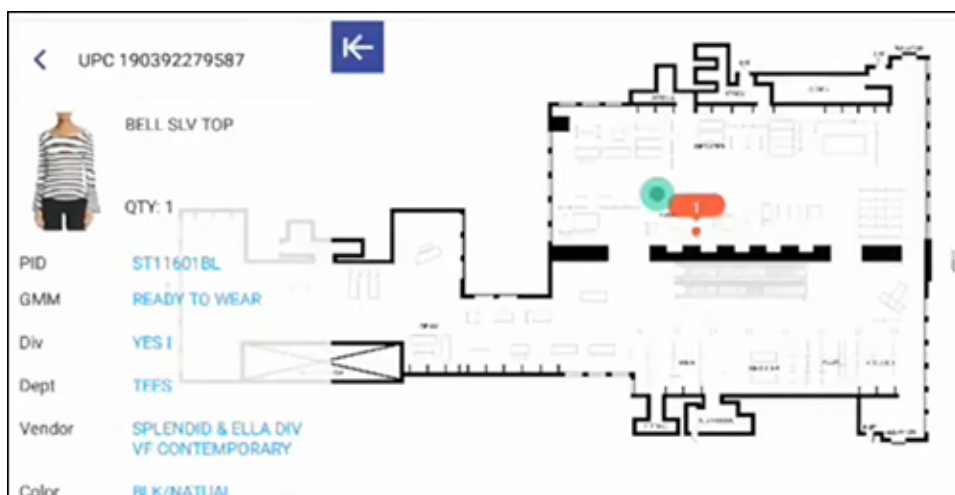


AI, RFID Technologies Point the Way to Tagged Inventory

Technology company [StealthMatrix](#) has developed an indoor mapping system designed to help point store associates in the direction of specific products, thereby helping them navigate their way to those items on a map of the store. In the future this feature could be made available to shoppers as well, depending on a retailer's infrastructure. StealthMatrix is releasing the latest version of its ARC device, which uses RFID, as well as augmented reality (AR) and artificial intelligence (AI) technologies, to specifically identify where a product was last seen, and where the individual using the system is standing, then to direct him or her to that item.

The company's origins are not in retail or AI. Margaret Nyswonger and Bradley Berlin launched [Stealth Network Communications](#) in 1994 to provide voice, data, security, network and wireless solutions to government agencies and commercial industries. Over time, the company started speaking with clients that faced inventory-management problems; they knew they had products in the store, but they couldn't find their specific location, explains Kat Bride, StealthMatrix's sales and marketing director.



The ARC device captures images and creates a

3D map indicating where barriers and display areas are located within a store.

The resulting solution displays an item and directs a sales associate to its exact location within 1 foot. It consists of StealthMatrix's ARC device and the company's cloud-based software to capture data from the device, and to link it to information that includes a map of a store and the locations of tags read within on the premises. In that way, users can simply follow an arrow that will lead them to the items they seek.

Existing in-store RFID solutions come with some shortcomings, Bride says. Handheld readers are limited in terms of the accuracy at which they can locate goods. Typically, the location is based on zone-based data input by a user as he or she undertakes an inventory count with a handheld reader in the storefront or back room. Therefore, a handheld system provides an accurate picture of what tags are onsite, and thus which products are available, though specific location data is lacking. A real-time location system (RTLS) with overhead readers can provide greater location granularity, but Bride notes that the cost of hardware installation (overhead readers, for instance) can be too high for most stores.

To launch the StealthMatrix system, a company acquires at least one ARC device, which comes with a UHF RFID reader and an antenna, as well as five sensors and five cameras. First, a retailer would need to map out its store. Users can hold the device in front of them in both hands, then walk through the aisles of the storefront or back room. The ARC captures the images around it and creates a 3D map indicating where barriers and display areas are located. The device can immediately begin reading UHF RFID tags within the vicinity. In that way, even as it creates a map, the system also captures the unique ID number of each tag affixed to a store product, along with the location of that item within about 1 foot. That data can then be stored in the cloud-based

software.

The system offers several advantages to retailers, Bride says. For one thing, it can be used for inventory counts that identify specifically where items are located and thus when they have moved. That information makes it possible to correct the misplacement of goods, and to determine if customers have moved a product without buying it. In the latter case, stores can capture analytics to better understand which products are attracting the interest of customers, as well as what items might be frequently tried on together—for instance, if a scarf or hat is being taken into the shoe department to be tried with a specific pair of boots, then is being left behind in that area.

The device can be used not only for counting inventory and identifying misplaced items, but also to locate products that need to be retrieved from the back room or the sales floor. For instance, some goods must be returned to a particular vendor if the season for those items has passed. In that case, users can input the items they seek, then quickly move throughout the store, following an arrow that points them to those goods, and remove them from store displays or from the back room.

In the future, stores could put some of the wayfinding functionality into the hands of shoppers. For instance, once the system knows where a product's location was last captured with an RFID read, that data is stored in the StealthMatrix software. A store could offer an app that a shopper could download in order to access some of that location information. StealthMatrix can work with the retailer and its available technologies to make this possible, Bride notes.

If a customer liked an outfit on a mannequin or display, for example, he or she could open the store's app and use his or her phone's camera to scan the QR code on the garment or

accessory. The app would access the StealthMatrix location data, display the store's map and provide wayfinding to that specific item so the shopper could try on or purchase the same garment on display. StealthMatrix is currently in conversations with some of its customers about that wayfinding feature.

The ARC device can use its built-in RFID reader to further identify where a particular tag is located as a user approaches it; the device can read tags at a distance of about 20 feet. Thus, when a user comes within that distance of a tag, the RFID read transmission can be used to approximate its location, based on its signal strength.

StealthMatrix's AR functions have been developed with AI features commonly used by the gaming industry. The company says it is in the process of building a next-generation product that will be smaller and easier to handle for sales associates. The Manhattan-based department store, which has asked to remain unnamed, is currently piloting the solution to identify the movements of some goods throughout its departments. StealthMatrix's goal is to provide tools that will help brick-and-mortar stores compete with the online retail market.

In addition to the New York store, a fashion company that makes custom-designed dresses is planning to pilot the system in order to capture the location of each made-to-order dress at its facility in India. While several companies have asked about using GPS to locate the RFID tags (by capturing the device's GPS location as it reads the tags), that kind of technology is not sufficiently reliable for the use case of locating an item within a few feet, Bride explains. "We wanted to concentrate on the micro-level," she states, "by identifying one piece of merchandise and how it moves," in addition to where specifically it was last located.