

Chapter 1: Getting Uncle Sam to Ante Up

In This Chapter

- ✓ **Getting a handle on your position**
- ✓ **Knowing your options**
- ✓ **Making a connection with your PC**

Every once in a while, the U.S. federal government gives its citizens — and sometimes the entire world — a gift. When the government financed, launched, and began running the Global Positioning System (GPS), it did just that: gifted us.

GPS is a system for finding your place anywhere in the world. As long as you have a fairly clear view of the sky, where the two dozen (or so) satellites orbit the Earth, you have a pretty good chance of getting a GPS reading and finding your way to where you want to go.

Its uses are almost limitless:

- ◆ Navigate the roads, letting more advanced GPS receivers lead you along street by street. Some models even speak the directions so you can keep your eyes on the road and not on the receiver's display. You also know which direction you're traveling in and how fast you're driving.
- ◆ Find a remote fishing hole — and then find your way back to your car. You can even keep your favorite hot fishing spot a secret because with GPS you've no need to leave any sort of marker that might tip off other anglers.
- ◆ Hike in the woods without getting lost. Or at least if you do get lost, your GPS receiver helps you get un-lost. It's the modern version of Hansel and Gretel, but the bread crumbs in this case are virtual, displayed on your GPS receiver as waypoints.
- ◆ Find a lost child who is wearing a GPS receiver on his or her wrist.
- ◆ Run or jog and collect precise information about your workout.
- ◆ Make an emergency call with your new GPS-equipped cell phone and help the 911 dispatcher locate you even if you aren't sure of your precise location.

Knowing Where You Are

Where are you? I know you're there because you're reading this book. You have to be somewhere to do that. But where are you really? In precise terms.

I can tell you where I am in precise terms:

N 42.96506 W 085.92599 Elevation: 744 feet above sea level

That's with an accuracy of about 30 feet. Just enough to throw off a stalker or an angry editor. (I'm just kidding about the stalker part.) In the next chapter, I explain how to understand that reading, but for now I just want you to see how accurate GPS can be.

How'd I get this reading? By using a very inexpensive GPS receiver called the Garmin eTrex. It was a \$79 Christmas gift. It doesn't talk to me and doesn't display any maps other than a very rudimentary one, but it's enough to get a basic reading from the GPS system. Figure 1-1 shows the eTrex. You can find out more about Garmin GPS receivers at www.garmin.com.



Figure 1-1:
Garmin's
eTrex GPS
receiver is
inexpensive.

Many other GPS receiver models do show quite detailed maps. For example, Sony (www.sony.com) sells a broad range of GPS receivers. The Sony GPS

receivers and mapping programs not only tell you where you are, but they can tell you the best route from where you are to where you want to go. Figure 1-2 shows the Sony NV-U44 GPS receiver that not only shows your current position but can also keep a log of where you've been for later playback. Furthermore, it can hold a bunch of photographs on an SD card and use its screen to show off your family memories.



Figure 1-2:
The Sony
NV-U44,
well-worn
and loved.

Achieving Missile Precision — Almost

Do you have a chimney somewhere in the world at which you'd like the U.S. military to fire a long-distance missile? Using GPS, they can do it. Assuming all goes well, the missile will find the chimney, make a downward turn, and take a ride straight down. GPS is relatively new, although Santa Claus has been using a similar technique for years.

How the military uses GPS

How do you think the U.S. military makes those precision strikes during confrontations? Soldiers take a GPS reading of the target, transmit it to artillery and air forces, and get the heck out of the way. The GPS coordinates and very expensive ammunition do the rest — at least they do if no one in the area is using one of the GPS jammers available from Russia.



