.4 [-10.3]	1.8 [2.9]	26.3 [42.3]
30	-7.2 [-11.6]	-2.6 [-4.2]	26.5 [42.6]
36	-8.5 [-13.6]	-1.3 [-2.1]	26.7 [42.9]
42	-8.7 [-13.9]	0.3 [0.4]	27.0 [43.4]
48	-8.7 [-13.9]	2.1 [3.3]	26.7 [42.9]
54	-8.7 [-13.9]	3.4 [5.4]	26.3 [42.3]

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Renault Megane- Maribor

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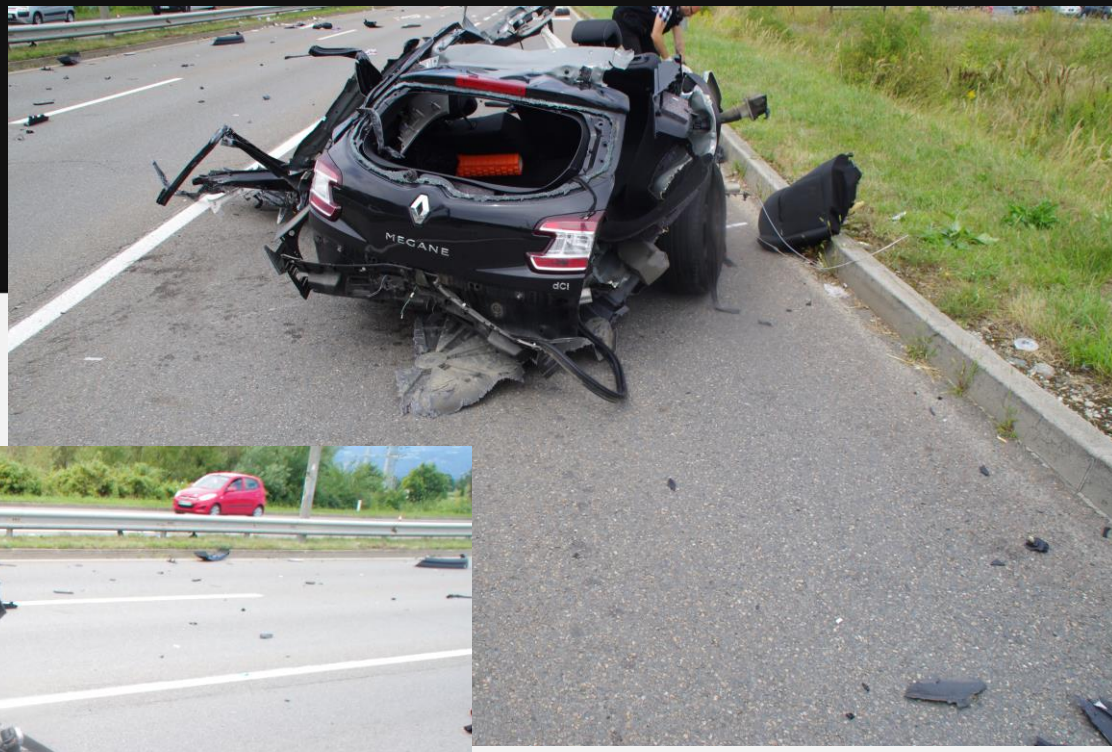

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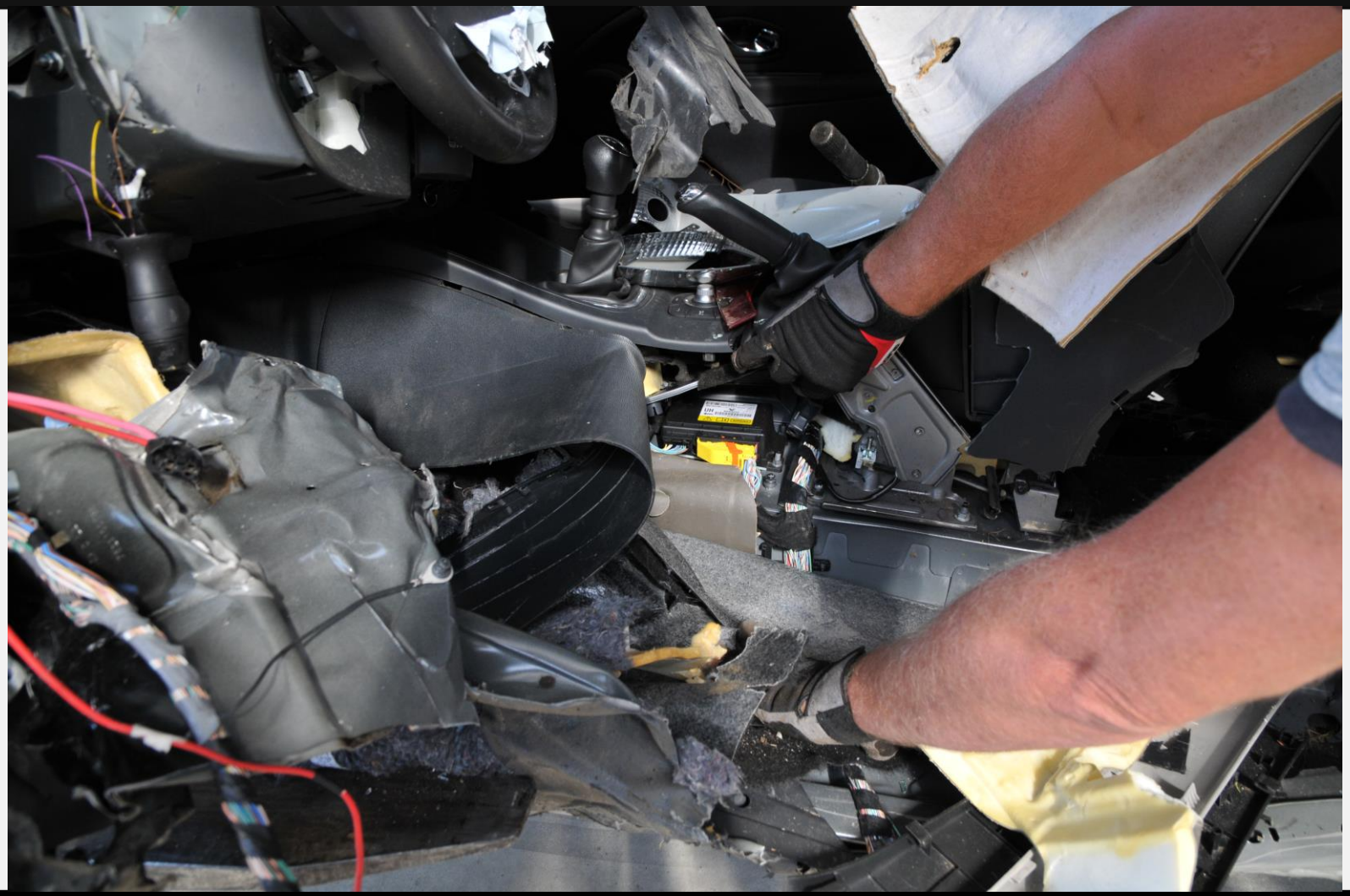

