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# High precision Headlamp Digital Aiming



Ludovic Toulisse DVN WORKSHOP USA 21-22 SEPTEMBER 2021



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Confidential



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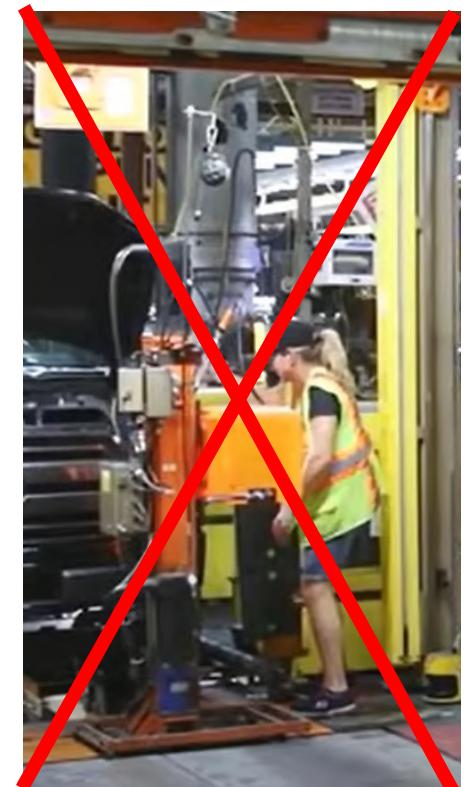
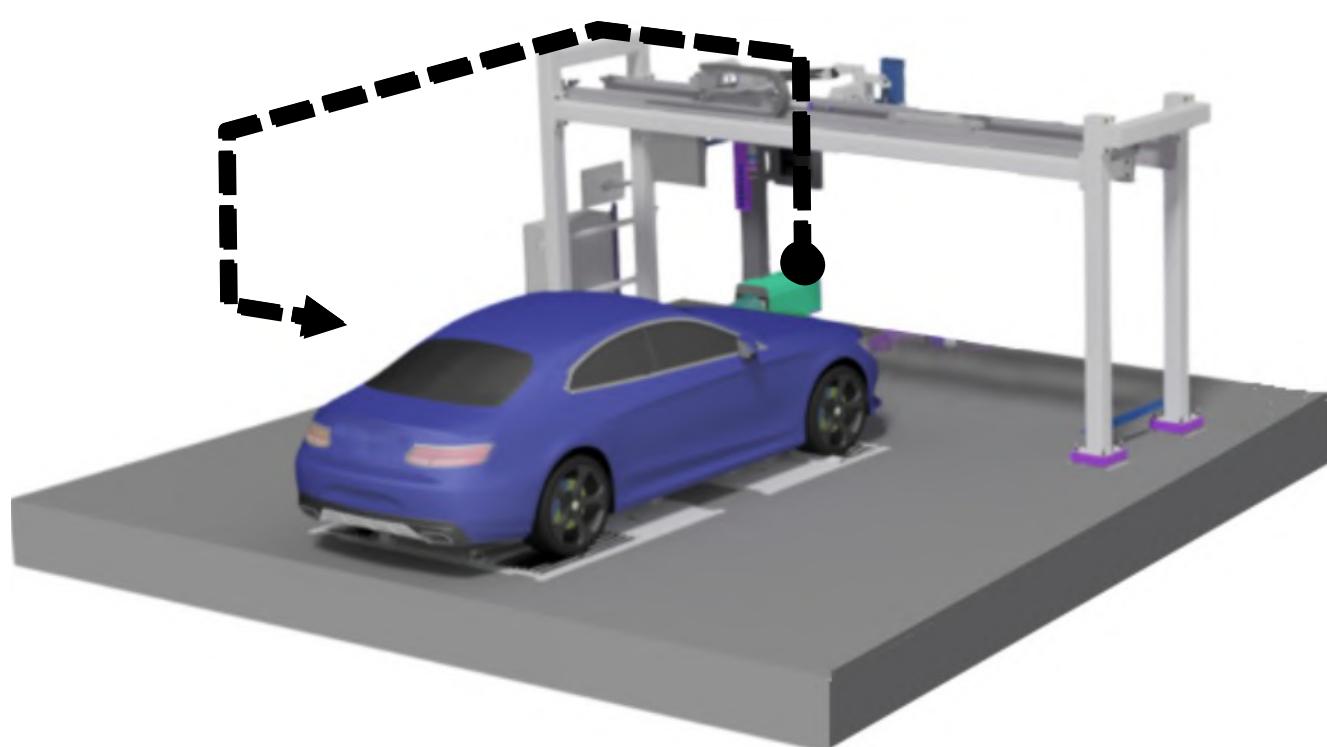
# What is Digital Aiming?

