

Canberra Bushwalking Club – Navigation Refresher #7: GPSr and PC 26 October 2017

1 Revision

1 A waypoint is a known and identified position

2 A route is a series of jointed waypoints

3 A track is a sequence of track points, each point being at least a known and uniquely identified position. A track point can have many other properties, such as altitude, date/time recorded

4 A map's datum is a mathematical model of the earth's shape on which that map is based. The 2 datum you will see on commonly used 1:25000 topographic maps for bushwalking are:

1 AGD66 (Australian Geodetic Datum 1966) or AGD or AMG. Used on older edition maps

2 GDA94 ('Geocentric Datum of Australia') or GDA or MGA

Check the datum on the map you are using.

5 A third datum you should know is WGS84 (World Geodetic System 1984), used by the GPS - Global Positioning System. For bushwalking navigation, WGS = GDA

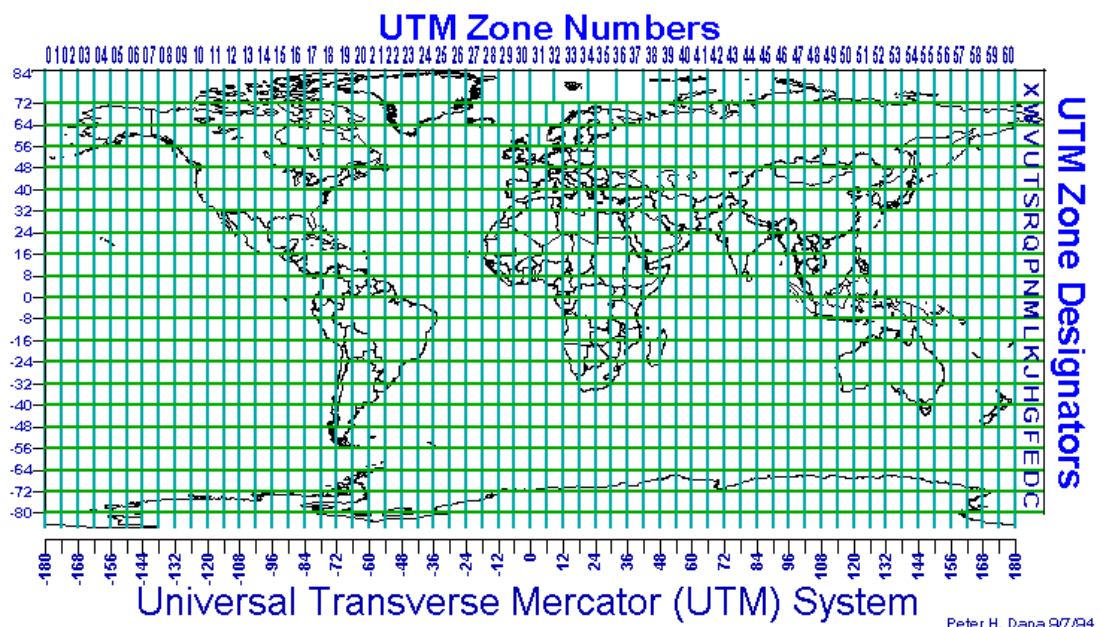
6 How are the coordinates of a location specified?

1 Lat/lon (Latitude/longitude). At least 3 different formats – ddd.ddddd°, ddd°mm.mmm', ddd°mm'ss.s''

Mount Tennent is at S35°33'5", E149°2'36" (GDA)

