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Tom Weisel,
President, Arch Day Design



Case Study

At a Glance

Company: Arch Day Design
URL: www.archdaydesign.com
Location: Ventura, CA
Industry: Medical device design

Challenges

- Slow turnaround time and high cost of outsourcing rapid prototypes

Solution

Objet Alaris30 3D Printing System

Results

- Can now produce rapid prototype in three hours, versus three days, which helps accelerate both design freeze and time-to-market for customers' devices
- Ability to produce more prototypes has also helped improved design quality

Alaris30 helps Arch Day Design improve design quality, win more business

In-house Objet 3D printing system helps medical device firm reduce turnaround time for rapid prototypes from three days to three hours

Arch Day Design is a comprehensive medical device design firm based in Ventura, California, whose principals have more than 25 years' experience. Specializing in minimally invasive devices, the firm's clients range from individual surgeons to large health-care companies such as Allergan.

Prototypes are essential to the medical device design process, used to check everything from form, fit and function to manufacturability. But prototypes can also be difficult to produce, due to the small size and intricacy of the parts. According to Tom Weisel, President of Arch Day Design, some of the parts they design are as small as a staple and measure just 0.020 inches in thickness.

Speed is also essential to the design process, because time to market is critical in the highly competitive medical device space. The ability to produce highly accurate prototypes quickly enhances device manufacturers' competitiveness. Shaving a few days or weeks off the design process can often mean the difference between being first or being second to market.



Design firm seeks out in-house 3D printer to accelerate turnaround time for prototypes

The combination of those two factors – importance of prototyping and need to accelerate time to market – means that Arch Day Design relies heavily on rapid prototyping. For many years, due to the high cost of buying an in-house system, the firm outsourced the work to service bureaus, spending tens of thousands of dollars a year. Though the quality of the parts was generally good, Weisel was unhappy with the turnaround time (generally three days at a minimum) and cost.

“We knew that if we had an in-house system, we could turn around prototypes much more quickly and probably reduce our overall costs, but the price points scared us away,” recalls Weisel. Then a colleague recommended Objet’s Alaris30.



The Alaris30 Desktop 3D Printer delivers a unique combination of high-quality, finely detailed printed models available in a compact office-friendly system. It can be used to create smooth surfaces, complex geometries, small moving elements, fine details, stand-out text and whatever else a design demands.

Objet Alaris30 provides combination of high value and high quality

The Arch Day Design staff was already familiar with Objet because its service bureaus used Objet 3D printers. “The Alaris30 was the first 3D printing system that was within our budget and produced high-quality parts suitable for medical device work,” says Weisel. “In the past, everything we’d seen was too expensive, had poor quality finish, or just wasn’t accurate enough. Objet changed that. The Alaris30 provides us with great value, and can handle 99 percent of our prototyping needs.”



“With our Alaris30, we have cut prototype iteration cycles from three days to just three hours, depending on the part design,” adds Weisel. “That has allowed us to increase the number of iterations we do by 3x, and still get to design freeze more quickly, which shortens our customers’ time to market.

“With the Alaris30 we get better designs, faster and at significantly lower cost when compared to outsourcing”

The Arch Day Design team has found the Alaris30 particularly helpful for handles and mating parts. “We design a lot of handles,” explains Weisel. “There’s no real magic to it, except that they have to feel good in someone’s hand. With our Objet 3D printer, we can try a lot of different options to see which ones feel best. It’s hard to tell that on a CAD screen, and when we outsourced prototyping, it just wasn’t feasible for us to try too many things or produce too many prototypes – there wasn’t time.”

Mating parts are trickier, according to Weisel, whose team can now do multiple iterations to make sure they get the right click-lock. “The alternative is to have the parts molded – that takes far too long. With the Objet 3D printer, we can do two or three sets of parts in one day and get to a great design really quickly,” he says.



The two biggest benefits to having the Objet printer in-house, says Weisel, are the reduction in turnaround times for rapid prototypes and an improvement in the designs the firm produces. And they are directly related. "More iteration means more improvements," he explains. "It also frees us to try some edgy designs that we might not try if we were limited to evaluating CAD designs or had to skip prototyping due to time or budget constraints."



