

BAE SYSTEMS

Responding rapidly to military aircraft retrofits with SolidWorks



As the world's second-largest defense contractor, BAE Systems develops, delivers, and supports advanced defense, security, and aerospace systems in the air, on land, and at sea. With numerous operations in five home markets—Australia, Saudi Arabia, India, the United Kingdom, and the United States—the company serves customers in more than 100 countries.

BAE Systems™ Support Solutions operation in Crestview, Florida—part of the company's US subsidiary with facilities in 38 states—was an early adopter of 3D CAD technology in 1997. Until then, BAE Systems-Crestview worked with 2D drawings produced with AutoCAD® software. The company's engineers believed 3D technology could help them respond to defense contracts more quickly, control costs more effectively, and grow operations more efficiently, according to Engineering Manager Craig Yort.

"Our work involves modifications and retrofits to military aircraft," Yort explains. "In most cases, we need to model the skin and ribs of the aircraft and design our systems in a specific location. It is imperative that we run analysis on these areas to simulate the operating environment, either within or on the exterior of the aircraft. It's much easier to do this kind of work in 3D."

"We do not have to worry about the entire aircraft, but need to visualize and interrogate the area where our systems are mounted," Yort adds. "We need a CAD system that is easy to use, compatible with outside analysis contractors, and highly visual."

Challenge:

Respond rapidly to defense contract opportunities by demonstrating designs without the need for costly prototypes and by increasing its confidence in design viability.

Solution:

Implement the SolidWorks® mechanical design platform to leverage 3D visualization capabilities and SolidWorks eDrawings® software for design communication.

Results:

- Delivered aircraft safety system to field in less than three months
- Eliminated costly prototyping cycles
- Increased level of confidence in designs
- Supported tenfold growth in defense contracts

BAE Systems-Crestview selected the SolidWorks® 3D mechanical design system because it is easy to use, includes robust 3D visualization tools, and comes with the SolidWorks eDrawings® design communications package. The company has 14 licenses of SolidWorks software—and its number of defense contracts has grown from 10 per year to more than 100 annually.

Unprecedented field delivery of defensive system

Using SolidWorks, BAE Systems-Crestview has consistently reduced its response times, a key requirement to winning new contracts and growing its business. For example, the company recently designed a safety system for CH-47 helicopters and delivered the system directly to the US Army in Afghanistan within three months, a major accomplishment.

"It is basically unprecedented for an operation of our size to deliver a field system of this magnitude in just three months," Yort notes. "We were able to develop the design, run the stress analysis to assess the system's crashworthiness, and deploy the design with no detrimental effect on performance because we have become so fast and efficient using SolidWorks software. The system is flying in the fleet now, and we quickly added a second configuration for installation on a slightly different version of the CH-47."

Increasing confidence in system designs

Because the company can more fully investigate the viability of its designs in software, BAE Systems engineers can be more innovative, while maintaining a high level of confidence that concepts will perform as intended. Although the group subcontracts most of its stress, heavy vibration, dynamic motion, and computational flow dynamics (CFD) analysis work, BAE Systems engineers utilize SolidWorks visualization and collision-detection tools to gain a better understanding of their designs.

"We recently developed a system for mounting a satellite communications antenna on the escape hatch of a C-130 military transport that passed a barrage of airworthiness tests at Edwards Air Force Base," Yort points out. "We had a high confidence level that the concept would work because we had run motion simulations in SolidWorks. When we built the system, it functioned exactly as we had envisioned."

Demonstrating design concepts cost-effectively

Since implementing SolidWorks software, BAE Systems-Crestview has eliminated the costly prototyping cycles it used to conduct because the company can now validate design performance by visualizing 3D models and running design simulations. "We no longer need to build and test a bracket to determine that we need to beef it up. The stress analysis tells us that," Yort notes. "Now, 3D solid modeling and simulation have replaced our prototyping cycles."

The company also uses SolidWorks eDrawings files of its designs to show customers how a system will operate without having to build it. "It's faster and more cost-effective to send an eDrawing file directly to the military, particularly on a demonstration project," Yort says. "With SolidWorks, we have the tools required to be the rapid-response company that we need to be."

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Craig Yort
Engineering Manager



Using SolidWorks, BAE Systems-Crestview has eliminated costly prototyping cycles for projects such as the mounting of a satellite communications antenna on the C-130 escape hatch, shown here.

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