



# Get to Market Faster

## Work Smarter, Not Harder With 3D Printing

You already know what it takes to be competitive in today's market: flexibility and speed. Slow development cycles mean your competitors get to market first, leaving you behind. Rushing to market without adequate testing increases risk. Can there be a sweet spot? Yes, the right tools can help speed a fully-vetted product to market ahead of the competition. But traditional prototyping technology may not be the answer. With tight timelines, it's too costly to vet multiple iterations using CNC or outsourcing. Sometimes designers and engineers skip prototyping completely and go straight to tooling to save on time and budget. But that means design failures get pushed to the manufacturing stage when it's too late to prevent costly redesigns.

Market leaders in product development and manufacturing use 3D printed prototypes. Creating accurate prototypes fast, early and often lets you examine a design's true potential at every stage, so you can go confidently into production. But even companies already using 3D printing for rapid prototyping face challenges making the most of this technology. If the 3D printers aren't readily accessible to the users, if the workflow is cumbersome and complicated or the equipment is unreliable, the benefits aren't there. Consumer 3D printers may seem like a beneficial rapid prototyping solution. While it's an appealing strategy, it's not without risk. In contrast, professional 3D printers provide additional value, through increased capability, efficiency and reliability. From plan to prototype to new product introduction, you can accelerate decision making and transform raw ideas into profitable products with professional, durable 3D printing.

# 4X Faster Than Traditional Methods

Professional-grade 3D printing is designed to increase the efficiency and simplicity of the rapid prototyping process. It enables product designers and engineers to move rapidly from concept to functional prototype in a fraction of the time, compared to traditional prototyping methods. Prototypes made with formed sheet metal, CNC machining or injection molding require substantial time and cost. Mathematical and thermal modeling gets you in the range of what is required, but can't provide exact results. 3D printers are designed to remove the barriers designers and engineers face by making the RP process more efficient and productive.

## Fast

It's no secret that businesses need to quickly respond to changing customer and market demands to stay competitive. That's true for small design firms as well as large, established manufacturers. Verifying concepts, validating designs and testing function with 3D printed prototypes is four times faster than using traditional methods due to the speed, lower-cost materials, less material waste and less downtime. Prevent expensive tooling redesigns and create better products faster, reducing your time to market.

## Smart

Print everything from fast, low-cost concept models to durable assemblies with accuracy, quality and consistency. Trial and error done with multiple 3D printed iterations gives you more time to confirm precise specs for a smarter design sooner. Because 3D printers can produce models with fine feature details and the strength to withstand rigorous testing, designers can be more confident in their work.

## Productive

Minimize typical pain points of traditional prototyping methods: lag time, inaccurate parts, high costs and low quality. In the race to develop new products quickly, chances for failures increase because there is not enough time and/or resources to adequately vet and test more than a few design iterations. 3D printing lets you produce multiple designs faster, which garner immediate feedback during critical development stages, allowing for more space and time to take on additional projects.

Center for Advanced Design (CAD), a small product design firm, specializes in creating complex surface geometry for the plastics industry. Developing a customer need into a product requires an ability to verify concepts, validate designs and test function quickly, a process made more efficient with CAD's in-house 3D printer.



**“3D printing prototypes gives us the ability to fail fast. We can produce multiple design iterations quickly and we can change a product design overnight to meet a customer’s deadline. The parts are accurate and the process is dependable.”**

– Jesse Hahne, co-owner, CAD

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# Simplify the Design Process

3D printers used in workgroup settings experience high utilization, placing significant demands on the mechanical components. Your workgroup's productivity will be hampered by a complex system, poor printer reliability and sub-par materials.

Hobby printers may look easy to use, but in reality users end up recalibrating the entire machine for each print job. This requires someone with a high level of technical expertise. Professional 3D printers are designed for ease of use and shorter, streamlined workflows that give your team the capability, repeatability and simplicity they need in a rapid prototyping platform to iterate, refine and perfect designs. Clean, safety-certified 3D printers fit well within the office environment.

## Improve part quality

3D printing with FDM® technology and engineering thermoplastics like ASA, ABS and PC-ABS provide the durability and accuracy needed to mirror engineering specifications. This reduces the time or material once needed to redo poor-quality prototypes. Hobby-grade printers are not designed for high use, and quickly start printing spaghetti when pushed too far, which means wasted time fixing warped parts or an overheated head. Curl is an inherent behavior of plastic as it cools from a melted state and controlling this characteristic is essential to maintaining part quality, particularly for long, flat parts. This is possible with uniform airflow and complex temperature control throughout the build area of professional-grade 3D printers.

## Plug and play

A small hobby-grade printer may look high tech, but it can become a major disruption in a design space. Without an enclosure, designers are subjected to the loud noise of low-cost motors. Quiet, office friendly, plug-and-play 3D printers with automatic setup are easy to use. Fast and quick material swaps also maximize productivity. Auto-calibration reduces troubleshooting so there's more time for iterating.

If you've ever spent time converting native CAD files to STL files, you know it can be frustrating. With GrabCAD Print™, you can import native CAD files directly, so there's no need to waste time converting STL files saving you 30 minutes with each design change. It's formatted similar to CAD software, which is familiar to designers and engineers. Simply open GrabCAD Print, drag in your file, select "Print" and start your build. It's that easy.

