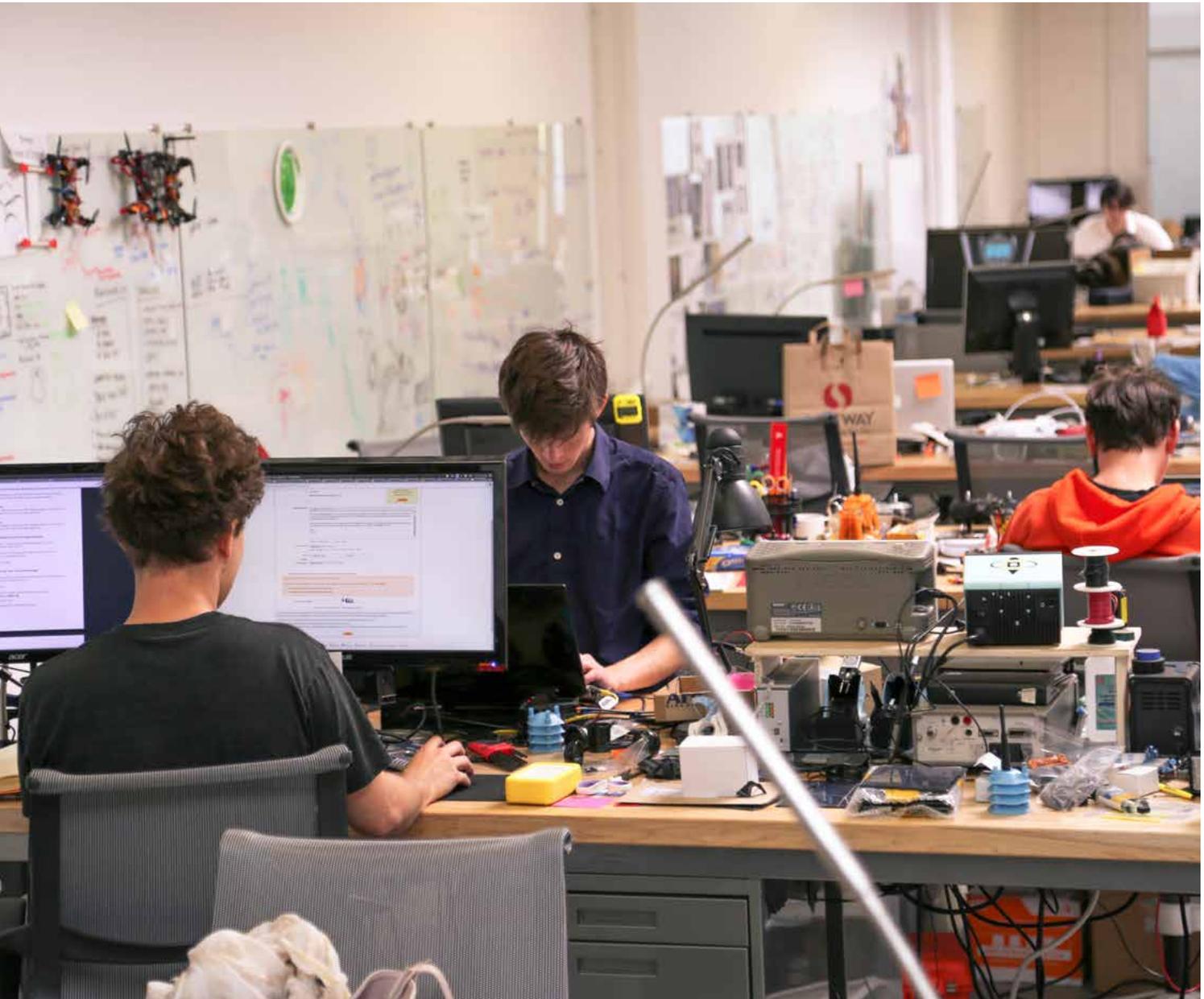


HIGHWAY1

DRIVING INNOVATIVE HARDWARE START-UP DEVELOPMENT WITH SOLIDWORKS SOLUTIONS



To achieve its mission of helping start-ups accelerate the development of innovative hardware ideas along the road to manufacturing commercially viable products, Highway1 chose to make SOLIDWORKS design and engineering tools available to participating start-ups.

Challenge:

Provide hardware technology start-ups with easy-to-use yet robust design and engineering tools to facilitate and accelerate development and release to production.

Solution:

Implement the SOLIDWORKS product development platform and make it available to participating start-ups.

Benefits:

- Enabled start-ups to create production-level designs within 16 weeks
- Facilitated teamwork and collaboration among start-ups
- Supported effective interaction with manufacturing partners
- Provided design and engineering tools required to complete development

Accelerating the development of innovative hardware ideas along the road to manufacturing commercially viable products is the mission of Highway1, the world's premier hardware start-up accelerator. Taking its name from the legendary California coastal highway, the organization evaluates hardware start-ups with great product ideas, scalable business plans, and compelling prototypes, with the goal of jump-starting the journey from proof-of-concept to market launch for products having strong potential for success. A division of leading supply-chain management and manufacturing services company PCH, Highway1 is dedicated to helping inventors and entrepreneurs finalize hardware-related products that deliver real value to customers, are delightful to use, and can be manufactured at scale.

