
SEPTEMBER 2021
SONO LIVE
Development Update
SONO MOTORS

SONO LIVE

Today's Experts

MARKUS VOLMER

CTO

- Previously at: Daimler, Foton Motor

MITCHELL ZARDERS

INFOTAINMENT DEVELOPMENT

- Previously at: Hyundai / Kia Toyota

LEONHARD SAIBEL

BODY STRUCTURE

- Previously at: Italdesign, EDAG, Bertrandt

BENE ZEILBERGER

THERMAL

- 3 years experience at Sono Motors

SERHAN SEZER

INTERIOR / SAFETY

- Previously at: Ford (10 years)
- 3.5 years experience at Sono Motors

SEBASTIAN BÖTTGER

COMMUNITY-BEIRAT

- Entrepreneur
- Software developer
- Community member advisor since 2020

SONO UPDATE

Agenda

01 DEVELOPMENT UPDATE (DESIGN RELEASE)	10 MIN
02 INFOTAINMENT	5 MIN
03 BODY STRUCTURE	5 MIN
04 SAFETY	5 MIN
05 THERMAL	5 MIN
06 Q&A	30 MIN

Q&A

Slido

https://app.sli.do/event/yeyluz1m

01 SONO MOTORS

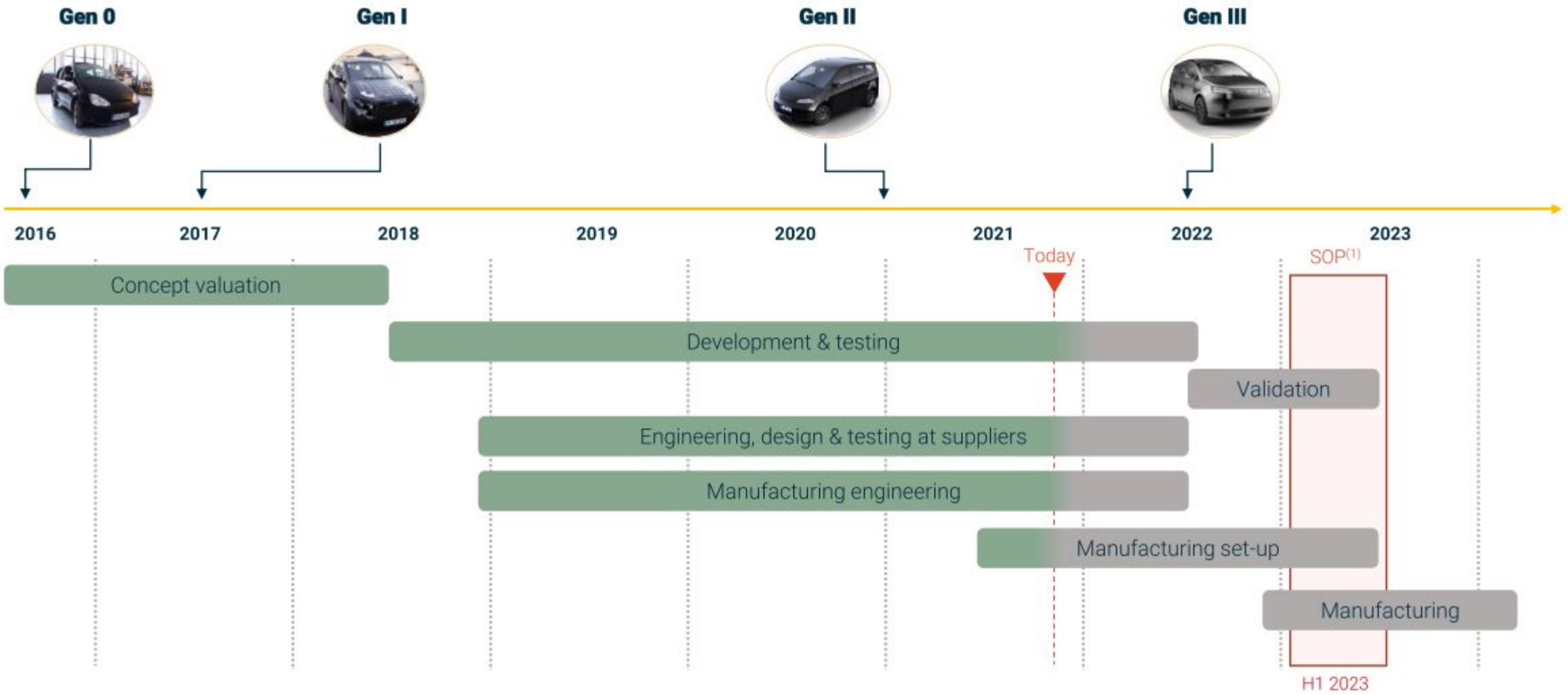
Development Update (Design Release)