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Analysis report - reduced 28.09.2016

Customer Reference Number:	Continental Reference Number:
VF1KZ140648342189	300001475497

1. Airbag Control Unit Download:

Date and time of download: 27 September 2016, 13:47:34 (GMT+2)	Method of download:
Location of download: Continental Automotive - Timisoara, Romania	☐ in the car ☒ via Test box

2. Vehicle data:

Vehicle type	RENAULT Grand Tour
VIN	VF1KZ140648342189

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Vehicle restraints configuration *taken from EEPROM

☒	Left Frontal Airbag Stage 1	☒	Activated *
☒	Left Frontal Airbag Stage 2	☒	Activated *
☒	Right Frontal Airbag Stage 1	☒	Activated *
☒	Right Frontal Airbag Stage 2	☒	Activated *
☒	Left Belt Pyro Retractor	☒	Activated *
☒	Right Belt Pyro Retractor	☒	Activated *
☒	Left Belt Lap Pretensioner	☐	Activated
☒	Right Belt Lap Pretensioner	☐	Activated
☒	Left Head/Curtain Airbag	☐	Activated
☒	Right Head/Curtain Airbag	☐	Activated
☒	Left Pelvis-Thorax Airbag	☐	Activated
☒	Right Pelvis-Thorax Airbag	☐	Activated

☒	Airbag ON management
☒	Inhibition switch / Passenger Airbag OFF Lamp
☒	Front left belt buckle switch
☒	Front right belt buckle switch
☒	Rear left belt buckle switch
☒	Rear center belt buckle switch
☒	Rear right belt buckle switch
☒	Driver seat position sensor
☒	Front passenger occupant detection

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Crash data stored in ACU	☒ YES		☐ NO
Type of crash	1 (one) Frontal crash event		
Information via CAN bus	**Time before crash* [ms]**	**Vehicle speed** [km/h]**	**Brake information****
	1200 ms	153.6	Brake pedal not pressed
	800 ms	152.3	Brake pedal confirmed pressed
	400 ms	144.6	Brake pedal confirmed pressed
	0 ms	134.4	Brake pedal not pressed
Odometer value	121317.62 Km		
Lifetime Counter of ACU at the time of crash	2045 hours 27 minutes 06 seconds		
Buckle switch status	• Driver: "buckled" • Passenger: "buckled" • Rear Left Passenger: "unbuckled" • Rear Middle Passenger: "unbuckled" • Rear Right Passenger: "buckled" • Third Row Left Passenger: "not configured" • Third Row Right Passenger: "not configured"		
Seat status	• Driver Seat Position: „backward" • Passenger Presence: "seat occupied"		
Passenger Inhibition Switch Status	• Front passenger airbag: "not deactivated"		
Crash output emitted	• Level 2		

* Information can be up to 399ms older.

** This information is stored in the Airbag Control Unit, but the information is received from other electronic control units from the vehicle via the CAN Bus. The accuracy of this information cannot be ensured by the Continental Airbag Control Unit.

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Audi A3-Renault Scenic

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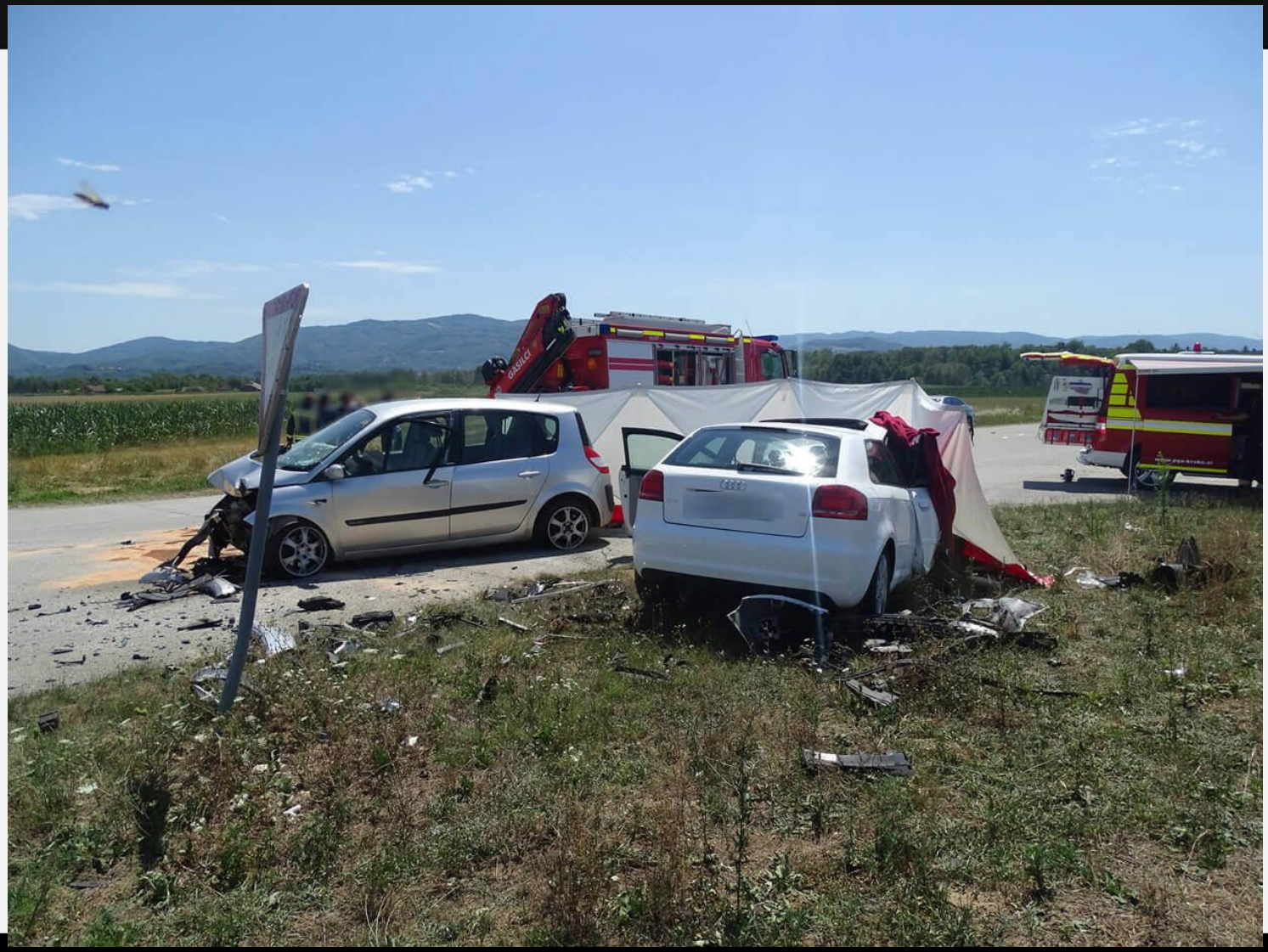
Audi A3-Renault Scenic



