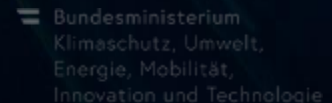
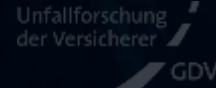
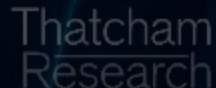
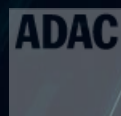
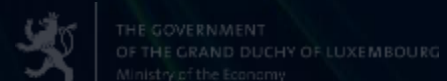
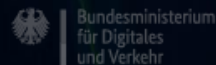
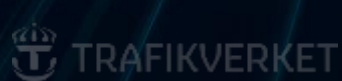


FOR SAFER CARS

# EURO NCAP





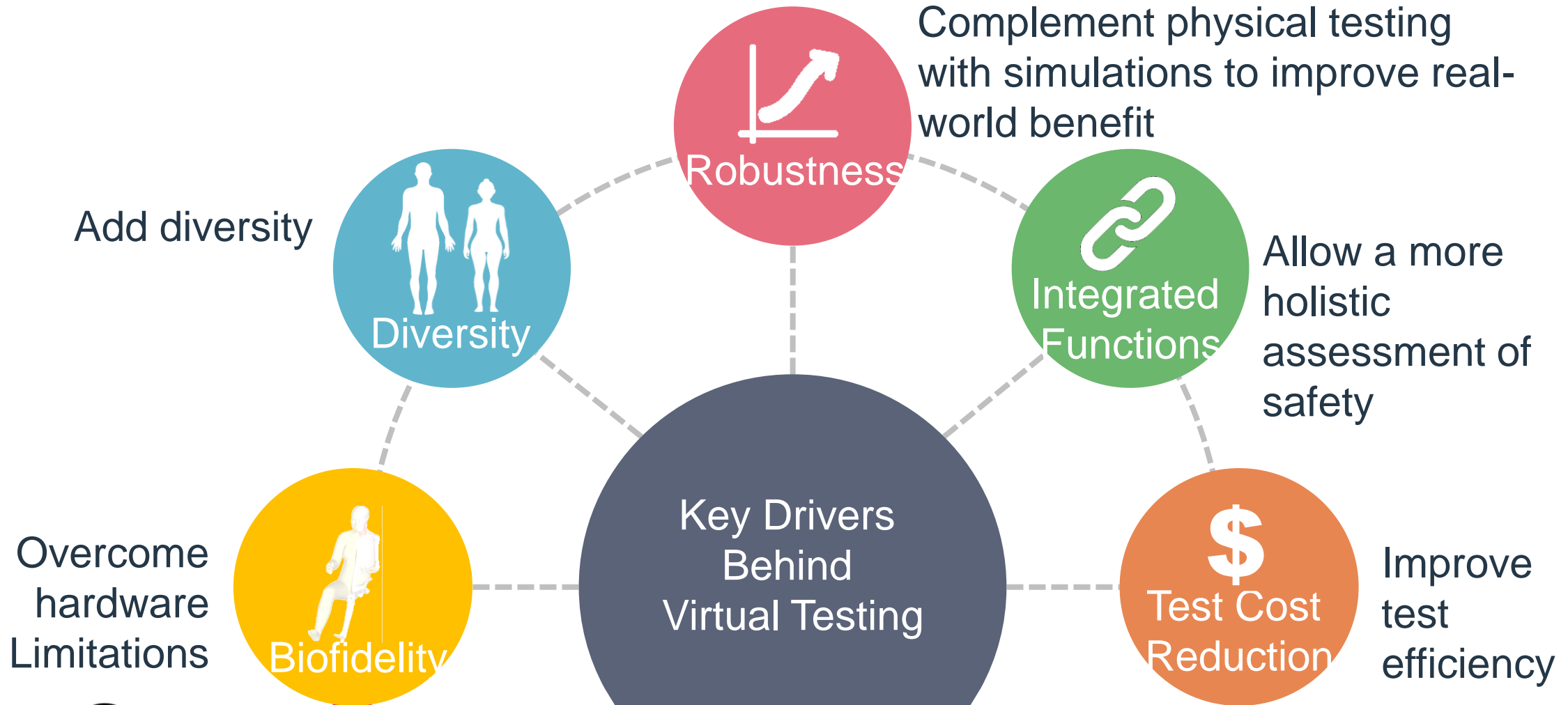
# Virtual Testing in Consumer Information

Corina Klug TU Graz

James Ellway Euro NCAP

November 2023

# Why Virtual Testing?



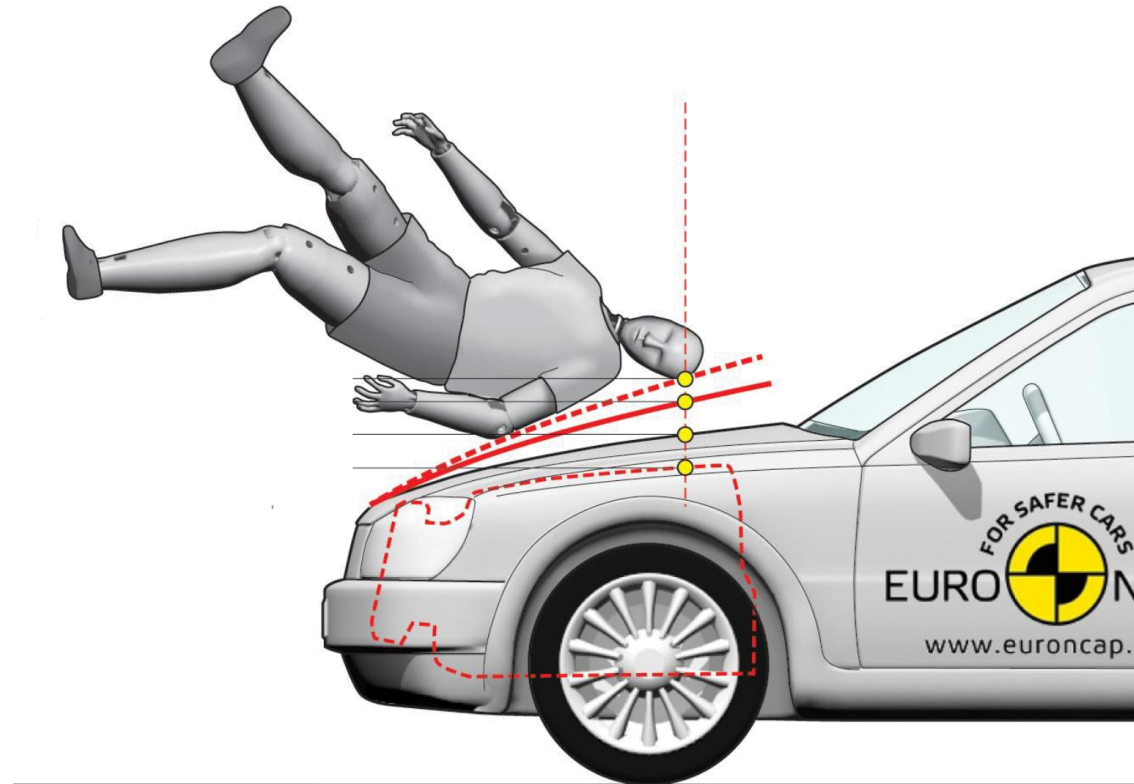
# Current Status – Virtual Testing



# First Virtual Testing in Euro NCAP

■ First loadcases where Human Body Models are used in Euro NCAP:

