

## Scouting COCers Handheld GPS Course

Portions © Garmin / [www.garmin.com](http://www.garmin.com)

## What is GPS

- ❖ Global Positioning System (not satellite)
  - ❖ Consists of satellites and receivers (GPSr)
- ❖ The receiver is a small, hand-held, portable, battery-powered device that gives very accurate position information.
- ❖ Position: as in Longitude/Latitude – 49<sup>th</sup> parallel etc.. Also altitude.
- ❖ Used correctly, GPS gets you within a few meters of any point in the world. In all weather, at all hours, every time!

## Your uses for a GPS

- ❖ **Mark ANYTHING that is hard to find**
  - ❖ Camp Sites
  - ❖ Trailheads
  - ❖ Emergency Facilities / Meeting Points
  - ❖ Find out how long your hike was
    - ❖ (trip computer)
  - ❖ Record the path of your hike
  - ❖ Estimate Time of Arrival
- ❖ Even if you've never been there, this will get you within meters!
- ❖ Have a Plan B (map).

## Other uses

- ❖ Direct emergency personnel
  - ❖ I came across a rolled tanker 57km N of Medicine Hat
  - ❖ Helicopter in fog story on Trimble website
- ❖ Anything needed for timing or location

Check speedometer calibration !

Trip Computer	
Horizontal	Vertical
Trip Odom	Stoppage Time
2506.7	36:21:27
Max Speed	Moving Time
124.4	20:09:14
Overall Avg	Total Time
44.4	56:30:41
Max Speed	Distance
889.0	2254.9

## Garmin eTrex (all GPS are similar)

- ❖ 12 channel parallel receiver
- ❖ Very Accurate (5-10 meters).
- ❖ Some 'base-map'.
  - ❖ and a Map Screen to see your track
- ❖ Basic Altimeter and Compass ability.
- ❖ Very Solid, Intuitive product.

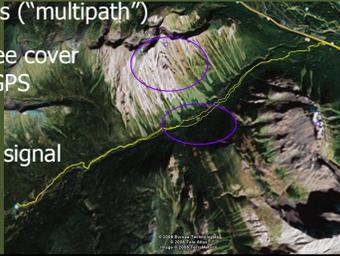


## Basics

- ❖ The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. There are no subscription fees or setup charges to use GPS.
- ❖ GPS satellites circle the earth twice a day in a very precise orbit and transmit signal information to earth. GPS receivers take this information and use triangulation to calculate your exact location.
- ❖ A GPS receiver must be locked on to the signal of at least three satellites to calculate a 2D position (latitude and longitude) and track movement. With four or more satellites in view, the receiver can also determine the altitude.

## Accuracy

- ❖ Your surroundings can degrade the accuracy
  - ❖ Tall buildings can reflect the signals getting to you & cause errors ("multipath")
  - ❖ Mountains and tree cover can block/weaken GPS
  - ❖ Tunnels, bridges, parkades etc. block signal



## Errors

- ❖ If any of these show up, you are NOT getting GPS data (yet).
  - ❖ Question mark on map position
  - ❖ No location on satellite page
  - ❖ No Speed or heading displayed

## Waypoint Introduction

- ❖ This is what we call the recorded position of a place or thing.
- ❖ You can record it if you are there or enter in from other sources (your buddy's favourite fishing hole).
- ❖ It consists of a symbol (dot is default), name, note, position, altitude and the choice to show it on internal map.

Waypoint	
■ <b>NAMAKA</b>	
06-OCT-03 16:12	
Location	
N	50.93156°
W	113.30820°
Elevation	Depth
965'	
<input checked="" type="checkbox"/> Show Name on Maps	
Delete	Map
Goto	OK

## Waypoint Entry

- ❖ To record a position, push and hold the 'Enter' key for 2 seconds.
- ❖ It shows the current position if GPS has a valid signal or last position if no lock.
- ❖ Keep the existing position or type in a position you got from another source.
  - ❖ Highlight the 'Location' field and press Enter to edit, also can edit Elevation field.
- ❖ Goto or show on Map

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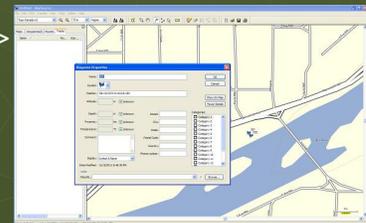
## Navigating Back to a Waypoint

- ❖ This is the whole reason for learning how to use a GPS.
- ❖ Here is where you use the GPS to guide you to your target destination.
- ❖ There are several ways it shows you where to go
  - ❖ View on a Map
  - ❖ View as a highway
  - ❖ View as a pointer



## How do you find coordinates?

- ▶ [www.trailpeak.com](http://www.trailpeak.com) [www.trails.com](http://www.trails.com) etc.
- ▶ Street & Trips / Delorme
- ▶ Google Earth
- ▶ MapSource ->



## Even the Hip use Coordinates

If I die of vanity, promise me, promise me,  
they bury me someplace I don't want to be,  
you'll dig me up and transport me, unceremoniously,  
away from the swollen city-breeze, garbage-bag trees,  
whispers of disease and the acts of enormity  
and lower me slowly, sadly and properly  
Get Ry Cooder to sing my eulogy,

At the hundredth meridian  
where the great plains begin.