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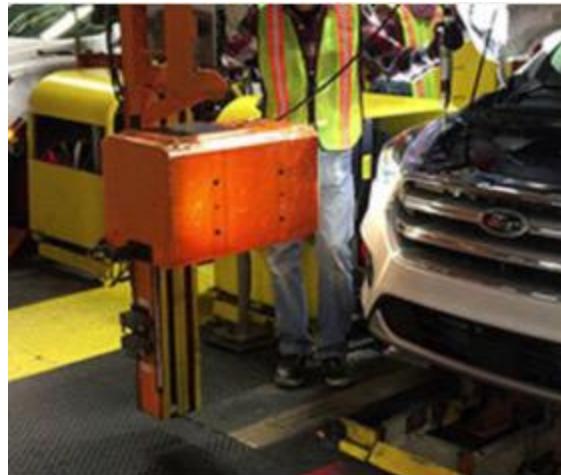


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# How to digitalize the aiming : Car assy line



# Human factor on aiming precision



- ▶ Screwing machine inertia
- ▶ Manual start / stop
- ▶ Torque variations



# Aiming components : factors of aiming degradation

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- ▶ Gears Brackets Bars Sliders Cables Seals and Screws



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# One example of aiming complexity



**6 plastic components and 10 screws**

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# Solutions for Digital Aiming for SAE headlamps

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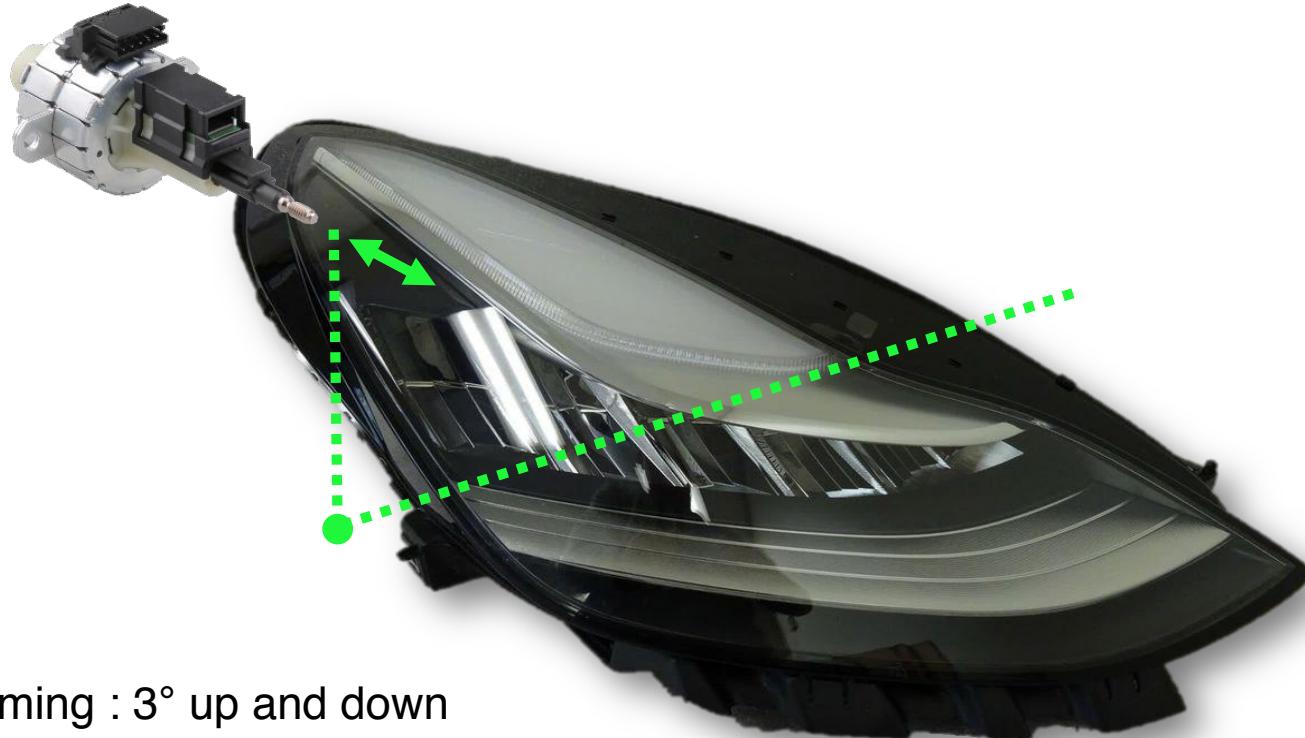
- ▶ Simplified stepper « aimer »
  - Dynamic leveler optimized for aiming
  - Fast and precise
  - Variable speed / Microstep driving
  - Typical angular precision +/-0.07%



