



## Workshop B2

Al Bustan Rotana Hotel, Rashidiya Ballroom C

# Priorities for New Testing Procedures – Testing Emission Systems

Chaired by Lothar Geilen

Member of CITA Bureau Permanent

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Beyond Vehicle Testing





Workshop B2

Presentation 1

# REPORT OF THE CITA STUDY ON TESTING ELECTRONICALLY CONTROLLED SAFETY SYSTEMS (ECSS)

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# CONTENTS

**1. Introduction**

**2. Inspection methods developed**

**3. Field tests results**

**4. Way forward**



# 1. INTRODUCTION



## OBJECTIVES

- Develop **new inspection methods** and **requirements for tools** for electronically controlled safety systems (ECSS) suitable for use in a legislative regime
- Perform **cost benefit analysis** for introduction of methods into European legislation

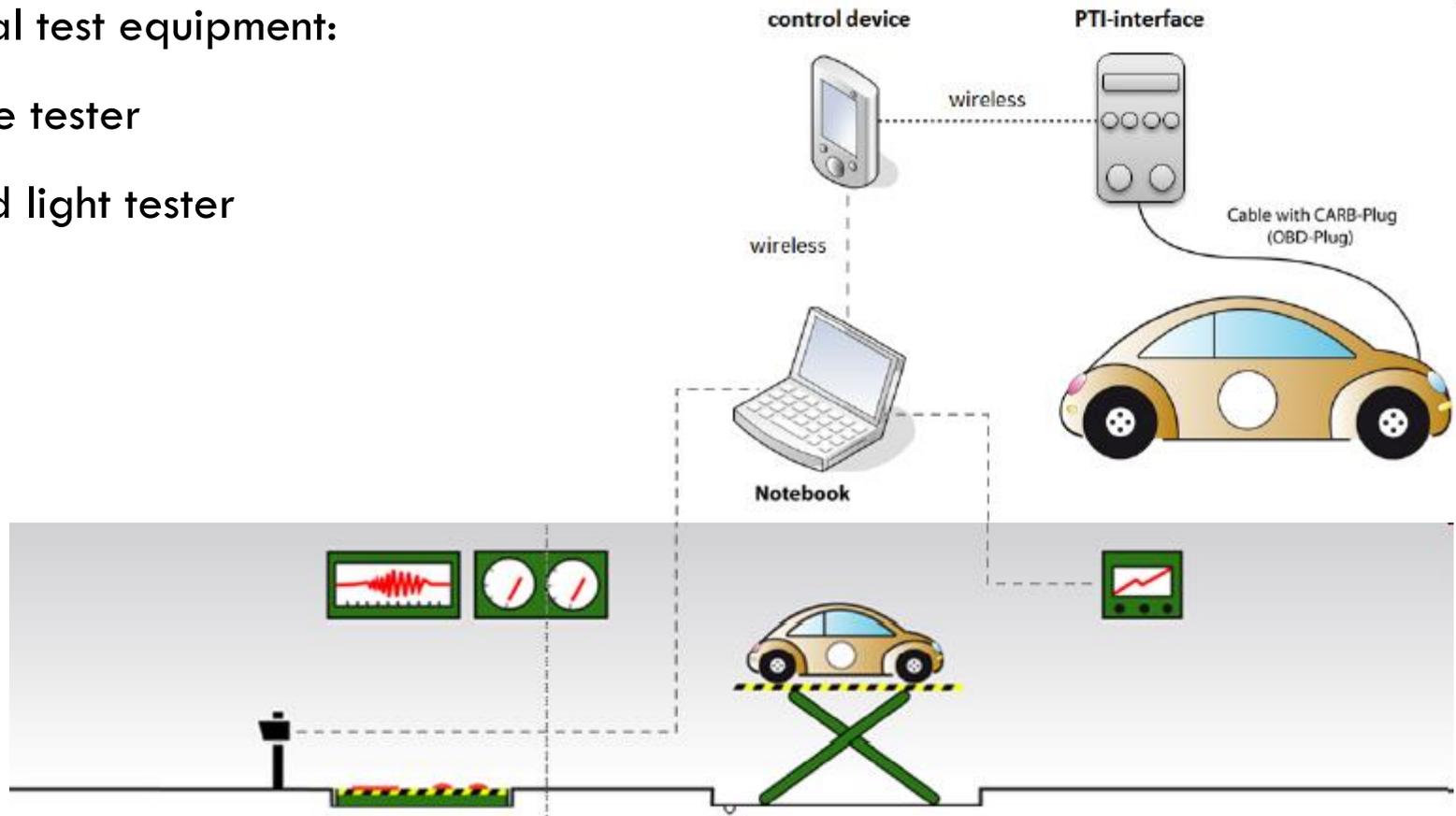




## DEFINITION FUNCTIONAL TESTING

Performance test of ECSS using measurement with external test equipment:

- Brake tester
- Head light tester
- etc.



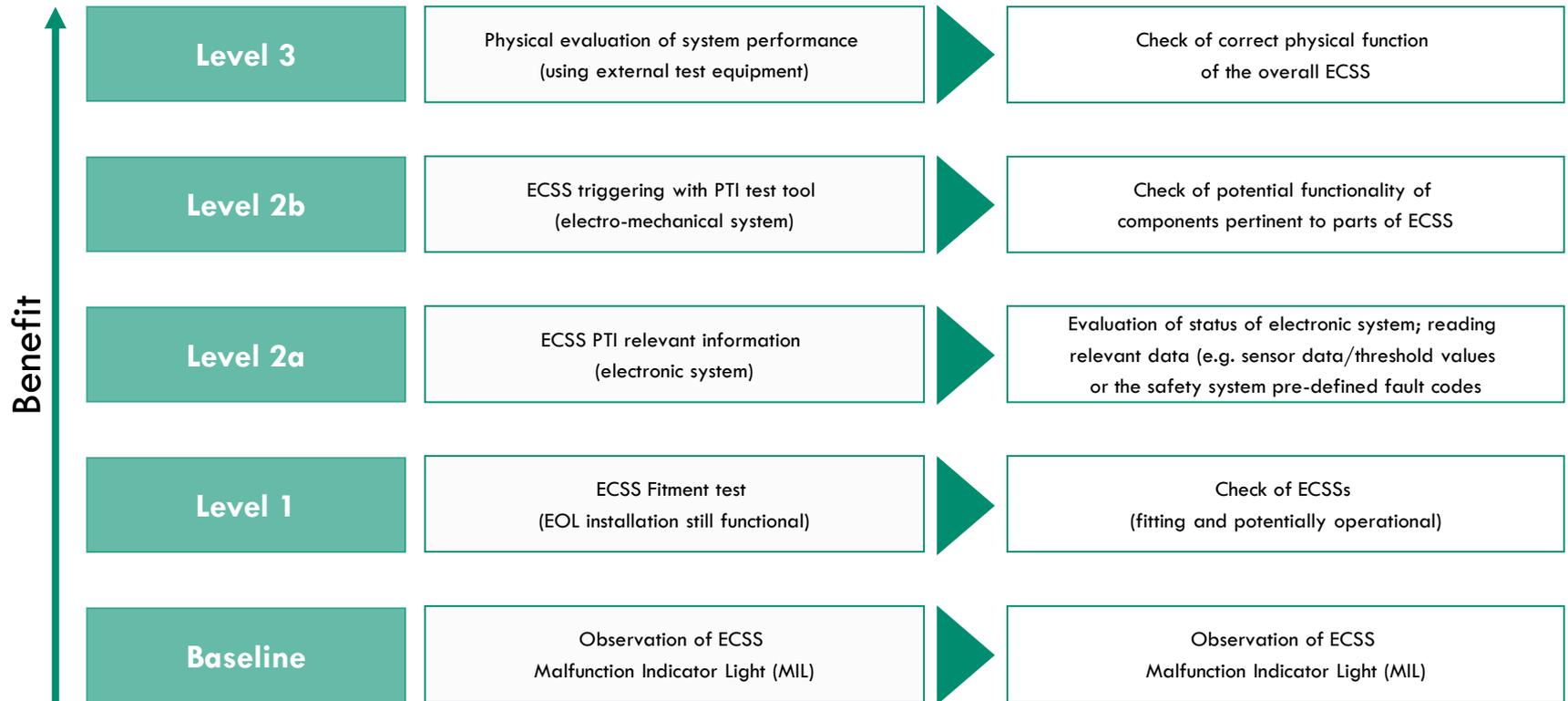
**>> Testing of functionality / performance of ECSS required**



## **2. INSPECTION METHODS DEVELOPED**



## DEFINITION OF INSPECTION LEVEL



Note:

Baseline and level 1 are always included in all other levels

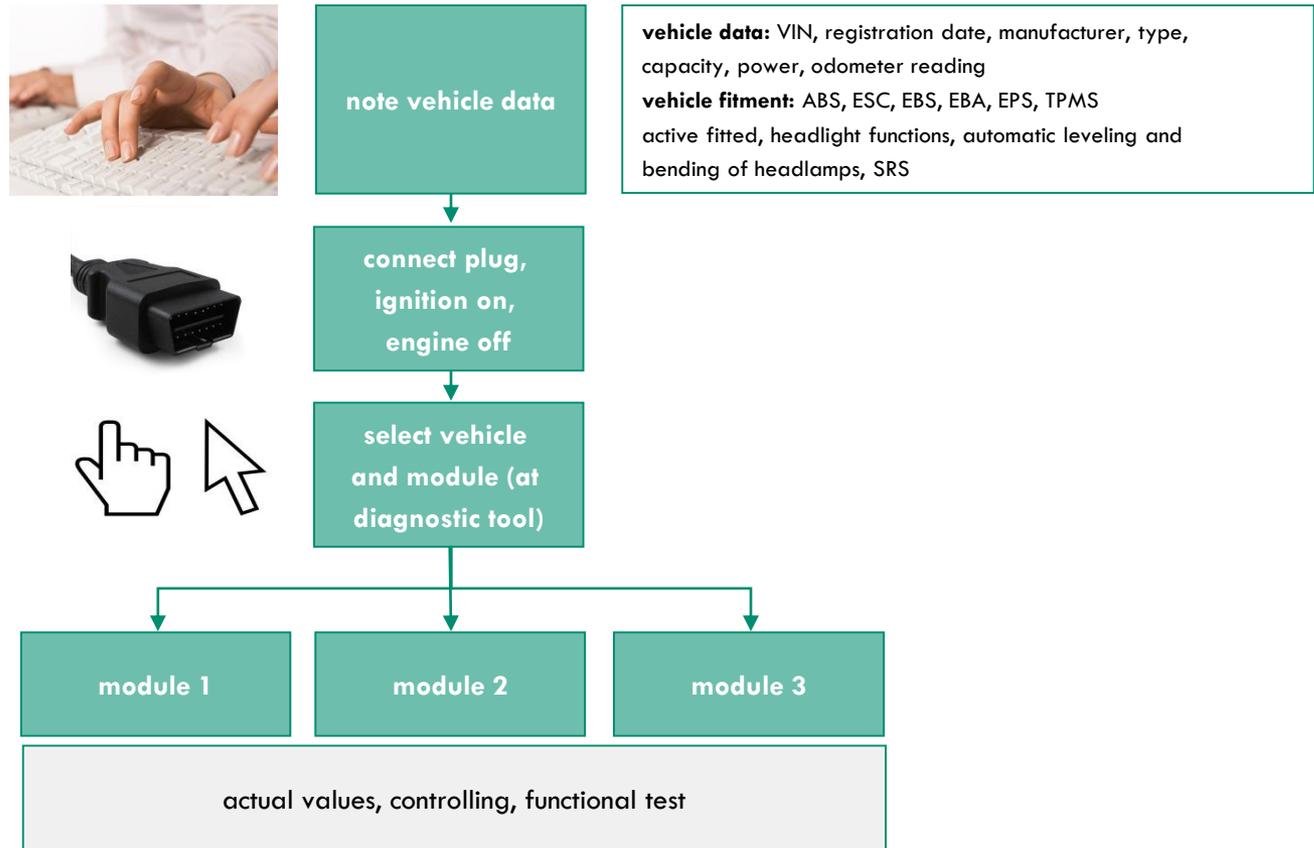
Level 2a is not included in level 2b or level 3

Level 2b is sometimes, or partially included in level 3.



