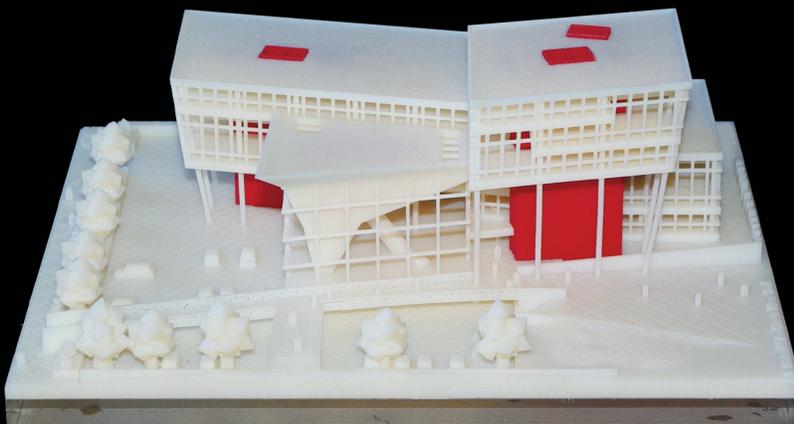
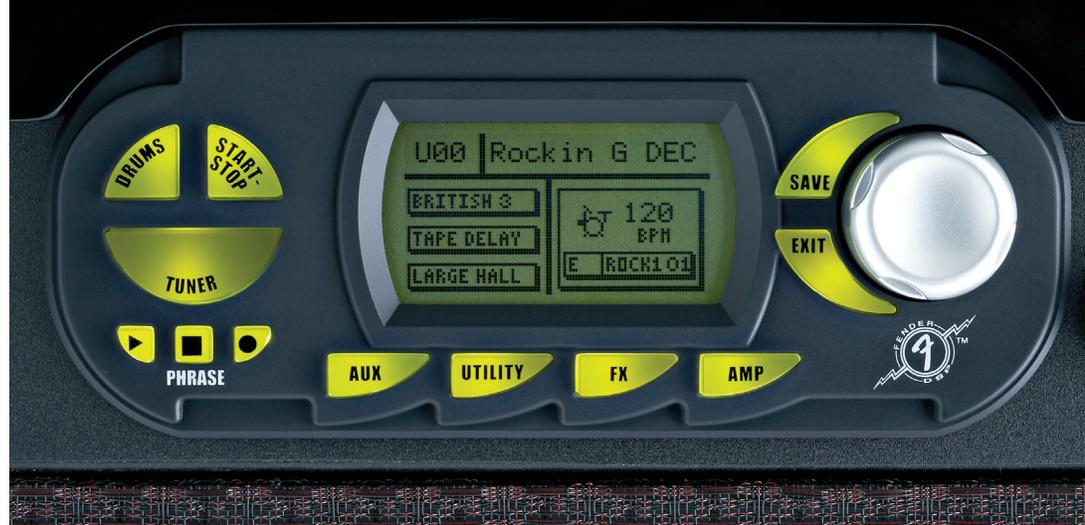




Top Five Reasons to Integrate PolyJet Technology into your Product Development Lifecycle



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Rapid prototyping has become a game-changing innovation for designers, engineers and manufacturers since it was introduced two decades ago. Previously, prototypes would be constructed from wood or metal in woodwork or machine shops. The process took weeks or months and the cost was often so prohibitive that designers skipped prototypes entirely and went directly from CAD to tooling. Often this meant that design flaws were not identified until manufacturing began, leading to expensive re-work and lost time.



Ivivi's medical device prototype printed on an Objet® 3D Printer.



Rapid prototyping technology has progressed significantly over the years improving on both the cost and quality fronts. Circa 2000, PolyJet™ technology was introduced to the market, a jetting process of photopolymer resin in ultra-thin individual layers that builds 3D models and prototypes. The resin is simultaneously cured with a UV light during the layering process, an approach that allows for the printing of several materials at once including flexible, rubber-like materials, rigid materials, opaque and transparent materials and even composite Digital Materials. Newer 3D printers allow for up to three components to be combined into a single material, including the option to combine Digital ABS™ with a third base resin.

