SIEMENS

Space Dynamics Laboratory (SDL)

Speed and flexibility boost development of spaceborne instruments

Products

Solid Edge, Femap, Teamcenter

Business challenges

Seeking ways to bypass complex design processes

Vendor CAD files don't fully translate, stalling project work

Students' learning curve delayed by having to acquire CAD understanding first

Keys to success

Solid Edge with synchronous technology

Faster 3D model repair

Ease of use

Results

Wide-field Infrared Survey Explorer (WISE) science instrument delivered on time and budget

30-fold improvement in fixing open surfaces from vendor files, with gaps now resolved in minutes versus hours

Faster response to project requests; greater customer satisfaction

Solid Edge with synchronous technology enables SDL to dramatically improve project turnaround; radically accelerate student learning curve

Leading the way in the development of sensors and supporting technologies

Space Dynamics Laboratory (SDL), a unit of the Utah State University (USU) Research Foundation, is a nonprofit research corporation owned by USU. Charged with applying basic research to the technology challenges presented in the military and science arenas, SDL specializes in electro-optical sensor systems, calibration, thermal management, reconnaissance systems, and small satellite technologies.

Among advancements, SDL developed and operated one of the first successful spaceborne, solid-hydrogen-cooled infrared sensors, developed real-time reconnaissance data visualization hardware and software for operational military applications, delivered successful sensors and subsystems for more than 400 spaceborne and aircraft-based payloads, and initiated, in a joint effort with USU, the first student
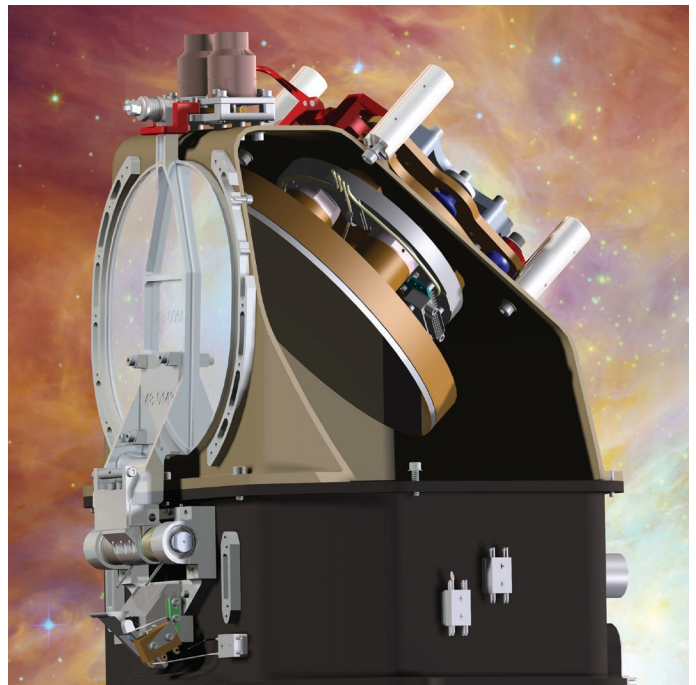
involvement program for the NASA Space Shuttle. In fact, SDL serves as the U.S. Defense Department's University Affiliated Research Center (UARC) for sensors and supporting technologies.

SDL uses Siemens' Solid Edge® software with synchronous technology for commercial design projects. Synchronous technology is the first-ever history-free and feature-based solid modeling software. Synchronous technology combines the speed and flexibility of direct modeling with the precise control of dimension-driven design.

www.siemens.com/plm

"I trust Siemens' people; they stand behind what they say, and with a stable workforce, it's been easy to build long-term relationships and keep them intact over the years – that's not something I can say about many companies in today's environment."

John Devitry
CAD Administrator, Space Dynamics Laboratory
Adjunct Professor, Utah State University

Dave McLain, who supervises the mechanical design team at SDL, says, "Solid Edge with synchronous technology is really a new CAD technology. Having used five different 3D CAD systems over the past 25 years, Solid Edge with synchronous technology offers a different thought process that eliminates the complexity of previous systems. The old days of being locked into a complex process are over. Siemens is breaking the walls down and establishing a far superior design approach."