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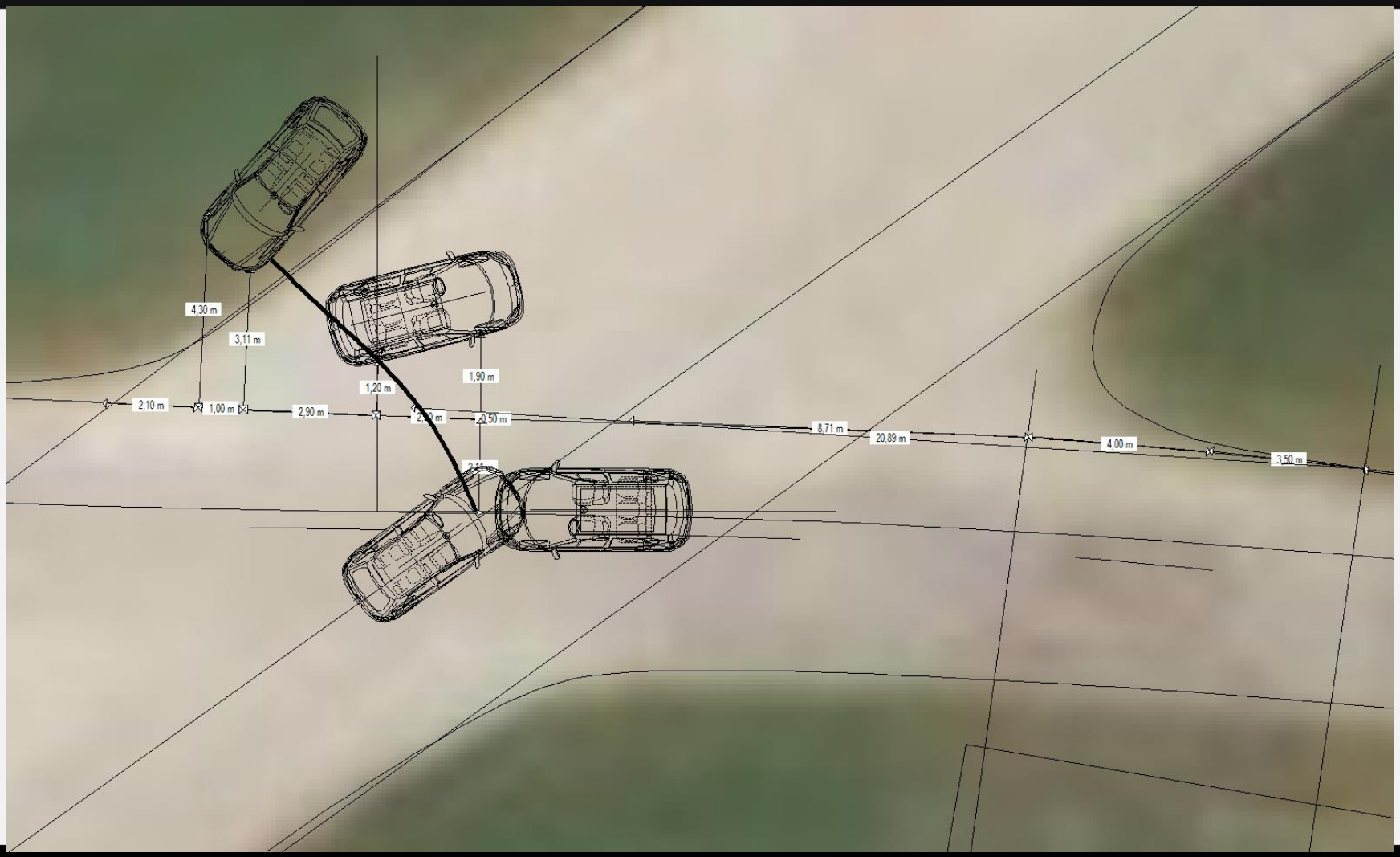

