CUSTOMER SUCCESS STORY

Crystal Group Streamlines Product Design and Quality Processes with Simulation and Document Control Solutions

The Organization

Crystal Group is a rugged server manufacturer, systems integrator, and custom design and manufacturing services provider that is headquartered in Hiawatha, Iowa. The company serves the industrial and aerospace/military markets in over 36 countries. Its rugged computer solutions are used in a variety of harsh environments including the battlefield, mining, and oil and gas extraction.

The Challenge

Handling Product Design Concerns While Minimizing Rework

In its server business, Crystal Group found that as processor power increased, the waste heat in the server chassis also grew significantly. Although the firm developed a higher volume chassis in response, the servers still were not being cooled adequately. The firm encountered similar challenges related to stability. All of Crystal Group’s chassis are designed for environments with high levels of shock and vibration. As the complexity in circuit boards increased, however, it became more difficult to stabilize them.

Both of these issues generated time-consuming testing cycles and costly rework for the company. Crystal Group’s engineering team only discovered the cooling issues after the metal for the server chassis had been cut and assembled. As a result, they had to design new components to remedy the problem. With regard to the stability issues, the team conducted numerous testing cycles to find viable solutions.

In addition to these product design concerns, the company also struggled with document control. The engineering team used AutoCAD, Autodesk Inventor and Windows File System, but had no configuration control of files. When files could not be found, they would design new parts that were almost identical to existing ones. “Without a solution that enabled employees to search for existing parts, we were unable to design dual-use parts which would have generated cost-savings for the firm,” said Chad Hutchinson, Director of Engineering.

The Solution

Fully Integrated Design, Simulation, and Data Management Solutions

To address the cooling and stability issues, Crystal Group decided to investigate software-based simulation tools. “We wanted to model air flow in the server chassis using a computational fluid dynamics tool. This would allow us to test different simulations before committing to designs and cutting metal,” said Hutchinson. “For the stability concerns, we needed a finite element analysis tool that would show how servers would perform under stress. This information would eliminate the impact of multiple rework cycles.”

As a solution to the design and document control challenges, Crystal Group was leaning toward Autodesk products. Although many computational fluid dynamics (CFD) and finite element analysis (FEA) tools were available, the team preferred solutions that would integrate seamlessly with the Autodesk suite. They contacted IMAGiNiT Technologies to learn more about the Autodesk solutions. Crystal Group decided to move forward with implementation of Autodesk Vault Professional, CFD, and Simulation Mechanical.

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Chad Hutchinson
Director of Engineering
Crystal Group
“The implementation went very smoothly. IMAGINiT was upfront about the cleanup work we needed to do prior to implementation. That made the process go more smoothly. The IMAGINiT team provided great assistance prior to and immediately after the implementation,” said Ed Epping, Senior Mechanical Designer. In addition, IMAGINiT provided training for Crystal Group’s Inventor and AutoCAD users.

The Results
Fewer Test Cycles, Better Document Control, and a New Revenue Source

Crystal Group is very pleased with its new Autodesk platform. The move has resulted in several important benefits:

- **Fewer test cycles mean significant cost and time savings.** The company’s CFD and FEA simulation capabilities have translated into fewer test cycles and more robust products. “Each time we avoid a test cycle for a product design, we save $4,000 and five weeks of rework in schedule time. It’s a considerable savings each year and the payback on our investment has been very fast,” said Hutchinson.

- **Crystal Group now offers CFD and FEA services.** Customers had been asking Crystal Group to provide CFD and FEA analysis services for existing products. Now the company is able to offer this as a new revenue-generating service.

- **Existing parts are easy to find, which means higher reuse rates.** It’s easy for Crystal Group’s employees to search for existing parts with Vault. As a result, they can reuse parts for new designs and adapt existing components for dual-use. Fewer unique parts reduce complexity, as well as design and manufacturing costs.

- **Better document control supports higher quality processes.** Since Crystal Group’s design files have been moved to Vault and the models have been put under control, all QA material now goes through engineering change processes. “This is important, because our company is AS9100C:2009 certified. This quality management standard requires document control and Vault has been the answer for us,” said Hutchinson.

- **The stage is set to move to a paperless system.** Looking ahead, Crystal Group would like to eliminate paper from its processes. Vault tools like DWG TrueView will enable employees to look at models on the manufacturing floor in a controlled way.

“Since I’ve been with Crystal Group, the support we’ve received from IMAGINiT has been outstanding. They are cost competitive and always extremely responsive. We selected IMAGINiT for our platform upgrade because we are confident that we’ll have the customer support that we need,” said Hutchinson.

About IMAGINiT Technologies

IMAGINiT Technologies, a Rand Worldwide Company, is the world’s largest provider of enterprise solutions to the engineering community, including the building, manufacturing, civil and mapping industries. With over 25 years of experience, and 45 offices throughout North America, we provide the expertise, training and support to help companies realize the full power of design technology, maximize ROI and gain competitive advantage.

As an Autodesk Platinum Partner, IMAGINiT is a leading provider of Autodesk software solutions and the largest North American Autodesk Authorized Training Center (ATC) partner.