- ▶ DC « Aimer »
  - Basic analogic driving
  - Constant speed



# Solutions for ADB headlamps : Vertical aiming + dynamic leveling



Aiming : 3° up and down  
Leveling : 3° up and down

Thin



Vertical



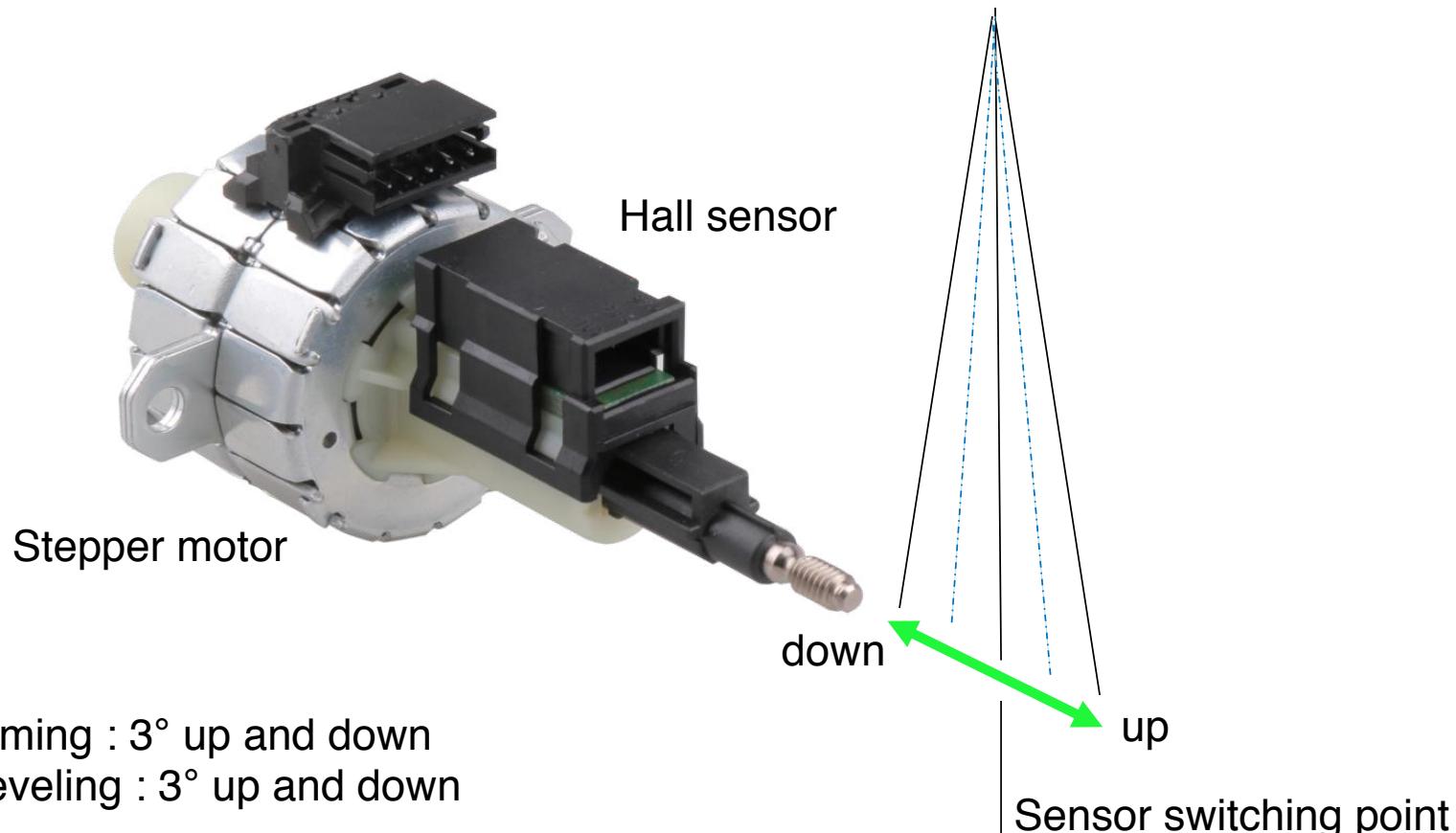
# Reference run of the stepper motor

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- ▶ Long stroke Vertical Leveling + Aiming : Long Motor reference run



