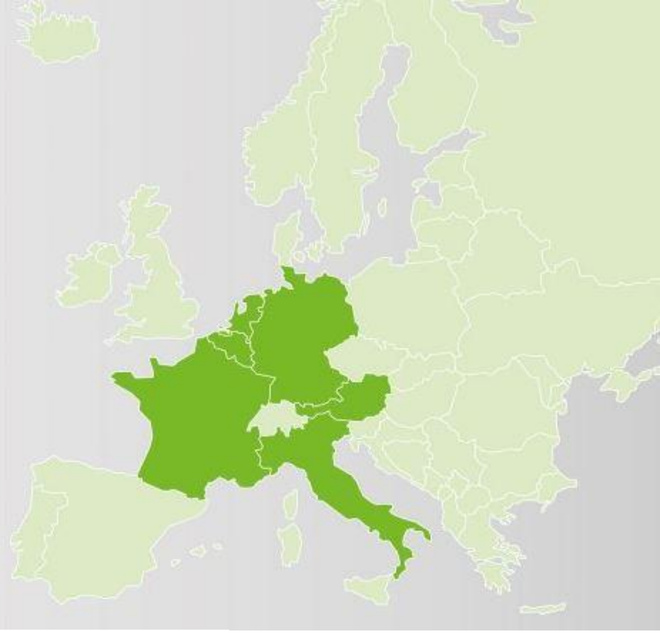
CEVOLVER

Connected Electric Vehicle Optimised for Life, Value, Efficiency and Range



SYSTEM AND COMPONENT TESTING USING AN EV PROTOTYPE COMPONENT CARRIER

Focus:
Basic design & layout / alignment w/ simulation

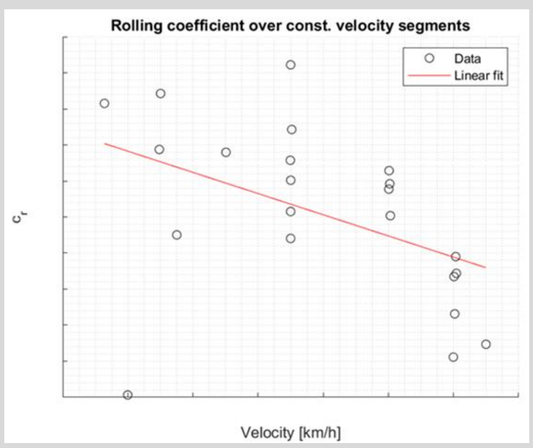
***Vehicle Control Unit**

Important Note:
CEVOLVER activities are integrated parts of an internal development activity @ BOSCH

Added value ..
Development / implementation of VCU functions & features / system approach

Focus:
Therm. system / heat pump / low temperature improvements

- Design, layout and construction of two prototypes (base vehicle and full body)
- Innovative thermal system: Benefits for waste heat recovery and heat pump
- Measurements: I.) Alignment w/ sim. & II.) Quantif. of low temp. improvements

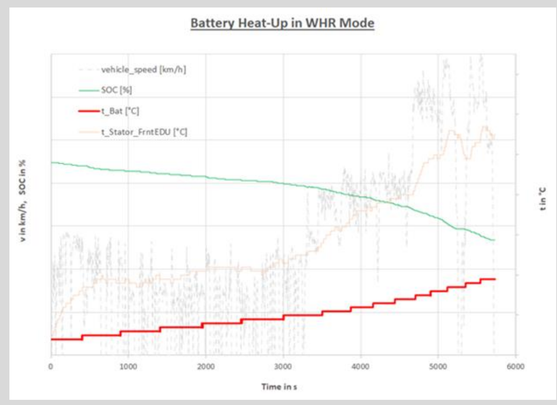


Identification of Vehicle Parameters:
- ✓ On system and component level
- ✓ e.g., Correction of absolute value and speed dependance of rolling parameter identified

Findings used to **align simulation & to increase accuracy of range prediction**

Waste Heat Recovery (WHR)
- ✓ Benefits of WHR: Drive train → bat.
  - ✓ Appr. 2x battery warm-up speed → lifetime improvement
  - ✓ Energetic benefits quantified

Findings: For longer trips, **WHR towards cabin** desirable



Trip Time Optimization for long trips with minimal battery capacity

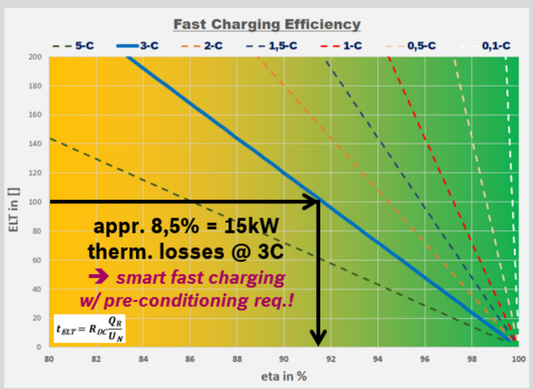
Optimized, connected, real time-based travel planning including, charge management (***Eco-routing***)

Onboard - monitoring of real vehicle vs. predicted data concerning e.g., GPS- position vs. time, SoC, remaining range, … → re-triggering of route-planning based on definable deviations (***Itinerary planning***)

Feature development and implementation/usage in VCU:
Eco-routing, eco-driving, thermal management, smart fast charging, range prediction, assured charging

Efficient, precise & dynamic ***Model-Based Control Approach***

User-centric development using:
usage scenarios, mapping of stakeholder goals with features and stakeholder requirements

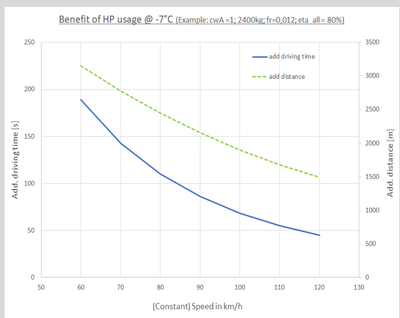


Definition of battery for use in consortium to simulate fast charging:
- ✓ 60kWh *(96S2P)*, “energy cells”
- ✓ 3C Charging rate defined as limit
- ✓ 15kW Thermal losses to be managed

Import. for **simulation / trip time deduction** and **planning of fast charge** events

Heat Pump (HP) (vs. el. heater) for cabin heating
- ✓ Encouraging level of COP on ref. circuit side
- ✓ Usage of front-end fan in HP mode considered
- ✓ Benefit conc. add. driving & distance quantified

Further **develop. need:** Identify balance between comfort & component protection aspects



CEVOLVER is a H2020 Research and Innovation project to develop battery-electric vehicles that are usable for comfortable long day trips with an affordable battery

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under Grant Agreement no. 824295

HTTPS://CEVOLVER.EU