



DEPARTMENT OF PUBLIC SAFETY AND
CORRECTIONAL SERVICES

**NON-JAMMING
CELL PHONE
PILOT SUMMARY**

JANUARY 20, 2010

INTRODUCTION

The Department's Cell Phone Pilot is a follow-up to the September 2009 Cell Phone Disruption Technology demonstrations at the de-commissioned Maryland House of Correction, Jessup, Maryland. September's demonstrations showed Department employees and other federal, state and private agencies some of the technologies available to disrupt unauthorized cell phone activities in correctional facilities. The Cell Phone Pilot gave vendors and the Division of Correction the chance to see how cell phone disruption/detection equipment works in a commissioned correctional facility.

Public Notice Announcements (see page 8) were placed in Baltimore's Daily Record, Montgomery County's Gazette of Politics and Business, the Department's website and Maryland's eMarketplace. The notice stated the Department wanted to pilot technology that *"detects the location of cell phones (and other wireless telecommunications devices) and captures data from recovered phones, so that the data can be analyzed"*. Vendors were instructed to obtain any needed authorizations from the Federal Communications Commission (FCC) and/or cell phone carriers. Three vendors responded to the public notice, Tecore, Columbia, MD; AirPatrol, Columbia, MD; and Digital Receiving Technology (DRT), Germantown, MD.

AirPatrol and DRT use passive technology that detects cell phone use, collects data from active cell phones and doesn't interfere with carrier signals. Tecore received carrier permission and secured a Special Temporary Authority (STA) from the FCC to conduct this pilot.

Tecore redirects cell phone transmissions to their antenna and only allows communication from authorized cell phones to be forwarded to carrier cell towers. Data is also collected from active cell phones. BCF provided the numbers of cell phones to be forwarded to carrier cell phone towers. All other cell phones within the facility would receive a lack of service message.

Tecore stated that the perimeter of the facility was walked 2-3 times daily to verify the transition point in coverage for each carrier (11 checkpoints). The site was visited multiple times during business hours and monitored 24 hours a day remotely from Tecore office in Columbia. Tecore coordinated radio frequencies and parameter set with each participating operator. Sprint and Verizon representatives visited the site and coordinated their testing with Tecore. AT&T did testing on their own.

PILOT STRUCTURE AND LOCATIONS

Each vendor was assigned to a different correctional facility. Site surveys were conducted at the 3 facilities on Monday, December 7th. AirPatrol and DRT surveyed a housing unit within their designated facilities. Tecore surveyed sites around their designated facility, but did not confirm cell phone reception inside the housing units. The initial pilot schedule was as follows:

- Tecore - December 9 - 15 @ Brockbridge Correctional Facility, Jessup (BCF)
- AirPatrol - December 16 - 22 @ Metropolitan Transitional Center, Baltimore (MTC)
- DRT - December 23 - 29 @ Maryland Correctional Institution-Jessup (MCIJ)

Each vendor was instructed to setup equipment the day prior to their pilot period and remove equipment the day after the pilot ended.

DOC Security arranged a staging event with cell phones to insure that data would be available for the vendors to analyze. Cell phones from the 4 major carriers - AT&T, Sprint/Nextel, T-Mobile and Verizon Wireless, were used. State issued cell phones were turned off before the test began. Security documented these staging events:

- 📱 Date & Time
- 📱 Facility
- 📱 The cell phones were:
 - ✗ Turned on
 - ✗ Made a call to DOC HQ and confirmed receipt
 - ✗ Received a call from DOC HQ and confirmed receipt
 - ✗ Turned off

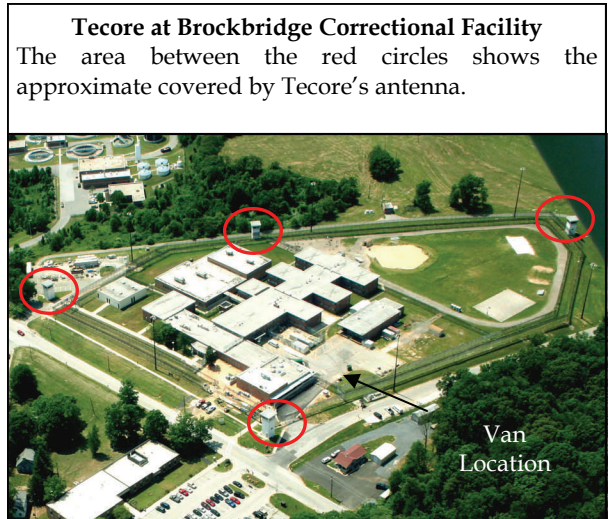
Calls were made and received from DOC Headquarters.

TECORE @ BCF

Tecore was able to obtain a temporary license from the FCC for the pilot, but it wasn't approved until December 14th. As a result, their pilot started the evening of December 15th instead of December 9th and ended 10:06 PM Friday December 18th due to a snowstorm.

