



SIEMENS
Ingenuity for life

Case Study

OEM builds game-changing food safety solution with Siemens components and global support, accelerating time to market

 CleanBeam

Clean Beam's DryZap! footwear sanitization unit incorporates sole-sourced Siemens components that simplify procurement, licensing, programming, and support, while saving significant time and costs.

Despite sanitation being a top concern for food processors and packagers worldwide, recalls keep recurring, impacting the revenue and reputation of businesses. Much worse, are the health issues from bacteria like listeria, E. coli, and salmonella. In the U.S. alone, the cost of medical treatment, lost productivity, and illness-related mortality is estimated to be many tens of billions of dollars a year.

Wisconsin-based Clean Beam aims to change this with its DryZap! footwear sanitization solution. It uses a patented,

dry and chemical free application of pulsed ultraviolet (PUV) light that eliminates the cost, safety, maintenance and compliance issues associated with conventional wet boot washing systems commonly used in food plants.

Founder and President Mark Cottone says wet bootwear-cleaning systems are messy and pose safety risks: "Workers typically wear multipurpose boots, often shared with others, onto the plant floor. But, first, they must step up onto a platform to clean the boots with brushes submerged in water and various

chemicals. Then they have to step down one to two stairs with wet boots, which can cause slip and falls."

Ironically, Cottone points out, wet systems like these can cause the very same contamination they are designed to prevent. "In many cases, by the end of the first plant shift, the water in wet systems has become a breeding ground for the pathogens. That's because the chemicals designed to sanitize the footwear have dissipated so much, leaving workers to then track the pathogen-laden water into plant areas."



Challenge: Develop an intelligent, easy-to-use, PUV-based dry footwear sanitation system with digital IIoT connectivity for fleet and data management

According to Cottone, when workers step into the Clean Beam DryZap! system, its PUV light emits a 200–1100 nm beam of energy –10 times the strength of the sun – to kill pathogens instantly at the DNA level but with little or no ambient temperature effect on the footwear. An ankle-height protective light shield protects users’ eyes from the PUV light.

“Our PUV solution takes about 3.5 seconds to kill about 10,000 times more germs than wet systems, without the mess, recontamination risks, maintenance, and cost of chemicals,” he says. “Plus, we’ve built in intelligence and connectivity to monitor compliance and manage data and system conditions, including remote diagnostics. Our approach is really disruptive to the status quo and is an industry game-changer.”

Previously CEO of Cougar Packaging Concepts, a major industrial packaging firm and Clean Beam’s parent company, Cottone was familiar with PUV and its positive impact on pathogen kills when applied directly to food. This experience and expertise was instrumental in developing this solution.

As the idea for the Clean Beam DryZap! system developed, they deferred to the global experience of the DryZap! system’s principal design engineer Vadim Wein, who chose Siemens. “I’ve worked with all major suppliers and Siemens has the most technologically advanced components that work seamlessly together and are easily programmable with the SIMATIC TIA (Totally Integrated Automation) Portal software engineering framework,” says Wein.

“As a startup,” he adds, “we are racing time against our cash-burn rate, so we can’t waste time sourcing, programming, integrating components from different suppliers, especially one that often subcontracts its parts to third parties. If a part has an issue, we can get the runaround in addressing it.”

Another key factor in choosing Siemens is its global service and support footprint. “We plan to sell our Clean Beam dry footwear sanitation solutions worldwide, so global coverage from Siemens is critical to us and our customers,” he says. “The Siemens name inspires trust in the quality of our product.”

Wein also notes, strategically, Siemens does a better job of supporting small OEMs like Clean Beam, especially in North America. “Siemens treats small customers like us as if we’re their number one account, while the others can be dismissive of us because we can’t promise them the volumes their larger customers do.”

“Siemens treats small customers like us as if we’re their number one account, while the others can be dismissive of us because we can’t promise them the volumes their larger customers do.”

— Vadim Wein, Principal Design Engineer, Clean Beam, Inc.

Solution: Deploy a highly integrated set of Siemens TIA components, including SIMATIC S7-1500 software controllers, Industrial PCs, WinCC and RFID solutions, plus SINAMICS drives and other Siemens products

To design and engineer the automation and controls for the Clean Beam DryZap! system, Wein specified a long list of Siemens components that include:

- **SIMATIC S7-1500 Software Controller (CPU 1507S)**, which is based on the hardware version of the S7-1500 programmable logic controller (PLC), Siemens most advanced. It provides the system’s automation and control functions and runs on a Windows PC but is independent of Windows itself for high



availability. It features PROFINET and PROFIBUS for connectivity, plus an integrated web server for remote access, programming, and diagnostics.

