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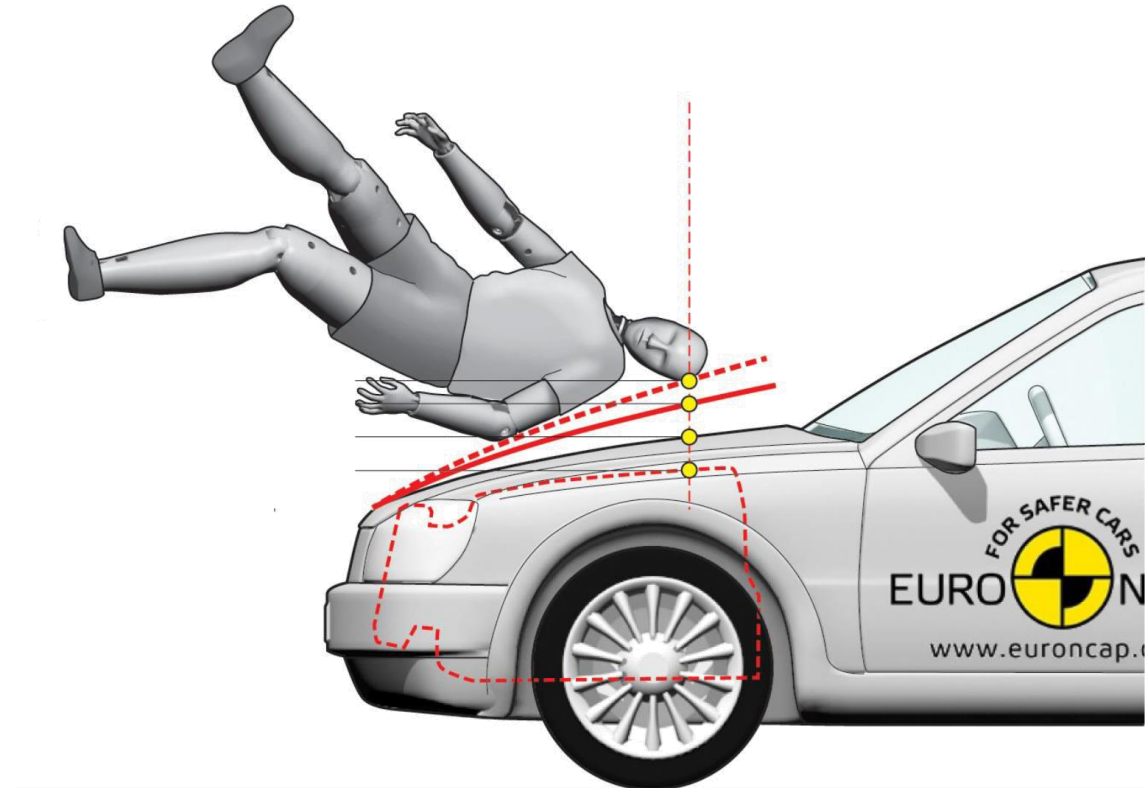


September 20 – 21, 2022 | Graz

Open Access Virtual Testing with Human Body Models

Corina Klug, Christoph Leo, Martin Schachner – Graz University of Technology

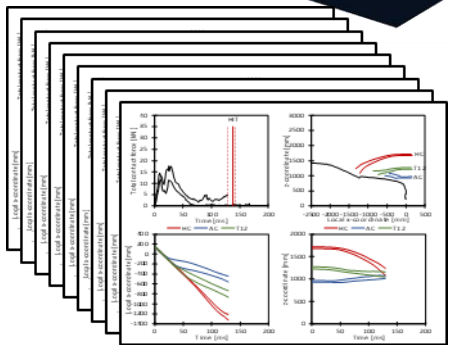
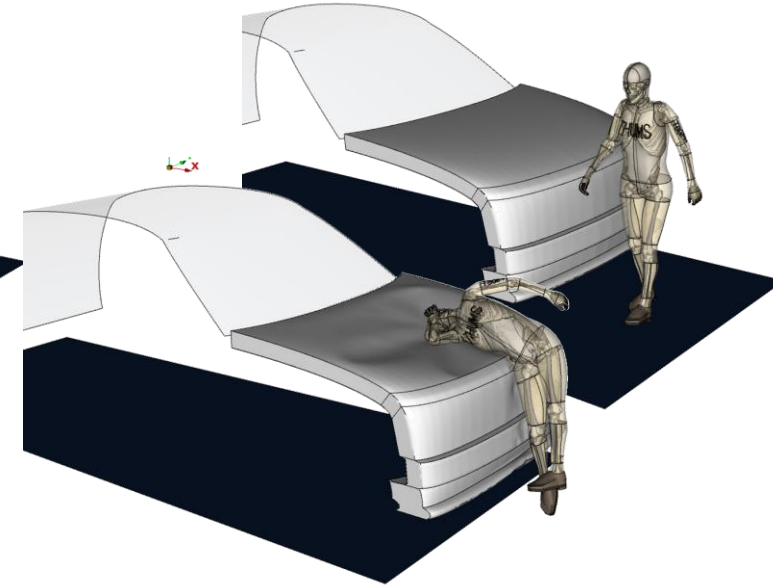
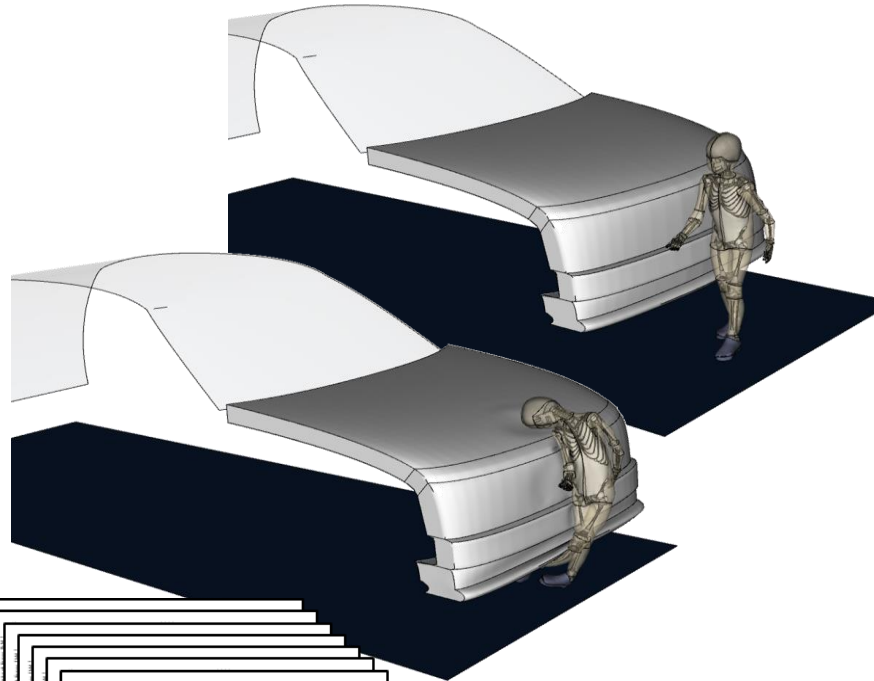
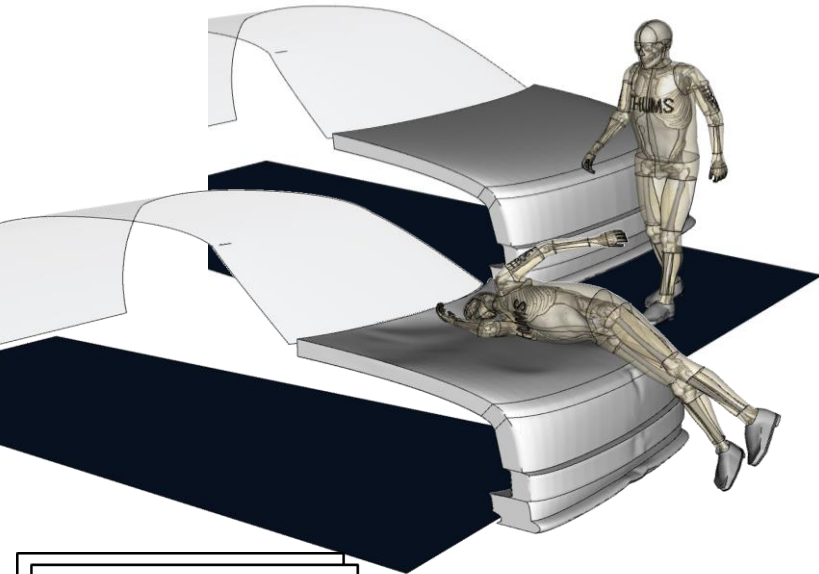
- First loadcase where Human Body Models are used in Euro NCAP:
 - Assessment of active bonnets (deployable systems)