# OPTIMIZED TEST METHOD FOR FIELD TESTING

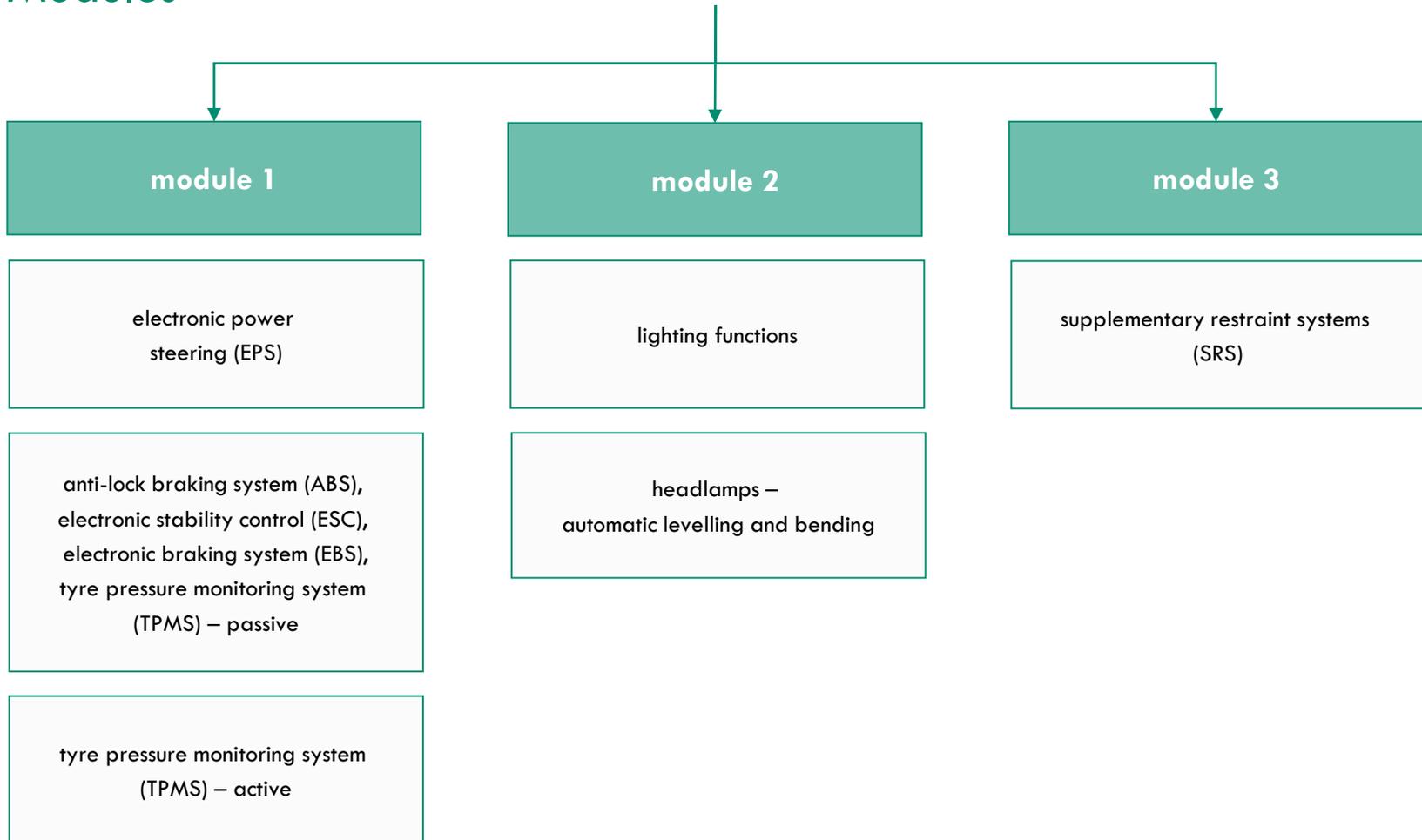
## Modules





## Optimized test method for field testing

### Modules





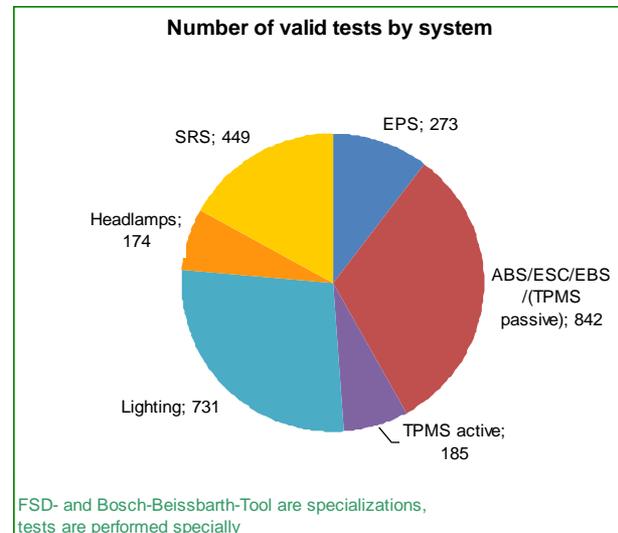
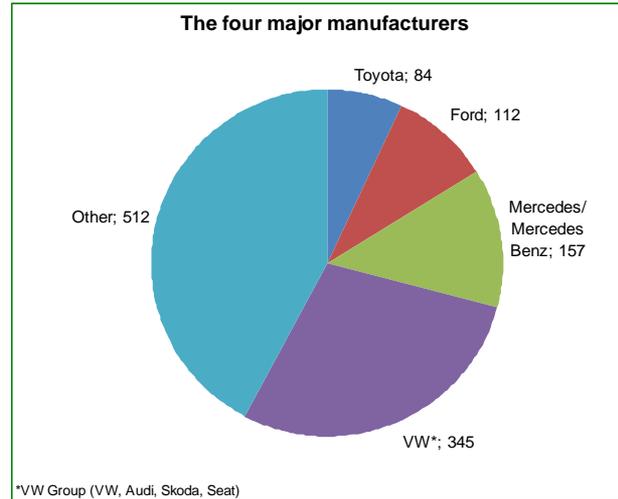
## **3. FIELD TESTS**



## DATA SET CHARACTERISTICS

Manufacturer	Number of vehicles
VW (VW, Audi, Skoda, Seat)	345
Mercedes/Mercedes Benz	157
Ford	112
Toyota	84
Others	512
<b>Sum</b>	<b>1210</b>

Valid tests by system	Number of tests
EPS	273
ABS/ESC/EBS/ (TPMS passive)	842
TPMS active	185
Lighting	731
Headlamps	174
SRS	449
<b>Sum</b>	<b>2654</b>





## RESULTS: LEVEL 1 (FITMENT TEST)

- Tool coverage: Variable with range from 4% to 93%
- Data from VM about fitment is required





## RESULTS: LEVEL 2

- Tool coverage: Mostly able to read-out sensor values and DTCs provided ECSS communication established
- Failure rate: Not possible to determine because threshold data not available from VMs
- Analysis of Diagnostic Trouble Codes (DTCs) showed that probably not useful for PTI unless standardisation and other measures, such as assessment of the power supply, taken.
- Note: For some SRS systems (e.g. airbag, seat squab sensor) level 2 testing may not be sufficient to detect manipulation





## RESULTS: LEVEL 3

ECSS brake system test method includes:

1. Check of brake efficiency on front and rear axle (Comparison of brake force and hydraulic pressure)
2. Check of brake force distribution between front and rear axle



Test method increased failure rate by 4.8 %



## SUMMARY

- 2654 tests performed which produced results suitable for analysis
- Level 1: Tool coverage varied widely dependent on type of ECSS
- Level 2: Unable to determine failure rate because vehicle technical data from VMs not available
- Level 3: 4.8% additional failures identified by applying check of brake efficiency on front and rear axle which uses comparison of hydraulic pressure and brake force measured on RBT
- Time taken for tests was often very high with the tools used because most were not designed for PTI.
  - However, after modification of software, these tools together with their associated vehicle communication interfaces (VCIs) will be capable of supporting PTI test requirements with a reduced test time.

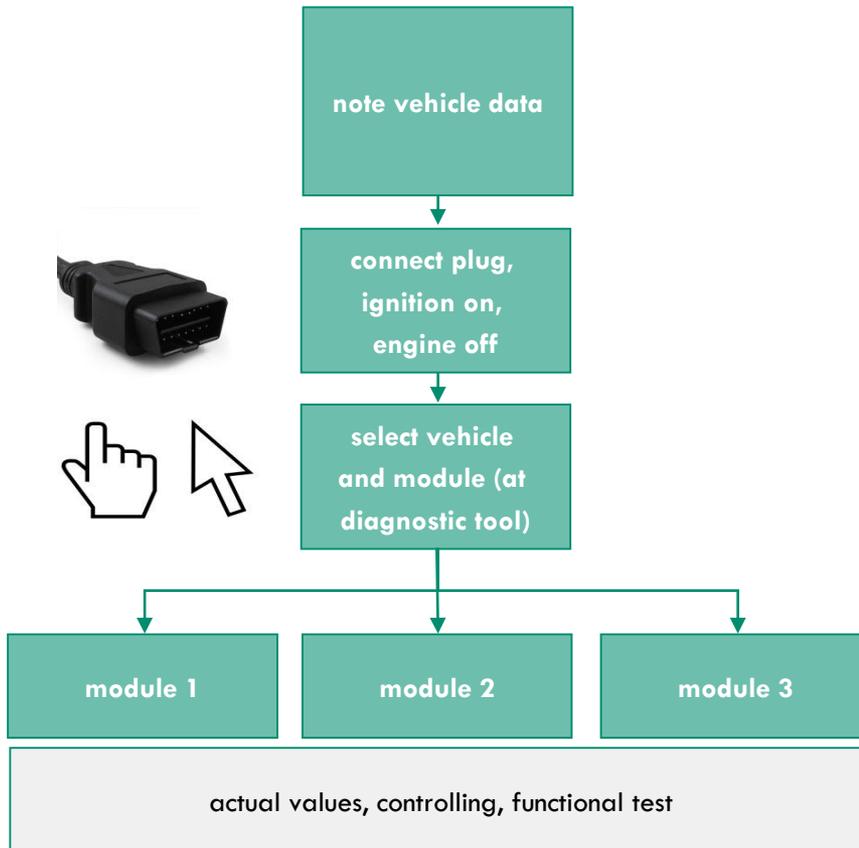


## **4. WAY FORWARD**



## NEXT STEPS

- Development of PTI-Scantool
  - Show what's possible





# ISSUES

- Your Aspects and Issues





**Thank You**  
very much for your attention!



Workshop B2

Presentation 2

# ECSS TESTING: CONCEPT AND IMPLEMENTATION OF A WIDER INTERROGATION OF THE ELECTRONIC CONTROLLED SAFETY SYSTEM VIA OBD

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# CITA Conference 2015

14-16th April 2015, Dubai, UAE

"Enhancing the Value of Vehicle Inspection"





# CITA Conference 2015

Priorities for new testing procedures

Testing Electronically Controlled Safety  
Systems (ECSS)





# ECSS testing

**Concept and implementation of a wider  
interrogation of the Electronic  
Controlled Safety Systems via OBD**





## A lot of research has been done

- **2002, CITA Research study programme on Electronically controlled systems on vehicles Agreement Number: 99/06;**
  - **TRL Limited – PR/SE/101/00 The reliability of electronically controlled systems on vehicles;**
  - **TRL Limited – PR/SE/439/02 The reliability of ABS and airbag systems with respect to periodic testing : a cost benefit analysis;**
  - **IKA Report 8328 – A test procedure for **airbags**;**
  - **TÜV Kraftfahrt GmbH, Report 02-946 EL 001 Testing of existing **AntiLock Braking Systems (ABS)**;**
  - **IKA Report 8329 – A test procedure for **vehicle dynamic controllers**;**



## A lot of research has been done

- **2002, 2nd CITA Programme on Emission Testing**

With e.g. June 2002, Study 3 : Use of OBD at Periodic Inspection;

- **2005, Initiative for Diagnosis of Electronic Systems in Motor Vehicles for PTI (IDELSY);**

- **2007, AUTOFORE;**

- **2011, TEDDIE;**

- **2014, ECSS;**



What was the outcome of these researches ?

How are we inspecting the Electronic Controlled Safety Systems?

Except for some Member States, we are only looking to the Malfunction Indicator Lamp (MIL).

Should we do more?

If we follow the outcome of all these studies: Yes.



# What did PTI organisations set up in the meantime? (non-limitative list)

**Germany : FSD Fahrzeugsystemdaten GmbH :**  
**Developed a specific PTI scan tool and test procedures.**

**FDS was founded in 2004;**  
**+ 100 employees working;**  
**funding : €1 for each PTI.**

**Their PTI test methods are proven but until today data is not  
available to check the entire German vehicle fleet.**



# What did PTI organisations set up in the meantime? (non-limitative list)

**Belgium: GOCA :**

**Developed in 2006 (E)OBD inspection based on the IDELSY project**

**a specific PTI scan tool (hard- and software customised)  
information on DTC's.**

**The aim for the project was:**

- consumer protection;
- learn about ECSS;
- teach the inspector about OBD (location 16 pin socket, etc ...);

**in the beginning 18,5% of the tested vehicles did have some trouble codes in their ECSS ECU's;**



# What did PTI organisations set up in the meantime? (non-limitative list)

**Sweden: Bilprovningen, OPUS Bilprovningen:**  
**“E-diagnosis” based on concept of GOCA**

**Germany, Sweden, France, The Netherlands, ...**  
**Emission tests via OBD (also for diesel cars)**

...

# Why are we all not testing the ECSS function to its appropriate level?

recommendations of the CITA 2014 ECSS study :

- As a mandatory part of future Type Approvals, **the vehicle manufacturers should provide the ability for inspection** of all systems with and without usage of vehicle interfaces;
- The data delivery should follow specific rules;
- The **communication** between the PTI scan tool and the relevant systems should be **further standardised**.

Furthermore the existing scan tools are developed **for diagnoses and repair**.



# GOCA's idea on how to move forward with ECSS

GOCA is convinced that we need **a mandatory part in future Type Approval requirements with all necessary data** for the inspections of all ECSS systems with and without usage of vehicle interfaces.

Without the data, it will be difficult to develop a complete ECSS test to its appropriate level (Level 3).

It is, however, for GOCA **no option to wait** until the restrictions for complete ECSS testing are all resolved.

(PTI database would be possible within 5-6 years ?? and then still the inspection methods should be developed. 2-3 years??)