Print and multi-tray management gives visibility into each print job and the ability to prioritize. There's no need for a special technician dedicated to printer operation and maintenance. You can manage or print jobs from anywhere, anytime.

**“ FDM has a much broader application range. It works well in 90% of what we do, including making prototype parts, fixtures, tooling, injection molds and production parts. If you can imagine it and draw it in CAD, you can build it in FDM.”**

Duane Byerley, Xerox

# Unlimited Design Freedom

3D printing frees designers from design-for-manufacturability constraints, letting them create virtually any shape and configuration.

Complexity is free with 3D printing. The design elements that increase time and cost with CNC milling are no longer a player with 3D printing. Certain geometries can't be 3D printed without material that supports overhanging features and nested assemblies during the build process. Hobby printers lack the capabilities, but professional 3D printers can produce complex parts, thin walls, internal cavities and interlocking parts thanks to the soluble support. Hands-free support removal also saves labor, making the design process more productive and efficient.

Controlling the temperature of the printer's enclosed build chamber is critical for maintaining design specifications as the part is built. Curl is an inherent behavior of plastic as it cools from a melted state and controlling this characteristic is essential to maintain part quality, particularly for long, flat parts. This is achieved with uniform airflow and complex temperature control throughout the build area.

**“None of this would have been feasible without 3D printing. We printed whatever parts we could because we didn't want to send it to manufacturing and lose control over the timing and the quality. There's a real benefit to having a part in your hand and evaluating it with very little effort or manpower.”**

Patrick Campbell, VER

## Dependability and Speed

Hobby-grade printers are not designed for high use. Print the same high-quality part every time fast with a professional 3D printer built for high utilization, constant temperature control and engineering-grade technology allowing you to test designs early and often.

Some professional FDM 3D printers offer fast-draft print mode, which operates at twice the speed of the standard FDM prints and typically using only one-third the material. This lets you 3D print models very quickly, whether it's for faster part iterations to validate design concepts or to quickly print multiple concept models for management or customer buy-in.



Soluble support capabilities makes it possible to prototype this camera lens cover with an adjustable aperture.

# In-House 3D Printing Advantages

3D printing in house shrinks product development time and improves design optimization. It also offers added insurance against supply chain risks. When development timelines are in danger due to part or resource delays, 3D printing parts in house keeps production schedules on track.



**We invested in additive manufacturing to not only enhance our processes, but extend into new tooling applications to further differentiate ourselves as an end-to-end, design-to-production service. The 3D printer has been a game-changer for us... Not only does it make the work of our operators much easier, it frees up resources and increases our overall productivity.”**

Darío González Fernández,  
Indaero

## Value

Professional 3D printers can work overnight without the need for monitoring. That means you can produce reliable results that justify the investment because of the increased capability, efficiency and consistency. Often, the printers pay for themselves with just a small number of projects. In-house 3D printing not only saves on time and cost during product development, it also opens the door to additional revenue streams such as low-volume tooling production. In contrast, hobby equipment limits long-term prototyping capabilities due to low-quality results and time wasted babysitting print jobs.

## Confidentiality

Prototyping in-house with local 3D printers not only speeds your design development, it also protects your intellectual property. There's no risk that confidential design information will fall into competitors' hands through outside machine shops and service bureaus. You can keep your new product under wraps, and still get to market faster.

## Cost savings

3D printing is a cost-efficient way to produce models and parts in house. If you outsource, the cost in time and dollars adds up quickly, on average \$2500 per prototype, when using traditional methods.



**We've saved over \$45,000 so far this year, and countless days of time. Costs were going to be about \$18 a cubic inch to print out-of-house, versus material costs of just over \$4 a cubic inch. Based on this quoted cost, our volume of printing on our two machines has already saved us enough to pay for the two printers.”**

- Rob Humphries, Thule

# Make rapid prototyping smarter, faster and more productive

If you're in the business of designing and developing new products, the office-friendly, professional-grade Stratasys F123™ 3D Printer Series offers the straightest path to a positive impact on your bottom line. These 3D printers are designed for ease of use and shorter, streamlined workflows that give your team the capability, reliability and simplicity needed to iterate, refine and perfect designs. They can do that in an office environment with clean, safety-certified 3D printers that are the quietest on the market, using three engineering-grade plastics, plus the economical choice of PLA and Fast-Draft mode.

This solution is not only for companies new to 3D printing but for long-time practitioners of the technology. That's because Stratasys F123 3D Printers maximize results with consistent performance and a simplified workflow using GrabCAD Print. That's beyond what's currently available in hobby 3D printers.

Stratasys F123 3D Printers leverage the time-tested durability and success of FDM technology to offer the highest level of reliability out-of-the-box for a range of capabilities and budgets. Over 100,000 hours of testing support that assertion. Stratasys F123 Series supports for every stage of prototyping, and is easy to operate and maintain, whatever your level of experience. The F123 enables:

- > Faster decision making with the project timeline
- > Early discovery of potential design failures
- > Ability to adjust designs and iterate rapidly
- > Increase profitability, speeding time to decision means you can take on more projects
- > New revenue streams

## ROI

Hobby-grade printers may be cheap, but they will yield cheap results and frequent breakdowns, driving your ROI down to nothing. To achieve ROI in less than a year, invest in a professional-grade rapid prototyping 3D printer.

## It's as easy as...



## Explore 3DP

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