

ENERGY TECHNOLOGY

APPLICATION EXAMPLE

## Control electronics for a high-voltage direct-current transmission system

For one of its customers in the power industry, HEITEC developed and produced a complete solution for the control system for HVDC (high-voltage direct-current) transmission systems that controls Power Modules centrally via fiber optic cables.

A system for use in process control requires high performance, real-time capabilities, data throughput, fail-safe operation, and robust thermal features, all of which were incorporated into the design of all system elements from the very beginning. Aspects such as the cost-optimized production of the complete solution and a long service life to protect the investment were also taken into account.

The development goals included extremely high computing power, parametrizable open-loop and closed-loop control hardware, and the simultaneous operability of a large number of Power Modules.

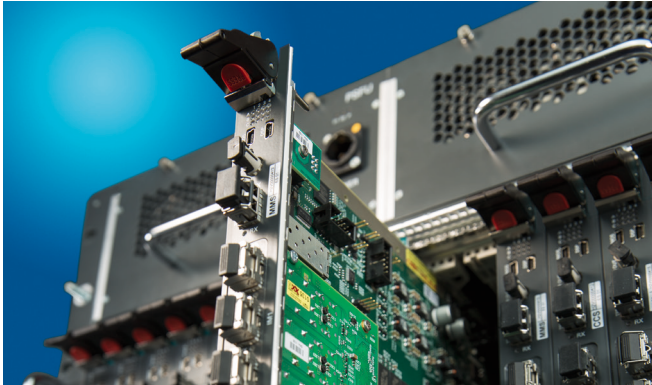
The project involved several challenges, one of which was to guarantee complete signal integrity at all times while maintaining a high data transfer rate. Large amounts of heat are generated in the process that the system must

dissipate. An innovative ventilation concept, verified and optimized through comprehensive thermal simulations, was able to maintain a virtually ideal, uniform distribution of flow velocity per slot even after the failure of one fan.

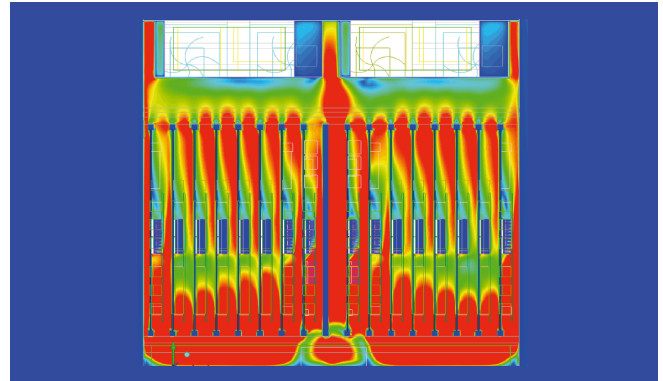
HEITEC developed the electronics, housing concept, and highly effective EMC shielding solution all under one roof, permitting a cost-effective implementation of the project within the target time period. HEITEC was also able to design and manufacture the associated, highly complex electronic assemblies in house.

This unique combination of hardware, software, electronics, mechanics, internal synergies, and expertise guarantees the customer quick marketability. Furthermore, by considering potential follow-up costs, implementation of the desired solution is guaranteed to be technologically advanced, high-quality, and cost-efficient. The comprehensive HEITEC services also include validation, testing, (re)certifications, and longevity of supply guarantees.

## Highly available system architecture



Electronic assemblies with customer-specific front panels and injector/extractor handle type IVs



Simulation of flow velocity when the second fan from the right fails

## Technical Summary

- › Subrack based on HeiPac Vario components (e.g. horizontal rails) and customer-specific components
- › D x W x H: 450 mm x 19" x 10U
- › System-integrated EMC solution
- › 2 redundant fan tray modules, each with 2 axial fans, 12 V DC, and 1000 W power supply, 85 to 265 V AC
- › Customer-specific backplane (passive PCB) with differential signal transmission of 5 Gbit/s
- › High-performance boards (concept, design, production, and testing)

## Customer Benefits

- › Specifications and concept design prepared together with the customer
- › Development of complete system comprising subrack and electronics boards
- › Innovative ventilation concept
- › Scalable, redundant system
- › Prototype development and production from a single source
- › Type testing and certification
- › Preparation of all documentation (specifications, technical documentation, user manual)
- › Logistics concept adapted to customer requirements (e.g. long-term availability)

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