ptc LIVEWORX

VOLVO

SESSION ID: AR1573B

AUTOMOTIVE TRAILBLAZER
HOW VOLVO GROUP IS REIMAGING SERVICE AND TRAINING WITH AUGMENTED REALITY

SPEAKER(s):

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VOLVO GROUP AR STORY

Vincent Barnoux

LONG-TERM AMBITIONS

Solving our customers' business challenges

- 100% fossil free

- 100% productive

- 100% Safe

OVER 90 YEARS OF SAFETY

"Basic principle of all engineering is and must be safety"

NEW TECHNOLOGY, NEW RISKS. NEW OPPORTUNITIES

Volvo prioritizes both customer and first responder safety

Identify

Show rescue info

Immobilize and disable hazards

Other infos

We believe in a safer approach during road events for first responders.

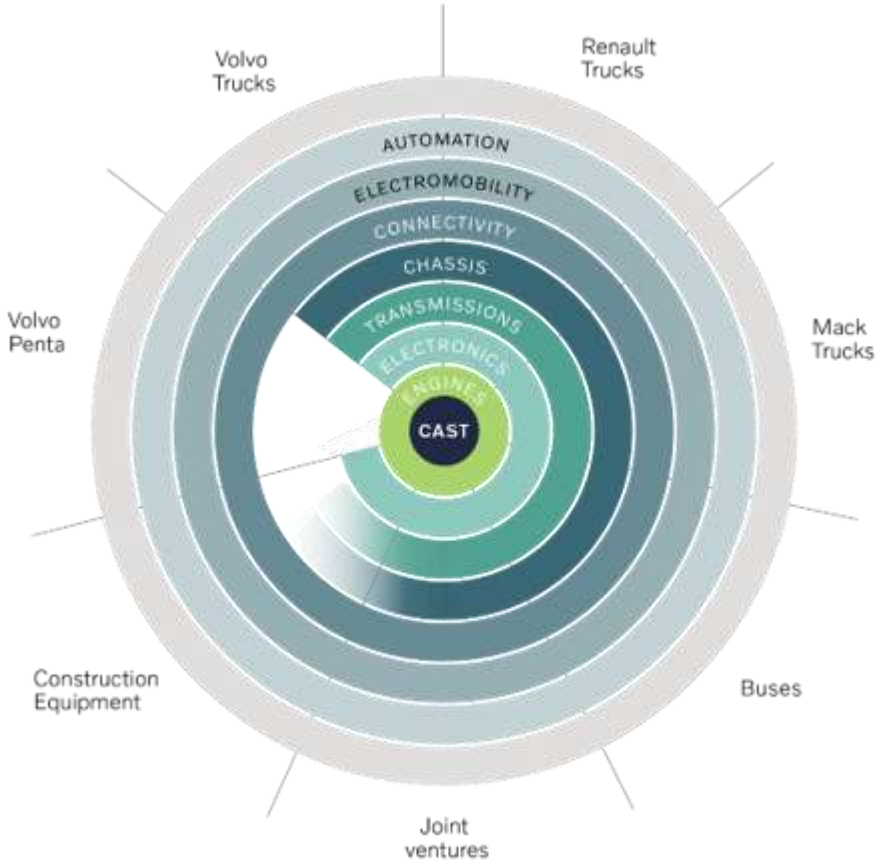
We believe in a faster and more efficient training time for first responders.

