



BUSH SEARCH AND RESCUE VICTORIA

Training notes for the Garmin eTrex Vista HCx GPS

BSAR members are strongly encouraged to develop their skills in the use of hand held GPS. The GPS is an essential tool on search operations. Loan units are available; contact the BSAR Convener.

These training notes cover:

Background to Global Positioning System (GPS) operation and mapping:

- How GPS works
- Number of satellites for a fix
- Appropriate selection of position format and map datums.

Understanding the Garmin eTrex Vista HCx GPS:

- the physical unit
- pre-loaded maps
- battery life
- system accuracy
- limitations

Using the Garmin eTrex Vista HCx to:

- turn the HCx on/off
- navigating the menu
- setup to default BSAR settings
- change batteries
- locate your current position
- change map datum
- enter, name and remove waypoints
- navigate to a nominated location
- relate the GPS to paper maps
- complete checks prior to going into the field.

References

Garmin eTrex Vista HCx Owner's Manual – downloadable from www.garmin.com

Background to GPS Operation and Mapping

How GPS works

The Global Positioning System (GPS) was originally developed by the US Department of Defence. It is now widely used by both the military and civilian sectors throughout the world. GPS relies on a constellation of 24 satellites in orbit to broadcast timed signals to earth where they are picked up by users with a GPS unit. Signals from at least three appropriately spaced satellites are required by the unit to calculate its position using triangulation.

Map Datums

A map datum is a set of reference points on the earth's surface against which position measurements are made. A number of map datums are used in different parts of the world, and the datum used also depends on when the map was produced. This is generally the main source of human error when using a GPS and it is critical that you match the datum on the GPS with that of the map being used.

GDA94 (Geodetic Datum Australia) is now the current standard datum for Australian mapping. It replaces the Australian Geodetic Datums AGD66 and AGD84 which were generally used on printed maps prior to the year 2000. On the HCx units GDA94 appears on the menu as GDA and is equivalent.

On searches either GDA94 or AGD66 datums may be used, depending on the printed maps available at the time. A GDA94 grid reference for a location will be approximately 200m NNE of the AGD66 grid reference.

For most practical purposes AGD66 and AGD84 are equivalent. WGS84 and GDA94 are similarly equivalent, varying within a meter of each other and changing slowly over time. WGS84 is the base datum used in modern GPS units.

If in doubt as to the correct datum to use, default to GDA on GPS units. Important locations on a search should also include the datum in use when giving a grid reference for the location.

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Position Formats

The position format defines the way to write down the position which the GPS has calculated.

The UTM UPS format is the standard format used on Australian maps and on BSAR searches. It appears on the GPS unit in the same format as this example:

55 H 0328315
UTM 5818948

To obtain a 6 figure grid reference as typically used with paper maps, simply use the three digits in the middle. In the above example the 6 figure grid reference is 283 189. This specifies the 100m square in which the location lies.

Only references to important locations on a search should include the datum and the full grid reference for the location. For less important locations the abbreviated 6 figure grid reference is always used, with a description of the location. This makes for much simpler conversations and radio messages.

Examples:

“BSAR 6 has found a footprint at 55 H 0328315 5818948”.

“BSAR 1 has stopped for lunch at the creek junction a 786 361”.

Other position formats that can be used include:

- hddd.ddddd = decimal degrees
- hddd mm.mmm' = degrees and decimal minutes (most commonly used)
- hddd mm'ss.s" = Latitude / longitude in degrees, minutes, seconds

Use the UTM/UPS format unless specifically requested otherwise. From time to time other agencies may use the decimal or latitude /longitude formats. It is straightforward to tell which format is being used and in this case the GPS can be switched to the appropriate format to enter the data then switched back to UTM/UPS.

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Garmin eTrex Vista HCx handheld GPS unit

Key Functions

IN/OUT Zoom keys

From the Map page, press to zoom the map in or out.

From any other page, press to scroll up or down a list or move a highlighted slider.

MENU/FIND key

Press and release to view the Options Menu for a page.

Press and hold to display the Find Menu.



ENTER/ROCKER key

Rock up or down or right or left to move through lists; highlight fields, on-screen buttons, or icons; enter data; or move the map panning arrow.

Press in and release to enter highlighted options and data or confirm on-screen messages.

Press in and hold at any time to MARK your current location as a waypoint.

QUIT/PAGE key

Press to cycle through the main pages.

Press and hold to turn the compass on or off (Vista HCx and Summit HC only).

POWER key

Press and hold to turn on or off.

Press and release for backlighting or to view time, date, and battery capacity.