- **SIMATIC Nanopanel PC IPC277E**, a flexible, industrial Windows PC embedded in a rugged and durable 7-inch display as the HMI for customer versions of Clean Beam DryZap! systems. Wein uses a much larger display to do programming, testing, debugging, and system diagnostics and updates.
- **SIMATIC WinCC Runtime Advanced (TIA Portal)**, which runs on the Nanopanel PC, provides a common software engineering framework for the system's HMI and SCADA programming.
- **SIMATIC ET 200SP distributed I/O with a Communications Module**, used to link the system's process signals to the S7-1500 PLC via PROFINET or PROFIBUS.
- **SINAMICS V20 0.25 hp drives**, for reliable, cost-effective, and energy-efficient motion control of PUV beam emitters that scan workers' boots with pathogen-killing UV light.
- **SITOP PSU100L**, a cost-effective, compact basic power supply with up to 89 percent efficiency for low power consumption and heat loss in the control cabinet, plus short-circuit and overload protection.
- **SINAMIC RF1060R RFID reader**, to scan users' employee badges as they pass through the system. Clean Beam plans on adding other identification options, such as a biometric thumb scanner and facial recognition.
- **SCALANCE switches**, to facilitate networking to higher-level systems, such as HR databases to track personnel's use of the Clean Beam DryZap! system. Siemens incorporates the OPC UA communications protocol in all its networking devices, so OEM customers like Clean Beam can have their machines communicate with third-party machines and systems.

- **SIRIUS Control Products**, such as push buttons used to start and stop the system's operation, as well as contactors and other small but critical devices.

According to Wein, because these Siemens components are part of the Siemens TIA portfolio, they are designed to easily interconnect and interoperate. "Programming is done via the TIA Portal, which is pretty much point-and-click-and-drag, thanks to its graphical interface," he says. "It also comes with libraries of proven code I used as the basis for much of my software engineering, saving me time in all stages."

Wein says he receives outstanding support from experts at Siemens and Steiner Electric, his Siemens distributor. "I don't need much support generally, but when I need it, I can get it from either of them, whether by phone or in person," he says. "Siemens' support philosophy is straightforward: If you're a customer, you can get all the support you need, no matter what your size. With Siemens competitors, it's a totally different story."

Results: Simplified procurement, licensing, programming, and support – saving significant time and costs

As a startup OEM, Clean Beam's sole-sourcing from Siemens of the SIMATIC S7-1500 software controller, the SIMATIC Nanopanel IPC, plus all the other core system components has simplified everything from procurement and licensing to programming and support. This has provided tremendous savings in both time – accelerating time to market – and costs.

For example, Wein estimates Clean Beam is saving as much as 60 percent on licensing fees because Siemens licensing is much simpler than competitors. In addition, he found an 85 percent savings when using the TIA Portal for programming. "With the SIMATIC TIA Portal, I can program, test, and debug specific functions in about two hours," he says. "With other suppliers' tools, it would take me about two days to do the same work."

Cottone has found the tracking and traceability functions of the Clean Beam DryZap! system has sparked a lot of interest from potential customers. "Compliance with the Food Safety Modernization Act is a big deal across the industry, and the Siemens S7-1500 software controller along with the Siemens RFID reader are at the heart of enabling the tracking and tracing of users that wet systems are unable to provide," he says.

"What's more, the IoT connectivity to higher level plant and even enterprise-wide systems will enable us to provide our customers with a service bundle that can include remote diagnostics, condition-based maintenance, especially counting the hours of use for the PUV emitters, along with data and fleet management," Cottone says.

"We are excited to be working with the global leader that Siemens is and extending our reach as we progress outside of North America with our customer relationships."

**Published by
Siemens Industry, Inc. 2019.**

Siemens Industry, Inc.
5300 Triangle Parkway
Norcross, GA 30092

For more information, please contact
our Customer Support Center.

Phone: 1-800-241-4453
E-mail: info.us@siemens.com

usa.siemens.com

Order No: AMCS_CLNBM_0519
Printed in U.S.A.
© 2019 Siemens Industry, Inc.

The technical data presented in this document is based on an actual case or on as-designed parameters, and therefore should not be relied upon for any specific application and does not constitute a performance guarantee for any projects. Actual results are dependent on variable conditions. Accordingly, Siemens does not make representations, warranties, or assurances as to the accuracy, currency or completeness of the content contained herein. If requested, we will provide specific technical data or specifications with respect to any customer's particular applications. Our company is constantly involved in engineering and development. For that reason, we reserve the right to modify, at any time, the technology and product specifications contained herein.