SIEMENS

Volgograd Manufacturing Company

Military vehicle firm uses Solid Edge to reduce design time by 90 percent

Product

Solid Edge

Business challenges

Upgrade Sprut-SD armored vehicle on a tight project schedule

Re-use model data

Reduce product development costs

Keys to success

Deploy Solid Edge

Develop a unified product design environment

Utilize collaboration tools

Employ CAE systems to reduce the number of physical tests

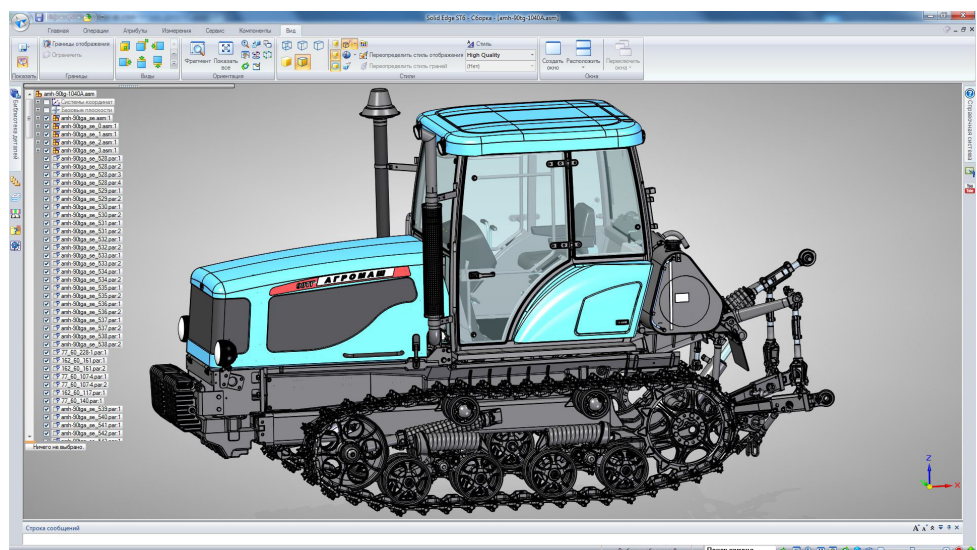Engage timely support from Siemens PLM Software

Results

Realized faster product development by reducing design time by about 90 percent

Completed upgrade project on time in spite of a tight schedule

Substantially reduced physical prototypes

Significantly increased design productivity

Notably improved CAD best practices

Siemens PLM Software technology enables Volgograd Manufacturing Company to meet demanding project deadlines

Upgrading the Sprut-SD self-propelled antitank gun
The Volgograd Manufacturing Company (VgTZ) is a Russian developer and manufacturer of advanced weaponry for airborne troops and other mobile forces.

The company executes projects based on state defense orders and produces military hardware for the Russian Army. For example, between the 1960s and 1990s, the company developed and manufactured

four generations of a combat vehicle for the airborne (BMD-1, 2, 3 and 4), and in the 1990s, it started work on the 2S25 Sprut-SD project. The 2S25-Sprut-SD is a self-propelled armored vehicle with an antitank gun used by the Russian Airborne Forces.

At the end of 2013, the Russian Ministry of Defense signed a contract with the company to perform a large-scale Sprut-SD gun upgrade. The upgrade included installation of advanced thermal imaging bombsights for the vehicle commander and gunner. Such devices increase the effective nighttime firing range by at least threefold. To achieve a higher level of commonality, the self-propelled gun unit had to be equipped