Therefore GOCA wants **something already** for these years.



# GOCA's idea on how to move forward with ECSS

To elaborate a complete ECSS test without the database can only be done by a specialised group at a certain cost.

Since equipment manufacturers have also a certain knowledge, a rather budget friendly intermediate solution seems to be possible:

GOCA has searched a new partner to extend their existing (E)OBD test with more possibilities.



# GOCA's idea on how to move forward with ECSS

## The system and the VCI's (Vehicle Communication Interface):

- Will be equal to the **existing system** (from 2006) and to be able in a more automated way (**via VIN**) to interrogate the **DTC's from the ECSS systems**;
- Will make it possible to evaluate an **EOBD emission test**;
- Will contain **additional information**, relevant for Technical Inspection.



# GOCA's idea on how to move forward with ECSS

**PTI will be different in the future with OBD data:**

## Anti-fraud measures

**Automatically reading out the VIN and the mileage**

**Mileages are registered in the CarPass system (complete history) and on each PTI certificate (the mileages actual visit and previous visit)**

- Less mistakes instead of the manually input.**
- The OBD VIN number will ensure that the right vehicle is at the inspection centre present.**
- The VIN numbers are also the key elements to match the OBD data with the vehicle in the inspection centre database.**



# GOCA's idea on how to move forward with ECSS

**PTI will be different in the future with OBD data:**

## EOBD Emission tests

The VCI's will be able to read out ECSS related information, but they will also be able to conduct a complete **EOBD emission test**.

Furthermore the OBD will give additional information on the tailpipe testing with **Engine temperature** and **Engine speed**.

# GOCA's idea on how to move forward with ECSS

**PTI will be different in the future with OBD data:**

**Additional information (not only DTC's and EOBD)**

•Battery voltage	•Trigger values tyre pressure for all 4 wheels (tpms)
•Brake fluid level	•Status igniters (SRS)
•Wheel speed for each wheel	•Value igniters (SRS)
•Steering wheel angle	•Switch passenger airbag (SRS)
•Brake pressure (ABS)	•Status seat occupancy (SRS)
•Lateral acceleration (ABS)	•Status seat belt (SRS)
•Yaw rate (ABS)	



# GOCA's idea on how to move forward with ECSS

**PTI will be different in the future with OBD data:**

The extra information shows a lot of **possibilities to be further explored** and to enhance the existing Technical Inspection.

- Brake fluid level** could be added next to the visual inspection;
- Since a low **battery voltage** generate a lot of DTC's this information is also important;
- Brake Efficiency testing of M1 category vehicles**. We hope to find a **similar system as the RD method** by evaluating brake forces against hydraulic brake pressure captured by the OBD system;
- Research on the ECSS systems of ABS and SRS.



# GOCA's idea on how to move forward with ECSS

## GOCA :

All PTI test centres will have this new VCI's by the end of 2015.

### GOCA aims with this initiative

- to learn about these ECSS systems and how to test them;
- to get information about the usefulness of testing ECSS;
- to get a scan tool adapted to our needs with a limited budget;
- Gather the experience and know-how to develop the test procedures once the vehicle manufacturer database is available.



# Conclusion

**GOCA** is convinced that already today limited ECSS testing is possible and give several advantages for later on testing the ECSS systems to its appropriate level.

As always, as for each of our projects, **GOCA** would be glad to exchange their experience with other PTI organisations

- to learn from each other about ECSS;
- to start up an similar project;
- to develop together ECSS methods;
- to look together to the future of PTI.



# ECSS testing

Concept and implementation of a wider interrogation of the  
Electronic Controlled Safety Systems via OBD

**Thank you for your attention**

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**CITA 2015** 

INTERNATIONAL MOTOR VEHICLE INSPECTION COMMITTEE

Conference and 17th  
General Assembly

14-16th APRIL DUBAI U.A.E.

WWW.CITA-VEHICLEINSPECTION.ORG

Workshop B2

Presentation 3

# CAPABILITY ANALYSIS OF DIFFERENT SCANNING TOOLS TO CHECK ECSS

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# Electronic PTI

## Spain 2014



**Capability analysis of different scanning tools to check ECSS**



1. Project description

**2. Main figures**

**3. Conclusions & results**

## 1. Project description

### Main objectives:

Verify that equipments and vehicles are not only ready to be tested in workshops, but also for PTI diagnosis offering fast, easy and comprehensive information for PTI inspectors and vehicle owners.

Analyse the feasibility and the convenience of implementing the electronic diagnosis of particular electronic safety systems (ECSS) related to the safety and environment of vehicles category M1 in PTI centres.

## 1. Project description

### Why:

Governments must take steps to develop the Electronic PTI:

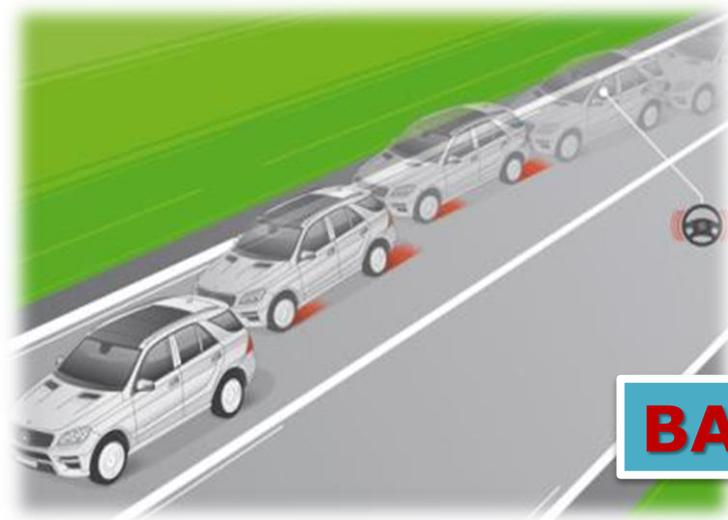
- ECSS affects and controls vehicles, also have defects & cause accidents.
- ECSS implementation is more & more common everyday.
- It is our responsibility to keep technology updated and offer complete services to customers: we must support and promote the PTI activity.

So, we must wonder:

- Is the equipment ready to fulfil requirements?
- Is there a demand from the fleet of vehicles for this?



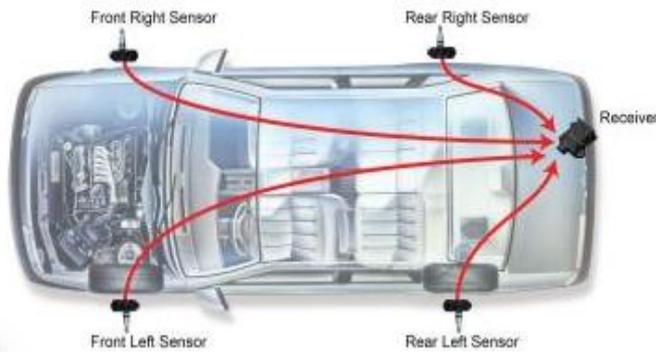
ESC



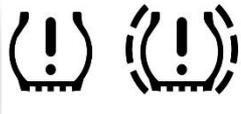
BAS



AEBS



TPMS



LDWS



<b>SAFETY SYSTEM</b>	<b>CODE NAME</b>	<b>CATEGORY</b>	<b>DATES N Types / N Mat</b>
<b>Electronic Stability Control</b>	<b>ESC</b>	M, N	1/11/2011 - 1/7/2014 1/11/2014 - 11/7/2016
<b>Braking assist</b>	<b>BAS</b>	M1, N1	24 /2/2011 24/8/2015
<b>Advance Emergency Braking</b>	<b>AEBS</b>	M2, M3 N2,N3	1/11/2013 1/11/2015
<b>Line departing Warning</b>	<b>LDWS</b>	M2, M3 N2, N3	1/11/2013 1/11/2015
<b>Tyre Pressure Monitoring</b>	<b>TPMS</b>	M1	1/11/2012 1/11/2014

## 1. Project description

### Who:

#### AECA ITV:

Spanish governmental & private companies non-profitmaking association since 1982, helping the Administration to develop standards, inspection guides & manuals, legal requirements, etc. :

66 entities, 400 centers, 1062 lines.

It represents the interest of the association & aims to improve the quality of the offered service.

Since 1992:

- Vehicles passed > 213 millions.
- Vehicles rejected: 46 millions vehicles (21,57%).
- Serious/Minor defects: 81/201 millions

## 1. Project description

### Who:

By AECA-ITV, companies which performed the test:

- Tüv Rheinland
- Veiasa
- Intectra
- Certio ITV
- Grupo Itevelesa
- SGS
- Atisae
- Itvasa
- Entidad IDV Madrid
- Applus Iteuve Technology
- Supervisión y Control
- Prevencontrol

## 1. Project description

### Who:

#### **AFIBA & Equipment Manufacturers:**

Association of manufacturers, dealers and importers of equipment & devices for automotion, companies such as:

- Bosch / Capatest
- AVL
- Texas
- Autocom / Vteq
- Hella
- Lambda Automotive
- Equipa Taller
- Actia Müller
- Maha
- Ryme/Continental Automotive VDO
- Launch
- Teknika Bereziak

## 1. Project description

### How:

1. AECA decides to develop the project.
2. It establishes a plan.
3. The equipment manufacturers and AFIBA were asked to participate.
4. The main characteristics and goals were explained.
5. The equipment is lent and field testing starts.
6. Results are gathered and conclusions extracted.
7. Summary and results are presented to AFIBA for continuous development and offered to the CITA Work Group I.
8. Results are sent with recommendations to the Ministry of Industry for further legislation considerations.

# 1. Project description

## Vehicle population target:

Most sold vehicles 2009 (Spain)	Units	Market %	Units to be inspected per company
<b>1-RENAULT MEGANE</b>	52.156	<u>16,03</u> %	12,02
<b>2-CITROEN C4</b>	42.369	<u>13,02</u> %	9,77
<b>3-SEAT IBIZA</b>	40.859	<u>12,56</u> %	9,42
<b>4-PEUGEOT 207</b>	31.039	<u>9,54</u> %	7,15
<b>5-FORD FOCUS</b>	30.311	<u>9,32</u> %	6,99
<b>6-PEUGEOT 308</b>	28.986	<u>8,91</u> %	6,68
<b>7 -VOLKSW. GOLF</b>	25.927	<u>7,97</u> %	5,98
<b>8-OPEL ASTRA</b>	25.166	<u>7,73</u> %	5,80
<b>9-NISSAN QASHQAI</b>	24.601	<u>7,56</u> %	5,67
<b>10-SEAT LEON</b>	23.966	<u>7,37</u> %	5,52

## 1. Project description

### Required scanning tools characteristics:

1. Easy to identify the connection port.
2. Comfortable routine, language protocols & interface use.
3. Success rate in vehicle communication  $\geq 90\%$ .
4. Offers VIN & mileage.
5. Identifies and verifies the state of the main ECSS.
6. Reads, understands & classifies all the vehicle DTC.
7. Information transference and ease of storage, adapted data format.
8. Fast use and response (complete test  $< 5'$ ).

## 1. Project description

### Required scanning tools characteristics:

8. Wi-fi connection & multiuser platform.
9. Easy integration with inspection software (standard protocols).
10. Self identification scanning tool.
11. Possibility to configure the inspected items (ECSS).
12. Distance warning.
13. Permanently updated DDBB.
14. Shock and abrasion resistance.

## 1. Project description

### Items to be inspected:

1. Vehicle identification (VIN) & mileage.
2. ESC.
3. ABS.
4. EBS.
5. EPS.
6. Restraint systems (airbags, pretensors y charge limiters) ASR.
7. OBD.
8. Others.

