

Industrial machinery and heavy equipment

## Control Micro Systems

Engineering laser-based solutions with Solid Edge

### Product

Solid Edge

### Business challenges

Fulfill specific customer requirements with custom solutions

Develop innovative applications of laser technology

### Keys to success

Exceptional engineering expertise

State-of-the art application laboratory

Move to 3D design with Solid Edge

Extensive use of 3D model data throughout the company

Synchronous technology for new designs and modifications of existing designs

Photorealistic rendering and visualization

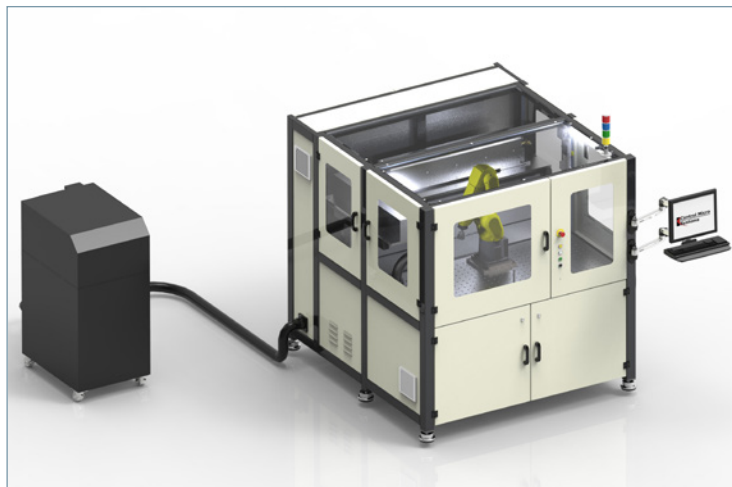
### Results

Excellent return on CAD investment

Completed design reviews in hours instead of weeks

New contract wins

Expedited customer coordination, review and approval



### Control Micro Systems uses 3D data throughout the product lifecycle

Founded in 1983 as an early innovator in software controls development, Control Micro Systems grew rapidly into being a supplier of complete industrial laser systems. The company built its reputation on providing industry-leading solutions for laser-based applications. This capability includes automated or robotic part handling along with vision and validation. Control Micro Systems has a large global installed base dealing with a wide variety of materials and applications from research and development (R&D) to high-volume manufacturing.

As the industrial applications of laser technology have grown, the company has enjoyed continuous growth and business success, even in challenging economic times.

At its headquarters in Orlando, Florida, the company has mechanical, electrical, and software engineering departments as well as a machine shop. A state-of-the-art applications laboratory staffed by experts in laser, optics and power technologies helps the company research and test laser solutions for drilling, cutting, welding, marking, etching, engraving, ablation, additive manufacturing and annealing processes on a wide range of materials.



Control Micro Systems products have won recognition for design excellence, including a recent award for a printed circuit board (PCB) marking system and another for a laser wire marking machine. The company serves customers throughout the world. "We are one of the few companies that are actually selling million-dollar systems to countries like China and India, instead of the other way around," says Art Almquist, mechanical engineering manager at Control Micro Systems.

#### **Adopting 3D engineering**

Until 2007, Control Micro Systems was performing all of its mechanical engineering work using 2D computer-aided design (CAD). At that time, the company sought to improve its development processes, and looked to 3D CAD to overcome some limitations of 2D-based design. Most importantly, the investment in 3D CAD would enable the company to deliver comprehensive and accurate design information for fabrication in the in-house machine shop.

In addition, 3D models would provide a superior focal point for design reviews, enabling all of the departments and disciplines in the company – electrical engineering, software engineering, manufacturing, project management, sales and field service – to examine the design in detail, identify issues and make suggestions for refinement. Furthermore, prospective customers could better understand proposed projects when presented with 3D models instead of 2D drawings. "We were tired of 2D CAD, and our customers couldn't understand what they were looking at," says Almquist.

After formal presentations from CAD vendors, the company evaluated the capabilities of several systems, and chose Solid Edge® software from product lifecycle management (PLM) specialist Siemens PLM Software. Some of the factors in the selection included favorable press and technical reviews of Solid Edge, as well as the fact that Siemens PLM Software also provided

the Parasolid® software modeling kernel used in Solid Edge and many competing systems. “Solid Edge had the best interoperability and a rich feature set,” says Almquist. “We feel that it’s a superior tool. Over the years we have hired engineers who were proficient with other systems, and after a few days they have all been happy to be working with Solid Edge.”

#### **Engineering solutions for any application**

Control Micro Systems engineers solutions to the specific needs of customers. In a typical cold sales call or at trade shows, prospects present a sample product and express their desire to inscribe it with a company logo or serial number.

Based on the materials and composition of the product, the experts in Control Micro Systems’ lab determine the best lasers to use and the power level required to accomplish the prospect’s objective. Upon return of an inscribed sample, the prospect may request a proposal for a system to accomplish the task efficiently and economically.

Control Micro Systems engineers then develop a proposal for a machine design. The solution may be a single machine, a machine with peripheral conveyors or robotics, or a complete turnkey system. Using Solid Edge, the engineers build a detailed 3D CAD assembly that includes the machine, material handling components, robots, machine operators, ergonomic features and the customer’s product. The proposal may also include animations that depict the doors opening, the product moving in and out of the machine, and other aspects of the machine’s operation. With animated 3D models, customers can readily understand and assess the suitability of the solution before they make a decision to invest.

