GPS Clinic

NATRC National Convention

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What Will You Learn Today

- Why should you use GPS at a CTR?
- They help you:
  - Stay on Trail
    - Getting lost $%&#'s!
  - Determine how far you've gone
  - Determine how long you've been riding
  - Determine how fast you are going
  - Determine where you are

GPS Basics

- What do they do?
- What they don't do.
- How accurate are they?
- Now you can leave your map at home!
  - WRONG!
- Types of GPSs and GPS Apps

Why is Having a GPS Important?

- Being able to look at your GPS and say, "I'm on (or off) trail" gives you confidence.
  - Avoids lost time and stress.
- They can help to pace you and your horse.
  - Am I on time?
  - Do I need to slow down/speed up?
- People get distracted and lose track of where they are.
- People make wrong turns / get lost.
- Trail markings may not be adequate.
  - Not enough markings for riders new to ride.
  - Ribbons and signs disappear.
    - Animals eat them. Wind knocks them down. Other people take them.
- If you have to abandon the ride, A GPS may help you get back to camp or another rescue point.

A GPS: What Does It Do?

- Use satellites to triangulate your position
  - Using the position (distance and direction) and Doppler affects of multiple satellites
- Shows you where you are
- Tells you were to go
- May tell you where you've been
- Specifies your exact location when you call 9-1-1

Can They Track You?

- GPS signals are one-way. They can't be used to track you.
- With additional hardware, yes they can.
  - SPOT
    - Call for help from almost anywhere in the world.
    - Transmit where you've been, and maybe where you are.
    - Send texts.
  - Smartphone tracking software.
    - Update locations to websites.
    - Dependent on cell service.

How Accurate Are They?

- Professional units, with correction are accurate to the sub-millimeter
- Handhelds
  - WAAS are accurate to 10' *
  - Using Doppler only, about 50' *
  - Satellite imagery: You can see *that* tree or building

* This is under ideal conditions

Can I Leave My Map at Home?

- No! The following are from personal experience
  - GPSs fail
    - Batteries die, electronics fail and misbehave, solar flares mess with satellite signals
  - GPSs mislead
    - They track your movement precisely, but are a mile off
    - They are only as good as supporting data
  - GPSs lie
    - They say you are still at your last ride
    - They say you rode 160 miles today
  - Use your head

Types

- Basic Navigation ($100 or less)
  - Distance and speed only.
  - Not what I recommend for NATRC
- Wrist / Watch ($200 - $1000)
  - Battery life (?), tiny maps if supported.
- Mapping Handheld or Wrist GPSs
- Smartphones

Good For NATRC

- Mapping Handheld or Wrist GPSs ($150 - $1000)
  - Pros:
    - Very durable
      - Weather proof
      - Handle bouncing on horses, some drops.
    - Moderate to good battery life
      - Multiple days on a couple AA's
      - Easily replaceable batteries
    - Off-road navigation tools
    - Accurate compass
  - Cons:
    - Screens are often small and hard to read
    - An extra piece of expensive equipment
    - Maps (usually extra $'s)
    - Satellite imagery available but often requires an annual subscription

Good For NATRC

- Smartphones
  - Pros:
    - You likely already have one
    - Free or cheap software and maps
    - Sufficiently accurate, satellite imagery, navigation
    - Off-grid maps
    - Compass (trustworthy?)
    - Fairly easy to share GPX tracks
    - This can be an older, retired, phone without an active data plan.
  - Cons:
    - Durability, (weather, drop, …)
    - Battery Life (airplane mode helps)
  - Bring a spare battery pack.

Mapping GPS Features

- Time, distance, speed
- Location
  - Coordinates and map location
- Navigation
  - Compass
  - Map
  - Routes
  - Tracks (breadcrumbs)
  - Waypoints

Navigation

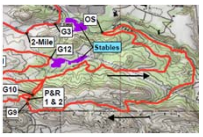
- Compass & bearing
  - Current calibration or movement.
  - Know how it works on your device.
- Waypoints / POI's
- Routes
  - Major POI's with an order
- Tracks
  - Waypoints every ~50'
  - Essentially a continuous line
- Waypoints, Routes, and Tracks can be used together

Waypoints

- In NATRC, these are usually timing points, or other points of interest.
- The GPS has no information about order, or even if order is relevant
- Knowing where a waypoint is, doesn't mean you can easily get there

Tracks (aka Breadcrumbs)

- These form continuous lines
  - Stray from the path, and you can easily move back
  - They define the path to follow between POI's
- Tracks don't define direction
  - i.e. they don't tell you to go east or west down the trail



Tracks (cont)

- Where am I?
  - Zoom out and look for patterns
  - Zoom in
- Which way do I go?

Tracks (cont)

- How do I get back on track?

- I've missed a turn. Where do I go?