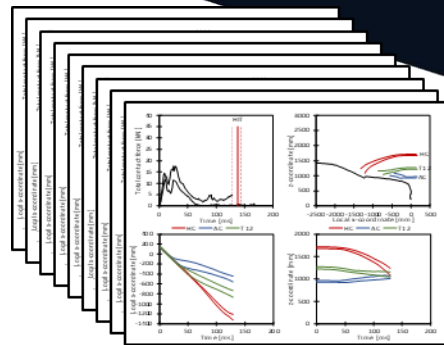
50th percentile male

6yo child

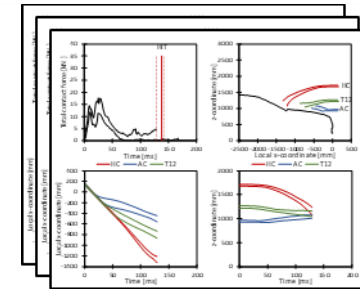
5th percentile female



Update - latest model versions and reduce to 9 loadcases



Update - latest model versions with harmonised anthropometries and reduced to 9 loadcases



NEW!
3 loadcases

→ Time for new loadcases

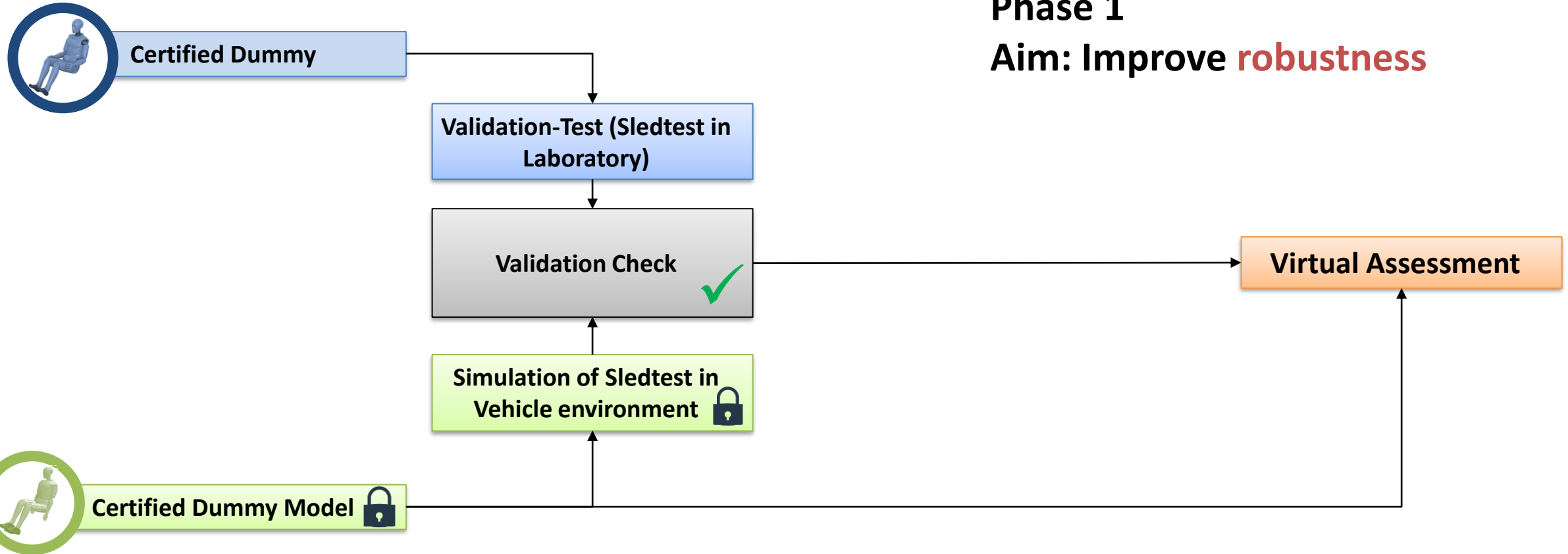
- EURO NCAP „Virtual Testing Crashworthiness“ group was founded in July 2019