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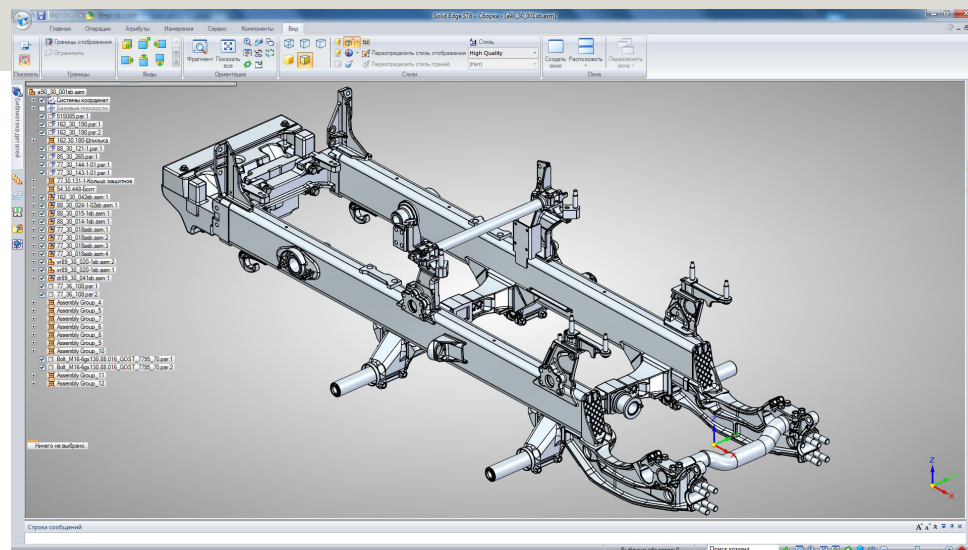
with the engine, transmission, suspension and chassis components similar to that of the BMP-4M armored infantry vehicle. The project also involved the Sprut-SD light tank, which included developing modular, detachable armor to significantly improve the survivability of its occupants.

Strong cooperative partnership from the onset
VgTZ is a part of The Concern Tractor Plant, which comprises a number of production facilities and design departments. To establish efficient collaboration between the business units, management decided to implement a unified product development system across the entire enterprise.

VgTZ chose Solid Edge® software from product lifecycle management (PLM) specialist Siemens PLM Software for its integrated development environment because it is a modern mechanical computer-aided design (CAD) system that would enable the company to readily work with assemblies containing a large number of components. Another important factor in the selection was the high quality of maintenance and extensive support provided by Siemens PLM Software.

The experts from VgTZ and Siemens PLM Software's Moscow office established an especially strong cooperative partnership

from the onset, which further strengthened during the course of deployment. To create efficient deployment processes, the specialists from Inform Standard Soft, the information technology (IT) division of Concern Tractor Plants, were also brought in. The company's primary users completed advanced Solid Edge training and earned certificates that enabled them to train other users. Management considered the technical support provided by Siemens PLM Software as instrumental in its ability to quickly adopt and extensively utilize the software's functionality. Management was especially impressed with the highly advanced, yet easy-to-use, design and engineering analysis tools of Solid Edge.

"As our design units develop the product," notes Maxim Meshcheryakov, director for regional development from Inform Standard Soft, "we test Solid Edge. We try the new capabilities issued in every release, and then we inform headquarters about the results. Siemens PLM Software's technology, already a leader in its domain, is continuously improving. The company's representatives always provide proactive as well as prompt consulting."

Fast track to results
The developers have used the extensive capabilities of Solid Edge to upgrade the Sprut-SD gun project and bring its combat and survival systems to a new level while

preserving the vehicle's exterior design. Substantial data re-use resulted in significantly reduced costs compared to developing the product from scratch.

Using Solid Edge, previously designed parts were readily converted to 3D and used comprehensively in subsequent modeling applications. In fact, every department within the Special Design Division handled the development of its assigned components, some consisting of numerous parts. Then all the components, such as electrical harnesses, fuel systems, chassis and weapons, were assembled.

One of the big advantages of Solid Edge is its capacity to address highly complex product designs, enabling engineers to effectively compose tens of thousands of unique parts and subassemblies via powerful concurrent engineering functionality. This is especially important for a highly iterative project like the Sprut-SD gun upgrade. Using Solid Edge, VgTZ assembles the entire product as a single file in a unified environment. Any changes made to the parts and subassemblies are propagated to the master assembly. As a result, errors are minimized or eliminated. More importantly, the master model serves a source for design documentation that helps to establish production.

