

LOCATING A ROVING POSITION RECEIVER WITHIN A LOCATION NETWORK

ABSTRACT

The present invention discloses a positioning system and method for enabling a roving position receiver to determinist own position. The positioning system comprises a specialized transceiver (hereinafter termed a positioning-unit device) that receives one or more reference positioning signals from other positioning-unit devices and/or other qualified reference positioning signal sources. Each of the received reference positioning signals preferably has a carrier component, a pseudo-random code component, and a data component. The Positioning-Unit Device generates, in response to the received reference positioning signals and their known locations, a unique positioning signal. The unique positioning signal has a carrier component chronologically synchronized to one or more of the carrier components of the received reference positioning signals, a pseudo-random code component chronologically synchronized to one or more of the pseudo-random code components of the received reference positioning signals, and a data component chronologically synchronized to one or more of the data components of the received reference positioning signals. Once a Positioning-Unit Device is chronologically synchronized to a reference transmitter, other Positioning-Unit Devices entering the network can use its transmitted unique positioning signal as a reference positioning signal. The geographical distribution of these chronologically synchronized Positioning-Unit Devices creates a time-coherent network of positioning signals that propagate a reference timebase over a substantial geographical area. The positioning system also includes a roving position receiver. The roving position receiver can generate code-based single point position determinations by making range measurements for each of the received chronologically synchronized pseudorandom code and data components, and can generate carrier-based single point position determinations by making range measurements for each of the received chronologically synchronized carrier components. The roving position receiver can autonomously calculate both code and carrier-based single point position solutions and subsequently calculate its own position without the requirement for differential correction or absolute time accuracy within the network.

Figure 2