By compressing product development into a 16-week program and providing start-ups with the specialized facilities, engineering tools, and vendor access required to complete product development, Highway1 not only drives innovative technology development forward but also enables hardware start-ups to move into the passing lane in terms of product commercialization. In addition to providing dedicated workspace and prototyping lab access at its facility, Highway1 needed to supply its cohorts with access to an effective design and engineering platform, according to former Engineering Lead Ryan Vinyard.

"Although PCH, our parent company, has utilized the SOLIDWORKS® 3D development platform as its primary design and engineering solution for more than 10 years, we conducted additional research to determine if the software provided our start-ups with the highest probability for transforming ideas to actual products ready for manufacturing in a relatively short period of time," Vinyard explains. "We discovered that SOLIDWORKS is an industry leader in the development of consumer products, is easy to use, and provides access to an integrated, robust suite of design and engineering solutions. We chose SOLIDWORKS solutions because they help us give our start-ups the best chance for success within the 16 weeks of the program."

Highway1 acquired the SOLIDWORKS 3D development environment—including SOLIDWORKS Premium design and analysis software, and SOLIDWORKS Simulation Professional analysis software—for use by its start-ups. "The chief technology officer at PCH recommended SOLIDWORKS to meet our start-ups' development needs," Vinyard notes. "The software allows companies to solve their design and engineering challenges while simultaneously providing a common data platform that facilitates collaboration and teamwork, which is a critically important aspect of the program."

"We're tightly focused on providing the resources that provide the flexibility necessary to accelerate development, and quite serious about helping our start-ups take products to market," Vinyard adds. "The SOLIDWORKS platform helps us do that."



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Highway1 chose the SOLIDWORKS 3D development platform for use by its start-ups not only because it's used by parent company PCH, but also because SOLIDWORKS provides a robust, easy-to-use, integrated suite of design and engineering solutions that give start-ups the best chance for success within the 16-week program.



TURN LIGHTS ON AND OFF WITH YOUR PHONE

Switchmate, a Palo Alto, CA, start-up, launched its product of the same name in early 2015 after completing the Highway1 program. The idea behind Switchmate was to create a simple, easy-to-install hardware product that enables users to turn the lights on or off in a home, apartment, or business through a companion application on a smartphone. Unlike previous smart-lighting products, which require taking a light switch apart to hardwire the product in for installation, the Switchmate uses magnets that snap onto the screws of existing toggle- and rocker-switch light controllers to simply and instantly install over an existing light switch. Battery-powered mechatronics within the unit mechanically operate the switch. The Switchmate leverages Bluetooth technology to allow users to turn the lights on or off with either iPhone® or Android™-based smartphones.



Switchmate relied on SOLIDWORKS design and engineering tools to fast-track development and launch of its product--a simple, easy-to-install light-switch cover that enables users to turn the lights on or off with a companion application on a smartphone.



“With SOLIDWORKS, we were able to visualize the mechanism and use interference-checking tools to quickly refine the design.”

— Robert Romano, Founder and CEO

Founder and CEO Robert Romano, a former robotics Ph.D. student from Stanford University, got the idea for the Switchmate after realizing that most “smart” devices actually aren’t that smart. “Many smart products intended for the home claim to make your life easier, but they’re often complicated and require an electrician to install,” Romano says. “We started Switchmate to design a smart light switch that is super simple to set up and that makes everyday life a little bit easier. Users just snap it on over an existing light switch, and then use the app to turn the lights on or off, or control anything that’s operated by the switch.”

Before being accepted into the Highway1 program, Switchmate had gone through four separate iterations and versions of the product design and wanted to speed up development. Using SOLIDWORKS 3D design and visualization tools—in concert with a Stratasys uPrint 3D printer—Switchmate was able to better understand mechanical constraints and improve the Switchmate design. “With SOLIDWORKS, we were able to visualize the mechanism and use interference-checking tools to quickly refine the design,” Romano explains.

Romano also credits access to SOLIDWORKS software with helping the company accelerate design changes to improve production and develop marketing materials to support product launch. “At Highway1, we obtained a good education about manufacturing considerations,” Romano recalls. “We used SOLIDWORKS software to prepare all of the drawings required to support production as well as to create really nice renderings for use on our website.”

MOLEKULE

PURIFYING INDOOR AIR LIKE NEVER BEFORE

Another Highway1 start-up, Molekule, has developed the world's first molecular air purifier. For the last half-century, air purification systems relied on high-efficiency particulate air (HEPA) filters, which only trap particles and some biological contaminants in a filter where they continue to live.