John Devitry, who is the CAD administrator at SDL and teaches Utah State University engineering students, notes, "Solid Edge with synchronous technology is flat-out easier to use. You don't get bogged down in learning the CAD system. It is a new CAD system. Literally new – everything is different. And in this case, new isn't just new, but also far better."

Synchronous technology eliminates gaps; skyrockets productivity
"We use Solid Edge with synchronous technology on all of our projects, unless required by a customer to use another program," says McLain. "We use many vendors and lots of models and parts, and often receive files that don't translate cleanly. Some files are almost unusable due to open surfaces. Solid Edge with synchronous technology allows us to redevelop these files and use them virtually immediately. Using the region command, we are able to repair the models that would have failed for various reasons, literally fixing the open surfaces."

SDL has used Solid Edge for a number of years across numerous major projects. Solid Edge was instrumental in the design of the Floating Potential Measurement Unit – instrumentation that monitors electrical charging on the International Space Station, protecting the safety of astronauts

from electrocution during space walks. The software also played a key role in the development of the Geosynchronous Imaging Fourier Transform Spectrometer, designed to greatly reduce risk for the Hyperspectral Environmental Suite (HES) program. "Now we are using Solid Edge with synchronous technology in everything we do," says McLain. "Our first major project with Solid Edge with synchronous technology was completing the design of the Wide-field Infrared Survey Explorer (WISE) science instrument." WISE is a cryogenically cooled infrared telescope designed to provide a complete stellar infrared map more than 1,000 times more detailed than previous surveys. It was launched in December 2009 and is now returning stunning images in four different wavelengths.

McLain states, "Solid Edge with synchronous technology represents a paradigm shift. It's been over 15 years since something as radical as synchronous technology has happened. It reminds me of when CAD was finally able to run on any hardware and was not locked to a certain vendor. Synchronous technology gives me the same liberating feeling. And of course, our project productivity is soaring. What used to take me several hours can now be completed in five minutes using Solid Edge with synchronous technology. With conventional CAD, you can't go back and delete the original features thus you cannot eliminate discrepancies in features."

Synchronous technology dramatically heightens student learning
"We immediately transitioned to teaching Solid Edge with synchronous technology, especially for conceptual design," says Devitry. He loves using the tool in his mechanical and aerospace engineering classes at USU, although it did require changes in his pop quizzes. Devitry explains, "The technology is so effective that my usual one-half hour quizzes were being completed in minutes by my students. Now I make the quizzes far tougher. The students are learning more,
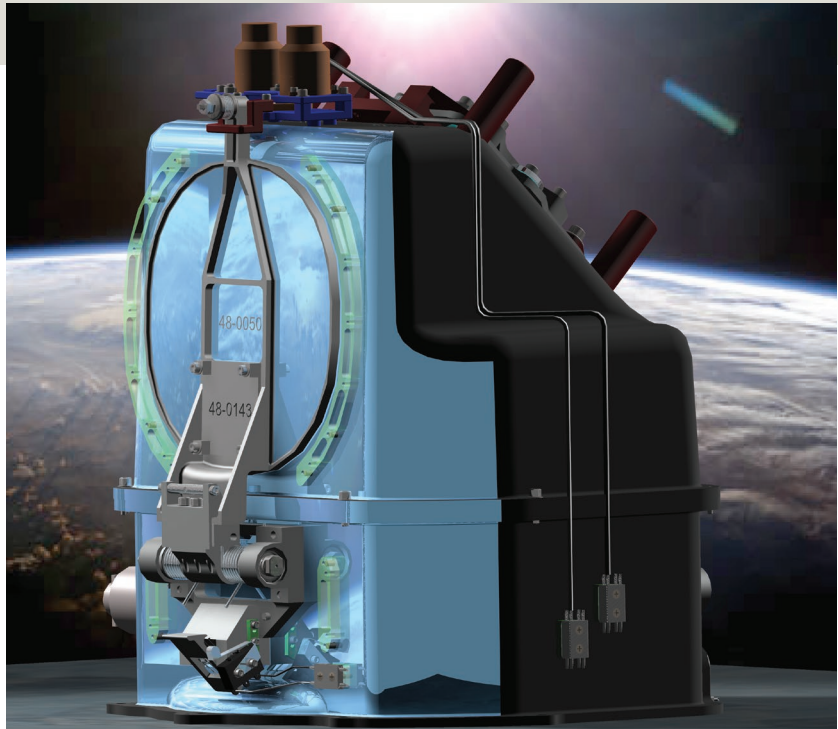
acquiring far greater depth, and doing so far faster than ever before."

