



The Client

Company: .decimal Headquarters: Sanford, Florida, USA Industry: Medical Devices

The Objective

Automate the design and machining of patient-specific radiation therapy devices to save time, maximize resource utilization, improve accuracy, and more consistently achieve the firm's 24-hour-turnaround guarantee.

The Solution

Implement CAMWorks machining software and leverage the open Application Programming Interfaces (APIs) of both CAMWorks machining and SOLIDWORKS design software to automate the design and machining of radiation therapy devices based on patient-specific data.

The Benefits

- Automated 85 to 90 percent of product design and machining.
- Achieved 99.6% on-time delivery within 24 hours.
- Saved a couple hundred man-hours in CNC programming time annually.



A CAMWorks Case Study Saving Lives with 24-Hour Turnarounds

Automating Patient-Specific Radiation Therapy Device Production with CAMWorks

.decimal[®], LLC (pronounced dot-decimal) is a leading manufacturer of patient-specific devices for the radiation therapy community. The company, which takes its name from the acronym for Digitally Enhanced Compensation/Intensity Modulation with Alloys, has provided radiation therapy products to hospitals and cancer centers across the United States to aid in the treatment of cancer for over two decades. .decimal's products are used with all types of radiation therapy treatments. Each product is unique to an individual patient's anatomy, providing maximum clinical benefits, and needs to be designed and machined within extremely tight development and production windows.

Fast turnarounds are critical—.decimal guarantees delivery of custom-designed products within 24 hours of receipt of patient data – not only to the manufacturer's business but also for delivering cancer treatments as expeditiously as possible. As the company's business has grown, so has its product development and machining challenges, according to Chief Engineer Kevin Erhart. "As our business continued to expand, so did the need for an automated approach for converting patient-specific anatomical data into accurate product designs and related tool paths, with little or no operator intervention," Erhart explains. "In short, we needed to automate our processes to deliver a higher volume of products within 24 hours without sacrificing accuracy or adding resources."

The medical device manufacturer initially used SurfCAM® machining software to support production on its Mazak® 3-axis and 5-axis CNC mills, but became dissatisfied with the amount of development work required to achieve the levels of automation that the company desired. "The SurfCAM solution didn't work out well because it was tied to a very specific build and wasn't applicable to many of our products," Erhart recalls. "That's why we continued looking for an automated machining solution that would meet our needs."

Erhart then saw a demo of CAMWorks® machining software. "I saw how much better the CAMWorks solution is and how integrated the software is with SOLIDWORKS," Erhart recounts. "However, what really prompted us to make the move to CAMWorks was the potential to leverage its open API (application programming interface) and intelligent database—in conjunction with the SOLIDWORKS API—to completely automate design and production."



Automation Drives Fast Turnaround

Utilizing the open CAMWorks and SOLIDWORKS APIs, .decimal has developed a fully automated design and machining process that uses patient-specific anatomical data to automatically create 3D solid models, quickly generate tool paths, and then schedule machining work without any human interaction with the system. This innovative, automated approach now handles 85 to 90 percent of the company's production—the remainder are special projects—and has enabled the medical device manufacturer to achieve on-time delivery within 24 hours 99.6 percent of the time.

"Until we implemented CAMWorks and automated the process, we needed at least three full-time people to create models and generate tool paths," Erhart notes. "Now, with the automation that we've been able to achieve, we're processing 75 custom, one-off products in brass, aluminum, wax, or plastic on an average day, without any human intervention. We've repurposed these employees to perform other work, including other continuous improvement projects, which have helped to grow and improve our business in many ways. In addition to automating design and manufacturing of 85 to 90 percent of our products, the move to CAMWorks has improved our ability to extend tool life."

Efficiencies Support Increased Throughput, Research & Development

The efficiencies that .decimal has realized by using CAMWorks and SOLIDWORKS software to automate product design and machining allow the company to support greater throughput as well as increase research and development. "With the advent of proton-based therapies, the radiation therapy market is growing dramatically," Erhart stresses. "We've seen a twenty-five percent increase in the number of proton cancer treatment centers in recent years, which results in more potential customers and a higher volume of products to deliver.

"The intelligent knowledge base in CAMWorks software lets us achieve the higher levels of automation necessary to comfortably handle the growing throughput, so we have the time and resources available to boost Research and Development," Erhart continues. "In addition to looking for ways to operate our business more efficiently, we are committed to winning the fight against cancer. That's why we continue to sponsor industry research and partner with other companies to develop new, effective products to aid in the fight against cancer."

Less Chance for Human Error, Better Resource Utilization

The automation .decimal has achieved using CAMWorks and SOLIDWORKS solutions also provides greater control of design and

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production, reduces the probability for human errors creeping into the process, and maximizes the company's utilization of resources. "By automating design and production, we are saving a couple hundred man-hours annually in CNC programming time," Erhart says. "This is a significant achievement because we are dealing with a range of products, unique anatomical data for each patient, and different external shapes depending on the model and brand of radiation delivery machines used with our products.

"When a specific order comes in, the system selects the correct configuration for that job, automatically generates the tool path, and schedules production on the appropriate machine with the correct offset," Erhart adds. "Instead of the possibility of someone making a mistake dealing with all of this information, the system controls it all, so we realize greatly improved quality. With CAMWorks and SOLIDWORKS, we are making better use of our resources, automating production, and taking a step forward in supporting improved patient outcomes."



We partner with our customers in building world class products and creating associated solution delivery ecosystems to help bring market leadership. We develop engineering products, solutions and platforms across Aerospace and Defense, Automotive, Consumer Electronics, Software, Online, Industrial Manufacturing, Medical Devices, Networking & Telecom, O ce Automation, Semiconductor and Servers & Storage for our customers.

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