Gallium-PDS is a revolutionary passive detection system (PDS) for cell phones and other mobile devices. Optimized for correctional facilities, Gallium-PDS detects and locates the use of illegal mobile devices to within one inmate cell.

Gallium-PDS is built around sophisticated, yet affordable signal processors. The processors cover a wide radio frequency (RF) range and have the capability to scan and focus on individual transmitters, thus ignoring irrelevant legal transmitters within and outside the protected facility.

A network of sensors and processors correlates received cellular signals and generates an accurate map of the transmitting devices, with an accuracy of a few meters (approximately 10 ft). The results are super-imposed on a building floorplan which enables first responders to quickly and accurately respond to the violation.

THE CHALLENGE

Contraband communication devices (both cell phones and other mobile devices) in correctional facilities are a growing challenge worldwide. In spite of the many screening processes and perimeter detection systems in use, cell phones are still smuggled in on a regular basis. Thus, authorities must find other ways to detect illegal communication.

However, isolating and disrupting the “bad guys” can be problematic due to legal restrictions and more commonly the complexity of mixed RF environments. Any disruptive system must differentiate between legitimate communication devices adjacent to the prison; devices used by correctional staff such as phones, radios and personal duress alarms; and illegal devices used by inmates.

Another challenge is accurately locating devices after activity is detected. The construction of a correctional facility typically includes large amounts of concrete and steel, which cause RF reflections, multi-path signal propagation, and non-line-of-sight transmissions. Accurately locating devices in such an environment requires specialized sensor equipment.

Features & Benefits

- Optimized and built bottom-up for correctional facilities
- All-passive detection:
  - No radio licenses required
  - Unrestricted usage (for legal and environmental reasons)
  - Absolute containment of the protected area; no “spill over” effects
- Accurate location to the nearest inmate cell
- Wide coverage: 2G, 3G, LTE, WiFi, VHF, and UHF
- Co-exists with on-site “friendly” wireless communication devices
- Web-based client application
- Easy-to-install and operate

SYNOPSIS

Gallium-PDS is a revolutionary passive detection system (PDS) for cell phones and other mobile devices. Optimized for correctional facilities, Gallium-PDS detects and locates the use of illegal mobile devices to within one inmate cell.

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A network of sensors and processors correlates received cellular signals and generates an accurate map of the transmitting devices, with an accuracy of a few meters (approximately 10 ft). The results are super-imposed on a building floorplan which enables first responders to quickly and accurately respond to the violation.
TRADITIONAL SOLUTION DRAWBACKS

There are many technologies currently in use for the detection of cellular activity, but all have significant shortcomings.

**Wideband RF jammers** – RF jammers mask a wide portion of the spectrum in order to block VHF, UHF, 2G, 3G, LTE, WiFi and other devices.

Unfortunately, these jammers also disable correctional staff’s wireless transmission, such as WiFi, cellular, and life safety devices. Also, it is impossible to limit the interference to within the correctional facility’s perimeter, meaning innocent third-party devices nearby may also be affected.

In addition, their wideband, high-power transmission may be considered hazardous.

**Managed access solutions** – These solutions exploit the mobility feature of cellular devices. They enable a stronger base station (e.g. “Fake BTS” or “IMSI Catcher”) to drag cellular devices away from the service provider’s base station.

Smart IMSI Catchers can distinguish “bad guys” from the “good” ones. However, these solutions are quite expensive as separate radio bands are required for each carrier. Legislation sometimes dictates that bands be leased from the operators. Also, device roaming can be easily avoided if the inmate manually configures the carrier settings on contraband cellular devices.

**Energy Detectors** – Basic detectors may be perceived as the simplest solution but they prove to be ineffective due to the presence of legal transmitting devices within the monitored bandwidth, none of which can be reliably separated from the illegal ones.

HOW GALLIUM-PDS WORKS

The PDS is comprised of four elements:

**Sensors** – Ruggedized wideband antennas pick up the signal from the cell’s vicinity. Sensors can be visibly installed in a corridor or public area, or can be concealed.

**Processors** – Receive the RF signals from the sensors and constantly scan the requested spectrum, isolating irregularities in RF emissions.

**Geo-location server** – The server analyzes and correlates the data from the processors in order to locate suspected transmitters.

**User interface (UI)** – Operators use a standard PC to access a web-based application that displays the location of cellular devices on a site map location and also provides other activity reports.

TECHNICAL SPECIFICATIONS

**RF SPECIFICATIONS**
- Frequency range: 70 MHz to 6 GHz
- Supported standards: GSM, DCS, PCS, CDMA, UMTS, LTE, WiFi
- Gain: 0 to 5 dB (different options available)
- Noise figure: < 8 dB
- Input Interception Point (IIP3): −20 dBm

**ELECTRICAL SPECIFICATIONS**
- Processors: –48V DC or PoE, 6W

**PHYSICAL SPECIFICATIONS**
- Processor dimensions (L/W/D): 26 x 16 x 10 cm (10.25 x 6.3 x 3.9 inches)
- Weight: 1 kg (2.2 lbs)
- Server: 19-inch rack mounted, 1U height

**ENVIRONMENTAL SPECIFICATIONS**
- Processor operating temperature: −10 to 55 °C (14 to 131 °F)
- Humidity: 10 to 80% (relative)