

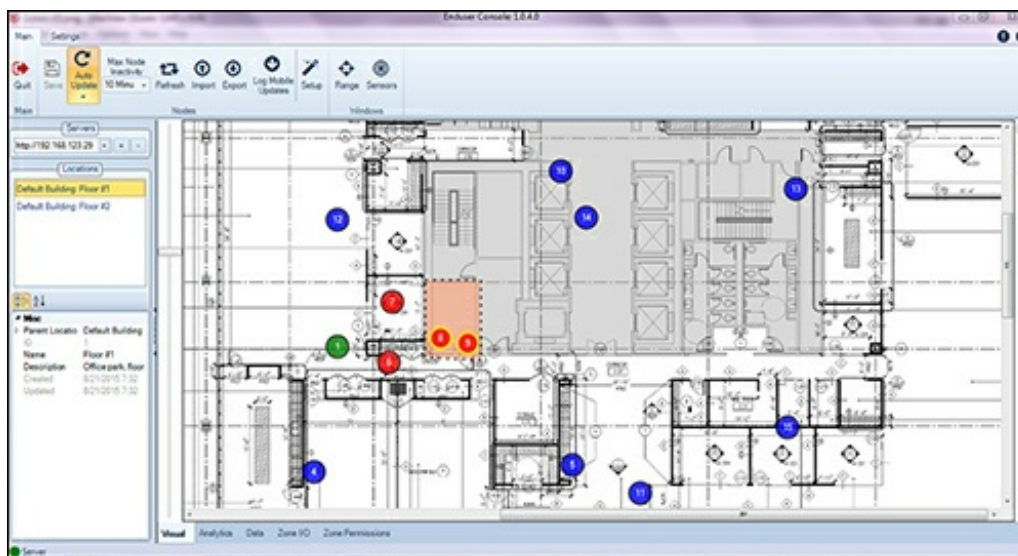
The company says its system, currently being piloted at construction sites and retail stores to track workers' whereabouts, does not require a Wi-Fi network, making deployments easy, fast and less expensive.

By Claire Swedberg

Tags: Retail, Asset Tracking, Construction, Energy

Nov 02, 2015—Redpoint Positioning Corp. has launched a real-time location system (RTLS) that it claims is easy to deploy, even on a temporary basis, in areas where Wi-Fi networks are not always available, and where highly granular location data is required. The technology is currently being piloted for safety applications in Boston by Skanska USA, as well as by other construction companies, to help alert workers if they enter a restricted area. The Redpoint solution is also being piloted by retailers for in-store workforce-management applications.

In the case of Skanska, the technology helps the company ensure that it knows when staff members go to an area of a job site that they are not authorized to enter, and can warn them to turn back. The system also provides historical data so that management can identify workers who repeatedly enter an unauthorized area, and provide them with additional training to prevent such mistakes from recurring.



Redpoint software displays the real-time locations of workers on the job site. (Click on the above image to view a larger version.)

The system was first showcased at RFID Journal LIVE! 2015 in April, and Redpoint has since been demonstrating its Wearable Safety Alert System—an RTLS solution for industrial construction sites—at other conferences, such as the BIMForum Conference.

Redpoint Positioning, founded in 2010 in Cambridge, Mass., has focused the development of its solutions on providing the accuracy of an ultra-wideband (UWB) system at a more affordable price compared with those of other high-precision RTLS solutions, according to Antti Korhonen, the company's president and CEO. Redpoint's RTLS uses DecaWave's DW1000 chips, which comply with the IEEE 802.15.4-2011 (UWB PHY) standard. Redpoint has also developed and patented software solutions to provide, for instance, the MAC layer, TDOA schemes and positioning algorithms. Using the DW1000 chip in conjunction with Redpoint's own software and tag components, Korhonen says, Redpoint's RTLS offers 2-D location accuracy of 20 centimeters (7.9 inches) and 3-D location accuracy of 30 centimeters (11.8 inches).

Redpoint also incorporates Bluetooth and other wireless technologies in its RTLS solutions, says Chunjie Duan, the company's CTO. "Combining different technologies intelligently with UWB," Duan adds, "allows us to further improve the accuracy, capacity [and] reliability, and deliver multi-tiered location service."

The battery-powered tags made with DW1000 chips can act as transceivers, and can be set up to create a wireless sensor

network (WSN) and RTLS solutions. The tags come with embedded positioning algorithms, Duan says, while network anchors, also made with the same DecaWave chips, act as "satellites" that make the Redpoint solution operate like GPS does, "enabling fast response locating, navigation and zero-latency alert applications."

