

Precision Agriculture Workshop

Exercise 1

GPS and Guidance Systems

This exercise is completed in two subgroups:

Subgroup A. Follow instructions on how to use Garmin eTrex handheld GPS receiver to record and to download waypoints and tracks. After recording at least three specific waypoints in different locations of Nebraska Tractor Test Laboratory Track, navigate to the first waypoint. Track at least one closed path around a specific area. Instructor will use one of receivers to download and display one set of waypoints and one track. While operating a GPS unit, record the coordinates (latitude and longitude) of two points with known proximity. Determine the distance between these two points in feet (use template below)

Subgroup B. Locate and identify components of lightbar guidance systems: AgLeader (display board) and Outback (instrumentation vehicle). Proceed behind a light cart with AgLeader lightbar display board while simulating straight path operation with 15 ft swath width.

Distance Calculator

	Display Output	Decimal Degrees
Point 1	Latitude (φ_1)	
	Longitude (λ_1)	
Point 2	Latitude (φ_2)	
	Longitude (λ_2)	

$$Distance = \sqrt{(F_{Lat}(\varphi_1 - \varphi_2))^2 + (F_{Lon}(\lambda_1 - \lambda_2))^2}$$

From the table http://bse.unl.edu/adamchuk/web_ssm/web_GPS_tb.html for $\varphi = 40.8^\circ$:

$$F_{lat} = 111050 \text{ m/deg} \text{ and } F_{lon} = 84389 \text{ m/deg}$$

Distance between Point 1 and Point 2 =