Design With Brilliance

GAME-CHANGING VERSATILITY AND REALISM WITH THE WORLD'S ONLY FULL-COLOR MULTI-MATERIAL 3D PRINTER

stratasys®

THE **3D PRINTING SOLUTIONS** COMPANY™

INTRODUCTION

Ask anyone in business, higher education or the medical community what their top objectives are and they'll probably say it's to achieve more, to solve more problems, faster than what's possible now, while saving money in the process. Ask what's holding them back and you'll probably find a diverse variety of obstacles in their day-to-day work processes that hinder them in meeting those goals.

Having the right tools to do the job is one crucial element in solving problems and becoming more efficient and productive. Additive manufacturing, widely known as 3D printing, is one of those tools that has helped businesses, educators, health care providers and researchers improve how they design, manufacture and perform research.

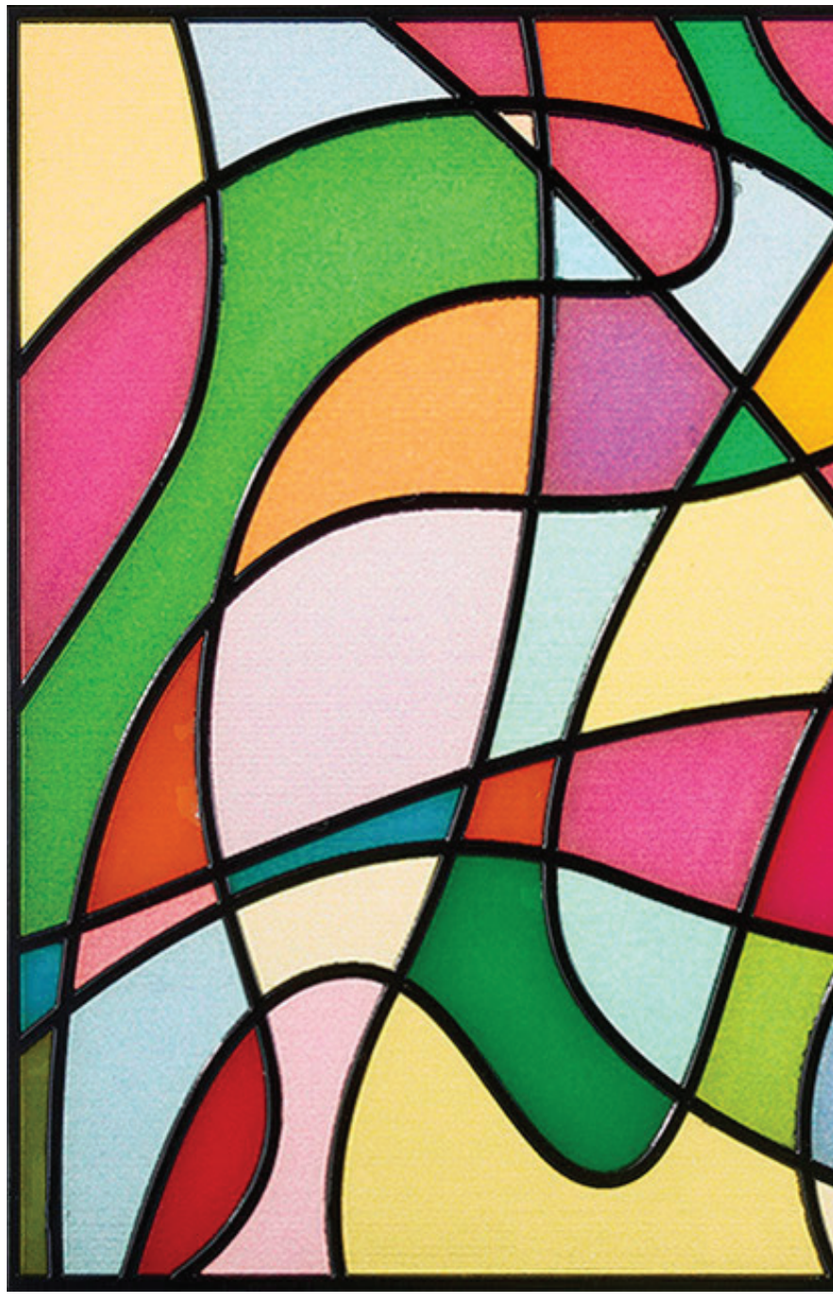
While no tool is an all-in-one solution, 3D printing is a strong step in that direction, particularly in its most sophisticated forms. 3D printing makes it possible to manufacture things that aren't feasible with traditional processes like machining or injection molding. It creates models, prototypes, tools and some finished products faster and with fewer constraints, empowering designers to make better-informed decisions, refine their designs more quickly, and get products to market sooner.

