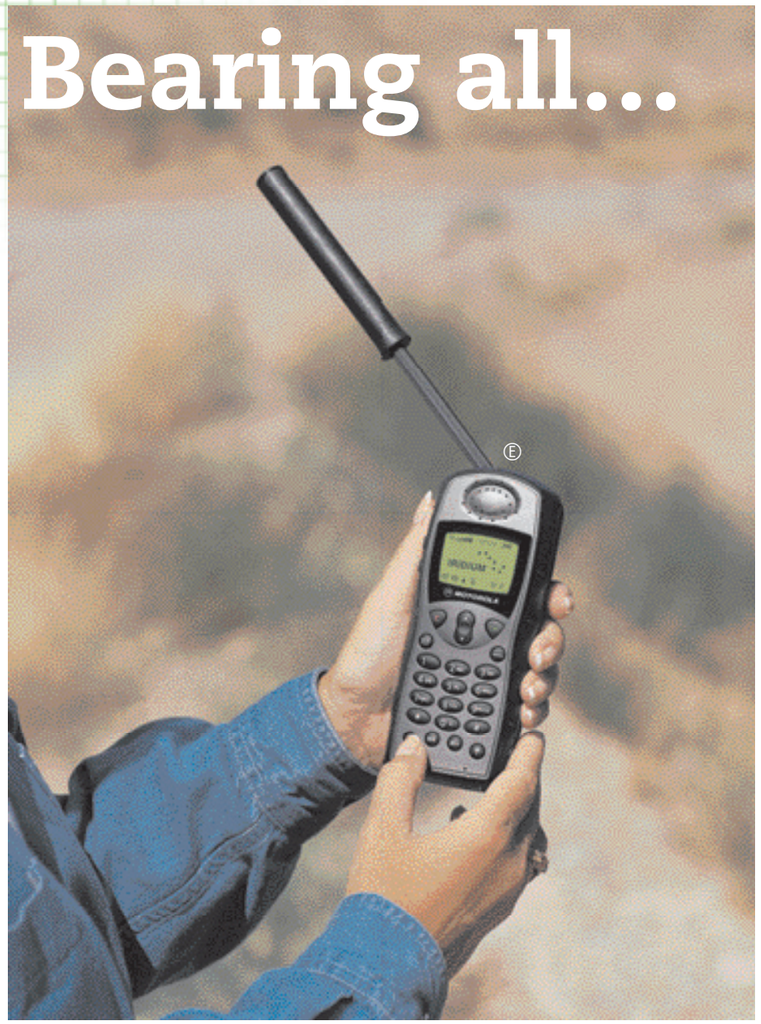
Bearing all...



Since the dawn of time, the compass has been the mainstay of the mountaineer's navigational system – then along came GPS. Nowadays there's a whole host of electronic gadgets available that check where you are, what the weather's doing, how you're feeling, and then tell all your friends. But which of these gizmos do we really need? **Bruce Goodlad** waves his sonic screwdriver at a good selection to find out...

Bruce Goodlad is an IFMGA mountain guide living and working in the Alps, you can find him at mountainadventurecompany.com

Electronic navigation aids range from wristwatch compass/altimeters to hand-held global positioning systems (GPS) whilst communication systems include mobile phones and satellite broadband. If travelling to remote areas then a satellite phone is invaluable for keeping in touch with the outside world, and also enables a cry for help to be made (should you need it!). If you're on a big trip then web access is fairly standard these days with systems more compact than ever and associated costs lower.

Navigation tools – before you start

If you are new to the hills and/or are just planning a weekend walking in the Lake District then buy a good quality compass and learn how to use it. Don't waist your money on a GPS; invest in a navigation course instead!

Failing that, don't leave it till you're lost in a whiteout to take out your map and compass for the first time! You must be able to read the map, interpret contours, measure distance on the ground, and understand grid references and bearings before you set foot on the hill. If you can't do all of these then you cannot consider yourself a competent navigator and need to go back and learn the skills. If you move straight on to using a GPS without a good understanding of basic navigational skills you could be heading for disaster.

Compass

A good quality compass is essential! In my opinion the Ⓐ **Silva** *Expedition 4* (£25) is the best on the market. It has a large base plate, so is easy to operate with gloves on, and makes distance measuring and accurate bearing taking simpler. With a roamer scale at 1:25,000 and 1:50,000, it is also easier to take accurate grid references.

Altimeters

An altimeter measures altitude using air pressure. Wrist-mounted watch versions are the most practical for climbers, providing time, date, alarms and all sorts of things that I can never remember how to use!