Combining smooth surface finish, highly accurate geometries and a large selection of materials and material combinations, PolyJet technology enables the best representation of the intended final product. PolyJet technology is also a clean process suitable for both office and desktop environments.

Is PolyJet Technology Right for You?

Based on a survey of users from various markets — including consumer goods, consumer electronics, medical device, education, research, entertainment and others — Stratasys crafted these top five reasons to integrate PolyJet technology into your product development lifecycle.

1. Designers can prototype more iterations without blowing the timeline or budget.

3D printing – particularly when performed in-house – enables design teams to quickly produce a high-quality, realistic prototype with moving parts, at low cost when compared to other methods such as CNC machining or outsourcing. This means teams can use prototyping on projects where it wasn't feasible in the past due to time or cost considerations.

“We needed a faster, more streamlined system: one that would let us do the engineering, development and production of clinical trial-ready devices in-house,” says André A. DiMino, executive vice president at Ivivi Technologies. “We had heard about rapid prototyping and were very excited about seeing how it could help us.” The integration of the company's PolyJet-driven 3D Printer into product development and production cycle was an unqualified success, yielding a positive ROI in less than one year. “We've cut an average of five to six weeks off the clinical trial device production process,” says DiMino.



Orchid's medical device and implant prototype printed on an Objet 3D Printer.

2. Better collaboration resulting in improved design and manufacturability.

The ability to quickly produce real working prototypes that teams can see and touch helps quickly bridge the gap between the virtual 3D CAD design and the final product. Design and manufacturing engineers can use these prototypes as a tool to better communicate how a design looks, feels and operates. This allows designers to better integrate their product designs with manufacturing at an earlier stage in the development lifecycle.

Brian McLaughlin from Orchid Design, a division of Orchid Orthopedic Solutions, says, "Often, something the designer sees on a rapid prototype – such as an undercut, or some other area of difficulty – will cause them to tweak the design before it goes to the customer or to machining ... 3D printing has definitely had a major impact on the quality and manufacturability of our designs."

According to Jon Fawcett from Fawcett Design, his team now uses an Objet 3D Printer for "anything and everything. Functional prototypes, aesthetic prototypes, rigid molds for urethane cast parts, rapid manufacturing ... our Objet 3D Printer is very versatile. We can now do same-day turnaround on prototypes, which in turn allows us to do a lot more prototyping. We can very quickly see if something will work; we no longer have to guess or take a chance."

3. Field test with prototypes that resemble the final product providing insight into potential design flaws.

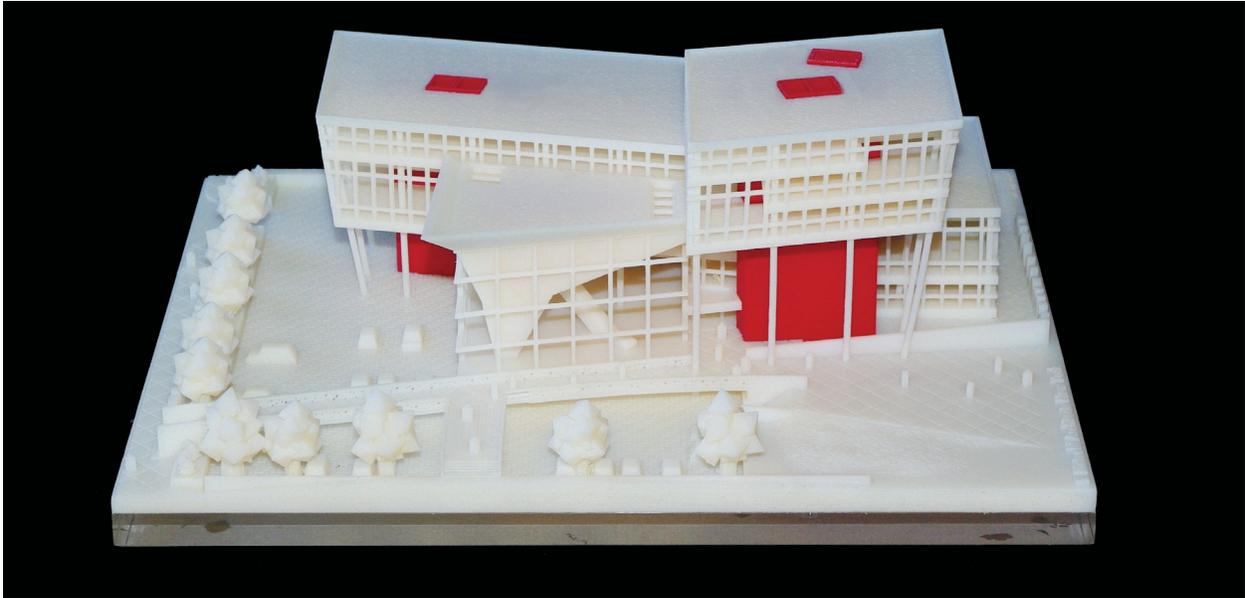
More prototyping means more opportunity to evaluate whether or not a part will function as intended. Prototypes allow designers to catch potential flaws before incurring the exponentially higher costs of re-tooling and rework, reducing some of the risk of introducing new products.