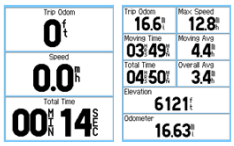
Using a GPS for a NATRC Ride

- Turn it on and warm it up (5 minutes).
  - Smartphone are always on so less of an issue.
- Timing out.
- Time, distance, speed.
- Location.
- Waypoints and proximity alerts.
- On the trail analysis.

- What to do when the mileage is off.
  - Mileage will rarely match the map.

Screens I Use 99% of Time

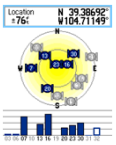
Trip Information



Map

Turn it on and warm it up

- Check the batteries
- A GPS may take 5 minutes to find itself if you are at a new location
  - Turn it on when you put it on your wrist/horse/…
  - Also, remember to turn it off when you get back into camp.
    - This applies to smartphone apps as well.



Timing out

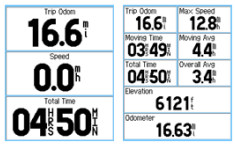
- Have the GPS ready to be reset before you get to the timer (if possible).
- When timer says "your out", finish reset/start process.
- Have a fallback timer.
  - Mark the minute on your watch if you can.
  - Knowing what time open timed out can help you guess when you timed out.

Timing out (cont.)

- People are using more devices and apps now.
  - For different devices and apps I have some more individualized instructions.

Time, Distance, Speed

- On a well marked trail, you will spend most of the time looking at
  - Total time
  - Speed
  - Distance
- Am I on time?
- How far is it to next timing point (check map)?
- Am I going to fast / to slow?



Location

- Where am I?
  - Zoom Out
  - Zoom In
- Which way do I turn?
- Do I turn here?
- Am I on the trail?
- I missed a turn! Where and how far back is the trail?

How to I Get Ride Tracks?

- Assuming someone has made tracks:
  - For handheld GPSs someone at the ride can load them. This requires someone with a laptop.
  - For smartphones, tracks probably need to be made available before the ride.
    - The method to load the tracks varies by the app.
      - MotionX (iPhone) allows Facebook shares or a pre-registered e-mail message.
      - US Topo Maps Pro (Android) works well with e-mailed tracks.

Smartphone App's

- There are many GPS apps available. Most aren't well suited for NATRC.
- What I want to see:
  - Ability to show
    - Total time on trail (setting zero at ride start should be easy).
    - Total distance ridden.
    - Current speed. The less this is a moving average, the better.
  - Ability to easily load GPX tracks and waypoints made by someone else.
  - Good base map(s).
  - Ability to pre-load maps for off-line use.
  - Pre-loaded track and rider track should be different colors.
  - Ability to re-center on current location.

iPhone App

- **MotionX** ($2)
  - Fairly easy to use.
  - Shows time, distance, speed.
  - Good maps.
    - I haven't figured out how to make the ride track and the current users track different colors.
  - Easy to share tracks.
    - Facebook, though there appears to be a size limit.
    - E-mail.
  - GPX tracks made using other GPSs can be e-mailed to MotionX and they will send you a link others can access via the MotionX app.
    - Once in MotionX, tracks can also be shared on Facebook.

Android App

- **US Topo Maps Pro** ($12, Free version insufficient)
  - Fairly easy to use.
  - Shows time, distance, speed (user can select what to display)
  - Many good base map options.
  - Ride track and the current users track colors can be defined by user.
  - Easy to share tracks.
    - E-mail.
    - Will load any (?) GPX track e-mailed to user from e-mail app.

Questions?

- …

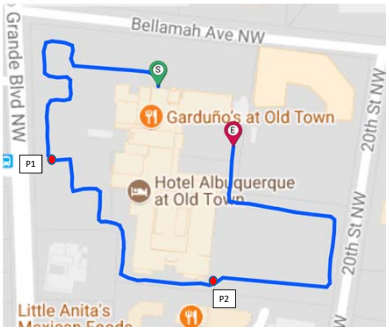
Let's Go For a Walk

- Let's get apps and tracks loaded.
- We are going to take a short walk with several waypoints and follow a track.

Contest

- 10 POI's are located in Old Town.
- Go find then and tell me what store or object of interest they are next to.
- Winner with most correct, or by drawing if tied, win two Riding Warehouse Raffle tickets.

The Trail

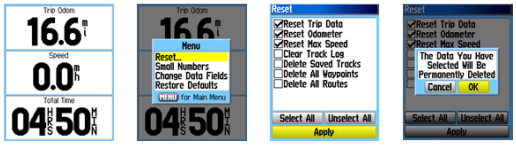


S – 0.00
P1 – 0.16
P2 – 0.30
E – 0.47

N

Practice Timing Out

Garmin etrex Legend/Vista (old)



Garmin etrex 20/30

Tasks on the Trail

- Go to the start point A
- Walk to the parking lot following the track
- Deliberately walk off track
  - See that you are off track
- Zoom out to get big picture
- Zoom in to get detail
- Follow trail and return to the meeting area