

Heavy equipment

## Venture Products

Tractor manufacturer eliminates physical prototypes and cuts time-to-market

### Product

Solid Edge

### Business challenges

Compete with specialist providers

Produce products that need to last a lifetime

Protect investment in quality and reputation

Ensure parts fit in the manufacturing stage

Eliminate physical prototypes to speed time-to-market

### Keys to success

Change from 2D to 3D CAD technology

Find the best sheet metal design tool

Move from history-based modeling to synchronous technology

Simplify 2D to 3D conversion process

Bypass constraints in history-based design

Explore more design ideas faster

### Use of synchronous technology accelerates 2D to 3D migration

#### 2D to 3D to better 3D

Venture Products Inc. (Venture) must protect a long-standing investment to ensure the quality and the reputation of its Ventrac line of compact tractors and commercial grade attachments. If designed parts don't fit together in manufacturing, these high-level goals come under extra pressure.

Ventrac targets a wide variety of applications and markets, including golf course turf management, municipalities, schools, universities, snow and landscape contractors, hobby farmers, homeowners and estate owners. The competition comes from other tractor suppliers and multiple companies that focus and specialize within one or more of these applications.

"It's key to us to be able to design and build a quality product – something that will last for a lifetime," says Dan Swartz, product support manager at Venture. "Some CAD (computer-aided design) software we've used in the past has kind of hindered some of that. We invest a lot of time and money to make sure that quality's good. That's our biggest challenge from a marketing aspect – just making sure we're building a great product for the end user."

Venture used 2D AutoCAD® software from Autodesk for many years. With a power



*The new Ventrac 4500 tractor is used by landscapers, municipalities, churches, universities, golf courses, homeowners, parks, sport facilities, shopping malls, tree growers, rental yards, nurseries and airports.*

user in the 2D application, the company built a strong line of tractors and specialty attachments. But one issue continued to impact manufacturing time: parts didn't fit the equipment correctly or moving parts interfered with each other.

#### 2D to 3D

Like so many manufacturing companies around the world, Venture decided to move from 2D to 3D design. One of the company's go-to new product development experts continues to work in 2D; however, he is near retirement. "As a company, we do not want to handicap his creativity," says Swartz, adding, "But the

