

Technical Report

BLU+ RF Monitoring

By Dennis Doffing*

The first electronic monitoring was done using Radio Frequency (RF) devices. Offenders wore a transmitter around the ankle or wrist. The device emitted RF signals, which were received by a home-based transmitter when the offender was present in the home. The unit reported the date and time of the reception (or “enter”) to a host computer, using the offender’s landline telephone. If the receiver stopped picking up the transmitter’s RF signals, it reported the date and time of the “event” to a monitoring center. That is still the basic design for the RF systems in use today. Many EM vendors and users now believe that RF technology is “old school” and will gradually be replaced by GPS-based location-monitoring systems, where all of the innovation seems to be occurring now. In truth, RF systems are likely to be around for a long time: their simplicity, reliability, and predictability serve the goals of most EM programs extremely well depending on the intended population of clients. Moreover, manufacturers of RF haven’t stopped innovating, either. A good example is the BLU+ technology developed by Satellite Tracking of People (STOP) based in Houston, Texas. BLU+ is an RF monitoring device with location features. The device allows supervising agents to monitor the date and time when an offender enters and leaves home (traditional RF functionality) and remotely monitor the offender’s compliance with mandatory locations outside the home without the supervising officer being in the vicinity. BLU+ is worn around the

offender’s ankle and reports events via a cellular network with BLUbox, a home-based RF signal generator.

Increasing reliance on cell phones as the only household phone service

The technology package underlying RF monitoring began to change as cell phones began to replace landline telephones. A 2012 study by the Center for Disease Control (CDC) estimated that 35 percent of U.S. households no longer have landline phone service, and 60 percent of adults ages 25-29 (a key demographic in criminal justice system involvement) live in cell phone-only

BLU+; the device sends the acknowledgement to VeriTracks.

Limitations of field visits with traditional RF monitoring equipment

In a traditional RF supervision program, agencies monitor attendance at home but have to trust that clients are compliant with the terms of their release when away from the home RF receiver. Often, supervisors require additional verification in the field—asking the offender to provide documentation such as pay stubs, counseling or AA sign in sheets, or job hunting logs. Agencies also send officers into the field with portable

Even in the era of GPS, RF systems are still introducing improvements

households. Increasingly agencies were finding it necessary to acquire equipment able to function independently of installed phone jacks or technologically diverse static broadband phone systems. BLU+ reports events (to VeriTracks, the cloud-based monitoring application) using nationwide cellular phone service. With cellular service installed on the ankle-worn device, BLU+ allows the agent to receive tamper alerts in near real-time, not just when the offender is in range of the home receiver, the way traditional RF equipment generally still operates. Anytime, anywhere cellular phone service and BLU+’s internal electronics provide two-way communication between the supervising agent and the offender. Supervising officers log in to VeriTracks to send BLU+ instructions to the offender; when the “call” is received, BLU+ vibrates or emits an audible tone and the offender acknowledges the message by pressing the button on the face of

drive-by units for random verification; in some rural jurisdictions, supervising officers may travel up to 100 miles from the office to conduct random home and work checks. (At least one agency is known to include in its program budget the cost of renting vehicles so supervising agents can conduct long-distance visits every two to four weeks.) The difficulty in validating out-of-home activities for offenders, particularly in distant locations, can lead supervising officers to concentrate on ensuring compliance with curfews, at the expense other important factors. Indeed, scheduled curfews are usually set with the offender, and tend to be places and times the offender has asked for, so there is often little to actually verify. Focusing on scheduled curfews also adds to the possibility that a supervising agent will fall into a predictable routine, which can allow offenders to work

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around field visits to do what they would not want their officer to see.

Location confirmation without physically being in the vicinity

Even though technology can never fully replace in-person, one-on-one interaction between a supervising officer and offender, in today's austere economic environment, agencies are increasingly turning to devices like BLU+ to reduce the costs and address gaps in coverage typical of random on-site checks. In fact, perhaps the principle innovation in practice made possible by BLU+ is reducing the need for agents to travel to various locations to confirm an offender's presence at a pre-approved required meeting or appointment. Using BLU+, the supervising officer can create up to three Check-N™ locations outside of the offender's home. The Check-N locations are stored in BLU+'s built-in memory (along with the standard curfew dates and times when offenders may enter and leave home). BLU+ automatically begins acquiring GPS location points prior to the offender's scheduled curfew or appointment. If the offender does not enter a Check-N location or return home on schedule, BLU+ reports a violation to VeriTracks, which in turn sends an alert to the supervising agent. The agent can log in to VeriTracks to view the offender's GPS location points on a map and see if the offender is en-route home or to an Check-N location or is outside the expected geographic area.