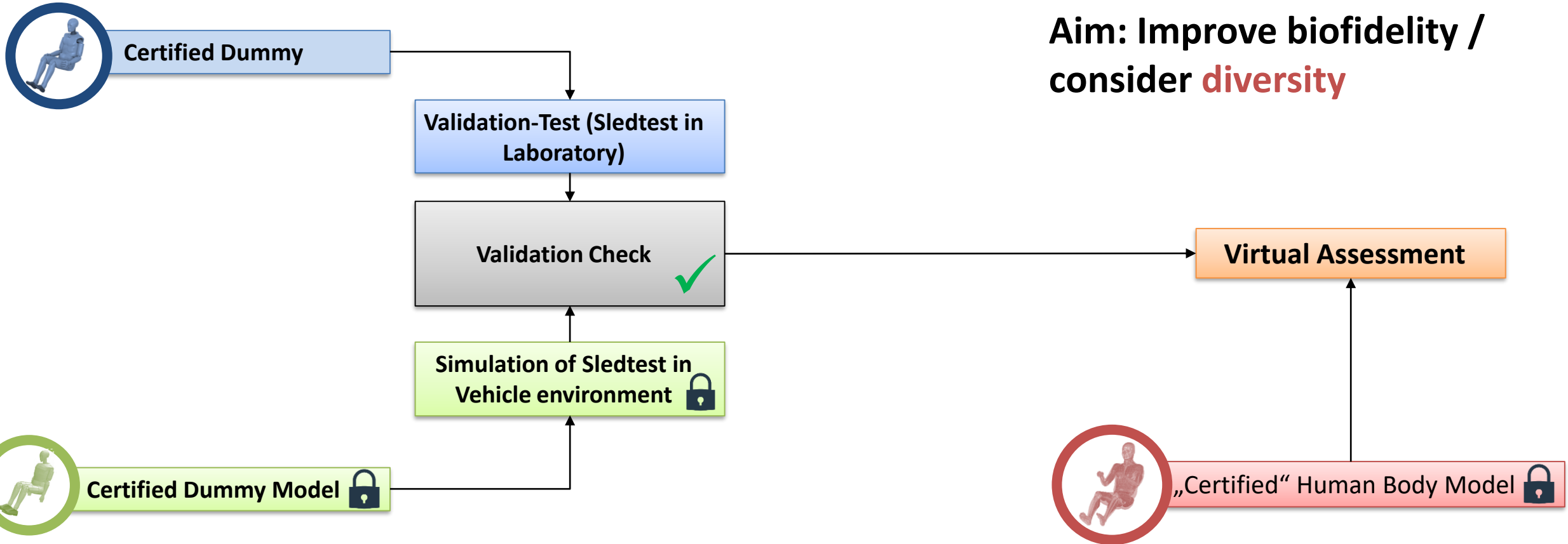


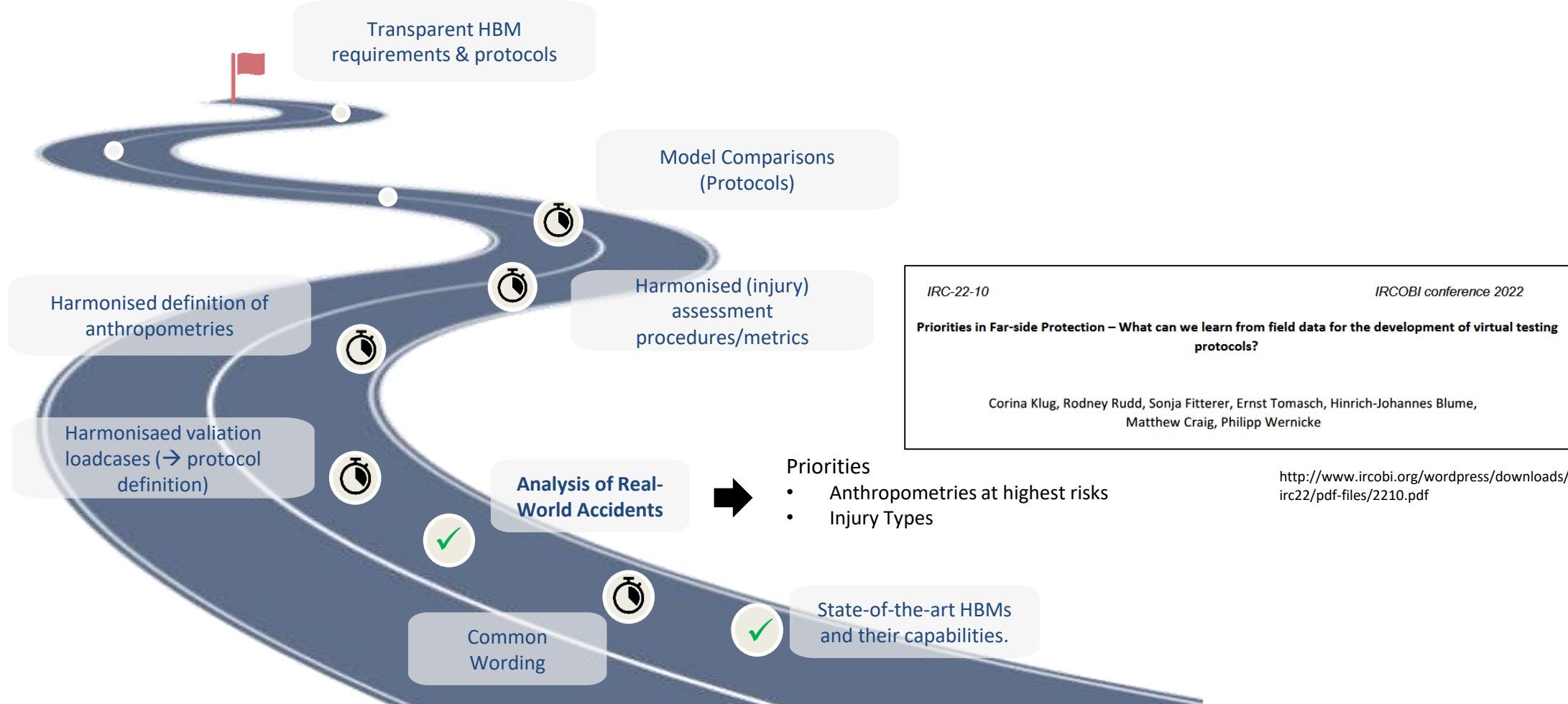
- Advantages compared to other occupant loadcases:
 - Sledtest (simplified environment)
 - Start with „kinematic“ assessment
 - Biofidelity limitations of WSID-Dummy
- New challenges have to be solved
 - Validation of vehicle interior
 - Seat
 - Countermeasures
 - Seatbelt
 - Positioning of Occupant inside the vehicle



© Euro NCAP







→ What else is going on?

