

Navigation Northwest

A Quarterly Newsletter of the Seattle Navigation Committee

Volume 2, Number 1

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News

- Basic Navigation Course students now receive their 3-year navigation cards when checking in after completing the Heybrook Ridge problem set. The revised card now displays the emergency location protocol: 1. Zone, 2. Datum, 3. Easting, 4. Northing. Card guru is Sub-Committee Chair Craig S. with an assist from Nina Crampton.
- Basic Navigation students now pass through a compass declination setting station before heading to their work tables. Nina Crampton led the pilot of this practice at the October workshop.
- Mirror problems have been uncovered with certain Suunto MC-2 compasses. See story below.
- Planning has begun for an in-city map and compass navigation practice area. Daniella Drader, WTA trails crew leader and SCA Camp Long challenge course facilitator, is leading the development.
- The club has authorized the posting for a one-year volunteer support staff position to help with recruitment, finding resources, trouble shooting, roster management, communication and marketing. Inquiries to Executive Director Martinique Grigg, martiniqueg@mountaineers.org.

Events

- **Meet the Mountaineers night.** Interested in learning how to kayak or navigate in the backcountry? Want to meet some new exploration buddies? Stop by the Mountaineers Seattle Program Center from 6:00-8:30 pm on Wednesday February 12. Representatives from each of our activity committees and lodges will be on hand to answer all of your burning questions about courses and upcoming events. The climbing wall will be open all evening and staffed by our climbing committee - so don't worry about bringing a harness or belaying just come ready to climb! Visitors will also have special access to our Gear Grab, where members can sell their gently used gear and everyone can buy new supplies, with a portion of proceeds going back to The Mountaineers community. To participate in the gear grab, email tessw@mountaineers.org

Off Trail

- Navigation Chair Peter Hendrickson and instructor Nancy Temkin provided a brief wilderness navigation training session to the members of the Puget Sound Mycological Society (PSMS) at their annual October Meany Lodge weekend. Navigation Instructor and PSMS organizer Jerry Steiner arranged the session.
- King County Libraries invited the Navigation Committee to provide introductory sessions to library patrons. An instructor will meet for an hour with Kirkland Branch patrons the evening of March 31.
- We continue to seek accounts of individuals or parties who have strayed off trail/route or have been benighted or lost for several days in the Northwest. We can each learn from the fortunes and misfortunes of wilderness navigators.

A few thoughts on maps & compasses during a 3- week trekking trip to Nepal. By Lynn Graf, Navigation Chair Emeritus

First about that compass: Of course I brought one, hey, I teach navigation and have been on the Nav committee for years! That meant finding out what the declination is in Kathmandu, easy nowadays with google and internet access. Zero degrees, I can handle that; all I had to do was find that old key to change it. In the end I never used it and came back with a bubble (maybe because of its age and that 14,000 ft. pass?) The only time it would have been very useful, of course I wasn't carrying it. The streets in Kathmandu aren't exactly straight and all look alike after a while, quite apart from the constant necessity to avoid motorcycles, pedestrians and the occasional cow. We eventually made it back to the hotel but I credit that to my companion's sense of direction.

Then the maps while trekking in the Mustang area, from Jomson and Kagbeni to Lo Mantang, at first along the Khali Gandhaki River: We found good maps in a Kathmandu bookstore and almost everyone in the trek bought one. We only noticed later that they differed in a few areas, with some routes not showing on all the maps. On the other hand the map notation "red cliffs and blue sheep" actually turned out to be accurate! The main navigators were our excellent guides anyway, communicating with local residents and even hiring one to accompany us on a tricky stretch. It's almost embarrassing to have one's morning tea served by someone who has climbed Everest 11 times. Now it's time to re-visit the area with Google Earth.