Being selective

On May 1, 2000, President Bill Clinton signed an order turning off the Selective Availability feature of the GPS system. Selective Availability was designed to degrade the GPS signal that was received by nonmilitary users so that the location information provided by civilian GPS units would be less precise than that of military GPS receivers. The U.S. military still has the ability to use a similar Selective

Deniability feature in war zones or when there is a global terror alert, but this feature is targeted at specific areas rather than affecting all civilian users worldwide. See the article on GPS at wordiq.com (www.wordiq.com/definition/Global_Positioning_System) for more information on GPS precision.

The military has an advantage over civilian GPS users: It uses some additional information to gain even more precision in GPS readings. The information is encrypted so that civilians — read: enemies — can't get the same precision. The U.S. military uses GPS in its missiles, its tanks, and other ground and air resources, and probably in ways that if I knew about they'd have to kill me.

Civilians can find their way, too

The precision the U.S. military achieves when using GPS for its guidance systems isn't quite as precise when a civilian uses the service. It's close enough for finding a fishing hole or navigating your way out of the woods, though.

The difference is so small, at least from a civilian perspective, that if I gave you the GPS coordinates for my front door, you might wind up at my back door — just enough precision to foil enemies without harming hapless hikers lost in the woods.



Actually, even civilian GPS receivers can have extremely precise measurements using a system known as Wide-Area Augmentation System (WAAS). This system relies upon ground-based transmitters whose position is very precisely known. These transmitters broadcast a signal that is matched with the satellite-transmitted GPS signal so that the normal positioning errors are reduced to such an insignificant degree that a WAAS-enabled system can be used to land an airplane in zero-visibility conditions. The WAAS system currently is only available in North America, but WAAS-enabled GPS receivers provide normal GPS accuracy even when they're used in areas where WAAS isn't available.



Most GPS receivers enable you to monitor the current signal to determine how accurately your position is being reported. Typically this information is reported using the following values:

- ◆ **PDOP (Position Dilution Of Precision):** A number representing the relationship between the error in user position and the error in satellite position using three coordinates. Smaller values are better.
- ◆ **HDOP (Horizontal Dilution of Precision):** A number similar to PDOP, but relating only to your horizontal position.
- ◆ **EHPE (Expected Horizontal Position Error):** The error in horizontal position, which you can assume under current conditions. For example, Figure 1-3 shows that the GPS receiver is probably accurate to within about 27 feet when I captured the image.

Figure 1-3:
The GPS receiver has my position located within about 27 feet of my actual location.

Sat	EI	Az	SNR	Stat	3D
8	63	326	39	NET-	
31	9	188	28	NET-	
29	7	320	27	-ET-	
0	0	0	0	----	
0	0	0	0	----	
27	71	32	32	NET-	
13	40	155	29	NET-	
19	37	69	28	NET-	
28	43	237	30	NET-	
10	22	290	27	NET-	
3	15	42	0	----	
124	0	0	0	----	
PDOP:		HDOP:		EHPE:	
N/A		1.0		27.1 ft	

Using GPS

What can you do with GPS and its receiver? As the list at the beginning of this chapter shows, the number of ways to take advantage of this free service are numerous. Here I go into detail on a few of the more popular uses.

Taking a hike

A GPS receiver is a must-have accessory for the outdoor types among you. It helps get you to where you want to go like a map cannot and prevents panic when all of those trees start looking alike.



Still, as my Garmin manual cautions, it's important to carry an old-fashioned compass and map with you whenever you hike in new territory. If your batteries die or the trees prevent you from getting a good lock on the satellite signals, your GPS receiver isn't much help. Also, if you're trekking into some back country or there's a possibility that the weather might turn sour, be sure to tell someone where you're planning on going so they know where to start looking for you if you don't return when you told them you'd be back.

If I was an outdoors person, and I'm not (although I do go outside to get the daily mail), I would buy one of the fancy, new two-way radios that combine a communications transceiver with a GPS receiver. I discuss these in Book VI, Chapter 3, which is about Family Radio Service and other two-way radios.

On the road again

I have a horrible time getting to new destinations. Actually, I have a horrid time finding places I've already visited, too. I don't know how many times I've driven to some strange city and found myself in the less glamorous parts of town rather than where I should be, safely in my friend's driveway.