- VIRTUAL Project

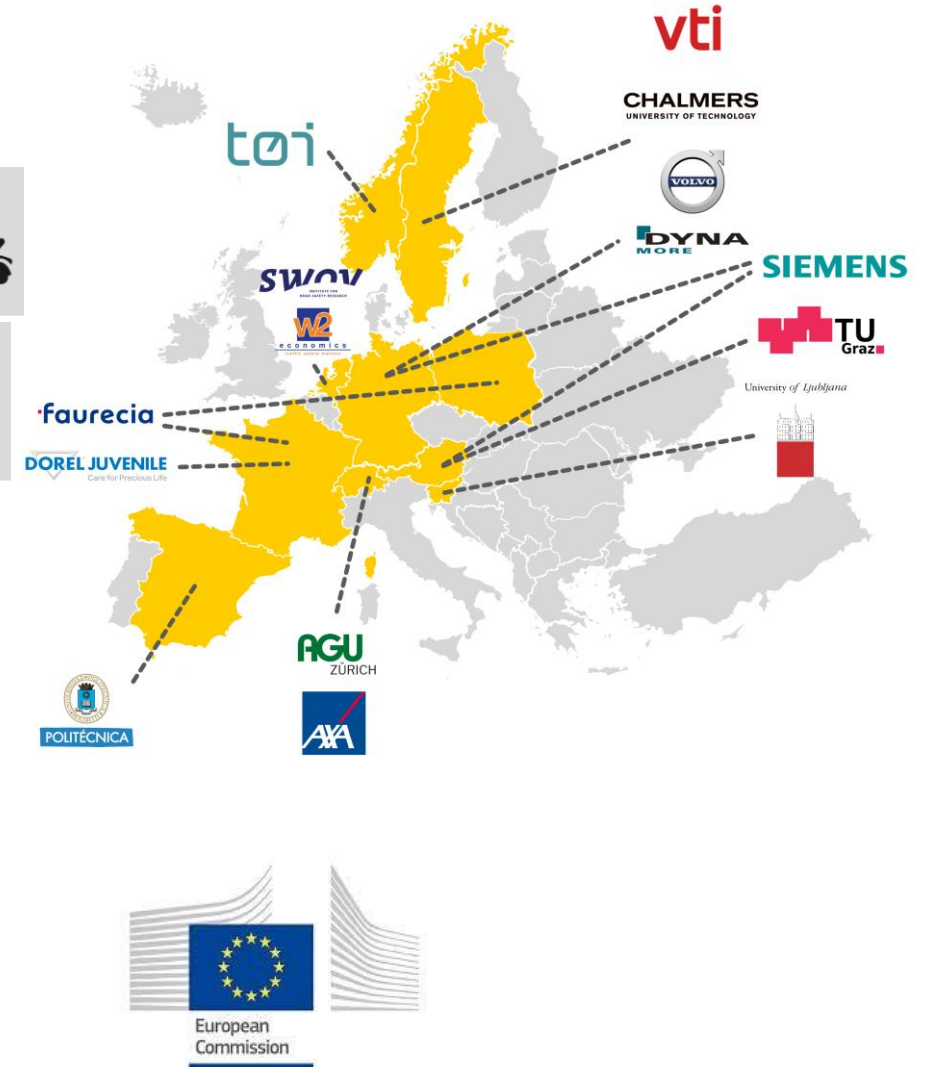
- Duration: June 2018 - May 2022
- Budget: Euros 7 Million
- www.projectvirtual.eu

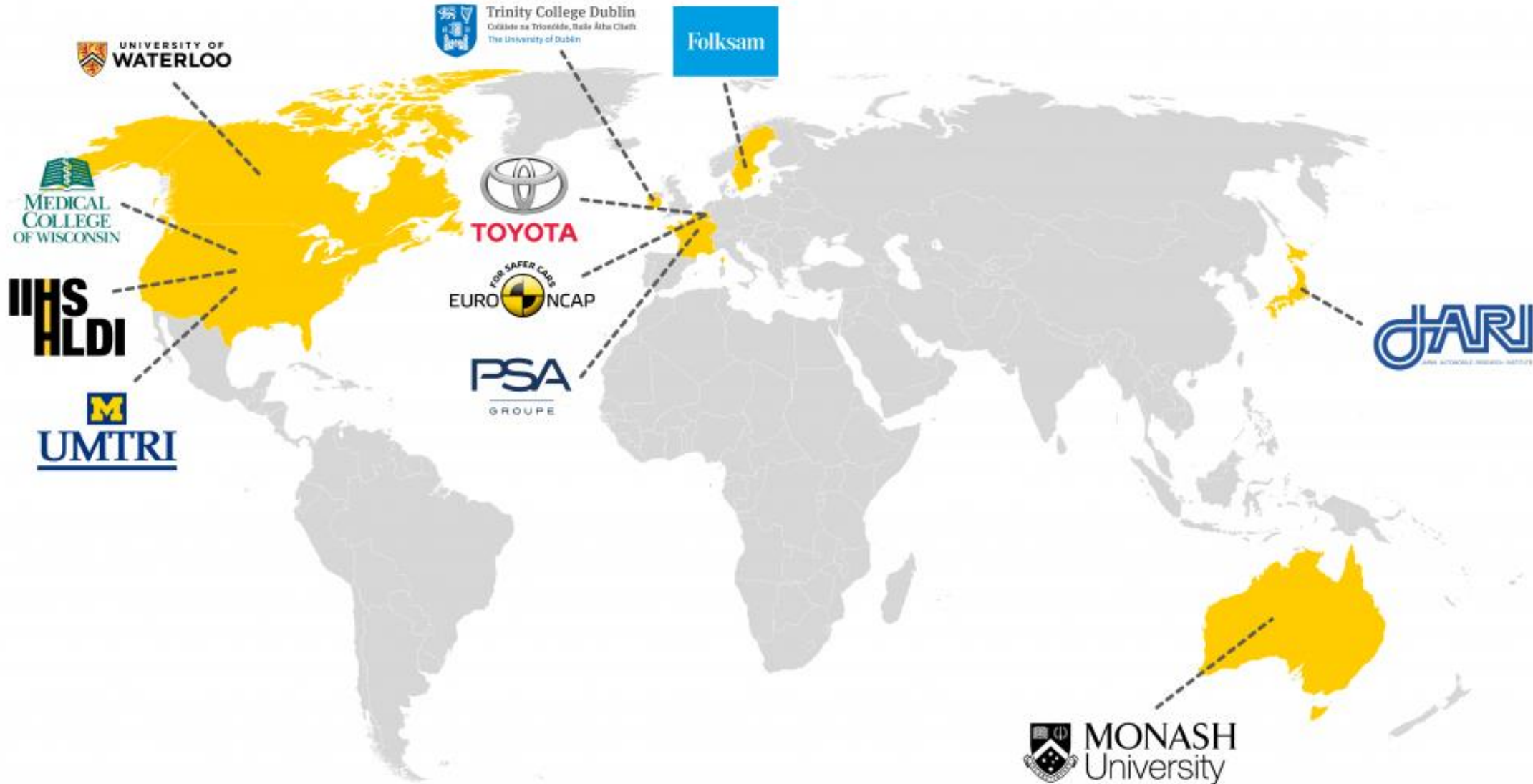
Aim

Reduce loss of life and health in road crashes

Identify protective innovations: Virtual testing and Human Body Models 50F and 50M

