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DEVELOPMENT OF A TRAINING PROGRAM FOR ENHANCING THE USE OF ICT TOOLS IN THE IMPLEMENTATION OF PRECISION AGRICULTURE

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Training package 2

GPS Configuration.

Student guidelines

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1 Practice

There is another concept to understand before the practice. The "visibility" of a satellite, or when we can "see" a satellite. By this terminology, we do not mean that we can, with the unaided eye, see the satellite (although it is sometimes possible to do so, especially when the Sun glints off it). We use the term "visibility" and "seeing" to mean "to have an unobstructed view of." Since the GPS satellites orbit the Earth in a non-geostationary orbit, they will rise and set. After they have set, for example, they are below the horizon and therefore "not visible." We cannot "see" satellites below the horizon. After they rise, satellites are above the horizon and thus potentially "visible."

Sometimes, even after satellites rise, their view is obstructed. Sometimes a building or tree will get in the way. That is usually not a good situation. When you perform the experiment, try to stay away from such obstructions like buildings or trees. You want to maintain good sky visibility so that you can see as many satellites as possible.

1.1 GPS test app

Download the smartphone app "GPS test" and answer the following questions:

- Which satellites net do you see? You can drag the satellites signal section to see all of them.
- Which satellite net is giving better signal? Notice the shape that represents each net (circle/triangle...), Disable and enable satellites net to check the accuracy between them.
- How many satellites did you see in the constellation map? How many is the app using to determine your position?
- There is any difference between your classmates display? Why is this difference?
- Cover the phone with something metallic, which accuracy do you have now? There is any difference from before?
- If we get a SNR of 55dB* for a certain satellite how much Noise do we have if we know that the Signal power on the earth surface for this satellite is about $1 \cdot 10^{-12}$ W. The decibel (symbol: dB) is a unit of measurement used to express the ratio of one value of a power (in this case the signal power) or field quantity to another (in this case the noise power)

1.2 GPS NMEA app

Download the smartphone app “GPS NMEA” and answer the following questions:

1. Click on «Sat. Positions»; Compare and confirm that the satellite seen by this application are the same as the other app and click the back button.
2. Click on NMEA Raw Data, Save some data on a *.txt file
3. Go too your Android file browser and try to find GPSNMEA folder.
4. Transfer it to your computer (eg: by WhatsApp or mail) in *.txt format
5. Open the file with excel
6. Then extract the position, utc time and all the interesting information from the GGA sentences.



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