DEVELOPMENT UPDATE

PLANNED SOP H1 2023

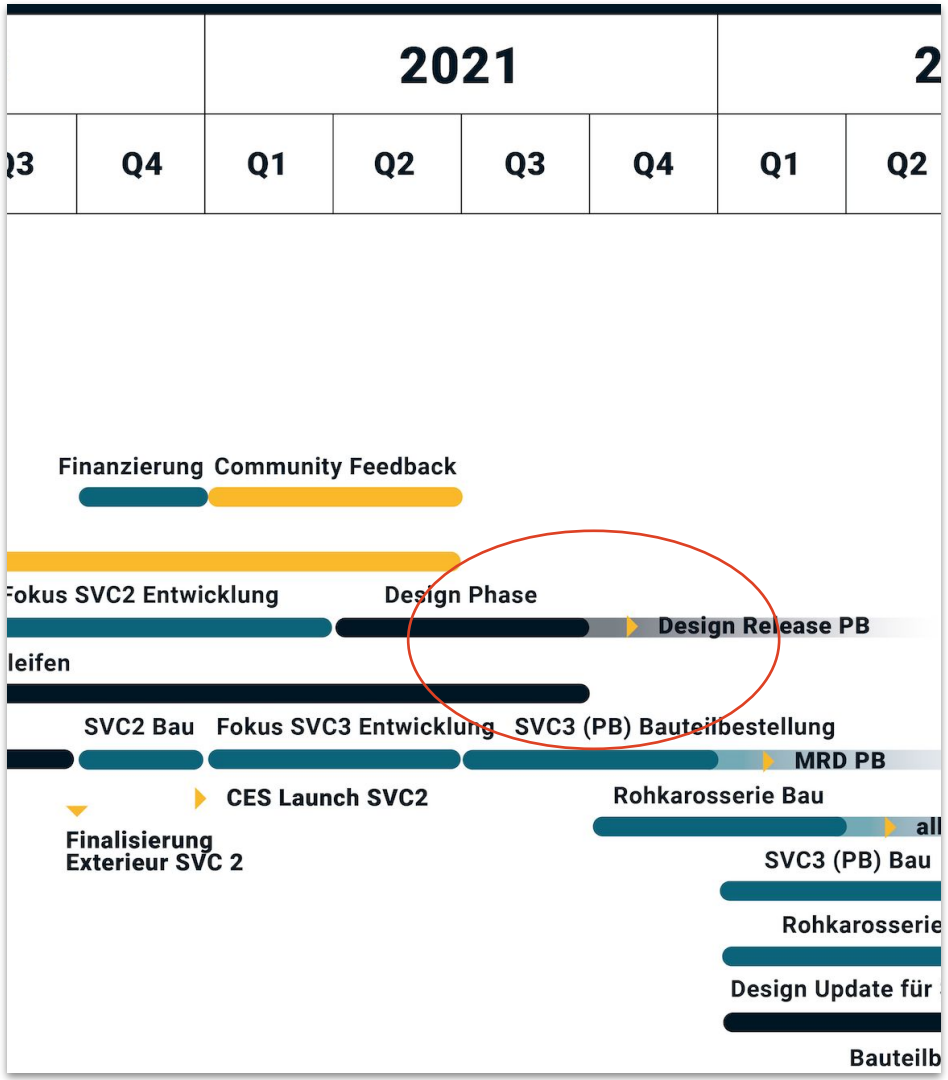
DEVELOPMENT PLAN

Prototype Series on the Way to Series Production



TERMS DEFINITION

Design Release (DR)



01 **Development complete**/
Long term tools commissioned/
Suppliers receive purchase orders/
Exact part costs are known.

02 **No further changes** to the vehicle are planned (only if testing is required).

03 **Production feasibility** is guaranteed for each component.

