

Altium enabling next-generation electronics design

CSEM

The Centre Suisse d'Electronique et de Microtechnique uses Altium Designer to bridge the E-CAD M-CAD divide.



The need

Consumers carry electronics with them as a daily habit. Whether it is a mobile phone, a portable computer or even a simple wristwatch, most people are equipped with some sort of electronic device. But what if consumers could actually wear electronics, and have it incorporated into their clothing? The possibilities are enormous. Electronics in textiles hold great potential for several industries, with everything from communications to medical organizations weaving functionality into clothing.

Leading the field of electronic textiles for the medical industry is the BIOTEX project. This ambitious project is co-ordinated by one of Switzerland's leading research centres, the Centre Suisse d'Electronique et de Microtechnique (CSEM). It aims to develop the world's first electronic textile sensors to measure and analyze biochemical and physiological data, which will then help monitor a patient's health.

The challenge

As part of the BIOTEX project, CSEM needed to develop a portable electronic sensor interface. Due to the nature of the project, the portable interface had to be as small and as lightweight as possible, and remain noninvasive to the patient. The challenge for the CSEM electronics designers was to create the two interconnecting boards and small connector board within its compact mechanical case.

This challenge of integrating electronics with physical structures is faced by most electronics designers. Many find it a frustrating process. Design discrepancies can easily occur and without complete design transparency, both electronic and mechanical engineers usually experience an awkward and drawn-out revision process.

The solution

CSEM has taken advantage of Altium Designer's IGES format and STEP files import-export functions. These features allow for greater design

transparency between the mechanical and electrical engineering departments and greater collaboration between teams. The electrical department can now provide detailed 3D PCB data for the correct development of both mechanical and electrical designs. Altium Designer's 3D visualization engine lets engineers view the PCB in a realistic form. Engineers can, in real-time, flip or rotate the board and zoom in to view internal layers, and understand the physical parameters of the board much more easily.

Altium Designer also provides CSEM's electronics designers with a suite of intelligent and powerful routing features that allow greater board performance and optimize on existing routing space. Altium's Interactive Routing feature integrates rules-driven, versatile interactive routing modes, predictive track placement and optimized connectivity to automate the routing process, raising electronics engineers to a whole new level of design. Designers now simply watch as the board routes itself with a 100% completion rate. And with the focus taken away from basic functionality, CSEM can design innovatively, ensuring its boards perform correctly and to their maximum capacity.

The results

The BIOTEX team was able to complete its portable electronic device in just six months. The significance is that the BIOTEX portable device is a unique design — the electronics needed to interface sensors did not previously exist on the market. Altium Designer also afforded CSEM greater design flow efficiencies. Because designers could collaborate effectively, the traditionally sequential process was broken down and both electronic and mechanical developers could work on their designs simultaneously.

In addition to greater departmental collaboration, CSEM was able to reduce the size of the boards. By taking advantage of Altium's intelligent, powerful routing capabilities, CSEM could easily capitalize on available board space and reach its project goals.

Altium Designer allowed us to develop a complex design comprised of several printed circuit boards without any errors. Because design revisions were completely avoided, we were able to focus on making sure our project delivered all its ambitious design objectives.

Jean Luprano

Project Co-ordinator, CSEM

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Product information

The BIOTEX project is a collaborative effort between several European Research Centres, universities and small-to-medium textile companies. The project aims to develop a biochemical sensing system that can be incorporated into textiles – the first of its kind to monitor bodily fluids via sensors distributed on a textile substrate. The sensor patches will be developed to measure different types of body fluids and biological entities around the body. The innovative sensors will have applications for patients in ambulance care, burns victims, in sports monitoring, isolated patients, or those who suffer from a chronic illness.

Customer information

Established in 1984, CSEM (Centre Suisse d'Electronique et de Microtechnique) is a private research and development centre specializing in microtechnology, nanotechnology, microelectronics, systems engineering and communications technologies. Its research has been the foundation for more than 25 start-up companies which are pioneering technologies as far-reaching as advanced imaging sensing devices to surface engineering. More than 340 highly-qualified employees from the most varied scientific and technical fields work for CSEM in offices located in Neuchâtel, Zurich, Basel, Alpnach and Landquart.

For more information, visit www.csem.ch

Altium's solutions implemented in the medical sector

About Altium

Altium Limited (ASX:ALU) provides world-leading unified design solutions that break down the barriers to innovation, and help organisations easily harness the latest devices and technologies, to create their next generation of electronic products.

Altium's solutions are unique because they unify the separate processes of electronics design, all within a single electronics design environment, working off a single data model, which links all the aspects of electronics product design into one process.

Founded in 1985, Altium has headquarters in Sydney, Australia, sales offices in the United States, Europe, Japan, China, and resellers in all other major markets. For more information, please visit www.altium.com

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