MASSCHALLENGE, INC.
ACCELERATING START-UP DEVELOPMENT OF INNOVATIVE PRODUCTS USING SOLIDWORKS

By making SOLIDWORKS Premium design and analysis software available, MassChallenge is helping its participating early-stage start-up companies accelerate development of promising, innovative products.

Challenge:
Give promising start-ups access to a design platform that accelerates product development.

Solution:
Implement SOLIDWORKS Premium software and make it available to member start-ups.

Results:
- Helped start-ups accelerate development
- Provided access to design, simulation, and communication tools
- Enabled start-ups to produce prototypes more quickly
- Supported efficient transition from design to manufacturing

MassChallenge, Inc, operates the world's largest entrepreneurial accelerator program and competition. The independent, not-for-profit organization leverages the power of competition to create urgency among early-stage start-ups, identify promising product ideas, and aggregate high-impact teams and resources. MassChallenge strengthens and accelerates the development work of its finalists by providing them with high-quality, personalized mentorship; access to office space and development resources; and connections to potential team members, advisors, customers, and sponsors.

The four-month, $1 million Accelerator competition takes place each summer, offering the 125 finalists—the world's most promising, high-impact start-ups—access to a world-class accelerator. MassChallenge has 27,000 square feet of office space in the Boston Innovation District for start-up use. The 361 start-ups supported in the 2010, 2011, and 2012 Accelerators have already raised over $360 million in outside funding and have created 2,910 new jobs as of October 1, 2012.

According to Scott Bailey, director of partnerships, "MassChallenge accommodates start-ups from any industry—from biotech to fashion, software to hardware," He adds. "Each year a significant percentage of accepted entrepreneurs are building companies focused on physical products and devices. Those start-ups rely on access to advanced design, simulation, and communication technology to speed development of their products."

MassChallenge chose to make SOLIDWORKS® Premium design and analysis software available to its start-ups because it's easy to use; has a track record of speeding development in industry; and offers the breadth of design, simulation, and communication tools that start-ups need to commercialize their ideas.

"The competition compels start-ups to work efficiently to demonstrate that their ideas will work," Bailey stresses. "By providing them with access to SOLIDWORKS Premium software, we help them move from conceptual design to prototyping more quickly and execute the transition from development to production more effectively."

"Most of our start-ups building physical products use SOLIDWORKS design capabilities," adds Marketing Curator Robby Bitting. "Some of them also take advantage of SOLIDWORKS simulation tools to test design performance, thereby reducing the number of prototypes required and reaching a final, functional prototype more efficiently. Access to SOLIDWORKS tools enables them to compress the time required to solve problems and ultimately discover whether their ideas are viable."

INCREASING MOBILITY WITH THE LEVERAGED FREEDOM CHAIR

A 2012 Accelerator $100,000 Diamond Prize winner, Global Research Innovation and Technology (GRIT) developed the Leveraged Freedom Chair (LFC). Known as the mountain bike of wheelchairs, the LFC enables people with disabilities in developing countries to move beyond pavement, providing them with the mobility that they need to lead independent lives.

According to Chief Technology Officer Mario Bollini, the LFC concept grew out of biomechanics research at the Massachusetts Institute of Technology (MIT). "This all started with an examination of the efficacy of traditional wheelchair designs," Bollini recalls. "That approach is not very efficient in terms of the upper body energy required to propel the chair."

"Without SOLIDWORKS 3D modeling tools, the development cycle would have taken a lot longer, and we would not be on the cusp of production."

— Mario Bollini, Chief Technology Officer

Regular wheelchairs are designed for hospitals, not the rough terrain of developing countries. Instead of pushing on the wheels like a regular wheelchair, LFC riders push on levers, which are biomechanically more efficient. The LFC design lets riders travel 80 percent faster than a regular wheelchair and provides 50 percent more torque, enabling riders to more easily power over obstacles.

In addition to the LFC's performance improvements, its design utilizes standard bicycle components, which are relatively common in the developing world. The potential social impact of the LFC design is enormous, providing greater freedom of mobility for people with disabilities worldwide.

Using SOLIDWORKS software, GRIT has taken development to the point of manufacturing. After an initial pilot using 20 LFCs in earthquake-ravaged Haiti, GRIT will begin producing the first order of 300 chairs with manufacturing partner Pinnacle Industries, which is based in India. Initial customers include governmental agencies and medical charitable organizations.

Bollini credits access to SOLIDWORKS design software with helping GRIT accelerate LFC development. "We've been working on this idea for several years, but our participation in the MassChallenge competition and access to SOLIDWORKS tools really ramped up development," Bollini says. "As we got closer to manufacturing—and had to communicate with other partners—having access to SOLIDWORKS software moved things along quickly.

"Without SOLIDWORKS 3D modeling tools, the development cycle would have taken a lot longer and we would not be on the cusp of production," Bollini adds.

MINIMIZING LIFTING INJURIES WITH THE STRONG ARM VEST

Another MassChallenge 2012 Accelerator $100,000 Diamond Prize winner, Strong Arm Technologies, Inc., is the brainchild of CEO Sean Petterson and his business partner, Justin Hillery. The two met as students at the Rochester Institute of Technology and collaborated on Petterson's idea for a vest that makes lifting easier.