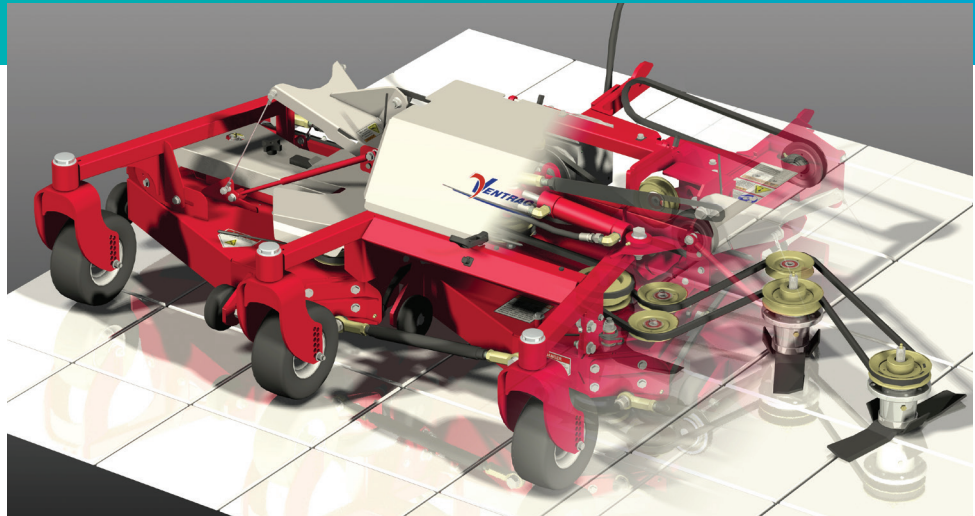
## Results

Parts fit together on first assembly, speeding time-to-market

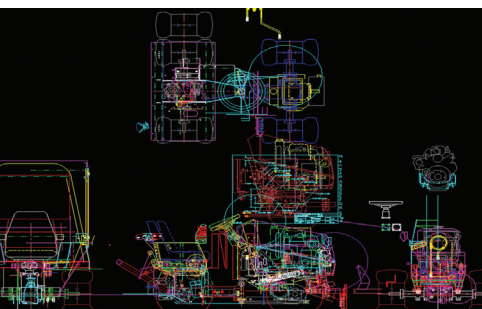
High-value legacy 2D designs fully leveraged

6 times faster conversion of 2D to 3D

6 times faster new design



*By converting designs to 3D, Ventrac catches moving part interferences and eliminates physical prototypes, getting to market much faster.*



*In its old 2D AutoCAD layouts, finding part interferences was impossible and manufacturing often had to build a dozen physical prototypes before it could send a product to market.*

negative issues with 2D design still needed to be addressed. That included parts not fitting. It was very difficult to see in the 2D view how parts fit together."

Other issues included having to create a large number of physical prototypes to get the design right and time-consuming design changes often stretching out for a year after production started.

Venture moved to 3D Solid Edge® software from Siemens Digital Industries Software in 2007, selecting it over SolidWorks® software. The primary reason for selecting Solid Edge was its sheet metal design advantages.

Venture could then take its large number of 2D designs and convert them to 3D using Solid Edge. This eliminated the delayed time-to-market caused by all the prototypes that had to be built to find the part interferences and fit issues during manufacturing.

The move to the 3D capabilities of Solid Edge also allowed Venture to produce high-quality manuals with easy-to-create isometric views to show how to adjust or assemble each product, instead of having to wait to take pictures of the manufactured unit.

### 3D to better 3D: the synchronous technology dividend

Not only did Venture benefit by migrating design creation from 2D to 3D design, but also from the powerful functionality of synchronous technology in 3D.

Soon after Venture moved from 2D design to 3D, Siemens Digital Industries Software developed synchronous technology. For Venture, use of the new technology greatly accelerated and eased the move from 2D to 3D. "There's nothing like synchronous technology," says Swartz. "I think CAD will be changed forever with the introduction of synchronous technology."

Synchronous technology combines the speed and flexibility of history-free CAD with the precision and automation of history-based 3D. Companies can design without pre-planning their use of dimensions and features to develop highly automated designs, while getting blazing-fast performance during edits.

Swartz notes, "For companies like Venture that want to move from 2D to 3D, the breakthrough is accelerated product development and slashed time-to-market.

"We can convert 2D designs to the more valued 3D with all the benefits, such as elimination of physical prototypes, which leads to faster time-to-market. For new 3D projects, we complete designs much faster than in the old history-tree process that most 3D CAD systems use."

Venture typically converts 2D parts to 3D six times faster using synchronous technology than the old history-based process. Swartz explains, "On a simple shield that covers a gear box on one of our lawnmowers, it would probably take me a minute to convert it to 3D using history-based CAD. With synchronous, I could do that in less than 10 seconds. With 8,000 parts already converted, that's a lot of time savings."

He notes that about the same productivity gain applies to brand-new design work as well: "We do a lot of AutoCAD conversions," says Swartz. "But we do new designs as well. I can do both just as quickly – six times faster than history-based design. There are no constraints. There are no handcuffs. Either way, synchronous technology just makes it so much easier."

Roscoe Lehman, an engineer at Venture, documented time savings on a large project: "We have a new project coming out that we converted from AutoCAD with synchronous technology. Using the history-tree environment to convert it may have taken 12 to 14 weeks. Using synchronous technology, it took eight weeks."