NEW TECHNOLOGY, NEW RISKS, NEW OPPORTUNITIES

Volvo prioritizes both customer and first responder safety

- X-ray vision
- Instant undertanding
- Avoid hazardous interaction with Traction High Voltage cables

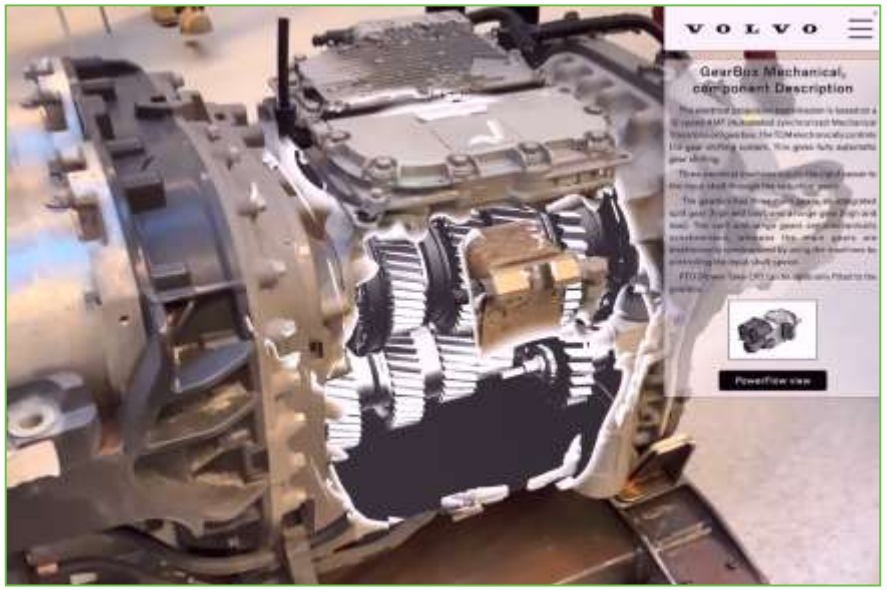
WHY NOW ?



- A brand-new architecture
- Staggered introduction

WHY NOW ?