In order to gain an accurate altitude reading, remember to set the altitude at a known height. This may be a spot height on the map, a summit or a hut. You must also remember that as the unit works on air pressure, a weather change may affect your altitude reading. This happened to me when skiing on the Piz Bernina, down toward the Marco Rosa hut; we skied 100m past the hut in a white-out because the air pressure had changed so dramatically. Once in a hut, camp or bivi you can check if the weather is going to change by using the barometer or altitude functions. Increase in pressure (decrease in altitude) means the weather is getting better. Decrease in pressure (increase in altitude) means the weather is getting worse.

There are a few brands producing altimeter watches these days, but the most readily available ones are from **Suunto** and **Polar**.

Ⓑ Suunto Vector £140

The *Vector* is one of Suunto's entry-level units. It has an altimeter, watch, barometer and an electronic compass. It also has three alarms, and can measure ascent and descent rates, as well as recording daily ups and downs in the log function. I found the *Vector* easy to set up and use, with the screens in a logical order that are simple to navigate through. It also tells you how warm your wrist is... which is particularly useful! You can change the battery yourself which is much easier than sending it off or trying to find a dealer, and can get an elastic wrist strap which will expand to fit over all your clothing, which is great in the winter.

The Suunto *Altimax* (£120) has all the same functions as the *Vector,* but without the compass.

Ⓒ Polar AXN 300 £135

Polar are fairly new to the altimeter market, their main business being wrist heart-rate monitors. The *AXN 300* is their most basic model that can do pretty much everything you would want, but if you're after more advanced technology there are another two models in the series.

The *300* has all the functions of the *Vector,* plus incorporates a heart rate monitor. It is a bit more complicated to use than the Suunto, but that is mainly due to an increased number of features. The unit comes complete with a chest band for the HRM, which is easy to use and a great help with training (I would recommend *Heart Rate Monitor Training for the Compleat Idiot* by John L Parker, available on Amazon). The altimeter is easy to adjust on the hill and you can change the battery yourself. My only criticism is the weight and bulk of the unit.

GPS – Global Positioning System

GPS comprises a series of satellites (24) originally put into orbit for military purposes that allow us to position ourselves any where on the globe with fantastic accuracy. When the first portable GPS units came on the market there was a random error built into the signal so that only the military could use the system with pinpoint accuracy. This has since been removed, so non-military hand-held units now give superb levels of accuracy.

Before we move on to looking at individual units I think it is worth looking at different ways in which we can use GPS. At the most basic level you turn the unit on, ask it for a position and it will give a position fix using whatever coordinate system the unit is set to. This can be used to check your map and compass navigation, which involves setting the Map Datum and the Coordinate System. It is worth learning how to change this setting early on in your GPS career, especially if you are planning to use it in different countries. An example would be working between Swiss and French maps, where the Swiss use Ch-1903 and the Swiss Grid for their maps and the French use WGS 84 and UTM/UPS.

You also have the option of in-putting a series of waypoints into the unit before leaving home, which can then be used to navigate the line of your route. This can be done manually, but be careful, most errors occur when measuring the grid references from the map. An alternative system is to use digital map software, such as Memory Map, enabling you to digitise your route and down load it straight to your GPS. There are a number of these available for most European countries, and they offer the most accurate way of plotting your route.

A third method for using your GPS, if travelling out and back along the same route, is to plot waypoints as you travel out. This gives the advantage of being able to plot your route around any natural obstacles that you may encounter along the way, such as crevasses. Consequently you know the exact route for the return journey, providing a quick escape if trying to navigate in poor weather. Most units have a track-back facility that does this automatically. The problem with this system is that if the unit has an interruption in the signal it will just draw a line between the last recorded point and the next, potentially leading you into trouble. The message I am driving at is make sure you are really familiar with your unit in good visibility, before you take it into the middle of the Bernese Oberland in bad weather!

There are lots of GPS Units on the market, most of which to my mind are too complicated for mountain use. Base maps are great when you are in a car and trying to find your Auntie's house, but don't have enough detail or information for mountain use. I want a unit to be simple and intuitive so when I haven't used it for months I can turn it on and still remember what to do. Looking at a unit's functionality is key, as is having an electronic compass. Most people don't realise that without one your direction of travel arrow will only keep pointing in the correct direction if the unit is moving at approximately 3km/h. If your unit has an electronic compass, the arrow will point in the correct direction all the time, even at slow speeds

when breaking trail, though it does use more battery power.

Garmin and **Magellan** are the two main manufacturers of GPS. Their latest models all include a new land-based system for increased accuracy. In Europe the European Geostationary Overlay System (EGNOS), and in the US the Wide Area Augmentation System (WAAS), use a series of ground stations to provide GPS correction data from the known position of these base stations. This typically gives accuracy of 3m or less.

I have highlighted a couple of units that I felt fit the bill.

