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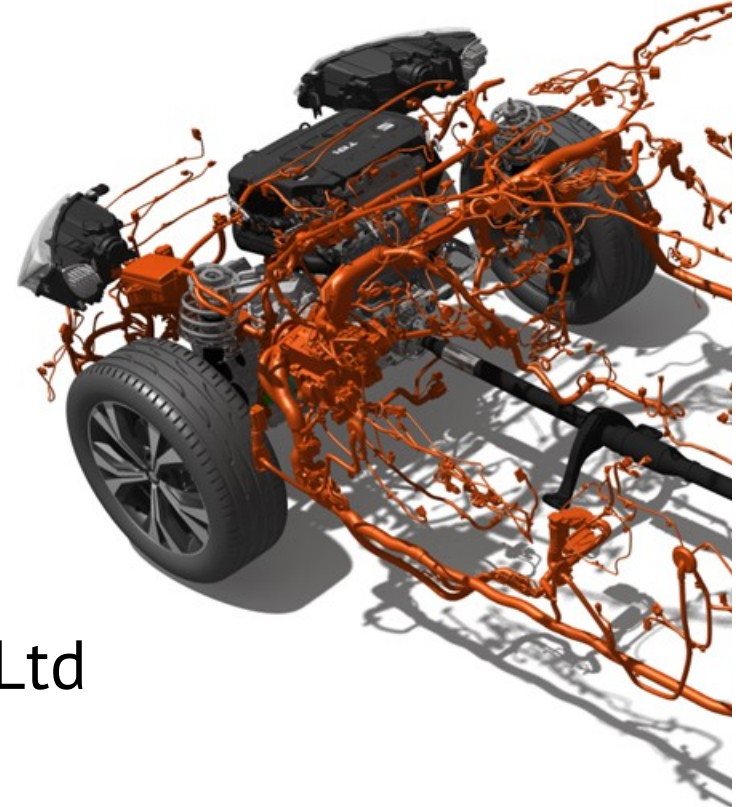
Engineering

