

# Handheld GPS Buyer's Guide:

What you need to know when purchasing a GPS for field work

Global Positioning Systems (GPS) is a satellite-based system developed by the United States Department of Defense, and now offers a common way to collect location data for agricultural, urban, and natural resource science applications. It is currently made up of a constellation of 31 "healthy" satellites used for civilian GPS, which accurately determine location (X,Y,Z) in almost any weather, day or night, anywhere on Earth.

There are several choices of GPS "receiver" units, all of which differ in features and capability. Overall, GPS units are separated into three categories: recreation-grade, mapping-grade, and survey-grade. This guide focuses on recreational and basic mapping grade units only (with horizontal accuracies of approximately 1-30m).

There are several things to consider when buying a GPS unit for your fieldwork or research:

## Waypoint capacity

*How many "waypoints", or GPS points, will the unit need to hold for the duration of the field visit?*

Many Garmin units hold 1,000 waypoints, but some older models hold only 500. For most fieldwork, it is recommended to buy a unit with at least 1,000 waypoints.

## Built-in electronic compass

*Do you need an electronic compass?*

If you require that direction (N, S, E or W) be known in the field, either for *real-time navigation* or *including with your data to use later in your research*, you will need an electronic compass. Note that in order to determine direction, you need to be moving. While standing still a GPS receiver cannot determine which direction you are facing, as it needs to record and process multiple point locations to determine direction.

## Memory

*What will you be putting on your GPS unit in the future?*

Many GPS units now have a lot of internal memory (up to 128MB), but many also now allow for additional memory using removable microSD data cards, of up to 8GB or more. If you plan to buy maps (Garmin does not currently allow a user to upload their own maps), it is a good idea to buy a unit with expandable memory. All Garmin units with an "x" in their model name feature expandable memory, but unfortunately also feature a much higher price tag.

## Receiver

*New receivers offers better satellite reception, but may cost more.*

Although there are many manufacturers of GPS receivers, they almost all use the same receiver "chipset", which handles the processing of the satellite signal itself. Some newer GPS models offer the SiRF chip, a high-sensitivity GPS receiver, which offers (1)

2) faster GPS location, (2) higher GPS signal stability (it will hold GPS signal better and at stronger signals), and better reception of more satellites under adverse conditions (e.g., heavy weather, dense canopy, partial indoors). There are an increasing number of chip manufacturers that are competing with SiRF chips now, including u-Blox and MediaTek (MTK).

## WAAS capability

*Pay the extra price for better GPS accuracy.*

WAAS (Wide Area Augmentation System) is navigation aid system that improves GPS accuracy and availability. Originally designed with air navigation in mind, WAAS signals are broadcast by geostationary satellites (they remain at the same point over the Earth at all times), and require a clear view of the horizon at higher altitudes. Most GPS units today are WAAS enabled, and it is recommended that you buy a GPS unit with WAAS capability, to account for possible future projects or research. WAAS can potentially improve horizontal accuracy from 5-30m to 1-5m.

## Price

*Ask yourself the following question...*

How much money do you have to spend on a GPS unit? Or how much are you willing to pay?

How much will you be using the GPS unit in the future? If you can afford it, then it is recommended that you pay a little more for the features that you need. Most new handhelds on the market today contain the SiRF chipset, making them more expensive than the older models, which can sometimes be found cheaply while supplies last. In addition, units sold through a retailer or an online auction tend to be more affordable than directly through Garmin, Magellan, Lowrance or another receiver manufacturer.

## Garmin GPS units

GPS units made by Garmin International, Inc. (<http://www.garmin.com/>) are very popular for both research, recreational, and commercial work. In addition, Garmin units tend to integrate well with various GIS software.

Compare Garmin units, with side-by-side feature comparisons at

<http://www.garmin.com/outdoor/compare.jsp>.

Compare Garmin eTrex family units, with side-by-side feature comparison at

<http://www.garmin.com/products/etrexVistac/>.

Learn about Geocaching with Garmin: <http://www.garmin.com/specs/geocaching.pdf>

GPS for Beginners Manual: [http://www.garmin.com/manuals/GPSGuideforBeginners\\_Manual.pdf](http://www.garmin.com/manuals/GPSGuideforBeginners_Manual.pdf)

## Popular Garmin models include:

### Garmin eTrex family



### New Garmin eTrex "H" series



### GPSMAP 60



### GPSMAP 76



*Guide to Garmin model names:*

H – High Sensitivity chipset

C – Color display

S – Electronic compass and barometric altimeter

x – Expandable memory via MicroSD Card

## Other GPS Companies

- Magellan (<http://www.magellangps.com/>) is another maker of handheld GPS units.
  - Magellan Product Finder: <http://www.magellangps.com/ProductFinder/>
- Trimble (<http://www.trimble.com/>) manufactures high-precision mapping-grade and survey-grade GPS equipment. These units can give sub-meter accuracy, but the price is substantially more than handheld GPS units.

## Where to buy

REI: <http://www.rei.com>

Sailnet: <http://www.sailnet.com/>

West Marine: <http://www.westmarine.com/>

Buy.com: <http://www.buy.com/>

Amazon: <http://www.amazon.com/>

Ebay: <http://www.ebay.com/>

Compare prices of GPS units at: <http://froogle.google.com/>