04 **Crash & Safety —** simulations show good to very good results

05 **Homologation —** all requirements for the vehicle and its components must be met

DESIGN RELEASE MILESTONES

Current Status: SVC3 Design Release

AREA	SVC3 STATUS Design Release 09.21	SVC3 MATERIAL Required Date (MRD) 03.22	COMMENTS
BODY			SVC3 DR + 12 weeks; Many interfaces (fixtures, assembly points) are still open (interior, exterior etc.). 3D data cannot be frozen until DR.
INTERIOR & SAFETY			Further negotiations with some suppliers necessary.
DOORS & TRIM			Some providers are missing. DR is expected to be in Nov ‘21.
EXTERIOR			3 nominated suppliers. Essentially 2 missing suppliers (underbodies, wheel arch liners). MRD is expected to be in Nov ‘21. Bumpers will arrive about 7 weeks after MRD date.
THERMAL			All interfaces are defined for the DR. Important parts are takeover components and are being procured. No orders have yet been placed for pipes, hoses, air ducts and sensors.
CHASSIS			The supplier for the steering system has not yet been determined.
ELECTRICS / ELECTRONICS			Some suppliers are missing. Device transmittal 1 month late. New requirements from infotainment, ASiL and FuSa received, affecting schedule and development.
MOTOR			There are still a few suppliers missing.
INFOTAINMENT			The only system that could be delayed is the head unit. For each system, 5 samples have been ordered for testing purposes.
HV BATTERY			Everything is sourced from the supplier. DV under detailed planning.

DEVELOPMENT UPDATE

The development strategy was adjusted so as not to delay SOP.

NECESSARY TO KEEP SOP

Adaptation of Development Strategy

WHAT REMAINS THE SAME?

- SOP H1 2023
- SVC3 H1 2022
- SVC3 is almost identical to series
- Manufacture at NEVS

WHAT CHANGES?

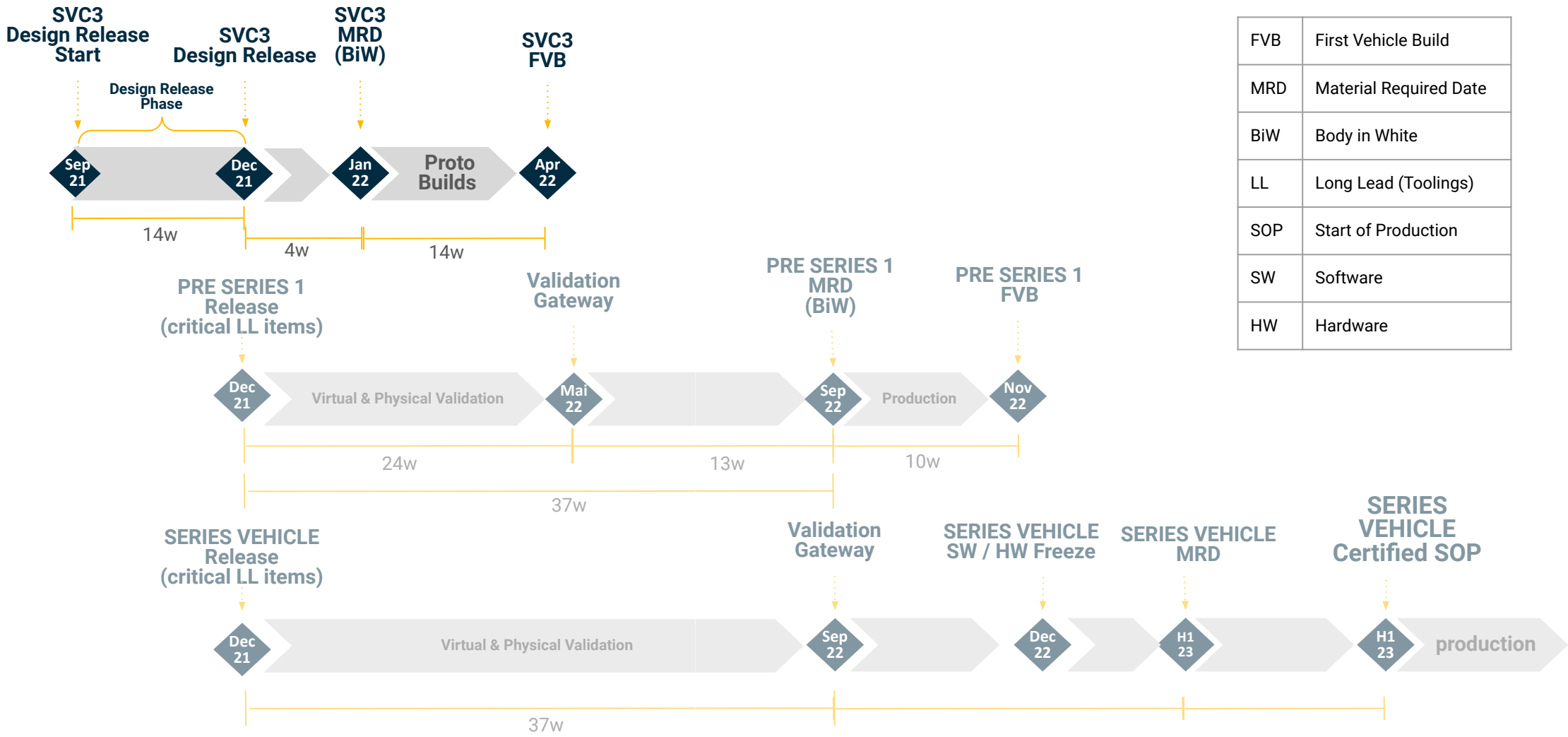
- SVC3 component release will become “phase” by 12/21
- First lot of 11 x SVC3 in spring 2022
- Mix of soft and hard tools in interior and exterior production