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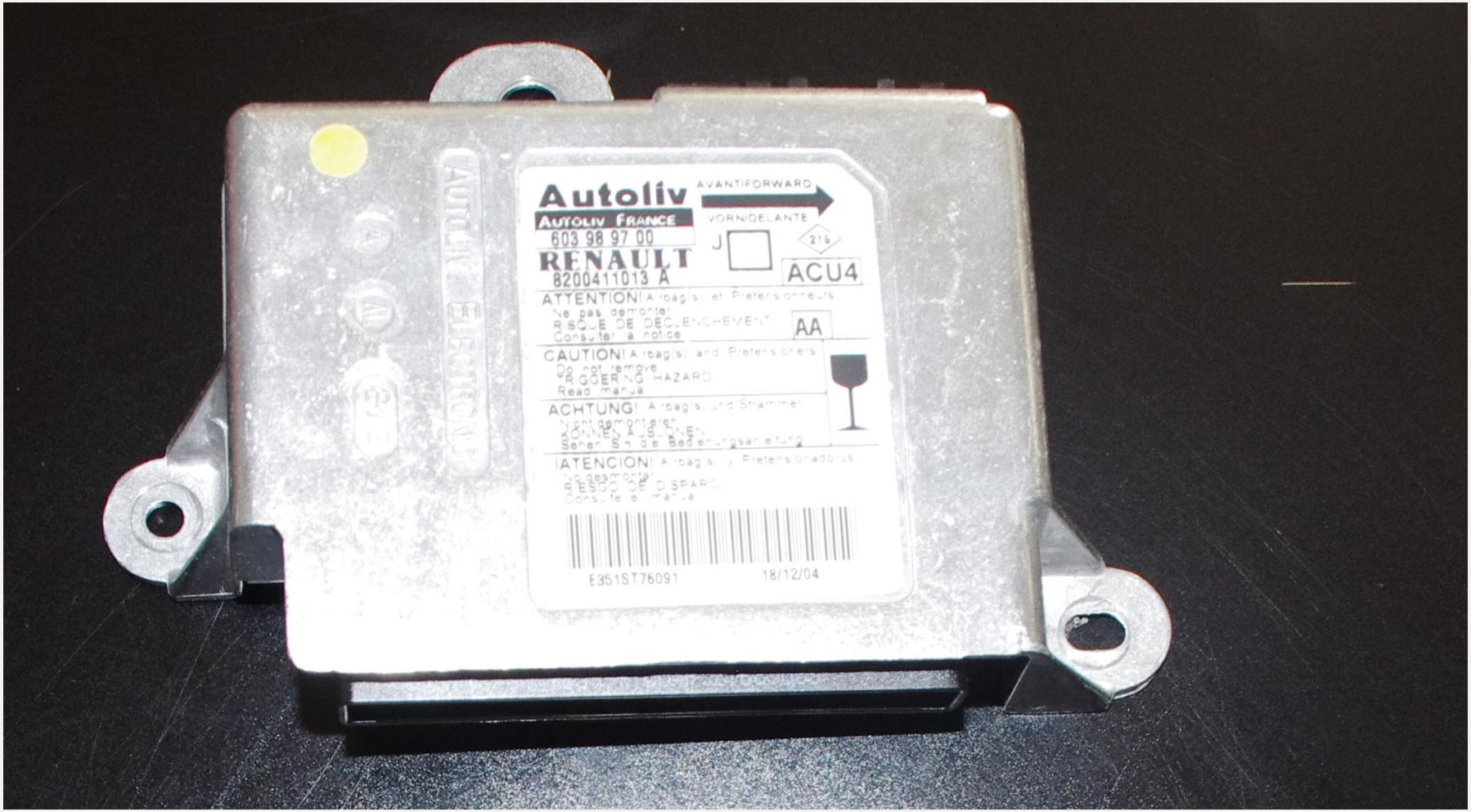

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Audi A3-Renault Scenic

-Vehicle speed information recorded 280 ms before entry in crash algorithm: 93,6 km/h.

-Vehicle speed information recorded 560 ms before entry in crash algorithm: 91,4 km/h.

-Vehicle speed information recorded 840 ms before entry in crash algorithm: 107,88 km/h.

-Vehicle brake information recorded 280 ms before entry in crash algorithm: Act on brake pedal.

-Vehicle brake information recorded 560 ms before entry in crash algorithm: Act on brake pedal.

-Vehicle brake information recorded 840 ms before entry in crash algorithm: No act on brake pedal.

-Mileage recorded at crash time: 134 743 kms.

-Crash date recorded: 1989,96 hours (1989 h 57 min 35 s)

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Porsche Cayman

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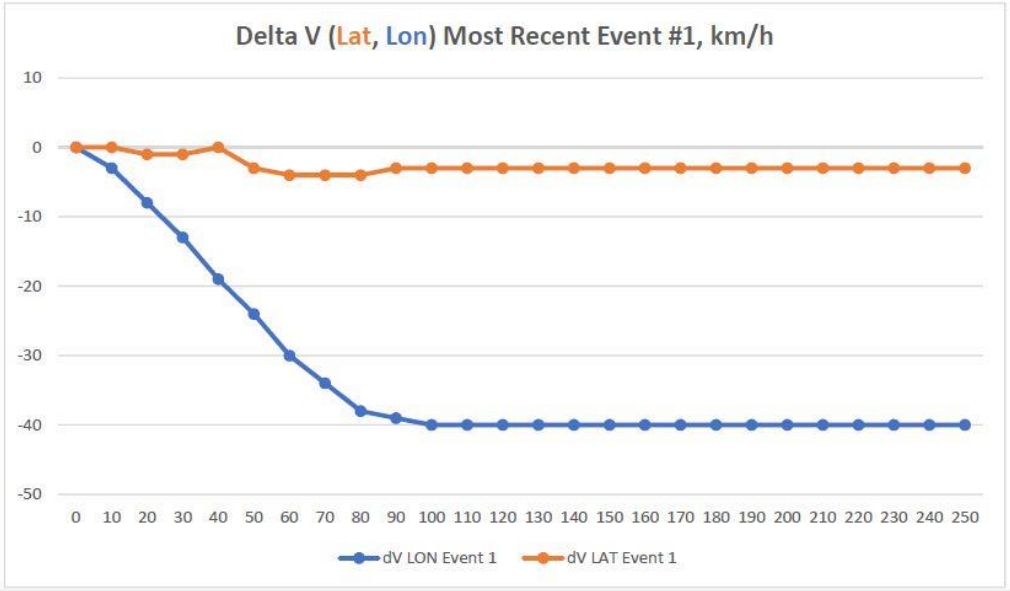
Porsche Cayman

EDR Extraction Report - © Crash Data Poland 2019

Event Data Retrieval Report

Vehicle and Control Unit Identification	
ACM Part Number	**991.618.201.09**
ACM Family	**TRW TS6**
ACM Serial Number	**218737125**
VIN	**WP0ZZZ98ZJK252053**
Number of stored events	**3**
Event type(s)	**frontal, side, side**
Remarks	**Investigated binary file. Odo as investigated: 10084 km**



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Time from AE (msec)	Lon Delta V	Lat Delta V
0	0	0
10	-3	0
20	-8	-1
30	-13	-1
40	-19	0
50	-24	-3
60	-30	-4
70	-34	-4
80	-38	-4
90	-39	-3
100	-40	-3
110	-40	-3
120	-40	-3
130	-40	-3
140	-40	-3
150	-40	-3
160	-40	-3
170	-40	-3
180	-40	-3
190	-40	-3
200	-40	-3
210	-40	-3
220	-40	-3
230	-40	-3
240	-40	-3
250	-40	-3

Table 1. Delta V Longitudunal and Lateral, Event #1 (most recent)

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Clio-Megane

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Clio-Megane

2.1) Crash telegram TG1 recorded :

-Front crash telegram recorded.