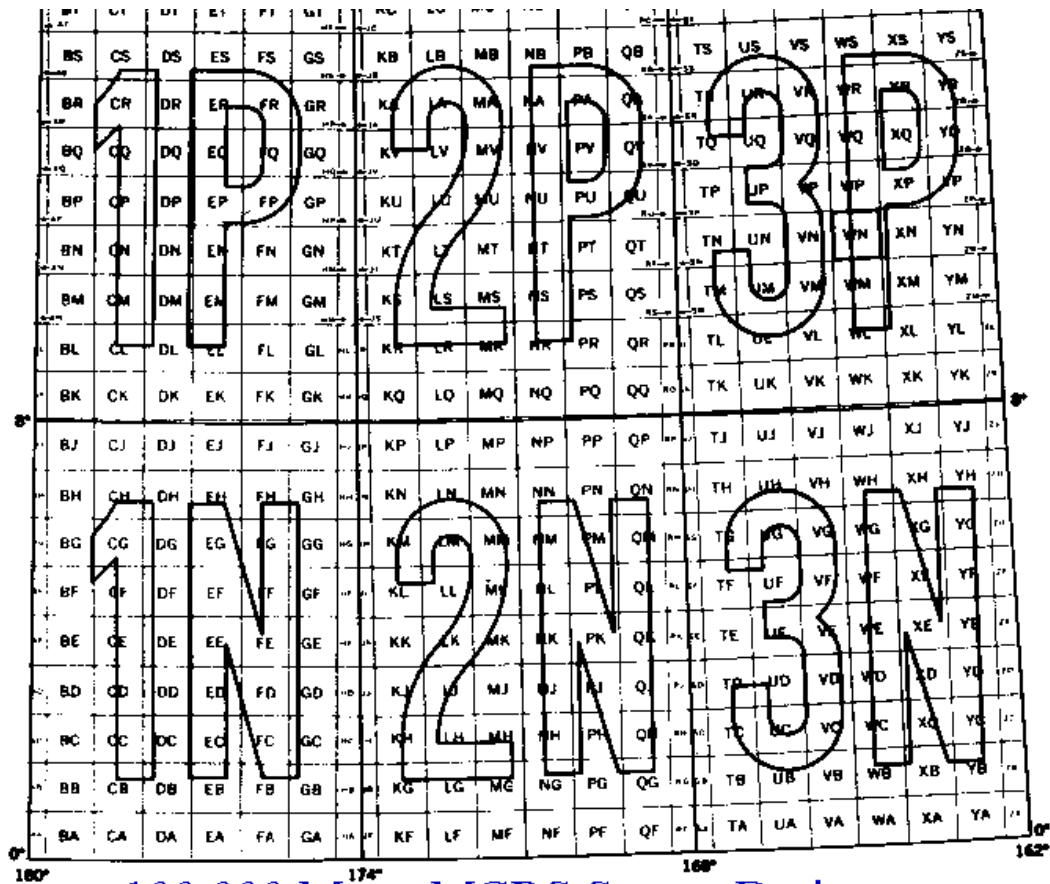
2 Rescue services use degrees and decimal minutes, ie. ddd°mm.mmm'. You may be able to customise your GPSr to show your location in this format, as well as your primary, preferred position format

3 UTM (Universal Transverse Mercator)



Mount Tennent is located at UTM 55H 68534E, 606405N (MGA)

4 MGRS (Military Grid Reference System) or GR



100,000 Meter MGRS Square Designators

Mount Tennent is located at UTM 55H FA 85346405 (MGA), or GR853641 (MGA94) on the Williamsdale 8726-4N map (giving 100m accuracy and with the nearest same GR being 100km away)

7 Ensure the datum on your map and GPSr are the same. The difference between AGD and GDA is ~200m. Ensure party members know the datum and position format you are using to navigate

8 GPSr setup – datum, position format (usually found under Setup, Position Format, Position Format and Map Datum in Garmin devices). Many other options. RTM! Eg. units, time, north reference, power saving options, ownership identification.

9 GPSr types – touch screen, button. The older eTrex H is no longer supported by Garmin

10 Batteries – high quality rechargeable eg. Panasonic eneloop pro 2500mAhNi-MH. A good quality charger which can refresh and analyse, not only just recharge. In extreme cold, use single use Lithium batteries (expensive).

