

Detroit Engineered products (DEP), is an engineering services, product development, software development, consulting and talent acquisition company. Since its inception in 1998 in Troy, USA, DEP is now a global company with footprints in Europe, China, Korea, Japan, and India. DEP uses the accelerated and transformed product development process, accomplished by utilizing our proprietary platform, DEP MeshWorks, which rapidly reduces the development time of products for all segments. The MeshWorks platform delivers tool sets that accelerate virtual validation activities associated with powertrain development across all stages for both conventional and electric powertrain.



Smarter solutions. Realized.

Several tools in MeshWorks have been created with deeper understanding of the needs in a powertrain engineering team. Tools like rib addition, feature removal, model checker, fuse welding, wall thickness reduction options, design space building tools and other model assembly tools have accelerated the way engineers perform model changes for what if studies and optimization.

DEP's IC sensor (In-Cylinder) offers comprehensive portfolio of combustion analysis to the engine design and testing teams in terms of real-time gathered data and make decisions considering emissions, combustion, timing, pressure pattern and performance parameters. This is applicable for single and multiple fuel engines.

The DEP TRIO of IC Sensor, MeshWorks tools and proven technological processes like MDO can significantly add value to Powertrain Engineering.



Model Based System Engineering

Introduction:

DEP offers a platform for Model Based System Engineering approach. There is an extensive effort put together in MBSE development projects which includes EV & HEV full vehicle performance prediction, Motor, Battery and Controls development and sub-system performance simulation and calibration in DEP.

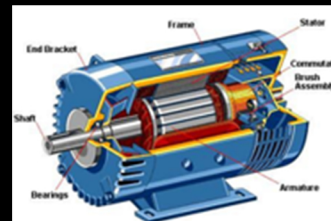
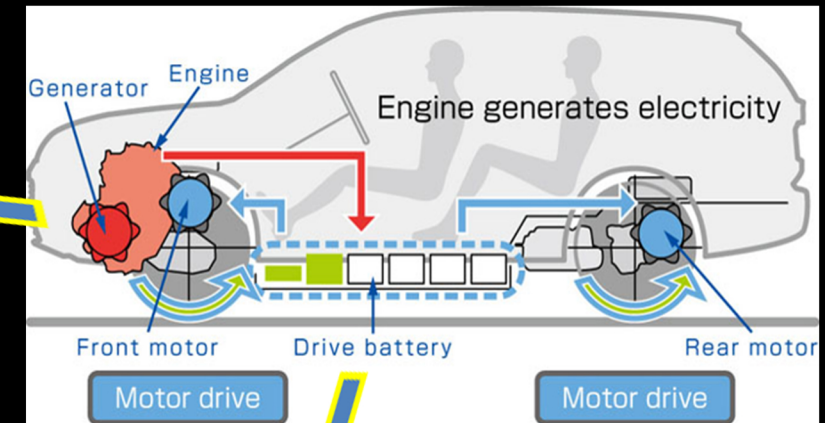
Key Facts:

- Powertrain system level simulation modeling and performance analysis.
- Vehicle Energy Management - optimum use of fuel & electric energy.
- High Voltage Cooling System/Thermal Management - making electric drive most potential.
- Waste Heat Recovery System & AC - satisfy need for cabin comfort.

EV/HEV Optimization:

- Vehicle Powertrain selection strategy.
- Sub-system performance analysis (motor, battery, inverter, etc.,)
- Electric consumption & Fuel economy.

Cooling System



Motor



Battery System

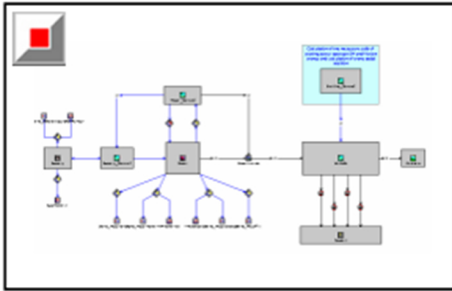


Drivetrain Control System

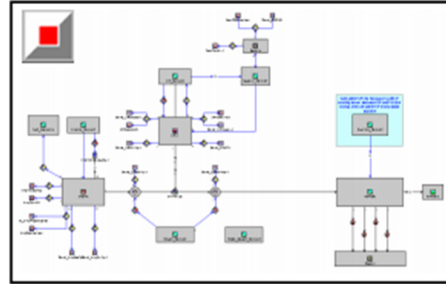
EV & HEV Simulation Technology

- Integrated model based system simulation and calibration of various system.