-Safing sensor was closed during the crash.

-No fault recorded during the crash.

-ECU decided to give an order to fire to the following safety equipments (firing decision):

-To the driver and passenger retractor.

-To the driver and passenger pyrotechnical lap pretensioner.

-To the driver front airbag.

-To the passenger front airbag.

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Clio-Megane

-Power supply (battery) was disconnected during the crash.

-Time to fire recorded for the driver and passenger retractors (pretensioners): 9 ms.

-Time to fire recorded for the driver front airbag level 1: 14 ms.

-Time to fire recorded for the driver front airbag level 2: 19 ms.

-Time to fire recorded for the passenger front airbag: 14 ms.

-Time to fire recorded for the driver PLP: 15 ms

-Time to fire recorded for the passenger PLP: 15 ms

-Vehicle speed information recorded at T0, entry in crash algorithm: 61,25 km/h.

-Vehicle speed information recorded 300 ms before entry in crash algorithm: 65,64 km/h.

-Vehicle speed information recorded 600 ms before entry in crash algorithm: 66,09 km/h.

-Vehicle speed information recorded 900 ms before entry in crash algorithm: 66,31 km/h.

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Clio-Megane

-Vehicle brake information recorded at T0, entry in crash algorithm: Act on brake pedal.

-Vehicle brake information recorded 300 ms before entry in crash algorithm: No act on brake pedal.

-Vehicle brake information recorded 600 ms before entry in crash algorithm: No act on brake pedal.

-Vehicle brake information recorded 900 ms before entry in crash algorithm: No act on brake pedal.

-Mileage recorded at crash time: 228 211 kms.

-Crash date recorded: 3378,24 hours n(3378 h min 10 s)

-Front acceleration crash curve recorded (X acceleration).

(See crash data + front crash curve recorded on table hereafter).

The last vehicle speed information recorded at the moment of the crash (T0) was 61,25 km/h (speed information available on the vehicle CAN network).

The delta velocity calculated from the acceleration curve recorded is 10,27 m/s (36,97 km/h)

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Seat-Suzuki

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Analyzed EEPROM file:	*Memory_60R1023242.pdf*	
Operation Time Counter on download	Ignition Cycle Counter on download	Records Stored (fault codes / crash data)
36d 23h 43min 35sec 200ms	5338	☒ Yes ☐ No

Crash data stored in ACU (at crash detect time)	☒ YES ☐ NO
Type of crash	• Frontal • Lateral on the driver's side (right side)
Airbag Warning Lamp status	OFF
Lifetime Counter of ACU at the time of crash	Frontal 36days 23hours 18min 40sec 550ms Lateral (right side) 36days 23hours 18min 40sec 650ms
ACU ignition cycles	5333
Buckle switches sensor status	• Not configured
Passenger airbag / Indicator status	• Front passenger airbag: "Not deactivated" • Passenger airbag OFF indicator lamp: "OFF"
Crash output	• Activated

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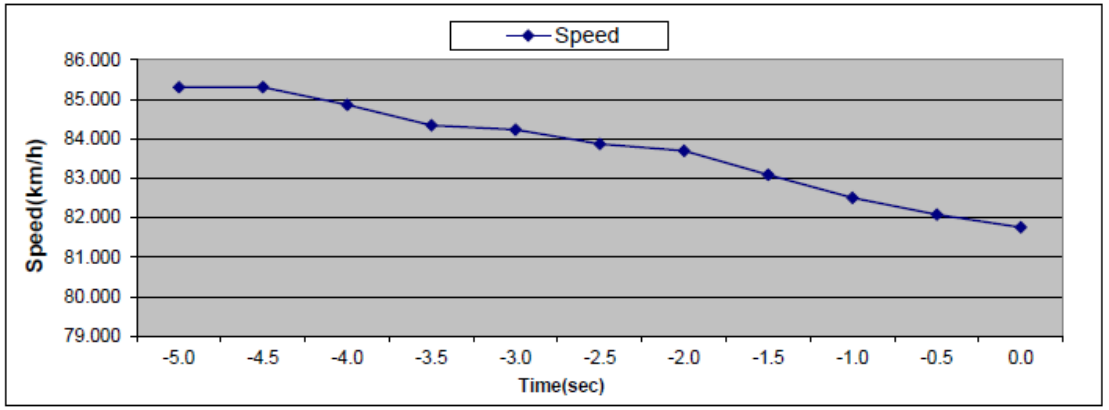
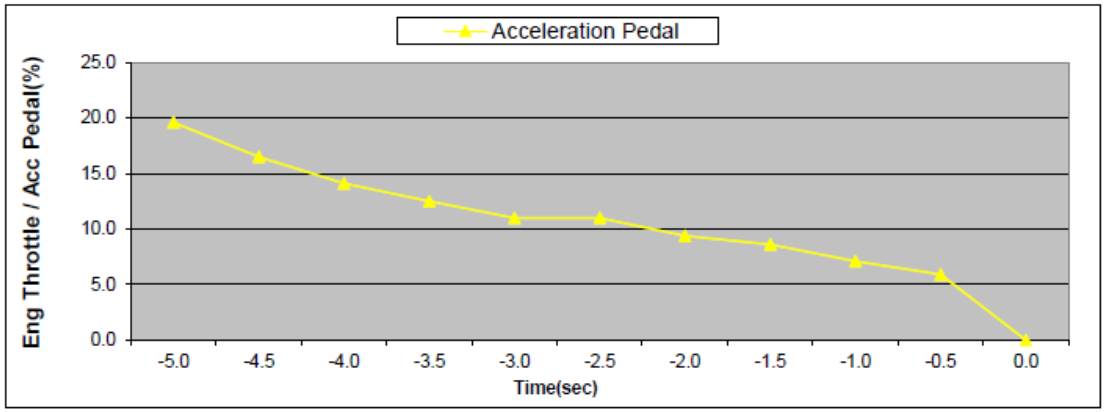
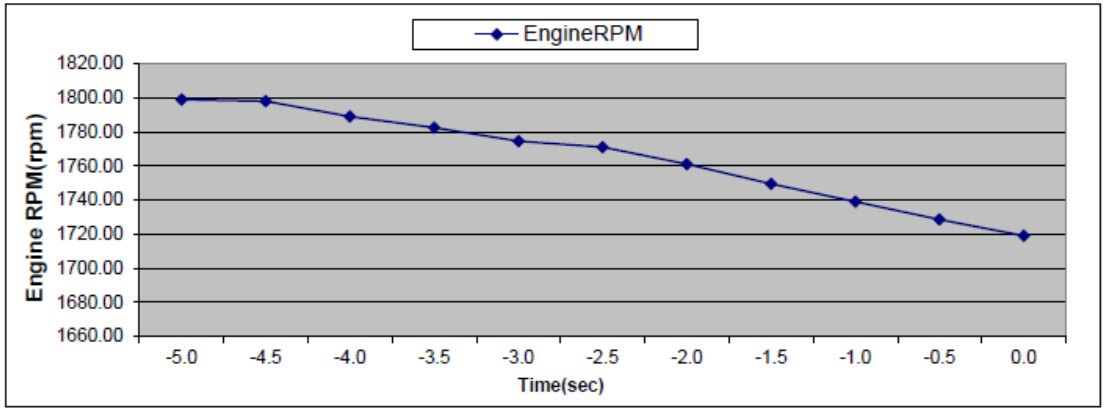
4.2. Event Data Recording







