

# DDDROP 3D PRINTERS

## BUILDING A 3D PRINTER FOR ENGINEERS WITH INTEGRATED SOLIDWORKS ELECTRONIC DESIGN ECOSYSTEM



ddd drop leveraged the entire SOLIDWORKS electronic design ecosystem—including mechanical design, electrical schematics design, PCB design, structural analysis, flow simulation electronics cooling analysis, PDM, rendering, and technical communications solutions—to efficiently innovate 3D printing systems that are specifically designed to satisfy the needs of engineers.

ddd drop

### Challenge:

Leverage customer feedback regarding 3D printing requirements and functionality in order to develop 3D printer models that are specifically designed to meet the needs of engineers.

### Solution:

Utilize the integrated SOLIDWORKS electronic design ecosystem, including SOLIDWORKS Premium mechanical design, SOLIDWORKS Electrical schematics design, SOLIDWORKS PCB electronic design, SOLIDWORKS Simulation Premium structural analysis, SOLIDWORKS Flow Simulation Electronics Cooling Module, SOLIDWORKS PDM Professional product data management, SOLIDWORKS Visualize rendering, and SOLIDWORKS Composer technical communication software solutions.

### Benefits:

- Cut development cycles in half
- Reduced number of prototypes required by factor of three
- Tripled printer sales in one year
- Completed mechanical, electrical, and PCB design in parallel

Taking its name from the popular Dutch drop licorice candy and 3D (ddd), dddrop 3D Printers has introduced new 3D printing systems specifically designed to satisfy the needs of engineers at an affordable price. A spin-off company of SOLIDWORKS® reseller CAD2M B.V., dddrop introduced its first 3D printer, the Recon, in 2012 as a reconnaissance project aimed at identifying the actual 3D printing needs of its customers.

From selling other 3D printers since 2004, CAD2M came to understand the pros and cons of available 3D printers, according to CAD2M/ddd drop Owner and CEO Alfred Uytdewilligen. “Professional-level 3D printers were simply too expensive for many of our customers, and the less costly 3D printers did not satisfy the needs of professional engineers,” Uytdewilligen recalls.

“Rather than imagining the printing functionality and features that our customers need, we decided to quickly develop and deploy the Recon 3D printer as a way to survey our customer base,” Uytdewilligen explains. “We asked them to tell us what they liked and didn’t like about the product to better understand the capabilities, and to build the sizes, precision, and range of materials that they need, so we can incorporate their feedback into future models.”

The company funneled its customers’ insights into the development of the dddrop Leader single-head 3D printer—introduced in 2015—and the dddrop Leader TWIN dual-head 3D printer—launched in 2016. Because of its relationship with

CAD2M, dddrop chose the integrated SOLIDWORKS electronic design ecosystem, including SOLIDWORKS Premium mechanical design, SOLIDWORKS Electrical schematics design, SOLIDWORKS PCB electronic design, SOLIDWORKS Simulation Premium structural analysis, SOLIDWORKS Flow Simulation Electronics Cooling Module thermal analysis, SOLIDWORKS PDM Professional product data management, SOLIDWORKS Visualize rendering, and SOLIDWORKS Composer technical communication software solutions.

“ddd drop serves as a test bed for new technologies, which is why we demanded the use of integrated SOLIDWORKS mechanical, electrical, and electronic design tools at ddd drop,” Uytdewilligen stresses. “Even though our electrical engineer had experience using another PCB design system [OrCAD®], we wanted him to use integrated SOLIDWORKS PCB software to develop the electronics for the Leader TWIN to fully understand the benefits of using an integrated, multi-disciplinary platform.”

### INTEGRATED PCB DESIGN, SCHEMATICS, AND ELECTRONICS COOLING

The integrated SOLIDWORKS ecosystem allowed ddd drop to conduct mechanical, electrical, and PCB design of the Leader TWIN in parallel, resulting in significant productivity gains. The company not only was able to use SOLIDWORKS PCB software to create and check PCB designs within their intended mechanical enclosures, but also tapped the SOLIDWORKS Flow Simulation Electronics Cooling Module to validate and optimize the board’s thermal performance and SOLIDWORKS Electrical design software to create electrical wiring and harnessing schematics.

“Because we completed development on an integrated platform—with all data managed in SOLIDWORKS PDM—we were able to collaborate and iterate more effectively, avoiding the file transfers, data conversions, and additional work associated with using separate tools,” Uytdewilligen notes. “When changes were made, they rippled across all of the systems. This enabled us to cut the development time for the Leader TWIN in half while reducing prototyping requirements by a factor of three.”



**“With the integrated SOLIDWORKS electronic design ecosystem, we developed and launched the Leader TWIN in record time.”**

— Alfred Uytdewilligen, Owner and CEO

## MAKING PRINT HEAD THAT'S LIGHT YET STIFF

In addition to leveraging SOLIDWORKS electronics cooling simulation tools, dddrop made great use of SOLIDWORKS motion and structural analysis capabilities to improve the Leader TWIN's performance. For example, the unit's print head has two nozzles to support the printing of flexible materials. The print head needs to be lightweight but also stiff enough to maintain a high level of precision.

"The SOLIDWORKS Simulation Premium motion and deflection studies that we conducted indicated that the print head should be 1 mm plate steel," Uytdevilligen recounts. "I said to myself, 'That can't work,' and decided to prototype both 1 mm and 3 mm versions. The software was proven right and I was proven wrong because the 3 mm version was too heavy and didn't work, while the 1 mm version functioned optimally."

## FAST RENDERINGS AND DOCUMENTATION SPEED TIME-TO-MARKET

dddop also utilized SOLIDWORKS Visualize rendering software to quickly create photorealistic images of the Leader TWIN to support marketing needs, and SOLIDWORKS Composer software to accelerate concurrent development of product documentation and user manuals. "With the integrated SOLIDWORKS electronic design ecosystem, we developed and launched the Leader TWIN in record time," Uytdevilligen says.

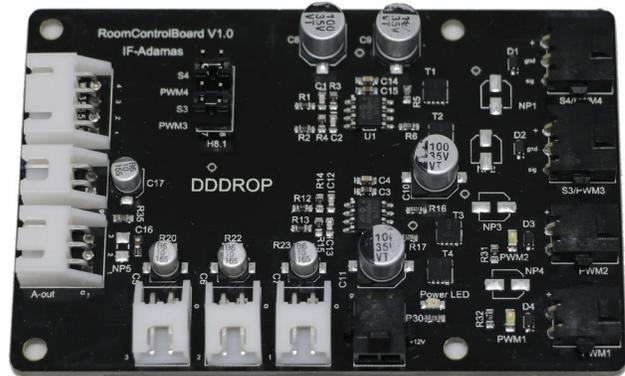
"The sweet spot for 3D printers in Europe is less than 5000 Euros, because injection-molding becomes a viable solution above that point," Uytdevilligen continues. "SOLIDWORKS helped us reduce the time and cost of development, allowing us to come in substantially under that, resulting in a tripling of sales in one year."

## Focus on dddrop 3D Printers

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Using integrated SOLIDWORKS development tools, such as SOLIDWORKS Visualize and SOLIDWORKS PCB software, dddop was able to cut design cycles for its 3D printers in half.

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