PolyJet™ technology is an additive manufacturing process with the capability to make parts, prototypes and models in multiple materials, colors and color textures. All of these characteristics can be combined in one 3D print job, allowing complex parts with diverse properties to be produced quickly.

The latest innovation in this technology is the Stratasys® J750™ 3D Printer. The most sophisticated and versatile 3D printer on the market, it provides a breakthrough in the realism of 3D printed prototypes with the ability to build in full color and a broad range of material properties. It also maximizes uptime and the diversity of jobs that can be handled with one system. In practical terms, if you're a rapid prototyping manager, that means you can deliver realistic prototypes to the designer faster, helping you stay on schedule. If you're a designer, it means you get not a vague glimpse, but a detailed evaluation of your future product.

A 3D printer won't solve all of the world's problems, but among creative minds, the Stratasys J750 is an impressive tool to bring business and research achievements in line with aspirations.

Let's take a closer look at how additive manufacturing and the Stratasys J750 provide real solutions.



CHAPTER ONE -

STRATASYS INVENTS 3D PRINTING. AGAIN.

The Stratasys J750 3D Printer isn't just the latest introduction in the portfolio of PolyJet 3D Printers. It's the first-ever full-color, multi-material system, and it addresses the frustration of designers who want realistic models but have to contend with inconsistent color results and rough finishes from current 3D printing technology. It also targets rapid prototyping managers using multiple technologies and messy processes, looking for a leaner, cleaner method to create exactly what the designer needs.

INCREDIBLE PART REALISM

A hallmark of the Stratasys J750 is its true, full-color capability, a breakthrough in 3D printing technology. The ability to 3D print with various colors is not new, but previous offerings forced users to sacrifice either color range or part quality. The Stratasys J750 changes this by producing smooth plastic parts with over 360,000 colors.

This color range is made possible because the Stratasys J750 can operate with 5 different colors: cyan, magenta, yellow, black and white. With the capacity to use all of the primary colors in the CMYK color process, including white, the Stratasys J750 creates colors similar to a full-color 2D document printer that's printing on a white background, enabling it to achieve a broad color spectrum.

Color textures and gradients are also possible. Color texture capability means rigid opaque parts can be 3D printed with a variety of realistic patterns like wood grain and plaid, for example, or even photographs and illustrations. Gradients allow a transition zone between colors that blend one into the other.

When a variety of material characteristics are needed, models can combine full color with a range of transparencies, or even different durometers. In practical terms that means being able to produce a rigid medical model representing various internal anatomical structures in multiple colors and gradients. Or it might mean producing a tray of multiple parts, each with different characteristics such as color textures, flexibility and transparency. Both scenarios are possible in a single print run.

One of the drawbacks of existing color 3D printing processes is the relatively rough surface finish that results. In contrast, the Stratasys J750 achieves very fine layer thicknesses, as low as 14 microns in high-quality print mode, enabling high surface quality and the creation of models and parts with very fine, delicate details.

CHAPTER ONE -

STRATASYS INVENTS 3D PRINTING. AGAIN.

The availability of such a wide color spectrum, combined with the fine-finish, multi-material capability, lets the Stratasys J750 produce parts with an incredible array of characteristics. Prototypes that need to look, feel and function like future products are possible in a single print operation, with minimal to no finishing steps like painting, sanding or assembly.

UNMATCHED VERSATILITY

The Stratasys J750 not only delivers incredible realism but it's also the most versatile 3D printer available.

This versatility originates from its robust material capacity, accommodating input of up to six base resins. Because advanced PolyJet systems create composite materials right on the build tray, the number of material options is far greater than the number of input materials. In the Stratasys J750, those six base resins yield hundreds of thousands of colors, translucencies and durometers.

Before the Stratasys J750, no single 3D printer could deliver full color, smooth surfaces and multiple materials. A shop that wanted to achieve all of these qualities would have had to adopt multiple 3D printing technologies and still resort to extensive post-processing, such as sanding, painting and bonding. Serving many needs with one system enables businesses to:

- Reduce the amount of rapid prototyping equipment onsite, and its associated overhead and points of failure
- Increase expertise and maximize use through familiarization with a single technology
- Protect investments against changing business needs, both cyclical and unpredictable

Print size with the Stratasys J750 is also generous, with a build area of 49 x 39 x 20 cm (19.3 x 15.35 x 7.9 in). This lets you create ample-sized parts or many smaller parts in one job.