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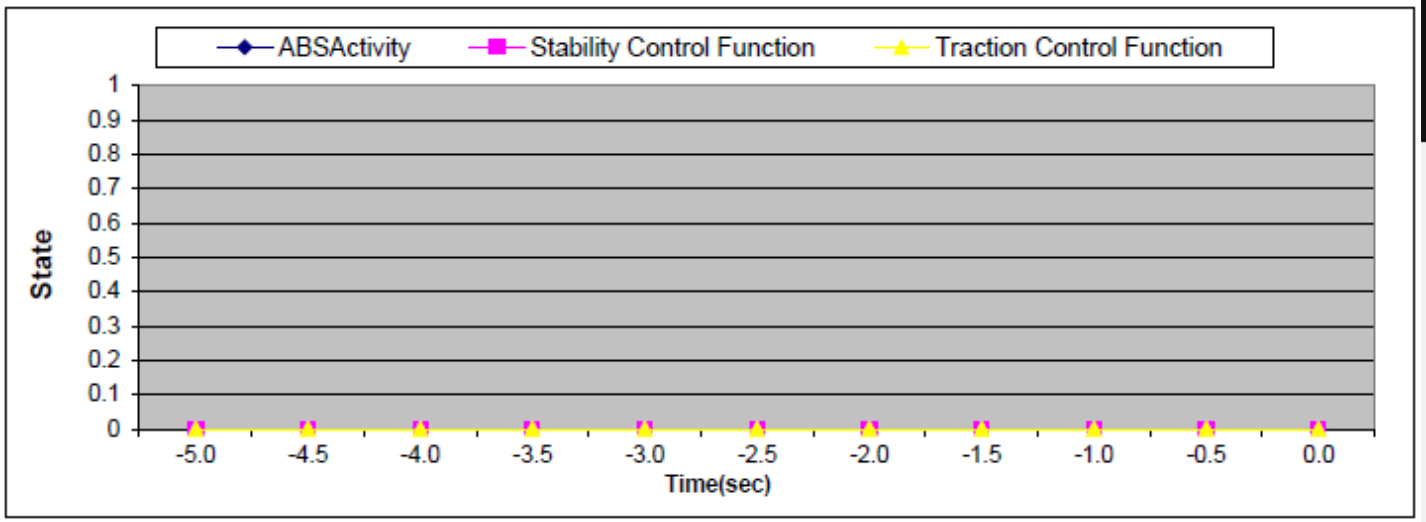

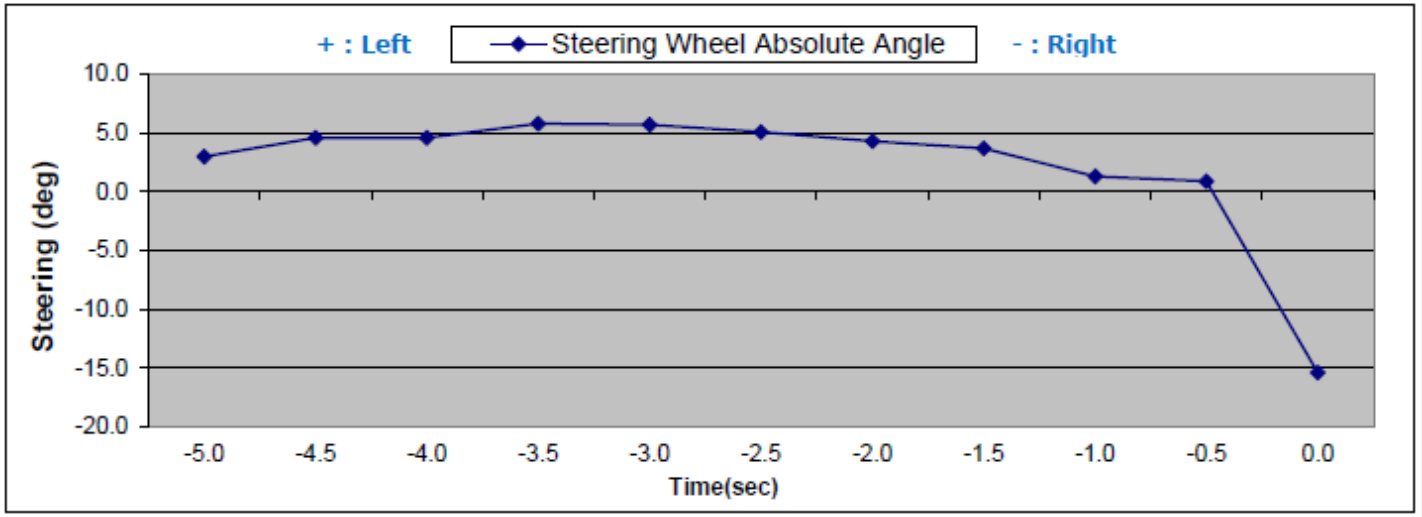

NOTE: The Records from "Steering Input" show the moving angle of the steering wheel. Negative is to the right, positive is to the left. The interval is -327.68deg / 327.67deg.