- Assessment of active bonnets (deployable pedestrian protection systems)
- 2018

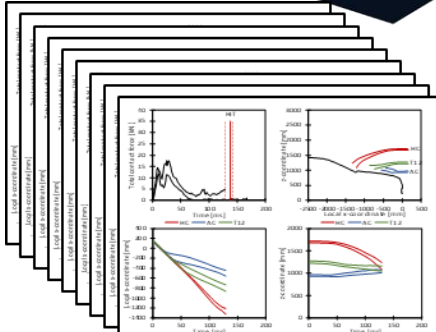
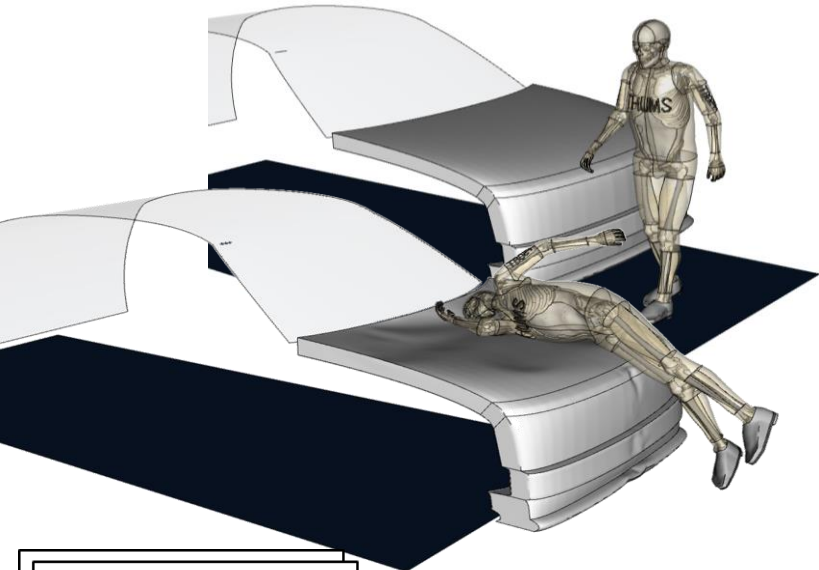


© Euro NCAP



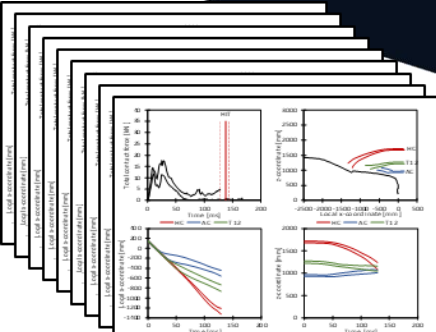
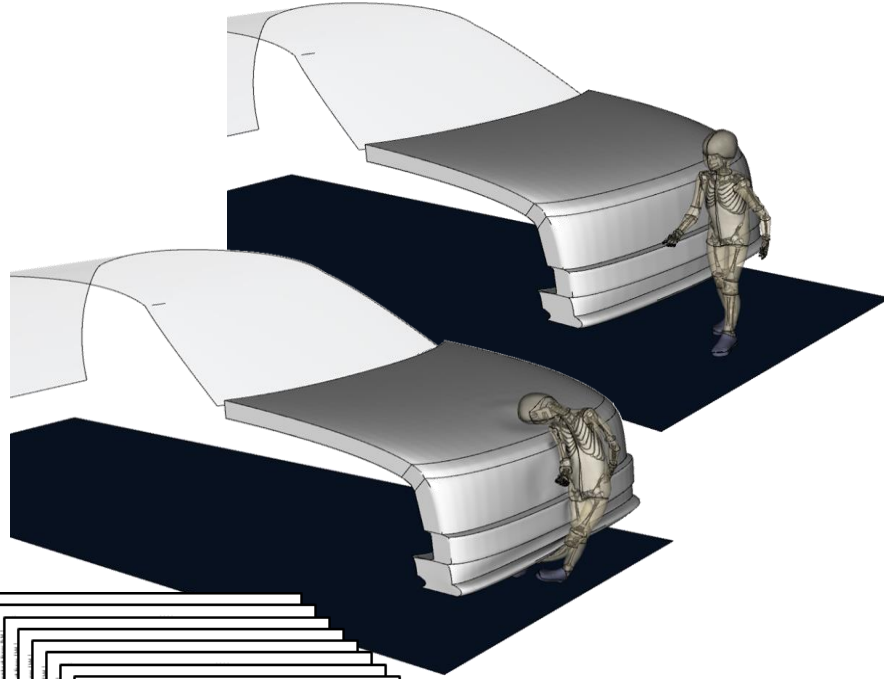
# Technical Bulletin 024 – Updated for 2024+

## 50th percentile male



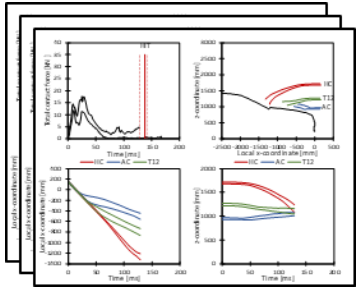
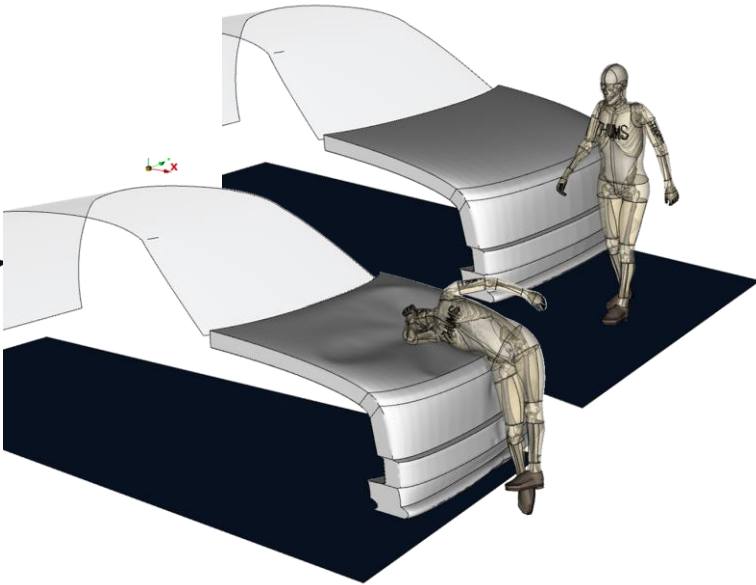
9 loadcases

## 6yo child



9 loadcases

## 5th percentile female



3 loadcases

# Virtual assessment of Far side Protection

## ■ Euro NCAP expanded use of virtual testing

- Far side testing at Euro NCAP will be supplemented by Virtual Testing [Crashworthiness – VTC]
- Phase 1: Improve robustness → Simulations with WorldSID [commenced 2019]
- Phase 2: Improve biofidelity and consider diversity → Use HBMs