A multi-stage, highly efficient process
The Sprut-SD upgrade project consists of several stages. First, a concept design in the form of a 3D model is developed. The model is used for project reviews, where they make required changes and troubleshoot problems. Meshcheryakov notes that the capabilities of Solid Edge enable modification and further project reviews to be conducted very quickly. Even when numerous designers are involved in the project, changes can be made expeditiously.

Meshcheryakov points out, "Using the concept design we make decisions about the product layout, and then proceed with detailed design. This stage can also be quite iterative. The collaboration capability of Solid Edge significantly reduces the time each iteration takes. When we used drawing boards, such a task took months or even years to complete; now it takes just two to three months. The number of errors is also reduced, and the designers work in an easy-to-use environment."

Typically, the next stage is a detailed project presentation to the Ministry of Defense, after which any requested changes are made. Making changes does not take much time because the associativity functionality of Solid Edge enables the master 3D model to be automatically updated throughout the process.

Then the prototypes of the updated Sprut-SD are made for field testing for the customer. These tests enable VgTZ to prove that the product meets the specifications, evaluate the manufacturability of certain components, and check its strength parameters. A report based on the test results is created and, if any changes are necessary, the cycle is repeated.

"With Solid Edge, it now takes us from six months to one year to design what took us five to 10 years to design in the past."

Maxim Meshcheryakov
Director for Regional Development
Inform Standard Soft
Concern Tractor Plants

Solutions/Services
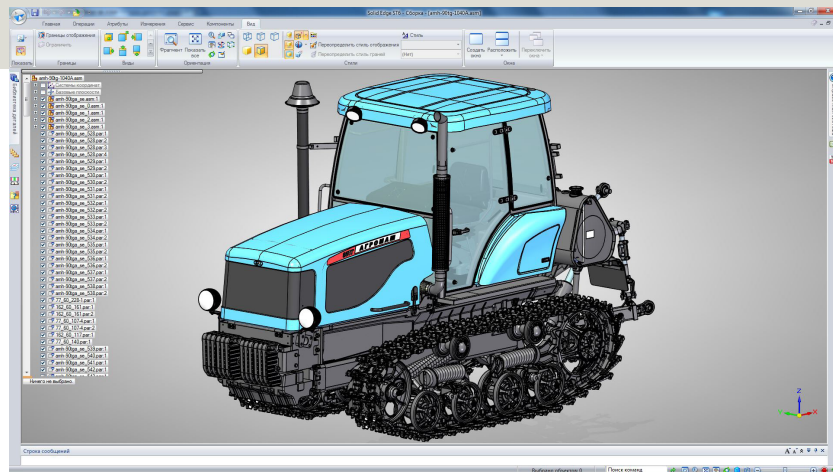Solid Edge
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Customer's primary business
The Volgograd Manufacturing Company is a Russian developer and manufacturer of advanced weaponry for airborne troops and other mobile forces. It is part of Concern Tractor Plants, a leading Russian machine builder. CTP is the country's largest tractor manufacturer, and one of the largest heavy mechanical engineering companies in the world.
www.vmk.tplants.com

Customer location
Volgograd
Russia

According to Meshcheryakov, with the entire project design developed in 3D using Solid Edge, the Sprut-SD project was successfully implemented in spite of a tight schedule.

Project design time reduced by 90 percent
The primary benefit of 3D modeling with Solid Edge for VgTZ is a faster product development process. In fact, using Solid Edge, VgTZ reduced project design time by approximately 90 percent. "With Solid Edge, it now takes us from six months to one year to design what took us five to 10 years to design in the past," says Meshcheryakov.

Solid Edge also helps VgTZ reduce costs by reducing the number of prototypes. Many aspects of the design can be analyzed virtually using the 3D model and the computer-aided engineering (CAE) tools of Solid Edge.

Ultimately, with advanced CAD functionality and collaboration technology from Siemens PLM Software, the company is designing highly technological products that meet requirements, and doing so faster, better and more cost-effectively.

"The collaboration capability of Solid Edge significantly reduces the time each iteration takes."

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Director for Regional Development
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Concern Tractor Plants

Siemens PLM Software

Americas	+1 314 264 8287
Europe	+44 (0) 1276 41 3200
Asia-Pacific	+852 2230 3308

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