In a typical application, an officer enters the address of the offender's place of employment as a Check-N location in VeriTracks. The offender must arrive at work at 9 a.m. Monday through Friday. Each work day prior to the scheduled arrival time, BLU+ turns on the GPS function. The device receives one GPS location point every minute. It tracks until the offender enters the Check-N location or a set time has elapsed without the tag entering the geographic region. Depending on the supervision plan of each offender, officers have the option to receive a "successful check in"

BLU+ Functionality Highlights

- Records and reports the date and time of enters and leaves into the offender's home.
- Create three date- and time-sensitive Check-N™ locations outside of the home (work, counseling appointment, etc.).
- Eliminates supervising officers physically checking locations outside of the offender's home for compliance.
- Receives GPS location points before and after the date and time of a Check-N™.
- Supervising officers can find the immediate location of any offender.
- No landline phone service needed in the offender's home.

notification when the offender enters the Check-N location on time. If the offender is late entering the Check-N location or fails to arrive at all, the supervising agent receives a Check-N late or Check-N unknown alert. The agent also has the ability to view the offender's GPS location points using VeriTracks, in order to determine the route the offender took to arrive at the Check-N location, or see where the offender really was at the time he should have been at the Check-N. Supervising officers can login to VeriTracks 24 hours a day, 365 days per

mentation confirming the compliance and positive behavior modifications.

Batteries: longer, stronger

Circuits and the devices they drive are getting smaller and more energy efficient. At the same time, battery materials and technology have experienced tremendous advances in the last decade. BLU+ exploits both of these trends. Older home-based RF receivers typically hold a charge for 48-72 hours of operation. The battery in BLU+ powers the device for seven days on a

Facing tight budgets, agencies are increasingly turning to devices like BLU+ to reduce the costs of field visits and address gaps in coverage

year to initiate a Location Request, which allows them to immediately view the most current location of an offender on a map.

This new technology lends itself to the "trust but verify" requirements of modern evidence-based practices. An officer can easily set up locations within the community to check an offender's attendance at pro-social activities, family events, school attendance, religious services and more. Agents can log in to VeriTracks from any computer or tablet with a high-speed Internet connection to initiate immediate Location Requests on their entire caseload in minutes for random location checks without driving around town. If an offender is found compliant and responding in a positive way to his community programming, he could be accelerated to lower levels of supervision with confidence because BLU+ and VeriTracks provide superior docu-

single charge. (Because offenders are more likely to remember a task they must perform every day, the BLU+ protocol calls for a daily charge of 15 minutes.) First generation RF transmitter batteries lacked the capacity to power functions more advanced than sending and receiving. BLU+ stores and processes monitoring data, communicates directly with companion applications like VeriTracks, self-analyzes schedules for compliance, activates GPS to locate offenders outside the home, notifies the supervising officer of violations, and provides for two way communications—all significant advancements over traditional RF monitoring equipment.

Smaller RF devices also make life easier for offenders who previously chafed at cumbersome units that could weigh anywhere from one to three pounds and required installation in the home by an agent. BLU+ weighs about six ounces. The

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BLUbox home-based receiver is under a pound and easy enough to install that the offender can do it. (The BLUbox is powered through a standard electrical outlet and back-up battery during service interruptions. VeriTracks monitors the installation remotely and verifies it is properly located and functioning, giving a “successful installation” message to confirm.)

Cloud-based monitoring application provides robust functionality

Many of the BLU+ functions do not reside on the unit itself but are activated from web-based software residing on STOP’s servers. Thus, supervising officers can access monitoring functions, through VeriTracks, that provide far more data than would have been possible from software resident on a traditional RF monitoring system. BLU+ events in VeriTracks are

displayed with map location, so officers can quickly see a correlation between a given event and the offender’s location—for example, the offender is late arriving home but VeriTracks locates him driving into the neighborhood as curfew began. While logged into VeriTracks, officers can clear alerts, or initiate a Rapid Reporting function, which increases the rate at which BLU+ returns monitoring data. A Dashboard enables officers to view their entire caseload, quickly see alerts in progress, confirm schedules, check-ins, and curfew compliance, and review current status of each active device assigned to an offender. None of these options are typically available with older RF monitoring equipment.

It has been thirty years since radio frequency devices helped launch the first generation of electronic monitoring technology. Thirty years has brought many changes we now take for granted: the Internet, smart phones, laptops and tablets, digital music, satellite television and more.

The growth of advanced community supervision strategies, evidence-based practice, reentry programming, drug courts and similar criminal justice innovations have set an agenda for supervising officers that is more ambitious than the supervision regimes of a generation ago. While active GPS technology fills a vital role for many specialized caseloads and high risk clients, the need for reliable, affordable, electronic community supervision has kept RF systems in wide use. BLU+ is the first in a new generation of RF systems capable of meeting the more rigorous and sophisticated objectives that electronic monitoring systems are being asked to perform, with the cost-effectiveness, simplicity, and reliability that RF is known for. ■

Reference

CDC: *Wireless Substitution: Early Release of Estimates from the National Health Interview Survey*, January-June 2012. Center for Disease Control, Stephen J. Blumberg, Ph.D. and Julian V. Luke



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