AIT/ITV Automatic Identification and Data Capture (AIDC) Examples

Automatic Identification and Data Capture (AIDC) is a term that refers to the methods for automatically identifying assets (e.g., shipment units, equipment, tools, people, etc.), the collection of data about those assets and entering that data in an information system, all without human intervention (i.e., data entry without a keyboard). The Automatic Identification Technologies (AIT) that provide the basis for AIDC capabilities include Radio Frequency Identification (RFID), button memory tags, bar codes, smart cards (CACs), and voice recognition. Manufacturers, warehouse managers, distribution center managers, and other industry professionals reply on AIDC as a means for identifying and tracking items, inventory, tools, and assets, etc. AIDC helps reduce data entry costs, eliminates errors associated with identification and/or data collection, provides better inventory security, anti-counterfeiting, and collect tracking data to enhance in-transit visibility (ITV).

Radio Frequency Identification (RFID).

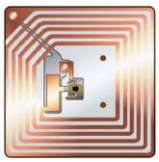
Radio Frequency Identification (RFID) is a method of AIDC in which data is stored or carried in an electronic device (i.e., a RFID tag), which communicates its data via radio frequency (RF) signals, either through a handheld or fixed reading device (usually called an Interrogator), a cellular telephone tower, or a satellite. Several types of RFID devices used by the military include active RFID, passive RFID, and cellular or satellite tags. RFID technology can be used to remotely identify, categorize, and locate materiel automatically (without human intervention). Each type of RFID device has both advantages and disadvantages, which leads to a requirement to select the device used to meet the specific business process or identification event requirements.

Active Radio Frequency Identification (aRFID)

Active RFID tags have a radio transmitter and their own power source (typically a battery). The power source is used to run the microchip's circuitry and to broadcast a signal to a reader (the way a cell phone transmits signals to a base station). Data is digitally stored on RFID tags (radio transceivers with memory units). Typical data capacity of an active RIFD tag is 128 Kilobytes. The information can be retrieved from distances of up to 300 feet away using electronic interrogators to identify tag location and relay the data via wired or wireless means.

Passive Radio Frequency Identification (pRFID)

Passive RFID tags do not contain a battery, the power is supplied by the reader. When radio waves from the reader are encountered by a passive RFID tag, the coiled antenna within the tag forms a magnetic field. This tag differs from active RFID tags by requiring external activation from an RF field to generate the power necessary return the data signal. While an excellent technology for capturing data rapidly and efficiently, the capability has a short read range and data capacity is very small.



Cellular/Satellite Tags

The most noticeable advantage of cellular and satellite based communications versus the conventional tag-to-interrogator communication is there are over 215,000 cell phone towers in the United States alone, and 24-baseline satellites positioned in orbit operating 24-7/365 days-a-year. Any equipment tagged with the newest cargo tracking devices can be observed anytime, anywhere, from the point of origin to the point of use on an hourly or once-a-day basis. Active and passive RFID technology is dependent on a prepositioned and maintained infrastructure of interrogators positioned along supply/transportation routes between cargo points of origin and points of destination, whereas satellite and cellular based devices are not dependent on such infrastructure. If interrogators are not placed along the anticipated waypoints, or if the shipment route is varied, the aRFID tag does not pass near the interrogator, resulting in no reports by the aRFID device. Cellular/Satellite utilize existing infrastructure to transmit movement data.

Contact Memory Button (CMB)

Contact memory buttons (CMBs) have been around for nearly a generation. They are a specific type of Auto-ID that requires a wand to make physical contact with the button tag to read the data encoded in the tag. The tags vary in size from less than a quarter inch to about the size of a quarter. CMBs costs start at just over 25 cents, can store up to 64 MB of information, and can survive most types of environmental damage. Given the limited adoption of CMB technology, comparatively little investment and innovation is occurring in this arena.

Bar Codes

Bar codes are optically readable symbologies which have encoded machine-readable data using light and dark areas. There are two main categories of bar code symbologies: linear (1D) and two-dimensional (2D).

Linear (1D) Bar Codes

Traditional bar codes systematically represent data by varying the widths and spacings of parallel lines, and may be referred to as linear or one-dimensional (1D). The vertical black lines and white

spaces printed on an item, label, or document. Linear bar codes have limited storage space (of up to 85 alphanumeric characters) and are usually used as a key to retrieve information stored in a database. To scan linear bar codes, you must use a laser scanner, although 2D scanners and imagers (cameras) can read both 1D linear and 2D bar codes. Bar code read error rate is extremely low (approximately 1error in 3.4 million scans).

Two-Dimensional (2D) Bar codes

Two-Dimensional (2D) bar codes look like squares or rectangles that contain many small individual bars and spaces or dots. A single 2D bar code can hold a significant amount of information (in excess of 1300 characters) and may remain readable, even when printed at a small size, when etched onto a product, or if the bar code symbol has been partially destroyed. The bar code on the front of your Common Access Card (CAC) is an example of a 2D bar code which may carry 100 times (about 1500 characters) the data encoded in a linear bar code. The error rate for the 2D bar code is approximately 1 in 7.1 million reads.