The Tecore equipment used in the pilot had the following limitations:

- 📱 CDMA carrier signals operate on up to 8 frequency channels. The CDMA Pilot Beacon used in the demonstration rotated between 3 of the 7 frequency channels at a time. (The 8th frequency is used by Tecore's equipment.) The pilot beacon was used on these frequencies to broadcast the message to idle devices to re-tune to Tecore's equipment's frequency. The frequencies used in the pilot beacon rotation were changed every 8 hours. Tecore stated that normal installations the pilot beacon would operate across the full set of frequency channels at all times.
- 📱 The pilot beacon that was deployed operated based on a hopping sequence across three channels. Redirected Verizon/Sprint (CDMA) subscribers would not return to Tecore's equipment's signal until the pilot beacon was broadcast on their current channel while in an idle mode.
- 📱 The equipment used in the pilot identified 2G CDMA/GSM services. Cell phones using 3G or 4 G services may not be identified. Tecore stated that normal installations would monitor 3G or 4 G services.



Tecore setup a communications van with equipment at the corner of Brock Bridge and Toulson Roads to the right of the BCF entrance. Their antenna was pointed towards the facility and the antenna's range was generally within the facility's towers.

The first evening (approximately 4:00 - 5:00 PM) Tecore reported 80+ phones trying to make calls from BCF. Some complaints were received from employees at the nearby Herman L. Toulson Correctional Facility (HLTCF) stating their cell phones did not have reception. In fact, a cell phone confiscated from an inmate at HLTCF would not work. BCF was unable to provide any specifics about the cell phones within to further research of the problem. Tecore did not have location equipment installed in their van to determine the area unauthorized cell phone transmissions were coming from. Tecore lowered their antenna 2-3 feet to prevent possible disruption of signals beyond BCF.

The K-9 Unit was dispatched to BCF to search for unauthorized cell phones identified on December 15th; however Tecore's temporary setup was not able to provide specific locations for the dogs to search. Tecore's records indicated that 95% of the detected phones were GSM prepaid type phones.

The cell phone staging occurred on Wednesday, December 16 at 11:55 AM. All of the cell phones were able to make and receive calls from DOC HQ. Another test was made in the morning, Friday, December 18th in a housing unit closer to Tecore's antenna. Once again all of the cell phones were able to make and receive calls.

Tecore stated the cell phones may have been able to connect to carrier towers for the following reasons:

- 📱 Verizon and Sprint devices may have been on a channel that was not being impacted by the pilot beacon. In this case the message for the idle device to "go to channels monitored by Tecore" was being broadcast on other channels in the carriers' spectrum.
- 📱 AT&T and T-Mobile devices listed used in the staging are both common devices that are 3G capable. Devices that are 3G capable use the 3G signal if available and Brockbridge is covered by 3G for both T-Mobile and AT&T.

Tecore lowered it's antenna at 10:06 PM Friday evening due to a snowstorm. On Monday, Tecore was told that cell phones used for the staging within the housing units were able to make and receive connections. Tecore's pilot ended on December 21st.

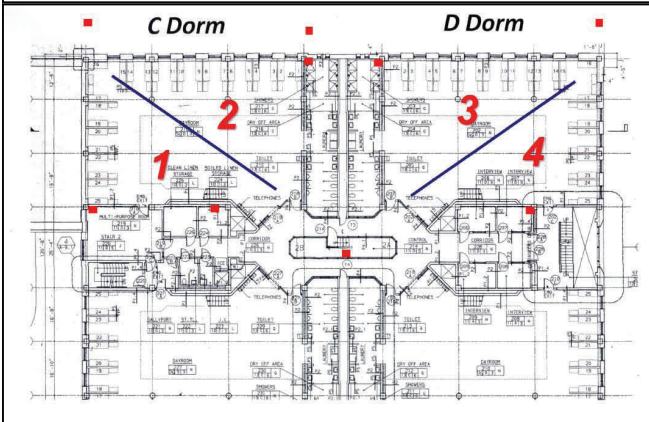
Data from Tecore found the following during the 3-day pilot:

- 📱 580 Individual Devices (this may include devices on access roads)
- 📱 126 with 10 or more Location Updates
- 📱 135 devices attempted voice calls
- 📱 62 Attempted to send Text Messages
- 📱 Top 50 Devices accounted for over 50% of the traffic on the system.

AIRPATROL @ MTC

AirPatrol's site survey was on Monday, December 7th. They used sensors connected by Wi-Fi to prevent running cables. A laptop recording data was placed in a Lieutenant's office near the Control Room for easy access. Considerations for sensor placement were:

AirPatrol placed sensors in a zone configuration in the Metropolitan Transition Center's C, D, G and H dormitories. The G and H dorms are above the C and D



📶 Performance of equipment

📶 Need for electrical power

📶 Security from tampering

Sensors were placed in C, D, G and H dormitories. An optimal layout which would have placed sensors in each corner of the dormitories could not be used for fear of inmates tampering with the equipment. Sensors were placed in utility rooms and outside windows to cover the housing areas. The locations provided better security with use of available electrical power for the sensors inside the building. The sensor placement divided

each dorm into 2 zones to provide the best coverage. The vendor was concerned that the buildings construction materials would prevent or lessen the sensors ability to receive data.