## 2. Main figures:

RESULTADOS GENERALES 2013	DATOS GENERALES	Identifica	Carroceria	Motor	Frenos	Direccion	Otros sistemas	Comentarios	Puede detectarse ruido? Valor obtenido de Contaminantes				
<b>RESULTADOS GENERALES 2013</b>													
<b>DATOS GENERALES</b>													
	Equipo utilizado	Marca vehiculo	Modelo	Matricula	Fecha 1ª Matriculacion	Tipo de Motor	Variante	Contraseña Homlog.	Posicion OBD	¿Se tuvo que quitar alguna pieza?			
2144	Autel	Ford	Focus	2004GNB	01/06/09	D-KKDA	KKDA1P	e13*2001/116*0144	Lateral izquierdo	NO			
2145	Lambda Autom.	Ford	Focus	2004GNB	01/06/09	D-KKDA	KKDA1P	e13*2001/116*0144	Lateral izquierdo	NO			
2146	Tecnika Bereziak	Ford	Focus	7463GVX	26/04/10	D-HHDA	HHDA1P	e13*2001/116*0144	Lateral izquierdo	NO			
2147	Autel	Ford	Focus	7463GVX	26/04/10	D-HHDA	HHDA1P	e13*2001/116*0144	Lateral izquierdo	NO			
2148	Lambda Autom.	Ford	Focus	7463GVX	26/04/10	D-HHDA	HHDA1P	e13*2001/116*0144	Lateral izquierdo	NO			
2149	Tecnika Bereziak	Ford	Focus	4758GRZ	27/11/09	D-G8DB	G8DB1P	e13*2001/116*0144	Lateral izquierdo	NO			
2150	Autel	Ford	Focus	4758GRZ	27/11/09	D-G8DB	G8DB1P	e13*2001/116*0144	Lateral izquierdo	NO			
2151	Lambda Autom.	Ford	Focus	4758GRZ	27/11/09	D-G8DB	G8DB1P	e13*2001/116*0144	Lateral izquierdo	NO			
2152	Tecnika Bereziak	Ford	Focus	2457GPP	18/09/09	D-KKDA	KKDA1P	e13*2001/116*0144	Lateral izquierdo	NO			
2153	Autel	Ford	Focus	2457GPP	18/09/09	D-KKDA	KKDA1P	e13*2001/116*0144	Lateral izquierdo	NO			
2154	Lambda Autom.												
<b>SISTEMA COMPROBADO</b>													
		Carcroceria			Motor			Frenos					
		¿Detecta air beg. pretensores y limitadores de carga?	Fallos	si tiene fallos Enumerar	Temporal/ Permanente	¿Detecta Electronica de motor/Inyeccion/Modificaciones (OBD)?	Fallos2	Si tiene fallos Enumerar2	Temporal/ Permanente2	¿Detecta ABS, ESP, Sistema de frenado?	Fallos3	si tiene fallos Enumerar3	Temporal/ Permanente3
2142		SI	NO			NO				SI	NO		
2143		NO				SI	NO			NO			
2144		NO				SI	NO			SI	NO		
2145		SI	NO			SI	NO			SI	NO		
2146		SI	NO			SI	SI	No especifica	No indica	SI	SI	No especifica	No indica
2147		NO				SI	SI	Tension alta en circ	No indica	SI	SI	No se encuentra posición cen	No indica
2148		SI	NO			NO				SI	SI	Angulo viraje posición cen	No indica
2149		SI	NO			SI	SI	No especifica	No indica	SI	NO		
2150		NO				SI	SI	4 fallos diferentes	No indica	SI			
2151		NO				NO				NO			
2152		SI	NO			SI	NO			SI	NO		
2153		NO				SI	NO			SI	NO		
2154		SI	NO			SI	NO			SI	NO		

AECA	QUANTITY												
	APPLUS	CERTIO	IDV	INTECTRA	ITEVELESA	PREVENCONT	SGS	SyC	VEIASA	ATISAE	ITVASA	TUV	TOTAL
<b>TOTAL Nº OF ESSAYED VEHICLES</b>	134	25	71	102	76	27	77	75	78	65	83	21	<b>834</b>
<b>TOTAL Nº OF ESSAYS</b>	317	75	212	179	226	27	231	225	312	195	332	47	<b>2378</b>
<b>Expected number %</b>	179	33	95	101	101	36	103	100	104	87	111	28	90
<b>PTI Centers</b>													
MEGANE	14	4	5	6	9	5	12	7	2	8	6	5	83
CITROEN C4	12	4	10	7	6	2	10	5	0	2	4	1	63
SEAT IBIZA	19	4	10	7	7	6	9	3	2	11	5	2	84
PEUGEOT 207	13	3	7	8	7	0	7	3	1	5	6	0	60
PEUGEOT 308	12	0	7	4	6	0	7	2	0	6	6	1	51
OPEL ASTRA	8	0	6	3	7	2	6	0	0	1	3	0	36
SEAT LEON	13	2	5	1	5	2	6	2	1	6	10	7	60
WV GOLF	12	4	6	4	6	3	7	3	2	3	1	0	51
NISSAN QASHQAI	7	3	5	9	6	6	6	4	1	6	7	0	60
FORD FOCUS	9	1	7	6	7	1	7	1	1	4	15	5	64
OTROS	14	0	0	8	0	0	0	0	0	13	20	1	56
<b>TOTAL</b>	<b>133</b>	<b>25</b>	<b>68</b>	<b>66</b>	<b>66</b>	<b>27</b>	<b>77</b>	<b>30</b>	<b>10</b>	<b>65</b>	<b>83</b>	<b>21</b>	<b>668</b>
<b>Car shop / Workshop / Rental</b>													
MEGANE	1	-	3	2	-	-	-	5	10	-	-	-	21
CITROEN C4	-	-	-	-	6	-	-	2	10	-	-	-	18
SEAT IBIZA	-	-	-	5	3	-	-	7	8	-	-	-	23
PEUGEOT 207	-	-	-	2	-	-	-	5	6	-	-	-	13
PEUGEOT 308	-	-	-	3	-	-	-	5	7	-	-	-	15
OPEL ASTRA	-	-	-	-	-	-	-	6	6	-	-	-	12
SEAT LEON	-	-	-	2	1	-	-	4	6	-	-	-	13
WV GOLF	-	-	-	2	-	-	-	3	4	-	-	-	9
NISSAN QASHQAI	-	-	-	1	-	-	-	2	5	-	-	-	8
FORD FOCUS	-	-	-	1	-	-	-	6	6	-	-	-	13
OTROS	-	-	-	21	-	-	-	-	-	-	-	-	21
<b>TOTAL</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>39</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>45</b>	<b>68</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>166</b>

## 2. Main figures:

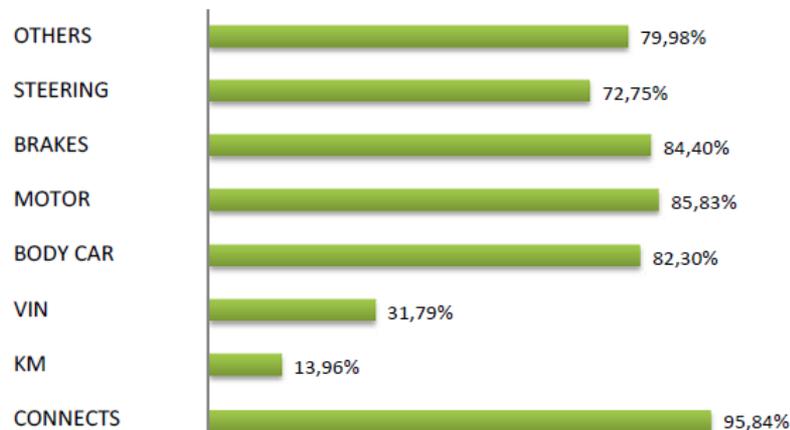
### Test numbers by equipment:

AECA ITV	SCANTOOLS						
	HELLA, S.A.	EQUIPATALLER, S.L	VTEQ	AVL	ROBERT BOSCH	TEXA IBÉRICA	
	168	136	96	261	180	221	
ESSAYS TOTAL NUMBER	SCANTOOLS						
	TEKNIKA BEREZIAK	LAUNCH IBÉRICA	LAMBDA AUTOMOTIVE	MAHA	ACTIA MULLER	CONTINENTAL VDO	TOTAL
	235	246	221	210	242	161	<b>2378</b>

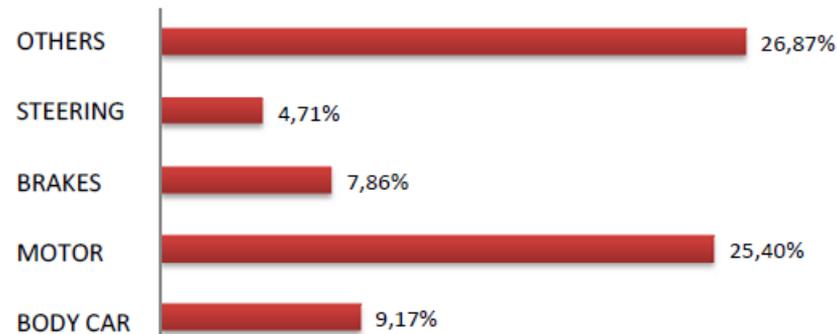
## 2. Main figures:

itv AECA	GENERAL	IDENTIFIED		BODY CAR			MOTOR		BRAKES				STEERING			OTHERS		
	Connects	Km	VIN	Detects airbag, pretens or & charge limiters	Fails	Temp/Permt	Detects motor electronics/ inyection/ Modifications (OBD)	Fails	Temp/Permt	Detects ABS, ESP, braking system	Fails	Temp/Permt	Detects Power Steering	Fails	Temp/Permt.	Detects other systems	Fails	Temp/Permt
<b>TOTAL TEST</b>	<b>2378</b>	2378	2378	2378	2378	218	2378	2378	604	2378	2378	187	2378	2378	112	2378	2378	639
<b>% YES</b>	<b>95,84</b>	13,96	31,79	<b>82,30</b>	<b>9,17</b>	4,75	<b>85,83</b>	<b>25,40</b>	14,17	<b>84,40</b>	<b>7,86</b>	3,32	<b>72,75</b>	<b>4,71</b>	3,95	<b>79,98</b>	<b>26,87</b>	10,56
<b>% NO</b>	3,99	<b>68,33</b>	<b>63,12</b>	11,56	72,62	1,18	7,95	59,76	7,74	8,96	74,31	2,86	20,27	66,99	0,13	12,83	45,12	6,73
<b>% NO RESULT</b>	0,17	17,70	5,09	6,14	18,21	3,24	6,22	14,84	3,49	6,64	17,83	1,68	6,98	28,30	0,63	7,19	28,01	9,59