Share and foster knowledge: Open Source





Open access virtual testing protocols for enhanced road user safety using Human Body Models

Male, female, elderly, obese and child occupants



Male, female, pedestrians and cyclists



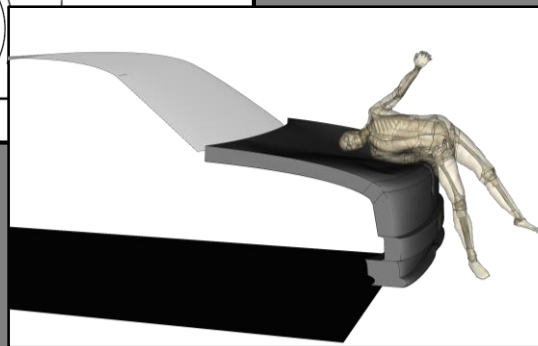
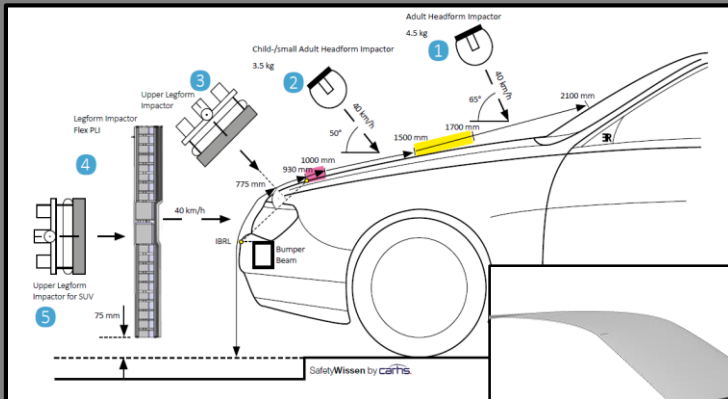
Public transport users



Passive Safety



Active Safety

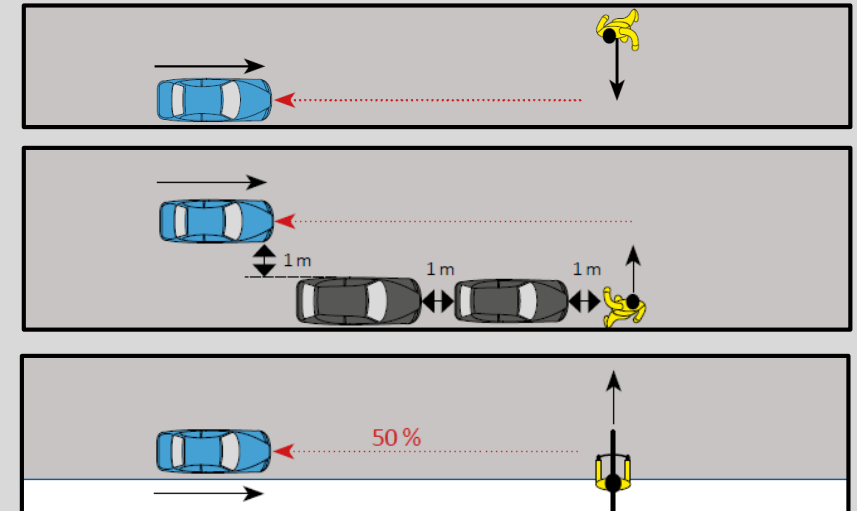


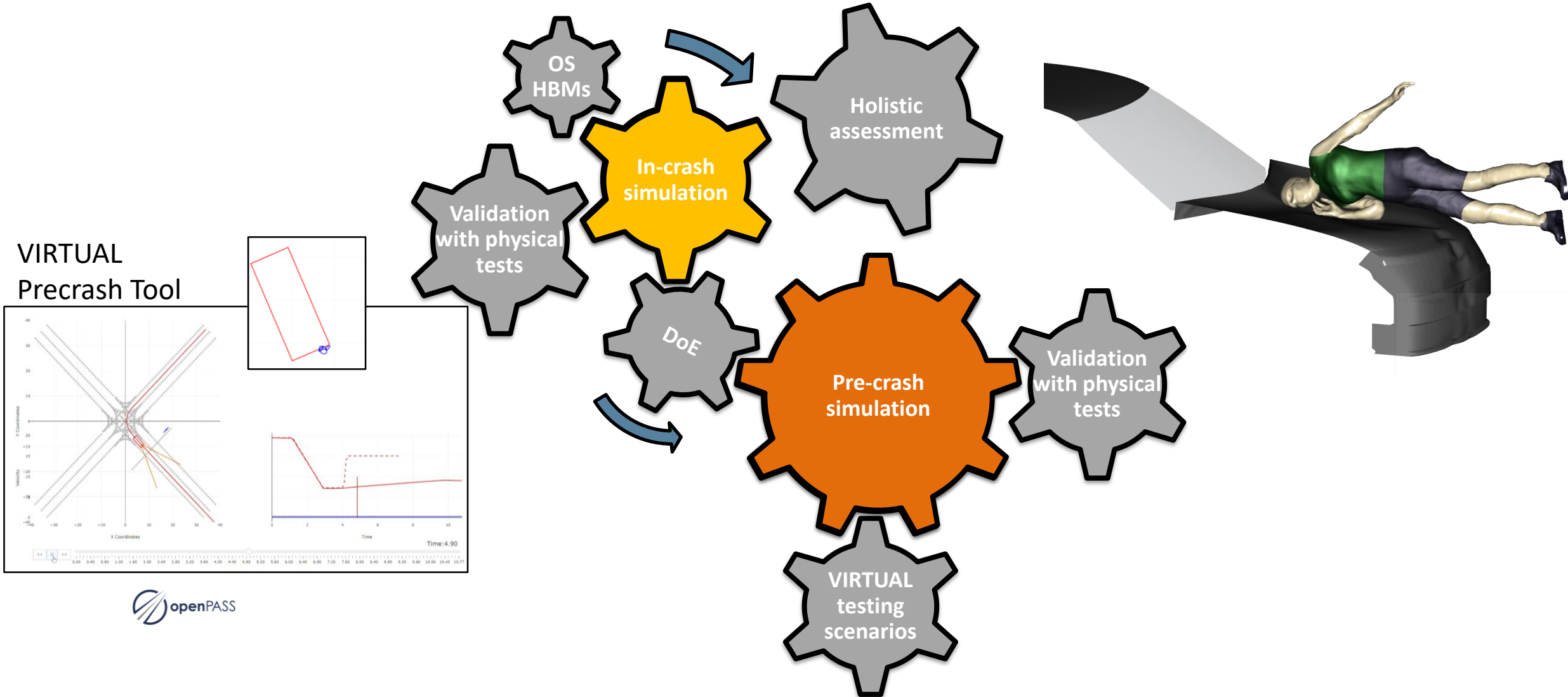
**Standardized
virtual testing
protocol**