GPS to the rescue!

Instead of relying on memory and getting all of those numbered highways mixed up in my head, I can rely on a GPS receiver to provide turn-by-turn directions. I tell the receiver where I'm going — it knows where I am, of course — and it tracks my direction and speed and lets me know when it's time to make a turn onto another highway or road.

If you're hungry on the way, some advanced models can tell you where the nearest restaurant is located. The DeLorme Street Atlas programs include information on literally thousands of points of interest including restaurants, gas stations, parks, campgrounds, and so on to make your trip far more enjoyable.

On a bike ride

It might not seem obvious at first, but a portable GPS receiver (or a PDA with a GPS accessory receiver) can be a wonderful addition for your bicycle. This is especially true if you set off on a road trip, but even mountain bikers can appreciate the way that a GPS receiver helps them find the trail in rugged back country.

If you do decide to bring along your GPS receiver on your bike, keep in mind that a bike presents something of a challenge to fragile electronic gear. Your local bike shop can probably supply a strong handlebar mount for the GPS receiver, but you may also want to shop carefully for a GPS receiver that's rated for rugged use.

It's a bird, no, it really is a plane

Private pilots travel in a world where the ordinary landmarks simply look a whole lot different than they do from ground level. It's awfully hard to read road signs from several thousand feet in the air, so getting a little extra help in determining exact position is really important to a pilot.

GPS technology has become a very important tool for pilots over the past several years. Products like Anywhere Map from Control Vision (www.controlvision.com) have simply revolutionized the general aviation

world because they've made it possible for virtually every flyer to realize the benefits of GPS mapping at a fraction of what it would have cost even a few years ago.

Just for fun

In the next chapter I talk about two other fun uses of GPS: finding goodies in a hobby called geocaching and finding your ancestors and their haunts in genealogy. I just mention them here briefly so you can decide whether you want to read more details in the next chapter.

Geocaching

By using your wits and a cheap GPS receiver, you can participate in something called geocaching. It's really a high-tech treasure hunt. The treasure, or cache, is usually inexpensive items, but the fun is in the chase. With coordinates in hand, you can drive to nearby locations, finding your way to the cache with GPS receiver in one hand and perhaps a can of bug spray in the other.

Genealogy

The use of GPS technology is just starting to catch on in the hobby of genealogy, which is the search for your family roots. With a GPS receiver, you can make the drive to old family homesteads easier and even find relatives' graves. Instead of requiring other researchers to retrace your steps on their own, you can provide precise GPS coordinates to make their hunt for family information and physical remnants easier.

Exploring Your Options

A wide variety of GPS receivers are available in all kinds of styles and with different levels of features. What you buy mostly depends on what its main use is, because a hiker's GPS receiver must be much smaller than one meant to rest on your vehicle dashboard.

Choosing a portable unit

When choosing a portable unit, these are some of your choices:

- ◆ Magellan at www.magellangps.com/en/
- ◆ Garmin at www.garmin.com
- ◆ Cobra at www.cobra.com

Each of these manufacturers offers an assortment of models aimed at different types of users. You probably want to look at several different GPS

receivers before choosing because the extra features that are included in the slightly more expensive models can greatly improve the convenience of using a portable unit.



If you intend to use your portable GPS receiver with your laptop PC, be sure to buy a unit that includes the necessary cables or adapters. These are typically not included with the least expensive models.

