

TMT OBSERVATORY CORP.

*MANAGING CREATION OF THE WORLD'S LARGEST TELESCOPE
WITH SOLIDWORKS ENTERPRISE PDM*



With the SOLIDWORKS Enterprise PDM product data management system and the SOLIDWORKS modeling environment, TMT has incorporated the efforts of contributors from around the world using different CAD formats to develop the world's largest land-based telescope.

Challenge:

Manage design data and workflows for the 30-meter telescope, which is being developed by contributors from around the world using a variety of CAD systems.

Solution:

Implement SOLIDWORKS design and SOLIDWORKS Enterprise PDM product data management software to efficiently, accurately, and productively handle and integrate diverse types of design data.

Results:

- Incorporated design files in different CAD formats
- Connected contributors and collaborators worldwide
- Automated CAD data conversion into single format
- Kept project on time and on budget

Planning, designing, and building the world's largest land-based optical/near-infrared telescope is a daunting challenge, especially when the project involves contributions from a team of globally dispersed collaborators, many of whom work in different CAD packages. That's the test facing TMT Observatory Corp., the partnership of scientific institutions and research organizations that is working to develop the Thirty Meter Telescope (TMT), the most advanced and powerful optical telescope on Earth.

A team of scientists, engineers, and project specialists from partners in Canada, China, India, Japan, and the United States are developing TMT, which will be installed near the summit of Mauna Kea in Hawaii early next decade. Able to see farther and better than the Hubble Space Telescope, TMT will allow astronomers to study objects in our solar system, stars throughout the Milky Way, neighboring galaxies, and forming galaxies at the edge of the universe.

The TMT project office is located in Pasadena, California. Because the project involves different languages and CAD systems, coordinating design work and managing design data could be analogous to the "Tower of Babel" scenario in terms of coalescing design work into a cohesive effort. According to former Solid Model Database Administrator Phillip Murg, choosing a flexible and effective combination of modeling and data management solutions was a critical factor affecting the project's success.

"We needed a robust modeling environment that could import and accommodate the varying forms of design data, and a PDM [product data management] system that not only supported diverse data types but also enabled collaboration and facilitated workflows on a global scale," Murg explains. "On this project, openness, usability, and flexibility are the key requirements."

TMT chose SOLIDWORKS® design software and the SOLIDWORKS Enterprise PDM system because the solutions are intuitive, support online access, and provide customization through the SOLIDWORKS Application Programming Interface (API).

MANAGING GLOBAL COLLABORATION

By implementing SOLIDWORKS design and PDM solutions, TMT securely and efficiently connects collaborators from different countries with the primary development effort—providing vital information on design envelopes and clearance requirements—and incorporates design information created in different CAD formats. For example, a designer in Estonia on the Structures Team needed to interact directly with the design.

"We put a client up for him, and he logged in to the SOLIDWORKS Enterprise PDM system via a web browser from Estonia," Murg explains. "This allowed him to stay current and sped up the collaboration process. We manage similar access for team members elsewhere. SOLIDWORKS Enterprise PDM allows us to tightly control access rights, and using the system via the web is quite easy. This approach allows us to have a second- and third-shift effort on the project, instead of having to exchange files and wait."

MAINTAINING A DIGITAL MOCK-UP

While SOLIDWORKS Enterprise PDM software provides the global framework for accessing, contributing, and managing design data, SOLIDWORKS design software and the open SOLIDWORKS API facilitate building and maintaining the design's centralized model, which TMT calls the digital mock-up or DMU.

"Partners deliver models through the SOLIDWORKS Enterprise PDM system, and we convert the data into SOLIDWORKS files," Murg notes. "We then add the files to the DMU. This approach lets us control revisions with the DMU, which all team members can view. Using the SOLIDWORKS API, we've automated the process further through file sort routines, batch processing of file conversions, and customized commands for adding files to workflow directories."

"For us, SOLIDWORKS Enterprise PDM really shrinks the time required to do our work on this project."

— Phillip Murg, Former Solid Model Database Administrator

CONFIGURATIONS, SPEEDPAK, AND LARGE DESIGN REVIEW

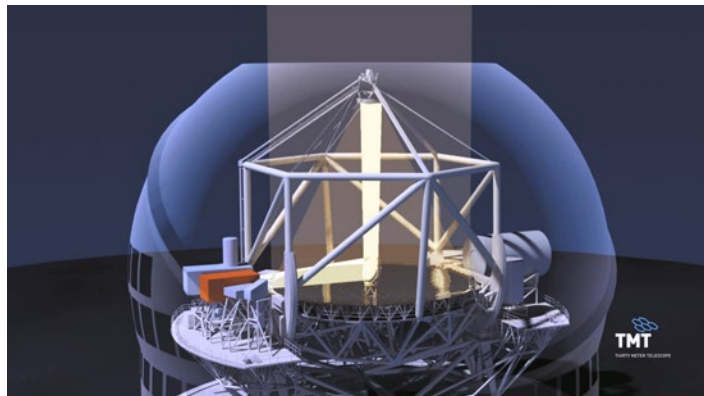
As the TMT model grows—the final design will total more than 500,000 components—the ability to view and manipulate it demands greater computing resources. “On the DMU, I have configurations of certain subsystems, for which I’ve stripped things down to reduce file sizes and make it easier to use,” Murg says. “Large assembly review and SpeedPak are other tools we use to improve performance.”

“At first glance, this project appears to be a real engineering nightmare because of the complexity of the development arrangement,” Murg adds. “However, the addition of SOLIDWORKS and SOLIDWORKS Enterprise PDM established the access, workflow, and management frameworks we needed to have all of the contributors interact efficiently. For us, SOLIDWORKS Enterprise PDM really shrinks the time required to do our work on this project.”

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TMT uses SOLIDWORKS design software to maintain a digital mock-up of the Thirty Meter Telescope, which will total more than 500,000 components.

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