Route finding in Argentine Andes

Our scrambling party of three plus Argentine guide Paula were just finishing dinner, chatting by her tent with fellow guide Cecelia and her client, Johannes of Hamburg, Germany. The tiny cluster of mountain tents was welcome refuge from the chilly winds flowing off the nearby snow pack and glaciers in the Cordon del Plata. We had climbed San Bernado (4K m) a day earlier, exhausted by the scant half-day acclimatization and hours of steep, off trail scree and talus. The rest day was a tonic as we prepared for two more 4K m peaks the next day. See <http://www.summitpost.org/adolfo-calle/155138>.

Cecelia and Johannes were bound for La Plata (6K m), a five or more day trek. Her experience (3 years) paled in comparison to Paula's--13 years including multiple ascents of Aconcagua (6961 m), highest peak in the Americas. Cecelia asked Paula for help with the route and we watched an age-old navigation routine play out. Paula grabbed two small stones and a stick to scratch a richly narrated route in the sand. She spoke of leaving a moraine on the right shoulder, reliable water sources, and standard camp sites.

In our four days and three peaks last month we never saw a compass or a map. Local knowledge and deep experience prevailed. I took a few back bearings "just in case" and hoped the clear skies would persist. Only back in Redmond did I thoroughly explore the fierce katabatic winds that plague those mountains west of Mendoza.



*From left, Adolfo Calle, Stepanek, ???, San Bernado.
--Editor*

Courses

The Basic Navigation Course is offered Fall and Winter/Spring. The Winter/Spring sessions, both Workshops and Field Trips are listed below. The fee is \$55. Sign up as either STUDENT or INSTRUCTOR (see instructor details below). Mentor sessions for those needing a bit more instruction before the field trip are also included. The Basic course does not include GPS-assisted navigation. A new A-GPS class for smart phones is under development. Fee.

1/23/14	Basic Navigation Workshop - INSTRUCTORS View Activity Roster	Navigation	Peter Hendrickson	Main: 46 avail.	REGISTER
1/23/14	Basic Navigation Workshop - STUDENTS View Activity Roster	Navigation	Greg Testa	Main: 77 avail.	REGISTER Prerequisites
2/10/14	Basic Navigation Workshop - INSTRUCTORS View Activity Roster	Navigation	Peter Hendrickson	Main: 48 avail.	REGISTER
2/10/14	Basic Navigation Workshop - STUDENTS View Activity Roster	Navigation	Jan Sweeney	Main: 90 avail.	REGISTER Prerequisites
2/13/14	Mentor Session for Basic Navigation Workshop View Activity Roster	Navigation	Tim Lawson	Signup with Leader	INFO Prerequisites
2/15/14	Basic Navigation Field Trip - STUDENTS View Activity Roster	Navigation	Mike Sweeney	Main: 70 avail.	REGISTER Prerequisites
2/15/14	Basic Navigation Field Trip - INSTRUCTORS View Activity Roster	Navigation	Peter Hendrickson	Main: 47 avail.	REGISTER
2/16/14	Basic Navigation Field Trip - INSTRUCTORS View Activity Roster	Navigation	Peter Hendrickson	Main: 53 avail.	REGISTER
2/16/14	Basic Navigation Field Trip - STUDENTS View Activity Roster	Navigation	Peter Hendrickson	Main: 90 avail.	REGISTER Prerequisites
2/26/14	Basic Navigation Workshop - STUDENTS View Activity Roster	Navigation	Wesley Rogers	Main: 98 avail.	REGISTER Prerequisites
2/26/14	Basic Navigation Workshop - INSTRUCTORS View Activity Roster	Navigation	Peter Hendrickson	Main: 54 avail.	REGISTER
3/5/14	Basic Navigation Workshop - INSTRUCTORS View Activity Roster	Navigation	Peter Hendrickson	Main: 55 avail.	REGISTER
3/5/14	Basic Navigation Workshop - STUDENTS View Activity Roster	Navigation	Greg Testa	Main: 97 avail.	REGISTER Prerequisites
3/12/14	Mentor Session for Basic Navigation Workshop View Activity Roster	Navigation	Tim Lawson	Signup with Leader	INFO Prerequisites
3/15/14	Basic Navigation Field Trip - STUDENTS View Activity Roster	Navigation	Wesley Rogers	Main: 95 avail.	REGISTER Prerequisites
3/15/14	Basic Navigation Field Trip - INSTRUCTORS View Activity Roster	Navigation	Peter Hendrickson	Main: 53 avail.	REGISTER
3/16/14	Basic Navigation Field Trip - INSTRUCTORS View Activity Roster	Navigation	Peter Hendrickson	Main: 54 avail.	REGISTER
3/16/14	Basic Navigation Field Trip - STUDENTS View Activity Roster	Navigation	Greg Testa	Main: 98 avail.	REGISTER Prerequisites