DETECTED ELECTRONIC SYSTEMS

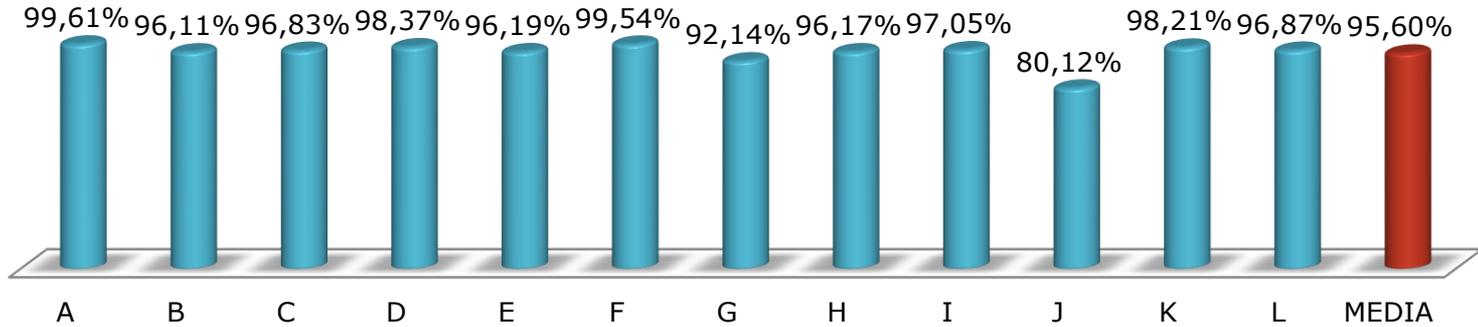


SYSTEMS WITH DETECTED FAILURES

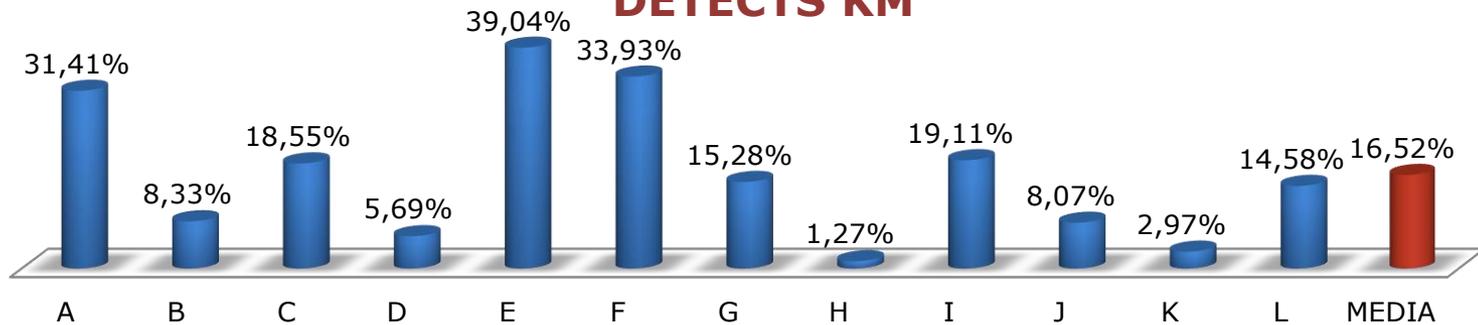


## 2. Main figures:

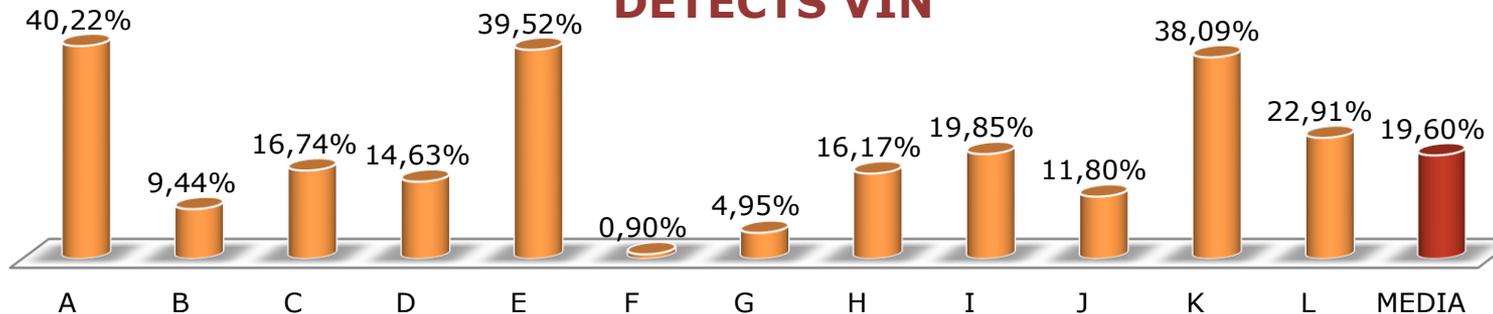
### CONNECTS



### DETECTS KM

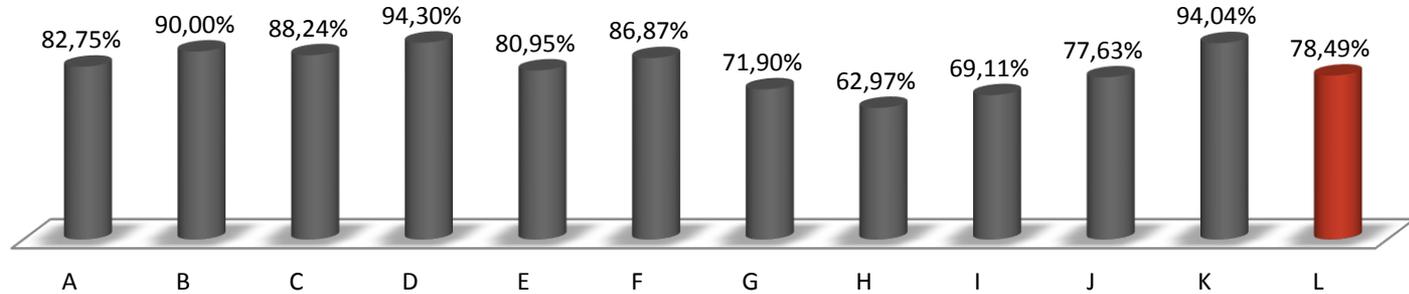


### DETECTS VIN

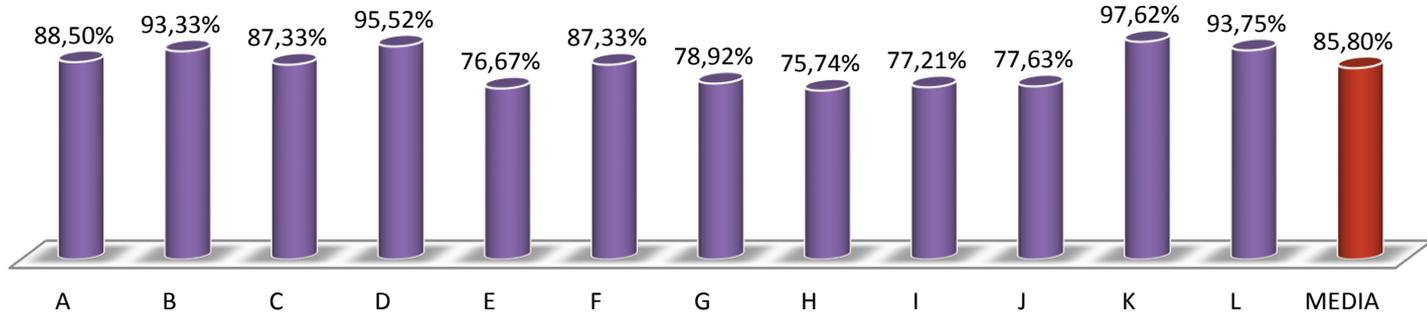


## 2. Main figures:

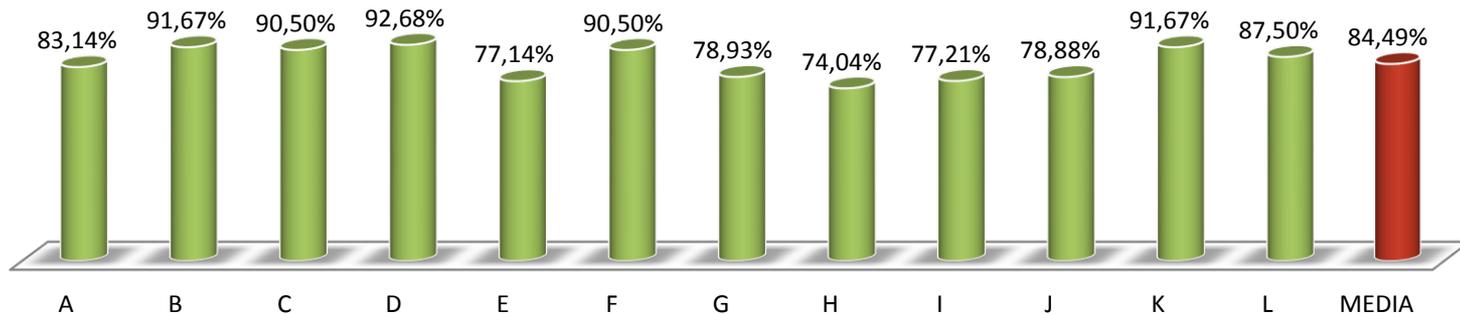
### DETECTS AIRBAG, INERTIA-REEL SEATBELTS & LOAD LIMITERS



### DETECTS ENGINES' ELECTRONIC/INJECTION/OBD ALTERATION

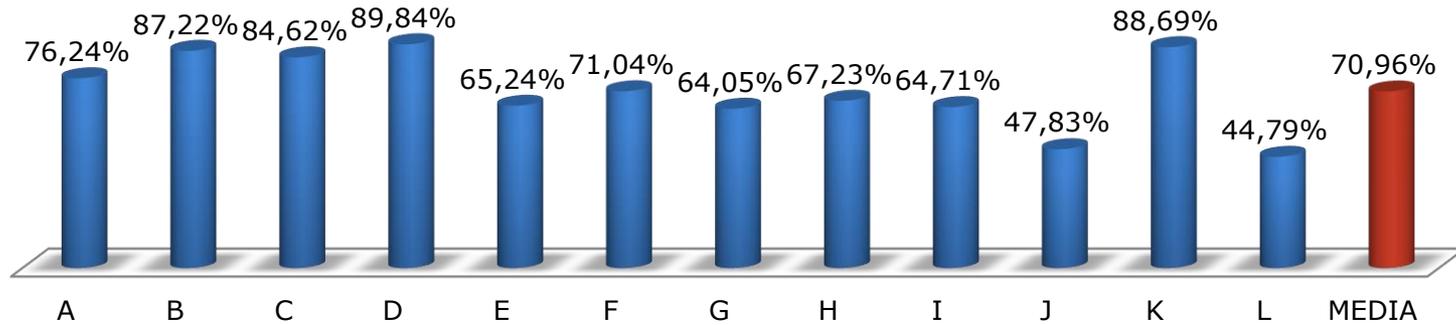


### DETECTS ABS/ESP/BRAKES SYSTEM

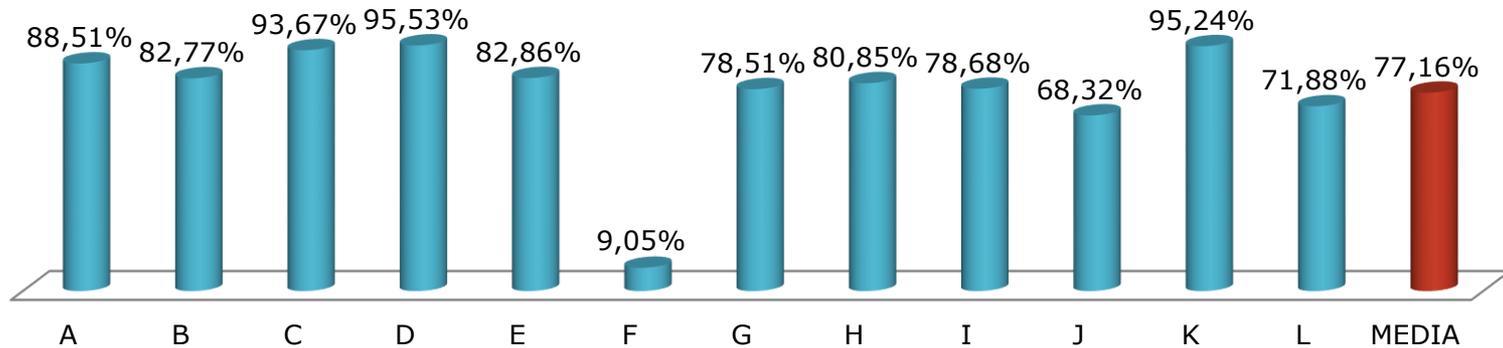


## 2. Main figures:

### DETECTS STEERING ELEMENTS

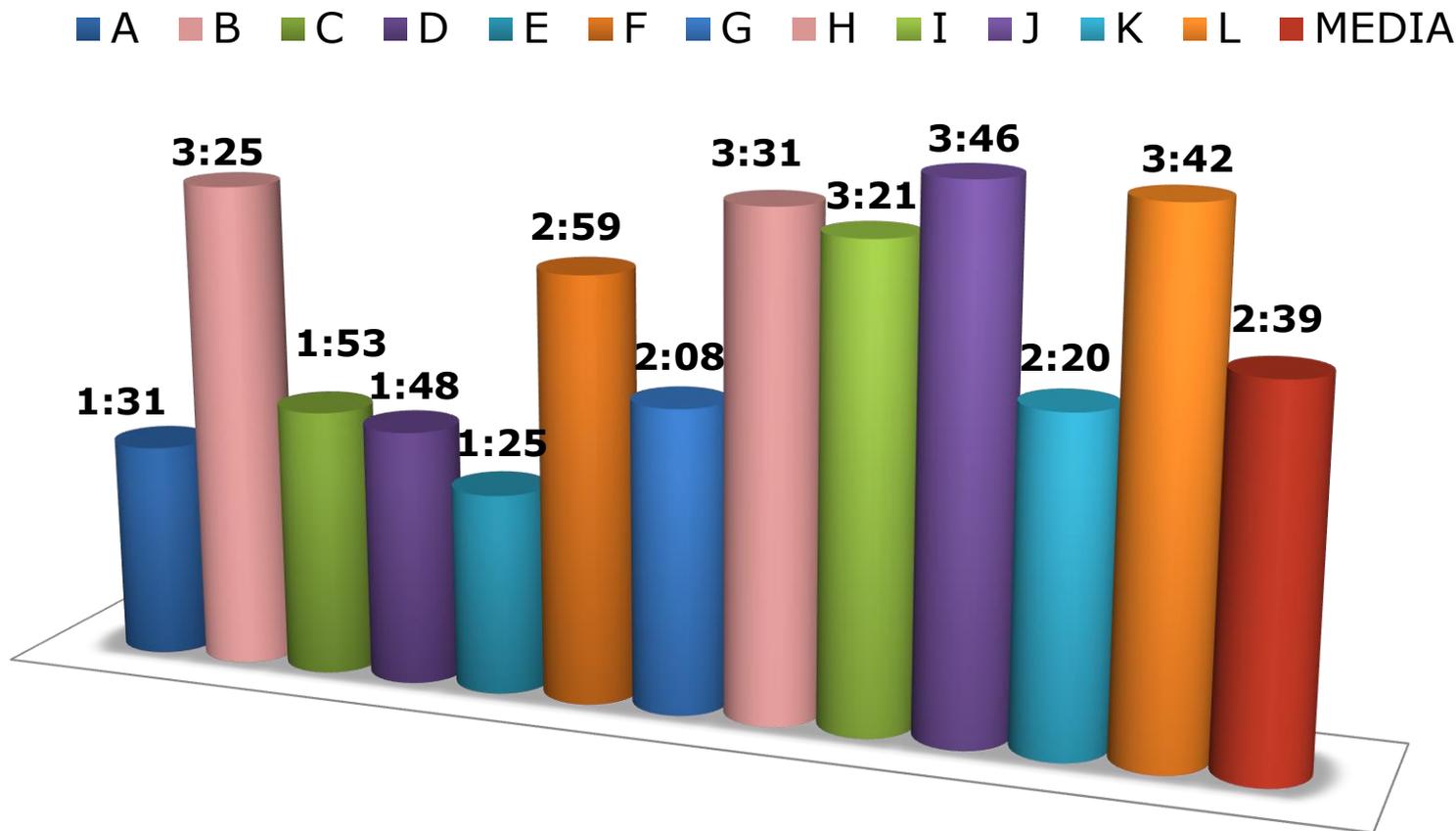


### DETECTS OTHER SYSTEMS

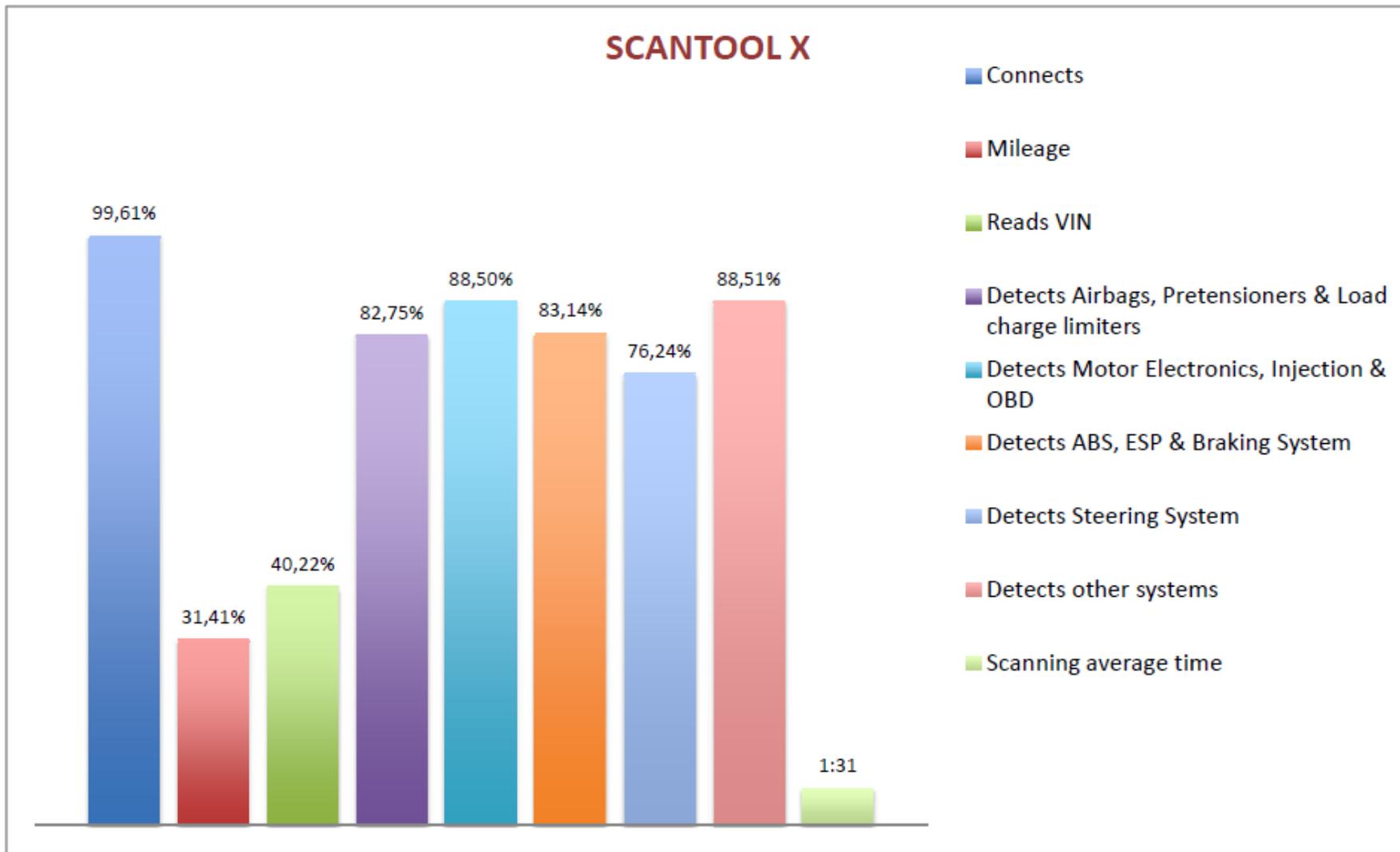


## 2. Main figures:

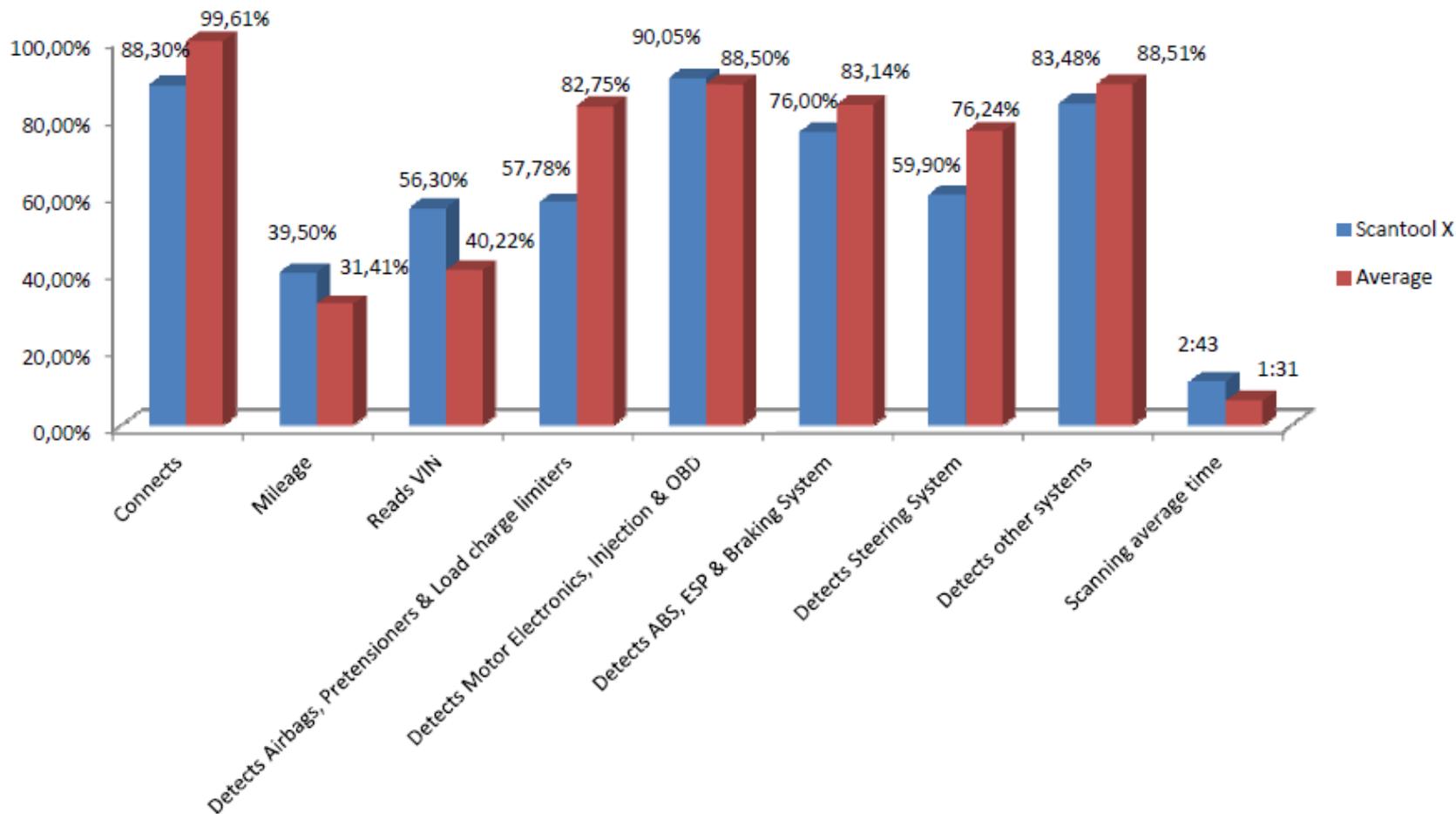
### Average testing time:



## 2. Main figures:



### 3. Conclusions & results



### 3. Conclusions & results

DEVICE	CONNECTS	KM	VIN	AIRBAG....	MOTOR	BRAKING	P STEERING	OTHERS	SCANNING	FINAL
A	OK	OK	OK	OK	OK	OK	OK	OK	OK	VERY GOOD
B	OK	N. I.	N. I.	OK	OK	OK	OK	OK	N. I.	GOOD
C	OK	OK	N. I.	OK	OK	OK	OK	OK	OK	GOOD
D	OK	N. I.	N. I.	OK	OK	OK	OK	OK	OK	GOOD
E	OK	OK	OK	OK	N. I.	N. I.	N. I.	OK	OK	GOOD
F	OK	OK	N. I.	OK	OK	OK	OK	N. I.	OK	GOOD
G	OK	OK	N. I.	N. I.	N. I.	N. I.	N. I.	OK	OK	N. I.
H	OK	N. I.	N. I.	N. I.	N. I.	N. I.	N. I.	OK	N. I.	N. I.
I	OK	OK	OK	N. I.	N. I.	N. I.	N. I.	OK	OK	N. I.
J	N. I.	N. I.	N. I.	N. I.	N. I.	N. I.	N. I.	OK	N. I.	N. I.
K	OK	N. I.	OK	OK	OK	OK	OK	OK	OK	GOOD
L	OK	N. I.	OK	N. I.	OK	OK	N. I.	N. I.	N. I.	N. I.

N.I.: Needs improvement

### 3. Conclusions & results

#### Recommendations shared with equipment manufacturers :

1. Connection to the systems through OBD port must be fast and automatic identifying VIN.
2. Manual configuration of the scanned systems must be implemented, so it is possible to select particular ECSS to be checked.
3. It is necessary to downsize some equipment.
4. DTC should be standardised, periodic & remotely updated, categorised and give useful information about the car state, data should be easily exported to PTI official reports.
5. Tests should not interrupt the normal inspection process, reduce consequences and dedicated time.

### 3. Conclusions & results

#### Government Conclusions :

1. Devices in the market could give us the required information.
2. Equipment software can be integrated easily at the PTI centres.
3. PTI testing can be done during the normal inspection time without problems.
4. Additional information can be provided to customers based on DTC.
5. Vehicles have given a good response to the connection of different scanning tools and they quickly facilitate the required information.
6. Electronic PTI is optional nowadays in Spain, it is expected new legislation obliging implementation for 2018.

1. Project description

**2. Main figures**

**3. Conclusions & results**

## Project description

### Main objectives:

Verify that devices/equipments and vehicles are not only ready to be tested in workshops, but also for PTI diagnosis offering fast, easy and comprehensive information for PTI inspectors and vehicle owners.

It seems clear that the equipments on the market is prepared, although some brands need to improve and it is very important to work hard on DTC data, main conclusion is to “start implementing Electronic PTI”.

Analyse the feasibility and the convenience of implementing the electronic diagnosis of particular electronic safety systems (ECSS) related to the safety and environment of vehicles category M1 in PTI centers.

