GROUPE FRANCK MULLER WATCHLAND SA

Crafting the World's Most Complicated Timepiece with SolidWorks Premium

SolidWorks software helped Franck Muller Watchland introduce the world's most complicated timepiece, the Aeternitas Mega 4 watch, which sold for the unprecedented price of $2.7 million.

A lifelong fascination with time, motion, and mechanics—combined with unique technical gifts—has made Franck Muller one of the world's most accomplished and respected watchmakers. Known as the "master of complications," Muller transformed his individual success into the founding of Groupe Franck Muller Watchland SA. The company, with offices nestled in the Swiss village of Genthod, established its preeminent reputation in watchmaking by introducing the world's most complicated wristwatch a few years after its founding in 1992.

Since then, Franck Muller Watchland has repeatedly elevated the state-of-the-art in watchmaking by surpassing each groundbreaking wristwatch with new models of increasing complexity. As the level of sophistication in timepiece micro-mechanics has advanced, so has the need to employ advanced design technologies to spur development.

"Watchmaking is both a science and an art, requiring the contributions of designers and engineers, craftsmen and artisans," explains Nicholas Rudaz, director of operations. "We came to realize that continuing along a path of ever-advancing complication—while maintaining the beautiful aesthetics for which we are known—would require increasing levels of automation, simulation, and control. In short, we understood that we needed to leverage computer-based development technologies to continue to push the complexity of our designs."

While the watchmaker had used AutoCAD® 2D design tools, the development of the Aeternitas Mega 4 Grande Sonnerie Westminster Carillon watch—the most complicated timepiece ever developed when released in late 2009—was completed in a 3D CAD package. Franck Muller Watchland selected SolidWorks® Premium design and simulation software, as well as the integrated SolidWorks Enterprise PDM product data management (PDM) system, to design the Aeternitas Mega 4 watch. The company chose SolidWorks because it is easy to use, includes motion simulation tools, provides advanced 3D visualization capabilities, supports design communications via SolidWorks eDrawings® software, and adds an integrated PDM system.

Challenge:

Efficiently design and cost-effectively manufacture the most complicated timepiece ever produced in the world.

Solution:

Utilize the integrated SolidWorks design solution, including SolidWorks Premium design/simulation software and SolidWorks Enterprise PDM product data management software.

Results:

- Shortened design cycles by 40 percent
- Cut development costs by 60 percent
- Decreased design errors by 30 percent
- Reduced file searching/design re-creation time by 60 percent

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Precision in small spaces

Using SolidWorks Premium software to design the Aeternitas Mega 4 watch enabled Franck Muller Watchland to more efficiently visualize and simulate the timepiece's micro-mechanics, which include 1,483 individual elements and 205 subassemblies—incorporating 36 complications, 25 of which can be viewed through the dial and case-back window. With SolidWorks, the watchmaker shortened the design cycle by 40 percent and cut development costs by 60 percent.

According to R&D Engineer Jean Pierre Golay, SolidWorks helps in the development of precision components within a small space. "Once the size of the watch is defined, the challenge is to figure out a way to design the various mechanisms to fit and function within the case," he stresses. "This challenge becomes increasingly difficult when developing complicated movements. SolidWorks software not only allows us to visualize individual components but also to simulate the motion of components and mechanisms, so we can avoid interference errors."

SolidWorks visualization and simulation tools enabled engineers to reduce design errors by 30 percent on the Aeternitas Mega 4 watch. "The movements in this watch are so precisely packed within a small space that it would not have been possible to have a clear overview of how the mechanisms function within the allotted space without SolidWorks 3D design tools," adds R&D Engineer Pierre Michel Golay.

Configurations save steps

One of the ways that Franck Muller Watchland saved time on the development of the Aeternitas Mega 4 watch, was to use configurations to address various aspects of the design. The watchmaker used SolidWorks design configurations to develop assemblies as well as components, according to Julien Roy, project engineer for the Aeternitas Mega 4 watch.

"Configurations were a big timesaver," Roy explains. "For example, we used configurations for springs in their initial shape and under stress. We also employed configurations to differentiate the shape of a manufactured component versus its shape following adjustments by the watchmaker."

Because all of the designs are tightly managed within SolidWorks Enterprise PDM software, Franck Muller Watchland realized additional efficiencies, reducing the time required to search for files or re-create designs by 60 percent.

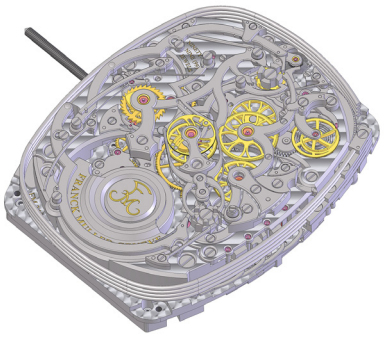
Complexity enhances price

SolidWorks software helped Franck Muller Watchland to introduce the world's most complicated timepiece with the release of the Aeternitas Mega 4 watch. When the watch was officially delivered to its first owner, it sold for the unprecedented price of $2.7 million, making it both the most complex and the most expensive watch in the history of watchmaking.

By implementing the integrated SolidWorks 3D design environment, the watchmaker has acquired the technology necessary to continue building upon its reputation as the most capable and respected watchmaker in the world.

"SOLIDWORKS SOFTWARE NOT ONLY ALLOWS US TO VISUALIZE INDIVIDUAL COMPONENTS BUT ALSO TO SIMULATE THE MOTION OF COMPONENTS AND MECHANISMS, SO WE CAN AVOID INTERFERENCE ERRORS."

Jean Pierre Golay
R&D Engineer



SolidWorks software enables Franck Muller Watchland to continue to push the sophistication in watch micro-mechanics that has made Franck Muller the "master of complications."

FRANCK MULLER GENEVE

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