IN-TECH GMBH
INNOVATING AUTOMOTIVE ENGINEERING TEST SYSTEMS WITH SOLIDWORKS ELECTROMECHANICAL SOLUTIONS
Case Study

in-tech relied on SOLIDWORKS mechanical, electrical, and electronic design tools to quickly redesign its orangeSwitch automated switching system for automotive testing as a modular, standard product, improving product performance and appearance while reducing delivery lead times.

Challenge:
Redesign the orangeSwitch automated switching system to make the design more modular, cut delivery lead times, and enable automotive customers to automate switching between testing of electronic control units (ECUs) to validate them more efficiently and provide a more efficient test bench for automotive ECU-controlled systems.

Solution:
Add integrated SOLIDWORKS PCB electronic design and SOLIDWORKS Electrical design solutions to its existing SOLIDWORKS mechanical design installation.

Results:
- Cut delivery lead times by 66 percent
- Developed orangeSwitch system without prototypes
- Eliminated design errors and related support issues
- Increased sales and profit margins

in-tech GmbH is an innovative engineering company that focuses on the development of electronic systems that support digitalization, automation, and development for the automotive, industrial, and transportation sectors. With offices in Germany, Austria, the United States, Mexico, China, the Czech Republic, the United Kingdom, and Romania, the company offers a comprehensive product and service portfolio. Founded in 2002, in-tech has steadily grown and now employs more than 1,500 highly qualified specialists working at 17 locations in eight countries.

The company's products include a line of electronic systems that make testing of automotive systems more efficient, accurate, and reliable. For example, the orangeSwitch automated switching system automates switching between tests of electronic control units (ECUs) to provide a more efficient test bench for automotive ECU-controlled systems. The orangeSwitch enables automated switching from one real-time virtual simulation of an ECU-controlled system to another without manual intervention, allowing for testing during off-hours while supporting all common testing-automation frameworks.

Because the original orangeSwitch was developed as a custom product for each customer case, in-tech engineers used to develop each switch separately, which led to what Lead Engineer Julian Renz refers to as the "abomination." "The old version of the orangeSwitch had many disadvantages," Renz explains. "It had a plastic enclosure and required prototyping the breadboard, as well as soldering and wiring the unit by hand. This led to a tedious, manual assembly process that was prone to error and difficult to troubleshoot and repair. To save time and money, improve product quality and appearance, and increase customer appreciation and satisfaction, we decided to completely redesign the orangeSwitch as a standard product

with a modular design requiring little customization, for which we needed better-integrated, automated design tools."

in-tech's R&D group began using SOLIDWORKS® 3D mechanical design software in 2014 and recommended the software to the orangeSwitch redesign team. However, the team also needed electrical and electronic design tools to create the electrical systems, schematics, and printed circuit board required for the redesign.

"Fortunately, our offices are in the same complex as our SOLIDWORKS reseller, SolidPro," Renz recalls. "After we acquired SOLIDWORKS mechanical design software in 2015, we added SOLIDWORKS Electrical design software in 2016 and the SOLIDWORKS PCB electronic design software in 2017, following SolidPro events on these solutions, because they are easy to use, integrated with SOLIDWORKS mechanical design, and provide the capabilities that we needed to complete our orangeSwitch redesign. Both solutions became available just at the right time that we needed them to facilitate orangeSwitch development."

INTEGRATING ELECTROMECHANICAL MODULAR DESIGN

With integrated SOLIDWORKS mechanical, electrical, and electronic design tools, in-tech quickly redesigned the orangeSwitch as a modular, standard product, with configuring the cable harness as the only item requiring customer-specific customization. The orangeSwitch redesign team created the product circuit board with SOLIDWORKS PCB, the electrical schematics and cable harnessing in SOLIDWORKS Electrical, and the mechanical housing with SOLIDWORKS CAD.