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Seat-Suzuki

EDR data:

Time (sec)	Vehicle Speed (km/h)	Acceleration Pedal (%)	Engine RPM (rpm)	Engine Throttle (%)	Service Brake (On/Off)	ABS Activity	Stability Control	Traction Control	Steering Input (deg)
-5.0	85.305	19.6	1799.00	0.0	Off	Enabled	Enabled	Enabled	3.0
-4.5	85.305	16.5	1798.00	0.0	Off	Enabled	Enabled	Enabled	4.6
-4.0	84.859	14.1	1789.00	0.0	Off	Enabled	Enabled	Enabled	4.6
-3.5	84.344	12.5	1782.50	0.0	Off	Enabled	Enabled	Enabled	5.8
-3.0	84.234	11.0	1774.50	0.0	Off	Enabled	Enabled	Enabled	5.7
-2.5	83.867	11.0	1771.00	0.0	Off	Enabled	Enabled	Enabled	5.1
-2.0	83.695	9.4	1761.00	0.0	Off	Enabled	Enabled	Enabled	4.3
-1.5	83.086	8.6	1749.50	0.0	Off	Enabled	Enabled	Enabled	3.7
-1.0	82.508	7.1	1739.00	0.0	Off	Enabled	Enabled	Enabled	1.3
-0.5	82.086	5.9	1728.50	0.0	Off	Enabled	Enabled	Enabled	0.9
0.0	81.758	0.0	1719.00	0.0	Off	Enabled	Enabled	Enabled	-15.4

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4. Analysis of the Airbag Control Unit (ACU)

4.1. Data Analysis

Analyzed EEPROM file:	*T12XX318818111443075_Memory.pdf*	
Lifetime Counter of the ACU at download	Ignition Cycle Counter at download	Records Stored (fault codes / crash data)
337 hours 56 minutes 8.35 seconds	5305	☒ Yes ☐ No

Crash data stored in ACU	☒ YES	☐ NO
Type of crash(es) (in the order of qualification)	○ 1 Pedestrian Event ○ 1 Pedestrian Event ○ 1 Frontal Crash Event	

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1st Record	○ 1 Pedestrian Event
Odometer value	• 7699.3 Km
Lifetime Counter of ACU at the time of crash	• 282h 59min 46sec 100ms
Ignition cycle counter	• 4264
Buckle switch sensor status	• Driver: “belted” • Passenger: “belted”
Status of Passenger Occupant Detection System (PODS)	• Front Passenger seat: “occupied 50% male”

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Pre-Crash-Data (from CAN):

This information is stored in the Airbag Control Unit, but the information is received from other electronic control units from the vehicle via the CAN Bus. The accuracy of this information cannot be ensured by the Continental Airbag Control Unit.

Time [s]	Vehicle Speed [km/h]	Throttle Pedal Position [%]	Engine RPM	Steering Input [deg] [+ left / - right]	Service Brake activation	ABS activity	Stability control
-5	254	100	6400	-8	off	off	off
-4,5	254	100	6336	-8	off	off	off
-4	254	100	6336	-10	off	off	off
-3,5	254	100	6336	-8	off	off	off
-3	254	100	6336	-8	off	off	off
-2,5	254	0	6208	-8	on	off	off
-2	254	0	6016	-4	on	off	off
-1,5	254	0	5632	-6	on	off	off
-1	254	0	5312	-4	on	off	off
-0,5	248	0	4928	-4	on	off	off
0	229	0	5440	+54	on	on	off

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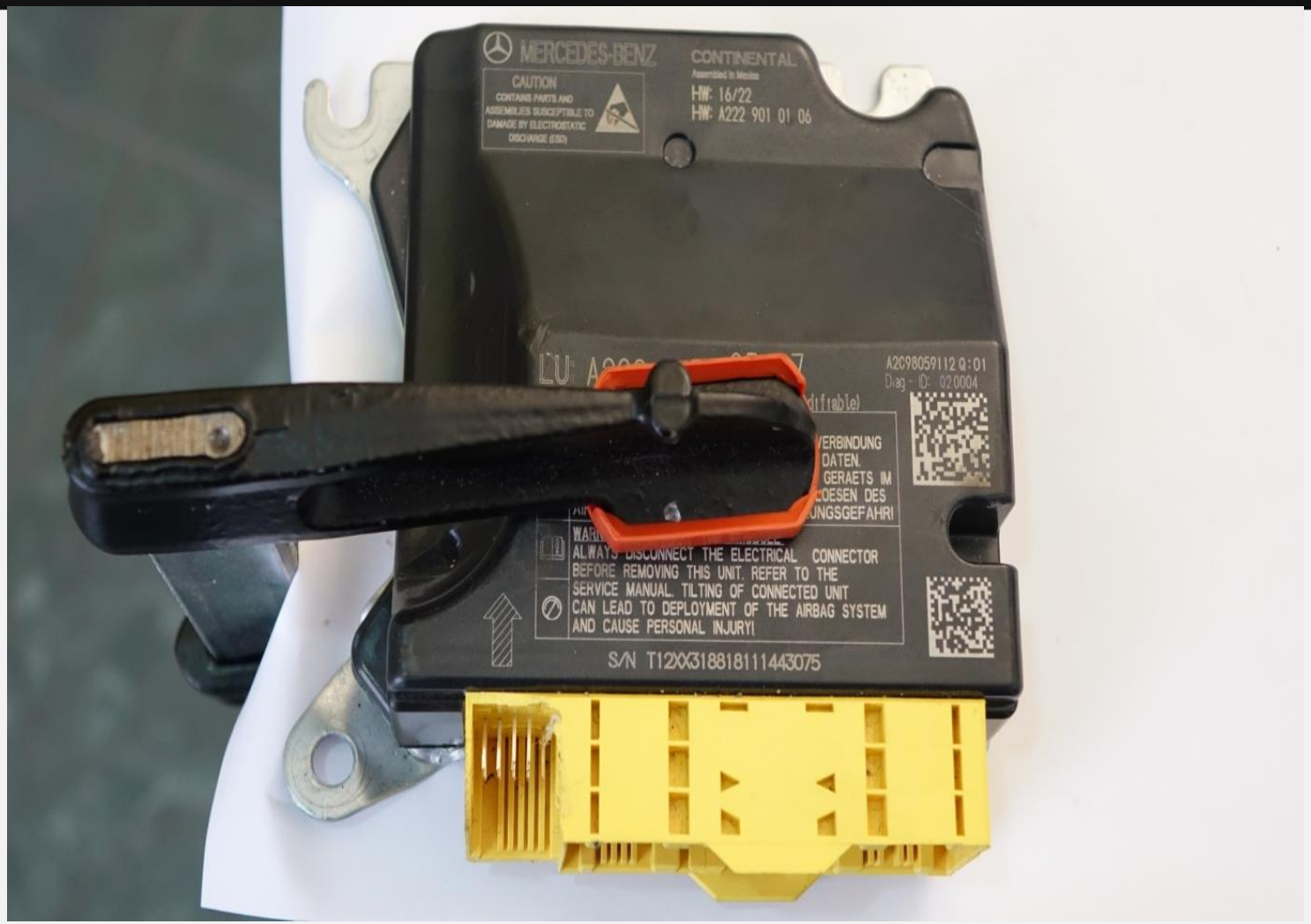

