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# **IoT Tag Solution Tracks Conditions for Cold Chain**

CoreKinect and Kudelski Group have released a new cold-chain and asset-tracking and -management solution intended to make automated, sensor-based tracking of goods in the supply chain affordable and secure. The solution, known as FreshTrack, is focused on providing grocery stores and logistics providers

with data regarding the conditions of fresh products as they are transported to stores. It can also be used for monitoring pharmaceuticals, electronic goods and other condition-sensitive products as they are delivered to a retailer, the companies report.

FreshTrack consists of CoreKinect's disposable tracker with built-in Internet of Things (IoT) technology, as well as sensors and related cloud-based software, using Kudelski Group's digital security technology to ensure data is not intercepted or changed throughout the distribution chain. The companies say the solution will enable users to reduce food waste by knowing the conditions to which goods have been exposed in transit to a store, and thus how long the shelf life is, even before the store accepts the goods from the shipper.



CoreKinect's  
John  
Horn

Food waste is a significant problem worldwide, and tracking the cause of the problem can be challenging. According to the Food and Agriculture Organization of the United Nations (FAO), approximately one-third of all food produced for human consumption worldwide ends up lost or wasted. Much of that waste occurs in the consumer's home, but retailers also lose fresh produce due to goods spoiling before they can be sold.

The FreshTrack flexible tracker is designed to be affixed to a carton of goods, and to be low enough in cost that it can be discarded once the products are delivered to a customer, such as a grocer. The tracker was designed with an efficient

manufacturing process in mind, says John Horn, CoreKinect's president and chief strategy officer. The company engineers and manufactures the devices in Tempe, Ariz.

The product design and manufacturing processes, Horn reports, have enabled the tag to be priced well below \$10 each. The trackers are designed with functional unit blocks that, together, create interchangeable units for a variety of solutions, by sensing unique conditions such as temperature, humidity and motion. A lithium-manganese thin-film battery is layered into the adhesive tracker, which can last for six to nine months for most use cases.

When it comes to the sensors, they can be selected to meet a specific user's needs and can include temperature, motion and moisture detection. There is also a transmission unit that can employ cellular, Wi-Fi, Bluetooth Low Energy (BLE), Bluetooth or Near Field Communication (NFC) technology to transmit conditions to a user's reader or mobile device, or a dedicated beacon or cellular or Wi-Fi network.

Each tracker comes with Kudelski Group's Pico Secure Element (SE), providing hardware-based protection of the device and its data. In that way, the system ensures that no unauthorized parties can access the data or attempt to change it. The result is that everyone across the cold chain can trust the information they access, says Christopher Schouten, Kudelski Group's head of marketing. "In that way," he states, "parties can access tracking data with one single authenticated, unmodified source of reality."

The tag is also designed to detect tampering; if anyone attempts to tear it off, it will no longer operate properly. Additionally, Horn says, it can be attached to cases of produce, so there could be dozens or hundreds of tags in each truckload of goods. That means removing one tag will not prevent sensor readings within the vehicle.



Kudelski  
Group's  
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Schouten

Typically, the tags are attached to cartons of products, at which time users can access a website or an app using a PC or mobile device, link data about the product to the unique ID number of the tracker, and then set up sensor parameters. For instance, if the temperature should never exceed 40 degrees Fahrenheit for a specific box or pallet, that can be indicated in the software. Each tag's parameters can be individually set. A built-in GPS sensor enables the tracker to detect where it is located in the event of a temperature excursion, and it can then securely store that data until the tracker is interrogated. "This tag is smart enough to say 'Something has been out of compliance, and it happened at this time and place,'" Horn explains.

When the goods are received at a retail site or a distribution center, an individual at a receiving dock can read the tags via a Bluetooth, BLE, cellular or Wi-Fi connection, then view a list of the items onboard the truck, as well as a red or green notice for each tagged item, indicating whether it met temperature requirements throughout transit. The company can then accept or reject some or all of a shipment, based on that data. While the secure element ensures that sensor readings cannot be changed, authorized parties can revise the perimeters for sensor measurements.

The tracker's memory can store a month's worth of sensor data or more in the supply chain, Horn says. The frequency at which sensor readings are taken can also be determined by a user. The

PC-based version of the software enables managers to view the data not only for a specific shipment, but also to perform analytics. For instance, the data allows them to compare information across a particular vendor, product or logistics provider.

Three companies are currently piloting the solution. Two fresh food retailers are using Bluetooth to capture data via tablets when goods are received at the store. The third piloting company is utilizing cellular technology not only to capture data via the device's built-in cellular connection when goods are received, but also to receive an alert in real time if conditions fall outside of the acceptable range.

For instance, if tags can detect when temperature levels are too high, they can then transmit their unique ID number, along with that temperature excursion, to a cellular network. The software will capture that data in a cloud-based server, along with the GPS location of the tag and a time and date stamp. It can then forward alerts to authorized parties. In that way, the company could potentially address the problem before the goods are damaged.

Retailers can benefit from the solution by being assured the goods they buy are fresh, Horn says, and that they will have an acceptable shelf-life. This information can prevent the purchase of a truckload of goods that might not be saleable by the time they are on store shelves. "The rejection of just a handful of bad shipments can more than pay for the solution," he states. "People get what they paid for."

Other supply chain members, such as logistics providers, can be assured that they aren't accused of causing damage to produce or product when they weren't, in fact, responsible. "It protects all the players in the ecosystem," Horn explains. "The only ones who are held accountable are the ones who were playing games," such as turning off the refrigeration unit in

the van to save power. “All the good players are protected and we can weed out the bad players.” The result is a set of data that all participants can trust, Schouten says, thereby providing “a single source of truth that doesn’t lie about what happened.”

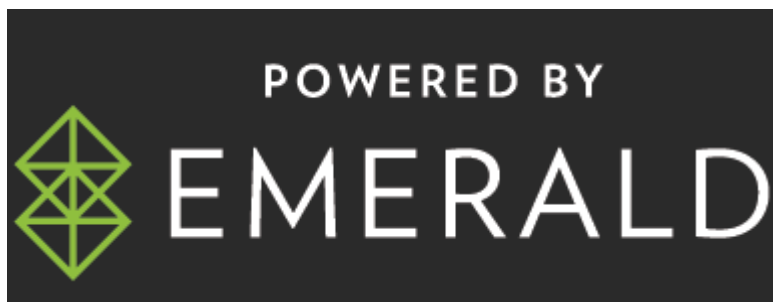
CoreKinect has been working with potential customers in North America, while Kudelski Group is speaking with potential customers in Europe. Companies can purchase the trackers for less than \$10 apiece, then use the software-as-a-service. “If we could stop one truck per store each year,” Horn says, “the system would pay for itself.”



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