© Euro NCAP

 TRAFIKVERKET

Applus®  
IDIADA 

 VSI 

 TNO 

 UTAC CERAM

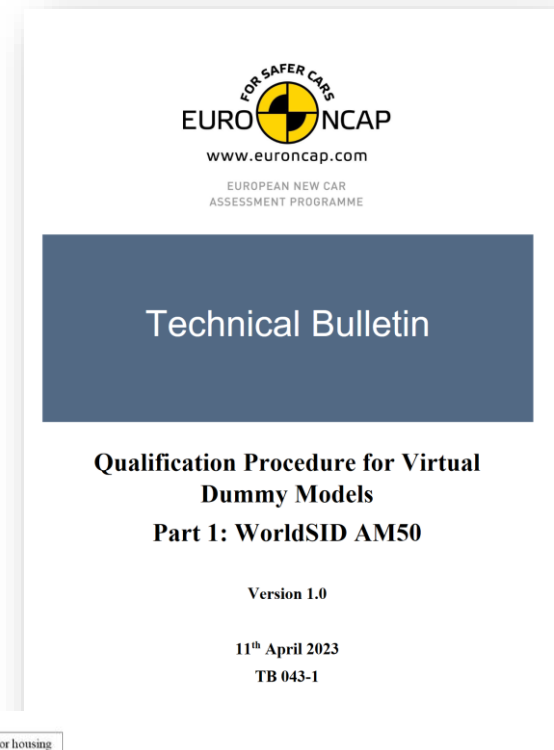
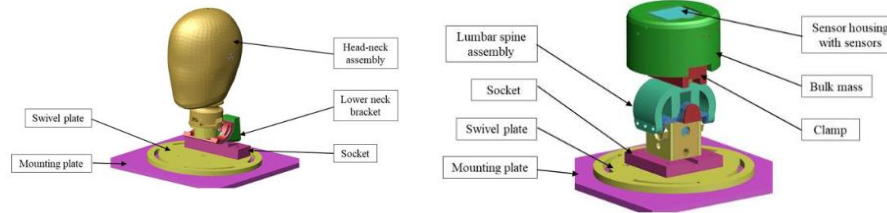
  

# VTC Assessment Approach

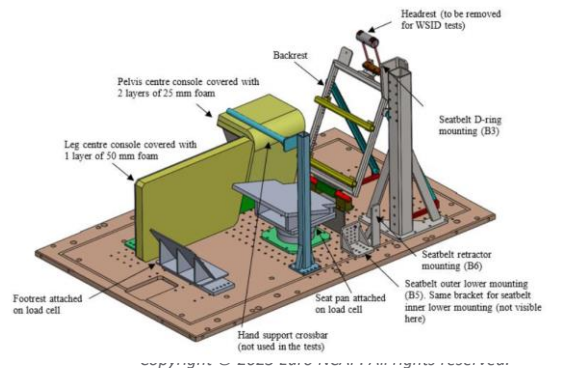
## WorldSID Dummy Model Qualification - OEM



- Stage 1: normative requirements: ISO 15830
- Stage 2: Component Tests
  - neck
  - lumbar spine
- Stage 3: Full-Scale Sled Test



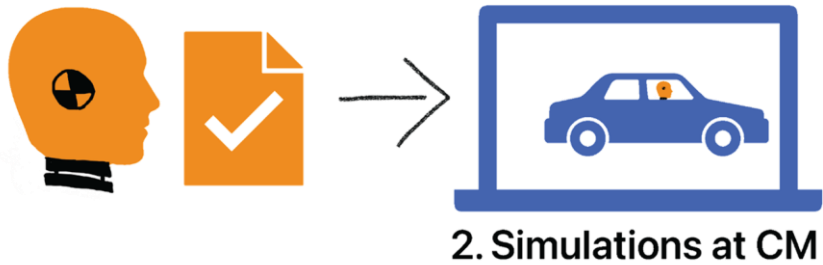
<https://cdn.euroncap.com/media/77237/tb-043-1-worldsid-model-qualification-procedure-v10.pdf>





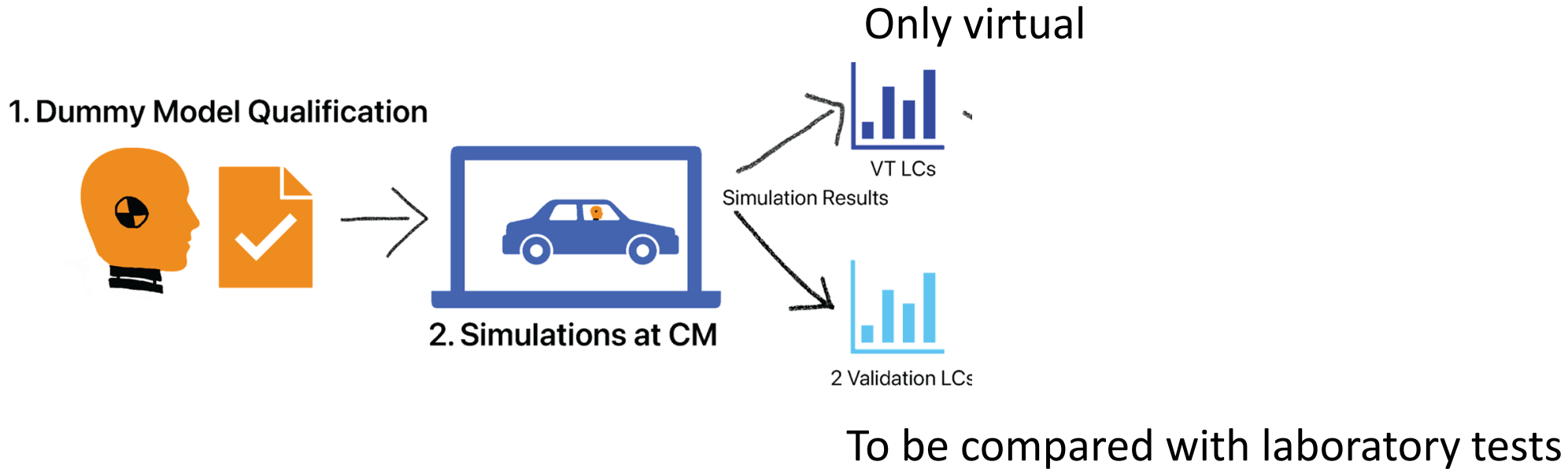
# VTC Assessment Approach

- WorldSID Dummy Model Qualification =>
- Simulations performed by the vehicle manufacturer