2 PC and Digital Maps

- 1 Apps and maps. There are many ways to skin a cat – many app and map combinations:
 - OziExplorer, and TopoView 2006 or OZRaster or NATMAP products or State Mapping Authority Maps
 - BaseCamp and OZtopo
 - Google Earth
 - GPSVisualizer - <http://www.gpsvisualizer.com/>
 - Mobile phone apps such as Back Country Navigator (talk with Peter Conroy). An IOS version of BCN will be available Q218. See [here](#)
- 2 Planning a Walk – using OziExplorer, Topoview Raster 2006 and Oregon 650
 - 1 Maps: LPI Topoview Raster 2006. NSW topographic maps, mainly 2nd edition 1:25000, some 1st edition, some 1:50000 and 1:100000 out west. The product also has a seamless mosaic of all NSW, and non-current maps (eg. 1st edition 1:25000 maps around the ACT, handy for checking out old fire trails); SI 55-16 Canberra Special 1:250000. A map of the ACT; NATMAP Digital Maps 100K 2010. 1:100000 and 1:250000 maps of all of Australia; OZRaster maps of NSW, based on data from 2012, so more up-to-date than LPI Topoview Raster 2006. No mosaic; Scanned maps. Any map can be scanned and calibrated for use with OziExplorer; other State mapping authority products eg. Tasmania
 - 2 Set waypoints with descriptions and save them
 - 3 Draw the proposed track and save it
 - 4 Create a Route Card by - Summing the proposed track distances between waypoints (if the distance between waypoints was used, this is only a straight line distance; Record the magnetic bearing between waypoints; Check the track profile for ups and downs using GE; Check the going from map, non-current map, Google Earth, ortho photo.
 - 5 Download waypoints and/or route and/or planned track to GPSr and save them.

IMPORTANT – Understand what it all means.

3 Executing the Walk

- 1 Set a waypoint at the start so you can get back to your car! Reset the trip odometer. Leave GPSr running to record actual track
- 2 Set waypoints at significant features
- 3 Navigate using map and compass and route card. Use GPS for confirmation/emergency, or be lazy.

4 After the Walk

- 1 Upload actual track from GPSr and save. Tidy up the track (eg. spurious points may be created when the GPSr is turned on and when not moving)
- 2 Compare with planned track
- 3 Upload waypoints from GPSr and save. Tidy them up
- 4 View actual track profile in GE
- 5 Save gpx file for sharing.

3 BaseCamp and OzTopo

- 1 BaseCamp is a free product from Garmin which can manage waypoints, tracks, routes, etc.
- 2 It can interact with a range of digital maps, including those loaded onto a Garmin GPSr. I use OzTopo.

4 Google Earth

1 You can use Google Earth to create waypoints (Placemarks) and tracks (Paths) and export them in a .kml (or .kmz) file

2 Use GPSTabel from <https://www.gpsbabel.org/download.html> (free software to convert between various data formats) to convert to .gpx file.

5 GPSVisualizer

1 www.gpsvisualizer.com is a free online utility that displays geographic data on maps. Functionally, you could compare it to OziExplorer + digital maps.

2 Input can be stored geographic data such as gpx files containing waypoints and tracks, or data created directly onto accessed maps. Output can be in a variety of forms, usefully a .gpx file.

3 Try planning a walk:

1 Access www.gpsvisualizer.com

2 Activate the drawing function [Sandbox \(drawing\)](#)

3 Centre the default map at a known location (eg. type Canberra in Center the map on a location); Go

4 The default map is Google hybrid. Pan and zoom as required. Select a different map if required. Often Open Street Maps (OSM) and OpenCycleMaps will have additional tracks contributed by local community members. au: Topo Maps 250k may be useful

5 Use the Drawing tools to plan a walk by creating waypoints and tracks

6 Save the data in a desired format (gpx, kml or txt). This generates a download link to activate.

7 Use the downloaded data. Eg. view a kml file in Google Earth; load a gpx file into a GPSr.

4 Input a recorded walk to analyse:

1 Although a simple map output of recorded data can be quickly generated via the Get started now! Box, more flexibility can be gained from ... Access www.gpsvisualizer.com

2 Activate the drawing function [Sandbox \(drawing\)](#)

3 Activate [Import a GPS file](#) in the Drawing tools: box, Browse ... to a file and open it, activate IMPORT

4 This makes the pan, zoom and map selection features available

5 NB. If you don't easily see your waypoints, change the symbol.

5 That's just a start. Thanks to Peter Conroy for introducing me to GPSVisualizer, 22 May 2017

6 Navigation using mobile phone

1 [BackCountry Navigator](#) is a popular, free app. Currently only available for Android devices. A new [Backcountry Navigator XE](#) app for Android and IOS devices will be available ~ May 2018. Not free.

2 Talk to Peter Conroy if interested.

7 Other things

1 Build a history of places (ACT Oracle)

2 Johnny Boy's Walkabout Blog at <http://www.johnevans.id.au>

John Evans

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