- A pragmatic move into geometrical digital twin use

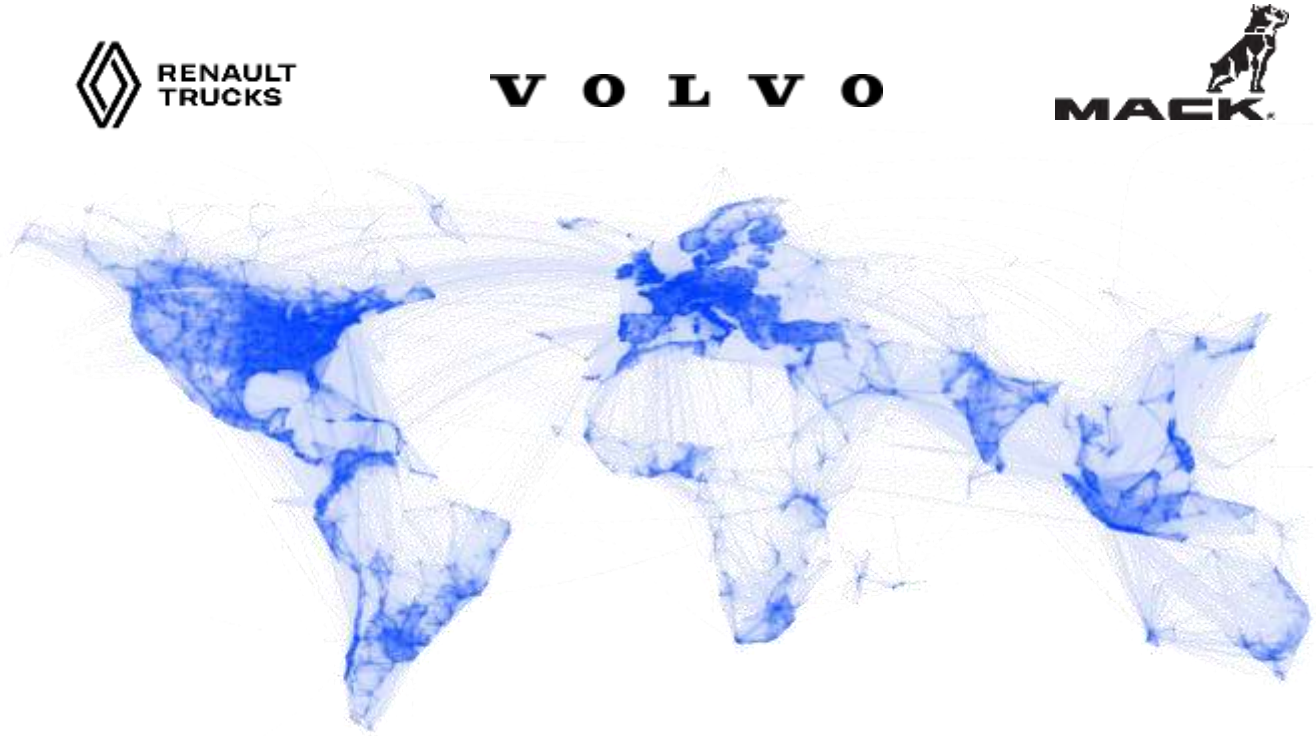


- Prepare AR enablers
- Build AR best practices

A NEW SERVICE ERA

- *Safety*
- *Autonomy & quality*
- *Reduce downtime*

A NEW SERVICE ERA



- Over 15k service points
- Approx. 100k service technicians

A NEW SERVICE ERA

Solving our customers' business challenges

- Useful
- Easy to use

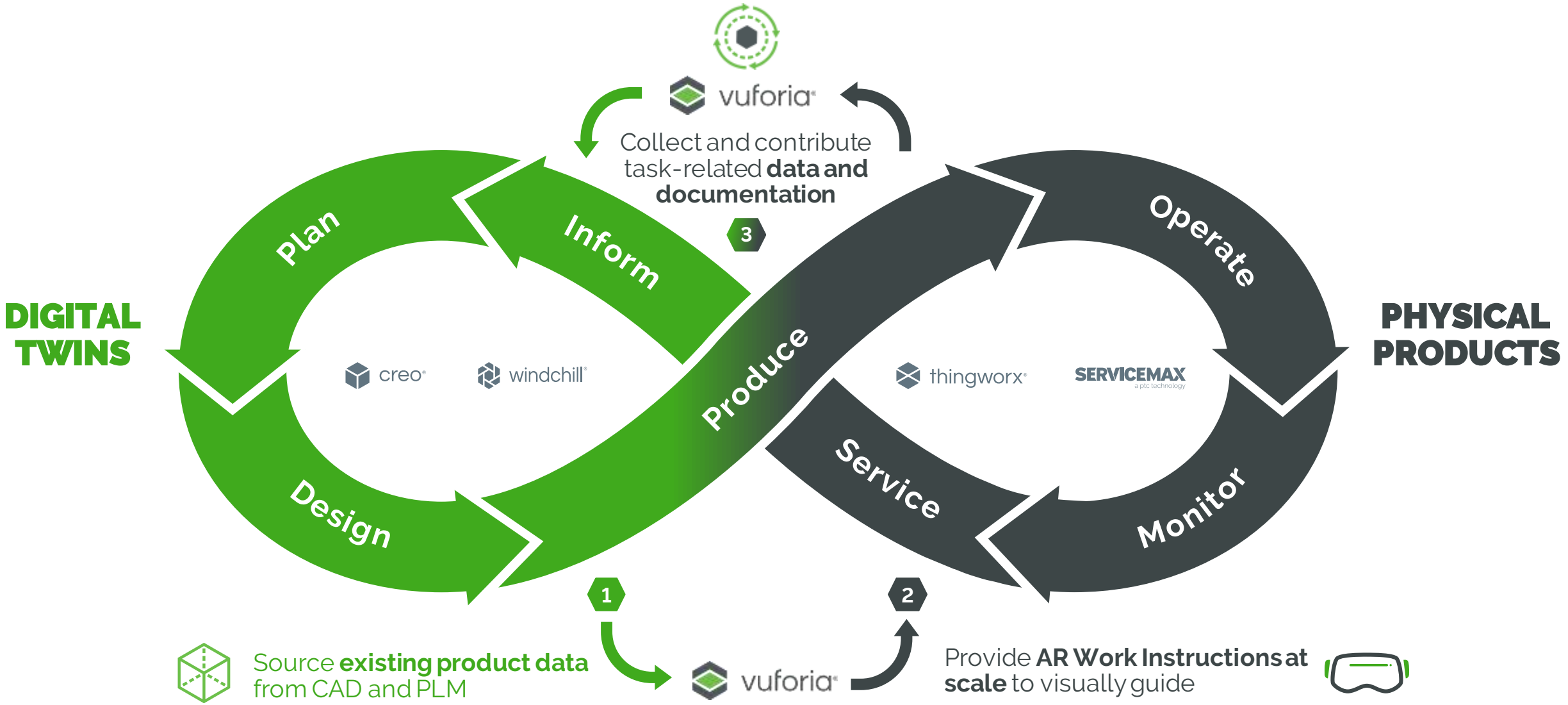
- Integrated

- Robust

DIGITAL THREAD FOR AR

Mic Gervautz

AUGMENTED REALITY IN THE DIGITAL THREAD



WHAT KIND OF DATA DOES AUGMENTED REALITY NEED?

Model Target to recognize and track a product (sometimes in different states)

Various **representations of the product** for occlusion and tracking/ recognition feedback

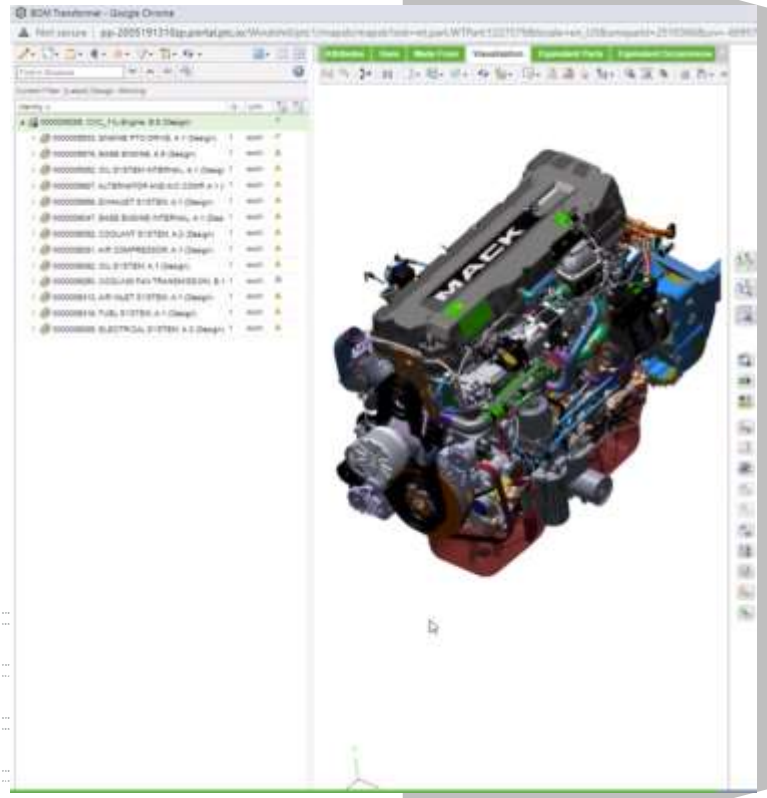
Visual representations of **“Hero” objects** and animations

Procedure with clearly indicated locations and viewing positions

Product Information associated with a location on the product

Sensor Readings (IoT data) associated with a location

FROM PRODUCT DATA TO AR DATA



- Metadata Cleanup
- Model Conversion and Cleanup
- Model Simplification
- Target Generation
(Viewing Positions and States)

MODEL SIMPLIFICATION

Augmented Reality is usually performed on mobile devices with limited rendering power

- Augmented Reality needs to render objects for different purposes
  - **Hero part visualization**: Some specific parts or subassemblies are highlighted or animated in AR applications
  - **Ground Plane Visualizations**: The whole product is visualized often in real size sitting on the ground, so that users can interact with it as if it was there (training)
  - **Occluder**: We are rendering the CAD model on top of the physical object using a special shader, just to make sure that the physical world is occluding other augmentations
  - **Model Target tracking**: For model target tracking the object is rendered in order to achieve precise alignment.
- **We need different model simplification algorithms** for those different purposes.