# VTC Assessment Approach

■ Simulations performed by the vehicle manufacturer



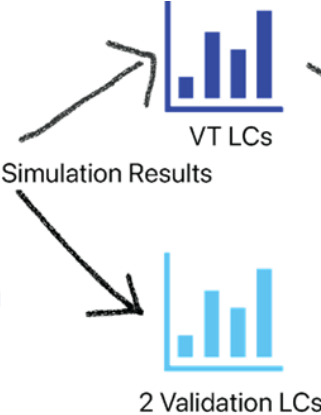
# VTC Assessment Approach

■ Vehicle manufacturer simulations – quality checked

## 1. Dummy Model Qualification



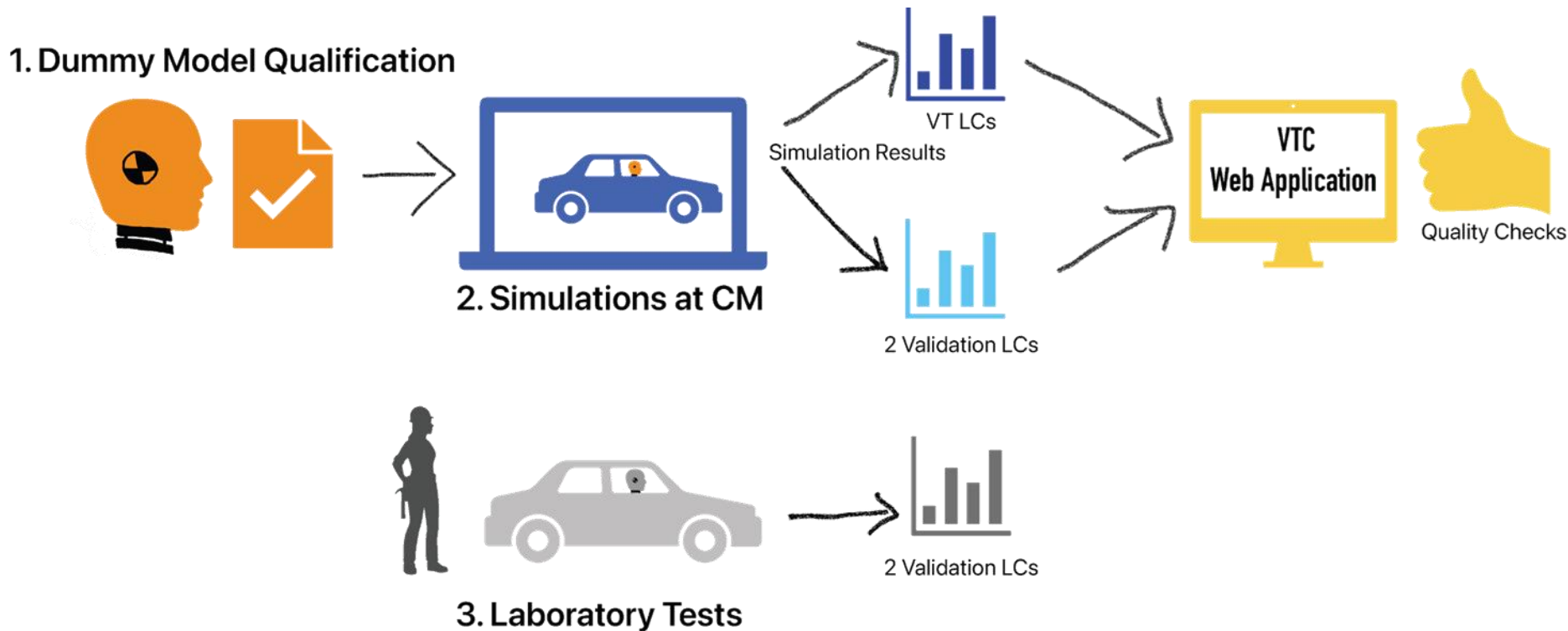
2. Simulations at CM



Quality Checks

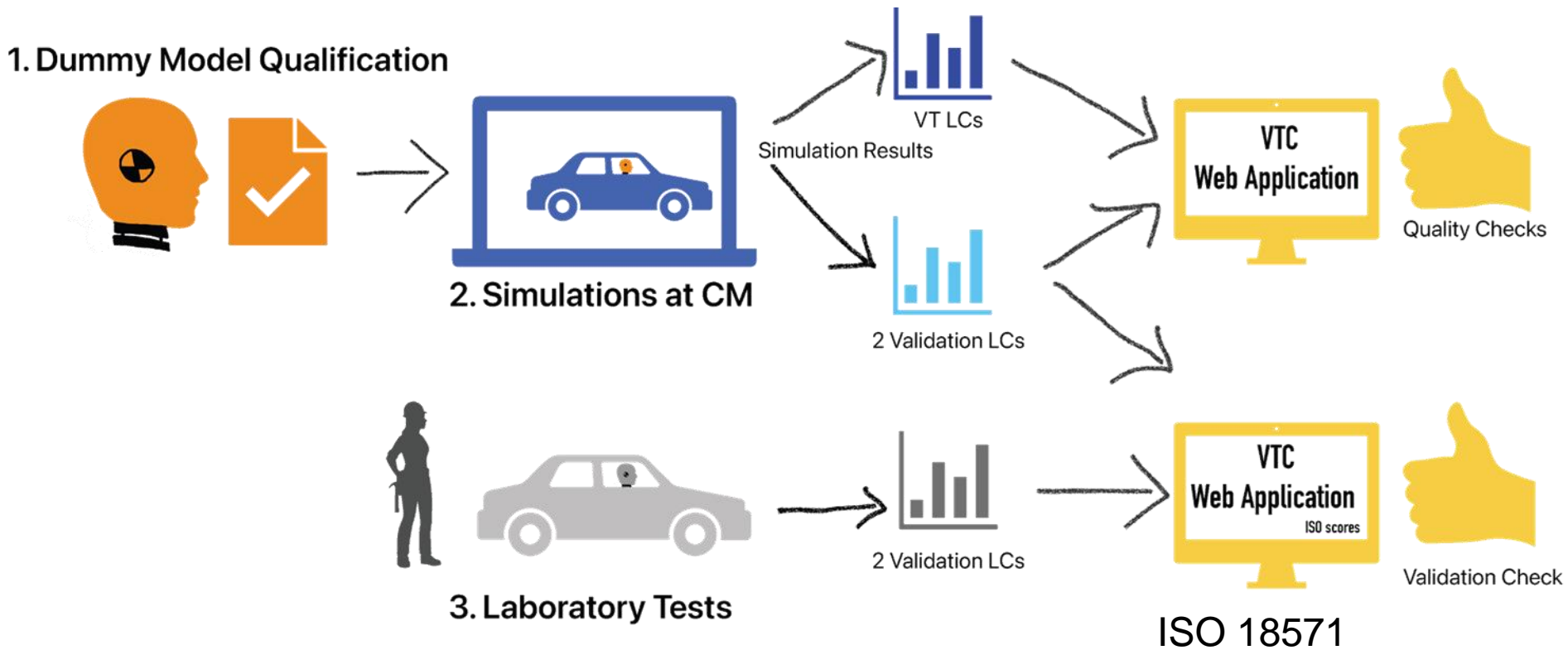
# VTC Assessment Approach

■ OEM performs physical sled tests - validation



# VTC Assessment Approach

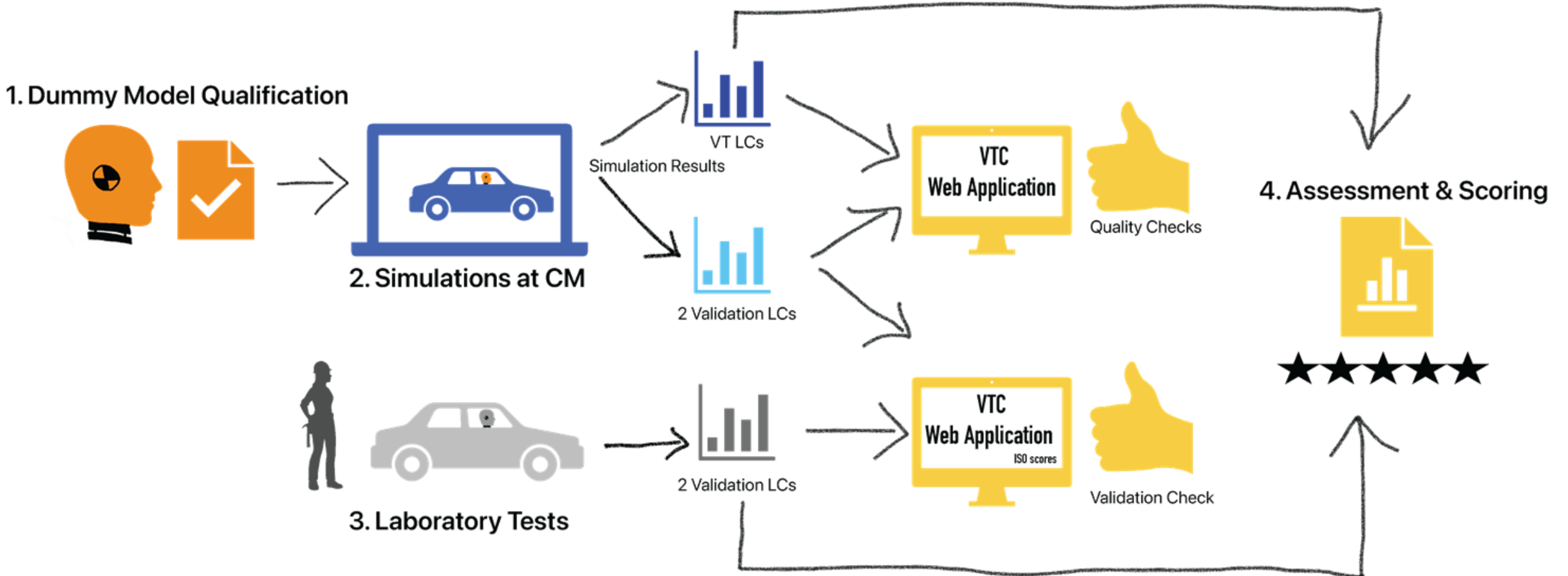
■ Validation check between simulation and tests