Prior to having the Objet 3D printer, says Weisel, Arch Day designers couldn't always produce a prototype because it took so long – a minimum of three days. So they might sit staring at their CAD stations a little longer, trying to select the best option – and then make their best guess and continue on. Now, says Weisel, instead of guessing, they can print out all the options and take a closer look. "It gives us greater comfort in being creative with our designs," he says. "We can try several different approaches and evaluate them objectively. These designs will ultimately become parts that are used in real people, so every last detail is absolutely critical."

Ability to turn around prototype in a day leads to breakthrough design for a customer



For example, recently Arch Day Design was working on a new design for an arthroscopic cannula system for a client, and had access to a surgeon-advisor just once per month. A cannula is a type of guide tube used for arthroscopic surgery. The client's previous design was comprised of three parts, and that had led to strength and reliability issues. Just two days before a meeting with the surgeon, the Arch Day team conceived of a new type of one-piece cannula design that it thought was a major improvement, but that would require surgeons to slightly change the way they performed a certain procedure. No one knew if the surgeon-advisor would see the change as minor or not. "In just one day, we were able to design the new part and print out prototypes for the upcoming meeting," recalls Weisel. "As it turns out, the surgeon thought the new design was a major improvement, and said that the procedure change it would require would be inconsequential. If we hadn't had the ability to produce that prototype in a day, we never could have pitched that concept – it was too risky to take a chance on without the surgeon's buy-in."



Another example: recently, during a regular Monday morning update meeting with a client, an idea for a design enhancement for a critical part came up. The challenge was that the molder was already fabricating the tool, and the production deadline was looming. However, the enhancement idea was too good to let pass.

"We jumped on the design modification immediately, and printed the part on our Alaris30 within a couple of hours"

recalls Weisel. "After doing some bench testing, we transferred a revised drawing to the molder that same afternoon. The change was implemented with no delay to the mold delivery, and hence no delay to the overall schedule. Our client was amazed."

On several occasions, says Weisel, Arch Day Design has had customers call in the morning and say, "I have an idea." With their Alaris30 printer, the team is able to turn around not only a design but a real prototype that same day. "Time is money, now more so than ever," says Weisel. "It's a huge advantage for us to be able to turn things around that quickly. Every day we save on design is a day closer the customer is to getting their product to market."



On a related note, Arch Day Design frequently gets calls from customers who need parts printed quickly for internal design review meetings, testing or focus groups. "Again, before we had the Alaris30 we basically needed three or four days' notice to produce any prototype, and that meant sometimes we had to tell customers that we couldn't make their deadline," says Weisel. "Now, we can help them out even with just a few hours' notice. There's no substitute for putting a real prototype in a surgeon's hand. Clients love it."

In-house prototyping capabilities lead to increase in business

As a result, Weisel notes that Arch Day Design is getting more business out of existing customers.

*"They are outsourcing more design work to us,
and asking for more prototypes"*

he says. "In the past, some would have us do initial designs but maybe not the prototype work. So we're earning a greater share of their business." The Objet printer has also become a selling point that's helped Arch Day Design win new customers, as they have earned a reputation as a firm that does things quickly and does them right.

"Arch Day Design has a lot of very smart customers with great ideas," concludes Weisel. "They come to us because we can make their ideas come to life very quickly – and Objet enables that."

About Objet Geometries

Objet Geometries Ltd., the innovation leader in 3D printing, develops, manufactures and globally markets ultra-thin-layer, high-resolution 3-dimensional printing systems and materials that utilize PolyJet™ polymer jetting technology, to print ultra-thin 16-micron layers.

The market-proven Eden™ line of 3D Printing Systems and the Alaris™30 3D desktop printer are based on Objet's patented office-friendly PolyJet™ Technology. The Connex™ family is based on Objet's PolyJet Matrix™ Technology, which jets multiple model materials simultaneously and creates composite Digital Materials™ on the fly. All Objet systems use Objet's FullCure® materials to create accurate, clean, smooth, and highly detailed 3D parts.

Objet's solutions enable manufacturers and industrial designers to reduce cost of product development and dramatically shorten time-to-market of new products. Objet systems are in use by world leaders in many industries, such as Education, Medical / Medical Devices & Dental, Consumer Electronics, Automotive, Toys, Consumer Goods, and Footwear industries in North America, Europe, Asia, Australia, and Japan.

Founded in 1998, Objet serves its growing worldwide customer base through offices in USA, Mexico, Europe, Japan, China and Hong Kong, and a global network of distribution partners. Objet owns more than 50 patents and patent pending inventions. Visit www.objet.com.

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