

Major Telecom Operator's Timing Disrupted

GPS Jammer Employed to Defeat a Fleet Tracking System Disrupts Telco's Timing

The Issue

The Chronos support team received a call from a mobile operator requesting an investigation into the occurrence of a Synchronisation Supply Unit (SSU) entering holdover. According to the system logs the SSU simply stopped seeing GPS satellites and disqualified its input, giving no other clues as to the cause. The system had been continuously tracking around 10 satellites, all with good signal levels. Given the relative brevity of the events and the lack of available data it was agreed that the system be monitored for future events in an attempt to determine the root cause and rule out one-off events. Over the next few weeks the system would continue to enter holdover for periods of time ranging from a few minutes to a few hours. During one extended event, the support team were able to observe a complete loss of satellite signals reported by the SSU and observed an immediate recovery of the signal when the event ended.

An analysis indicated that all events were occurring between 09:00 and 17:00 Monday through Friday. Working on the suspicion that the system may be under the influence of a GPS jammer being used for personal privacy, and using Google Maps, the support team identified local businesses whose premises were adjacent to the telecom operator. The website of one of the companies, who sell, lease and service plant equipment, highlighted the use of tracking devices for the service engineers' vans using a widely available fleet management system.

Over a period of a few weeks a secondary GPS system with a common antenna location was brought online and monitored to see if this was affected in the same way. The logs from both systems recorded outages at similar times and durations confirming the presence of external interference, but was it a human operated jamming device? An analysis of events would certainly indicate that it was. As well as all events occurring within working hours the most telling statistic was a complete lack of GPS related issues reported by both systems over the two week Christmas period, with the events re-appearing on the first Monday when the majority of people would be returning to work.

The next course of action was to issue a local engineer with handheld detectors—the CTL3510 Jamming Detector and the CTL3520 GPS Jamming Detector and Locator, and attempt to capture and locate the interference source.



Typical cigarette lighter GPS jammer readily available on the Internet



CTL3520 Handheld GPS Jamming Detector & Locator on optional universal mount with suction base

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Pinpointing Personal Anti-Tracking Devices

The sporadic nature of the events meant that a little luck would be needed for the engineer to be onsite at the time of an event. However, on the second and third site visits, the engineer was able to capture two jamming events in action. The CTL3510 was initially used to detect the presence of an interfering signal, the results of which were later downloaded and matched to the outage times seen by the SSU. The CTL3520 was then used to locate the source of the interference.

Using the CTL3520, the engineer was able to locate jamming signals coming from two vehicles both parked in the grounds of the plant equipment company.



CTL3510 on optional universal mount with suction base

Resolution

After explaining the situation to the plant equipment company's fleet manager, and demonstrating the CTL3510 and CTL3520, the fleet manager was able to recover two jamming devices from company vehicles. It was suspected that up to three more jammers may also have been in use by other drivers based on the results from the tracking system.

Effects and Costs of Jamming

Fleet Manager

The plant equipment company had invested in the tracking system to streamline engineers' visits but the system was deemed unreliable based on the strange results seen by the management software. The use of jammers would apparently cause the system to only report the tracking devices last known location. One of the vehicles was still being reported as being at the staff member's home even though it was parked in the company's yard. The fleet manager commented that the systems hardware had been upgraded and replaced several times in an effort to resolve apparent reliability issues.

Mobile Operator not Impacted!

The investment by the mobile operator in Rubidium oscillators in their SSU and the sound planning of their synchronisation network resilience combined with the relatively short duration of the events meant that there was no real risk of the outages affecting service. This may not have been the case if the systems were running with lower grade oscillators and had a lack of PRC traceability.

Support Team

The involvement of Chronos in the detection of jamming technology enabled the mobile operator's support staff to quickly determine the possibility of a jamming scenario. Had this not been the case, given the location of the site and position of the installed antennas, the support team would have been obliged to undertake a costly, time consuming and ultimately unsuccessful site visit.

3 Way Win

The local plant equipment hire company resolved the longstanding tracking issues with its fleet management system, which gave the additional benefit of maximising its engineering resource. The mobile operator solved its interference problem and also proved the resilience of its network; and Chronos avoided logistical complexities and the cost of travel and equipment hire – all by using GPS jamming detection equipment.