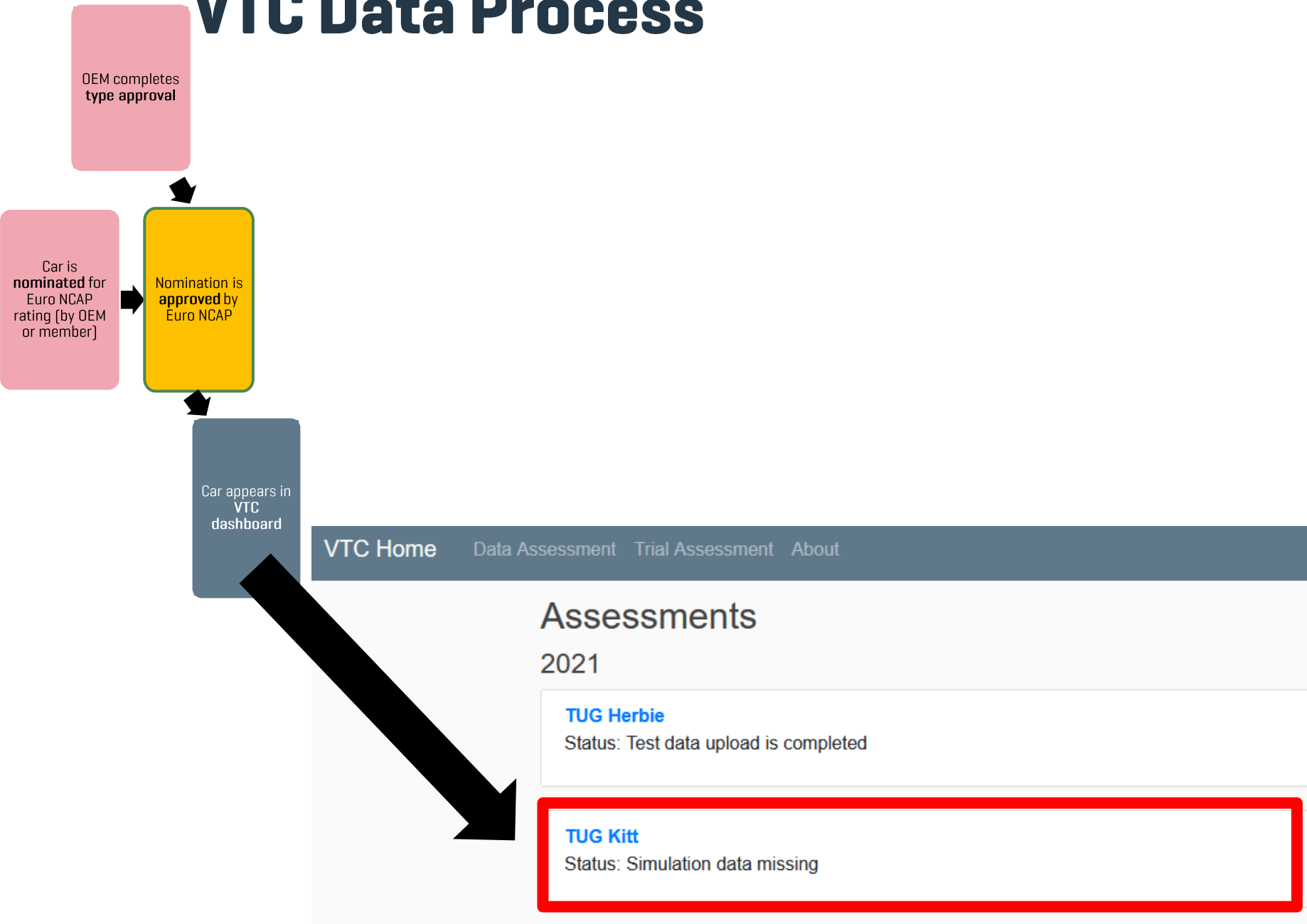


# VTC Assessment Approach

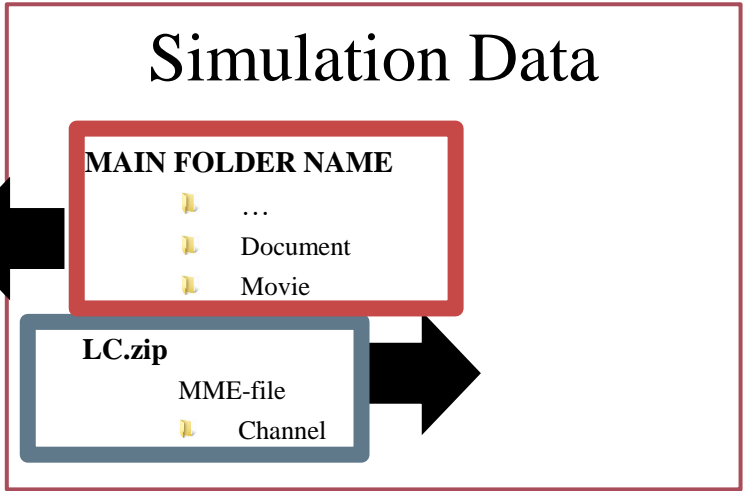
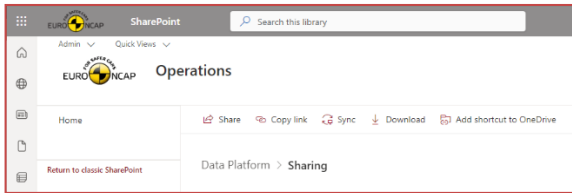
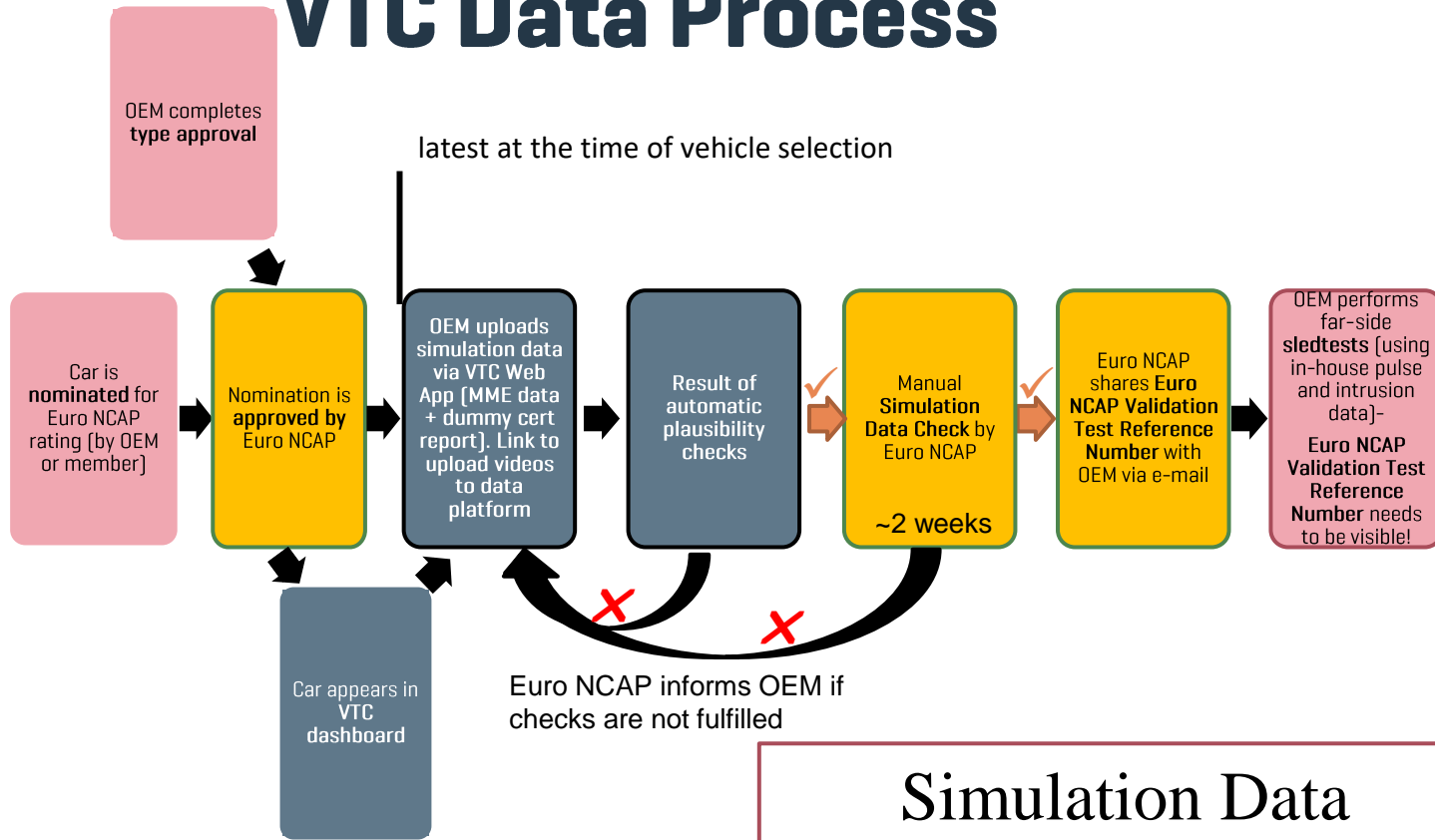
■ All ok => assessment of robustness simulations



