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2. The method of claim **1**, further comprising:

measuring a signal propagation delay and a Doppler shift of a carrier signal.

3. The method of claim **2**, further comprising:

determining the signal propagation delay and the Doppler shift based on a random access channel (RACH) burst from the user terminal.

4. The method of claim **2**, further comprising:

determining the user terminal location based on the signal propagation delay and the Doppler shift.

5. The method of claim **1**, further comprising:

resolving ambiguity of the user terminal location.

6. The method of claim **5**, further comprising:

resolving the ambiguity of the user terminal location based on a spot beam pilot signal emitted by the satellite.

7. The method of claim **1**, further comprising:

converting the user terminal location to an earth-centered earth-fixed (ECEF) coordinate system.

8. The method of claim **1**, further comprising:

tracking the position of the at least one satellite.

9. A system for determining a location of a user terminal on the surface of the earth, comprising:

a ground station for tracking a position of a satellite;

a receiver capable of determining a signal propagation delay and a Doppler shift of a radio frequency (RF) signal transmitted between the user terminal and the satellite;

a processor, in communication with the receiver, for determining the location of the user terminal, based on the signal propagation delay, the Doppler shift, and a spherical approximation of the shape of the earth in combination with an ellipsoid approximation of the shape of the earth.

10. The system of claim **9** further comprising:

means for resolving ambiguity of the location of the user terminal.

11. The system of claim **10**, further comprising:

means for resolving the ambiguity of the location based on a spot beam pilot signal emitted by the satellite.

12. The system of claim **9**, further comprising:

means for converting the location of the user terminal to an earth-centered earth-fixed (ECEF) coordinate system.

13. A computer-readable memory storing a program for directing a computing device to determine a user terminal location on the surface of the earth by estimating the user terminal location based on a signal propagation delay and a Doppler shift derived from a radio frequency (RF) signal transmitted between the user terminal and a satellite, and based on a spherical approximation of the shape of the earth and a predetermined refined approximation of the shape of the earth.

14. A method of determining a user terminal location on the surface of the earth by referencing a satellite rotating the earth, the method comprising the steps of:

measuring a signal propagation delay and a Doppler shift of a carrier signal;

determining an earth central angle α between the user terminal and a sub-satellite point, the earth central angle being a function of the signal propagation delay;

determining an azimuth angle β between the user terminal and the direction of motion of the satellite measured at sub-satellite points, the azimuth angle being a function of the Doppler shift;

determining an estimated user terminal location based on the earth central angle, the azimuth angle and a spherical approximation of the shape of the earth; and

adjusting the estimated user terminal location using a refined approximation of the shape of the earth.

15. A system for determining a location of a user terminal on the surface of the earth, the system comprising:

a ground station for tracking a position of a satellite;

a receiver adapted to determine a signal propagation delay and a Doppler shift of a radio frequency (RF) signal transmitted between the user terminal and the satellite;

a processor, in communication with the receiver, for determining the location of the user terminal, based on the signal propagation delay, the Doppler shift, and a spherical approximation of the shape of the earth in combination with an ellipsoid approximation of the shape of the earth;

said processor having means for determining an earth central angle α between the user terminal and a sub-satellite point, the earth central angle being a function of the signal propagation delay;

said processor having means for determining an azimuth angle β between the user terminal and the direction of the motion of the satellite, the azimuth angle being a function of the Doppler shift;

said processor having means for determining the user terminal location based on the earth central angle and the azimuth angle.

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