

Dynamic Structures

Customer Success Story

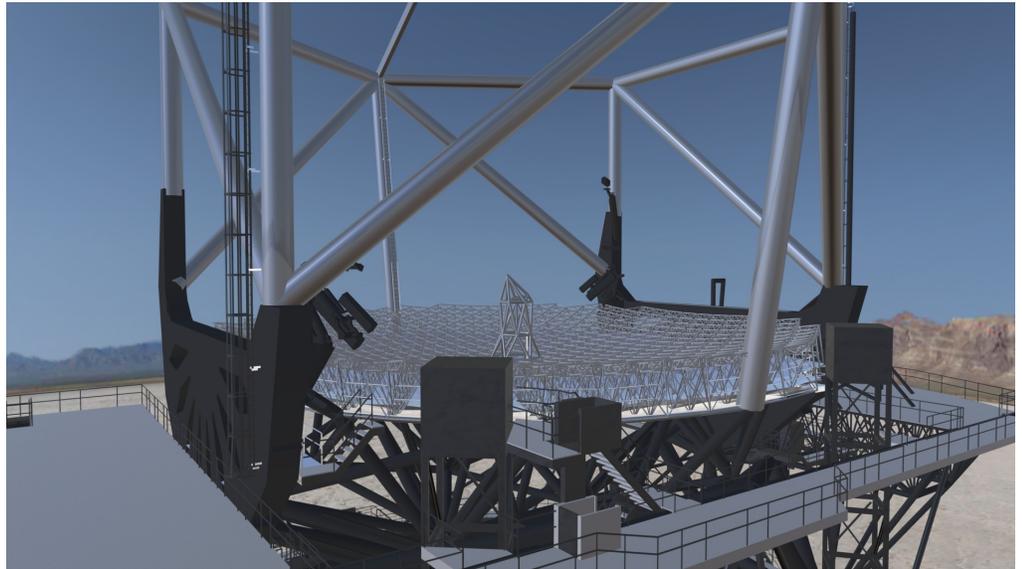
Autodesk® Inventor®
AutoCAD® Mechanical
Autodesk® Navisworks®
Autodesk® Vault Manufacturing
Autodesk® 3ds Max®

I'm not sure how we'd even begin to tackle a project of the size of TMT without Inventor—the resources required would just be overwhelming.

—Craig Breckenridge
Drawing Office Manager
Dynamic Structures

Reaching for the stars.

Dynamic Structures uses Digital Prototyping to streamline the design and manufacture of cutting-edge telescopes and more.



Project Summary

Founded in 1926 and based in British Columbia, Dynamic Structures designs and manufactures complex structures. Whether it's creating a massive telescope enclosure or a thrilling amusement ride, Dynamic Structures is known for its innovative designs and exacting engineering. Among the company's achievements are the Gemini Observatory and the Keck II telescope, the largest ground-based telescope in the world. To help streamline its design process, Dynamic Structures creates a single digital model for each of its designs with Autodesk® Inventor® software. The company also relies on other software in the Autodesk solution for Digital Prototyping, including, AutoCAD® Mechanical, Autodesk® Navisworks®, Autodesk® Vault Manufacturing, and Autodesk® 3ds Max® software. With its Autodesk solution, Dynamic Structures has been able to:

- Create and revise part and assembly drawings more than 20 percent faster
- Rely on Digital Prototyping to validate complex geometry
- Check for interferences between equipment before construction begins
- Win over customers with realistic animations

The Challenge

The products Dynamic Structures builds have very precise requirements. Amusement rides must not only wow riders, they must meet stringent safety regulations and be completely reliable. Ride rails need to line up and switches bear up under weight and motion. Telescopes and their enclosures must achieve precise pointing accuracy and adhere to strict motion profiles. When massive 2,000 ton telescopes move, there can't be any motion-induced vibration. On these and other Dynamic Structure projects, there's little room for error.

Most of the time, building physical prototypes of these complex projects is nearly impossible. Yet Dynamic Structures needs to have confidence that when fabrication does begin, it has accounted for all aspects of operation and installation. That's why, in 1994, the company began designing its most complex structures using AutoCAD®, incorporating 3D functionality as it became available. Then, in 2002, Dynamic Structures decided to move beyond 3D to Digital Prototyping with Autodesk Inventor software.

Dynamic Structures has reduced design time by more than 20 percent since adopting Inventor.

The Solution

Moving from AutoCAD to Inventor was a natural progression for Dynamic Structures. “We were very impressed by how easy it is to do complicated geometry in Inventor,” says Craig Breckenridge, drawing office manager at Dynamic Structures. “Everyone has made the transition from AutoCAD to Inventor quite easily.”

With Autodesk Inventor software, Dynamic Structures is able to model highly complex geometry for intricate structures faster and easier than ever before. What’s more, it can use Digital Prototyping to visualize and validate designs from all angles.