The Fleet of vehicles demands Electronic PTI, DTCs are an important tool and are already affecting safety and environment issues.



**AECA-ITV**

**Thank you very much!**

**Supervisión y Control SA - Syc ITV**

**Enrique Taracido Vázquez**

**[etaracido@sycitv.com](mailto:etaracido@sycitv.com)**



Workshop B2

Presentation 4

# TEST METHODS AND DATA FOR THE PTI OF ECSS AND THEIR INTERNATIONAL PROVISION

Christian Theis

Federal Ministry of Transport and Digital Infrastructure (BMVI),  
Germany

HOSTED BY



الشريك الأفضل بقطاع الطاقة  
ENOC Energy Partner of Choice

أكاديمية محمد بن راشد للمركبات  
Beyond Vehicle Testing





2015 CITA Conference, 14-16th April 2015, Dubai, UAE

## **TEST METHODS AND DATA FOR THE PTI OF ECSS AND THEIR INTERNATIONAL PROVISION**



Bundesministerium  
für Verkehr und  
digitale Infrastruktur

Christian Theis  
Federal Ministry of Transport  
and Digital Infrastructure



Zentrale Stelle

Chairman  
of the Controlling Board  
Central Agency for PTI

# TEST METHODS AND DATA FOR THE PTI OF ECSS

## AGENDA



### History of PTI

### PTI of ECSS in the EU and in Germany

- PTI-relevant systems
- ECSS testing tools
- Data and information from vehicle manufacturers
- Process: Provision of PTI information, development of test methods from OEM to the inspectors
- Next steps

### International provision of German test methods

### Future of PTI

# VEHICLE CHECK 1936



# **THE PTI OF ECSS IN THE EU AND IN GERMANY**

# LEGAL BASIS



# LEGAL BASIS



**Directive 2014/45/EU**

# LEGAL BASIS



**Directive 2014/45/EU**

**StVZO**  
**Road Traffic Licensing Regulation**  
**included PTI**



# LEGAL BASIS

## Directive 2014/45/EU



29.4.2014  Official Journal of the European Union L 127/51

DIRECTIVE 2014/45/EU OF THE EUROPEAN PARLIAMT AND OF THE COUNCIL

of 3 April 2014

on periodic roadworthiness tests for motor vehicles and their trailers and repealing Directive 2009/40/EC

(Text with EEA relevance)

THE EUROPEAN PARLIAMT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 91 thereof,

Having regard to the proposal from the European Commission,

After consulting the European Economic and Social Committee (\*),

## DEDICATED ECSS TESTING

Acting in accordance with the ordinary legislative procedure (\*\*),

Whereas:

(1) In its White Paper of 28 March 2011 entitled 'Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system', the Commission set out a 'zero-vision' objective whereby the Union should move close to zero fatalities in road transport by 2050. With a view to attaining that objective, vehicle technology is expected to contribute greatly to improvement of the safety record of road transport.

  **VISUAL/MANUAL: SINCE 2011-12-31**

(2) Roadworthiness testing is a part of a wider regime designed to ensure that vehicles are kept in a safe and environmentally acceptable condition during their use. That regime should cover periodic roadworthiness testing of vehicles and technical roadside inspection of vehicles used for commercial road transport activities, as well as providing for a vehicle registration procedure allowing for the suspension of a vehicle's authorisation to be used in road traffic where the vehicle constitutes an immediate risk to road safety. Periodic testing should be the main tool to ensure roadworthiness. Technical roadside inspections of commercial vehicles should merely be complementary to periodic testing.

 **VIA THE ELECTRONIC VEHICLE INTERFACE: FROM 2018 - 2023**

(\*) OJ C 44, 15.2.2011, p. 128.