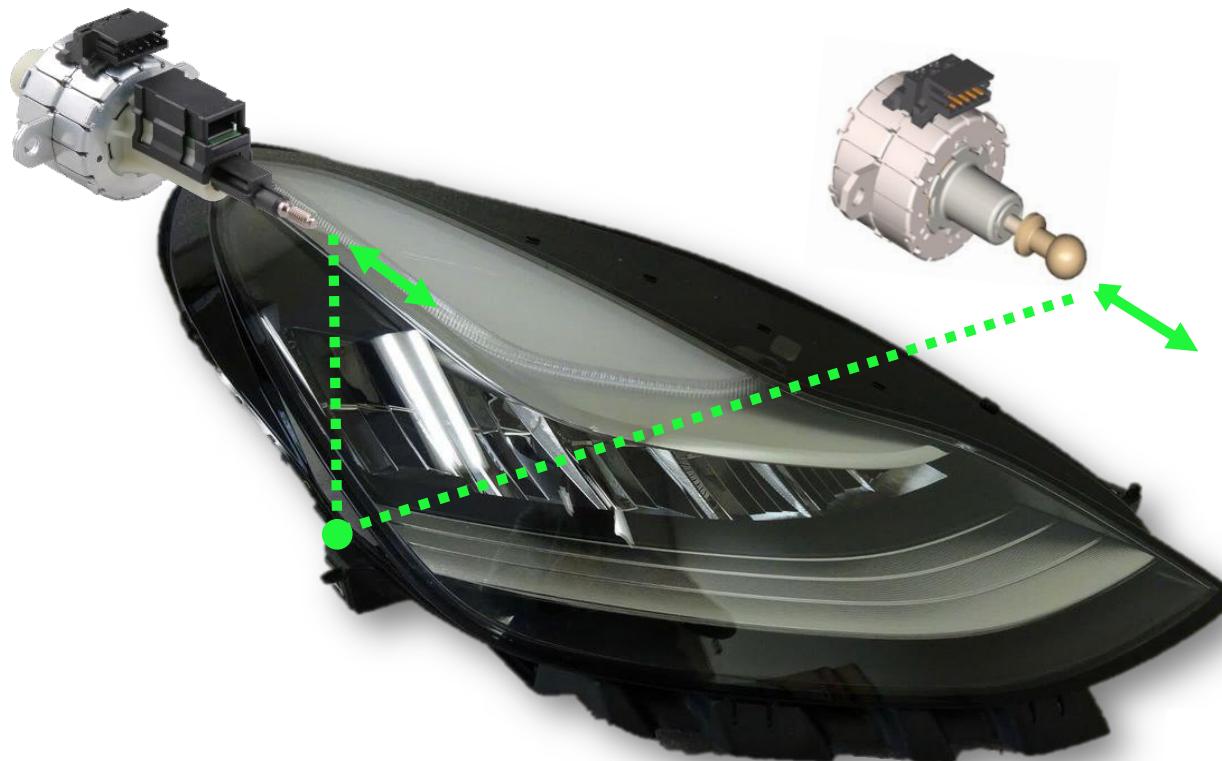
# Reference run Noise cancelling motor



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