WHICH RISKS ARISE?

- Early release for long term parts
- Additional costs in production

CURRENT TIME PLAN

Sion Timing Overview



FVB	First Vehicle Build
MRD	Material Required Date
BiW	Body in White
LL	Long Lead (Toolings)
SOP	Start of Production
SW	Software
HW	Hardware

DESIGN RELEASE MILESTONES

Current Status: SVC3 Design Release

AREA	SVC3 STATUS Design Freeze 09.21	SVC3 MATERIAL Required Date (MRD) 03.22	DR STATUS AFTER STRATEGY ADAPTATION
BODY			
INTERIOR & SAFETY			
DOORS & TRIM			
EXTERIOR			
THERMAL			
CHASSIS			
ELECTRICS / ELECTRONICS			
MOTOR			
INFOTAINMENT			
HV BATTERY			

PRODUCTION PARTNER UPDATE

NEVS remains our production partner for the Sion. All Sion reserved to date will be produced in 2023.

MITCHEL ZARDERS

Infotainment Development

INFOTAINMENT

Design Release ✅

HIGHLIGHT

- Design Release for all critical components ✅
- All components set to be delivered for bench testing 01.12.2021 ✅
- Parts will be available for LabCar ✅

IN PROGRESS

- Ramp up staff for hardware and software development
- Accessing two suppliers for Ecall button hardware

LOW LIGHT

- World wide chip shortage “may” have in impact on purchasing timing
- Need to finalize steering wheel supplier (mapping buttons for IHU & IC interface)

FEATURES

Infotainment System Specs

FEATURES:

- **Core processor: NXP i.MX 8QuadMax**
- Antennas FM/DAB/WiFi/BT/LTE/GPS
- **Wireless Apple CarPlay & Android Auto**
- **Android Automotive 11 OS**
- **Custom, in-house developed the infotainment UI**
- Bluetooth hands free
- **Custom designed hypervisor in head unit (virtual machine manager)**
- Front USB interface (27W charging and data)
- Rear USB (15W charging only)
- **Four channel 250W internal amp**
- **Infotainment OTA (over the air updates)**
- 25.6cm CID touch display / 26cm IC TFT display
- **Six speakers**
  - **Dash 2 x 2.5cm tweeter**
  - **Ft door 2 x 16cm woofer**
  - **Rr door 2 x 12.7cm full range speaker**

LEONHARD SAIBEL

Body

BODY

Final design release planned for end of November 2021

HIGHLIGHT

- Pre-release of 3D data SVC3 already ready in KW40 ✅
- NVH requirements almost met ✅
- Feasibility of individual parts checked ✅
- Fügefolgen seitens Produktion bestätigt ✅
- Gewichtsreduzierung durch Optimierung der Bauteile ✅

IN PROGRESS

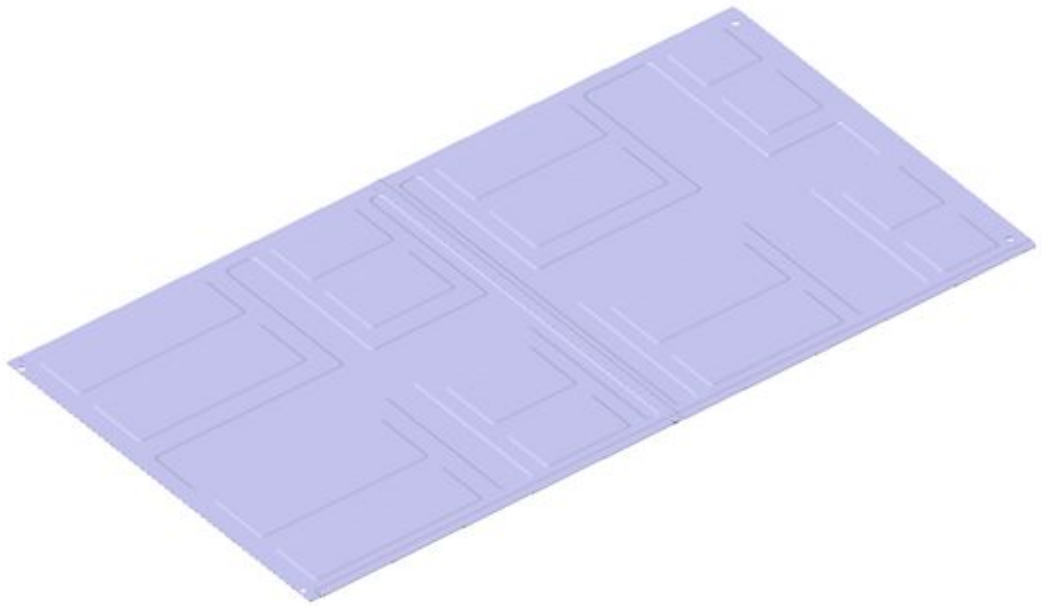
- Further crash optimizations up to DR and to increase the degree of maturity.
- Bolts for grounding (earth bolts) are not yet finally defined

