

GPS System Limitations

Global Positioning Satellite (GPS) tracking systems were originally designed and utilized by the military for a variety of purposes, but generally to provide location and/or velocity information of objects or individuals around the world. GPS has been used in the last decade by civilians to effectively track vehicles, inventory, Alzheimer's patients, migrating animals, and even pets.

In community corrections, GPS tracking is a form of intensive supervision used most commonly to monitor higher-risk individuals under community supervision. Offenders are tracked by a portable GPS receiver that is carried or worn. In order to provide accurate location information, a receiver must be in clear sight of at least three satellites. In most normal situations, a human being is likely in view of between five and eight satellites; however there are basic limitations in GPS technology that inhibit or block transmissions for brief or extended periods of time.

Known Geographic & Weather Related Limitations

Since satellite transmission power is low, certain geographical conditions may cause problems with a GPS receiver's ability to record location data:

Terrain – Signals can become degraded and the receiver system may not provide location information if the view of the sky is severely limited. This situation can occur in deep canyons, or under dense vegetation.

Urban Canyons – Large or tall buildings grouped closely together can cause large multi-path and fading errors that may affect the ability to track offenders.

Vehicles – Signals can be lost when an offender is riding in a car or other enclosed means of transportation if the receiver is not placed near a window within the vehicle.

Weather – Signal strength can become degraded by moisture such as rainfall, fog, or snowfall.

Because of these factors, it is difficult to ensure complete or thorough GPS coverage at all times. However, with the ongoing advancements in technology, certain system components and features are now available that improve the equipment capabilities. For example, omni-directional antennas enable tracking devices to pick up GPS coverage in virtually any orientation. Flat patch antennas are not as advanced and must maintain an upright position to receive coverage. Reliable radio frequency (RF) technology, cellular towers and Advanced Forward Link Trilateration (AFLT) can also be paired with GPS to enhance system accuracy.

Due to the types of individuals normally being supervised with GPS by community corrections professionals (i.e. higher-risk offenders on parole/probation, pre-trial defendants, etc.), equipment reliability is imperative. Community safety is a concern if faulty or sub-standard equipment is used to supervise individuals that may otherwise be in detention, jail or prison. Affordable and effective alternatives to incarceration are available and agencies must consider the benefits as well as the system limitations and liabilities that exist with all GPS products.