The savings are not just about conversion. "There's also the advantage of being able to edit imported data easier," says Swartz. "It's quicker and easier. It's more accurate. The very fact that you can take someone's file and modify it using synchronous technology makes it that much easier. We've downloaded many suppliers' parts that we needed to tweak or send back to them."

#### **Trying more ideas, quickly**

For Lehman, moving from a 2D system to Solid Edge was welcome news. Trained on Pro/Engineer® software from Parametric Technology Corporation, Lehman already knew well the major advantages of using 3D over 2D for design. "I remember thinking: 'If I just had 3D CAD, I could readily change the model, and then just click update and the draft would be done instantly.'"

*An image of the 4000 Series tractor, designed and rendered in Solid Edge. Ventrac easily converted its old 2D AutoCAD data into 3D Solid Edge data using synchronous technology.*



He notes, "Then Venture Products bought licenses of Solid Edge and that was a huge step forward. At that point, it was only history-based, but it was really nice to go back to a 3D CAD system. When synchronous technology was introduced in Solid Edge, that was even better. That meant we didn't have to spend time trying to figure out what surfaces the dimensions were tied to, and spend time trying to fully constrain sketches. Everything's really dynamic, and it's a lot quicker to complete design work using synchronous technology than with any other traditional CAD system."

"Using synchronous technology allows us to explore considerably more design ideas quickly, without having to go through and individually update each part. You can tie everything together so that you can change one part and all the other parts that are tied to it will automatically update. That allows us to go through many more design iterations quickly instead of updating everything individually."

The use of the technology positively impacts the company's processes and portfolio. "It allows us to improve our products, because you can make the parts fit

**"There's nothing like synchronous technology. I think CAD will be changed forever with the introduction of synchronous technology."**

Dan Swartz  
Product Support Manager  
Venture Products Inc.

## Solutions/Services

Solid Edge  
Solid Edge SP  
solidedge.siemens.com

## Customer's primary business

Venture Products designs and manufactures the Ventrac series of compact tractors and commercial grade attachments. The company utilizes the latest 3D CAD software, laser-cutting technology, robotic welding equipment, and an advanced powder paint system.  
www.ventrac.com

## Customer location

Orrville, Ohio  
United States

*"Using synchronous technology allows us to explore considerably more design ideas quickly, without having to go through and individually update each part."*

Roscoe Lehman  
Application engineer  
Venture Products Inc.

together so much better, quicker and easier," says Lehman. "You can make the holes line up with each other. And with the 'intelligence' that synchronous technology provides, you can change one face and all the other faces will move with it. It's very intuitive."

## Design management with Solid Edge SP

On top of its successful adoption of synchronous technology, Venture also implemented the Solid Edge SP design management solution to get control of its growing volumes of 3D product data and speed completion of its equipment design projects. Solid Edge SP is based on Microsoft® SharePoint® software.

Venture had been using standard Windows® software folders to manage its design data, a very labor-intensive file management process for even simple design changes. In many cases, making a change to a CAD model would be very quick, but the total amount of time spent moving files as well as processing and updating drawings was enormous.

"Early results of using Solid Edge SP indicate that Venture will experience significant gains in design efficiency, accuracy, communication with manufacturing and overall time-to-market," says Swartz.

He provided an example in which mounting holes needed to be added to a foot platform plate in order to attach a cab to the tractor. The changes needed to be reflected in three subassemblies. "Using the basic revision manager tool, it would take us more than an hour to make the revision, but with Solid Edge SP, we completed the changes to the parts and the subassemblies in 15 minutes," says

Swartz. "We'll always be making changes like this. Leveraged across multiple design projects, this capability will be huge."

According to Swartz, the company expects to realize significant benefits from its new way to manage complex design data. He explains, "Solid Edge SP has a lot to offer as we bring new products to market, including automating processes for engineering changes and integration with our ERP (enterprise resource planning) system, which is also based on SharePoint."



*Attachments designed for Ventrac tractors must fit perfectly.*

## Siemens Digital Industries Software

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