Devitry notes that a number of his students had never used CAD before his class. "They don't have the biases of complex design processes built in," he says. "With synchronous technology, the way they naturally think about the design is the way the software works. Prior to synchronous technology, we couldn't cover a lot of important material because we were spending time teaching the CAD interface. Now we spend more time on key engineering topics such as motion and analysis. It's amazing how much more focus we can place on core engineering concepts because the design process isn't getting in the way. The volume of academics in these classes has increased and will keep growing."

Most importantly to most students, Solid Edge with synchronous technology pays real-world dividends. "Our students work on a whole gamut of real-world projects, designing parts, running them through the machine shop, assembling instruments, and calibrating them," says Devitry. "In fact, we hire students from our own

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Dave McLain
Group Leader,
Mechanical Design
Space Dynamics Laboratory

Solutions/Services

Solid Edge
www.siemens.com/solidedge

Femap with NX Nastran
www.siemens.com/plm/femap

Teamcenter
www.siemens.com/teamcenter

Customer's primary business

Space Dynamics Laboratory (SDL), a unit of the Utah State University (USU) Research Foundation, is a nonprofit research corporation owned by USU. Charged with applying basic research to the technology challenges presented in the military and science arenas, SDL has developed revolutionary solutions that are changing the way the world collects and uses data. SDL continues to lead the way in the development of sensors and supporting technologies. www.sdl.usu.edu

Customer location

North Logan, Utah
United States

classes. With more extensive engineering knowledge, made possible by Solid Edge with synchronous technology, many students immediately go on to work for leaders in the industry."

Devitry pinpoints the power of the technology: "Solid Edge with synchronous technology bridges the gaps and holes. We have a lot of parts with faces at odd angles. Mirrors bouncing light around at weird cut angles. It's a lot easier to rotate a face and feature using the Solid Edge wheel feature than to have to place a reference plane at an angle – that's hard to do. Now with synchronous technology, you just use the wheel to rotate the surface. It's so very easy to manipulate and modify models with synchronous technology."

At the end of classes in his most recent term, Devitry asked his students to write a short sentence on their impression of Solid Edge with synchronous technology. Their perspective is presented in a separate case study.
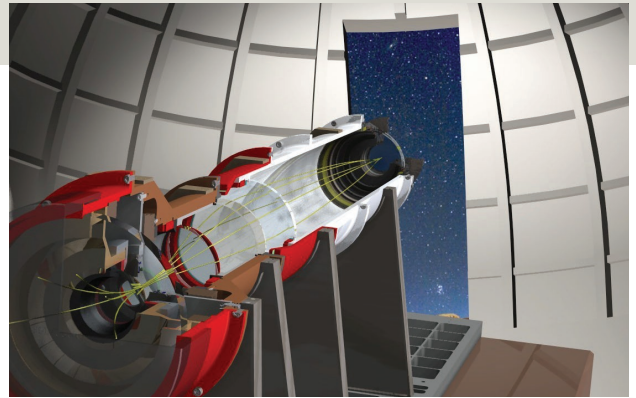
The Siemens factor

It's more than just technology that makes a marked difference in significantly improving productivity and academic performance. According to Devitry, "It's as much about the relationship with Siemens as their technology, including not just our use of Solid Edge with synchronous technology but also Teamcenter and Femap with NX Nastran." He explains, "I trust Siemens' people; they stand behind what they say, and with a stable workforce, it's been easy to build long-term relationships and keep them intact over the years – that's not something I can say about many companies in today's environment."

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