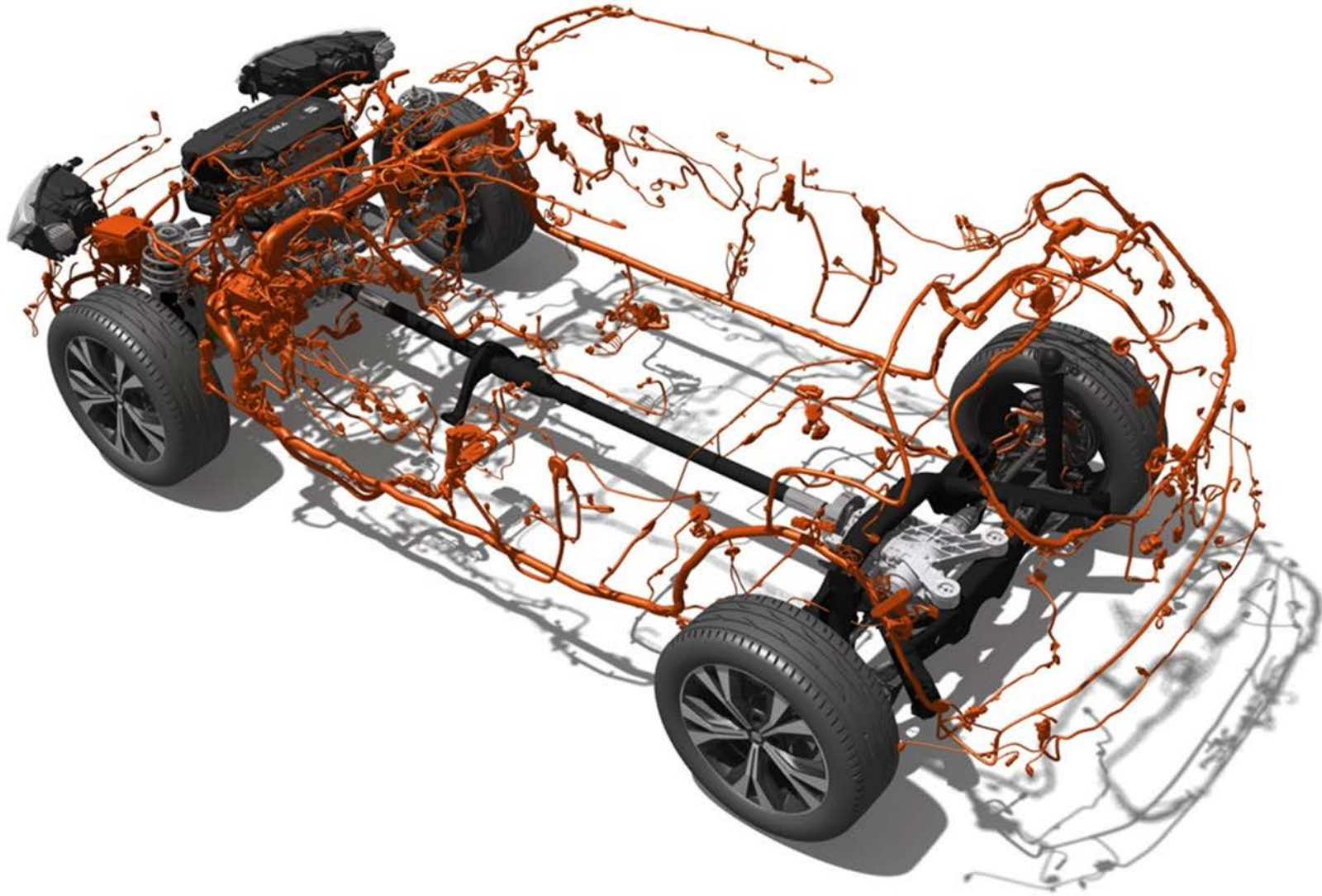
The art of the possible

The art of the possible 2019

- Evolution
- Proliferation and convergence
- ADAS - symptom
- Towards 2030.....

By Andrew Marsh FIMI,
Engineering Director, Auto Industry Consulting Ltd





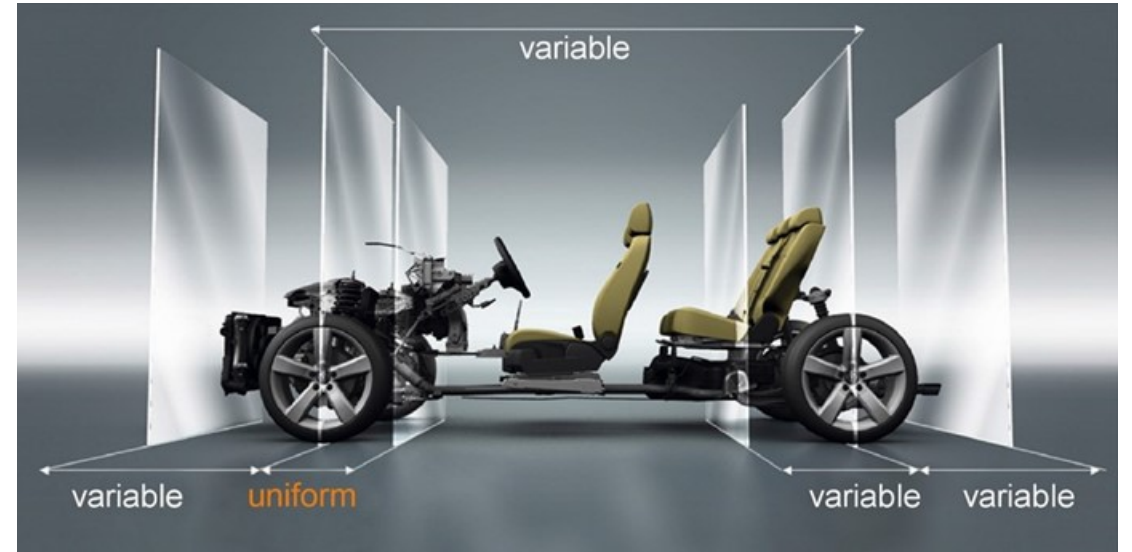
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Evolution