MODEL TARGET SIMPLIFICATION

Tessellated original CAD data
16.000.000 Polygons, 4.500 draw calls
Cannot be used for Model Target tracking

Simplified Model
200.000 Polygons, 11 draw calls
Works as Model Target even on lower-end devices

TARGET GENERATION

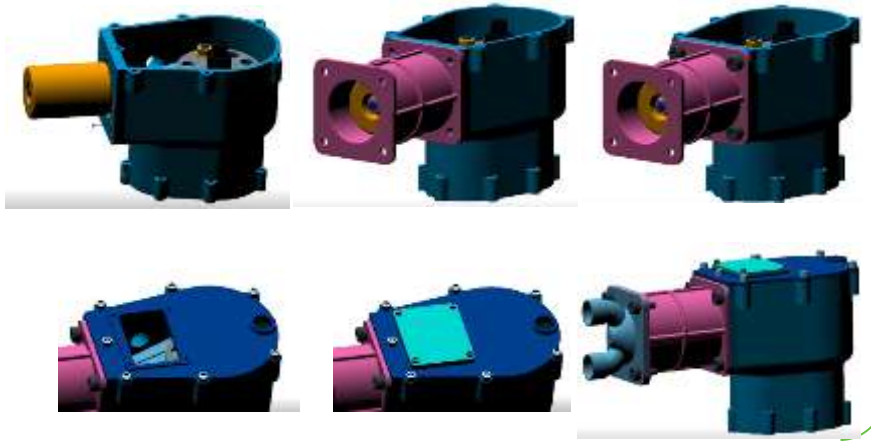
Model

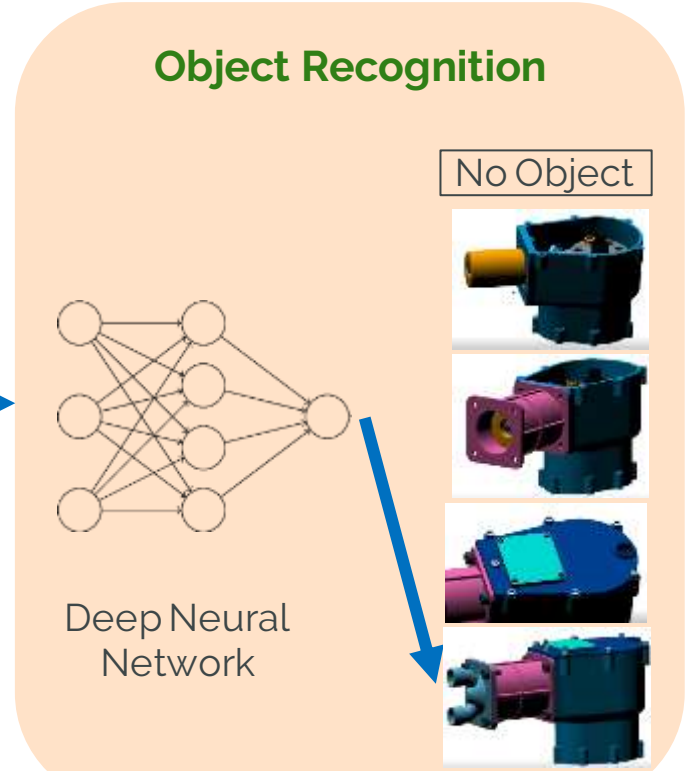
Model Geometry