For rapid prototyping programs, this versatility is an opportunity to meet the diverse demands of your operation without the inefficiencies associated with material changes or the need to invest in, operate and maintain a variety of technologies. You can print realistic prototypes, presentation models, Digital ABS injection molds, jigs, fixtures, educational and promotional pieces, production parts – or all of the above, with one system.

The Stratasys J750 3D Printer and material cabinet.

Create concept models featuring multiple colors, textures and moving parts, all in a single build.

CHAPTER ONE -

STRATASYS INVENTS 3D PRINTING. AGAIN.

FAST, EFFICIENT WORKFLOW AND EASE OF USE

Using the printer is easy, starting with PolyJet Studio™ software to process your part. PolyJet Studio is the next generation of Objet Studio™ software and offers multiple improvements for workflow efficiency. The software includes an intuitive interface that makes it easy to choose materials, optimize the build and manage print queues. Once the parameters of the part are selected it's simply a means of clicking the "print" button to start the build. It's a hands-off process and doesn't require operator attention while it's building, letting you focus on other priorities.

Server functionality built into the 3D printer is another software advantage. This allows several users to work on the same printer at once for greater efficiency.[1] The software's visual enhancements include a darker background, improving on-screen color for more precise color choices, and the ability to see the model's full material properties at all times.

The Stratasys J750's six-material capacity is a considerable time and material saver. Multi-material printers with less capacity need material changes for different colors or material types. This results in printer downtime and wasted material, made necessary to purge the system of the previous material. The Stratasys J750's larger material capacity lets an operator load their most-used materials and drastically reduce or even eliminate material changes, saving time and resources.

New print heads increase the printer's speed. The Stratasys J750 has three print modes: high speed, high mix and high quality. The high speed mode prints at twice the speed of Connex3™ printers when using three materials, providing the ability to make multi-material models faster than previously possible. The high mix mode makes it possible to use the printer's full, six-material capacity, for the optimum number of choices in color and mechanical properties. Despite the increased number of materials, high mix mode prints at the same speed as existing Connex3 printers. And the speed at which Digital Materials such as Digital ABS can be printed has increased two-fold.

Some 3D printing processes must run in a dedicated facility because of the materials, chemicals and post-processing steps involved. In contrast, the Stratasys J750 3D Printer uses a clean, easy process, with no hazardous chemicals to handle.

Note the realism of the simulated wood grain finish and leather shift boot on this prototype automotive dashboard.

[1] Full server functionality will result from a software upgrade subsequent to the earliest product shipments.

CHAPTER ONE -

STRATASYS INVENTS 3D PRINTING. AGAIN.

View this video to see the Stratasys J750 in use and the prototypes and parts it produces.

A 3D printer with this capability is a powerful tool, enabling creative solutions for diverse challenges that impact the medical, educational and consumer product industries. In the following chapters, we'll look at how 3D printing benefits these industries and how the Stratasys J750 improves on these advantages.

CHAPTER TWO -

IMPROVING MEDICAL OUTCOMES AND ECONOMICS

As 3D printing technology evolves, its use in the medical field continues to grow. Medical device manufacturers, hospitals, doctors, medical researchers and educators can all benefit.

RAPID PROTOTYPING AND PRODUCT DEVELOPMENT

Rapid prototyping and product development are key areas where 3D printing helps medical device manufacturers. In-house 3D printing produces prototypes much more quickly and usually for less cost than traditional manufacturing methods, particularly when it replaces outsourcing. This speeds up the entire development process because designs can be changed and parts re-printed quickly. This iterative but fast-feedback loop gets products to clinical trial and to market faster, benefitting patients sooner.

ANATOMICAL MODELS FOR SURGERY PREP AND EDUCATION

Scanning technology such as computed tomography (CT) and magnetic resonance imaging (MRI) lets doctors see a patient's anatomy with intricate detail. But as helpful as these tools are, they don't offer the benefits a 3D model can in terms of being able to study all aspects of an anatomical structure like a human heart. 3D printing is the natural extension of this scanning technology, providing the ability to create anatomical models in intricate detail. These models are multi-purpose too, used for surgical preparation and training as well as educational aids for medical students.

