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Implementing J1939 in vehicle design

Mentor's Capital suite of tools is suitable to design the electrical and electronic system of vehicles from the E/E architecture definition.

Most of the commercial vehicles are equipped with CAN networks running J1939 protocol stacks (Photo: Mentor)

Hans-Juergen Mantsch presents in his article "Implementing J1939 in vehicle design" the Capital suite of tools by Mentor. He summarizes: "The tool set features built-in data coherency between the electrical design and implementation. This digital continuity fosters multi-domain and multi-disciplinary collaboration to reduce errors and improve design cycle times. Additionally, Capital enables rapid iterations to explore and evaluate different implementation options directly within the design environment with metrics to understand the technical and financial costs of implementing proposed changes.

Capital has now extended to integrate network and electrical system design. Capital Systems Networks expands the synthesis-driven Capital paradigm into network design. This enables engineers to reuse existing network design data to create a network dictionary such as for the J1939 specifications. Network design data can be directly implemented in the functional design. Then, a validated network design output can be synthesized from the electrical system architecture. Finally, teams can generate outputs to enable OEM and sup- plier collaboration, reporting, testing, simulation, and for further optimization of the design in downstream flows.

The use of Capital tools for J1939 network design removes the manual file exchange and copy and paste tasks from system design for off-highway and commercial vehicles. Data consistency within the design flow assures a correct by-construction design methodology. Engineers can rapidly assess the impact of proposed changes across the entire platform, reducing the risk of unknown consequences to the system design. Design data is stored in a database for re-use on future platforms, and downstream tools, removing repetitive and error prone tasks throughout the flow. Moreover, an integrated electrical, functional, and network design flow produces more accurate designs while increasing the efficiency of engineers for both near- and far-term projects."

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