

ROBUST ENGINEERING DESIGN EVIDENCE IN EV THERMAL SYSTEMS

Customer Challenges

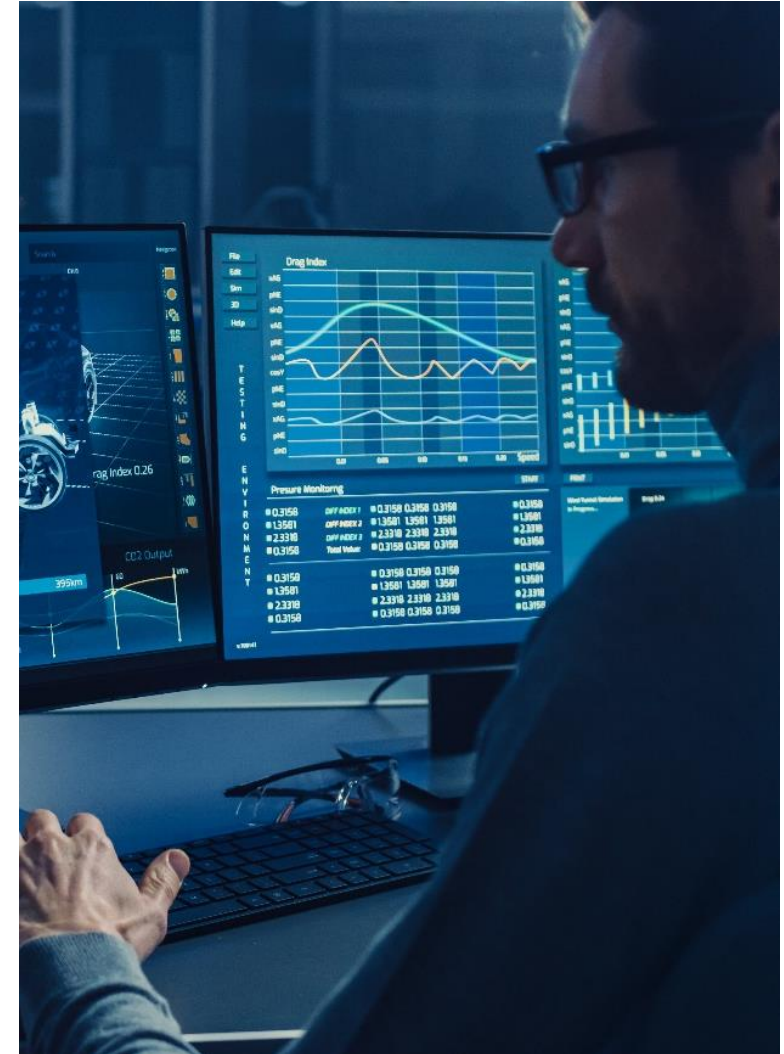
Our client is a California-based American autonomous car startup. They are building a fully electric fleet of vehicles for the Robo-taxi market.

They faced Vehicle Thermal Management System optimization issues when building EV systems. They faced significant hurdles in selecting the optimal architecture and design of the cooling system for EV subsystems and cabin systems.

Additionally, before the detailed design phase of the Product Development lifecycle, they needed to evaluate performance characteristics.

Scope

- Partner in progressing design by generating the engineering evidence through 1 D analysis methods.
- Thermal System architecture design, selection & optimization using GT-Suite software.



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Approach

Tata Elxsi worked closely with the customer to fully comprehend the design requirements, then applied its years of experience in Thermal Management systems to develop model-based 1D simulation approaches.

For a thorough vehicle analysis, a calibrated 1D model of EV system components, cooling system components, and HVAC system components were developed

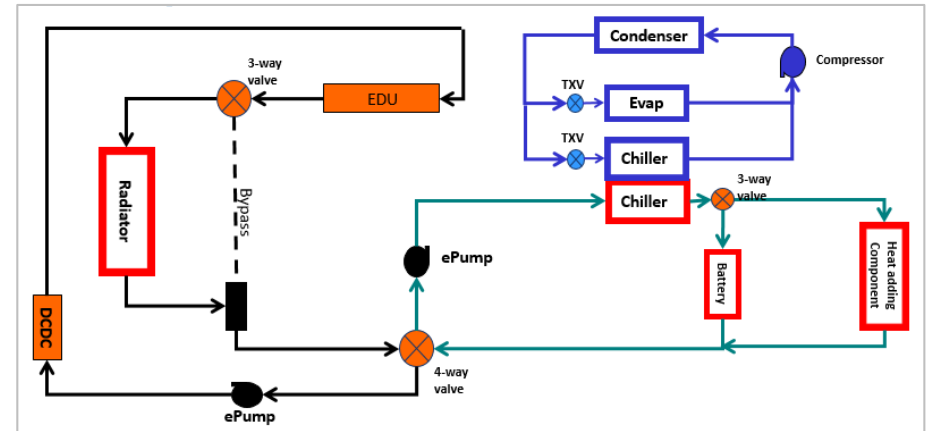
Select an appropriate drive cycle to simulate all relevant systems and evaluate the entire thermal management system

Modify and evaluate several thermal management system architectures to select the most efficient solution

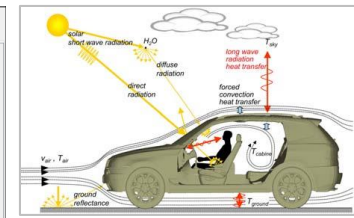
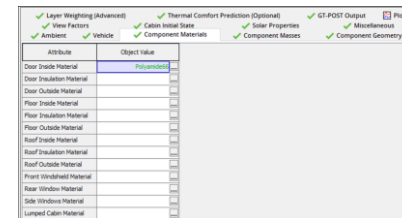
To define control logic, generate component performance in the system

Impact

- As a measure of effective cooling, the coolant temperature to the Battery and Motor systems is less than 30°C and 60°C, respectively
- In a short span of time, evaluate the performance
- Changes made late in the design cycle were kept to a minimum



Cabin



Pump

