

GPS Field Exercise Instructions – Accuracy and Coordinates for Identifiable Points

GPS Set Up and Basic Operation (Work in groups of 2 or 3)

Get your GPS set up to display UTM coordinates using the NAD27 CONUS datum.

Precision v.s. Accuracy Exercise

Your GPS displays UTM coordinates with a precision of 1 meter. But it is not accurate to one meter. The following exercise will demonstrate accuracy of our GPS receivers for the current overhead satellite configuration. While we will likely see typical accuracy, many factors come into play and accuracy may vary substantially from what we see today. More on this topic later in class.

1. Proceed to the parking lot where I have marked a 1 meter square and determined its coordinates. I determined these “reference coordinates” several days ago and likely had a different overhead satellite configuration.
2. Write down the “reference coordinates”
3. Place your GPS in the 1 meter square and write down the UTM coordinate determined by your GPS.
4. Move to the position indicated by your GPS relative to the “reference coordinates”. If your GPS provided an easting that is 2 meters more than the “reference coordinates” you will need to move two meters to the east. Likewise, if your GPS giving a northing 3 meters less than the “reference coordinates” you will need to also move 3 meters to the south. (If you have a difference that is more than 100 meters, your GPS most likely has an incorrect datum setting. Change the setting to NAD27 CONUS, and try again.)
5. Once you have moved into position, mark your location using a piece of chalk. This position represents the difference in accuracy between your GPS and the “Reference GPS.” Look around at where other students end up and you will most likely see that they are randomly distributed around the “reference point” The size of this cluster is about the level of accuracy you should expect when you are searching for a specific point using your GPS.
6. If you take time to repeat this experiment tomorrow and two weeks from now, you will get a sense of how repeatable the position provided by your GPS is.

Coordinate Exercise

1. Each group needs to have a coordinate format card, and a piece of flagging tape. Write your name on the end of the flagging tape with a Sharpie marker.
2. Exchange cell phone numbers with another group. You will be calling them with coordinates for your flagging tape once you have placed it.
3. Place the flagging tape some where on campus. It should be about head high and visible. Use you GPS to determine the location, save it as a waypoint, and convert it's coordinates to the coordinate format given on your card. Exchange coordinates with the other group. Exchange the coordinates and map datum of the flagging tape and the name written on it.
4. Set your GPS to the coordinate format and map datum of the coordinate your were given, enter the coordinates you received from the other group into your GPS and save as a waypoint.
5. Locate the other group's flagging tape. Bring the flagging tape with you when you have located it.

Coordinate Formats

Coordinate Format	GPS Format Name	Example Coordinate
UTM	UTM/UPS	10S 0587905m E 4124393m N
Latitude / Longitude Degrees, Minutes, Seconds	hddd° mm' ss.s"	N 37° 22' 30.0" W 122° 15' 45.0"
Latitude / Longitude Degrees, Decimal Minutes	hddd° mm.mmmm'	N 37° 22.5000' W 122° 15.7500'
Latitude / Longitude Decimal Degrees	hddd.dddd°	N 37.37400° W 122.26250°
United States National Grid USNG	US National Grid	10S ES 87040 24516
Military Grid Reference System MGRS	MGRS	10S ES 87040 24516

Locating Waypoint Flags

There are six waypoints stored in your GPS labeled 1001 to 1006. Use your GPS to find these waypoints. There are all on campus and are marked with flagging tape.