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MATRIC NO: 17/ENG03/048

COURSE TITLE: ENGINEERING SURVEY

COURSE CODE: CVE 310

ASSIGNMENT TITLE: GLOBAL POSITIONING SYSTEM (GPS).

1.BENEFITS OF GPS

1. Relatively high positioning accuracies, from tens of meters to millimetre level.

2. Capability of determining velocity and time, to an accuracy commensurate.

3. Signal availability to users anywhere on the globe; in air, on the ground, or at sea.

4. It is a positioning system with no user charges and uses relatively low cost hardware.

5. It is an all-weather system, available 24hours a day.

6. The position information is in three dimensions, that is, vertical as well as horizontal information is provided.

2. ERRORS ASSOCIATED WITH ABSOLUTE GPS

1. Ephemeris errors and orbit perturbations

2. Clock stability

3.Ionospheric delays

4.Iropospheric delays

5. Multi-path

6.Satelite and receiver clock errors

7. Selective availability(S/A)

8. Anti-spoofing

9. Receiver noise

1. Ephemeris errors and orbit perturbations: Satellite ephemeris errors in the prediction of a satellite position which then be transmitted to the user in the satellite data message.

2. Clock stability: GPS depends on accurate time measurements. GPS satellites carry rubidium and oesium time standards that are usually accurate to 1 part in 1012 and 1 part in 1013 , respectively, while most receiver clocks are accurate by quartz standard accuracy of 1 part 108.

RE = TO \* C

RE = User equivalent range error(UERE)

TO = Time offset

C = Speed of light

3.Ionosperic delays: GPS signals are electromagnetic signals are non-linearly dispersed are refracted when transmitted through a highly charged environment like the ionosphere. Dispersion and refraction of the GPS signal is referred to as the ionosphere range effect because it results in an error in the GPS range calculation as the velocity of the radio signals from the satellite is affected.

4.Signal multipath: Multipath describes an errors affecting positioning that occurs when the signal arrives at the receiver from more than one path. This occurs when the GPS receiver is positioned close to a large reflecting surface such as a lake, a big rock or a building. In this case the satellite signal does not travel directly to the antenna but hits the nearly object first and is reflected into the receiver’s antenna creating a false measurement.

5. Satellite and receiver clock errors: Even though the clocks in the satellite are very accurate to about 3 nanoseconds, they do sometimes drift slightly and cause small errors, affecting the accuracy of the position.