Once the customer approves the proposed project, Control Micro Systems conducts an internal design review and uses Solid Edge to finalize the details of each component, then creates drawings or CAD models for all required manufacturing processes, including sheet metal fabrication, plastics molding and machining.

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Art Almquist  
Mechanical Engineering  
Manager  
Control Micro Systems

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Art Almquist  
Mechanical Engineering Manager  
Control Micro Systems

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Solid Edge includes many options for output of 3D data, and supporting tools enable easy sharing with customers to facilitate collaboration and expedite review and approval. Control Micro Systems designers use Solid Edge to create 3D PDF files or JT™ data format files for customers, who can use no-cost tools such as the Solid Edge viewer or JT2Go for viewing and markup.

#### **Accelerating design with synchronous technology**

Synchronous technology is one of the most valued aspects of Solid Edge at Control Micro Systems. “Using synchronous modeling is so much more user-friendly and expedient, and well-suited for our mechanical engineering design needs,” Almquist says. The direct modeling capabilities made possible by synchronous technology are especially useful when working with component models from suppliers, or with product models provided by customers. Because accuracy is so critical with laser processing, it is essential to have precise 3D models to integrate

customers’ products into laser-based machinery. With synchronous technology, Control Micro Systems’ engineers can readily add intelligence to models, move surfaces and add holes and features as necessary.

Today, synchronous modeling is a standard tool in the company’s design process, but Almquist was reluctant to use it when it was first introduced. “It’s just human nature to be fond of what you are familiar with,” Almquist says. “Once you go through the initial learning curve with synchronous technology, you realize that it’s the best way to design. It’s so easy to work with. Now I sometimes wince when I have to go back to the old way.”

#### **Supporting electrical and software design**

Because Control Micro Systems’ core competence is in turnkey systems, electrical and software design are critical. While these disciplines use other systems for their primary work, their work is streamlined by the availability of the Solid Edge models and their use of the Solid Edge viewer. Electrical engineers can reference the Solid Edge models to allocate components and determine the size of electrical panels. They provide the mechanical designers with 2D CAD drawings of the electrical panels, from which the mechanical team creates 3D models. Models of electrical components are then integrated with the machine model, enabling the team to check fit and interference and add production details such as holes and fasteners.

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Software designers at Control Micro Systems also benefit from Solid Edge, especially its integration with KeyShot® 3D rendering software, which includes diverse ray-trace rendering and illumination tools. Software engineers typically include photorealistic images of the company's machines and fixtures, and accurately illustrate sequences of operations in software manuals, troubleshooting guides and other supporting documentation that make machine operation much more user-friendly.

### **Supporting manufacturing and procurement**

Control Micro Systems manufactures about 80 percent of their components in their machine shop, which includes numerical control (NC) machining centers, manual mills and other machines. The company outsources many large frame components that exceed the size capacity of their in-house machines, as well as large welded plate components and sheet metal doors and panels. Many suppliers use 3D CAD data directly to manufacture components, and in such cases Solid Edge is used to create data in neutral exchange formats. For sheet metal parts, Control Micro Systems engineers use Solid Edge to quickly flatten models, then create 2D drawings in DWG format to support their procurement.

### **Supporting assembly, service and maintenance**

Assembly drawings, exploded views and complete bills of materials (BOMs) are easily and quickly produced using Solid Edge. The drawings and models are used in succinct and accurate packages of documentation for the assembly floor. Once the machine is assembled, customers can inspect the machine as it processes their product in Control Micro Systems' facility. The company also provides customers with operation and maintenance manuals that include the 3D CAD data.

Control Micro Systems supports and services its products around the world, 24 hours a day, seven days a week. The company's field service team has access to complete BOM data, spare parts information, repair manuals and schematic diagrams, all created using Solid Edge. All legacy design data is archived on the company's network for remote access by the service team using mobile devices.

Designing in 3D with Solid Edge also assists Control Micro Systems in the delivery, commissioning and installation of its systems. "Using the mass properties tools in Solid Edge, you can easily calculate how much the machine weighs when it's time to ship it," says Almquist. "You can find the center of gravity, which helps determine where to hang the tool balancers so the machine won't tilt."

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### Solutions/Services

Solid Edge  
[www.siemens.com/solidedge](http://www.siemens.com/solidedge)

### Customer's primary business

Control Micro Systems is a supplier of complete industrial laser systems. The company built its reputation on providing industry-leading solutions for laser-based applications.  
[www.cmslaser.com](http://www.cmslaser.com)

### Customer location

Orlando, Florida  
United States

### Well-positioned for the future

The use of laser processing systems continues to grow, and Control Micro Systems is well-positioned to provide solutions that help improve productivity and profitability in a burgeoning variety of applications.

These include pill drilling, where the accuracy of lasers is unmatched for penetrating protective coatings of medications so that they are released in a metered fashion when ingested. The company is also working with a large aerospace manufacturer to

develop an advanced material for lowering jet engine noise. As the technology develops in many directions, Control Micro Systems can rely on the advanced 3D design technology of Solid Edge to respond quickly to opportunities. "Solid Edge is a valuable tool for every aspect of the company's business," says Almquist. "Sales, manufacturing, commissioning, maintenance, spare parts and others. We have had an excellent return on investment."

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