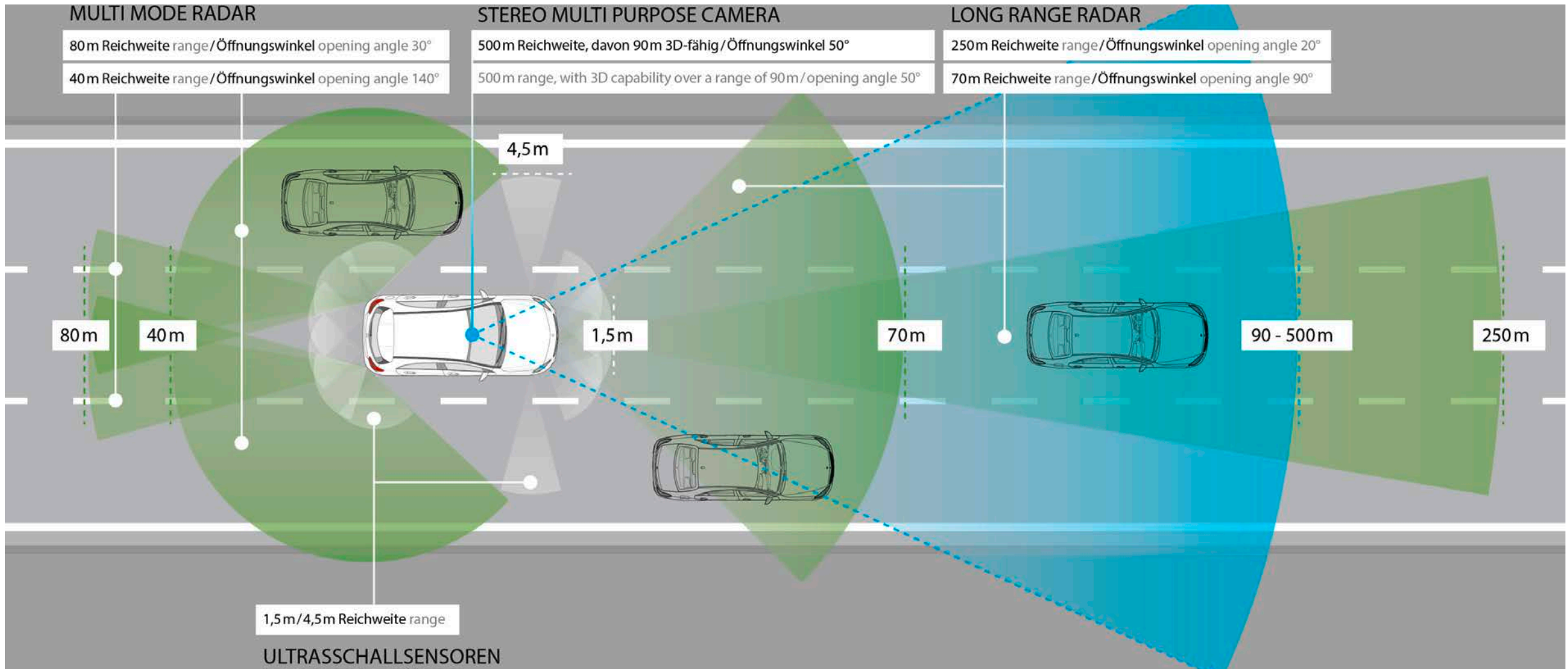
	Models		Body shapes	
	2010	2018	2010	2018
Audi	11	17	14	22
BMW	9	17	17	27
Mercedes-Benz	11	19	16	31



