LoRaWAN for geolocation: easy, cost-effective and long-lasting tracking

LPWA technologies

Up to 15 km range

LoRaWAN is the new global standard for low power and long range IoT communication. With a range of up to 15km and up to 10-year battery life, LoRaWAN is supported by major global network operators including Orange, Comcast, NTT, Softbank, Proximus, KPN, Swisscom etc. LoRaWAN networks are ideally suited for industrial IoT applications including connected buildings, smart metering, smart cities and precision agriculture. A key capability is “geolocation”: the ability to accurately determine the position of an object.

Geolocation capabilities

Geolocation can be used to locate connected objects, track them as they move, or create geo-fences: sending an alert if an object moves outside a defined area. Many applications can benefit from geolocation – either GPS based or LoRaWAN network based, depending on the requirements.

GPS for ultra precision

LoRaWAN’s bidirectional connectivity with an embedded GPS chip offers an exceptionally longer battery life (10 times as cellular) enabling sensors to operate for several weeks or months between charges.

LoRa for energy/cost efficient location estimate

LoRaWAN networks can locate devices without GPS, using only radio communications signals. Three GPS-synchronized base stations with accurate timestamping are able to triangulate any sensor’s position. Measuring Time Difference on Arrival (TDoA) translates into the distance between it and three fixed points which allows for an estimate location.

Avoiding GPS on a device reduces cost & power consumption.

Use cases

GPS

Asset tracking: Containers

6 million shipping containers are in transit at any time. Their owners and their clients require visibility of the ongoing condition of their products and containers. LoRa sensors with GPS chips provide port authorities and transportation companies with a powerful and cost effective tool for asset tracking and location, within ports or storage facilities.

Geo-fencing: Open pit mine equipment

Open pit mines are large and remote areas that contain resource-critical and very expensive equipment. Their position needs to be constantly monitored to avoid accidents, streamline operations (refuelling, maintenance...) and even to avoid thefts. GPS-free network location allows mine operators to leverage robust, reliable and long-life LoRa sensors.

LoRa

Animal tracking: Wildlife in nature reserves

Wild animals are equipped with trackers for health, scientific or security purposes. To limit human interference, the sensors’ battery has to last for several months at least. LoRaWAN network based triangulation allows authorities to locate them in huge areas without relying on GPS. An estimate of the animal’s position is enough and battery life is hugely increased.

Anti theft: Cable drums in sub-stations

In depths or at construction sites, cable drums must be monitored to avoid thefts or mishandling. LoRa combined with GPS can meet this need. Combined with a geo-fencing application, sensors will trigger an alert if the drums are being moved outside a predefined area, securing the asset whilst securing a long battery life.

How to choose?

GPS

- High accuracy (a few meters or less)
- Limited battery life, more complex and costly sensor package
- Suits for high value asset tracking and accessible sensor batteries to recharge within weeks

LoRa network-based location

- Area-based location
- Long-lasting battery, cheaper devices
- Suits for use cases where meter-precise location is not needed but accessibility (hence battery life) & cost are critical

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