Garmin Geko 301

The *Geko* range are the smallest non-wrist mounted GPS units I have tried. The *301* has all the features you would want in the mountains, and an electronic compass that keeps you travelling in the right direction, no matter what your speed is. It has storage for 500 waypoints, with the possibility of 20 saved routes. The unit also has all the usual track back facility. The main advantage of the *Geko* for me is its size and weight – 96g with the batteries, so it can just live in the bottom of your sack. The two AAA batteries don't last as long as some of the bulkier units but for such a small, light unit it's great. The only thing Garmin could do with working on is that the data cable is still only available with a serial plug, as opposed to most other models that have a USB connector.

Garmin Etrex Vista HCx £270

The new *Etrex Vista HCx* is the most advanced hand-held GPS I have tried. I was pretty sceptical about all its features, as I'm a bit of a 'keep it simple' kind of guy, but was really impressed by the functionality of the *Vista.* The screens are really easy to navigate through with the aid of a small joystick and side buttons, and the unit has all the features you would need, plus an electronic compass and altimeter. The lock-on to satellites was really fast, and it even worked through the office window. It might be because I have used Garmin GPS a lot in the past but I found the whole unit really intuitive, even the base map screens which I was new to. The *Vista HCx* has a base map relevant to the area the unit was bought, but others can be added, as can topographical maps and charts from Blue Map. The big difference between the *HCx* and other handheld units with a base map is that this one can give you driving instructions, albeit in text format. Marking and inputting waypoints was really easy, and again my only gripe is that for £270 you don't get the USB cable. You have to buy it extra, which is a bit tight! The big question is would I buy one? To be honest, in the mountains a base map isn't that much use, so I would spend my money on the simpler *Etrex Summit* which you can pick up for about £140, or the slightly more advanced *Summit HC* for £225.

Ⓓ

Ⓕ

Ⓓ Magellan Explorist 600

This most advanced model in the *Explorist* range has a digital compass and can store as many waypoints as you could ever want, though Magellan call them 'Points of Interest'. The unit has a base map, so make sure you buy the map for your area. The unit is easy to navigate around using a small joystick, and the screens all appear in a logical order. A card can be inserted with more detailed maps and the unit interfaces with all the standard mapping programs. A USB cable comes standard with the unit, as does a rechargeable battery that lasts between 7½ and 14hrs, depending on which features and lighting you have switched on. You can swap this for 3 AAA batteries that fit into a supplied case. The *Explorist 600* has a really robust feel to it but felt quite a lot heavier than others I have used.

Communications

Communications in the mountains can mean anything from updated weather reports, calls for help or simply saving people worry if you're late back. In large parts of the world you can now get standard cell phone coverage. Most phones won't survive a soaking so it's worth getting some protection. **Ortlieb** have a great range of products and the *Watatait* range from **Haglofs** is also great.

If travelling further a field you may want to consider satellite communication. There are a number of different options: Ⓔ **Iridium** is still the only network that offers genuinely global coverage. I've phoned my Mum from the top of the Vinson Massif, and mates have phoned theirs from the top of Everest, so it does work! The phones are not that cheap though. The **Motorola** *9505A* is the smallest and most user-friendly model but costs about $1500 for a handset, though you can probably get a better deal on the web. Once you get a phone there is an activation fee of $25 then a contract of about $40 per month, though you can buy pre-paid minutes with no contract. Calls are about $1.50 per minute, which is about the same as roaming with a cell phone.

An alternative system is Ⓕ **Thuraya**. This does not have the coverage of Iridium but it has a better call quality, and the phones are much smaller. The *SG 2520* ($1400) is the smallest satellite phone available and has a Tri-Band GSM option. It also has high speed GPRS for Internet on the move. Similar contracts are available, including Europe, most of Africa, India and most countries to the north, until you reach Siberia. So if you're in the Himalaya it's a great option.

If you need high-speed Internet in remote areas then the **Inmarsat** *BGAN* system is the best I have found. The unit is about the size of a laptop, which is then connected to your own laptop providing data and voice services. Costs for the units are between $2500 and $4800 depending on the upload and download speeds you're after.

Thanks to Danielle Edwards at NSSL **satcom-solutions.com** *for all the information on these sat systems.*

One other system worth a look is **Globalstar**, who have coverage of Europe, North and South America, North Africa, Northern Asia and Australia. Phones cost from €900 and calls from €0.80 within Europe.

Contacts		
Garmin	garmin.co.uk	023 8052 4000
Globalstar	globalstareurope.com	+353 1 2990770
Haglofs	haglofs.se	01934 877 998
Inmarsat	inmarsat.com	020 7728 1777
Iridium	iridium.com	
Magellan	magellangps.com	
Motorola	motorola.com/uk	0870 9010 555
Ortlieb	ortlieb.com	
Polar	polarelectro.co.uk	01926 310 330
Suunto	suunto.com	01294 316 219
Thuraya	thuraya.com	