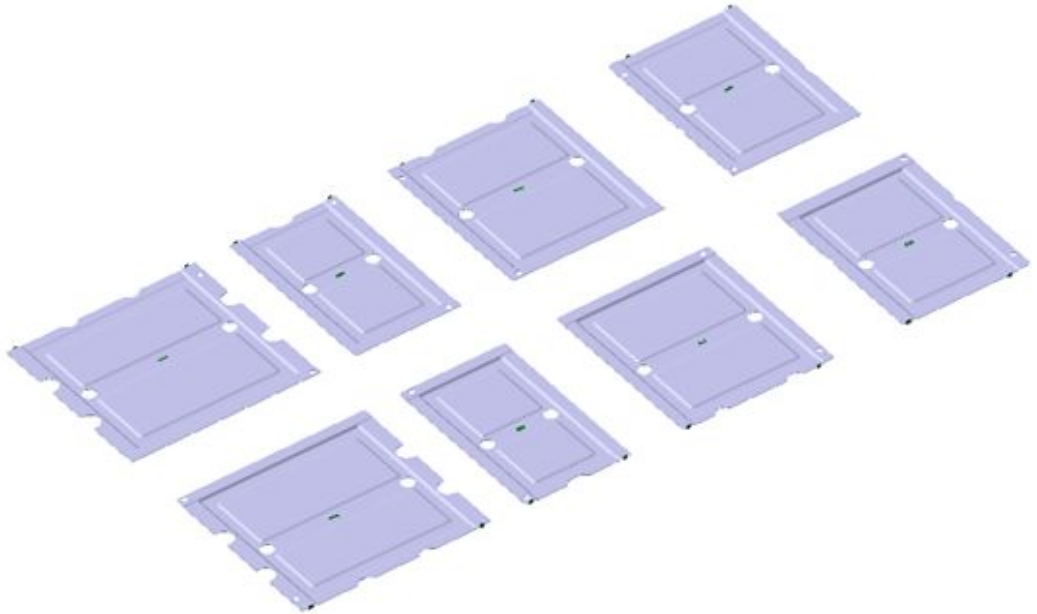
LOW LIGHT

- Mounting concept for roof module and sun visors not yet confirmed

Weight Optimization Example **(approx. -3kg)**

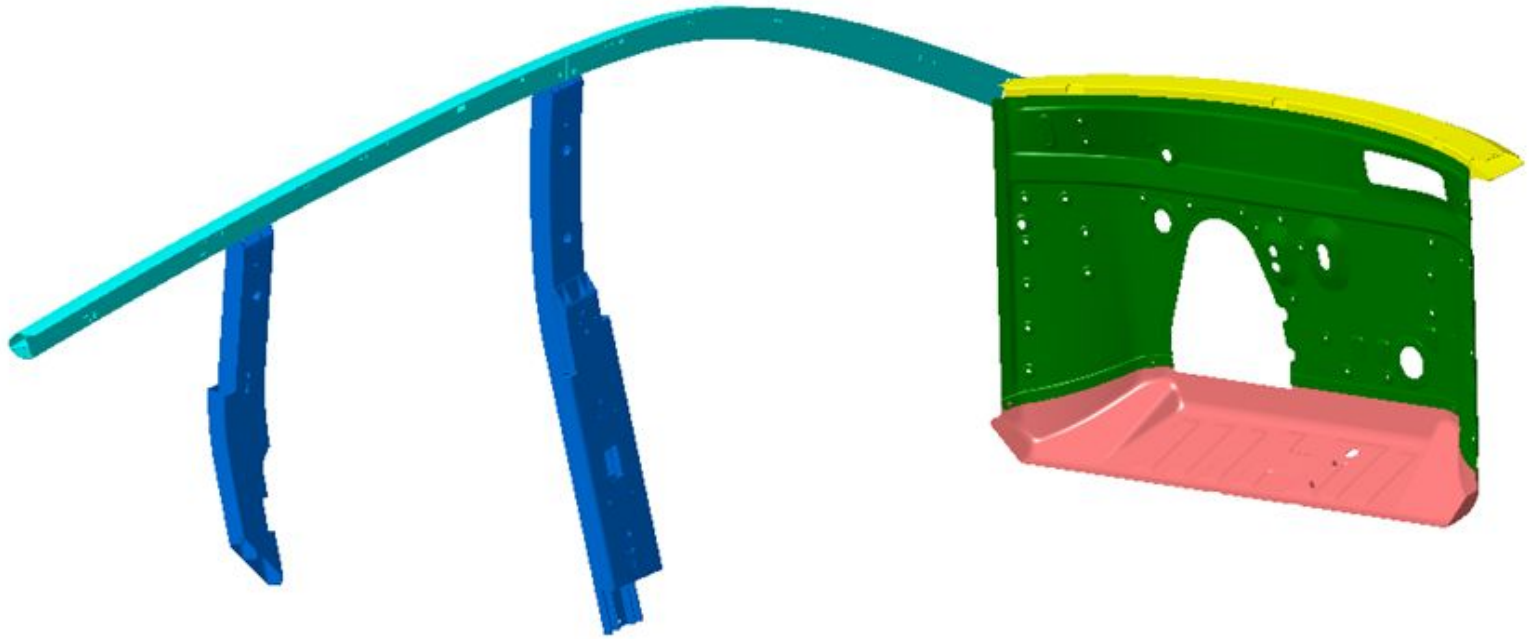
- Weight optimization
  - 1 large component divided into several smaller parts
    - Identical parts can be installed on the envelope -> lower parts variation





Critical Long-Term Parts – Tool Running Times up to 65 Weeks

(Potential for reduction to 54 weeks)



SERHAN SEZER

Crash & Safety

CRASH & SAFETY

Design Release

HIGHLIGHT

- Extension of front-end ✅