Loaded Maps

The maps loaded in the HCx show roads and topographic data including 10m contours for the whole of Australia. As you zoom in or out more or less map detail will be displayed. Be aware that some data will only be displayed when you zoom in to an appropriate level.

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HCx Position Accuracy

The typical position accuracy is less than +/-10m for 95% of the time. In search conditions with limited visible sky the accuracy can often be of the order of +/-50m. The position accuracy is shown on the Satellite Acquisition screen.

HCx Batteries

Battery Life

The nominal battery life on the HCx is up to 25 hours. Note that if Nickel Metal Hydride (NiMH) AA cells are used instead of Alkaline AA cells the HCx setting for batteries must be changed accordingly so that battery life can be correctly displayed. Obviously, the more you have the backlight on the quicker the batteries will be spent.

Battery Check

Press the PAGE button until the MENU screen appears. At the top of the MENU page is a battery icon. Alternatively press and release the POWER key to display the battery capacity and the current date and time.

Care when Changing Batteries

When changing batteries, ensure the 2GB Micro SD memory card, which resides in the top left of the battery compartment, remains fully inserted as it is spring-loaded and can easily be released accidentally. The memory card contains the topographic and road map data.

Spare batteries

On a search, always start the day with fresh batteries, turn on the GPS and check the battery status. Always carry spares.

Take Care of your GPS

The GPS units used by BSAR must be looked after in the field. They are **water resistant** but not water proof. A **carry pouch** is provided to provide physical protection. Attach the GPS using the supplied lanyard so you will not lose it.

Keep the GPS unit on at all times while you are searching and on the move. Leaving the unit on improves accuracy in obtaining a Grid Reference and provides a log of your travels. To conserve batteries, turn off the unit while at search base or when stopped overnight. Remember to turn it on again when you move on.

Carry the GPS high – your body will block the satellite signal if the GPS is carried below the waist. Attach the GPS carry case to your pack's shoulder strap or place the GPS in the top pocket of your pack.

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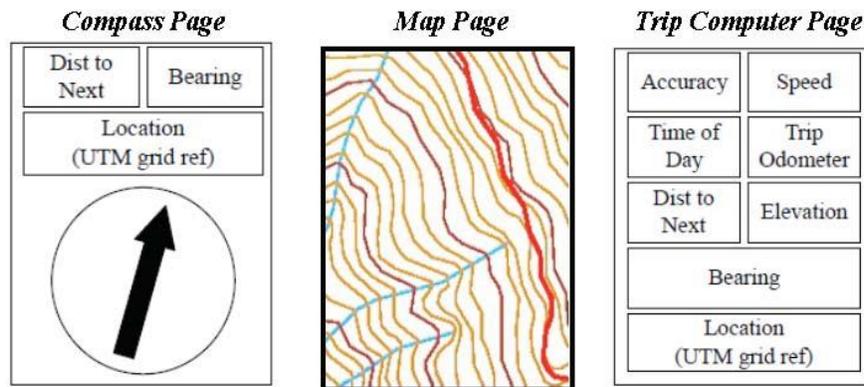
HCx Screens for use by BSAR

The recommended page/screen sequence for the HCx is:

- ◆ *Map*
- ◆ *Compass*
- ◆ *Main Menu*
- ◆ *Satellite*
- ◆ *Trip Computer*
- ◆ *Find*

All other pages are not displayed. Pressing the **PAGE/QUIT** button scrolls to the next page in a continuous loop.

The main pages that will be used by BSAR in the field are:



Start of Day HCx Tasks during a Search

- ◆ **Turn the unit on and check the batteries**
- ◆ **Check Position format and the map datum** located in the *MAIN MENU* then *SETUP* then *UNITS*.
- ◆ **Obtain a Satellite Fix** – Ensure the sky overhead is relatively clear of obstacles. Wait till the GPS receives signals from 4 satellites. If the GPS has not been switched on for some time this could be a considerable period, up to tens of minutes depending on the location. Note the position accuracy value on the Satellite Page.
- ◆ **Confirm your current Location** – press and hold the ENTER key for 2 seconds to obtain your current Grid Reference. Ensure it matches your expected current location and that of other GPS units at your location.
- ◆ **Electronic Compass Calibration**
Calibrate the electronic compass at least daily. On the *COMPASS* page press *MENU/FIND*, follow the prompts.
- ◆ **Pre Loaded Waypoints and Tracks**
Tracks, routes and waypoints may have been specifically pre-loaded for the search. Tracks will often be downloaded off the GPS at the end of the day for record purposes. Do not delete tracks, waypoints and routes unless specifically instructed.