Driving around with a vehicle GPS unit

In the car, you have lots of options for using GPS, but don't pay it so much attention that it turns you into a reckless, dangerous, inattentive driver:

- ◆ You can buy a new car that has a fancy built-in navigation system. This is by far the most expensive option, of course, but it's the only one that's guaranteed to impress the neighbors (or make your boss start wondering if you're being paid too much). Built-in navigation systems often have a hidden cost your dealer may "forget" to mention, though. In most cases you need to buy expensive map add-ons if you want maps for the entire country.
- ◆ If you like the idea of a built-in GPS navigation system but aren't in the market for a new car, the manufacturers of portable GPS receivers offer aftermarket units that can be added to your existing car. While these might not have quite the panache of a factory-installed GPS navigation system, they're a lot more affordable, and you can move them to a new vehicle in the future.
- ◆ You can also use a Bluetooth or another GPS receiver with a laptop PC and carry it along in your car. This option is far less expensive than the other two vehicle options I mentioned, and it has one feature that trumps both of them in a big way — the laptop PC's screen is far bigger than that on any built-in vehicle GPS system. In addition, GPS mapping software for your laptop is far less expensive to update, so it's far easier on your wallet when you want to know about the newer roads.
- ◆ If you want the small size of a portable GPS receiver but you also want most of the advanced mapping options available with laptop PC GPS mapping software, you might want to consider pairing up a GPS receiver with a PDA. I talk about using a GPS receiver with a PDAPDA shortly, but this is an excellent choice in many cases.



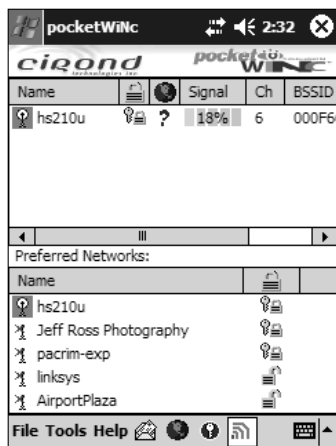
No matter what type of GPS navigation system you use in a vehicle, it can be very dangerous to you and everyone else on the road if you don't take the time to get to know the unit before you begin driving. In fact, unless the GPS navigation system uses voice prompts to tell you when and where to turn, it's far safer to have a passenger handle the navigation duties than to try to watch the screen while you're driving.

Merging your laptop with GPS

I've already mentioned how you can use your laptop PC for navigation in your vehicle. This is a very popular option among RV owners because they usually have plenty of room for the laptop and at least one passenger who can handle the navigation while driving. In addition, GPS mapping software for laptops generally includes the locations of RV parks so you may not need a big, printed RV park directory.

Another way to use GPS with your laptop is to combine your search for Wi-Fi hotspots, which I discuss in another chapter, with GPS. Using your laptop, you can drive around, essentially mapping hotspot locations. To aid in this quest, you may want to download a trial version of WiNc from Cirond (www.cirond.com/winc.html). This extremely handy program quickly identifies all Wi-Fi connections within an area and helps you determine if you can connect to them. Cirond even offers a PDA version called pocketWiNc, shown in Figure 1-4.

Figure 1-4: WiNc and pocketWiNc enable you to easily locate and connect to Wi-Fi hotspots.



Using GPS with a PDA

I've mentioned several times that a PDA and a GPS receiver make an excellent pairing. With the two, you have most of the size advantages of stand-alone portable GPS receivers and a whole raft of capabilities that you won't find in most portable GPS units. (You may want to pick up a copy of *iPAQ For Dummies* or *PDA For Dummies* — both written by Brian Underdahl and published by Wiley Publishing — to read more about what you can do with a PDA.)

Because different PDA models offer different expansion options, you'll find several types of GPS receivers that work with various PDAs. I recommend checking out the products that are available from the following:

- ◆ **DeLorme** at www.delorme.com
- ◆ **Sony** at www.sony.com
- ◆ **Teletype** at www.teletype.com
- ◆ **PocketMapStore** at www.pocketmapstore.com
- ◆ **ALK Technologies** at www.alk.com

In each case you should specify the type of PDA you own so you can get the proper GPS receiver.



GPS maps can eat up a lot of memory on a PDA. If you don't already have a PDA, try to get one with built-in Bluetooth, so you can use the expansion slot for a memory card to hold your maps.