Perhaps the most remarkable and beneficial example of this application involves modeling a specific patient's anatomy, including pathology, that lets doctors study the best approach for surgical intervention. The 3D printer's ability to easily produce any shape is perfectly suited to the uniqueness of an individual's anatomy, and the variety of Shore A values rendered with PolyJet technology means models offer the proper tactile resistance as well as appearance. Doctors use these models to plan the best surgical approach resulting in shorter operating times and better post-operative results.

3D printed models also help train doctors to perform medical procedures and use new devices, and educate medical students on general anatomical structures. The Stratasys J750 in particular offers complex geometries and blends of material properties that would be difficult or impossible to produce with conventional manufacturing methods. Training models can mimic the look and feel of living tissue and can integrate instructional elements, such as labels or contrasting colors. These models can be produced on demand and avoid the challenges associated with human cadavers like availability shortages and handling and storage expenses.

Precise structural detail and gradual color gradients are combined on this rigid model of the human heart.

This liver model was created as a procedural planning device to show the critical structures to avoid cutting during a live-donor liver transplant procedure.

CHAPTER TWO -

IMPROVING MEDICAL OUTCOMES AND ECONOMICS

SURGICAL GUIDES, PROSTHETICS AND ORTHOTICS

Additive manufacturing is an optimal solution for prosthetics, orthotics and surgical guides because it's easily tailored to the individual's specific needs. Orthopedic surgical guides can be shaped to the patient's anatomy instead of using generic guides. This makes treatment more precise, resulting in fewer post-operative complications and faster recovery.

3D printed prosthetic devices cost a fraction of typical solutions, in part because of the lower costs associated with additive manufacturing. They are personalized to the individual's needs and in the case of growing children, replaced with new devices as needed for much less than traditional solutions.

LABORATORY TOOLS, JIGS AND FIXTURES

Using 3D printed manufacturing tools like jigs, fixtures and other production aids streamlines the work process and helps shorten the product development cycle. It's also a less costly approach compared to machining, which is often a disincentive.

Labs tools in the form of pipet racks, gel combs and other small parts can often be 3D printed for a fraction of the cost of what medical suppliers charge. They can also be tailored to the specific job needs making them a more versatile option than standard stock items.

CHAPTER THREE -

INCREASING KNOWLEDGE AND UNDERSTANDING

THE ENGINE OF INNOVATION

Research is the fuel that powers development of the innovative products and services we enjoy today. Research that has its roots in things seemingly unrelated to normal everyday life eventually results in tangible benefits for society. The conventional view may be that industry is responsible for these advances. But the truth is that universities and higher educational institutions perform a significant portion of the research that forms the basis of these advances. In the U.S., 31% of the total research (applied and basic) is performed by universities, including 56% of basic research.

The clear point is that these institutions are responsible for much of the knowledge that society ultimately benefits from. This is not esoteric study with no application in the real world. Rather, it's the pursuit of knowledge and answers that result in better medical care and other advances in business, technology and the arts. It's also used to educate future generations of professors, scientists, researchers, students and leaders. In essence, it's a society's investment in its future.

Aside from the minds that fuel this exploration, research institutions need the best tools, resources and technology available. And 3D printing is a key tool that gives the educational community the power to innovate.

EMPOWERING MINDS AND EDUCATING FOR REAL WORLD APPLICATIONS

The University of Virginia is recognized as a leader in aerospace studies because of its commitment to hands-on learning. The school started with one 3D printer and has since acquired several, sufficient to establish a rapid prototyping lab. The university makes the lab easily accessible, which draws attention from students both inside and outside the engineering program.

The creation of the 3D printing lab made it possible for a collaboration with leading aerospace engine manufacturer, Rolls Royce, resulting in a $2 million grant. Rolls Royce has high praise for UVA graduates' ability to understand crucial design concepts and knowledge of how to correct design errors. According to UVA professors, the 3D printer plays a big role in teaching students smart design.

From UVA's perspective the value of 3D printing in an academic setting is that it teaches students to design and build for real-world applications. Access to 3D printers gives students the ability to bring their designs to life, see how they work and understand if they meet design goals and solve problems. As a result, the students are better prepared to enter the workforce, equipped with the skills to tackle the challenges faced by industry.

This telescope model and its decorative Milky Way finish was created on the Stratasys J750 3D Printer.

CHAPTER THREE -

INCREASING KNOWLEDGE AND UNDERSTANDING

In a similar vein, Singularity University uses 3D printing to empower students to develop knowledge aimed at solving some of the biggest global challenges. The university's mission is to expose students to cutting-edge technologies and how to use them to benefit the world.