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Clearing Track Logs and Waypoints

Only clear track logs or waypoints when specifically instructed to do so.

For *Tracks* select **MENU PAGE • TRACKS • CLEAR**.

For *Waypoints* select **MENU PAGE • WAYPOINTS • DELETE ALL**.

To clear *Trip Computer* log access the **TRIP COMPUTER PAGE** then press **MENU/FIND • RESET** and follow the prompts (Tracks and Waypoints can also be cleared via this function)

To obtain your current grid reference

Page to the SATELLITE Screen and read the location or hold in the ENTER button for 2 seconds. A grid reference, as part of marking a waypoint, will appear on this page. It should appear in the same format as this example:

55 H 0328315
UTM 5818948

Waypoints

To store your location as a waypoint

Press and hold the ENTER key for 2 seconds. This takes you directly to the **MARK WAYPOINT** page. The screen shows you at your current location. Note or edit the waypoint number/name as required. Press the ENTER key to store this location.

Make a waypoint for another location

Press and hold the ENTER key for 2 seconds. This takes you directly to the **MARK WAYPOINT** page. The screen shows you at your current location.

Press the rocker key to move the cursor over the grid reference. Press the ENTER key to edit the current grid reference. A pop-up keypad is displayed. Use the rocker key to move over the numerals. Press ENTER over the < or > arrows on the keypad to move between each character of the grid reference. Press an alternate number over the numeric buttons to change each character.

When you have set the new waypoint details, press OK to return to the **MARK WAYPOINT** page. Take note of or edit the Waypoint Name that appears towards the top of the screen. Press OK to store the new waypoint.

Note: you cannot enter a 6 figure grid reference directly. It must be converted to a 14 digit grid reference.

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To navigate to a waypoint

Go to the **FIND MENU**. Select **WAYPOINTS** then press the rocker keys to move over the selected waypoint of interest. Press **ENTER** to select the waypoint then press the **GOTO** button on the displayed waypoint.

The GPS will then display your route. On the Compass or Trip Computer pages, the Dist To Next display advises the straight line distance to the waypoint. The Bearing display will indicate the compass direction (magnetic) to the waypoint. A separate compass is a more reliable guide to the correct direction than the built in compass. Periodically refer to the bearing display to confirm that you are still on target to the waypoint.

Create and follow a route

Go to **MAIN MENU • ROUTES**. Use the rocker and **ENTER** keys to create a route composed of one or more waypoints. To follow a route, press the Navigate button for that route.

Other hints

If you are in a screen you don't want to be in, simply press the **PAGE** key until you return to the top-level menu. The **PAGE** key acts like the Esc key on a standard PC keyboard.

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HCx Default Configuration

The default configuration for the BSAR HCx GPS is detailed below. Normally HCxs will be set to these settings and will not require adjustment.

<p>System (via Setup menu)</p> <ul style="list-style-type: none"> ◆ GPS – Normal ◆ WAAS – Disabled ◆ Battery Type – Alkaline 	<p>Units (via Setup menu)</p> <ul style="list-style-type: none"> ◆ Position format – UTM/UPS ◆ Map Datum –GDA or Aus Geod '66 ◆ Distance/Speed – Metric
<p>Heading (via Setup menu)</p> <ul style="list-style-type: none"> ◆ Display – Degrees ◆ North Reference – Magnetic ◆ Switch to compass heading below – 2km ◆ For more than – 30sec 	<p>Map (via Setup menu)</p> <ul style="list-style-type: none"> ◆ Orientation – Track up below 200km ◆ Auto zoom – On ◆ Detail – More ◆ Lock on road -Off
<p>Display (via Setup menu)</p> <ul style="list-style-type: none"> ◆ Display – Auto ◆ Backlight Timeout – 30 seconds ◆ Backlight Level – 50% 	<p>Time (via Setup menu)</p> <ul style="list-style-type: none"> ◆ Time Format – 24 hour ◆ Time Zone – Sydney ◆ Daylight saving – Auto
<p>Tracks (via Main menu)</p> <ul style="list-style-type: none"> ◆ Track Log – On ◆ Wrap when full – On ◆ Record Method – Auto ◆ Interval – Normal ◆ Colour -pink 	<p>Routing (via Setup menu)</p> <ul style="list-style-type: none"> ◆ Guidance Method – Off Road
<p>Page Sequence (via Setup menu)</p> <ul style="list-style-type: none"> ◆ Map ◆ Compass ◆ Main Menu ◆ Satellite ◆ Trip Computer ◆ Find 	

To check or change the GPS configuration select **MENU • SETUP** and then choose the particular item you require.

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