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Figure-A: LPS – Local Positioning System -- Overview

1. The main apparatus for the LPS – Local Positioning System, comprising:

The principle of the positioning system is the clock and timing. The LPS would come with atomic clock with clock synchronization across all the local LPS devices which would provide the positioning accuracy. Wherein, the atomic clock oscillator chip would be built-in into the LPS devices which provide timing in nanoseconds value into the Timer Counters for faster counting which would be used to calculate the distance based on the time that the LPS device received the signals from the LPS transmitter devices or LPS Fixed-Location devices. The LPS devices would use the same transmission interval and same protocol

LPS - Local Positioning System -- Claim

with LPS data packages that contain LPS Transmitter ID and the heart beat Timing Counter as the time-stamp of transmission. The target LPS receiver device would receive the signals from the LPS transmitter devices with the same atomic clock with the time synchronization, the target LPS receiver device would easily find out the position of itself within the area of the base.

2. The main functional operations apparatus for the LPS, comprising:

The LPS operations would need to have at least 3 LPS transmitter devices for a target LPS receiver device to receive and calculate its position within the base area; the positioning calculation would need the time that a target LPS receiver device received signals from the other LPS transmitter devices. Wherein, the target LPS receiver device when it is moving, would receive LPS signals from the LPS transmitter devices every 1 second transmission interval by default configuration which can be changed by the system to adjust the accuracy; the target LPS receiver would be able to calculate its position by reading time-stamps from the LPS data package from each LPS Transmitter that carried by the LPS protocol. The LPS transmitter devices can be calibrated to synchronization the atomic clock at any time when needed to transmit correct atomic timing to the LPS receivers. When the LPS is widely used, we would have many applications in real-life that need tracking and positioning would use LPS devices instead of GPS devices.

3. The LPS Protocol for transmission apparatus of claim 2, further comprising:

The LPS system would have the protocol well defined so all the LPS devices can receive and extract data from the LPS data package to calculate the position. Wherein, the LPS devices would need the protocol with shorter, simple and enough info in data package as possible to calculate their positions accurately and quickly as possible. The protocol would contain data package with 4-bytes for nanoseconds counter, 4-bytes for seconds counter and 8-bytes for the LPS Transmitter ID which can be adjusted to fit the system requirements and keep as simple as possible for faster LPS signal processing.

4. The LPS Position Calculation of claim 1 & 2, further comprising:

The LPS Position Calculation would be based on the time that the LPS device receive the signals from the LPS transmitter devices and apply the common Distance verse Speed and Time. Wherein, the wireless signal travels with speed of Light and the times-tamps from each LPS transmitter devices that provide the time that the signal traveling for each transmitter; this would provide enough data to calculate the distance of the target LPS receiver device to each of the LPS transmitter devices. The physics formula to calculate the distance which was mentioned in the original invention document would be: $d = tc = tf\lambda$; Where 'd' is distance, 't' is time of received signal, 'C' is speed of Light, 'f' is signal frequency and ' λ ' is wavelength.

5. The Mobile LPS functions and operations apparatus of claim 1 & 2, further comprising:

The LPS system can be extended to mobile LPS system where the LPS Base transmitter devices are installed on the mobile base of the vehicles or in space. Wherein, the Mobile LPS system would have the LPS Base transmitter devices with similar protocol, transmission heart beat, and atomic clock synchronization; the LPS receiver devices would receive and function the same as the regular LPS system except that the internal control system of the LPS receiver devices or LPS receiver devices/vehicles would implemented with the automatic keeping the same position and the same path as required by the LPS

LPS - Local Positioning System -- Claim

system when the base is moving which would make the LPS receiver devices move with the base as expected.

6. The LPS Calibration functioning apparatus of claim 1 & 2, further comprising:

The Atomic clock oscillator on each device may run out of sync overtime where each device has its own power and different environment which could cause the clock oscillators are off in phases overtime, and the LPS devices are needed to calibrate. Wherein, the LPS Calibration process would need a LPS Calibrator which can be used to synchronize the clock on each LPS transmitter devices by place the LPS Calibrator right at the beacon at position zero or the closest position with known distance of the LPS transmitter device as possible to synchronize the clock with the 'PAIR' button. The LPS transmitter devices that are installed on the fixed locations can be synchronized the atomic clock by Automatic Clock Synchronization across the LPS transmitter devices or LPS towers.

7. The LPS applications in real-life apparatus of claim 1 & 2, further comprising:

The LPS – Local Positioning System which is installed on earth or local base of the vehicles with fixed locations would be very useful to have many applications in real-life which were already mentioned several applications in the original invention documents which have been shown on the website www.TheCloudOSCenter.com. Wherein, the LPS system can be used to improve existing airport where airplanes and ground services devices or vehicles can equipped with LPS receiver devices; LPS system can be used for Drone or Remouflyers with cameras in Patrol Circle for Points of Interest for security purposes which has been shown on the website www.ThePatrolCircle.com; LPS system can be used for LPS Locator app that running on mobile devices that help the users tracking each other within their own devices' signal transmission when their mobile devices are out of signal coverage. LPS system can be used for Drones or Remouflyers to guard and monitor surround areas of the Aircraft Carriers and can be used similarly for vehicles on Mars or in Space in the future and would be more applications that use LPS devices.

Corrections: There were simi typos in the original invention document for the words 'Collaborate / Collaborating / Collaboration / Collaborator' which should be 'Calibrate / Calibrating / Calibration / Calibrator'.

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