OpenVT Gitlab platform



**Open Source
Tools**





virtual

Results

car_ped Conf Type

LTODRD

SCPPL

LTSOLD

LTSO

SCPPR

RTOD

LTOD

EURO NCAP

+

Scenario Catalogue

Car Configuration

AEB Configuration

From Collision

From Weibull Distribution

Conflict Type

car_ped

Conflict Situation

LTOD

Severity

minor

Weibull Distribution for VUT Speed

min	max	step size
0.05	1	0.05

Weibull Distribution for VRU Speed

min	max	step size
0.1	1	0.1

Impact Location [%]

-40 -20 0 20 40

Friction Coefficient μ

0.5 0.8

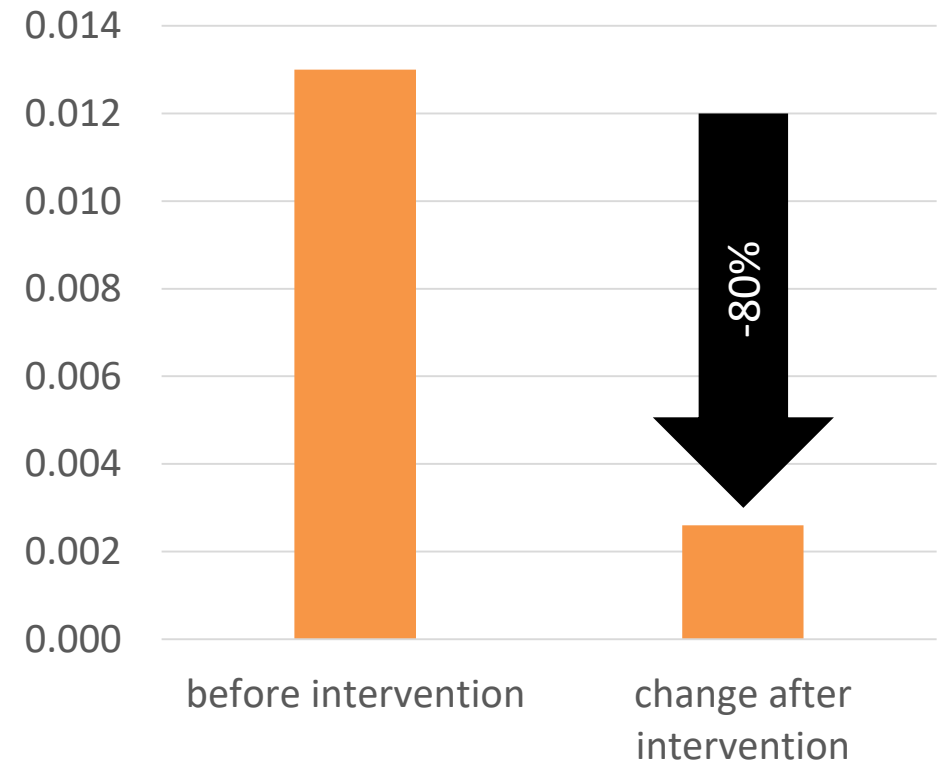
Number of generated scenarios: 1710

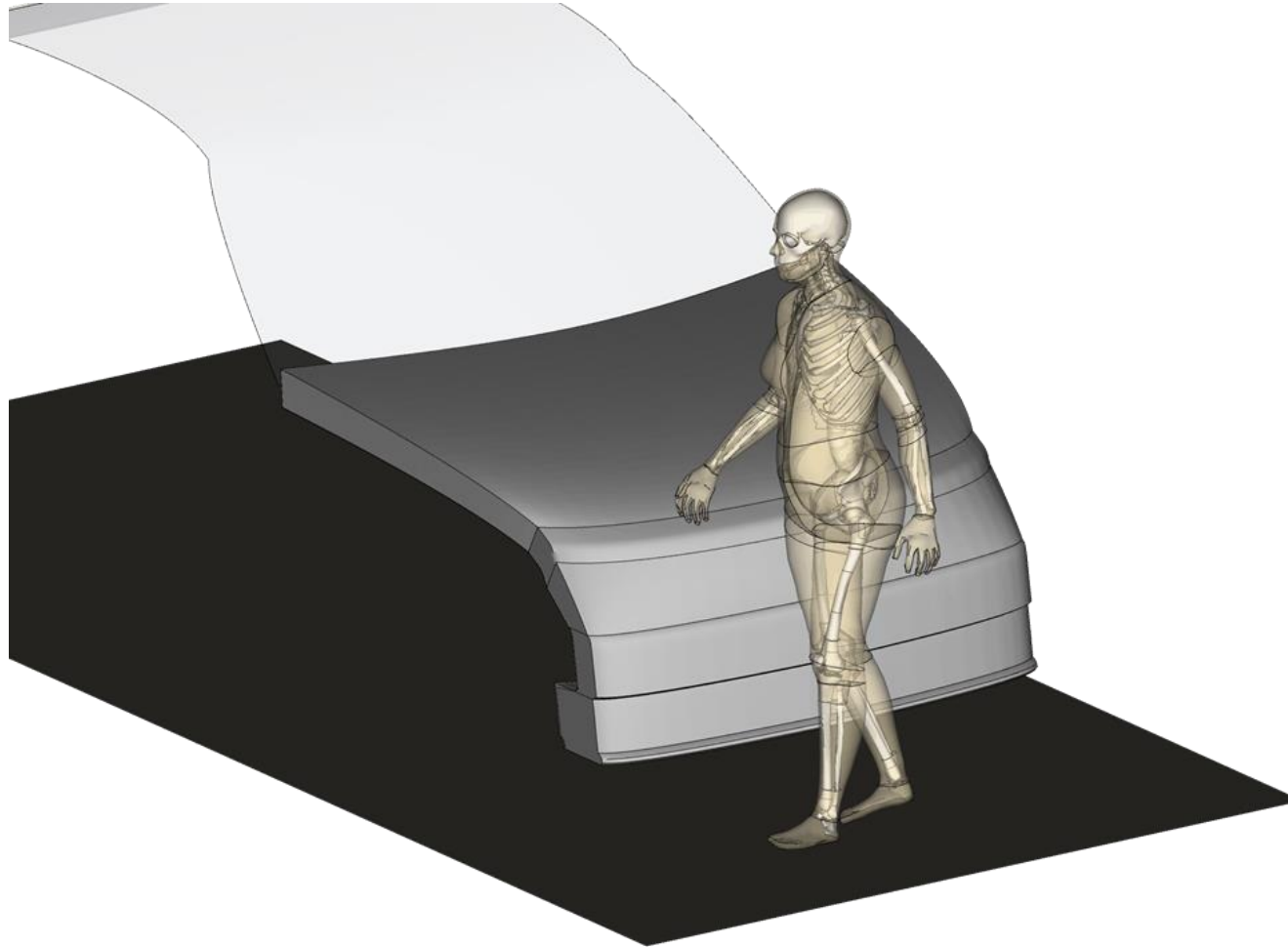
LTOD conflict situation

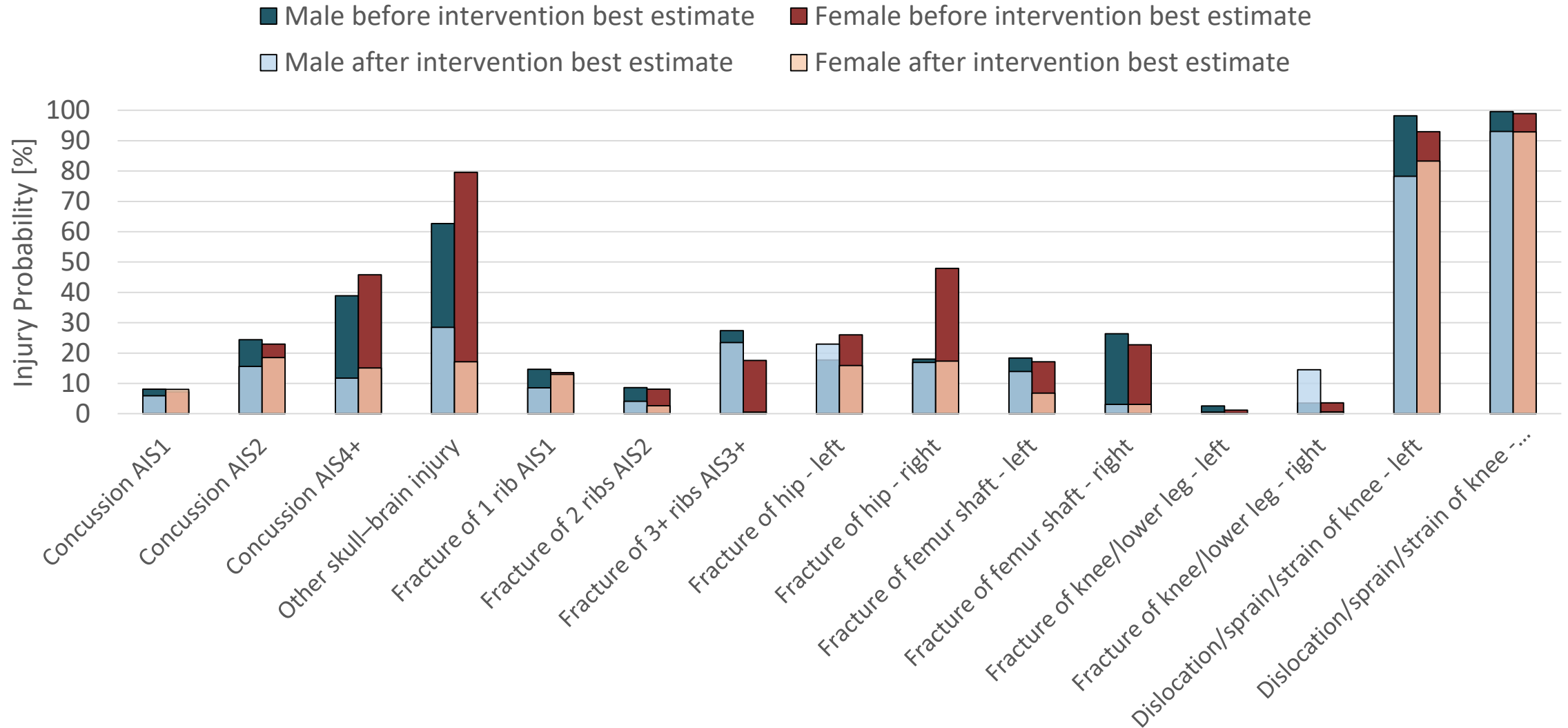
VUT Speed Weibull Distribution CDF (severity: minor)

