Favorable Diagnosis

MOVE FROM VIRTUAL PROTOTYPING TO RAPID PROTOTYPING CUTS MANUFACTURING COSTS $7.2 MILLION

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– Scott Notaro, Instrumentation Laboratory

CASE STUDY

Instrumentation laboratory's ACL TOP 500 is a mid-volume hemostasis testing system with the speed, flexibility, and intelligence of the largest automated analyzers.

Instrumentation Laboratory is a worldwide manufacturer of in vitro diagnostic instruments, related reagents and controls for use primarily in hospitals and independent clinical laboratories. The company's product lines include critical care systems, hemostasis systems and information management systems.

The company developed its Hemostasis testing system, the ACL TOP 500 to offer a lower price point than previous models. In the development process, the company re-engineered many components to make them less expensive to manufacture.

Like many other companies, Instrumentation Laboratory used a virtual prototyping process before production. “Typically, we develop design concepts in CAD software and discuss them with our manufacturing engineering team and molding suppliers to determine the most cost-efficient manufacturing option,” says Scott Notaro, manager of mechanical engineering at Instrumentation Laboratory.

“But difficulties in conceptualizing a CAD model can lead to time-consuming revisions. This reduces time in the development schedule and allows for only the most expensive parts to be addressed. This may result in a cost reduction of approximately 30%, but we wanted to achieve a greater reduction on this project.”

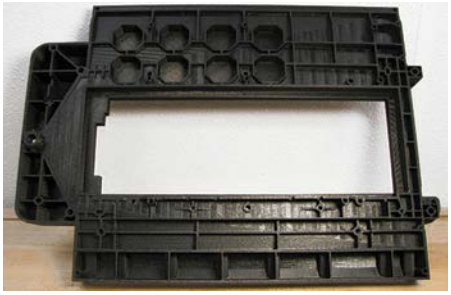
About the time the project was kicking off, Instrumentation Laboratory was considering the purchase of a Fortus 3D Production System. Of all the additive manufacturing systems on the market, they chose Fortus because it’s powered by Fused Deposition Modeling (FDM) and gives them the ability to easily produce parts in production-grade thermoplastics - something other additive manufacturing technologies simply cannot do. “We decided to purchase the machine and use this project as a test-case to see if rapid prototyping could help improve the design engineering process,” says Carl Chelman, R&D model shop supervisor for Instrumentation Laboratory.

The company discovered that FDM prototypes help engineers move more quickly to an optimized design, and allow for incorporation of greater contributions from the manufacturing team and suppliers. “Having parts in hand, our manufacturing team was able to identify more ways to reduce costs,” says Chelman. “And mold vendors provided additional ideas about consolidating parts to save tooling and production costs. The prototypes significantly improved communications with our mold vendors so rework was not required on a single mold.”

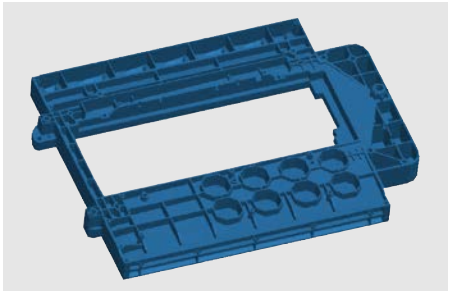
In another example, a six-part sheet-metal assembly was challenging to visualize due to its multiple bends. With the FDM prototype, engineers were able to convert it to an injection molded assembly with only two parts, for an 80% cost reduction. Instrumentation Laboratory engineers created assemblies from FDM prototypes and frequently identified interference problems that would not have manifested until much later in the process. The excellent mechanical properties of the FDM prototypes enabled Instrumentation Laboratory to validate the functionality of a working machine.

Instrumentation Laboratory’s diagnosis of prototyping methods assured them that in-house prototyping was the right prescription to improve time-to-market and ROI. “We were able to re-engineer over 25 parts at a cost-savings, far greater than could be realized with traditional virtual prototyping methods,” says Notaro. “FDM helped us achieve a manufacturing cost reduction of 40%. That’s 10% more than the traditional approach would have offered.” That 10% savings amounted to $600,000 per year. Extended over the 12-year life of the product, this represents a $7.2 million cost reduction. The company also saved $50,000 in mold rework and delivered the product to market six months earlier than expected with traditional methods.

This prototype was created with the FDM process. It helped optimize the design for injection molding.



FDM prototype of the system’s “reagent base,” an assembly that secures reagent vials for cooling during the blood-analysis process.



CAD rendering of the reagent “base”.

How Does FDM Compare to Traditional Processes for Instrumentation Labs?

METHOD	COST	LEAD TIME
Traditional Process	$28.8 million	18 months
FDM Technology	$21.6 million	12 months
Savings	$7.2 million (25%)	6 months (33%)

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