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Top Five Reasons

to integrate 3D Printing into
Your Product Development Lifecycle



Rapid prototyping was a game-changing innovation for industrial designers when 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 prototypes
3D printer: **Eden350**

Rapid prototyping technology has progressed significantly over the years improving on both the cost and quality fronts. Circa 2000, Objet Geometries introduced the PloyJet™ and PolyJet Matrix™ technology to the market, a jetting process of photopolymer resin in ultra-thin individual layers that builds models. The resin is simultaneously cured with a UV light during the layering process; an approach that allows for printing of several materials including flexible, rubber-like material and composite Digital Materials™. The result is a much higher-quality surface finish and highly accurate geometries. Unlike many competing technologies, Objet's PolyJet and PolyJet Matrix are clean processes suitable for office environments.

So why should you consider using 3D printing technology as part of your product development process?

Objet surveyed its' base of users from various markets including consumer goods, consumer electronics, medical device, education, research, entertainment and others, why they made the investment, and based on their responses crafted these Top Five Reasons to Integrate 3D Printing into Your Product Development Lifecycle.

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

3D printing – particularly when done in-house – enables design teams to quickly produce a high-quality, realistic prototype with moving parts, at relatively low cost when compared to other methods such as 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.



Orchid's device and
implant prototypes
3D printer: **Alaris30**

"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. We had heard about rapid prototyping and were very excited about seeing how it could help us." Andre' A. DiMino, Vice Chairman of the Board, Executive Vice President and Chief Technical Officer, Ivivi Technologies. The integration of the Eden350 into the product development and production cycle at Ivivi has been an unqualified success, yielding a positive return on investment in less than one year. "We've cut an average of five to six weeks off the clinical trial device production process," said DiMino.

2. Better collaboration resulting in improved design and manufacturability

The ability to quickly produce real working prototypes that teams can see and touch helps bridge the gap between the virtual 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 allowing for the product design to integrate 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. Or, a customer will say, 'You created it just as I described, but now that I see it, I think we need to change X, Y or Z.' 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 the 3D printing system for "Anything and everything. Functional prototype, 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."



Fender's Guitar amplifier prototype

3D printer: **Eden350V**



Rietveld's building prototype

3D printer: **Eden350**

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.

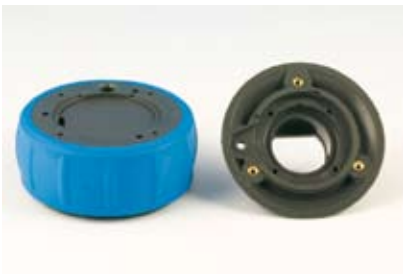
Shawn Greene from Fender Musical Instruments describes a recent project to develop a light-up front panel for an amplifier. Using 3D printing, Greene produced prototypes of the panel using a clear material, tested it with different types of lights and discovered that light didn't deflect the way they 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. So by the time we noticed that problem we would have already paid for tooling, and then we would have had to pay for amendments for the tool. The ability to rapid prototype in house saved us a fortune on that project."

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 constituents of 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," said 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. 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." -Brian McLaughlin, Orchid Design



Vista's prototypes

3D printer: **Connex500**

5. Seeing is believing

Design is both an art and a science that starts with 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.

'With the Objet Connex500, we don't have to rely on imagination to convey how an overmolded part will actually look, feel and operate.'

– Dan Mishek, Vista Technologies

"No matter how good our 3-D graphics are, there is nothing like a model in your hands..." – Henry K. Kawamoto, M.D., D.D.s, UCLA Medical Center

"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" -Shawn Greene, Fender Musical Instruments

Additional considerations

Cost and time savings are the primary drivers for incorporating 3D printing 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 – by offering 3D printing services or use the services as a way to lure customers into giving them ancillary business such as manufacturing. When Fawcett Design was evaluating rapid prototyping technologies they settled on a high-end 3D printing system because it offered the speed and finish quality required to have the competitive edge as a rapid prototyping service provider.

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 Objet 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 printing system can be useful for many different applications some of which were originally unexpected. Having this technology

**Alaris30**Affordable Desktop
3D Printing Systems**Eden Family**Professional Line of
3D Printing Systems**Connex Family**World's Only Multi-material
3D Printing System

at their fingertips gives them the freedom they need to be more creative and efficient with their designs.

A 3D printer for every need

Whatever the driver, this paper demonstrates a myriad of benefits to integrating 3D printing into your product development process. In recent years, 3D printing technology has matured to the point where there are a number of different types of systems on the market, from entry-level to high end. Chances are a system exists that meets your organization's exact requirements.

3D Printing Systems from Objet Geometries

Objet Geometries is the innovation leader in 3D printing. Objet develops, manufactures and globally markets ultra-thin-layer, high-resolution 3D printing systems for rapid prototyping and rapid manufacturing. Our wide range of solutions includes the market-proven Eden family of 3D printers and the Alaris30, the world's first desktop 3D printing systems, based on our patented PolyJet™ technology. Our Connex Family of 3D printers are the only 3D printing systems on the market which are based on PolyJet Matrix™ technology and allow users to print multi-material prototypes in a single build.

Visit our webinar library and learn more about how customers like Orchid Design and Burton Snowboards have successfully incorporated 3D printing in their product development lifecycle.



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