(\*\*) Position of the European Parliament of 11 March 2014 (not yet published in the Official Journal) and decision of the Council of 24 March 2014.

## StVZO Road Traffic Licensing Regulation included PTI



*particularly §29 and  
annexes VIII, VIIIa, ..., VIIIe*

Untersuchung der Kraftfahrzeuge und Anhänger

§ 29

§ 29

Untersuchung der Kraftfahrzeuge und Anhänger

(1) Die Halter von zulassungspflichtigen Fahrzeugen im Sinne des § 3 Absatz 1 der Fahrzeug-Zulassungsverordnung und kennzeichenpflichtigen Fahrzeugen nach § 4 Absatz 2 und 3 Satz 2 der Fahrzeug-Zulassungsverordnung haben ihre Fahrzeuge auf ihre Kosten nach Maßgabe der Anlage VIII in Verbindung mit Anlage VIIIa in regelmäßigen Zeitabständen untersuchen zu lassen. Ausgenommen sind

1. Fahrzeuge mit rotem Kennzeichen oder Kurzzeitkennzeichen,  
2. Fahrzeuge der Bundeswehr und der Bundespolizei.  
Über die Untersuchung der Fahrzeuge der Feuerwehren und des Katastrophenschutzes entscheiden die zuständigen obersten Landesbehörden im Einzelfall oder allgemein.

(2) Der Halter hat den Monat, in dem das Fahrzeug spätestens zur  
1. Hauptuntersuchung vorgeführt werden muss, durch eine Prüfplakette nach Anlage IX auf dem amtlichen Kennzeichen nachzuweisen,  
2. Sicherheitsprüfung vorgeführt werden muss, durch eine Prüfmarke in Verbindung mit einem SP-Schild nach Anlage IXb nachzuweisen. Prüfplaketten sind von der nach Landesrecht zuständigen Behörde oder den zur Durchführung von Hauptuntersuchungen berechtigten Personen zuzuteilen und auf dem hinteren amtlichen Kennzeichen dauerhaft und gegen Missbrauch gesichert anzubringen. Prüfmarken sind von der nach Landesrecht zuständigen Behörde zuzuteilen und von dem Halter oder seinem Beauftragten auf dem SP-Schild nach den Vorschriften der Anlage IXb anzubringen oder von den zur Durchführung von Hauptuntersuchungen oder Sicherheitsprüfungen berechtigten Personen zuzuteilen und von diesen nach den Vorschriften der Anlage IXb auf dem SP-Schild anzubringen. SP-Schilder dürfen von der nach Landesrecht zuständigen Behörde, von den zur Durchführung von Hauptuntersuchungen berechtigten Personen, dem Fahrzeughersteller, dem Halter oder seinem Beauftragten nach den Vorschriften der Anlage IXb angebracht werden.

(3) Eine Prüfplakette darf nur dann zugeteilt und angebracht werden, wenn die Vorschriften der Anlage VIII eingehalten sind. Durch die nach durchgeführter Hauptuntersuchung zugeteilte und angebrachte Prüfplakette wird bescheinigt, dass das Fahrzeug zum Zeitpunkt dieser Untersuchung vorschriftsmäßig nach Nummer 1.2 der Anlage VIII ist. Weist das Fahrzeug lediglich geringe Mängel auf, so kann abweichend von Satz 1 die Prüfplakette zugeteilt und angebracht werden, wenn die un-





# CRITERIA FOR PTI-RELEVANT SYSTEMS



   **13 relevant criteria, incl.:**

- Braking
- Change of direction
- Longitudinal, transverse and yaw dynamic stabilization of vehicle movement
- Improvement of the visibility conditions
- Change in suspension and damping behavior
- ...

**Systems are PTI-relevant, which are able to execute one or more of the 13 safety- or environmentally relevant criteria**

# PTI-RELEVANT SYSTEMS



**11 Systems, including:**



Electronic brake system (EBS)



Electronic Power Steering (EPS)



Electronic Stability Control (ESC)

...

# PTI-RELEVANT SYSTEMS



**11 Systems, including:**



Electronic brake system (EBS)



Electronic Power Steering (EPS)



Electronic Stability Control (ESC)

...



**2 Systems**



Shock absorbers / Electronic damping



Electronic parking brake

# PTI-RELEVANT SYSTEMS



**11 Systems, including:**



Electronic brake system (EBS)



Electronic Power Steering (EPS)



Electronic Stability Control (ESC)

...



**2 Systems**



Shock absorbers / Electronic damping



Electronic parking brake



**50 Systems, including:**



test method (video)



Shock absorbers / Electronic damping



Electronic parking brake



Adaptive Cruise Control



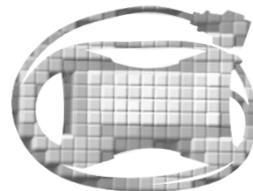
Automatic emergency brake



Lane keeping assist

...

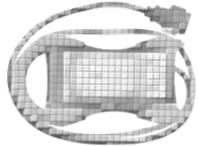
# ECSS TESTING TOOLS



# ECSS TESTING TOOLS



## Tool description



**Directive 2014/45/EU**

**ANNEX III**

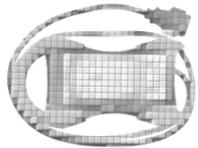
[...]

(14) A device to connect to the electronic vehicle interface, such as an OBD scan tool;

# ECSS TESTING TOOLS



## Tool description



### Directive 2014/45/EU ANNEX III

[...]

(14) A device to connect to the electronic vehicle interface, such as an OBD scan tool;



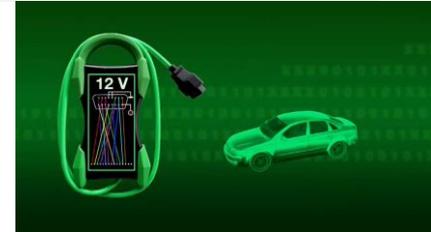
## Tool description



### StVZO Annex VIII d

[...]

Nr.25 Devices for [...] testing using the electronic vehicle interface



The PTI Adapter is a **PTI-specific** scantool with integrated **acceleration and yaw rate sensors**

enabling hybrid test methods as e.g. an efficient **shock absorber test**

# **DATA AND INFORMATION FROM VEHICLE MANUFACTURERS**



# DATA AND INFORMATION FROM VEHICLE MANUFACTURERS



## Legal basis

Directive 2014/45/EU

Article 4, No. 3

Implementing act before 2018-05-20 for

(a) a set of technical information [...] necessary for roadworthiness testing [...], and

(b) the detailed rules concerning the data format and the procedures for accessing the relevant technical information.

The technical information [...] shall be made available, free of charge or at a reasonable price, by the manufacturers

# DATA AND INFORMATION FROM VEHICLE MANUFACTURERS



## Legal basis

**Directive 2014/45/EU**

**Article 4, No. 3**

Implementing act before 2018-05-20 for

(a) a set of technical information [...] necessary for roadworthiness testing [...], and

(b) the detailed rules concerning the data format and the procedures for accessing the relevant technical information.

The technical information [...] shall be made available, free of charge or at a reasonable price, by the manufacturers

## Legal basis

**StVZO**

**Annexe VIIIa and VIIIb,  
since 2006-04-01**

Vehicle manufacturers deliver for their vehicles PTI requirements regarding

- Fitment
- Condition
- Function and Performance for all PTI-relevant Systems

and test methods to test the compliance with these requirements.

The information for a vehicle is delivered at latest 6 months after the market start of the vehicles model.

# DATA AND INFORMATION FROM VEHICLE MANUFACTURERS



## Content

In discussion in EC working groups  
(preparing the implementing act)

Status: Draft of the table of necessary  
information

## Format & Process

Discussion in EC working groups  
(preparing the implementing act)  
starts 2015

# DATA AND INFORMATION FROM VEHICLE MANUFACTURERS



## Content

In discussion in EC working groups  
(preparing the implementing act)

Status: Draft of the table of necessary  
information

## Format & Process

Discussion in EC working groups  
(preparing the implementing act)  
starts 2015

## Content (examples)

- Vehicle-specific information about the originally installed systems
- Diagnostic data and information for a fitment test
- Reference values for the brake performance test
- ...

## Format & Process

- Diagnostic data: mainly ODX, partly PDF, Excel and other formats
- Other data and information: wide diversity of formats
- Data delivery mainly via SFTP upload

# PROCESS: PROVISION OF PTI INFORMATION, DEVELOPMENT OF TEST METHODS FROM OEM TO THE INSPECTORS



Manufacturers



Testing centres **and**  
relevant competent  
authorities



Inspectors

# PROCESS: PROVISION OF PTI INFORMATION, DEVELOPMENT OF TEST METHODS FROM OEM TO THE INSPECTORS



Manufacturers



Manufacturers



Relevant competent authority  
Central agency for PTI



Testing centres **and**  
relevant competent  
authorities



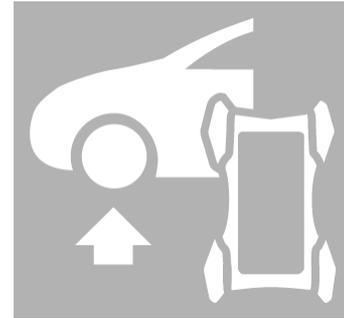
Testing centres  
Inspection organizations



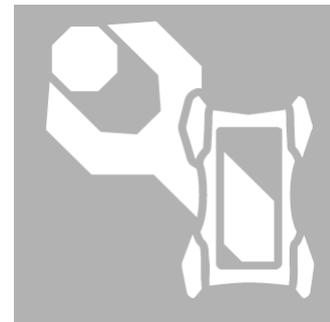
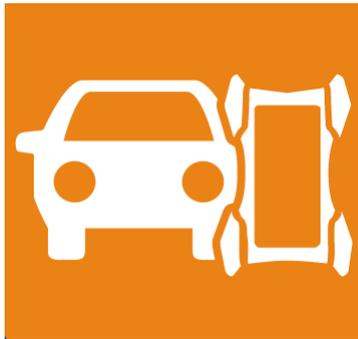
Inspectors



Inspectors



# TEST METHODS



# TEST METHODS

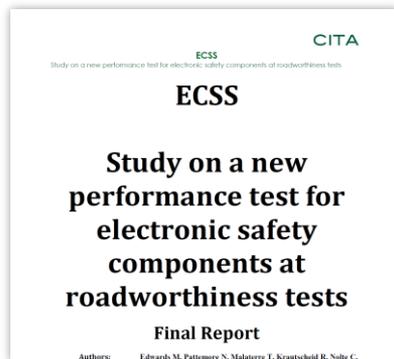


## for 11 Systems

Test methods not specified in detail

In preparation: Delegated act  
to introduce test methods for ECSS  
using the electronic vehicle interface

1st step:  
ECSS project



## for 2 Systems

Test methods not specified in detail

# TEST METHODS

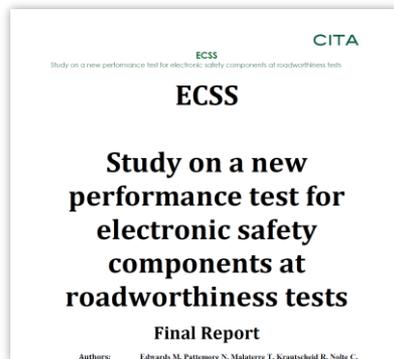


## for 11 Systems

Test methods not specified in detail

In preparation: Delegated act to introduce test methods for ECSS using the electronic vehicle interface

1st step:  
ECSS project



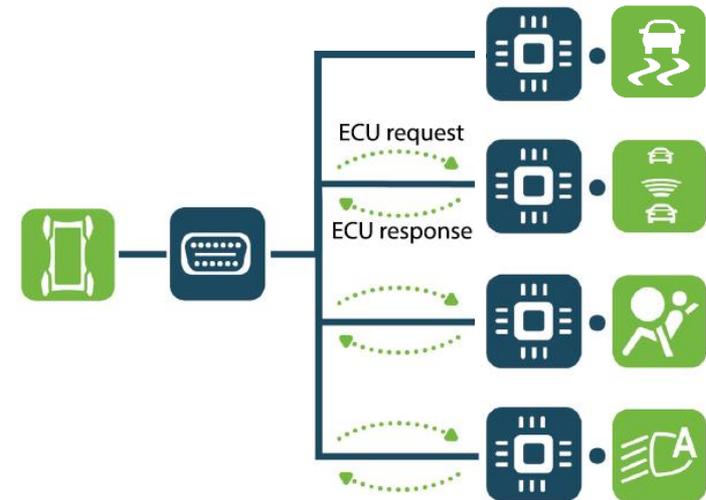
## for 2 Systems

Test methods not specified in detail

## for 50 Systems (examples)



Fitment test



# TEST METHODS

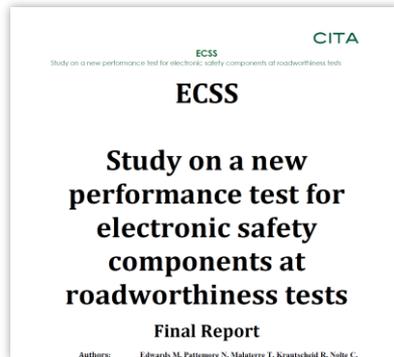


## for 11 Systems

Test methods not specified in detail

In preparation: Delegated act to introduce test methods for ECSS using the electronic vehicle interface

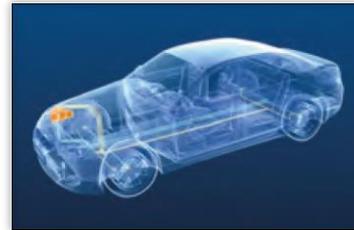
1st step:  
ECSS project



## for 2 Systems

Test methods not specified in detail

## for 50 Systems (examples)



Fitment test



Function test



Performance test

# NEXT STEPS



# NEXT STEPS



**2015 (?)**



**Delegated act:** Inclusion of ECSS test methods using the electronic vehicle interface

**Before 2018-05-20**



**Implementing act:** Definition of information to be provided by manufacturers and data formats and access procedures to be used

**2018-05-20**



**2014/45/EU comes into force**  
i.a. requirements regarding *test methods* (ANNEX I) obligatory

**At latest 2023-05-20**



**Start of the obligatory use of the electronic vehicle interface for PTI**

# NEXT STEPS



2015 (?)