Singularity University uses 3D printers to elevate the students' typical learning model from just thinking and writing to actually putting their ideas into tangible form. The 3D printer lets students hold their ideas in their hands. Once they've crossed this threshold they have a whole new perspective on the design process.

Much like an artist uses a pad and paper to sketch rough ideas of an intended portrait, the 3D printer lets students iterate on their design concepts. It frees them from the constraints that theoretical concepts alone put on the design process. Instead, it lets them visualize and manipulate their designs in physical form until they arrive at their optimal solution.

According to Singularity faculty, driving students' creativity is the greatest value this technology provides. And this is an invaluable skill for solving any type of problem, big or small.

PUSHING THE BOUNDARIES OF RESEARCH AND UNDERSTANDING

The Anthropological Institute of the University of Zurich (UZH) uses 3D printing to advance its research and understanding of human evolution. One example is its use of 3D modeling and 3D printing to enhance the investigation of Neanderthal brain evolution.

An important tool in anthropological study is the ability to accurately replicate fossils. They are too fragile to be handled frequently and too valuable to risk damage or destruction from repeated examination. The ability to scan the fossils and reproduce accurate models for reconstruction and study using 3D printing is an invaluable tool for UZH researchers. They used this capability to reproduce skull fragments of a Neanderthal infant, enabling them to reconstruct the skull and compare it with other skeletons. This ultimately led to a better understanding of brain development during this time period.

CHAPTER THREE -

INCREASING KNOWLEDGE AND UNDERSTANDING

3D printing also lets archeologists study fossils in new ways. Using scanning technology, researchers digitally slice fossil bones, obtaining imagery and data invisible to the eye. This information is used to create 3D models of the interior bone structure. UZH researchers used this technique to study fossilized tooth roots and inner ear cavities.

The accuracy and fine details that are possible with 3D printing, combined with the ability to scale fossil reproductions up or down as needed lets UZH researchers find answers to questions and push the level of knowledge and understanding in archeological study.

CHAPTER FOUR -

CREATING BETTER PRODUCTS, FASTER

Consumer products make up a significant portion of the world's economic trade volume. Put another way, almost everything you touch on a daily basis, from a toothbrush to the shoes on your feet, falls under the umbrella of a consumer product.

GETTING AHEAD WITH 3D PRINTING TECHNOLOGY

Businesses must provide the best product they can to compete in the marketplace. This typically involves a relentless pursuit of product development and improvement, which may require customer feedback to assess what the market wants or how to improve existing products.

Designers assimilate this information and develop initial designs. Prototyping managers take this information and create prototypes, working with the designers to refine the design. These prototypes are tested or used in trials to gauge their success and the process either continues on to full production or repeats itself until a viable product results.

This product development process can take weeks, months, or in some cases, years, depending on the type of goods being produced. Regardless of the industry, getting your product to market faster is a key determinant in generating revenue and gaining or maintaining leadership in that market.

Making physical products by traditional means usually involves machining or molding parts and assembling them together to create concept models and prototypes. Many companies have to outsource these processes, putting them at the mercy of a variable that's difficult to control – the vendor's lead time. It also means added cost, in the form of skilled labor and the associated time and material that's involved.

That's where 3D printing is causing a marked disruption. It lets designers and rapid prototyping shops create products much faster than by traditional methods. Faster, easier production provides more time for refinements to arrive at the optimal design.

Other benefits include the ability to produce parts and prototypes as complete products that include color and multiple textures. This eliminates additional finishing steps like assembly and painting. The end result is a much shorter product development cycle and the capacity to get products to market faster.

The Stratasys J750 shortens the development cycle by allowing designers and prototyping managers to iterate much faster with realistic product concepts.

CHAPTER FOUR -

CREATING BETTER PRODUCTS, FASTER

HIGHLY REALISTIC PROTOTYPES MAKE FOR BETTER, FASTER DESIGNS

The design department within the Adidas Group is constantly refining the design of its sports shoes, requiring highly realistic models with multiple material characteristics. 3D printed models satisfy this demand. A big benefit is the speed at which these models can be produced. Designers can refine their design multiple times, quickly detect and eliminate errors and reach the final design in a short amount of time.

Before adopting 3D printing, the Adidas Group relied on technicians to hand-build models and functional prototypes using specialized tools. Now it takes a fraction of the labor to make the models on 3D printers that operate around the clock to keep up with demand.

