WATERSHOT, INC.

Plumbing the depths of underwater camera housings with SolidWorks software

With SolidWorks software, Watershot was able to electronically design the Watershot A35-3 Bluewater Housing without building a single prototype.

Watershot, Inc., designs and manufactures underwater housings for 35 millimeter still, video, and 16 and 35 millimeter film cameras. During the company's early years, its designers used Bridgeport® machining software to design and manufacture components and assemblies for its camera housings. But as demand for more sophisticated underwater camera housings grew, owner Steve Ogles realized Watershot would need to become more efficient and accurate in both design and production to secure and maintain a leadership position in this burgeoning market.

"Our ambition was to completely design and produce a camera housing electronically without building a single prototype," Ogles explains. "We were looking for a way to separate ourselves from our competitors and eliminate costly prototypes. My colleagues recommended SolidWorks® 3D CAD software as the best system for achieving our goals."

Watershot tested SolidWorks software on some smaller projects, such as converting a deep-dive camera housing for "splash" or surface use. "We really started to see what SolidWorks software could do for us on that project," Ogles notes. "So when Pete Zuccarini of Zuccarini Films, Inc. (a leading underwater cinematographer: Ultimate X, Ocean Men, Disney's New True Life Adventures, Sea of Sharks) approached us to develop Zuccarini Camera Housings, we were ready to design and manufacture our first camera housing that did not require the production of a costly prototype."

Results:

- Realized 50 percent reduction in design cycle
- Cut design errors by 95 percent
- Manufactured product without a single prototype
- Created innovative gear tower assembly

SOLIDWORKS

Not a single prototype

The Zuccarini Camera Housing project presented unique design challenges to accommodate the underwater environment. The housing needed to be compact, lightweight, and allow the cinematographer to control the camera lens, iris, and focus bezels precisely. In addition, the housing needed to be capable of accepting any of 17 different lenses, yet simple enough for a camera assistant to load without specialized tools.

By quickly modeling the entire camera in SolidWorks software, Watershot engineers were better able to visualize their design challenges and come up with an innovative gear tower mechanism that transfers the axial motion of the external camera housing controls a full 90 degrees to the axial rotation of the iris, and focus bezels on the camera lens inside the housing. "The gear tower assembly was the most complex mechanism we had designed up to that point," Ogles says. "Before we implemented SolidWorks software, we could not have imagined geometry like the gear tower assembly. SolidWorks software gave us the ability to visualize the nested gear assembly and achieve the precision necessary for packaging it in a very tight space."

The low-profile, lightweight requirement compelled Watershot designers to employ curves and sweeps on the model exterior while designing pockets and ribs on the interior. "We realized a 50 percent reduction in our design cycle as a result of using SolidWorks software," Ogles points out. "We also reduced design errors by 95 percent, and achieved our goal of producing the housing without a single prototype. There's no way we could have completed this project in the time we did without SolidWorks software."

Integrated applications accelerate design

Critical downstream applications that are fully integrated with SolidWorks software, such as SolidWorks Simulation for design analysis and CAM software for toolpath generation, also contributed to the improved efficiencies at Watershot. "We used SolidWorks Simulation to simulate the water pressure on the housing at different depths," Ogles says. "When Pete (Zuccarini) asked us about the depth rating calculations on the housing, we showed him simulations in SolidWorks Simulation that allowed us to obtain the depth-rating information we needed without building a prototype."

Ogles adds that because Watershot worked with machine shops that used CAM software, they were able to create toolpath programming directly from SolidWorks software files, saving additional time and money.

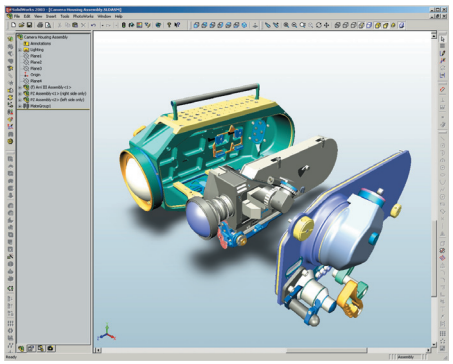
Improved collaboration, communication

In addition to using SolidWorks software to avoid costly prototype iterations, Watershot saved more time and effort by using the design collaboration and communication tools found in SolidWorks software to interact with the customer and suppliers.

"SolidWorks closed the communications loop for us," Ogles explains. "SolidWorks eDrawings® was an absolutely indispensable tool. Our client (Zuccarini) is based in Miami, and we're in San Diego. Using eDrawings files, we sent him models that he could rotate and review from all angles without the need for specialized software." Working with vendors that also use SolidWorks software saved more time. "If everybody has the same software package, you can adhere to a single data communications protocol," Ogles says. "That's how you get success."

"THERE'S NO WAY WE COULD HAVE COMPLETED THIS PROJECT IN THE TIME WE DID WITHOUT SOLIDWORKS SOFTWARE."

Steve Ogles
Owner



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Watershot, Inc.
828 H Avenue
Coronado, CA 92118-2522
Phone: +1 619 437 1489
www.watershot.com

Dassault Systèmes
SolidWorks Corp.
300 Baker Avenue
Concord, MA 01742 USA
Phone: 1 800 693 9000
Outside the US: +1 978 371 5011
Email: info@solidworks.com
www.solidworks.com