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>
> —Julian Renz, Lead Engineer

"Because SOLIDWORKS mechanical, electrical, and electronic design tools are integrated, we completed the design without having to make a prototype and with just a single revision," Renz recounts. "In particular, we valued the comprehensive design rules and online design routing check [DRC] in SOLIDWORKS PCB and the simplified yet informative schematics diagrams created in SOLIDWORKS Electrical software."

MINIMIZING CUSTOMIZATION SHORTENS DELIVERY LEAD TIMES

With the integrated SOLIDWORKS electromechanical development system, in-tech was able to more effectively employ the modular approach to design that minimized the amount of customization required on the orangeSwitch, reducing delivery times. "Shortening delivery times was a primary goal in redesigning the orangeSwitch, and the SOLIDWORKS solutions enabled us to more easily achieve that goal," Renz stresses.

"It used to take roughly six to eight weeks to customize the switch prior to the redesign," Renz continues. "With the SOLIDWORKS-enabled orangeSwitch redesign and its dramatic reduction in customization requirements, we can deliver the switch in two weeks."

INCREASING SALES AND PROFIT MARGINS

The upshots of the orangeSwitch redesign and subsequent market launch are a better product, increased sales, and improved profit margins. "Using SOLIDWORKS electromechanical solutions to redesign the orangeSwitch has improved the overall look and performance of the product, which helps us make a more professional impression," Renz notes.

"We are fortunate to have some very faithful customers in a very limited market in terms of volume," Renz continues. "With the orangeSwitch redesign, we've been able to eliminate the design errors and support issues that we experienced with the former version, providing our customers with a higher quality product while simultaneously growing sales and profit margins—a win for us and a win for our customers."

Using integrated SOLIDWORKS electromechanical design tools, in-tech engineers completed PCB design and routed cables and harnesses from within a single design environment, speeding development while simultaneously improving product quality.

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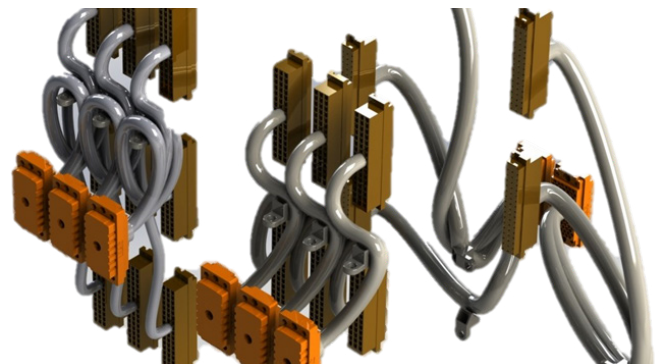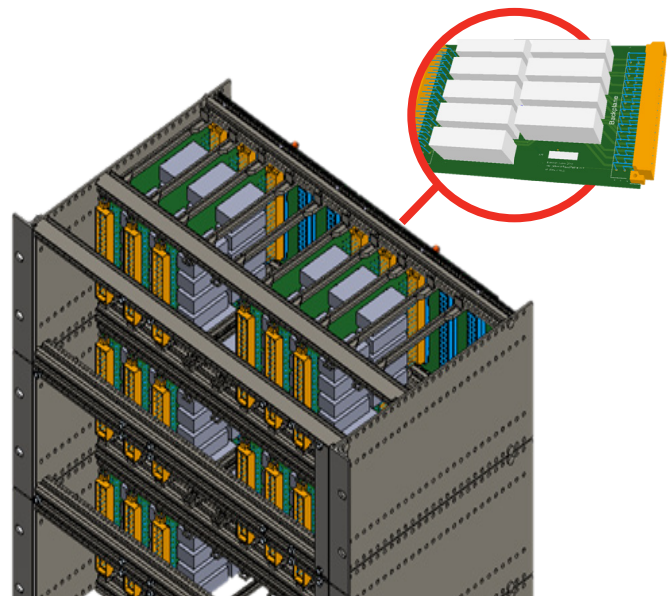
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