- Structural crash targets considering the new HV Battery ✅
- Low-speed damageability assessment for insurance classification ✅
- Structural crash assessments ✅
- Development of the passenger safety targets ✅

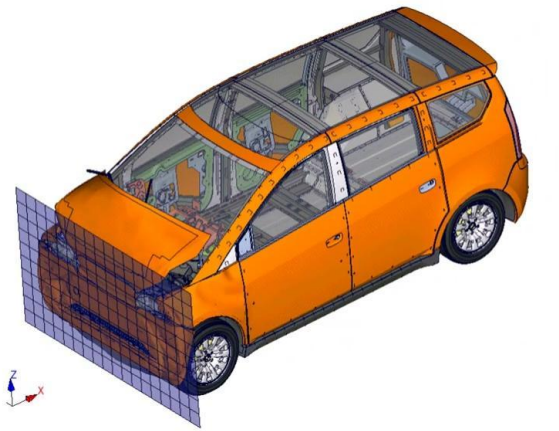
IN PROGRESS

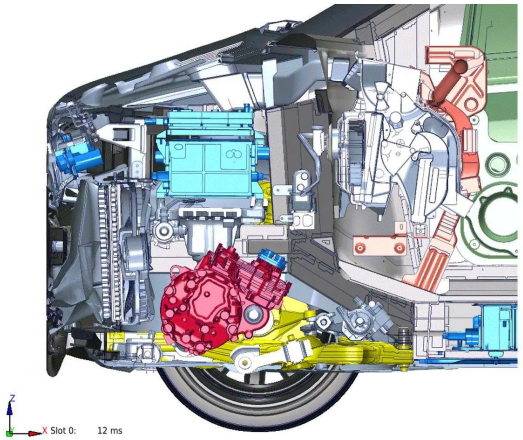
- Integration of restraint systems
- HV safety and rescue assessments
- Model assumptions in vehicle simulation model
- PedPro: PV integrated hood
- Structural crash assessment counter measures
- Pedestrian protection assessments
- Adaptation of new HV Battery

