

## Valiant Machine & Tool Inc.

Customer Success Story

Autodesk® Inventor® Professional  
Autodesk® Algor® Simulation

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—Dominic Baulier  
Director of Research and  
Development  
Valiant Machine & Tool Inc.

# Innovation takes flight.

Valiant Machine & Tool Inc. makes a mark on the aerospace equipment industry with help from Autodesk® software.



### Project Summary

In 50 years of business, Valiant Machine & Tool Inc. has forged an ironclad reputation for out-innovating its competition. While the company traditionally has developed manufacturing products for automotive, construction, and forestry industries, Valiant began applying its creative engineering expertise to aerospace industry projects with impressive success. In recognition of this success, Boeing recognized Valiant as a "Supplier of the Year" for 2007 in the "Non-Production/Shared Services" category.

At the core of Valiant's innovative designs are Autodesk® Inventor® Professional software and Autodesk® Algor® Simulation software, which enable Valiant to more quickly assess whether a new idea is a dead end or a promising beginning. With help from Autodesk Inventor software and Autodesk Algor Simulation software, Valiant has been able to:

- Develop a groundbreaking portable cargo loader for Boeing
- Communicate novel ideas with animated 3D models, impressing customers
- Reduce errors and design time by conducting mechanical simulations in-house

### The Challenge

Valiant relies on Autodesk Inventor software to design a wide range of products, from powertrain manufacturing equipment for automotive original equipment manufacturers (OEMs) to aerospace tooling, assembly, and ground support equipment for aerospace manufacturers. Because Autodesk software is used heavily in the industries Valiant serves, Autodesk Inventor software was a natural choice. But more important to Valiant, the software's ease of use helps the company push the boundaries of innovation.

"Inventor is so intuitive. It lets us test different concepts very quickly," says Tom Stein, a mechanical and simulation research and development engineer at Valiant. "It definitely gives us a competitive advantage when we're developing something that's never been done before."

Valiant faced a challenge when Boeing asked the company to design ground support equipment for transporting parts required for assembly of a new aircraft. "Boeing needed a portable cargo loader that could be put on pallets and transported by a cargo freighter," explains Dominic Baulier, director of research and development at Valiant. "We had to make sure our design would not exceed a fixed number of pallets, the pallet's dimensions, and aircraft load requirements."

Autodesk®

# Valiant builds its aerospace business by innovating new equipment with help from Autodesk software.

## The Solution

Even though Valiant had to deliver files in a format other than Autodesk Inventor, the company decided to use the software to develop the cargo loader design. Valiant's design team determined that using Inventor provided sufficient advantages to justify the need to convert the model to the format used by Boeing.

"Using Autodesk Inventor software, we developed a digital prototype very quickly," notes Baulier. "Our proposal included an animated digital model that helped us demonstrate to Boeing how we'd already thought through the entire system. Inventor played a key role in helping us win the project."

## Handling Non-Native Data

After winning the project, Valiant simply built out and refined its concept model in Autodesk Inventor software. The team had no trouble working with non-native data, which was particularly important since Boeing uses a different CAD package. "It's very easy to import data sets from other common design formats into Inventor—and it saves time and reduces errors," says Andrew Pawelski, CAD Support at Valiant. "We used that Inventor functionality frequently on the Boeing project."

## Design, Test, Design

Valiant's portable cargo loader design called for an easy-to-assemble clevis pin construction. Valiant engineers had to make sure that the clevis pin connections holding the cargo loader's tubular truss structure together were strong enough and stresses appropriately dispersed. They also needed to minimize the structure's weight.

For this, Valiant turned to Autodesk Algor Simulation software, which offers a suite of mechanical simulation tools. "Our design called for eight telescopic hydraulic cylinders to lift 90,000

pounds each," says Stein. "Using Inventor, we were able to package three-section telescopic cylinders in place of four-section cylinders, increasing load capacity while reducing cost. In an application with demanding clearance and structural requirements, we used Inventor Professional and Algor to develop a design that spreads significant loads to the upper truss structure. As a result, we had confidence at early stages of the project that our targets were achievable."

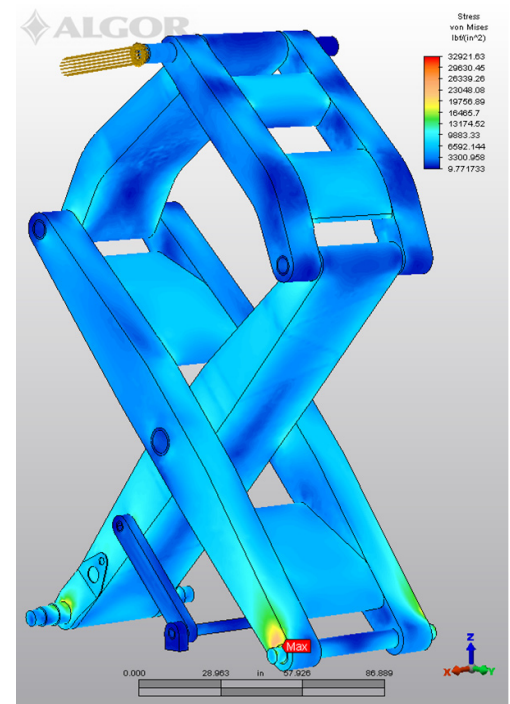
In addition, its confidence in the Algor structural analysis allowed Valiant to reduce the wall thickness of the 6 x 6-inch steel tubing comprising the truss structure to 3/16 inch. Once the team put the material into Inventor, they checked the model properties to calculate weight.

"We ended up below our weight requirement," says Stein. "Thanks to the interoperability between Inventor and Algor, we could make incremental changes and quickly assess whether the design would still hold up. In general, conducting analysis in-house with Algor Simulation software helps us reduce errors and design time. We don't have to wait for an expensive third party to test our designs for us."

## The Result

Valiant credits Autodesk Inventor software and Autodesk Algor Simulation software with helping it maintain its high levels of innovation. In fact, Valiant was the only company to define a plan to break the 114-foot loader into two operational 50-foot loaders, providing a key competitive advantage.

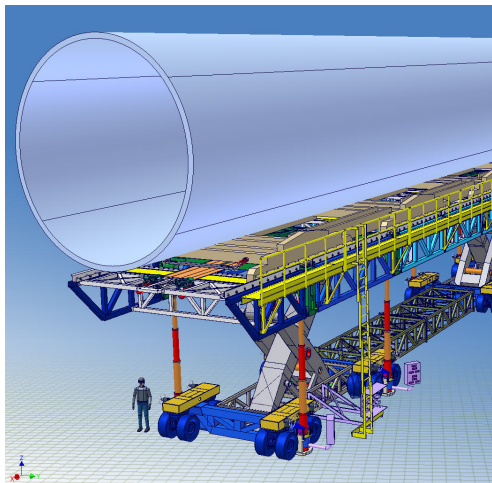
Valiant chief operating officer Marty Solcz sums up the value of Inventor this way: "With Inventor, we're able to be much more competitive. Our engineers can spend 80 percent of their mental energy innovating, and 20 percent deciding how to draw a line.



Inventor software frees us up to think about the next big idea. With the added talents of our people, that creates outstanding possibilities and potential!"

## For More Information

To find out how Autodesk and Digital Prototyping can help boost innovation, speed design times, and reduce errors, visit [www.autodesk.com/industrial-machinery](http://www.autodesk.com/industrial-machinery).



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