Using a GPS-enabled cell phone or smartphone

Nextel has a service called TeleNav that provides audible driving directions, automatic notification when you've gone off course, and locations of nearby businesses like gas stations and restaurants. You can read more at www.nextel.com/about/enterprise/wbs/gps/navigate.shtml. Other carriers have similar services. Visit your carrier's Web site or call to see if they sell any GPS-enabled phones.

One very popular phone with a GPS integrated is, of course, the Apple iPhone. In fact, my doctor often brags to me while I'm lying on his table that he and his daughter went hiking in some backwater area of the United Kingdom, and when they got lost, she whipped out her iPhone and led them home. My doctor is an interesting fellow.

Saying Goodbye to AAA



Even though GPS devices rule so thoroughly, I recommend you don't take AAA or any other paper map out of the loop just yet, especially when you're using a GPS unit in the car. There's still the chance the map data you upload is not up to date, that your batteries will go dead, or that you'll have some other technical problem. Having a map gets you to the Grand Canyon long after your GPS receiver stops working. If you're hiking, a compass and a map are essential, even if you have the best GPS receiver available. In that case, your life is possibly at stake, and you don't want to rely on an electronic gizmo to get you out of the woods and back home.



GPS mapping programs for laptop PCs generally offer the option to print out both ordinary maps and those that show your selected route. These printed copies can serve as an excellent backup for your GPS unit and save you a trip to the auto club office.

Making a Connection with Your PC

There are quite a few reasons why I think you'll find that having a connection between your GPS receiver and your PC awfully handy. Examine a few of them.

Upgrading software and maps

As I mentioned in the previous section, once you move beyond the most basic portable GPS receivers, you quickly get into units that display maps rather than simply numbers to indicate your position. You may have noticed, however, that maps have a certain amount of obsolescence built in. For some reason people want to build new roads, change the course of old ones, or even just rename existing roads. That's one reason many GPS receivers offer the option to connect to your PC — so you can update the maps in the GPS receiver.

Downloading your life's movements

Virtually all GPS units can store some record of where they've been. By downloading this tracking information to your PC, you can map out the route you took in getting somewhere. Here are some possible uses for this type of information:

- ◆ Imagine how useful it would be to be able to print out maps of the trail to some hidden but beautiful picnic spot so that you could share those maps with your friends.
- ◆ If you have a consulting business where you must visit your client's locations, you could use your GPS track to justify the travel expenses you bill to the customers or that you claim on your tax returns.
- ◆ Because the GPS track also includes information about the speed of travel, you might try to beat an unwarranted speeding ticket by convincing a judge that the GPS track is an accurate representation of how you were driving. I don't think I'd bet on that working, but you're welcome to try. (Just don't blame me if the judge throws the book at you — remember, I'm not offering anything resembling legal advice here.)
- ◆ You could put your GPS receiver in your car before you let your teenager drive to the library and remind him or her that the unit tracks both speed and location. Who knows? It might just make your kid drive a bit more carefully.

Using your GPS with your laptop

Don't you just love it when you can get the best of both worlds out of a product? Well, when it comes to GPS, it's entirely possible for you to do so. There's no reason why you can't buy a small, portable GPS receiver that's perfect for taking on hikes and then connect that same GPS receiver to your laptop PC to use with the far more comprehensive PC-based GPS mapping software for trip navigation in your vehicle.

Sure, you probably have to buy a portable GPS receiver that's slightly above the bottom of the line, but virtually any of the portable units that include a PC connection cable as standard equipment can likely do the job. (You can check the PC-based GPS mapping software manufacturer's Web site to verify if a particular portable GPS unit is considered compatible.)



GPS receivers work the best in vehicles when the receiver has a clear view of the sky. The optimal location in most cars is at the front of the dashboard as close to the windshield as possible. A small piece of rubberized drawer liner (like you find in the housewares section at your local store) goes a long way toward preventing the GPS receiver from sliding around as you drive.