

# Access Control and Zonal Security: *Can Active RFID deliver a better solution?*

By

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## **With the benefit of Long Range Detection, can Active RFID serve as a more functional access control medium and provide greater visibility?**

Methods to achieve perimeter security have evolved considerably since the days of padlocks. Metal keys with unique characteristics of every kind still continue to be used, but have been augmented with electronic keypads, and more recently with proximity cards containing passive RFID technology. All these different methods provide the ability to secure a portal, most often an egress point such as a door. Electronic means of security such as keypads and proximity badges also allow collection of data associated with the movement of the people



entering the portal, by capturing and storing PIN numbers and reading the unique IDs of the badges. Once inside a building or a zone within a building, the person can no longer be tracked or located using any of these means of access control, unless keypads and proximity card readers are also used within the building to enter such zones through secured doors. Besides the movement of people, there is great value in identifying and tracking



the movement of high value assets through the portals for loss prevention and for location purposes. Keypads and proximity badges require human intervention and so do not lend themselves for use with assets, although passive RFID used as the building block of proximity badges may yield limited success. Passive technology has come a long way with regards to the success rate of tag detection at portals, though it requires expensive equipment to ensure that tags can be read in the presence of obstructions such as metal objects, and regardless of the orientation of the tag as it moves through a portal.

Security of people has become one of the most prominent considerations in every enterprise and institution, due to the many threatening incidents in an increasingly hostile world. It is no longer adequate to prevent egress into a building to unauthorized people, but equally important to monitor and deny access to certain personnel and visitors into sensitive areas within a building. CCTV surveillance cameras can be seen within most buildings these days. Although useful as a deterrent, and somewhat effective in detecting possible breaches in security, it is reliant on personnel to continuously watch multiple video streams in real-time and make a judgment call. In most cases the archived video information is the means to determine a breach *after* it has occurred and not while it is occurring. Also, one can think of instances where visual monitoring is not adequate. For example, someone hiding a laptop computer with sensitive data in a briefcase could not easily be discovered by watching the person's passage through an exit, if discovered at all. Many corporations therefore implement a "bag check" in and out of the premises, which is also not completely infallible.



Man-made and natural disasters are driving the need for real-time knowledge of who may be in a building, and where in the building if possible. Proximity sensing

of personnel and visitors gives a very limited profile of the demography within an affected building for emergency response activities.

### Can Active RFID do any better?

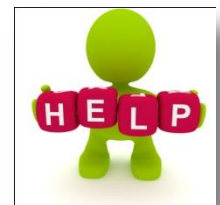
Active RFID tags are miniature transceivers that can be detected at distances of hundreds or even thousands of feet. Active RFID tags are self powered, using a built-in battery, and contain processing intelligence so that they can transmit status information with or without external stimuli. They can also monitor various types of sensors and report their status, which can also be based on preprogrammed rules. Some active tags also accept commands to retrieve information or execute a task. Several active tag manufacturers use a combination of ultra-high frequency (UHF) and low frequency (LF) to achieve good performance for both long-range (up to thousands of feet) and proximity detection (tens of feet), adding the benefit of location and tracking of tags



within a building or yard, in addition to accurately capturing tags as they traverse a portal. Keyless car “clickers” are a form of active RFID devices with each sending a unique encrypted code to its paired vehicle. The latest ones don’t even require one to push a button, as the vehicle door will open as long as it is in the vicinity of the vehicle. Similarly, access through doors in a building can be achieved by having an active RFID tag on one’s person, as long as the rules for that particular tag allow entry.

In other words, detection of active RFID tags does not require any human intervention, and the latest technology allows these tags to be read successful under almost any environmental conditions. The cost of active tags is higher than that of passive RFID based proximity badges, but the difference is not as significant as it used to be. However, as active tags are self-powered and contain a battery, maintenance cost could become a consideration. Active RFID may not be a solution that suits everyone’s needs, but it sure has some compelling attributes that offer functionality unmatched by the traditional means of securing a portal. The following examples illustrate some of the features that active RFID can offer due its unique characteristics:

- As the tags are self-powered, they can be programmed to periodically send a “blink” so that tag readers placed within the perimeter of a building continue to detect their presence. The absence of the “blink” in the case of an active tag would immediately discover the absence of a tagged person.
- The “blinks” are also used to locate a tag within the perimeter, accomplished by using several types of algorithms. This means that a tag entering a zone that is out of bounds within a building can be identified and appropriate measures taken without the need to restrict movement of authorized personnel by placing physical barriers such as doors and turnstiles within the area of coverage.
- Tagged assets can be “associated” with a person or a group of people, so that only authorized tagged personnel are able to transport such items through secured portals. Therefore, a hidden laptop computer which is tagged will be instantly identified and the portal secured to deny access.
- Active tags coupled with sensors or switches can perform a variety of tasks, such as report the ambient temperature in its immediate vicinity, or detect that the bearer of the tag has taken a sudden fall.
- A button on the tag can provide the means for an employee to summon for help when under duress, and the system’s location ability permits rapid response to the call. Such tags can also have long range receivers built into them, allowing for signaling such as acknowledgement of a duress call received and indicating help is on its way.
- Such tags can also have incalculable benefits in an emergency or disaster event, providing response teams information regarding the demography within a building, provided that the system infrastructure is still intact and operational.
- Active RFID installation is accomplished by placing devices above ceiling tiles or in locations which conceal them, making the presence of the system discrete, unlike wall mounted devices and turnstiles.



## GuardRFID's Staff Tag



*GuardRFID's Staff Tag contains a variety of features that lend themselves to a diversity of applications.*

### Blink Transmissions

*Tag location is accomplished using periodic "Blinks".*

### Capture Zone Detection

*Immediate notification is sent to the system when the tag enters a low frequency capture zone.*

### 2-Way Communications

*Staff can be sent messages by using the tag as a pager. Built-in Audio/Visual indicators indicate different message types.*

### User Buttons

*Two configurable buttons that allow coded messages to be sent, such as one to indicate duress.*

### Fall and Motion Detection

*An emergency signal is initiated in the event the wearer of the tag has a sudden fall.*

Several tags are equipped with sensors to detect motion, visible light, a sudden fall and others, to be able to report tag tamper attempts

or movement of the item that the tag is placed upon. GuardRFID's Argus Middleware Engine is at the heart of the system, providing all tag and system management capabilities, and storing status information in a SQL database. All it takes to create a complete solution is connecting the appropriate software application to Argus via GuardRFID's API.

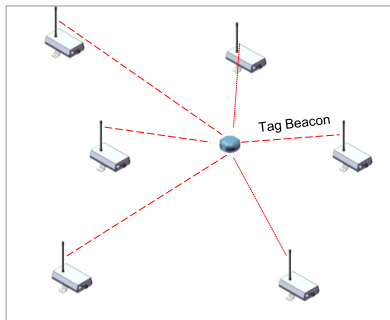
## Conclusion

Active RFID certainly has many attributes that lend themselves to creating a "hands free" access control system with a difference – no user effort is required, and, by employing a network within the perimeter, zonal security can also be accomplished. Added benefits include the ability for bi-directional communications and acquisition of sensor data. The technology has matured, and therefore cost and technology stability are no longer an issue. As evidence of this, standards such as the proposed IEEE 802.15.4f, the ISO-18000-7 and the DASH7 have emerged which will further accelerate adoption. There are certain hurdles that need to be overcome, such as personal privacy with respect to tracking, but the new world has imposed challenges that demand greater vigilance, and personal security may outweigh this as long as privacy of such information is respected.

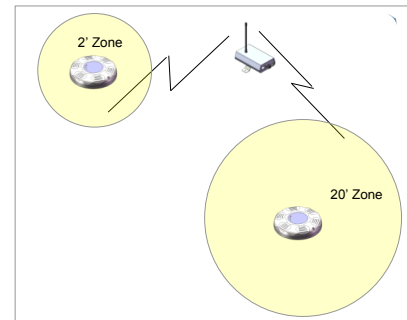
## GuardRFID's Active RFID Technology

GuardRFID's Active RFID system uses the 433MHz frequency, thus offering a large family of the smallest tags available, with long battery lives. The system consists of tags placed on people and objects, and a network of Readers that receive "blink" messages that are constantly transmitted by the tags. This allows for real-time tracking and long-range location of the tags within the area of coverage using a special algorithm. The system is unique in that it also includes a second mechanism for detection of tags in close proximity to a location, using low frequency Excitation Fields.

Such "capture zones" have unique IDs and can be adjusted fairly precisely between 2 to 20 feet, thus permitting zones of different capture distances to be set up depending on specific situations. A tag entering such a zone will instantaneously transmit its entry within that specific capture zone, and will also announce its departure from the zone. This permits both Long Range and Proximity location capabilities, allowing for the design of systems that can provide Real Time Location and Tracking as well as Security and Loss Prevention within the same system.



Long Range Location – Multiple Readers receive tag signal, and sophisticated location algorithm reports location (8-30 ft depending on construction and Reader density)



Proximity Location – Tag entering Zone reports zone ID immediately. This can be used for bed or closet level location, for example. (2-20 feet, based on Exciter setting)



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**Active RFID That Delivers**