Digital Prototyping Delivers

Dynamic Structures is realizing the benefits of Digital Prototyping every day on a current project, the Thirty Meter Telescope (TMT) astronomical observatory slated for completion in 2018. While the world’s largest existing telescope is 10 meters in diameter, TMT will be 30 meters and provide up to 10 times the resolving power of existing ground-based telescopes. Together, the telescope and structure will include nearly 200,000 parts.

“On massive, complex structures such as TMT, we can’t fabricate, assemble, then realize something won’t work,” says Breckenridge. “We need to visualize how everything fits together as we design so there are no mistakes.”

Breckenridge gives a straightforward example of how Digital Prototyping simplifies the design process. “On a traditional drawing, it can take hours to determine whether someone can access an area of an enclosure,” he explains. “With the digital prototype, we can visualize exactly how the worker can do it. We know how much space equipment takes up, what’s around it, and how we’ll support it—just by looking at the digital prototype.”

Before Digital Prototyping, teamwork was hampered by miscommunication. Now, designers and engineers easily work together more collaboratively. Both designers and engineers access data for projects using Autodesk Vault Manufacturing, data management software that helps with revision control and the engineering change order process. “Before, it was us and them,” says Breckenridge. “Now it’s all of us together, working on one digital model.”

Simulation and Validation

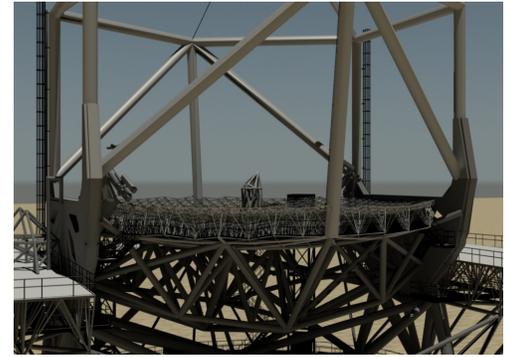
Digital Prototyping is helping Dynamic Structures validate designs using the dynamic simulation tools in Inventor. Engineers can check range of motion and the impact of wind load on the TMT digital prototype. And when they need to do further analysis, they simply export the digital prototype into finite element analysis (FEA) software by ANSYS, an Autodesk partner.

Additionally, the data exchange capabilities between Inventor and AutoCAD Mechanical makes it easier to validate geometry Dynamic Structures creates in AutoCAD Mechanical. “We detailed a recent bridge project in AutoCAD Mechanical but had complex geometry in a few places,” says Breckenridge. “We modeled the geometry in Inventor and then double-checked AutoCAD measurements against it. It really helped accuracy and sped up the project.”

Dynamic Structures can also check for interferences and clearances between structures and equipment prior to construction using Autodesk Navisworks. “For the TMT project, we’ll use Navisworks to check for clashes between our digital prototypes and models supplied by other companies working on the project,” explains Breckenridge.

Visualization Aids Manufacturing and Sales

Besides helping to streamline the design process, Digital Prototyping enables Dynamic Structures and its clients to experience photorealistic render-



ings and animations of designs. “Before we build anything, we can see and almost feel it,” enthuses Breckenridge. “It makes a huge difference in the accuracy of our design process—we are confident that what we see is what we’ll get.”

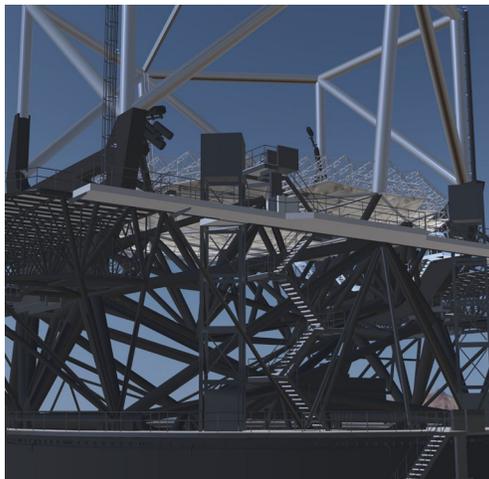
The company animates digital prototypes to help the fabrication shop quickly understand how to sequence the assembly process. It also includes 3D visualizations in its bids for new projects, importing Inventor models into Autodesk 3ds Max software to create project animations.

The Result

Dynamic Structures estimates that Digital Prototyping reduces the time it takes to create and revise part and assembly drawings by more than 20 percent—and is helping to keep the TMT project stay on schedule. In fact, Breckenridge notes, “I’m not sure how we’d even begin to tackle a project of the size of TMT without Inventor—the resources required would just be overwhelming.”

For More Information

To find out how the Autodesk solution for Digital Prototyping can help you increase innovation, reduce mistakes, and cut costs, visit www.autodesk.com/inventor.



Dynamic Structures relies on IMAGINiT Technologies, an Autodesk Authorized Reseller, for training and to get advice on using Autodesk software to its fullest.

“If we’re not sure we’re doing something the best way, we call IMAGINiT first. They’re great at problem solving.”

—Craig Breckenridge
Drawing Office Manager
Dynamic Structures

Images courtesy of Dynamic Structures