

The marriage of Active RFID and CCTV:

Active RFID combined with Video Surveillance puts Security right on target!

By

Zahir Abji, President & CEO, Guard RFID Solutions Inc.

Combining Active RFID technology with a CCTV system can result in detection, tracking and visibility within a Surveillance System that has never before been possible



Video surveillance has become commonplace in most commercial buildings, and also as a tool to fight crime in large metropolitan areas. IP-based surveillance systems are preferred over analog systems because they have much more to offer with regards to image resolution, ease of connectivity, and features that computer processing power can offer such as motion detection and immediate analytics. Regardless of the technology utilized, effective real-time surveillance requires an operator constantly viewing the live video stream in order to make decisions to try and combat the undesired activities for which the system has been deployed. A CCTV surveillance system that has

been implemented to prevent loss, or to detect and thwart movement of unauthorized people or objects in high security areas relies heavily on the operator's ability to recognize the potential threat in order to trigger the appropriate security response. Such judgment calls can be extremely unreliable in many instances. For example, an employee within a corporation that has been entering and exiting its building for a period of time could be leaving with a laptop containing highly confidential data in his or her briefcase. Unless expensive resources are deployed to ensure that every item entering or leaving the building is physically examined, chances are that the employee will be allowed to leave the building without being challenged.

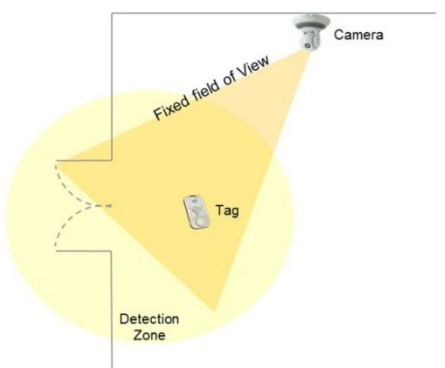
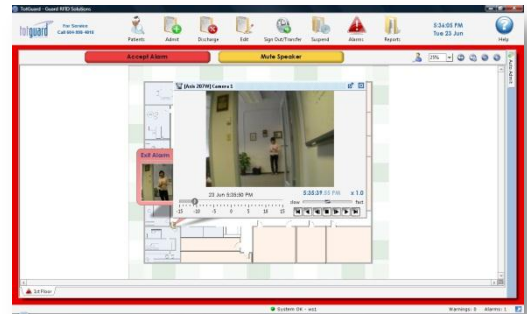
Both active and passive RFID technologies have been utilized to track, locate, and secure assets and people for many years. Passive RFID is predominantly a short-range technology. Passive tags require the reader to provide enough RF power to the tag in order to activate that tag and enable it to reflect back a relatively weak signal. The requirement for reliable detection significantly limits the range of detection between the tag and reader. An active RFID tag can be detected at considerable distances because it has its own power source and can therefore transmit a relatively high level signal to inform of its presence autonomously and independently of the reader. Active tags may also contain different types of sensors within them and have the ability to periodically transmit their status or to immediately communicate warnings triggered by the sensor's condition. For example, a tag containing a tamper or motion sensor can be placed on a stationary object and a message immediately dispatched by the tag if the tag was tampered with or the object was to move. Active RFID systems also have the additional capabilities of being able to track a tag in real time as it moves within its system coverage area, and to locate a tag within the area on demand. Long range active tag location is accomplished by receiving a tag message at multiple readers and employing various algorithms to calculate the position of that tag. Positive proximity location can also be achieved by placing low frequency (LF) radio fields or detection zones that trigger an immediate tag message within close proximity of a desired location. The latter method is the most reliable with respect to locating a tag at a portal, such as an exit



door for example, and enables instantaneous action to be taken based on predetermined rules associated with the tag, such as engaging a magnetic lock to disallow the tag to move through the exit.

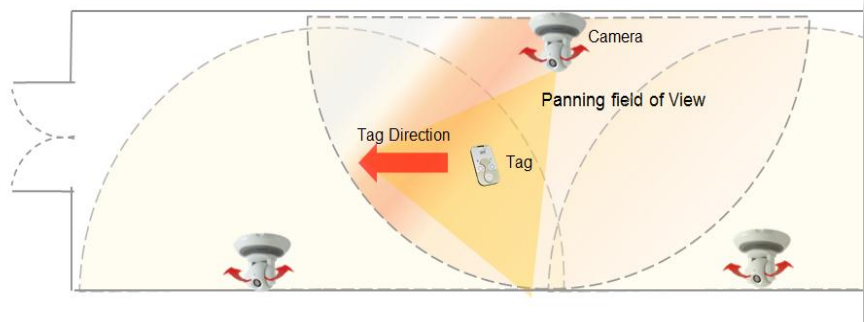
When a security event occurs within an active RFID system, it is typically broadcast by displaying the type of event and location on a computer screen. The event may also be communicated via pagers, email, SMS, two-way radio, and other messaging media. Unless people are dispatched to the event site, many other relevant details that can potentially assist in the determination of the appropriate response to the event may be lacking. These include things such as people involved at the event site, or environmental conditions that exist at the site, for example.