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- Glede na Tabelo 1, je hitrost vozila od 5 sekund pred trkom do 1 sekunde pred trkom 254 km/h (oziroma višja, ki pa je modul zračnih blazin ne more zapisati), 0,5 sekunde pred trkom je 248 km/h in kot že prej rečeno ob trku 229 km/h.
- Do 3 sekunde pred trkom je voznik še držal stopalko za plin in sicer s 100% pritiskom. Pri 2,5 sekundah pred trkom je stopalko spustil in pritisnil zavoro, ki je bila nato aktivna vse do trčenja. S kakšno močjo je voznik pritisnil na zavoro iz podatkov ni razvidno, razvidno pa je, da se je ABS sistem vklopil šele v času med 0,499 - 0 s pred trkom, kar pomeni, da pred tem zavore niso delovale do te mere, da bi prišlo do blokiranja koles in posledično aktiviranja ABS sistema.
- Nadzor stabilnosti vozila oziroma ESP se pred nesrečo ni vklapljal.

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Ugotovitve

- Ker je iz odčitanih podatkov razvidno, da je pričel zavirati 2,5 sekunde pred trčenjem, je hitrost preden so zavore pričele delovati znašala okoli 295 km/h.

- Če upoštevamo še reakcijski čas 0,80 sekunde, je voznik osebnega avtomobila reagiral od mesta trčenja oddaljen 250,60m pri hitrosti vožnje 295 km/h, je v času 0,80s prevozil razdaljo 65,75m.

- Pred reagiranjem pa je voznik pritiskal pedal za plin do konca z 100% pritiskom.

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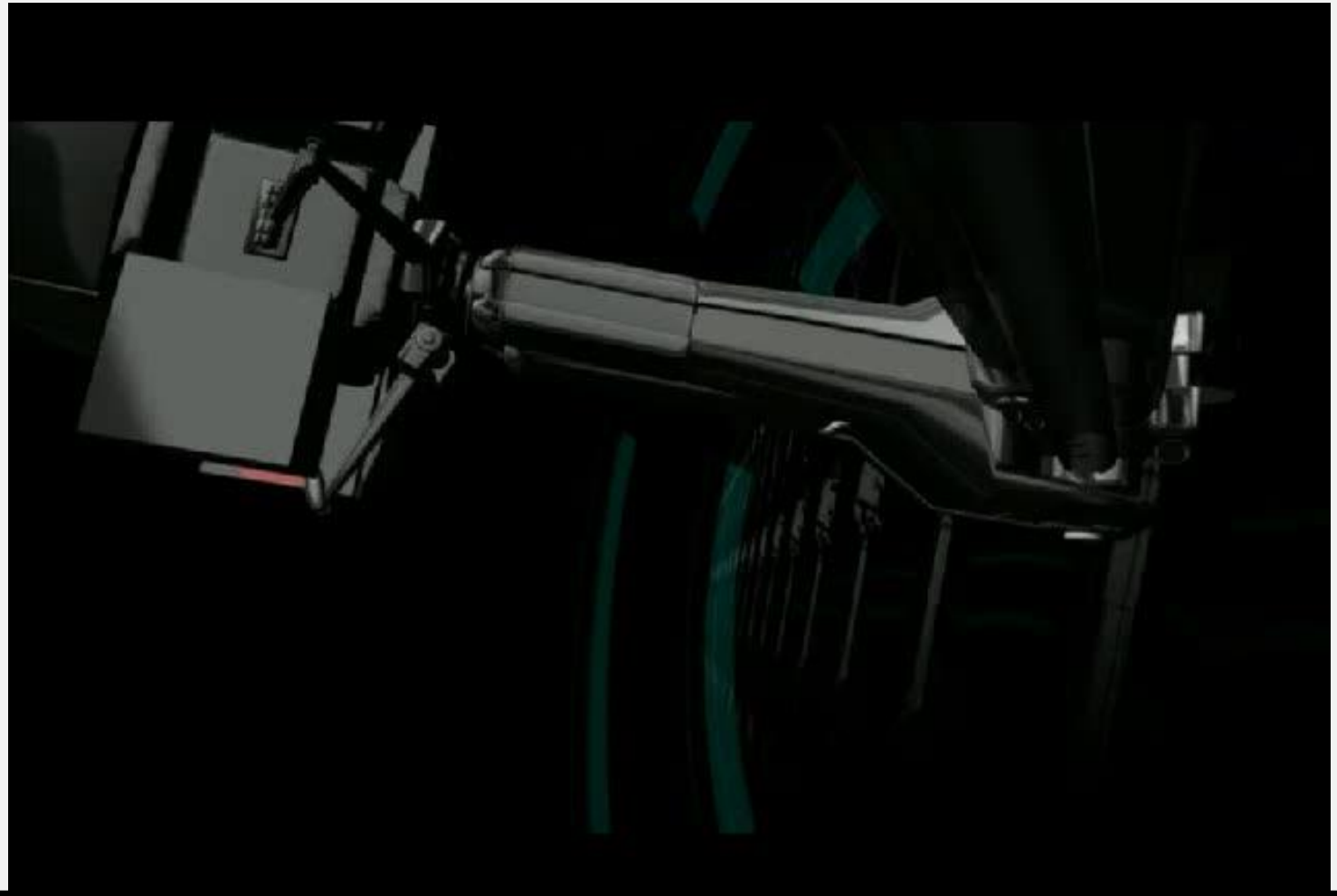

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