**Delegated act:** Inclusion of ECSS test methods using the electronic vehicle interface

Before 2018-05-20



**Implementing act:** Definition of information to be provided by manufacturers and data formats and access procedures to be used

2018-05-20



**2014/45/EU comes into force**

i.a. requirements regarding *test methods* (ANNEX I) obligatory

At latest 2023-05-20



**Start of the obligatory use of the electronic vehicle interface for PTI**

2015-07-01



**Start of the obligatory use of the electronic vehicle interface for PTI**

# **INTERNATIONAL PROVISION OF GERMAN TEST METHODS**

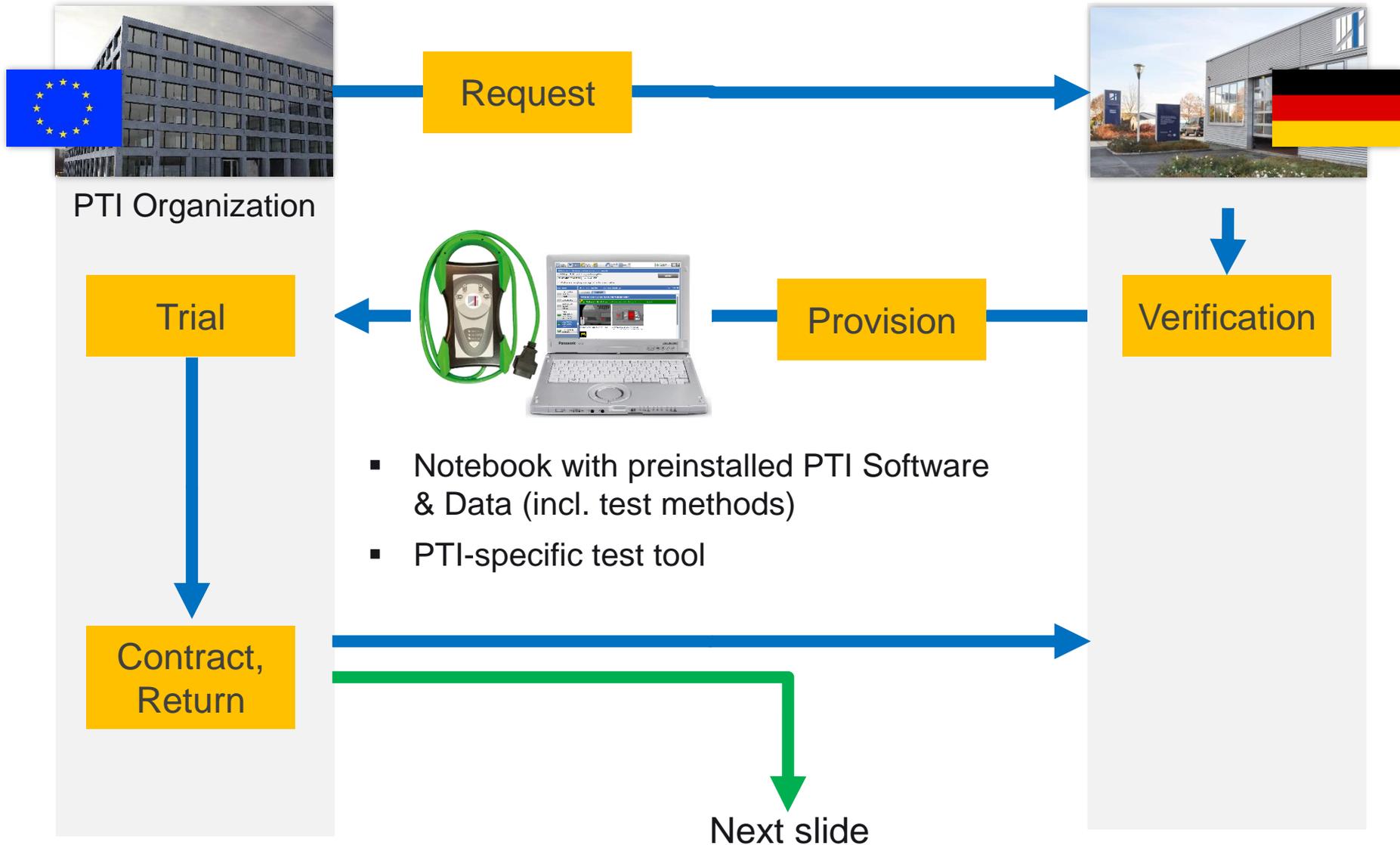
# LEGAL BASIS

[International] Organizations authorized for performing PTI according to Directive 2010/48/EU receive the PTI test methods by request for a non-discriminatory fee.

**Source: No. 3.3, Annex VIII StVZO**

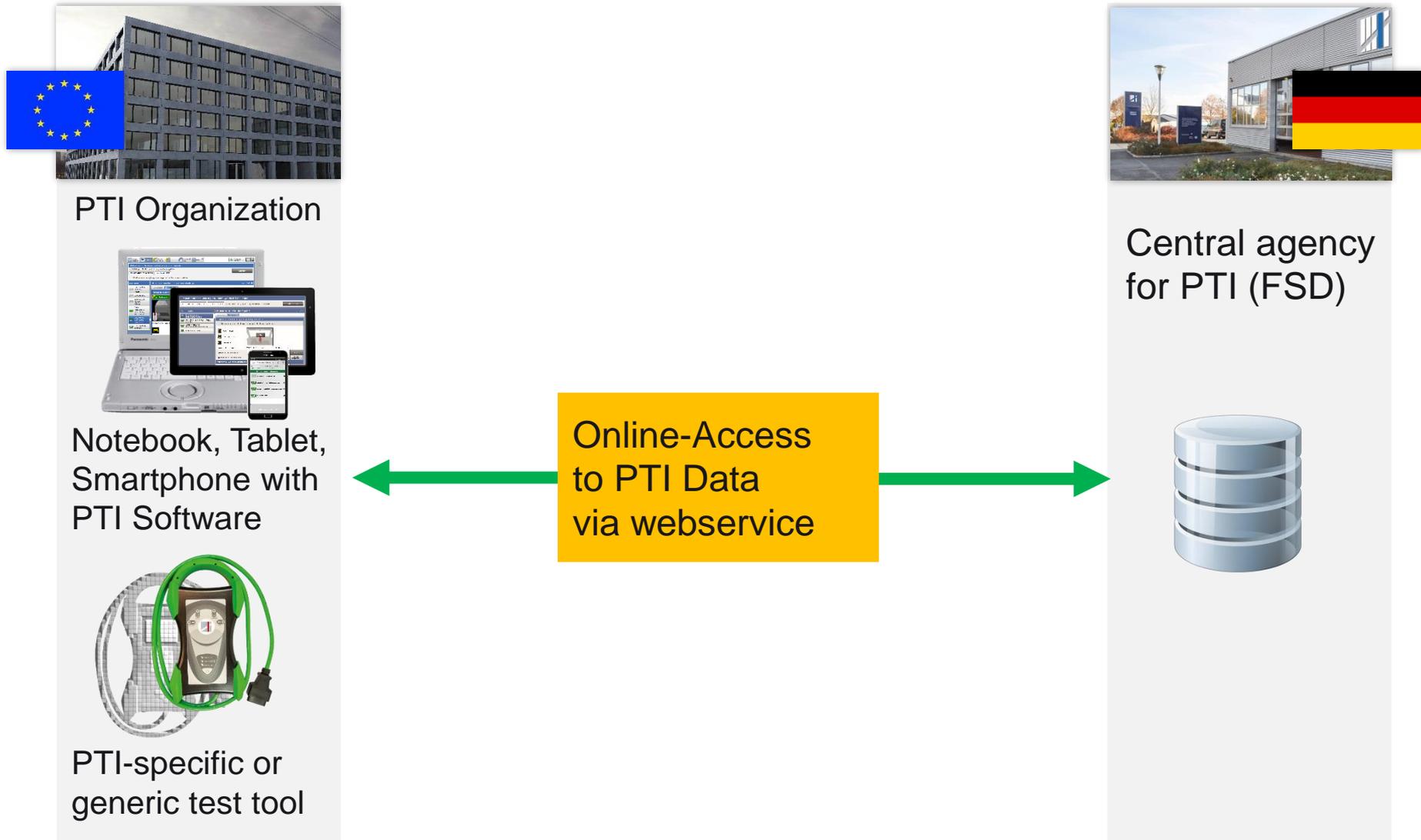
# TECHNICAL ACCESS

## SAMPLE UNIT (FOR TRIAL)

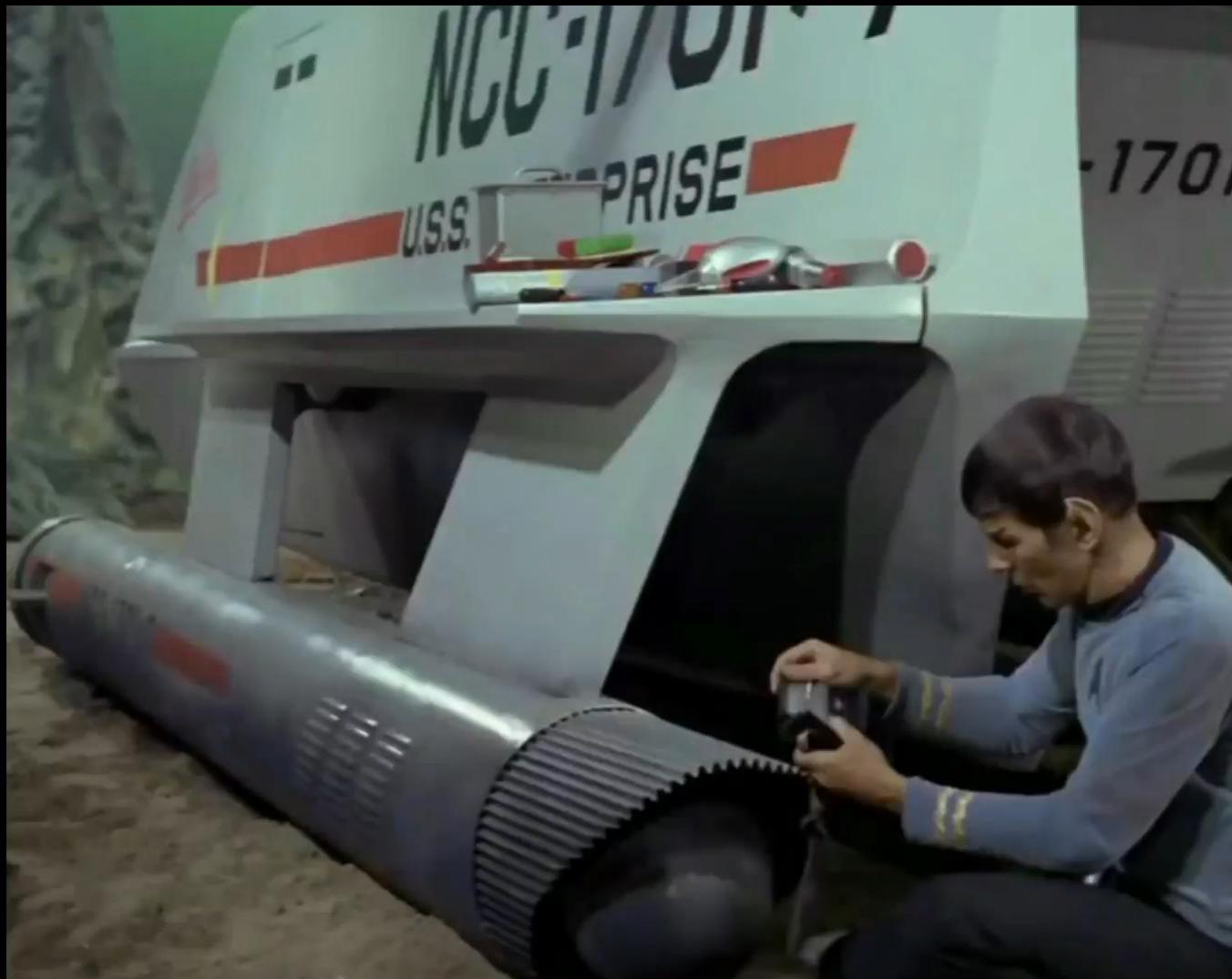


# TECHNICAL ACCESS

## PRODUCTIVE USAGE (WITH CONTRACT)



# FUTURE PTI: STARDATE 5928.5



**THANK YOU  
FOR YOUR ATTENTION!**



**ANY  
QUESTIONS?**