These models are also made with multiple materials for a very realistic look and feel. This combination of speed, realism and accuracy enables the Adidas Group to build and evaluate models in just several days, compared to several weeks that it took with the previous mold-making process. This helps the design team meet their goals and ultimately create a better product in less time.

In much the same way, Thermos Company relies on realistic prototypes that employ multiple materials to develop new products faster and for less cost. Thermos manufactures insulating containers, lunch boxes and other consumer goods. They're designed to be functional but also intended to be aesthetically pleasing with a personalized style. Because they're handled frequently, ergonomics and how they feel are very important.

To capture all these requirements and arrive at the right design, Thermos needs to continually iterate and refine its designs, making multiple prototypes. It used to outsource this work but a typical prototype took three to five days. Thermos purchased several 3D printers and brought the work in-house, cutting the prototyping process down to hours instead of days, for about one-fifth the cost to outsource.

Beyond the time and cost savings, 3D printing helps Thermos make better products. Designs are quickly changed and parts re-printed to achieve the optimal configuration. The process is also easy to use and doesn't require additional, highly trained personnel. According to Thermos, the process is simple enough for inexperienced engineers to use.

Versatile 3D printers give Adidas and Thermos the agility to excel in a competitive marketplace, through faster product design, development and validation.

Achieve the ultimate in realism through multiple materials, colors and textures, produced in a single operation.

Make faster, more informed design decisions by printing multiple iterations at the same time.

CHAPTER FIVE -

HOW THE STRATASYS J750 FITS

MORE THAN JUST AN EFFECTIVE TOOL

Based on case studies and evidence from the field, it's clear that 3D printing makes innovation possible, from the way things are made to the expansion of knowledge and understanding. The decision for companies and educators is which specific tool to choose to take advantage of these possibilities.

The Stratasys J750 is one choice among an ever-growing array of 3D printers in the marketplace. But its capabilities and versatility make it more than just a 3D printer. It's a solution-maker. Viewing it as just a sophisticated tool is limited because it doesn't just make prototype parts. It makes it possible for the rapid prototyping manager at a consumer products company to produce parts faster and with greater realism, shortening the development cycle and lowering cost.

It has multi-material capability but it doesn't just produce parts with flexible and rigid characteristics. Rather, it helps educate physicians through accurate anatomical training models, letting them create new procedures and enhance their skillset, ultimately enabling them to improve health care outcomes.

And it's not just a lab tool that lets students 3D print this semester's project to satisfy a credit requirement. Instead, it's the vehicle that allows a professor to expose her students to state of the art technology, enabling them and the university to push the current boundaries of research and learning and become a recognized center of innovation, better positioned to attract partnerships and funding.

CHALLENGES AND SOLUTIONS

3D printing technology isn't new and there are other 3D printers that are capable of colored models. But each system has its drawbacks and fails to completely address the full scope of pain points impacting its users. The Stratasys J750 is designed to address these problems through improved technology, workflow and capacity.

Perhaps the best way to understand how the Stratasys J750 can benefit is to see how its breakthrough technology offers real solutions, using scenarios from the medical, educational and consumer product industries. What follows is a series of challenges individuals in these industries typically face and how the Stratasys J750 addresses those problems.

CHAPTER FIVE -

HOW THE STRATASYS J750 FITS

Challenge:

A surgeon's skills rely on practice and hands-on training for mastery of existing and new surgical procedures. However, traditional training methods don't provide sufficient opportunities with anatomically-realistic tools to gain this proficiency in a low-risk environment. Current 3D printing technology is capable of producing anatomical models, but this technology is limited because it doesn't offer flexible, tissue-like materials that reproduce the organs with realistic pathology and detail.

The Stratasys J750 Solution: Realistic, 3D printed anatomical training models with colored, flexible materials and hollow channels and chambers that realistically simulate actual human tissue. Faster print times reduce the time to print the models.

The ability to produce 3D replicas of human anatomy from CT and MRI scans in realistic, detailed, multi-textural material lets physicians learn and train on realistic models that accurately replicate human tissue. It allows them to practice multiple times in a realistic but no-risk setting, with models that provide tactile feedback consistent with human physiology. This enables research hospitals to maximize learning resources and helps training surgeons become proficient on delicate and state-of-the-art procedures.

Other 3D printing technologies produces colored models, but not with variable flexibility and the option for clear, translucent or opaque characteristics in the same model. With some 3D printers, the color is not consistent and the amount of post-processing is time-consuming and/or messy or involves hazardous materials.