Video surveillance systems provide the ability to view remote locations in real time while active RFID provides the ability to track and locate tagged people and objects in those locations. A system that combines the capabilities of the two distinct technologies offers the capability to track, locate, and view the people or objects that are tagged in real time. Several manufacturers of active RFID systems offer the ability to trigger a video stream from a surveillance camera in the vicinity of the site of a security event and instantaneously display it on their application screens. Currently this is only available in systems equipped with detection zones and the video stream is limited by the angle and field of view of the camera at the time the event occurred. If the person or object of interest moves away or moves outside the field of view, then the visibility of subsequent movement and actions is lost. New technology would allow a surveillance camera



system to locate and follow a person or object throughout a building without relying on triggers based on security events at a detection zone. By marrying long-range active RFID location capability with a CCTV system one can automatically switch the video stream being displayed to the next nearest camera as the tagged person or object moves. The ability for the camera to automatically pan and zoom in on the person or object further enhances the capacity to monitor security and trigger a security response.

The active RFID system deployed to enable this capability must have location accuracy that is adequate enough to enable logical transfer from one camera's video stream to the next one. Location accuracy of around 10 feet is adequate for following a tagged item as it moves through a corridor. The precision that is deemed adequate would also depend upon the construction and vastness of a building, camera placements, required field of view from the cameras and so on. Active RFID primarily uses Radio Signal Strength Indication (RSSI) or Time Difference of Arrival (TDOA) of the signals received from the tags in order to determine approximate location of a tag. By using sophisticated algorithms, manufacturers of active RFID systems are now able to locate a tag well within the limits required to achieve accurate control of CCTV cameras and follow a moving person or object.



Such a feature within a security system has many uses, such as being able to visually track a tagged high value object as it is transported within a facility, follow a perpetrator who is carrying a tagged item, monitor the movements of high risk individuals if they were to infringe an identified "virtual" boundary line, and many others. The feature can also be used as a tool to provide remote real-time visibility for non-security applications.

GuardRFID's Tag Portfolio



GuardRFID offers a wide variety of tag types that can be placed on people and objects.

Article tags

Three different tag types are available. Battery life of 3 years, tamper and motion sensing is supported, depending on tag choice

Staff Tags

About the size of a typical staff badge, this supports bidirectional communications, configurable buttons, indicators and fall detection.

Industrial Tags

An extremely robust tag that has a 4 year battery life and a built-in motion sensor

Patient Tags

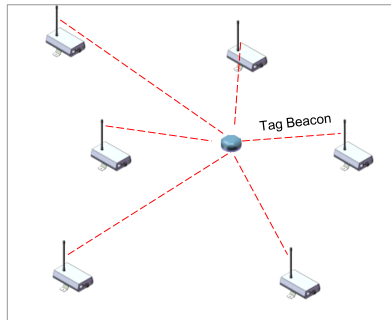
Wearable on a person's wrist, this tag has a 1 year battery life

Infant Tags

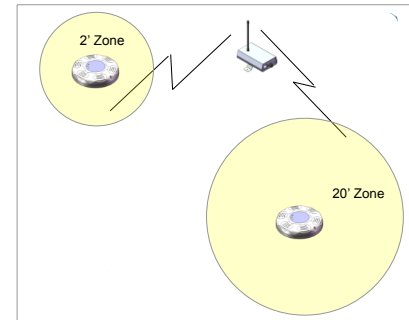
A unique patented dual-tamper detecting tag and Umbilical tags are available

GuardRFID offers "Seek and Follow" Technology

GuardRFID's Active RFID system uses the 433MHz frequency, thus offering the smallest, least obtrusive tags available and with long, maintenance-free battery life. The system comprises tags for 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. The system also includes a second mechanism for detection of tags and security events in close proximity to any location of interest using low frequency detection zones.



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)

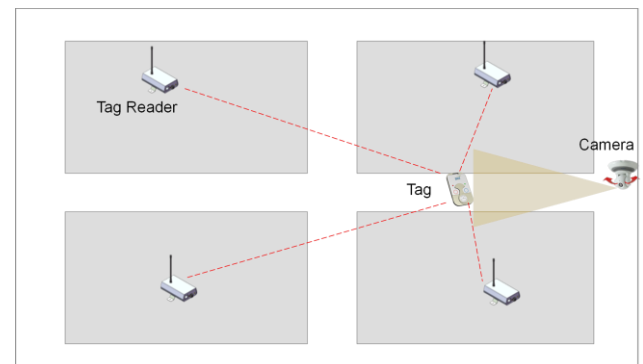
GuardRFID offers the ability to provide a streaming video image using both the proximity and long range detection methods. The system can be set up to instantly show the video feed from a camera placed at the vicinity of a security event (e.g. a breach at an exit) triggered using positive proximity detection of a tag. The video stream can be played back at variable speeds to view activity that lead to the event being viewed. In addition, the long-range detection and location capability of the GuardRFID system provides the ability to "seek" a particular tagged person or object and then "follow" its movements within the coverage

area by methodically switching the video feed to the nearest surveillance camera. GuardRFID also has the location capability required to control the panning and zooming of the cameras so that they virtually "follow" the target as it moves within any single camera's field of view.

Using Seek and Follow technology, critical security events can be monitored in real-time and analyzed from archived video with greater accuracy and more complete information than ever before.

Conclusion

A system that combines Active RFID and an IP based Surveillance system provides a means to not only be able to track and locate tagged people and objects within a coverage area, but to also deliver real-time visibility of the activities and movements associated with them. This can significantly enhance security within the coverage area, and allow more informed response activities to be undertaken. Due to the nature of IP connectivity, such monitoring can be accomplished from almost anywhere a network connection can be established.





Tel: 866.785.7343
Fax: 604.524.4018
guardRFID.com

Active RFID That Delivers