Reutech Radar Systems

RATCHETING UP RADAR RELIABILITY WITH SOLIDWORKS SIMULATION PREMIUM

RRS uses SolidWorks Simulation software to predict radar system performance, accelerate development, and control costs.

CHALLENGE:

Accelerate the development, reduce prototyping costs, and improve the quality of sophisticated radar systems.

SOLUTION:

Implement integrated SolidWorks Simulation and SolidWorks Flow Simulation software to analyze and optimize designs during the modeling stage.

RESULTS:

- Reduced time-to-completion by 50 percent
- Saved 30 to 60 percent in prototyping/testing costs
- Expanded product offering into new markets
- Increased profit margins

In an increasingly dangerous world, identifying and tracking objects in the air and on the ground requires radar surveillance. Whether a radar system is used for military and police operations, for border control, or for warning of a mining slope collapse, it involves a sophisticated blend of complex mechanical structures, high-precision electromechanical systems, and microwave/RF electronics. To meet the needs of the modern world, radar systems have to be reliable, effective, and accurate.

Radar provider to the South African National Defence Force, Reutech Radar Systems (RRS) is a worldwide leader in radar technology. As demand for sophisticated radar systems swells, so does the need to address new environmental challenges and diverse applications. RRS recently developed radar systems for the Norwegian Navy, the World Cup Soccer Final, and several open-pit mining operations. Responding effectively to ever-increasing technical requirements is critical to the company's success.

"Our customers' reliance on radar system dependability compels us to effectively manage the challenges of extreme environments," explains Chief Mechanical Engineer Carel Kriek. "We have to ensure that our products can function in both the extreme cold and the desert heat, from -40° C to 55° C, and can withstand the structural loads of severe storms and seismic conditions. To do that cost-effectively and expeditiously, we must be able to predict physical behavior before building a single component."

In the past, RRS contracted out its analysis work. However, company management believed that using integrated simulation tools would enable RRS to better predict system performance, accelerate development, and control costs. "We need to be able to simulate shock, vibration, stress, thermal, and aerodynamic phenomena with a high degree of accuracy and confidence," Kriek notes.

After evaluating solutions, RRS added SolidWorks® Simulation Premium and SolidWorks Flow Simulation software to its SolidWorks CAD system because the software is easy to use, is fully integrated inside SolidWorks, and provides the full range of simulation capabilities that the company needs – from nonlinear dynamic to thermal to fluid-flow analyses.

SolidWorks

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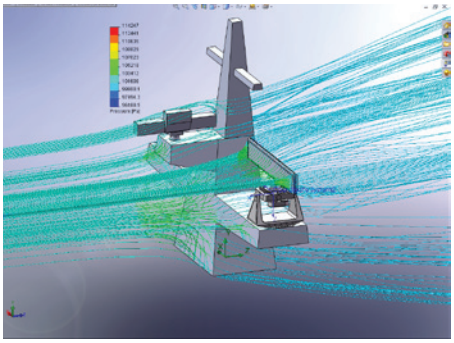
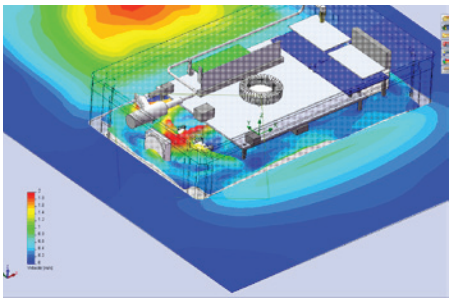
Carel Kriek
Chief Mechanical Engineer





With SolidWorks Simulation and SolidWorks Flow Simulation software, RRS can simulate shock, vibration, stress, thermal, and aerodynamic phenomena with a high degree of accuracy.

"I have been exposed to other finite element analysis (FEA) packages and find SolidWorks Simulation to be the best fit for us," Kriek adds. "It allows us to stay within the same environment, can handle anything we need to do, and eliminates the potential for model translation problems."

Accurate simulations speed development

With internal simulation tools, RRS can avoid the delays associated with using consultants or conducting extensive testing. Since implementing SolidWorks Simulation, the company has substantially shortened development time, reducing time-to-completion by 50 percent in some cases.

"The combination of our expertise, the integration of SolidWorks Simulation, and the software's range of capabilities has allowed us to cut development time in half," Kriek says. "We developed the mechanical elements of a helicopter control radar system for the Norwegian Navy in less than a year. The project could have easily taken 18 months to two years without simulation. This capability is a huge advantage for us."

Improving quality and saving money

SolidWorks Simulation not only helps RRS compress development cycles, but also enables the company to save money and increase its profit margins by reducing prototypes and improving system quality at the same time. For example, on the Norwegian helicopter radar project, RRS developed the system while producing just a single prototype that passed its environmental and functional tests the first time around. Similar projects in the past had required three or four prototypes. RRS has cut its prototyping and testing costs by between 30 and 60 percent by doing simulations instead of building prototypes.

"We are making a more accurate, higher-quality product by using simulation to optimize the design, instead of building prototype after prototype," Kriek stresses. "In addition to reducing prototypes, we are saving money by using less material. Simulation has allowed us to cut the weight of certain components in half because we can simulate how geometry changes can produce a 25 kilogram component with the same strength and stiffness as a 60 kilogram part."

Capitalizing on emerging radar opportunities

Adding SolidWorks Simulation software helps RRS take advantage of new applications, such as open-pit mining radars, in emerging markets through increased efficiencies and broader capabilities. "The fluid-flow simulation lets us study air flow around a radar antenna, so we can choose the appropriate size motors and actuators for rotating and stabilizing the antenna," Kriek explains. "Nonlinear dynamic analysis helps us predict the behavior of assemblies containing nonlinear materials. We can even forecast radar accuracy due to wind-induced deflection, uneven solar heating on the radar structure, and ship motion.

"The ability to do all of these different types of analyses is a truly encompassing advantage," he adds. "Because we have such a good technical analysis solution, we can explore new markets and go after additional work anywhere in the world."

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