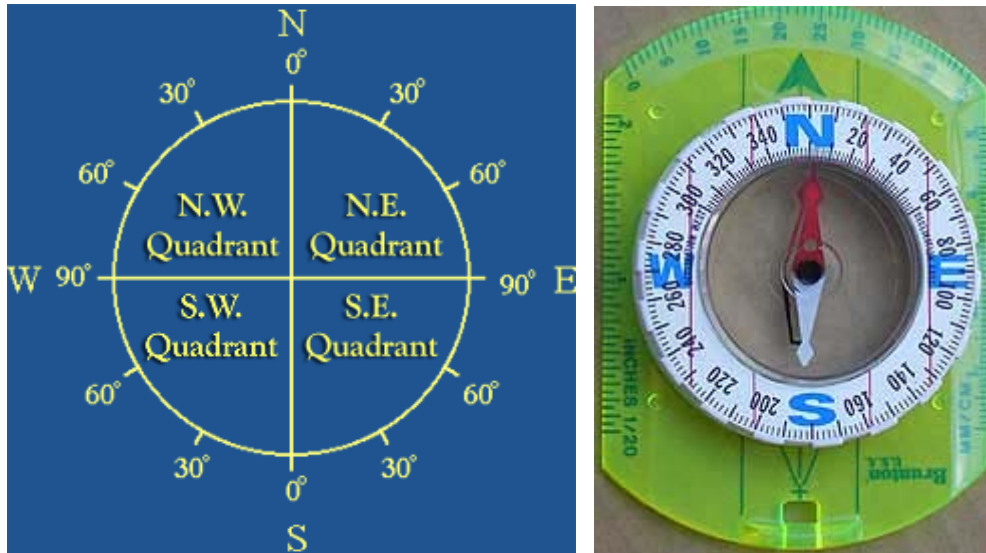


Activity 3

Creating Routes & Waypoints Using Bearings

Bearings describe direction by the number of degrees (0° - 90°) and direction (E or W) away from true North or South (e.g., N 30° W). Most deeds provide boundary locations in bearings.

Azimuth is direction measured in degrees, with true North being 0° (or 360°) and increasing clockwise (East = 90° , South = 180° , West = 270°). Terrain Navigator, USAPhotoMaps, and the GPS unit use azimuth.



Source: http://geology.isu.edu/geostac/Field_Exercise/topomaps/bearing.htm

Convert these bearings to azimuth:

N 70° W = _____

S 56° E = _____

Creating Routes Using Bearings

There are several ways to create a route based on a property description given in distance and degrees from a certain starting point. You can enter the distance and compass direction (in degrees) into the GPS unit to create new waypoints, but entering in each digit is time-consuming.

In Terrain Navigator, you can, 1) type in the distance and compass direction for each leg of a property boundary, or, 2) move your cursor over the map until the correct distance and degrees is displayed (free hand).

You can also use this free hand method in USAPhotoMaps, but the displayed distance is the total distance of the route, not the distance of each leg. For this reason and because there are more editing options, Terrain Navigator is a better program to use for creating routes. However, USAPhotoMaps is great for locating buildings and wooded areas using the aerial photos (keep in mind that many of the maps and aerial photos are old and may not reflect recent changes in land use).

It can be useful to locate a site and mark a corner in USAPhotoMaps, then use that waypoint in Terrain Navigator to create a route.

Open USAPhotoMaps and GoTo this address:

**18330 Keedysville Road
Keedysville, MD 21756.**

The create waypoint window will appear. Click OK. Just north of this point will be a triangular piece of wooded land.

Make a waypoint at the top point of the triangular piece of land. Name the waypoint **TOP**. Send this point to the GPS unit by clicking Waypoints > Show Current... > highlight **TOP** > To GPS.



Open Terrain Navigator. Import the TOP waypoint by clicking GPS > Receive from GPS > Receive Waypoints > highlight **TOP** > OK.

Terrain Navigator

You are going to create a route using the TOP waypoint as the starting point, then creating legs using distances and directions.

Open Terrain Navigator. Select Layers > Routes > New. Choose Waypoint (radio button at top of window) and select New. Select **Top** from the dropdown box. Click okay. Now you have the first point in your route. You can now create a leg based on a given distance and direction from this point.