Cell phone staging was completed on Wednesday, December 16th. The staging team could see on the laptop that the calls made and received were recorded. Later the same day, the system went down. It was receiving transmissions by 2:45 PM, but cell phone location accuracy was off by more than 8-10 feet, and several of the sensors were going on and off.

AirPatrol determined that the location of the sensors in utility room combined with the buildings construction materials interfered with the Wi-Fi connection. It was not practical to move the sensors inside the dormitories due to security and placing more sensors outside of windows was impractical for the length of the pilot.

The system identified cell phones in the housing units, but was not able to locate the phones. The K-9 Unit explored the building, but was not able to find phones.

Data gathered from the pilot showed the following:

- 📶 There is considerable cell phone usage in the dorms for many hours per day
- 📶 Most of the activity is in C and D dorms in zones 1 and 4. Most activity in the dorms is in an area not visible through dorm entry windows. (These areas are less visible to correctional officers in the Control Room.)
- 📶 Cell phone usage in C & D Dorms occurs most frequently between 3:00 PM and 9:00 PM.
- 📶 Cell Phone usage in G & H Dorms occurs most frequently between 3:00 PM and 12:00 AM.

DIGITAL RECEIVING TECHNOLOGY (DRT) @ MCIJ

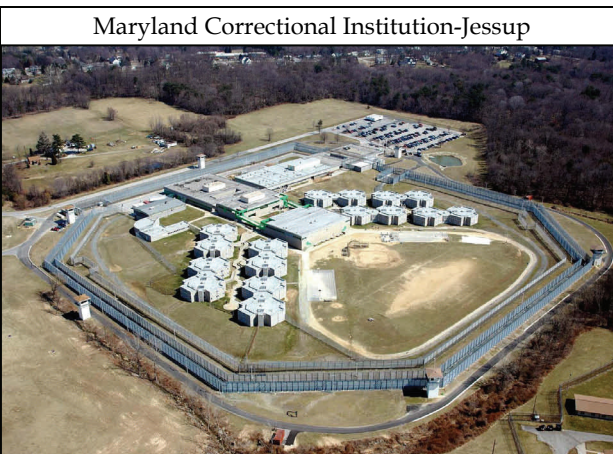
DRT's site survey was on Monday, December 10th. When another vendor was unable to start the pilot on December 9th, DRT was contacted. They were able to start their pilot on December 11th instead of December 22nd. The pilot ended on December 17th.

Sensors were placed in the Control Room's windows overlooking the housing unit's cells. This secured the equipment from tampering, provided electrical power and provided a secure cabling connection to a laptop used to record data. Pilot limitations are:

- 📱 Passive monitoring meaning data is analyzed after a call is made
- 📱 Encrypted calls were not analyzed
- 📱 Text and voice messages were not differentiated.

DRT collected data showing when cell phones were turned off, turned on and registered with the nearest cell phone tower. For example, a highly suspect device may be turned on at 01:15 AM, and turned off at 01:30 AM. The company then analyzed the time and length of messages over the course of the pilot.

DRT sensors identified 11 phones that may be contraband (calls staged by DOC Security on December 16th may be part of the cell phone information analyzed). DPSCS will compare the IMEI information collected by DRT with authorized cell phones to determine whether the identified cell phones were contraband. A portable sensor was used to identify a particular cell that had a high probability of cell phone usage within. The information was given to MCI-J security, however inmates may have realized a search was being done for a cell phone. The K-9 unit and correctional officers inspected the identified cell and the inmate residing within was strip searched, however the unauthorized cell phones was not found.



CLOSING

The pilot included a cross-section of technology available for cell phone detection.

- Equipment that interdicted all cell phone signals and only passed authorized phone signals to a carrier's cell phone tower
- Sensors used to locate cell phones using a cabled connection
- Sensors used to locate cell phones using a Wi-Fi connection

There are several items that need to be considered when installing cell phone disruption systems.

- Installed sensor systems need to be near a power source.
- Building construction and materials may have to be overcome for wireless sensor systems to work efficiently.
- Systems that are in locations in which inmates can access them need to be tamperproof.
- Data from cell phones need to be filtered to separate phones from the public passing by. This is critical in urban areas.
- Cell phones can only be identified when they are turned on. Phones being used quickly, turned off and then hidden in a cell or dormitory may not be found.
- Cell phones used once or twice for short periods may be "filtered out" unless used consistently over time.

Public Notice
Pilot of Cell Phone Disruption Technology

The Maryland Department of Public Safety and Correctional Services seeks vendors to conduct a three-week pilot of cell phone disruption technology in one of its correctional facilities starting on December 9, 2009. The Department is interested in piloting technology that detects the location of cell phones (and other wireless telecommunications devices) and captures data from recovered phones, so that the data can be analyzed. The vendors are responsible for securing any required approvals associated with their participation, including approval from the Federal Communications Commission. The pilot will be at no cost to the Department. Please submit all inquiries to jgover@dpscs.state.md.us or 410.339.5075 by November 30, 2009.