Shawn Greene from Fender Musical Instruments Corporation describes a recent project to develop a light-up front panel for an amplifier. Greene 3D printed prototypes of the panel using a clear material, tested it with different types of lights and discovered that light didn't deflect the way his team thought it would.

"We had to adjust the design to make it work," says Greene. "In the past, we would not have done a prototype for that kind of part because it would have taken too long and cost too much money. ... The ability to rapid prototype in house saved us a fortune on that project."



Fender's guitar amplifier prototype printed on an Objet 3D Printer.



Rietveld's architectural prototype printed on an Objet 3D Printer.

4. Improve customer satisfaction.

3D printing can help improve satisfaction for both internal and external customers. Designers using 3D printing have the ability to quickly produce realistic prototypes for internal decision-makers as well as external clients. Having the ability to touch a real-world concept, combined with testing functionality, allows all partners in the design and manufacturing process to make better product decisions.

The bottom line: 3D printing helps organizations get better products to market faster than ever before. "Frequently during a project, clients request design changes or wonder how particular changes may impact the overall aesthetic," says Piet Meijs, Rietveld Architects. "Our Objet system lets us create a whole new model right away, and that wows the client every time."

"Now that we have it, we tend to use it for all our projects, and the feedback from our customers has been terrific," says Brian McLaughlin of Orchid Design. "It's pretty amazing to see someone's face when you give them a real model that brings their idea to life. It really blows them away."

5. Seeing is believing.

Design is both an art and a science that starts with the imagination. 3D printing helps quickly transform something imagined into something that can be seen and touched. Prototypes are often used to help sell new concepts, so the more realistic the prototype, the better.

"You can show someone something on paper all day long, but when you give them a real part that they can touch, they really get excited," says Shawn Greene of Fender.

For Thermos, perfecting a design is crucial since customers touch the finished product with their hands and mouths. "[3D printing] allowed us to optimize the fit of the cap stopper and pouring performance of the best-selling Thermos mugs," says Thermos R&D engineer Takahiro Maruyama.



Adding in-house 3D printing capabilities enabled Thermos to quickly test out new designs and cost just one-fifth of outsourcing.

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Additional considerations

Cost and time savings are the primary drivers for incorporating 3D printing and PolyJet technology into the product development process. But for some organizations, other factors influence the need for in-house technology.

The ability to drive revenue – pertaining primarily to service bureaus — through lower-cost 3D printing services helps encourage their customers into giving them ancillary business such as manufacturing.

Organizations oftentimes weigh the need for in-house technology against the efficiencies of outsourcing. A typical maturity curve is to start off with outsourcing, and then bring it in-house as the volume of projects grows.

Many customers have realized that an in-house solution has significant additional benefits like the ability to protect the confidentiality of their designs.

Customers have also found that the 3D printer can be useful for many different applications, some of which were originally unexpected. Add to this the multi-material and multi-color technology available in the Connex™ line of 3D printers, and customers can achieve unparalleled product realism.

Having this technology at their fingertips gives customers the freedom they need to be more creative and efficient with their designs.

A 3D printer for every need

Whatever the driver, there are myriad benefits to integrating 3D printing into your product development process. In recent years, 3D printing technology has matured to the point where there are today a number of different types of systems on the market, from entry-level desktop machines to high-end multi-material 3D printers. Stratasys has a full range of 3D printers designed to meet your organization's exact requirements.

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