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Every GPS device requires orbital data about the satellites to calculate its position. The data rate of the satellite signal is only 50 bit/s, so downloading orbital information like ephemerides and the almanac directly from satellites typically takes a long time, and if the satellite signals are lost during the acquisition of this information, it is discarded and the standalone system has to start from scratch. In exceptionally poor signal conditions, for example in urban areas, satellite signals may exhibit multipath propagation where signals skip off structures, or are weakened by meteorological conditions or tree canopy. Some standalone GPS navigators used in poor conditions can't fix a position because of satellite signal fracture and must wait for better satellite reception. A regular GPS unit may need as long as 12.5 minutes (the time needed to download the GPS almanac and ephemerides) to resolve the problem and be able to provide a correct location.

### Operation

In A-GPS, the network operator deploys an A-GPS server, a cache server for GPS data. These A-GPS servers download the orbital information from the satellite and store it in the database. An A-GPS-capable device can connect to these servers and download this information using mobile-network radio bearers such as GSM, CDMA, WCDMA, LTE or even using other radio bearers such as Wi-Fi or LoRa. Usually the data rate of these bearers is high, hence downloading orbital information takes less time. Utilizing this system can come at a cost to the user. For billing purposes, network providers often count this as a data access, which can cost money, depending on the tariff.

To be precise, A-GPS features depend mostly on an Internet network or connection to an ISP (or CNP, in the case of CP/mobile-phone device linked to a cellular network provider data service). A mobile device with just an L1 front-end radio receiver and no GPS acquisition, tracking, and positioning engine only works when it has an internet connection to an ISP/CNP, where the position fix is calculated offboard the device itself. It doesn't work in areas with no coverage or internet link (or nearby base transceiver station (BTS) towers, in the case on CNP service coverage area). Without any of those resources, it can't connect to the A-GPS servers usually provided by CNPs. On the other hand, a mobile device with a GPS chipset requires no data connection to capture and process GPS data into a position solution, since it receives data directly from the GPS satellites and is able to calculate a position fix itself. However, the availability of a data connection can provide assistance to improve the performance of the GPS chip on the mobile device.