The combination of clear and colored structures come together to form an accurate educational model of the human hand.

CHAPTER FIVE -

HOW THE STRATASYS J750 FITS

Challenge:

A consumer products designer needs realistic and convincing concept models and prototypes to win the customer's approval and support for the design. She needs several models, each with different characteristics to aid the customer's decision. The rapid prototyping manager needs to produce them for the designer in a time and cost-efficient way. Existing 3D printers offer color but some lack consistency and produce fragile models with a rough surface finish. Making several different variations of a model is also time consuming, particularly if only one version of the model can be produced at a time.

The Stratasys J750 Solution: Six-material capacity minimizes material changes and enables the creation of models with incredible realism. New print heads increase the speed of production and depending on model size, several different variations can be printed in a single production run.

The capacity to load six materials into the printer means the prototyping manager can load the materials he typically uses most, minimizing the need for changes when printing a variety of models. When a change is needed, improved hardware results in less waste, saving time and material. This capability, combined with the generous tray size of the Stratasys J750, allows him to make several different models with unique qualities in a single print job. This ultimately lets him create prototypes faster and meet product development targets.

The fast creation of durable, realistic models and prototypes gives the designer flexibility. The ability to print several ideas or variations of a design in the same production lot enables more iterations in a shorter amount of time, resulting in faster, better design decisions.

Challenge:

Universities need cutting-edge technology like 3D printing for research and to attract top academic talent. However, this need is shared across multiple departments, each with different goals and objectives. This can result in piecemeal acquisition of different types of technology with different learning requirements, limiting use and widespread adoption.

The Stratasys J750 Solution: Full-color, multi-material versatility to service creative needs from art to science and the easy-to-use functionality that accommodates new and experienced users of 3D printing.

The capacity to use six base resins means countless color options and fewer material changes.

Variations on a theme: reliable, consistent colors and intricate color textures all add up to more realistic and convincing models and prototypes.

CHAPTER FIVE -

HOW THE STRATASYS J750 FITS

The versatility of the Stratasys J750 eliminates the need for multiple forms of technology and the requirement to learn how to use each of them. It simplifies the process of obtaining, using and maintaining these assets. It's also a perfect solution for establishing multi-disciplinary centers that cater to diverse departments within the university. Rather than purchase and support multiple technologies to cater to various departmental needs, Stratasys J750 technology leverages the investment with the capability to service multiple departments, maximizing use and lowering cost.

These are just a few examples of how the Stratasys J750 3D Printer offers solutions to real problems and creates opportunities for improving the status quo in education, design and medical care.

CHAPTER SIX -

REINVENTING INVENTION CASE STUDY

To create our favorite products, a team of designers, engineers and marketers go through countless design iterations, striving to build something consumers will covet, identify with, and use daily. From the light switch to the mobile phone, every desirable product results from inspiration, hard work and collaboration.

The team at Synergy, a product development company in Netanya, Israel, lives and breathes this cycle of innovation. Clients rely on Synergy to transform bright ideas into viably manufacturable, marketable products. Industrial designers and engineers often work around the clock to perfect the grip on a medical device or the appearance of a phone charger.

“The first time the entrepreneur sees his idea and feels it in his hands, is a crucial moment. We need to give him the most realistic prototype possible,” said CEO Michael Librus. Dream designs can be rendered onscreen quickly, but functional prototypes can take weeks of investment in labor and outsourcing – especially when products have complex designs and diverse materials. Design ideas are embraced, refined or abandoned based on the look and feel of a prototype. So to hasten and sharpen that crucial decision-making, Synergy relies on a Stratasys J750 3D Printer.

The Stratasys J750 played a key role in Synergy’s redesign of a keypad for an emergency-response system used in the automotive after-market industry. The project meant producing multiple designs for the panel, which mounts above the rear-view mirror, to test which would best fit the car’s interior and pass ergonomic and mechanical testing. Each iteration included soft-touch buttons, backlighting, graphics, housing and internal connections to the electronic panel.

Before the Stratasys J750, Prototyping Manager Omer Gassner would have tapped several vendors to create a single keypad panel prototype: CNC machining and water printing for the body, casting for the light pipes, sanding for smoothness and then silicone engraving and tampon printing for the buttons. It would have taken ten days to two weeks to create, at a cost of $700 per unit. With the Stratasys J750 it took just hours and cost $200 per unit.

