



TEKNA, INC. RAPIDLY DEVELOPING ULTRAVIOLET-LIGHT DISINFECTION SYSTEM WITH SOLIDWORKS SOLUTIONS



Tekna relied on integrated SOLIDWORKS mechanical design, electrical design, and simulation solutions to develop the AvaUV disinfection unit in response to the COVID-19 pandemic, quickly developing a world-class product to meet the need to disinfect common handheld items—like handheld tools, phones, and tablets—as well as larger items, such as laptops used in schools.



Challenge:

Rapidly develop and commercialize ultraviolet disinfection technology for disinfecting common handheld items like tools, phones, and tablets to meet market opportunities resulting from the COVID-19 pandemic.

Solution:

Utilize integrated SOLIDWORKS product development solutions to quickly bring ultraviolet disinfection technology to market.

Results:

- Cut development cycle in half
- Quickly validated door-closing design via simulation
- Launched new company during pandemic
- Commercialized ultraviolet disinfection technology into broader markets

As the largest industrial design and product development consulting firm in the state of Michigan, Tekna, Inc. has grown dramatically since its founding in 1988. Since then, the hard work and creative vision of the consultancy's talented designers and engineers have continued to drive growth in a rapidly evolving industry. From its establishment, Tekna has specialized in medical device design and development, which requires greater rigor and attention to detail than developing other types of products. The same focus that enabled the company to create successful products throughout the medical industry for both major companies and startups-is now being applied to other industries, including consumer and industrial goods, electronics, and appliances.

Throughout its growth history, Tekna management has followed market and technology trends, regularly re-evaluating market opportunities and the productivity benefits of product development technologies to better serve its clients. This is why the company chose to re-evaluate the PTC Creo® design software that it used until 2015, according to Mike Nellenbach, VP/Product Innovation. "Until 2015, Pro/E® and then Creo were our dominant tools because most of our clients used that solution. But we still had a couple of seats of other types of CAD software for use with customers who used those specific solutions," Nellenbach recalls.

"However, over the last six to seven years, trends in customer needs have shifted dramatically, with the vast majority of our customers now requesting SOLIDWORKS®," Nellenbach explains. "That trend, combined with the fact that roughly 95 percent of the designers and engineers that we hire already have SOLIDWORKS experience, and with the better fit of SOLIDWORKS for downstream manufacturing, prompted us to move to SOLIDWORKS for most of our work."

Program Manager Phil Ogden notes that once Tekna started using SOLIDWORKS, the experience confirmed the decision to switch. "We felt that SOLIDWORKS was more user-friendly and intuitive, and we've enjoyed higher-quality customer support," Oqden says. "If a customer comes in without a CAD preference, we automatically start working in SOLIDWORKS."

Tekna moved to SOLIDWORKS in 2015, implementing SOLIDWORKS 3D CAD (SOLIDWORKS Premium, SOLIDWORKS Professional, and SOLIDWORKS Standard), SOLIDWORKS Simulation Professional, SOLIDWORKS Flow Simulation, SOLIDWORKS Electrical 3D, SOLIDWORKS Electrical Schematic Professional, and SOLIDWORKS CAM solutions. And when it came time to develop and commercialize its own disinfection product—and spin off a separate company, AvaUV—as an investment strategy amidst the COVID-19 pandemic, Tekna naturally chose to use integrated SOLIDWORKS solutions.



"Innovation isn't just about creating an idea. It's about transforming ideas into meaningful solutions and delivering value to the marketplace, and SOLIDWORKS tools are helping us achieve that goal."

- Mike Nellenbach, VP/Product Innovation

RAPIDLY COMMERCIALIZING UVC DISINFECTION AMIDST PANDEMIC

When the COVID-19 pandemic struck the United States in early 2020, many of the larger manufacturing companies decided to hunker down and halted much of their product development activity, leaving Tekna with a paucity of clients. Yet as Nellenbach explained, the consultancy decided to develop its own product aimed at the pandemic, commercialize ultraviolet disinfection technology, and launch a new spin-off company instead of cutting staff. Tekna has deployed this investment strategy in the past to deliver other meaningful innovations in the medical device and athletic equipment industries.

"We viewed the shutdown as an opportunity to develop our own product," Nellenbach says. "We saw the need created by the pandemic to disinfect common handheld items-like handheld tools, phones and tablets—as well as larger items, such as laptops used in schools. With the AvaUV disinfection unit, which comes in three sizes, these items can be disinfected in as fast as 30 seconds, helping to curb the spread of pathogens while creating a spin-off business opportunity."

AvaUV (www.AvaUV.com) utilizes a specific 254 nm wavelength of UVC, which is proven to deliver peak germicidal efficacy. UVC, or ultraviolet light, is an effective way to prevent microorganisms from replicating and spreading in any environment. By destroying nucleic acids of pathogen DNA and RNA, it renders them incapable of functioning. While originally designed for healthcare

professionals and food production, AvaUV is targeted toward many other potential applications, such as hospitality, financial institutions, and schools. Units entered beta testing at Western Michigan University, as well as several other regional facilities, in late 2020.

CUTTING DEVELOPMENT CYCLE IN HALF

Although the AvaUV design team was forced to work remotely in developing its world-class product, the Tekna team was able to cut the product development cycle in half, from 18 to 24 months down to 8 to 10 months. According to Mechanical Engineer/Project Manager Brendan Fike, the team was able to rapidly develop the AvaUV—even while team members worked remotely—by sharing screens, utilizing the Microsoft® Teams video app, using SOLIDWORKS on-screen models instead of prototypes for design reviews, and employing integrated SOLIDWORKS solutions.

"The team knew that we needed to complete this project faster than any that we've done before, so in addition to a lot of late nights, we looked for ways to save time, such as using the model instead of physical prototypes for design reviews and building just one final prototype for testing," Fike notes. "Using section views and cross-sectioning the model in SOLIDWORKS enabled us to identify and resolve design issues. This was actually more revealing than using a prototype because we could cut through and see inside the design."

INTEGRATED SOLUTIONS DRIVE DEVELOPMENT

Tekna utilized integrated SOLIDWORKS mechanical design, simulation, and manufacturing solutions—and worked with an outside vendor that developed printed circuit boards (PCBs) using Altium® electronic design software—to further accelerate development. Fike says SOLIDWORKS Simulation tools were especially helpful in resolving a technical issue related to the door on the smallest "Capsule" version of the AvaUV.

"We designed the door to the Capsule to re-open automatically to avoid re-contamination," Fike explains. "When the user puts items in the chamber and closes the door, which is lined with a highly reflective aluminum surface, disinfection takes place, and the door re-opens after the 30-second cycle. While that takes place, the user washes his or her hands so the chamber

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and items are not re-infected when they take the items out. We used SOLIDWORKS Simulation to identify and validate the best mechanism for opening and closing the door."

Using integrated SOLIDWORKS solutions, Tekna quickly developed and introduced an innovative, in-demand product. As Nellenbach says, "Innovation isn't just about creating an idea. It's about transforming ideas into meaningful solutions and delivering value to the marketplace, and SOLIDWORKS tools are helping us achieve that goal."



Using integrated SOLIDWORKS tools, such as tapping SOLIDWORKS Simulation to identify and validate the best mechanism for opening and closing the AvaUV door, enabled Tekna to cut the product development cycle in half, from 18 to 24 months down to 8 to 10 months.

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