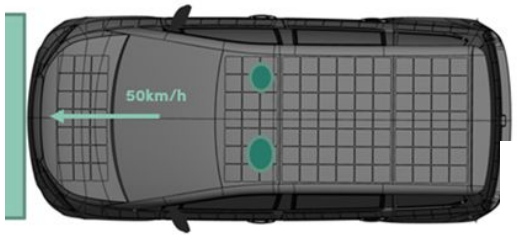
LOW LIGHT

- Multi-interface charging lid in the front
- No physical testing done so far
- Timing between design releases and physical vehicle crash tests

2020

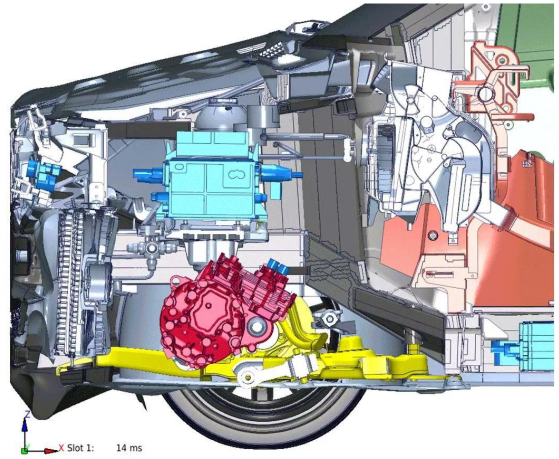


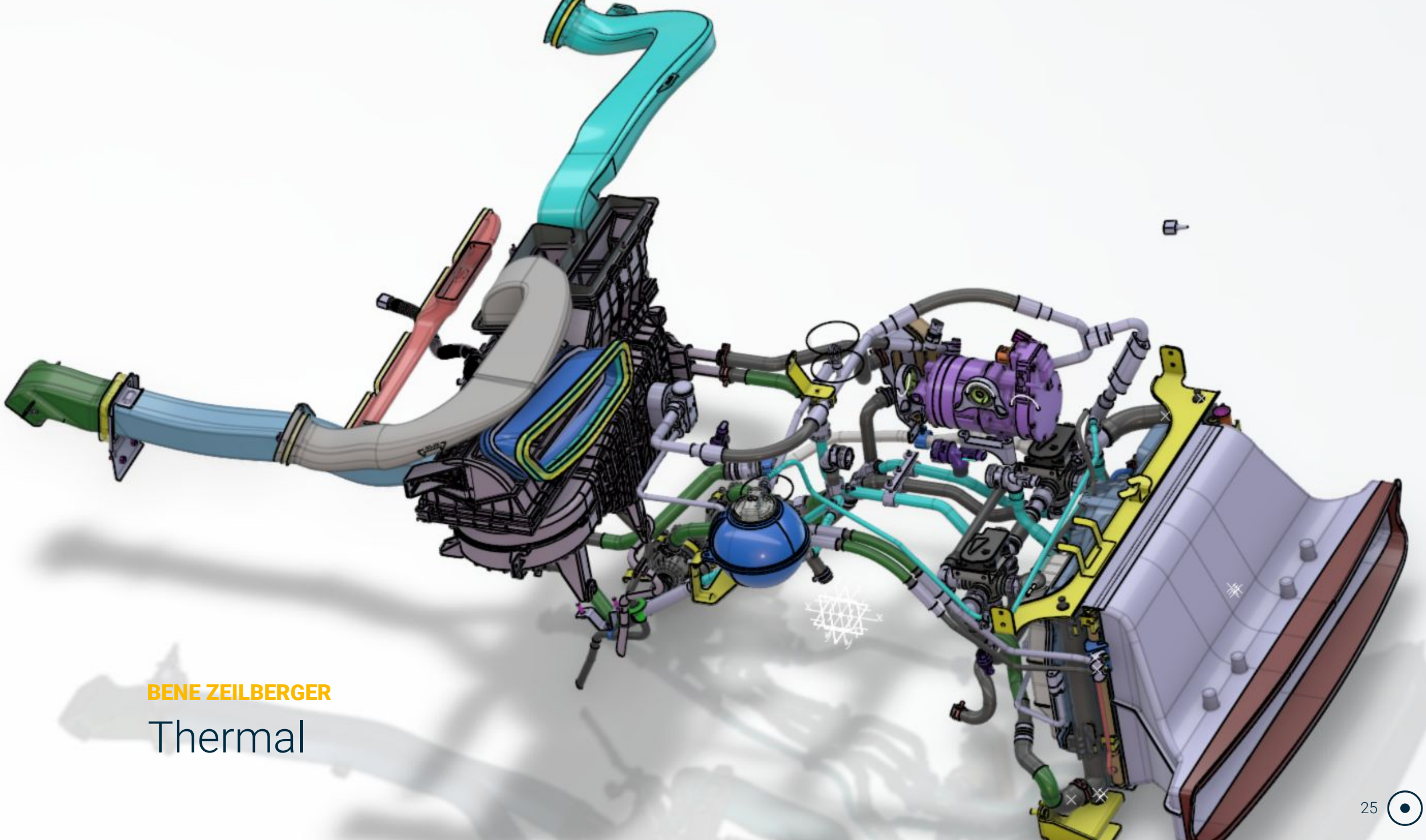




ECE R137 – Full Frontal

2021





BENE ZEILBERGER

Thermal

THERMAL

Design Release ✅

HIGHLIGHT

- CO suppliers are ready for the SVC3 ✅
- All components in the installation space (reactive changes still possible) ✅
- Design of the lines manufacturable ✅
- CAE simulations of the holders in order ✅

IN PROGRESS

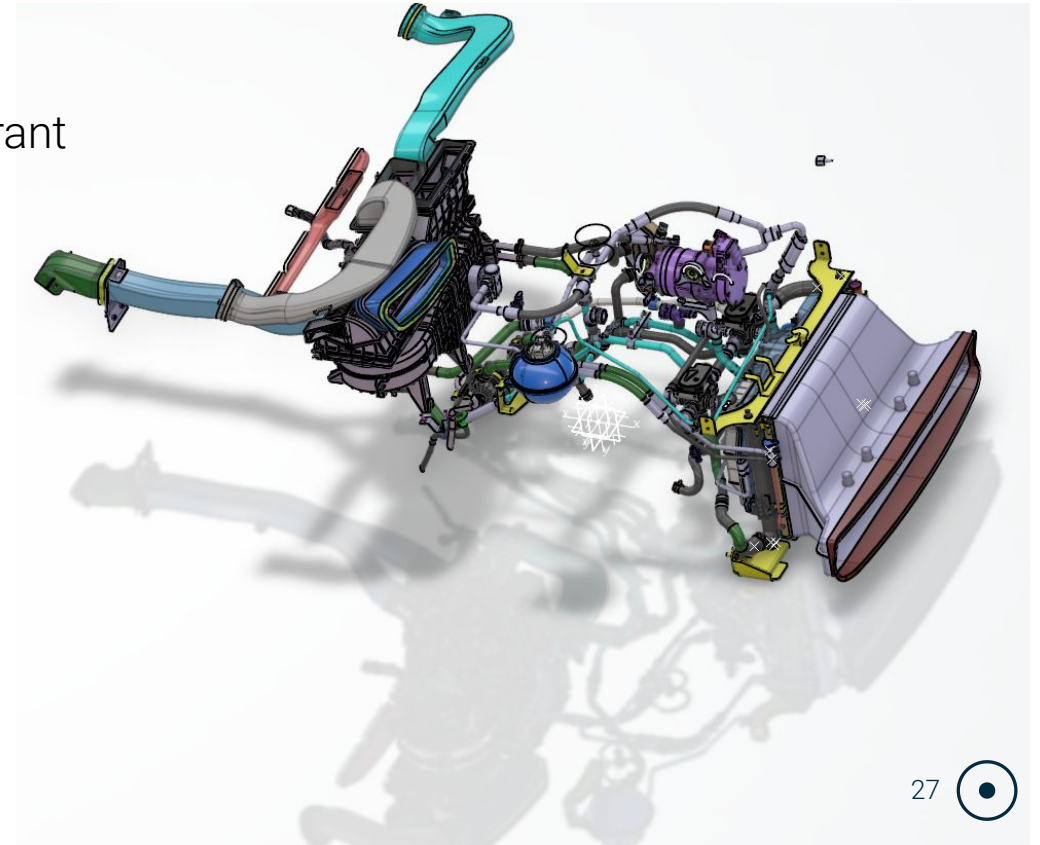
- 54 kWh battery created additional workload
- New supplier needed for the coolant pump
- High workload due to small parts (seals, screws, clips)

LOW LIGHT

- Coolant level sensor

Technical Data Overview

- Liquid cooling (cooling agent: water-glycol mixture) for EDU (motor), OBC (on board charger) and HV battery
- Interior heating via coolant -> waste heat utilization possible
- HV heater (400V) with 5 kW heating power for interior and battery
- Pre-conditioning possible (interior and battery)
- Classic air conditioner with connection to battery cooling: refrigerant R1234yf
- Strong performance, high efficiency, comparatively inexpensive



THE BEST FOR LAST

THANK YOU, COMMUNITY!

OUR VISION

A WORLD WITHOUT FOSSILE FUELS.

QUESTIONS & ANSWERS

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