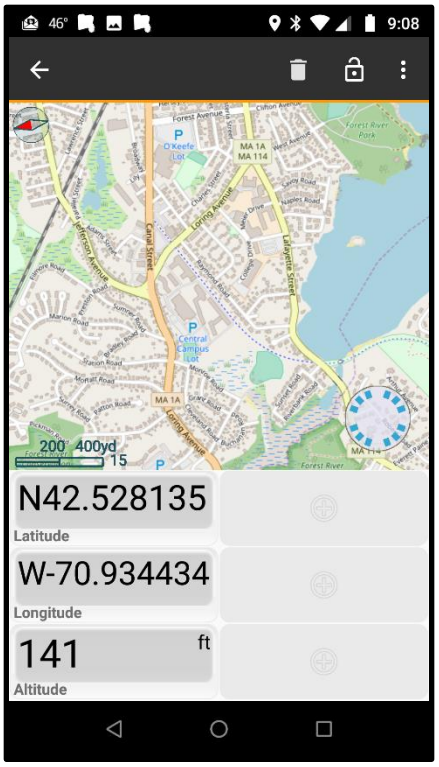
GPH100 Weather and Climate Lab **Brian M. Cacchiotti**
All Sections

GPS Lab

The purpose of this lab is to introduce you to the world of Global Positioning Systems (GPS). GPS enabled devices are able to use satellite signals to find accurate locations on the surface of the earth. These devices will detect the signals from multiple satellites, and by reading the time it takes for the multiple signals to arrive at the receiver, it is able to accurately locate the unit's position in three-dimensional space.



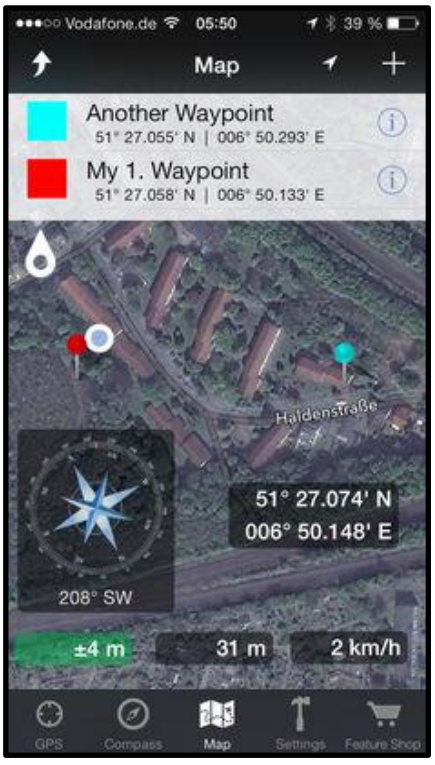
The easiest way to do this lab is with your own phone enabled as a GPS device using an app.

I have tested **the Android app: GPS Essentials**.
I've been advised that for the **iPhone: GPS and Maps Track Coordinates, Compass + Waypoints**, is a good option.

For either app you will need to first select decimal degrees as your Position Format units.

In **GPS Essentials**,

- Go to the 3 wavy lines (top left) and then go to Settings
- Now scroll down to Position Format and select decimal
- From the main screen select Maps. You can zoom in/out of the map as well as scroll in any direction.
- Next you want to add dashboard items. Tap in the white area and it will allow you to select from many different items.
- You should first select Latitude, then Longitude and finally, Altitude.



For **GPS and Maps Track Coordinates, Compass + Waypoints:**
I'm sorry but I have no information about the iPhone app.
This app should operate in a similar fashion to the Android app.

- So first set the positional units to decimal degrees
- and then find the display that shows you Latitude, Longitude and Altitude (Note: altitude can be omitted if difficult to configure)

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Names: _____
_____
_____

PART ONE: Find the latitude, longitude and altitude (at arms height – about 4'-0" off the ground) for the following building corners on the Salem State College campus…

	Latitude	Longitude	Altitude
A – Bookstore			
B – Peabody Hall			
C – Bowditch Hall			
D – Meier Hall (doors)			

PART TWO: Use your GPS unit (and knowledge of how latitude and longitude work) to find the following coordinates on campus. Then describe the item or location of these coordinates.

	Latitude	Longitude
1	N 42.50633	W 070.89588
2	N 42.50537	W 070.89411
3	N 42.50487	W 070.89074

1) _____

2) _____

3) _____

PART THREE: From your final location you need to travel about 90 feet south (toward the large building near you). There you will find a very interesting round table/patio. What is the actual location of this item (hint: look around for a clue) and then make some weather observations for the day!