# VTC Data Process



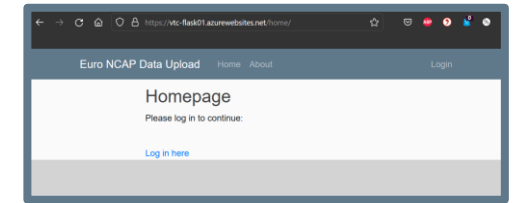
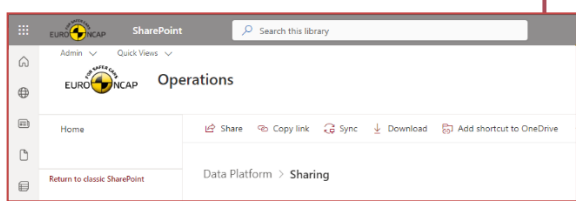
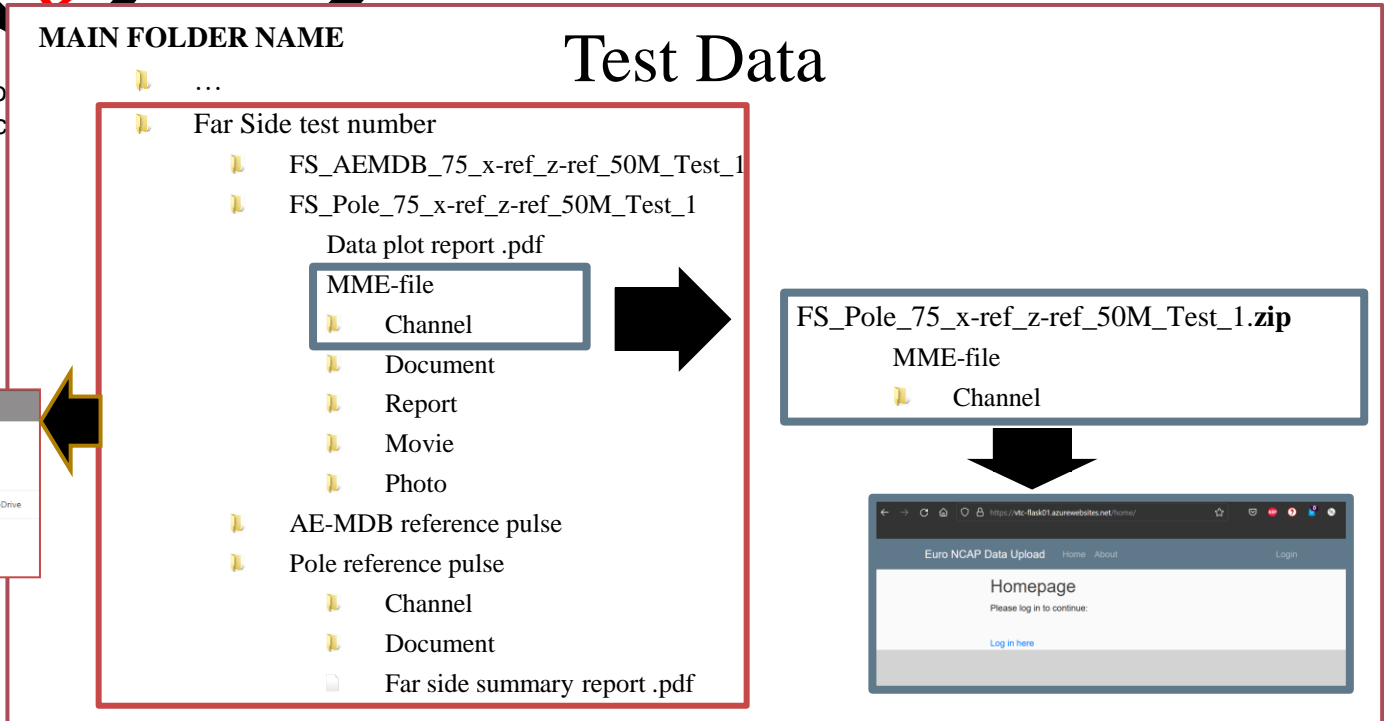
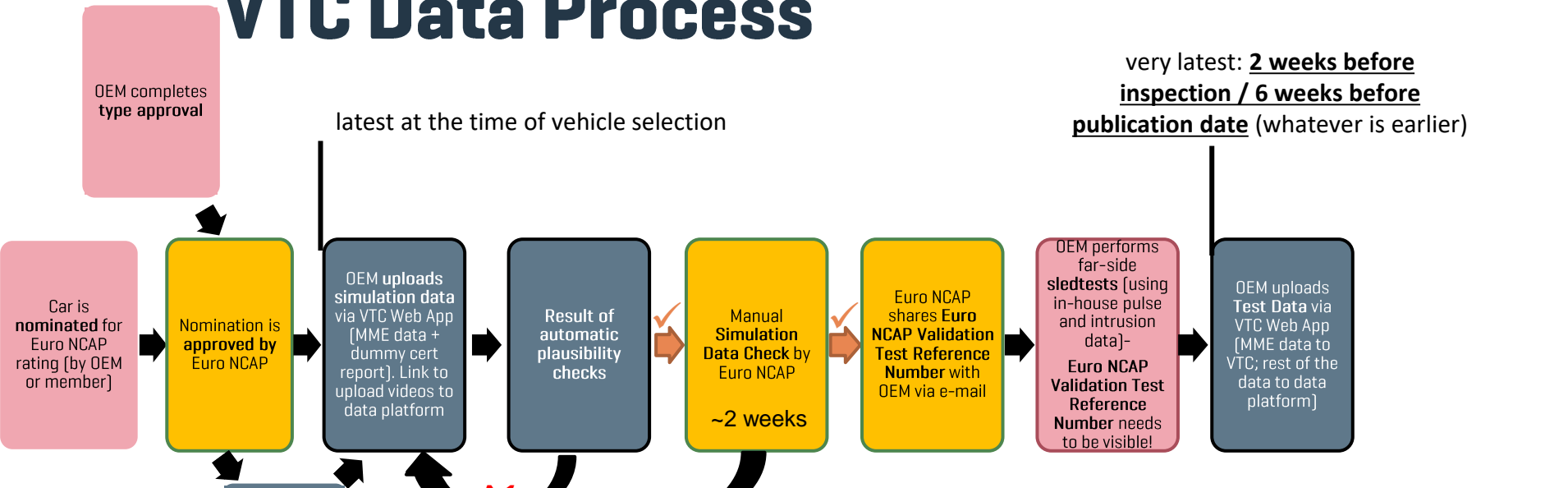
# VTC Data Process



