GPS NAVIGATION

LEARN YOUR GPS

NAVIGATION TERMINOLOGY

Latitude: Distance from the equator, north or south. Equator to pole = 90 degrees.

Longitude: Distance from the Prime Meridian (the line through Greenwich, England), east or west. Maximum east or west longitude = 180 degrees. 180 east = 180 west, in mid-Pacific

Degree: Measure used for latitude and longitude. One degree latitude = approximately 60 nautical miles (69 statute miles, 111 kilometers). Distance varies for Longitude from approximately 60 nautical miles at the equator to 0 at the poles. One degree longitude is about 56 nautical miles (49 statute miles, 79 kilometers) in SE Michigan.

Minute: Measure used for latitude and longitude. One minute = 1/60 degree. One minute latitude = approximately 1 nautical mile (1.15 statute miles, 1.85 kilometers). One minute longitude in SE Michigan = approximately 0.93 nautical miles (1.07 statute miles, 1.31 kilometers).

Second: Measure used for latitude and longitude. One second = 1/60 minute = 1/3600 degree. One second latitude = approximately 101 feet or 31 meters. One second longitude in SE Michigan = approximately 94 feet or 29 meters.

Statute Mile: The standard mile used in the US. 1609 meters or 5280 feet.

Nautical Mile: Originally defined as arc length of 1 minute of latitude of the Earth. Current definition = 1852 meters or 6076 feet.

GPS TERMINOLOGY

Waypoint: A point you manually mark on the map. Can be a parking lot, trail intersection, lake, or anything else. Waypoints must include a latitude and longitude, and may also include a name or number, elevation, a symbol, and a comment, depending on the GPS unit.

Track: The path followed by the GPS. Tracks are stored as lists of breadcrumbs. The GPS, or computer program, draws a line from breadcrumb 1 to breadcrumb 2 to breadcrumb 3, etc, giving a line on the map representing the path followed. They may be very close together, as little as a meter or two.

Breadcrumbs: Used in tracks. Each breadcrumb is a position (latitude, longitude, and maybe elevation).

Route: A GPS route is a list of list of waypoints. Normally, these are straight-line routes from waypoint to waypoint, so they do not usually represent actual trails. Not very useful for hiking.

Error/Accuracy: The maximum calculated error in your position. This is calculated based on satellite geometry. Minimum for hand-held, recreational GPS's is usually around 15 feet. With poor geometry, error can be well over 100 feet.

Satellite: One of 24 – 36 space-based devices in a GPS system. GPS satellites know and transmit their own ID, health, exact time, and exact position multiple times in a precise pattern every 30 seconds.

Cold-start: A GPS location-finding routine when the GPS has been off for a long time, or has moved a great distance from its previous location. GPS cold-start times can be from 30 seconds to several minutes.

Warm-start: A GPS location-finding routine when the GPS has not been off for very long, and when the GPS is reasonably near where it was when last turned on. Warm-start times can be as little as just a few seconds. GPS's always assume they are exactly where they were when turned off so they always try to warm-start.

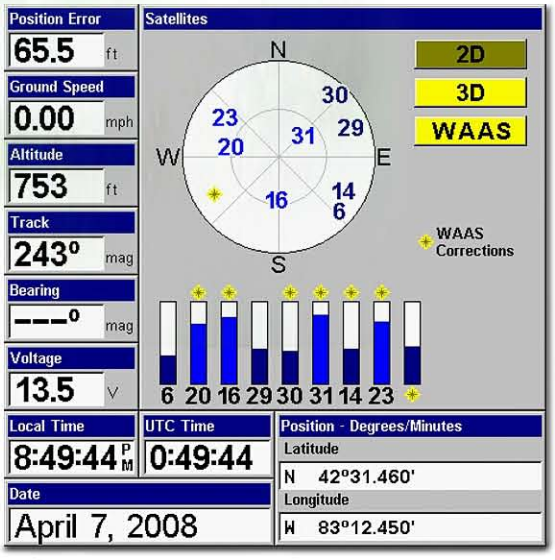
GPS NAVIGATION

SKY VIEW

Location: Gives "Locating position" or information below
Error/Accuracy: How accurate is the position reported?
Latitude: Reported as N or S and degrees, minutes, seconds, or degrees, minutes with decimal minutes.
Longitude: Reported as E or W and degrees, minutes, seconds, or degrees, minutes with decimal minutes.

Sky:
Center of circular area is straight up.
Top always represents north.
Outer ring is horizon.
Satellite number is current expected position of that satellite
Solid is locked
Flashing is acquiring (not locked)
Grey is not found

Satellite list:
Bar heights is signal strength
Solid bars are locked satellites
Outlined bars are unlocked satellites
No bar indicates that satellite is not found



GETTING THE BEST FIXED POSITION

Use Sky View screen to find blocked parts of the sky (cliffs, buildings, etc).
Trees don't block much signal, but rocks and metal will.
Don't carry your GPS in the same pocket as anything metal (keys, cell phone, coins, etc).

MAKING YOUR MAP

Always set a waypoint whenever you encounter:
* Your car (parking lot) * Restrooms * Drinking water * Filterable water
* Interesting features * Roads * Buildings * Trailheads
* Major visible features * Bridges * Intersections * Anything else you want

Walking the trail:

1. Start at the trailhead (and mark it)
2. Walk to the first intersection.
    1. If the intersection is not marked:
        1. Mark the intersection with a red flag.
    2. If the intersection is marked "complete" (green dot):
        1. You don't need to do anything here.
    3. If the intersection is marked "incomplete" (red flag)
        1. Count the tracks coming into the waypoint on your GPS and the trails coming into the intersection where you're now standing.
        2. If, when leaving intersection, you have now been on every intersecting trail, change the symbol to a green dot.
        3. If, when leaving intersection, you have not been on every intersecting trail, leave the trail marked with a red flag.
3. Look at your map and pick your trail out of the intersection.
4. *Go to step 2.*