The newly released network anchor also comes with Bluetooth Low Energy (BLE) radio, enabling it to detect the locations of beaconing devices, such as BLE asset tags, smartphones or tablets. The Redpoint badge—which can calculate the real-time location within the badge itself, based on the signals received from anchors—also has a built-in BLE transceiver so that it can communicate current location data to any BLE-enabled devices, such as a smartphone or tablet. The system also comes with what the company calls a "dual API," offering an application programming interface at both the tag end (for connecting tags to smart devices via BLE) and the server end (for traditional RTLS applications).

Korhonen says most RTLS solutions on the market can often be inconvenient to deploy, such as at construction or oil and gas sites, as well as retail sites. For instance, many of these locations lack Wi-Fi infrastructure, or the Wi-Fi they are using might not provide the less-than-half-meter location granularity required. On construction job sites, Korhonen notes, high-precision RTLS technology is necessary for defining reliable hazard zones for employee alerting. "Even a 1-meter mistake in detecting hazard zone boundaries can be dangerous," he states. In retail stores, location precision is needed for data-analytics applications to provide item-level accuracy rather than just aisle-level accuracy. "For these use cases, RTLS solutions before Redpoint have either been too complex and cost-prohibitive, or not accurate enough to support these safety and analytics applications."



Antti Korhonen,  
Redpoint's CEO

Redpoint offers an alternative to Wi-Fi-based RTLS technologies. The company's battery-powered or power-over-Ethernet (POE) network anchors can be installed around an area, with their location stored in the cloud-based software to help link a moving tag to a location based on the anchor transmission. Those network anchors can receive and forward transmissions from Redpoint UWB tags worn by employees in the form of badges, or attached to specific assets, tools or equipment. In that way, a mesh network can quickly be established to identify the locations of the tagged individuals or items. Some network anchors can act as a bridge or gateway, sending that positioning data to the cloud-based server via an Ethernet connection. Asset tags are the size of a matchbox, while the badges are similar in size to traditional ID badges.

The Wearable Safety Alert System features a safety vest with a built-in LED light and Redpoint RTLS tag. The vest's embedded tag acts as a switch between the battery and the LEDs to turn the lights on and off, based on an individual's position and the virtual zone information the system receives from anchors. According to Korhonen, any off-the-shelf safety vest with the LED light will operate with this solution, once the tag is installed by Redpoint or a reseller or systems integrator. Typically, the light is intended to remain illuminated in order to warn others in the vicinity of a worker's presence. However, Redpoint's solution goes a step further, triggering the light's illumination only if the system determines that a worker has entered a danger zone. In that way, it can warn him or her to leave the area.

General contractors and other businesses can use Redpoint's cloud-based software linked to building information management (BIM) construction-management software to set up zones in which specific individuals should not go. For instance, workers with no reason to be in a particular area can be warned to stay out.

Redpoint, or the user, can deploy the anchors around an area, linking each anchor's ID number with a specific location. As a worker walks through an area, his or her badge tag receives signals from surrounding anchors and uses this data to calculate its real-time position. It then forwards that location information back to the server via the anchors. Redpoint software determines if the employee is authorized to be in that specific area, and if he is not, the badge tag triggers the LED light on the vest to begin flashing, thereby warning the individual and those around him that he has entered a restricted area.

In addition, a solution provider can integrate a Redpoint tag with an actuator to slow or deactivate heavy equipment in the event that the tag comes too close to it while it is operating.

Users can utilize a Redpoint app on a smartphone or tablet to learn where they are located within a building or at a worksite, and navigate to another location displayed on the map—such as a store, restroom or other part of a worksite—via a BLE connection between the anchor and the tablet or phone. Workers (a foreman, for instance) can also use a Redpoint construction-site app, coupled with the BIM-based worksite map, to view where staff members are on the site in real time.

In addition, Korhonen says, several retailers are testing Redpoint's technology for applications focused on workforce optimization in situations "where it is important to know with 100 percent accuracy inside which store aisle and within which product section people are working." The software not only captures the locations of staff members wearing Redpoint badges, but also provides analytics for store managers so that they can determine better and more efficient ways for their employees to conduct their work in the store.

"There are a variety of other retail use cases with RTLS," Korhonen states, "and we will get to them later."

With a typical installation, Korhonen says, users can determine the location of a Redpoint personnel or asset tag to within about 20 centimeters (7.9 inches). "The key is, however, that because of the mesh network, there's no need for cabling necessary, such as would be the case for a Wi-Fi-based system," he notes, "which requires a network of wired Wi-Fi access points to receive signals from Wi-Fi-based RTLS tags."

Redpoint Positioning is currently offering a software developers kit to enable users to develop their own apps for use with the company's tags and anchors. Redpoint's own software will be available on a hosted server around the end of this year. The firm is also developing solutions for warehouses and the oil and gas sector.