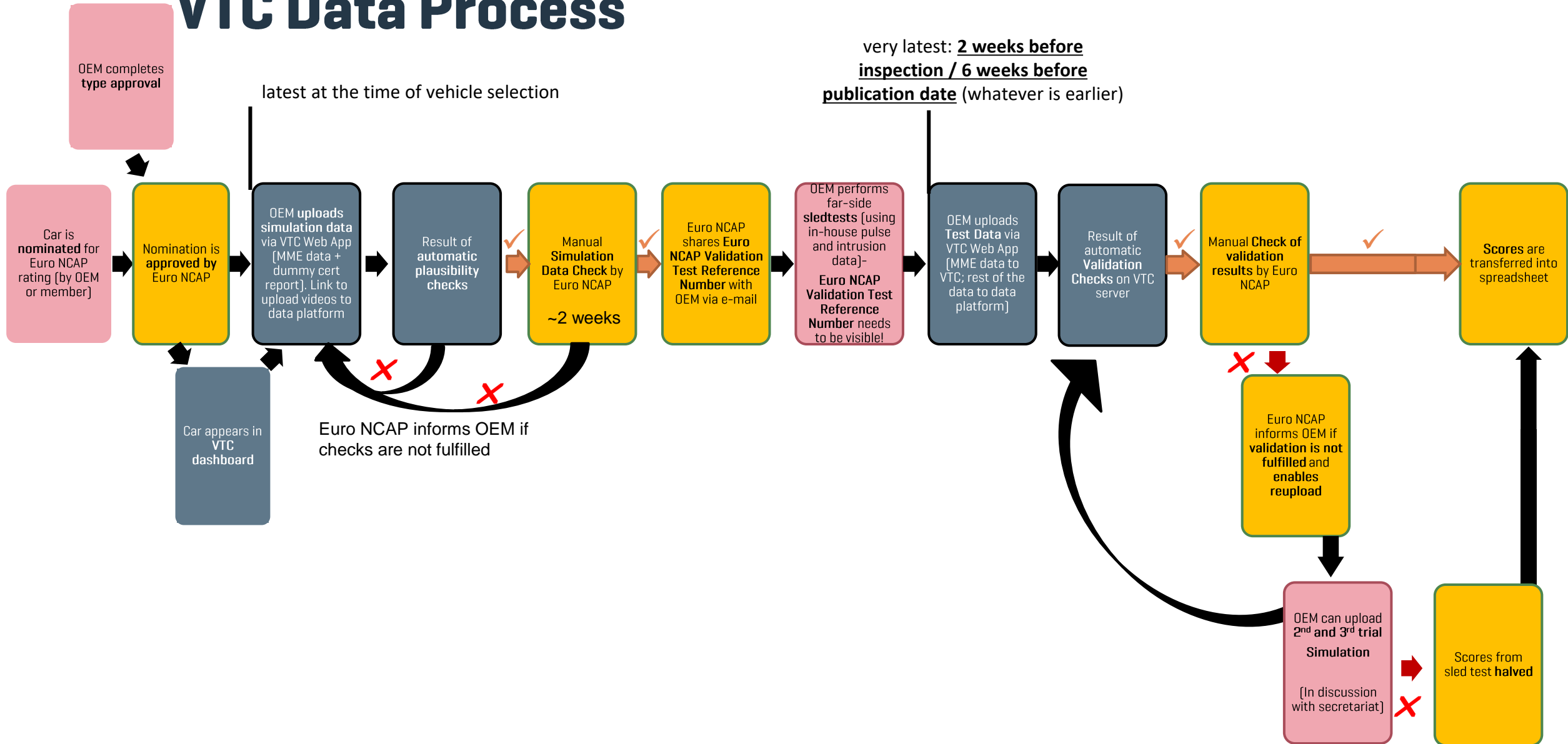
Simulation Load Cases

Assessment #	Protocol	Pulse	Angle	Seat Position x	Seat Position z	Anthropometry
1	FS	AEMDB	75	x-ref	z-ref	50M
2	FS	Pole	75	x-ref	z-ref	50M
3	FS	AEMDB	75	x-ref	z-high	50M
4	FS	AEMDB	60	x-ref	z-ref	50M
5	FS	AEMDB	90	x-ref	z-high	50M
6	FS	AEMDB	90	x-ref	z-ref	50M
7	FS	Pole	75	x-ref	z-high	50M
8	FS	Pole	90	x-ref	z-ref	50M