	2010	2018
Audi	5	2: MQB, MLB Evo, R8
BMW	5	2: UKL, CLAR, G29, 'i' x2
Mercedes-Benz	6	2: MFA, MRA, SL / SLK, AMG GT



Convergence

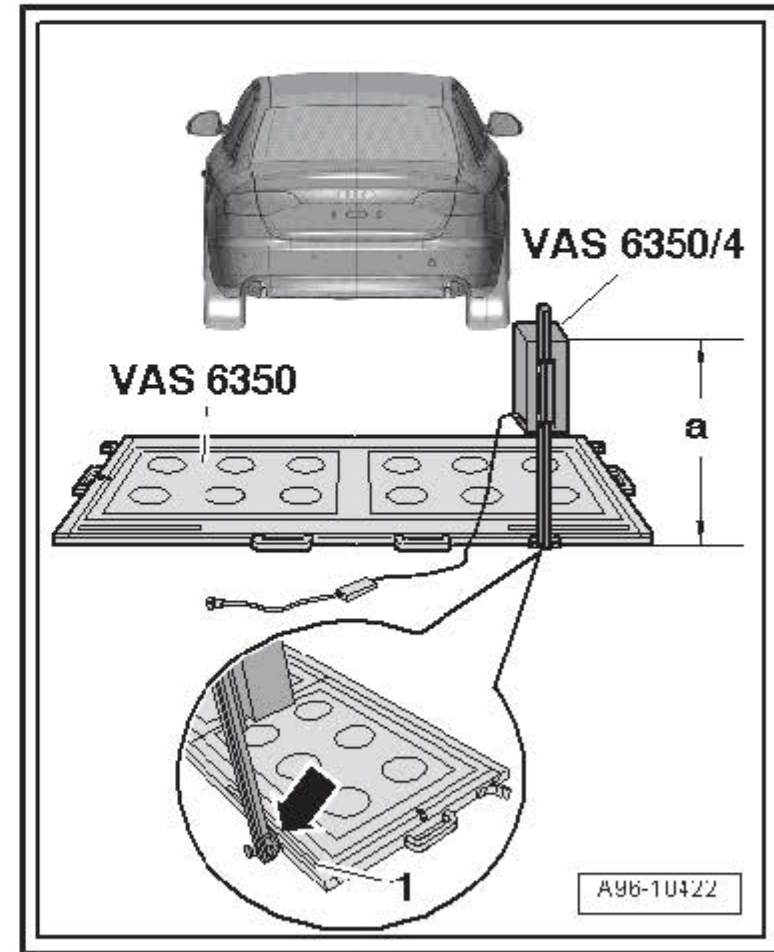
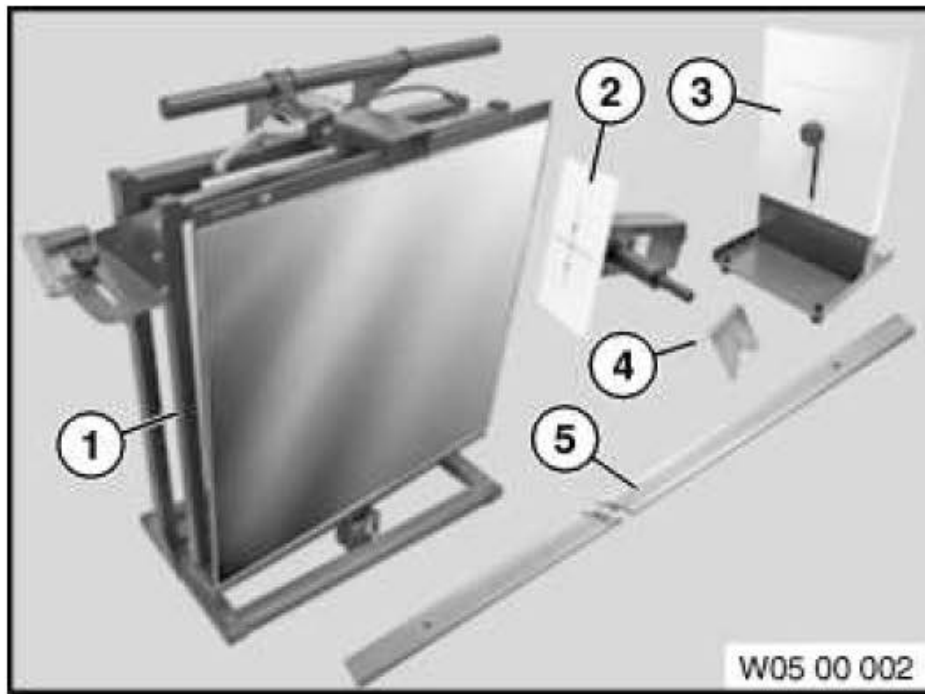