Tamar Fleisher, Synergy art director, said clients appreciate the realism and responsiveness that the technology adds to product development. “Now our customers can make instant decisions about the ergonomics of a product -- about the touch and feel -- as well as test how it fits into its environment,” Fleisher said. “The ability to simulate light transfer on the panel meant my client could decide about every detail of the design. And if a design change was needed I could go to my computer, make the design change and print it in a matter of hours.”

The Stratasys J750 gave Synergy’s designers the ability to prototype with multiple images to refine this phone charger sleeve design.

Printing multiple versions of this keypad saved Synergy days in development time and reduced the cost by 70% per item.

CHAPTER SIX -

REINVENTING INVENTION CASE STUDY

For CEO Librus, photorealistic prototypes empower him to better fulfill the dreams of innovation that bring customers to Synergy. “I’m just glad that we have the J750 in-house,” Librus said. “We wouldn’t do it any other way.”

HOW DOES THE STRATASYS J750 COMPARE WITH TRADITIONAL METHODS TO PROTOTYPE THE KEYPAD PANEL?

	COST	LEAD TIME
CNC machining plus post-processing	$700	Up to 2 weeks
Stratasys J750	$200	1 day
Savings	$500 71%	9 business days 90%

CHAPTER SEVEN -

LEVERAGING THE TECHNOLOGY FOR OPTIMAL BENEFIT

The versatile capabilities of the Stratasys J750 3D Printer let users do what they do best in a more time and cost-efficient way. More significantly perhaps, it provides a platform to develop new solutions, better products and inspired research by the doctors, designers and educators who use it.

An investment in this kind of technology is rightly viewed as a significant capital expense. But it's often looked at from a limited perspective, without considering how it can positively impact other divisions in the same company. A 3D printer with this capability offers benefits across multiple departments, which helps justify the expense and maximize its use.

Consider the scenario of a medium-sized company that designs and manufactures technical climbing gear. The engineering, design and rapid prototyping departments benefit from the quick feedback loop made possible through prototypes that are produced in-house and overnight. This shortens the product development cycle and gets new products into customers' hands more quickly.

The marketing department uses the ultra-realistic prototypes to communicate more effectively in promotional efforts and for user feedback on concept models for future products. Focus groups get to see and touch models that are virtually identical to final-production parts in the way they look, feel and function.

Manufacturing takes advantage of the 3D printer to create specialized jigs, fixtures, inspection guides and other manufacturing aids quickly, with the ability to adapt and change tooling as the product design evolves. Tools are "stored" digitally and printed as needed, saving on storage space.

With this kind of broad-based application, the justification for a 3D printer like the Stratasys J750 gets easier because more departments benefit. In many cases, a 3D printer is purchased for one or two specific purposes. However, owners consistently report that once in-house 3D printing is adopted, it's used for a wider range of purposes, as people see and leverage its potential.

The ability to see, touch and hold realistic prototypes can be a powerful communication tool in marketing and focus-group efforts.

Leverage the power of the Stratasys J750 to produce not only prototypes and production parts but tools and assembly aids, like this color-coded fusebox installation guide.

CHAPTER SEVEN -

LEVERAGING THE TECHNOLOGY FOR OPTIMAL BENEFIT

Regardless of what field you're in, consider the following questions:

- Would your organization benefit from a shorter product development cycle, and better designs through more effective communication?
- Could your caregivers achieve better patient outcomes by using accurate, realistic training models?
- Would your university benefit by attracting the best and brightest students and leading researchers through access to state-of-the-art technology?

Stratasys 3D Printing solutions have a proven track record helping companies and organizations meet these goals, and the Stratasys J750 continues that tradition with the next level of 3D printing capability.

Get a closer look at the Stratasys J750 3D Printer by downloading the spec sheet at www.stratasys.com/j750specsheet. Then, contact Stratasys when it's time to start the conversation about how this technology can solve your business and educational challenges.

Is it real sushi or a 3D printed food display? (Hint: don't try to eat it.) Incredible realism, thanks to the Stratasys J750 3D Printer.

stratasys

E info@stratasys.com / STRATASYS.COM
ISO 9001:2008 Certified

HEADQUARTERS
7665 Commerce Way,
Eden Prairie, MN 55344
+1 800 801 6491 (US Toll Free)
+1 952 937 3000 (Intl)
+1 952 937 0070 (Fax)

2 Holtzman St., Science Park,
PO Box 2496
Rehovot 76124, Israel
+972 74 745 4000
+972 74 745 5000 (Fax)