Geolocation Accuracy

The location of the transmitter is determined by the evaluation of the received signals.

Each Time-Distance of Arrival measurement delivers a hyperboloid of possible transmitter locations. From there, the intersection with the earth's surface delivers two parabolae as a coordinate, (C1, C2) with the estimated transmitter location at their intersection.

Geolocation Accuracy (Cont.)

The mean squared error (MSE) is used to measure the difference between the estimated transmitter location and the true transmitter location.

This results in a lower accuracy closer to the equator, which increases with respect to an increase in latitude

Because of this, if a satellite is located exactly above the equator, it is in a 'blind zone'

Also, location estimation is time dependent due to the movement of the satellites

Thus, the remote geolocation might not be sufficient as a single source of information for the transmitter's location.

Geolocation Error in Latitudinal and Longitudinal Directions

The geolocation errors for the latitude and the longitude are determined separately.

When finding errors, the error in the longitudinal direction is much smaller than the error in the latitudinal direction

The geolocation of the longitude has a higher precision because the error for the longitude is almost independent of the latitude of the transmitter

It is possible to further reduce the amount of information transmitted about the longitude using Assisted Hybrid Geolocation.

Assisted Hybrid Geolocation

The hybrid system only provides the information that is required at the receiver to increase the accuracy of remote geolocation.

To do this, it skips the most significant bits (MSBs) of the quantized coordinates.

The geolocation algorithm can resolve the ambiguity caused by the reduced transmitted information.

Assisted Hybrid Geolocation (Cont.)

This results in: [Read Slide]

Conclusion

[Read Slide]