ADAS 'calibration'

Three groups:

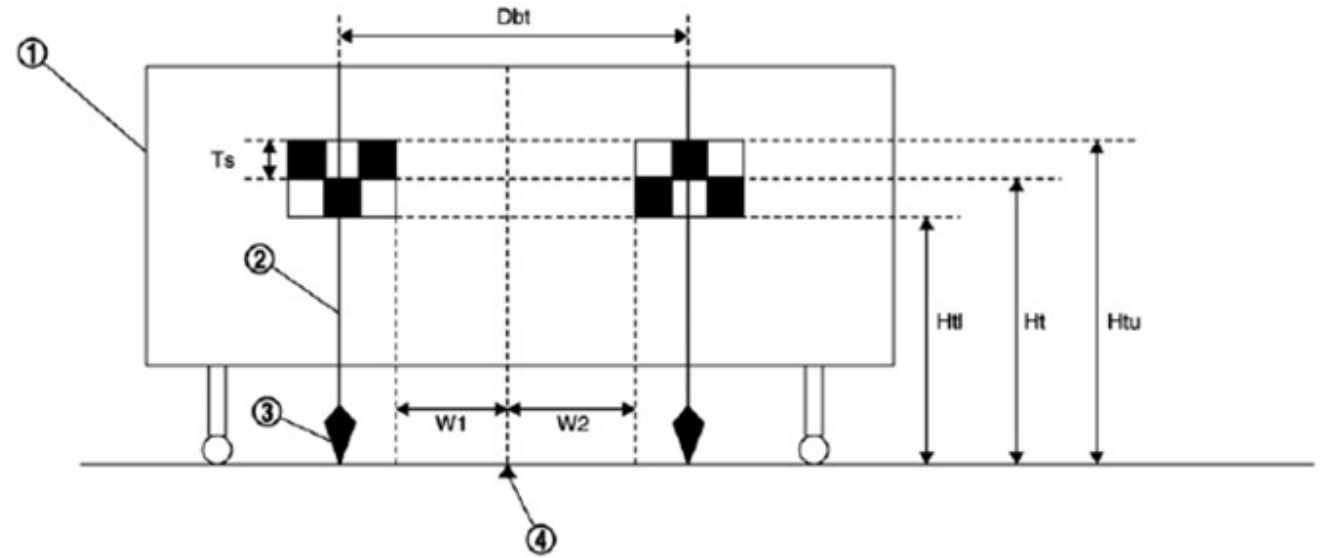
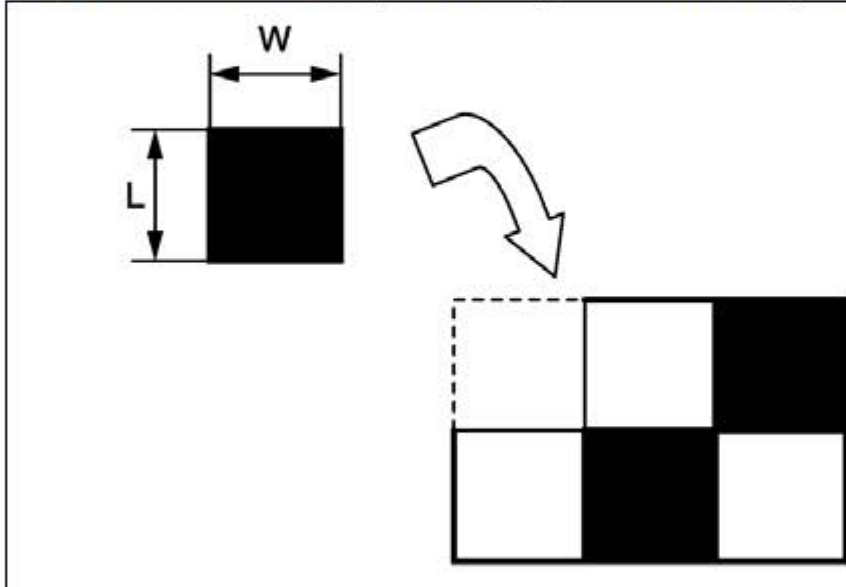
- 2000 onwards..... Static
- 2008 onwards..... Dynamic
- 2017 onwards..... Self calibration