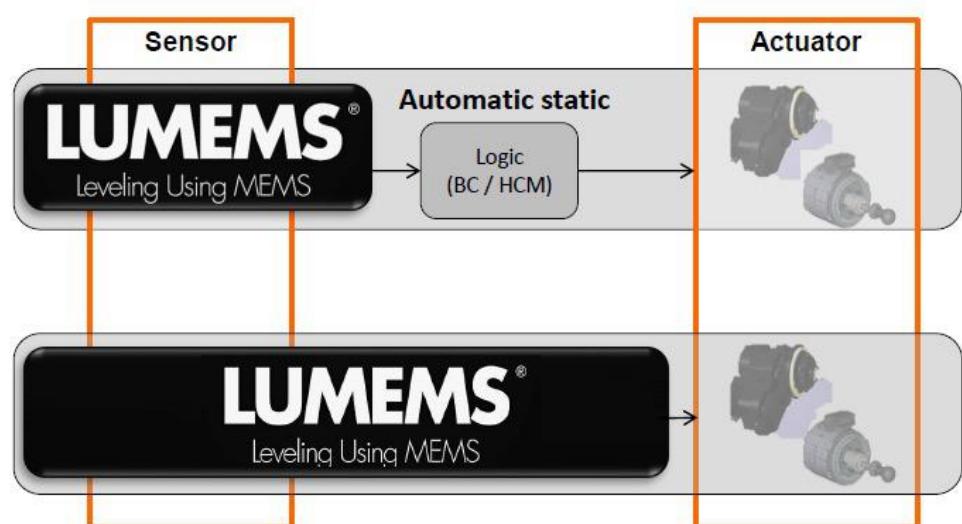
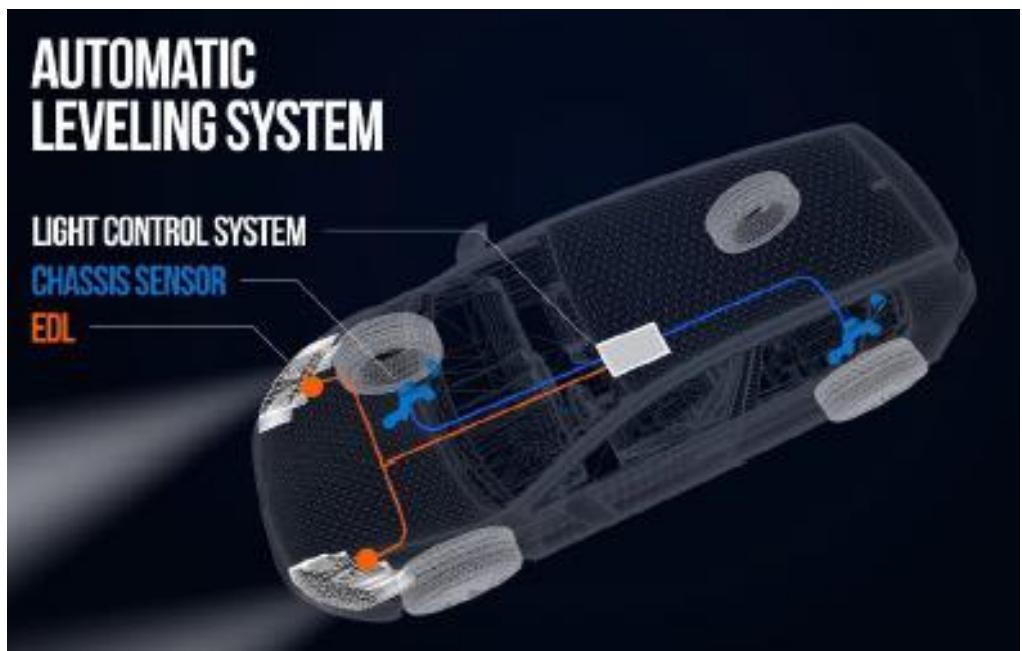
# Solutions for ADB headlamps : Horizontal aiming