# VTC Data Process



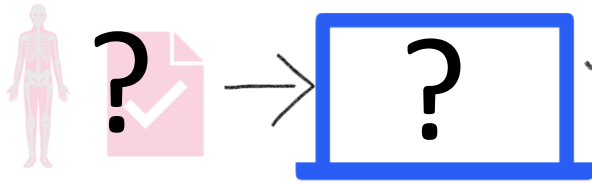
# VTC Data Process



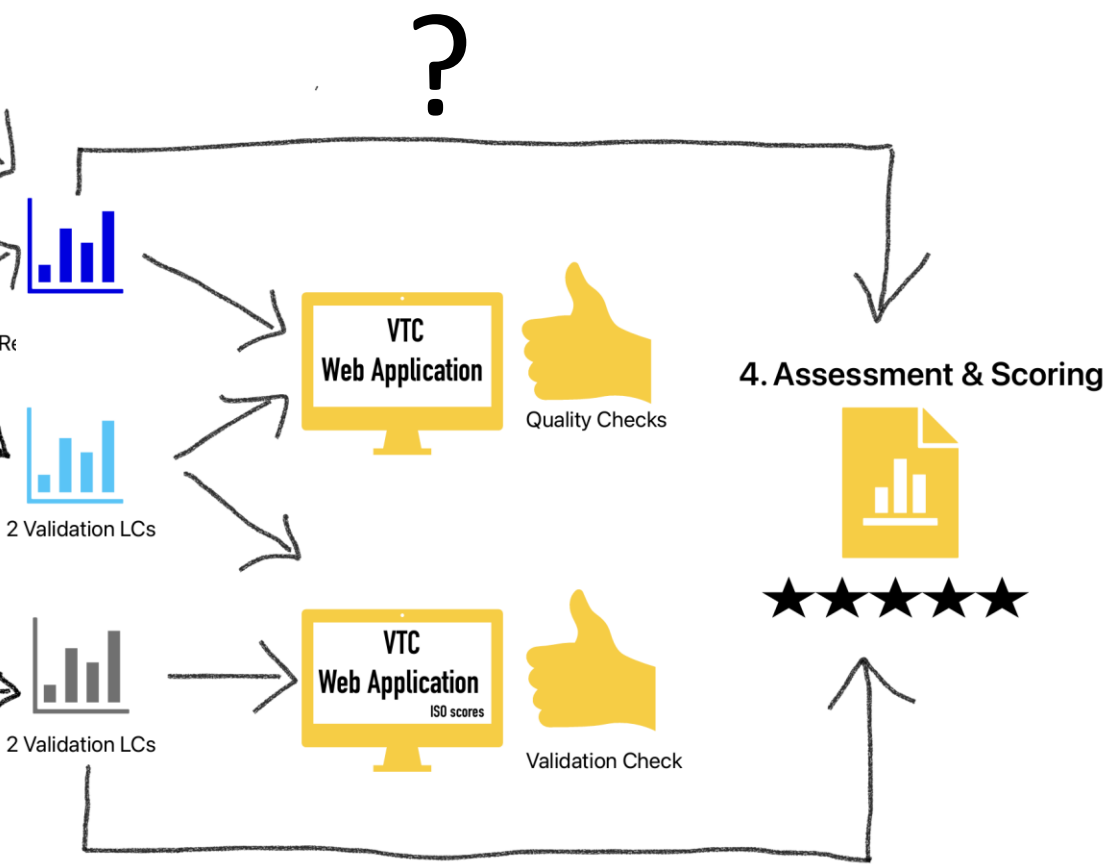
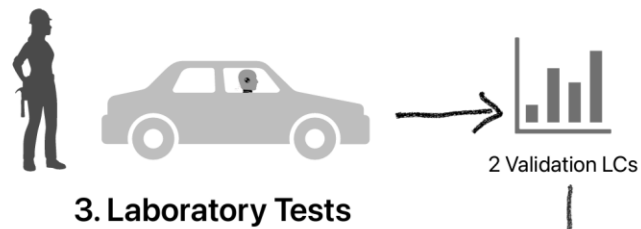
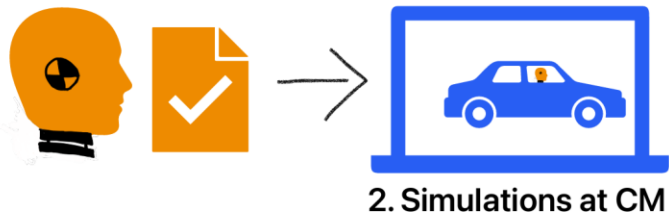


# VTC Approach with HBM?

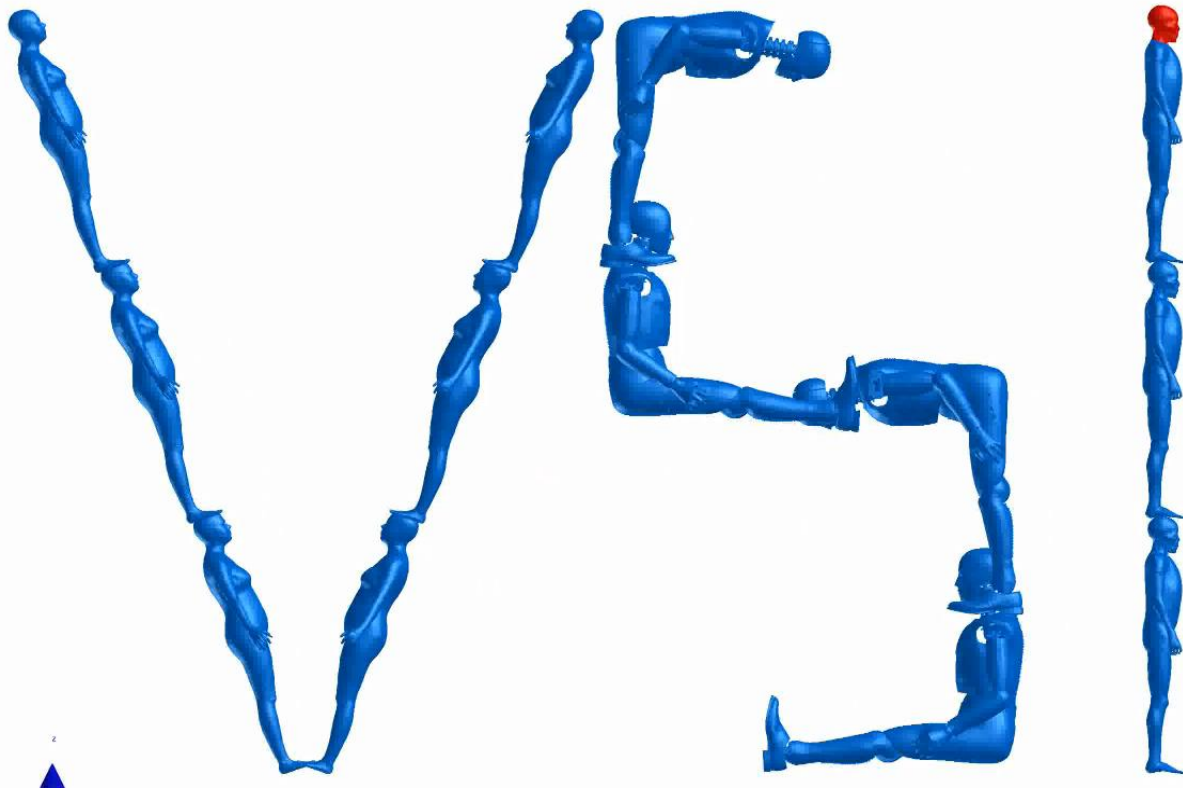
## 1.1. Human Body Model Qualification



## 1.2. Dummy Model Qualification



# Thank you!



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Euro NCAP

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