Static: The 'tool room' approach



Static: Nissan Micra K14

Tape three sheets of black paper and three sheets of white paper together to make a target of 360 mm (14.17 in) × 240 mm (9.45 in).

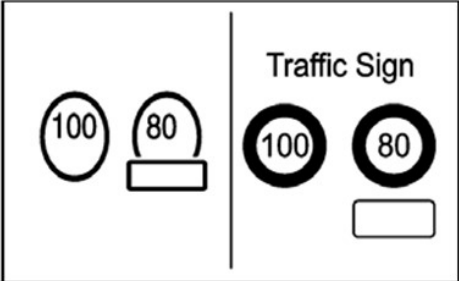



- ① Board
- ② String
- ③ Cone
- ④ Center between two targets

Side of a target (Ts)	: 120 mm (4.72 in)
Height of a target lower end (Htl)	: 1,180 mm (46.46 in)
Height of a target center (Ht)	: 1,300 mm (51.18 in)
Height of a target upper end (Htu)	: 1,420 mm (55.91 in)
Width between a right target center from a left target center (Dbt)	: 720 mm (28.35 in)
W1	: 180 mm (7.09 in)
W2	: 180 mm (7.09 in)

Static > Dynamic: Nissan Micra K14

Road sign recognition calibration... is dynamic!!!!

TSR ON	Road sign detected (Speed limit signs)	<p>This is an example. For details of displayed signs, refer to System Description</p>  <p>The diagram shows two columns of signs. The left column has a speed limit sign with '100' and a smaller sign with '80' below it. The right column is labeled 'Traffic Sign' and has a speed limit sign with '100' and a smaller sign with '80' below it.</p>
TSR is malfunction	The TSR system is automatically canceled.	 <p>A warning icon (triangle with exclamation mark) is shown above the text 'Warning'. Below that is a small icon of a car with a red exclamation mark, and further down is the text 'System fault'.</p>