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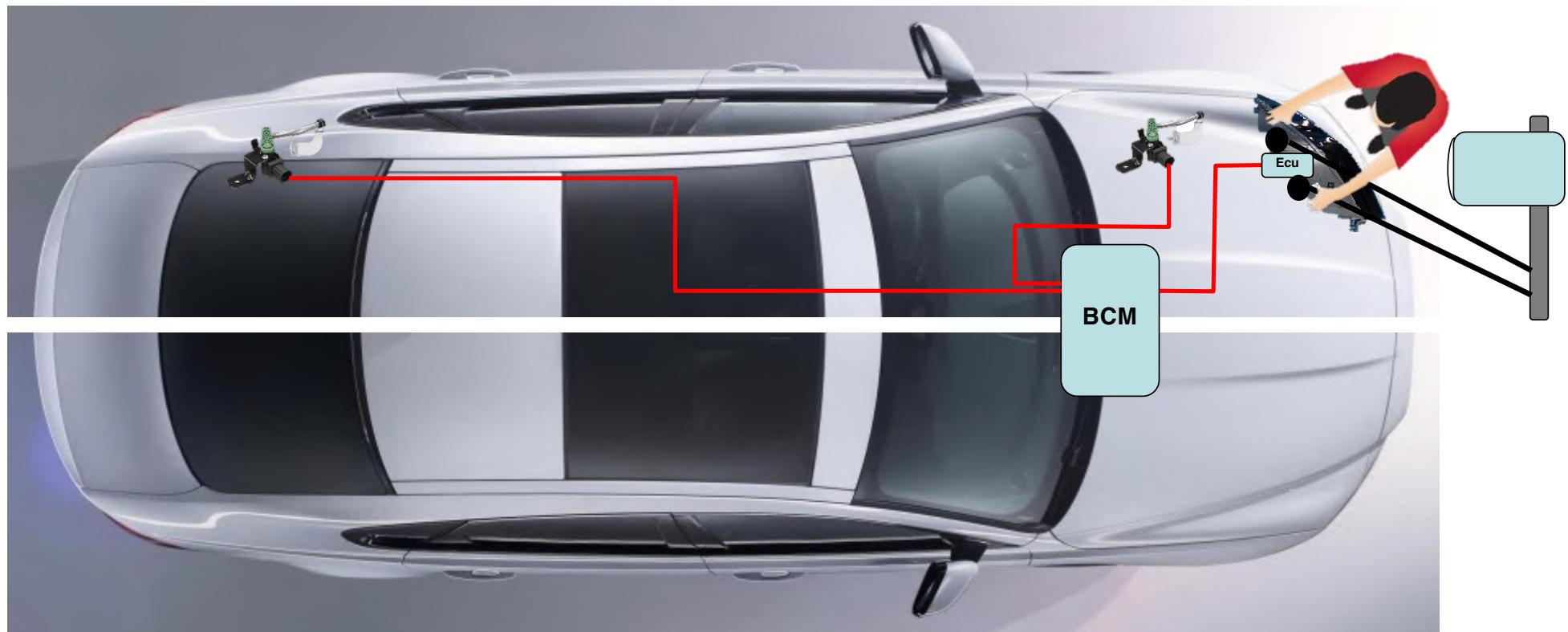


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# Merging with « Lumems »