Latitude: _____

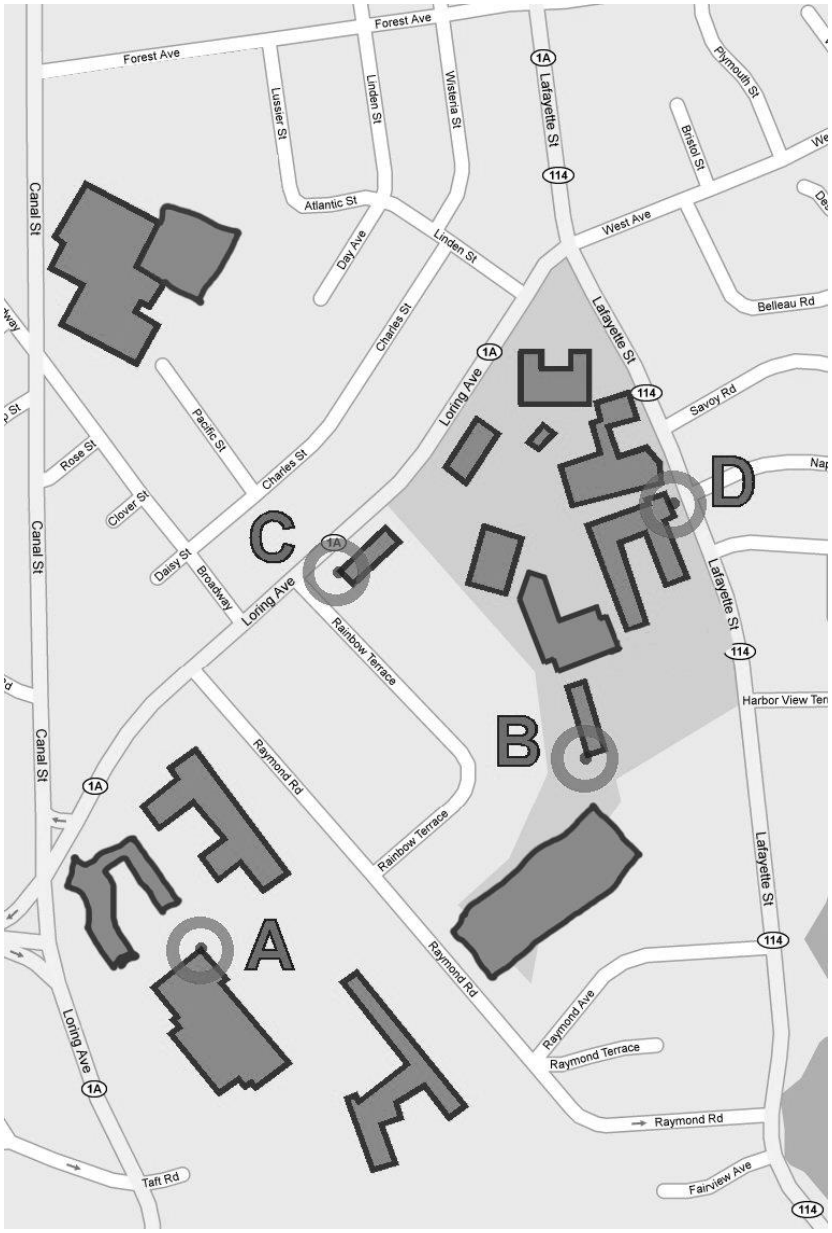
Longitude: _____

Temperature: _____

Wind Speed & Direction: _____

Percent Cloud Cover: _____

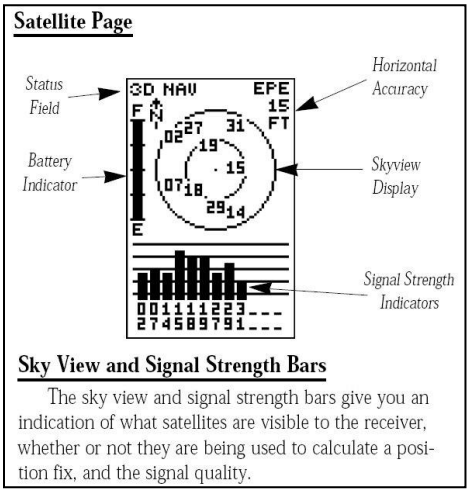
Types of Clouds (if any) _____



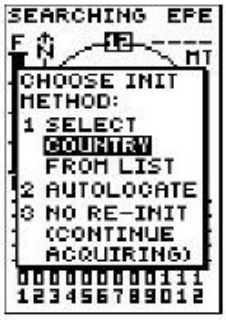
Using the old GPS Units

These units are Garmin GPS 12XLs. The main satellite page looks like the image to the left. In order for these units to be as accurate as possible, it is necessary to acquire the signal from the maximum number of satellites. For this reason, it is advisable to begin first by simply holding the unit up, away from too many obstructions such as buildings. Allow the receiver to first find (open boxes) and then acquire (solid boxes) the signal before taking any readings.

You need to set your unit to read out in degrees and decimal degrees. To do this, turn on the unit by pressing the red 'light' button for 1 second. Allow it to startup. It will automatically go to the satellite screen (left). Press <page> until the Main Menu screen appears. Use the arrow buttons to move to Setup Menu and click <enter>. Then select Navigation and hit <enter>. Then select the values under Position Frmt and hit <enter> (only the "h" will be selected). Use the arrow keys (up and down) to select hddd.ddddd° from the menu, hit <enter>. Click <page> <page> <page> and you will return to the satellite page.



To complete our lab today you will need to use two of the GPS screens. The first screen in the satellite page (explained above). Always start here and make sure you have good (at least 3) satellites in the black bars before continuing.



The other screen is the Position page. To get here you need to hit <page> until the screen appears. This will show you the current position in Latitude and Longitude of the unit, as well as the altitude. You will need to determine both the coordinates of certain locations as well as determine what feature is located at specific coordinates.

Other issues:
If the unit displays an error saying that the Memory Battery is Low… this is not a problem… simply hit <page> and continue normally.

If the unit says it needs you to choose an INIT Method… select Country <enter> (see right), then use the up and down arrow keys to highlight United States MA <enter>.

GPS units can be used for a great many things, we are simply using it today as a method for determining basic location on the surface of the earth.