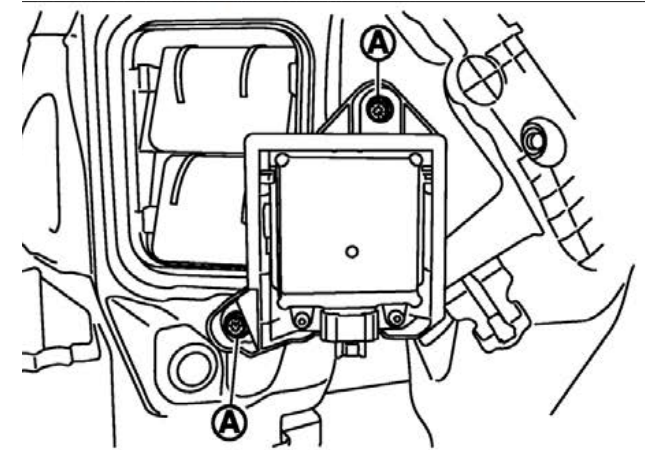
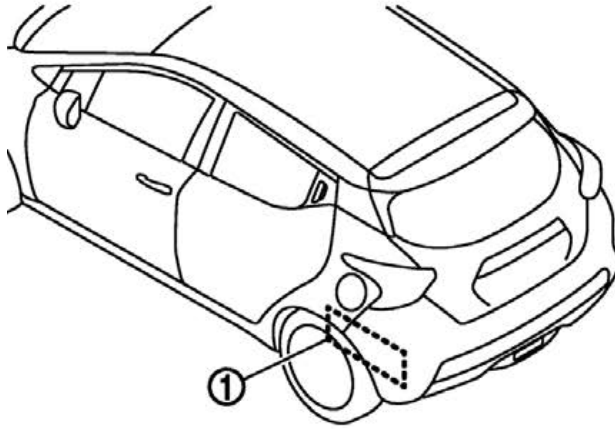
Dynamic:

- Two technicians
- Speed: 64 and 96 km/h
- Variety of lines & vehicles
- Cycle time: 10 and 30 minutes



- Completes the process > final fault sweep
- Restarts vehicle systems

Self-calibration: Nissan Micra K14.....



■ CAUTION ■

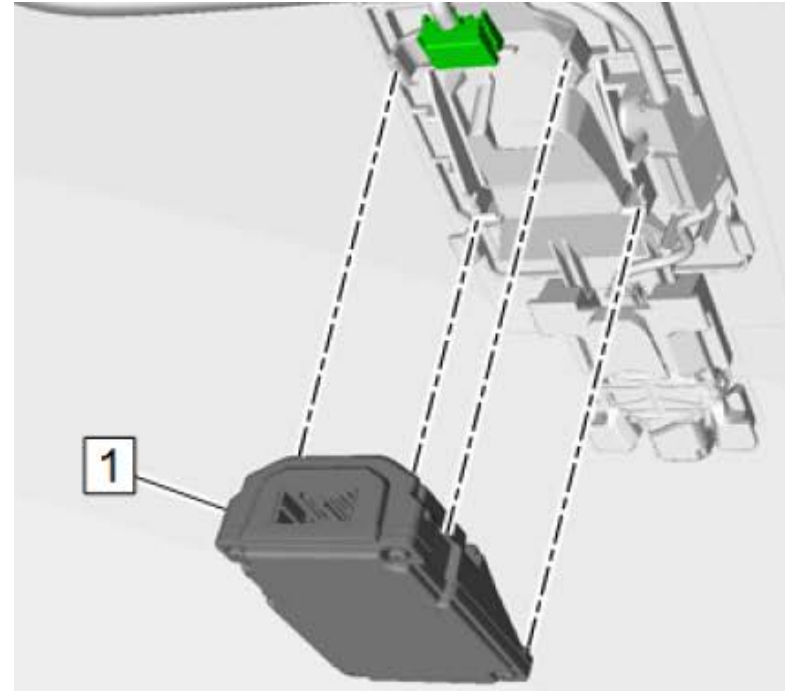
- Never use the BSW system when driving with free rollers or a chassis dynamometer.
- Never perform the active test while driving.
- Never change BSW initial state ON ⇒ OFF without the consent of the customer.

Evolution from now to 2030

- '2000' technology still around in 2030
- Self-calibration driven by OEM warranty

Repairers – system recognition:

- > **Efficient repair**
- > **'Go to' expertise**



ADAS – future

The art of the possible – thank you!

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