Model States

Viewing Positions

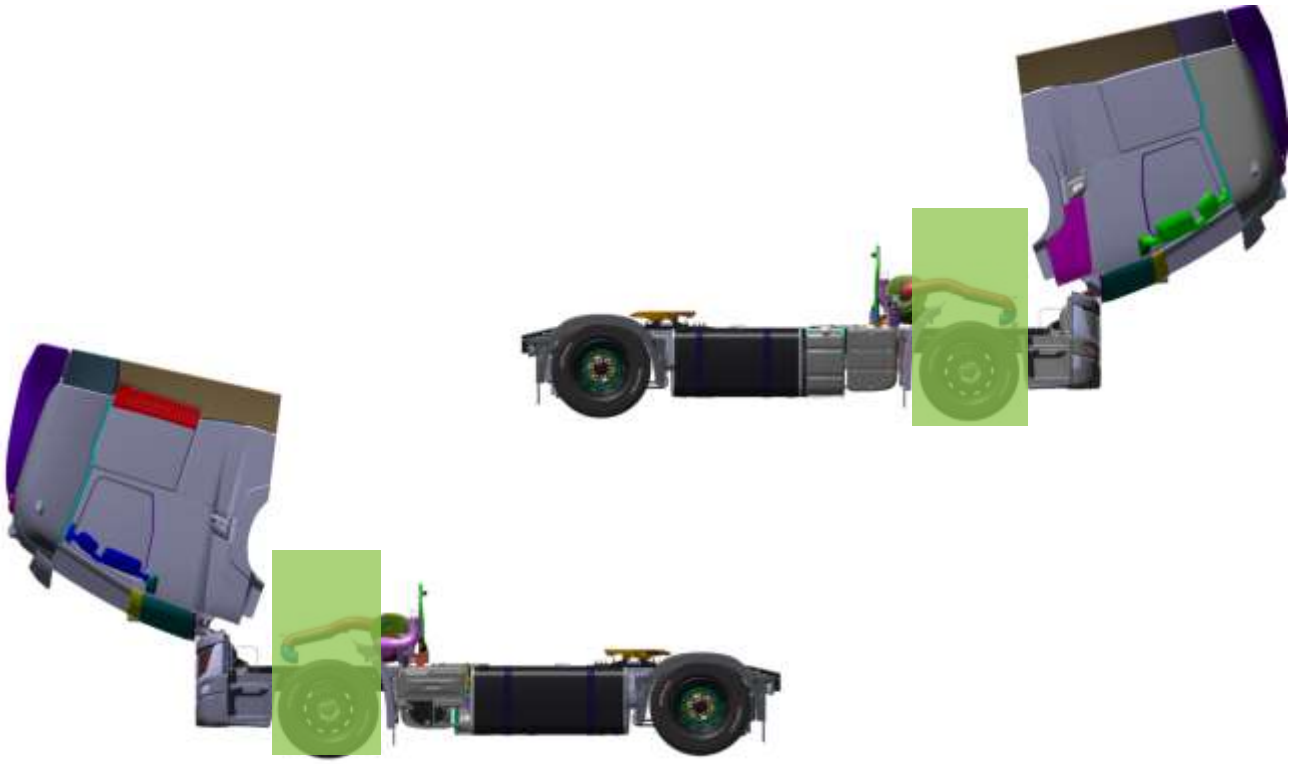
Procedure

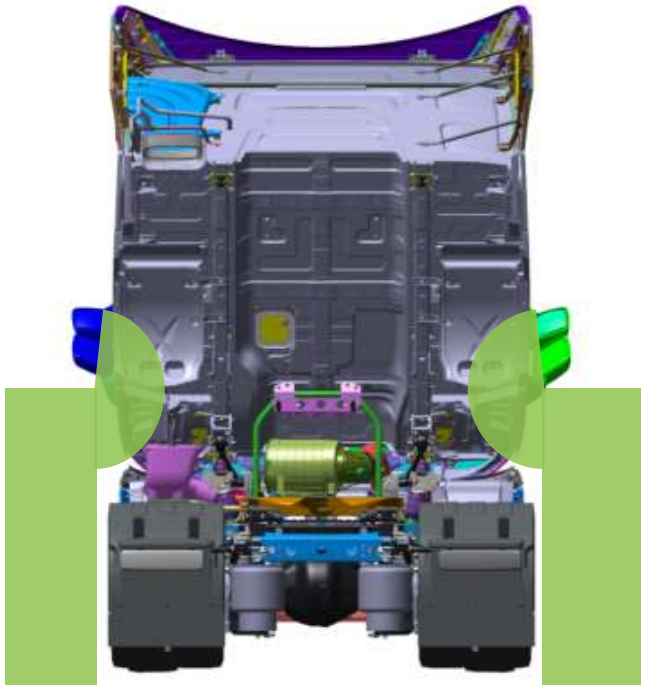


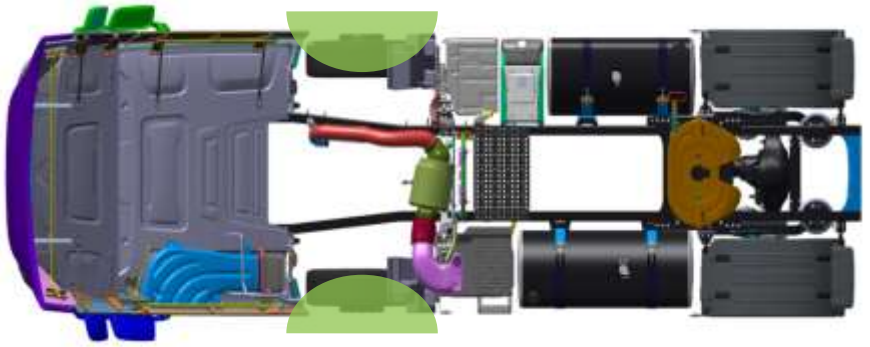


SERVICE TECHNICIAN POSITIONS

- From the 2 front wheel sides over the engine bay

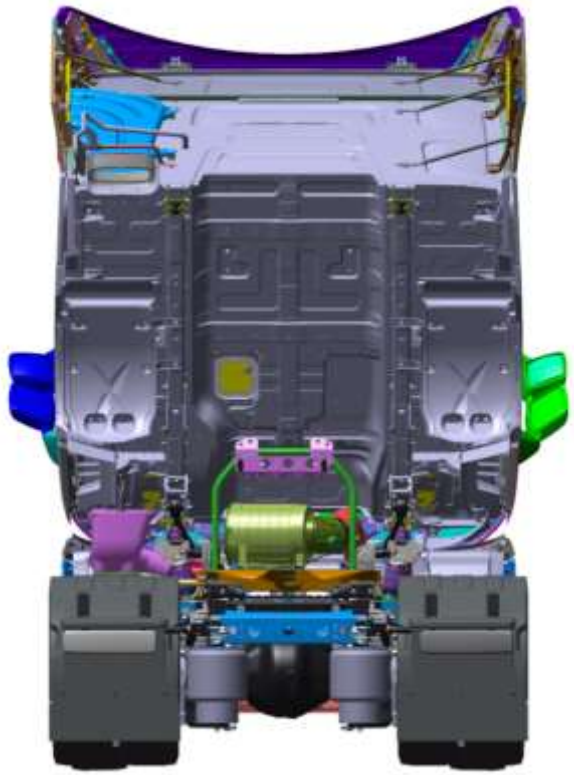






SERVICE TECHNICIAN POSITIONS

- From below the engine, transmission and rear axle



CONCLUSIONS

You do have the data that you need for AR!

- AR needs data that exists already in most of the cases as part of the product data
- A correct 3D representation of the product is the basis for great AR experiences
- AR specific data (targets) can be derived automatically – digital thread

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