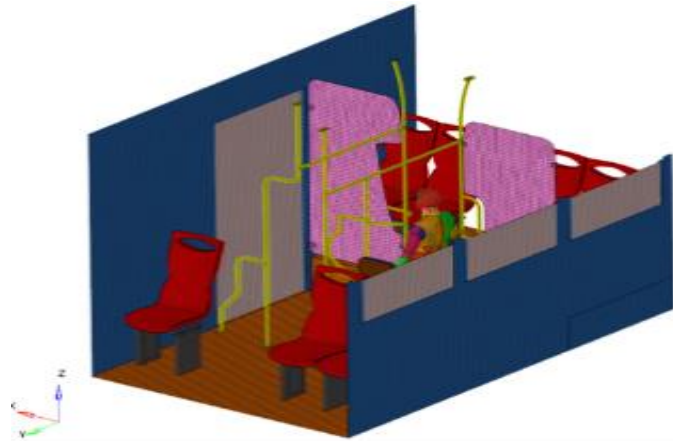
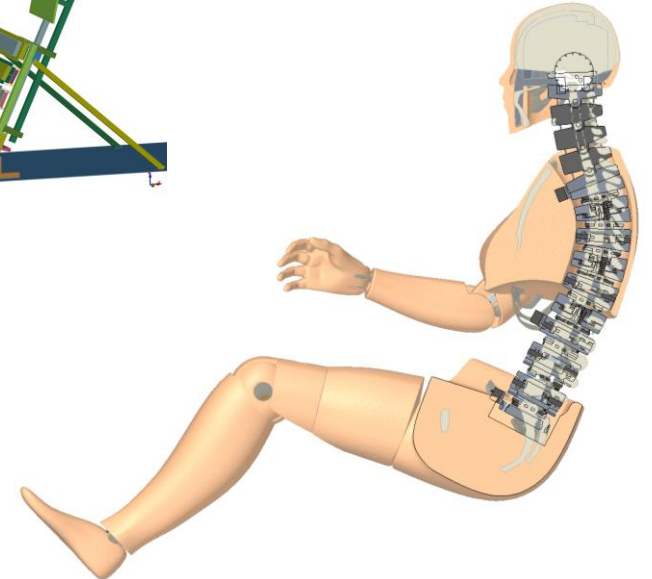
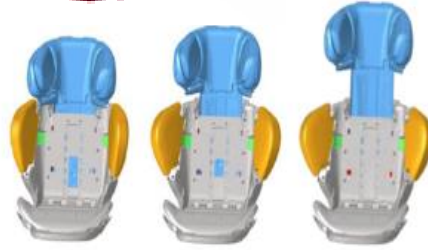
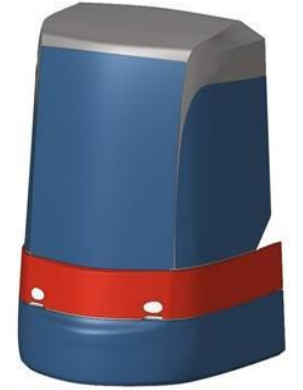
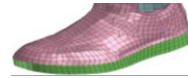
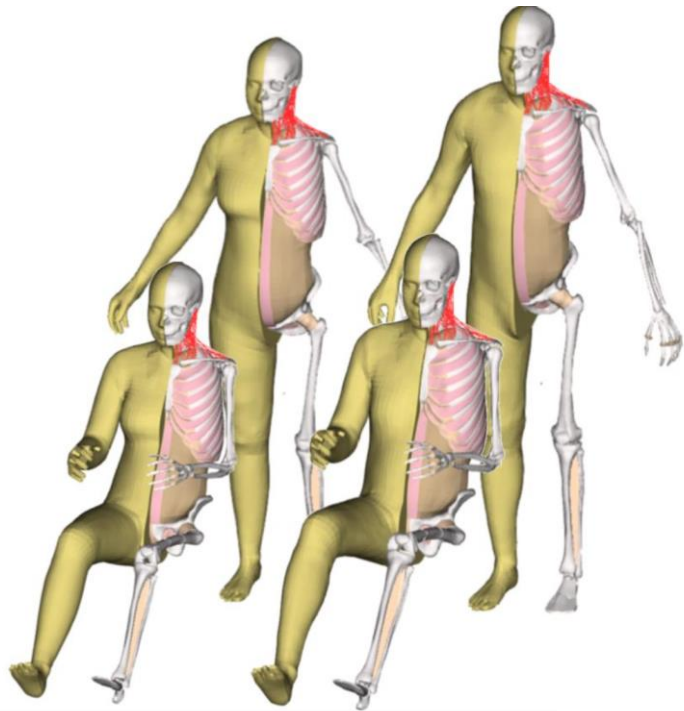
VRU Speed Weibull Distribution CDF (severity: minor)

Crash risk (number of target crashes per vehicle per year)



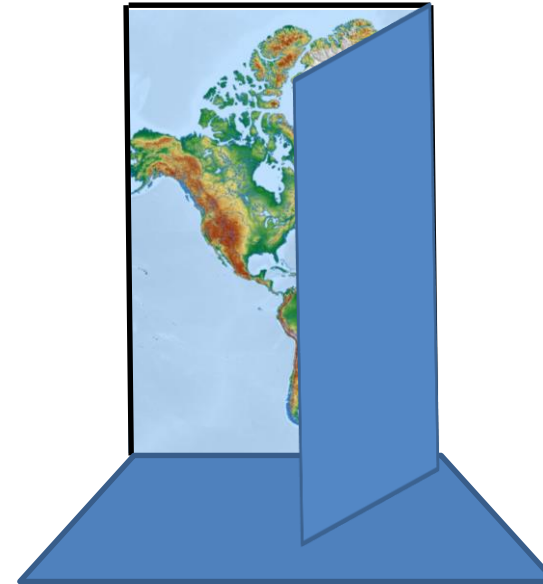








The OpenVT platform





OpenVT Gitlab platform



This is the OpenVT platform, the platform for open access virtual testing protocols for enhanced road users safety.

Please, sign up for free on the right in order to get full access to the OpenVT platform.

You can browse the Public contents without registration: [Overview Public contents](#).

As a new user, please, check out our [manuals and guidelines section](#) and the [OpenVT wiki](#). There you also find a [FAQ section](#).

The OpenVT platform is part of project **VIRTUAL**. For more information, see [projectvirtual.eu](#).

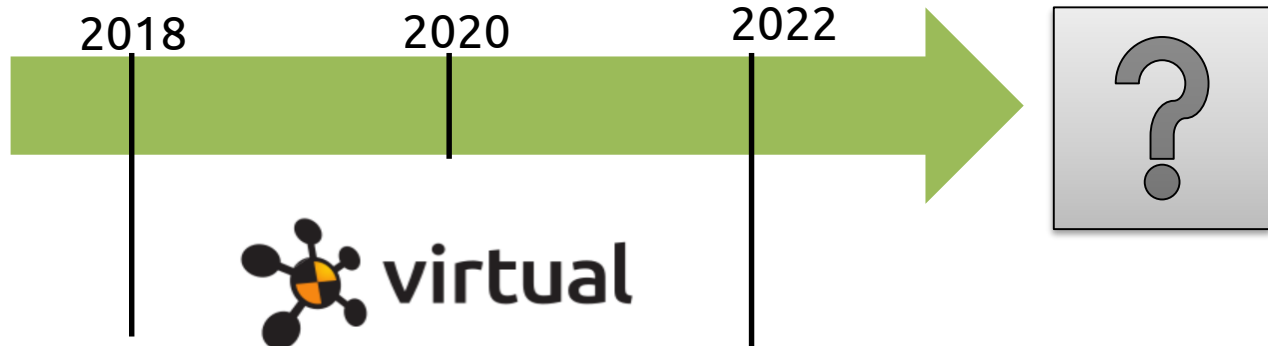
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Sign in





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-  **Founded in October 2021**
-  **Based in Zurich, Switzerland**

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- Virtual testing benefits:
 - More robustness of evaluation (standard loadcases → Real-world safety)
 - Higher biofidelity
 - Consideration of Diversity
 - Integrated Assessments
- Availability of models and tools has improved
 - e.g. of the VIRTUAL project openvt.eu
- More work needed on harmonisation of HBM responses
 - Community approach

Open Access Virtual Testing with Human Body Models

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