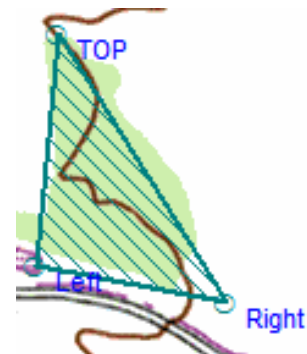
In the Route Waypoints/Legs window, select the Legs radio button and click New... A New Route Leg window will appear. Name it Right. If not already selected, select the buttons for Insert **After** and Distance/Bearing **From**. Enter data for bearing (in azimuth degrees) and distance. Click okay. Select New and name this leg Left. Enter the Left data and click Close.

Right: Bearing 148 Degrees; Distance 1646 Feet.

Left: Bearing 281 Degrees; Distance 1012 Feet.

Name the route you've just created **Triangle**. Check the box next to Loop so that the route will end with your starting point.

Change the waypoint, loop interior (and pattern), and line colors. This way, you will differentiate this route from others.



What is the distance of your route? _____

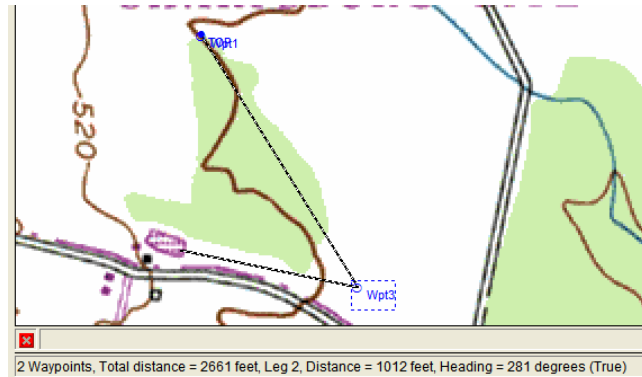
What is the area? _____

Delete the route from Terrain Navigator before drawing the free hand route.

Free Hand Route in Terrain Navigator

Import the TOP waypoint. Select the Route Tool. Move your cursor to a point near the TOP waypoint and click once to make your first route location (you won't be able to make it directly on top of the waypoint). Place your cursor over your first route point and click and drag the point so that it is directly over the TOP waypoint. Move your cursor away from this point (a line should be connecting your cursor to the first location).

Look at the text box below the map. You will see the description of the leg of the route you are creating. Move your mouse until the leg distance and bearing (Heading) matches the information provided for you. Click where you want to make the next corner. Continue making all legs of your route. Right-click and select Toggle Route Loop. This will link the last waypoint with the first.

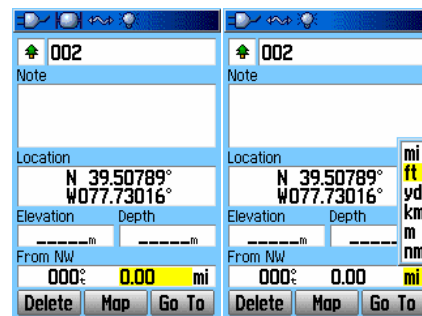


Right-click again and select finish route. To change the name of the route, put the cursor over one of the waypoints in the route, right click and select edit route. You can then change the name, edit points, change the font, etc.

GPS Unit

To create waypoints on the GPS unit using bearings, you will need to have a starting waypoint saved in the unit.

To create a waypoint a certain distance and bearing from a saved waypoint, press FIND and select a starting waypoint (TOP). Press MENU once. Select Project Waypoint and press ENTER. At the bottom of the screen, a box will be labeled "From ..." naming the first waypoint you selected.



By highlighting and pressing ENTER, you can change the bearing and distance. To change the distance units, highlight the current unit (miles (mi) is the default) and press ENTER. Once you enter the bearing and distance, the latitude and longitude will automatically change to the correct coordinates for that location. Rename the waypoint and select Map. The new waypoint will be automatically saved. You can see the new waypoint on the map screen.

When you are ready to create the next projected waypoint, press FIND, select the waypoint you just created, and proceed with the same process. This method allows you to make waypoints. If you want to make a route out of these waypoints, you can do that by creating a route and adding each point in order.