Developed by Dr. Yogi Goswami, director of the Clean Technology Department at the University of South Florida and chief science & technology officer of Molekule, the patented photoelectrochemical (PECO) air disinfection technology completely destroys indoor air pollutants, including allergens, bacteria, endotoxins, molds, viruses, and volatile organic compounds, and produces no harmful by-products, only trace amounts of water and carbon dioxide. The technology is effective and scalable, outperforming all available solutions on the market. According to Co-Founder and Chief Operating Officer Jaya Rao, Molekule applied for inclusion in the Highway1 program to accelerate development of a product that will bring the technology to market.



Molekule leveraged SOLIDWORKS development solutions to create the world's first molecular air purifier, which utilizes the company's patented photoelectrochemical (PECO) air disinfection technology that completely destroys indoor air pollutants, including allergens, bacteria, endotoxins, molds, viruses, and volatile organic compounds, yet produces no harmful by-products, only trace amounts of water and carbon dioxide.



"CAD is my Zen, and we were very glad to get SOLIDWORKS design software. I used SOLIDWORKS at Highway1 to collaborate with an industrial design group, which also uses SOLIDWORKS, to produce a beautiful yet effective design."

— Jaya Rao, Co-Founder and Chief Operating Officer

"At Highway1, we made the leap from a proven, functional technology to an aesthetically pleasing, manufacturable product," says Rao. With master's degrees in mechanical engineering and public policy from Stanford University, Rao serves in both technical and operational roles at the company. "CAD is my Zen, and we were very glad to get SOLIDWORKS design software. I used SOLIDWORKS at Highway1 to collaborate with an industrial design group, which also uses SOLIDWORKS, to produce a beautiful yet effective design."

Rao notes that the ability to collaborate with industrial designers on the common SOLIDWORKS design platform supports Molekule's efforts to accelerate development of a commercially appealing product. "We've been working with functional proof-of-concept prototypes with our beta testers to validate performance and gain insights into how we want the final design to look and feel," Rao stresses. "Now that we've gained a better understanding of the user experience, we can use SOLIDWORKS tools to improve the form of the product and address specific details, such as the curvature that we want to employ on a display."

SOLIDWORKS software facilitates this process because it supports fast design iterations and communications across the Molekule team. "Communication is fundamental to getting to a viable design," Rao adds. "Whether we're working with industrial designers or the local machine shop, the ability to visually communicate in 3D with SOLIDWORKS is a key factor in helping us achieve our goal of launching our first product in early 2017."



SMART COMPANION TO IMPROVE YOUR HABITS

Working at Highway1, MOTI is developing a personable smart companion of the same name that helps users establish, form, and maintain better habits. Founder and CEO Kayla Matheus was inspired to develop the product as a result of her own experiences related to developing exercise habits associated with physical therapy after she tore her ACL. In researching the science of forming good habits (involving triggers, routines, and rewards) and learning that existing products that address this need, such as wearables and smartphone applications, aren't very effective, Matheus came up with the idea for a standalone device that was simple to operate and that elicited an emotional response.

"I discovered that we're more Pavlovian than we might think and that developing good habits—like drinking more water, exercising regularly, or flossing daily—requires an environmental cue and emotional reward," Matheus explains. "Developing a device that supports this process involves a pseudosocial relationship and interactive response. MOTI combines pushing a single button when a task is completed with a celebratory display of light, sound, and haptics, plus long-term relationship-building through the analysis of your habit progress and a suite of additional online features.

"Other products are not very effective because you have to form a habit of using a tool to form a habit—whether it's charging a battery or finding the right app," Matheus continues. "Plus, wearables have form limitations, and it's difficult to have an emotional relationship with a smartphone app. MOTI employs facial and eye imagery and social robotics concepts to make it more effective in helping people maintain the motivation required to develop good habits that last."

At Highway1, MOTI is leveraging SOLIDWORKS design software to refine the product's design so that the MOTI's form and appearance match its emotive, playful manner. While earlier designs were primarily solids-based, Matheus is leveraging SOLIDWORKS surfacing tools in preparation for production. "We've done some light surfacing to make the design ready for manufacturing," Matheus says. "We'll be utilizing silicone molding in a vacuum chamber, and the mold design and analysis tools in SOLIDWORKS have helped maintain best practices for production, such as draft angles and wall thickness.

"Personally, MOTI motivates me to maintain a regular yoga routine, and SOLIDWORKS software is helping me to give MOTI the design and personality that it needs to be effective," Matheus adds. "Right now, accelerating development is critically important, and the tools that I have access to in SOLIDWORKS have helped me refine the design and take it into rapid prototyping very quickly."



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software is helping me to give the MOTI design the personality that it needs to be effective. Right now, accelerating development is critically important, and the tools that I have access to in SOLIDWORKS have helped me refine the design and take it into rapid prototyping very quickly."

— Kayla Matheus, Founder and CEO

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Using SOLIDWORKS design and engineering solutions, MOTI accelerated development of its product of the same name, a personable smart object that helps users establish, form, and maintain better habits.

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 210,000 customers of all sizes in all industries in more than 140 countries. For more information, visit www.3ds.com.

