



AUGMENTED REALITY AND WEARABLE TECHNOLOGY

The Future Is Here for the Testing, Inspection and Certification Industry

By Tom Chestnut

Food safety and quality audits have been essential to the food industry's commitment to produce safe and high quality products for consumers. These audits have historically been part of a food company's internal processes to ensure conformance to food safety standards, but over the last 15 to 20 years there has been an increasing shift to the use of third-party organizations and more formal certification schemes, like the Global Food Safety Initiative (GFSI), to accomplish this task.

Augmented reality (AR) and wearable technology will forever change how the food industry and the testing, inspection and certification (TIC) industry conduct business.

While there has been little change in the information that is collected over the course of a food safety and quality audit, we have seen a shift in how the information is documented and stored. From the early days of carbon paper forms to the computer and hand-held devices, technology has progressed slowly in finding ways to help auditors be better, as well as collect information in a way that supports strong data analytics and process improvements. But all of that is about to change over the next three to five years as we will see quantum leaps in technology, particularly in the areas of augmented reality (AR) and wearable technology. And it will forever change how the food industry and the supporting testing, inspection and certification (TIC) industry conduct business.

WEARABLE TECHNOLOGY SOLUTIONS FOR AUDITING, TRAINING AND DATA MANAGEMENT

Innovators in the TIC industry, like NSF International, are envisioning new enterprise applications of the Glass technology. NSF International's vision was transformed into reality in February 2015 on the Google campus in Mountain View, California when a food safety and quality audit was conducted at a Google foodservice operation without the auditor having to leave their home hundreds of miles away in Los Angeles. Instead, a kit was shipped to the campus restaurant containing everything that was needed to conduct an audit: flashlight, thermometer, alcohol swabs, chlorine test strips and a very important addition – Glass.



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The manager of the facility was then guided through each step of the audit by the remote auditor using two-way audio and video communication via Glass. The auditor filled in the inspection report each step along the way, and upon completion emailed the audit report to the facility manager for review and discussion, just as they would have done if they had been physically present in the restaurant.

As with any new technology, there were issues the first time around, including internet connectivity and the ability to have clear audio communication in a noisy restaurant environment. But much of this would improve over time, with the biggest change occurring with audio capabilities when we began to test prototype versions of the new Glass Enterprise Edition on the Google campus in July 2015.

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The overall experience for both the restaurant managers and remote auditors in the initial pilot studies have been quite positive. Managers feel like we have taken them out of the “passenger seat” where they accompany an auditor during the traditional on-site audit and instead placed them into the “driver’s seat” by actually conducting the audit through remote assistance. Through the initial stages of the Google pilot we also learned that the Google wearable technology could offer an immediate training opportunity during the course of conducting a remote food safety and quality audit. By creating a bank of 30- to 45-second key training videos that an auditor can access during the course of a remote audit, the manager can view the short segments via the Glass to receive instant training on food safety and sanitation SOPs as any issues are encountered along the way.

NSF began to see even broader applications of this wearable technology and by July 2015 had secured four trademarks and submitted two U.S. patent applications for applying the technology to processes in the food industry. And in November of the same year, EyeSucceed was formed as a start-up entity within NSF International to drive wearable technology across the enterprise, as well as to thousands of NSF customers in the food industry.

APPLICATIONS OF WEARABLE TECHNOLOGY FOR THE TIC INDUSTRY – TODAY AND IN THE FUTURE

Today, nearly two and a half years after the initial pilot on the Google campus, Glass Enterprise Edition and other advanced wearable devices like the ODG R-7 and Vuzix M300 are being used by NSF around the globe for training and efficiency, and to ensure the highest levels of auditor consistency and integrity. This is accomplished through the livestreaming, two-way audio/visual communication that allows NSF to access technical expertise from anywhere in the world and bring it live to the audit site. It also provides the means to conduct shadow audits and auditor calibration without the trainer needing to travel and be on-site. In a recent training example, over 20 auditors were trained, from the point of view provided by Glass, on brand standards for two major foodservice chain restaurant clients without the typical need to travel to the clients’ corporate headquarters for training.

In 2017, NSF started to pilot conducting the actual audits with the wearable devices instead of the traditional tablets or computers, bringing another level of efficiency to the audit data capture. It also brings opportunities to develop new capabilities for real-time auditor training and calibration. If the auditor is less experienced, audit questions are viewed and answered one by one to allow the customer policy statements/interpretations to be displayed alongside the question. For the more experienced auditor, questions are viewed three at a time except when the auditor is outside of one standard deviation in citing a non-conformance as compared to their peers. When that occurs, a visual alert is given and the experienced auditor will view just that question along with the customer’s policy statement/interpretation, bringing real-time calibration to the workplace.



For NSF, this brings greater accuracy and efficiency when executing over 150,000 food safety and quality audits around the globe each year. And at a time when there is much greater need for specialized expertise, and an aging workforce that is no longer willing to be “road warriors,” wearable technology introduces the capability to bring these experts to the audit without them ever having to leave their home or office.

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So what does the future hold? NSF International is now investing heavily to bring AR to the forefront where, combined with wearable technology, it will transform the role of today’s auditor over the next five to 10 years. No longer will auditors be needed on-site as food safety and quality verification will be “self-guided” through wearable devices that automatically extract key data like temperatures from “smart equipment.” In the future, advanced image recognition and machine learning will immediately detect and record any deviation to standards, along with immediately initiating corrective actions.

This form of food safety and quality verification will work hand in hand with the “smart training and execution” that is currently being brought forward to the food industry through EyeSucceed. Less than three years from now, we will have the ability to fully map into the cloud all actions that are associated with performing a job, allowing for step-by-step guidance through wearable technology and the ability to correct problems before they can occur. As an example, let’s envision that an employee is required to put on vinyl gloves before preparing a salad. If the employee reaches for the lettuce without wearing gloves, the wearable device will detect the deviation and immediately

display STOP on the viewfinder as well as a visual of the gloves being placed on the hands. This is also recorded into the cloud both to demonstrate corrective action (as verified by the wearable technology) and to capture data on where employees may struggle with particular steps in a process. The future auditor role will then evolve to more of a focus on data analytics and the subsequent process improvements that may be needed to facilitate better and more efficient execution of job tasks.

What is even more amazing is how fast this technology will be coming to the food industry. This is not the Star Trek-like vision of the future in 15-20 years. After two years of R&D, EyeSucceed will be starting field trials for “smart training” in late Q3 or early Q4, 2017. As for the technology that will detect and immediately correct human error in real time, that’s only 12-24 months behind.

Welcome to the new world of ambient intelligence, in which wearable technology combined with AR will be transformational to both the food and TIC industries, providing new levels of food safety and quality that could have never been imagined in the past.

ABOUT THE AUTHOR



Tom Chestnut, Senior Vice President of the Global Food Division at NSF International.

NSF International has over 60 offices and laboratories around the globe where Tom oversees a team of over 2,000 public health professionals that are responsible for over 150,000 food safety audits each year on farms, food processing facilities and distribution networks in 150 countries, as well as consulting, training and technical support across the food industry. Prior to joining NSF 10 years ago, Tom spent over 20 years in the food industry working for Darden Restaurants where he was Vice President, Total Quality, responsible for all aspects of supplier and restaurant quality assurance. In 2015, he initiated a pilot program with Google as a means to bring AR and wearable technology to the forefront of addressing issues that face the testing, inspection, and certification industry, and he co-founded EyeSucceed later that year.