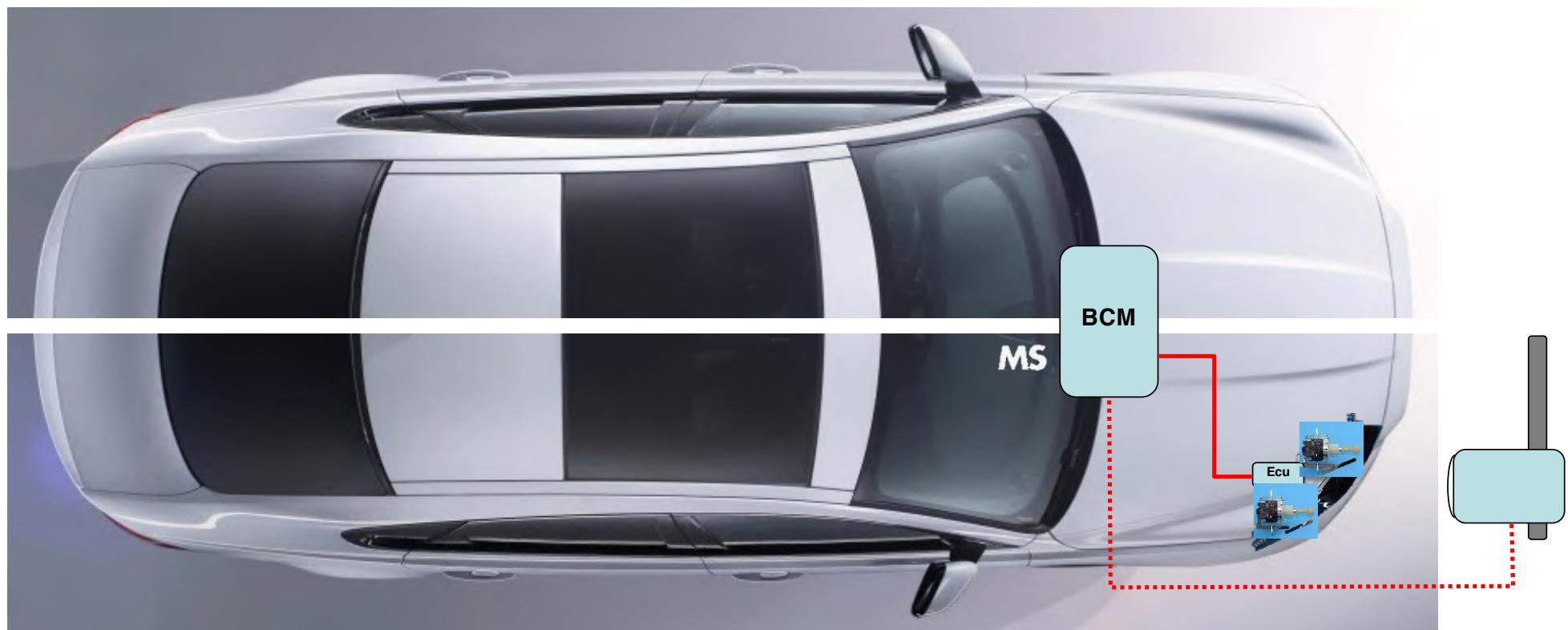


# Ideal Aiming and Leveling architecture of an ADB car



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# Ideal Aiming and Leveling architecture



Headlamp Digital Setting



A large 3D white 'THANK YOU' text is centered in the image, floating above a light brown wooden surface with visible planks. Around the central text, there are several smaller, tilted 3D white text labels, each representing a different language's way of saying 'thank you'. These include:

- Gratulacii (Czech)
- Grazie (Italian)
- Merci (French)
- Dank (German)
- Gracias (Spanish)
- Gratias (Latin)
- Takk (Norwegian)
- PaxMet (Welsh)
- Prasom (Lao)
- Koszonom (Hungarian)
- Obrigado (Portuguese)
- Mahalo (Hawaiian)
- Arigato (Japanese)
- Спасибо (Russian)
- Multumesc (Romanian)