Battery EV



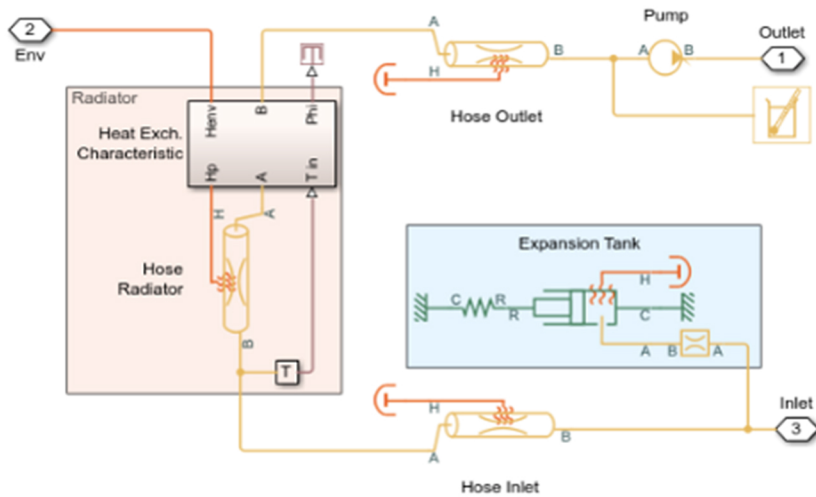
Parallel HEV



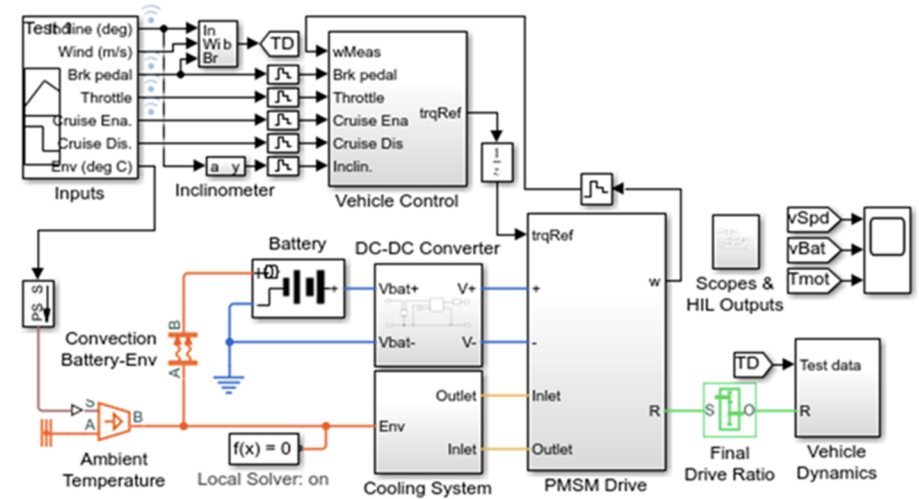
Concept Design

- Model setup and validation
- Potential determination
- Component investigations
- Concept layout
- Periphery design

Cooling System Subsystem



Vehicle Energy Management Simulation

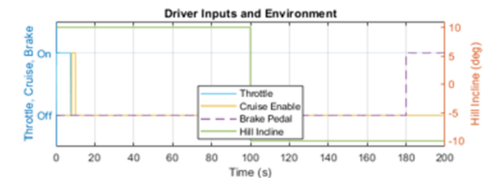
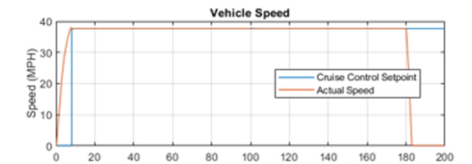


System Function Development

- Continuous model adjustment
- Choice of components
- Function development
- First desk calibration
- MIL/SIL tests
- Robustness testing

Vehicle/PT Calibration

- Continuous model adjustment
- Trouble shooting
- HIL tests
- Model based calibration
- Extrapolation of key boundary conditions (altitude, climate)
- In addition to the basic vehicle fuel economy and performance predictions, extensive studies have been made for the control of driveline model's fidelity



DEP'S Capabilities:

- House for Complete MBSE solution.
- Detailed design and simulations for peripheral systems.
- Component level system engineering.

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