

## Appendix I – Agricultural Mechanics

### GPS Exercise: Measuring Distance between Two Points

**Introduction:** The purpose of this exercise is to:

- Familiarize you with the operation of GPS equipment.
- Learn how to measuring distance between two points using GPS.

**In the Field:**

This exercise describes the use of the Garmin GPS 60 (about \$150), but any unit that provides data in decimal degrees UTM coordinates could be used.

1. Turn on the GPS unit by holding the Power Button until the unit powers up. Wait until the unit acquires the GPS satellites. (Pictures of the other screen used in this exercise can be found at the end of the document.)

2. Answer the following questions:

a) What is the estimated accuracy shown on the Skyview page? \_\_\_\_\_ ft.

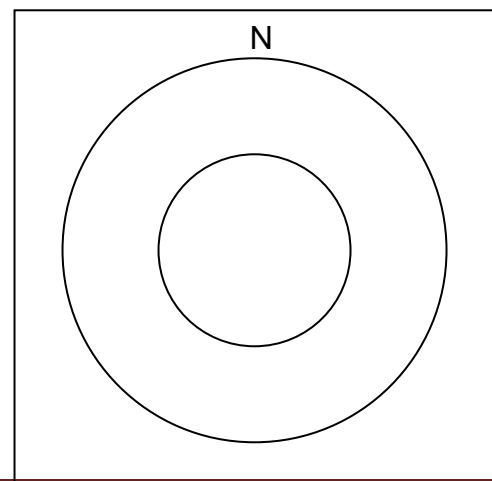
This number is based on the satellite geometry. DOP or Dilution of Precision is a similar estimate and is reported on more expensive GPS units.

b) Record the satellites in use (dark) on the diagram.

3. The unit should display UTM Coordinates at the bottom of the display. (e.x, Easting (X): 340970 meters and Northing (Y): 4467682 meters).



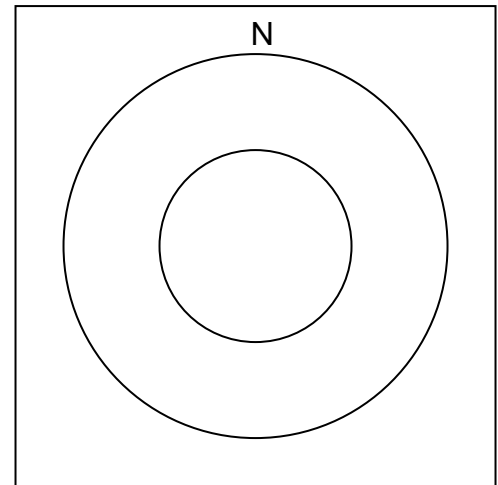
GPS  
or



4. Locate the two points marked in the field and take 3 readings at each point.  
 IMPORTANT: The location of the GPS reading is at the antenna, be sure locate the antenna directly over the point.
5. Write down the readings below (record all of the digits).

Flag Number	Easting (X) (meters)	Northing (Y) (meters)	Accuracy (ft)
1. - 1			
1. - 2			
1. - 3			
Ave 1.			
2. - 1			
2. - 2			
2. - 3			
Ave 2.			

6. Record the satellites in use now.
7. Compare the satellites in use and their position to the diagram when you started the exercise. How have they changed? How did the accuracy change?
8. With the data you have collected, you will know be able to calculate the distance between the two points. You should note the accuracy of the different systems and how this might influence what type of GPS equipment you use for different precision applications.



Distance between point 1 and 2 = \_\_\_\_\_

Distance Calculation - 
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

1 meter = 3.28 feet