DASSAULT SYSTEMES

SOLIDWORKS

BPG, INC.

INVENTING COOL, GREEN, NEXT-GENERATION VEHICLES WITH SOLIDWORKS

Using SOLIDWORKS Premium software, BPG continues to advance development of the UNO electric scooter, which was named one of the Top 10 Inventions of 2008 by Popular Science magazine.

BPG werks

Challenge:
Develop unique, innovative vehicle concepts and transform these ideas into manufacturable designs and commercial products.

Solution:
Implement SOLIDWORKS Premium design and analysis software to refine concepts and produce manufacturable designs.

Results:
- Cut design time by 50 percent
- Reduced number of prototyping cycles
- Improved design manufacturability
- Introduced first-of-its-kind product

Before founding the corporation that bears his initials, Benjamin P. Gulak was a young inventor with an idea for making green vehicles cool. At 19, Gulak transformed a design for an electric scooter that began as a high school science project into an international sensation.

The UNO electric scooter won the grand prize at the 2007 Intel International Science and Engineering Fair, was named one of the Top 10 Inventions of 2008 by Popular Science magazine, and raised enough money from investors to allow Gulak to found BPG, Inc. The company has continued development of the UNO motorcycle and is developing other innovative vehicle designs, such as the DTV Shredder, a crossover vehicle for action sports.

Converting the buzz, excitement, and ingenuity of Gulak's early engineering achievements into actual products that support a successful manufacturing business is challenging, and requires the efforts of a full-time design and engineering team working in a capable and cost-effective development environment.

"There are models and drawings for the UNO and DTV Shredder that go back a few years," Mechanical Engineer Dan Arnold explains. "However, turning those rough concepts into designs that we can actually manufacture and sell at a profit requires the use of sophisticated design and analysis tools. When you are innovating first-of-their-kind products, you need to continually simulate, analyze, prototype, and redesign the concepts, as well as identify and resolve performance and manufacturability issues. That's what we're doing with the UNO and DTV Shredder, and SOLIDWORKS® Premium software is our design system of choice."

BPG selected SOLIDWORKS Premium software as its 3D development system because it is well suited for refining and optimizing concept vehicles, providing easy-to-use solutions for visualizing, analyzing, prototyping, and manufacturing designs. "SOLIDWORKS provides us with the tools we need to utilize our design experience, verify our design decisions, and assess the manufacturability of the parts that we design," Arnold notes.

SKATEBOARD + MOTOCROSS + TANK = SHREDDER

The DTV Shredder (www.bpg-werks.com) is BPG's first commercial product, with an initial run of 800 to 1,000 units scheduled for 2012. The shredder combines the platform of a skateboard, the handlebars of a motorcycle, and the treads of a tank to create a vehicle unlike any other. Using SOLIDWORKS Premium software, Arnold has worked with the initial concepts to engineer a design that BPG can manufacture at an attractive price point.

"There have been previous prototypes of the shredder, but none that we can manufacture and sell at a profit like our final frozen design," Arnold points out. "We have essentially condensed a several-year development cycle and eliminated a number of prototyping cycles by using SOLIDWORKS Premium software. The ability to use simulation capabilities for testing performance in conjunction with design tools for making changes in real time has enabled us to cut design time in half."

IMPROVED PERFORMANCE AND MANUFACTURABILITY

SOLIDWORKS design and analysis tools played a key role in helping BPG refine the DTV Shredder design into a commercially viable product. Reliable performance and design for manufacturability are primary goals for any type of new product. Arnold says he regularly used SOLIDWORKS Premium's simulation tools to reduce stresses in critical parts, improve the shredder's overall performance, and optimize the design for manufacturability.

"SOLIDWORKS simulation capabilities have helped us in locking down the design without incurring additional prototyping cycles," Arnold stresses. "Simulation tools enabled us to add a vehicle suspension that functions well, improve the performance of high-load parts, and maintain cool-looking parts that are very manufacturable."

> **"We have essentially condensed a several-year development cycle and eliminated a number of prototyping cycles by using SOLIDWORKS Premium software."**
>
> — Dan Arnold, Mechanical Engineer

THE EVOLUTION OF THE UNO

Even though the commercial introduction of the DTV Shredder took less time than the concept on which BPG was founded, the future market potential for the UNO self-balancing "dicycle," as an eco-friendly means of urban transport and mobility, is far greater. SOLIDWORKS Premium is helping BPG Mechanical Engineer Danaan Metge evolve the UNO from its first incarnation as strictly a dicycle (a motorized unicycle on two closely positioned parallel wheels) to the UNO II, which transforms into a motorcycle, and the UNO III, the first road-ready transforming cycle and the final prototype before BPG's go-to-market product.

"We have used SOLIDWORKS exclusively to develop the UNO," Metge says. "From using structural and dynamic stress simulation tools to analyze the suspension to looking at the mass properties, center of gravity, and design aesthetics to improve the design, SOLIDWORKS has enabled us to continue to develop a true innovation in wheeled vehicle design."

With SOLIDWORKS design and analysis tools, BPG refined early concepts of the DTV Shredder to produce the company's first commercially viable product.

Focus on BPG, Inc.
VAR: SolidVision, Inc., Littleton, MA, USA

Headquarters
86 Joy Street
Somerville, MA 02143 USA
Phone: +1 781 775 8029

For more information
www.bpg-motors.com

Our 3DEXPERIENCE® platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3DEXPERIENCE®** Company, provides business and people with virtual universes to imagine sustainable innovations. Its world-leading solutions transform the way products are designed, produced, and supported. Dassault Systèmes' collaborative solutions foster social innovation, expanding possibilities for the virtual world to improve the real world. The group brings value to over 190,000 customers of all sizes in all industries in more than 140 countries. For more information, visit **www.3ds.com**.

3DEXPERIENCE®

DASSAULT SYSTEMES | The 3DEXPERIENCE® Company

Corporate Headquarters
Dassault Systèmes
10, rue Marcel Dassault
CS 40501
78946 Vélizy-Villacoublay Cedex
France

Americas
Dassault Systèmes SolidWorks Corporation
175 Wyman Street
Waltham, MA 02451 USA
Phone: 1 800 693 9000
Outside the US: +1 781 810 5011
Email: generalinfo@solidworks.com

Asia-Pacific
Dassault Systèmes K.K.
ThinkPark Tower
2-1-1 Osaki, Shinagawa-ku,
Tokyo 141-6020
Japan