

SARA's Positioning System (SPS) Powerful Location Capability

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Situational Awareness is being made aware of critical information in real-time. Situational Awareness is also all about knowing where these critical events are taking place. Real-time alerting for fixed devices (smoke detectors, door contacts, fixed panic buttons, etc.) is fairly straight forward from a location perspective. If the location was known previously chances are it'll still be there next time it alarms. The real challenge is directing responders to the location of mobile duress alarms.

Solution Overview

With SARA's Positioning System (SPS), SARA provides enhanced location support for mobile devices within the Inovonics EchoStream RF Infrastructure. Through vector mapping technology, SARA provides highly accurate location data which shows the proximity of the mobile device to a fixed device within the infrastructure. In the absence of fixed points or as an enhancement, Points of interest can be defined anywhere within the wireless coverage area. Points of Interest provide expanded location reporting capability through a facility.

This technology can be useful in a variety of different applications including at schools, corporate campuses, senior living facilities, rehabilitation facilities, hospitals, assembly plants, courthouses, jails, etc. Perhaps anywhere that knowing the location of a mobile duress is important. One example is a courthouse. Judges, law enforcement, lawyers, family members, etc. could be issued a mobile duress device while at the facility. In this scenario, a judge that just sentenced someone to jail was approached by an irate family member on the way to his car. This is potentially a very dangerous situation. The judge could discretely press the mobile panic button to initiate a call for help, and SPS would report the location of the mobile alarm. In any life safety situation, time matters, and responders can get there faster with SPS.

Technology Overview

SARA's Positioning System (SPS) is a patent-pending technology that can provide accurate location using in-building wireless transmitters. SPS is not triangulation, but instead uses vector mapping technology to locate the known device closest to the transmitting mobile duress device.

As the name implies, triangulation involves using geometry to solve a simple math problem to place a point on a map. Using GPS as an example, you can imagine large triangles formed between the GPS satellites and your car. The satellites are in geo-synchronous orbit, so we know exactly where they are. They also transmit exact timing information so we can calculate how far they are away. Your GPS can use this info to plot the sides and angles of a triangle with your car being one corner.

When we move inside, there are several complicating factors. First of all, we do not have exact coordinates for our repeaters or for any rooms in the facility. Secondly, signals bounce around indoors, so we really have no way of determining which direction they are coming from. For this reason, we create a vector map – basically a unique signature – for each transmitting device in a facility. Without delving too deeply into the math, a vector is basically a mathematical concept that combines direction and strength. SARA considers points of interest (POIs) to be the same as fixed devices, so from the SPS point of view, there is no difference between a panic button on

the wall and a POI. When SARA receives a mobile transmitter press, we calculate the vector for that press, then calculate the distance between that vector and all the other vectors we have created. We then display the closest ones.

Summary

SPS is the process of SARA building a multi-dimensional model of the EchoStream (Inovonics wireless platform) network. The Model consists of the fixed devices and virtual points of interest (named positions in the facility). Once this model is built, SARA mathematically compares the device in question to the model, and provides the three closest positions. Any type of facility or business has the ability to make location more precise by defining multiple points of interest.