A Tracklog is what we call a series of positional points that are stored as we move.  
Sailing in Desolation Sound

## Tracks II

- ❖ A tracklog is stored automatically (when enabled) by the GPS receiver.
- ❖ It can store based on distance, time or when the GPS sees a change in direction.
- ❖ It gives you a visual indication on the map of where you've been.
- ❖ The use of tracks can be handy for finding your way back out of a difficult area (so can reversing a route).
- ❖ The eTrex has a temporary tracklog and the ability to save the temp log into one of 10 named, semi-permanent locations.
- ❖ Track logs can be saved to and from a GPS into a PC.
- ❖ Tracks can be shared via e-mail and WWW sites

## How do you find tracks?

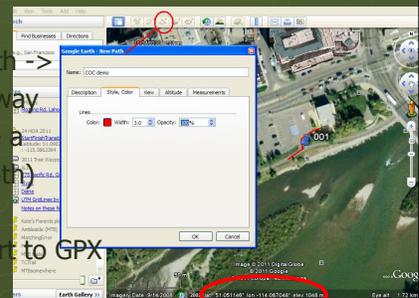
► [www.trailpeak.com](http://www.trailpeak.com) [www.trails.com](http://www.trails.com) etc.

► MapSource

► Google Earth ->

Now easiest way to make/save a track (Add Path)

Pitfall: Convert to GPX



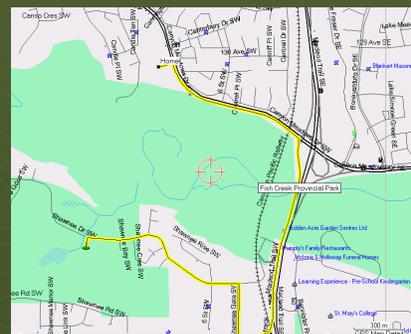
## Routes

- ❖ A Route is just a series of waypoints.
- ❖ It is used to define a particular path to take to access a point, typically the final waypoint in the route.
- ❖ You're here, you want to go to Point B and the arrow points to the Fraser. A route defines a series of waypoints to go past to get to your destination.
- ❖ As you navigate the route, the GPS automatically switches to the next waypoint in the route.
- ❖ SOME\* maps auto-route (down roads)
  - ❖ (sometimes you don't want them to)

## Routes II

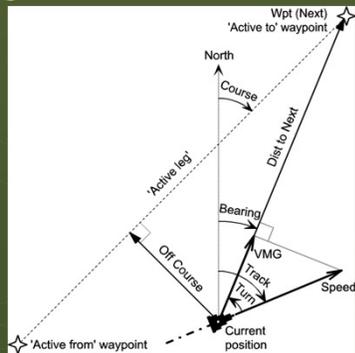
❖ Say I'm at home and want to go golfing.

❖ Here is what a Route looks like as a map.



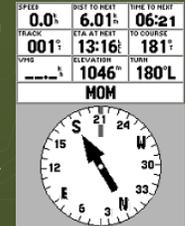
## Navigation Terms

- ❖ This shows True North, Magnetic North is ~20 degrees East



## Compass

- ❖ The eTrex compass:
- ❖ Calculates your heading based on your movements
  - ❖ Must be moving for this to be accurate
    - ❖ The faster the better
  - ❖ Any jumpiness can cause temporary errors
  - ❖ Some now have an e-Compass



## Coordinate Systems (Datum)

- ❖ This is the mathematical model of the shape of the earth (it's not perfectly round)
- ❖ HAVE to use the same as everyone else and what your maps are referenced to (e.g.: when getting co-ords from your buddy)
- ❖ What datum do your maps use ? \_\_\_\_\_

## Coordinate Formats

- ❖ These below are all the exact same place.
  - ❖ Degrees (and decimal degrees)
    - ❖ N 49.26841° W 123.02339°
  - ❖ Degrees Minutes (and decimal minutes)
    - ❖ N 49° 16.1046' W 123° 1.4034'
  - ❖ Degrees Minutes Seconds (and decimal seconds)
    - ❖ 49° 16' 6.276" W 123° 01' 24.204"
- ❖ There is no magic here, just like a clock, a degree has 60 minutes and each minute has 60 seconds.
  - ❖ You can convert back and forth just by multiplying and dividing by 60
  - ❖ i.e.: 16.1046' = 16 minutes and 6.276 seconds (0.1046\*60)

## Coordinate Formats II

- ❖ Any format can use most any Datum & vice versa !!
- ❖ UTM – Metric based (in meters North and meters East of the corner of the grid covering this particular area.)
  - ❖ "Northings and Eastings"
  - ❖ 10 U 498301 5457299 (same as previous page)
    - ❖ Grid = 10U, we're 498,301m East & 5,457,299m North of SW corner
  - ❖ UTM can be easy to 'eyeball' distances and angles
  - ❖ Many maps, especially topographics have a UTM grid
    - ❖ You can easily measure distances on them just by subtracting

## Coordinate Conversions

- ❖ [www.gpsvisualizer.com](http://www.gpsvisualizer.com)
- ❖ [www.maptown.com](http://www.maptown.com) (also converts LSDs)

## Geocaching & Other Functions

- ❖ <http://www.geocaching.com/>
- ❖ Search by PostCode: T2N 3E4 or: [N51 03.078 W114 05.205](https://www.geocaching.com/track/5103078)
- ❖ **Other Uses:**
  - ❖ The most accurate watch you'll ever have
  - ❖ Altitude (and altitude plotting)
  - ❖ Tide Tables, Sun and Moon Calculations
  - ❖ Trip Computer