"We both come from families of blue-collar workers, and my father passed away from a heart attack on a construction site," Petterson explains. "I wanted to do something that improved the lives of everyday workers, and I had this idea for a vest that changes the dynamics of lifting by reducing the load carried by the hands. Working with Justin and participating in the MassChallenge Accelerator has enabled me to turn my idea into a viable product—the Strong Arm Vest—and a promising company."

GRIT used SOLIDWORKS design tools to make the Leveraged Freedom Chair a reality, providing mobility to disabled people in developing countries in areas with no paved roads or sidewalks.
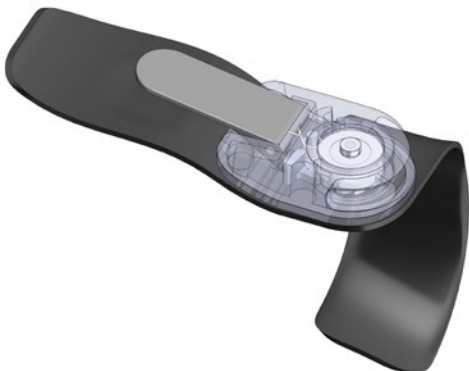
Many occupations involve lifting, including material handlers, dockworkers, baggage handlers, and warehouse workers, and studies show that $50 billion is spent annually compensating injuries from workers who lift incorrectly. The Strong Arm Vest uses a cabling system to lessen the impact of lifting loads, correcting posture and reducing fatigue in the process. Put simply, workers lift more safely and with less effort.

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>
> — Sean Petterson, CEO

Petterson says that developing the vest presented unique challenges and that SOLIDWORKS software played a major role in resolving them. "Our vest demands precision, and making it is literally as precise as garment work can get," he notes. "With SOLIDWORKS, we were able to use rapid prototyping to build parts on a 3D printer. The vest required a lot of prototyping in order to make it fit and function for people of all shapes and sizes. There's a huge dynamic range in people, and we needed to make the system operate in a similar fashion for everyone. This required examination of many combinations of materials and parts, and SOLIDWORKS made the process faster and easier."

The company also used eDrawings® to facilitate laser cutting of critical components. "SOLIDWORKS software enabled us to communicate effectively, whether we were working with manufacturers, suppliers, or industrial design partners," Petterson says. "Having full-time access to SOLIDWORKS has allowed us to secure three patents, get the product ready for launch in early 2013, and continue development of a pipeline of additional products."

HELMUTHUB PROVIDES BIKESHARE RIDERS WITH PROTECTIVE HELMETS

A MassChallenge start-up that may soon be coming to a city near you is HelmutHub Corporation. The company was founded by MIT graduates to address an important safety problem. While bikeshare programs, which offer bicycles for rent for getting around downtown areas of major cities, continue to grow in popularity, they don't provide the protective helmets that are required for riding a bike safely. You can rent a bike, but unless you've brought your own helmet, you'll be riding without head protection, increasing the risk of a serious injury resulting from a fall or collision.

HelmutHub intends to address this safety issue by creating an innovative helmet vending machine that dispenses helmets alongside the existing stations in bikeshare programs, ensuring that a helmet is available when you want it. When you've finished your ride, you simply drop your helmet off at the HelmetHub kiosk where you returned your bike. Helmets are inspected and sanitized before being put back into circulation to ensure that they're clean and safe.

According to Chris Mills, HelmutHub CEO and co-founder, the availability of helmets is expected to boost bikeshare ridership and grow the number of bikeshare programs from the 150 that currently operate worldwide. He says SOLIDWORKS software helped the company refine a cool idea into a functional machine.

"Our initial prototype was helmet-specific (it could only handle one type of helmet) and had a capacity of 10 helmets," Mills explains. "We needed to be able to handle any brand of helmet while increasing machine capacity to 36 helmets to satisfy ridership demands. Using SOLIDWORKS software, we were able to develop the sophisticated internal helmet delivery mechanisms and assemblies required to meet our goals."

Mills says that SOLIDWORKS motion simulation tools enabled HelmetHub to evaluate potential collisions and interferences, and establish the necessary clearances for smooth operation of the helmet-delivery mechanisms. The company also used SOLIDWORKS TolAnalyst™ tools to maintain the tight tolerances required and PhotoView 360 capabilities to create concept renderings.

"Having access to SOLIDWORKS software was really important for fleshing out ideas and improving quality," Mills says. "For example, we were able to work with a helmet manufacturer to obtain a SOLIDWORKS model of a helmet, which was a huge help. Without SOLIDWORKS, development would have taken 10 times as long. SOLIDWORKS was key to helping us go from an idea to a functional machine that we can pitch to customers."

Photo credit: Analogue Studio

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— Chris Mills, CEO and Co-Founder

HelmutHub relied on SOLIDWORKS design tools to develop its safety helmet vending system in response to growing demand associated with the proliferation of bikeshare programs in urban settings.

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