Classes and Seminars

Introduction to Map & Compass classes are offered 8 times each year. Loaner maps and compasses are provided. This class does not satisfy requirements for scramble, climb, snowshoe or backcountry skiing classes. Fee

1/14/14	Introduction To Map & Compass Getting Started View Activity Roster	Navigation	Greg Testa	Ldr: 2 avail. Main: 19 avail.	REGISTER
4/17/14	Introduction To Map & Compass Getting Started View Activity Roster	Navigation	Greg Testa	Ldr: 2 avail. Main: 19 avail.	REGISTER
5/15/14	Introduction To Map & Compass Getting Started View Activity Roster	Navigation	Greg Testa	Ldr: 3 avail. Main: 20 avail.	REGISTER
6/19/14	Introduction To Map & Compass Getting Started View Activity Roster	Navigation	Wesley Rogers	Ldr: 3 avail. Main: 20 avail.	REGISTER

Help Instructing

The Navigation Committee invites Basic Navigation Course graduates to volunteer as novice or experienced instructors. New instructors will be paired with an experienced instructor at both the Workshop and the Field Trip. Instructing at either event will renew your Navigation Card for a period of three years. New instructors who have completed the Seattle Basic Navigation Course are strongly encouraged to attend an evening training session. No fee

1/16/14	Instructor Training View Activity Roster	Navigation	Mike Sweeney	Ldr: 2 avail. Main: 17 avail.	REGISTER
10/9/14	Instructor Training View Activity Roster	Navigation	Mike Sweeney	Ldr: 3 avail. Main: 24 avail.	REGISTER

Navigation Projects

Our work advances with improvements to existing practice and additions to the suite of services. In every case, volunteers are the key. Email Committee Chair Peter Hendrickson if you are interested in any of the current projects below.

- Seeking producer for YouTube supplemental videos to accompany the Basic Navigation class.
- Seeking Navigation Northwest Newsletter section editors—book reviews, gear, web sites, smartphone apps...

Suunto MC-2 Compass--Problems in the Field

Stockbrokers are pledged to tell clients that past performance is no guarantee of future performance. Unfortunately our most essential, simple and reliable tools—the +/- 2-degree accuracy, adjustable declination compass—may not perform as expected in the field. November field reports from King County Explorer Search and Rescue (ESAR) and a Seattle Mountaineers field trip exposed problems with the Suunto MC-2 Explorer, a compass independently recommended to students by both organizations.

Mountaineers Navigation and ESAR Instructor Bob Boyd reported, "It was just by luck that I had three of the Suunto compasses, sitting open. As I walked by I saw my image shift, just like mirrors in an amusement park. I immediately knew they were concaved mirrors." At a recent ESAR training only 10% of the MC-2 mirrors were determined satisfactory (n=90). Some 145 of 250 ESAR compasses were returned.

Past Mountaineers Navigation Chair Lynn Graf learned of at least two students who had

mirror issues with their Suunto MC-2 compasses on Heybrook Ridge. On the same trip, veteran instructor Mary Panza had a student whose Suunto had a sticky needle. You could tap the side of the base plate and the needle would not settle properly.

Students from both training operations were off by 4 to 5 degrees with the problematic compasses.

There are several versions of the MC-2 which Navigation Compass reviewer Greg Testa investigated to find the few to recommend to navigation students. Models listed by Amazon include MC-2 Pro, MC-2, MC-2 Mirror, MC-2G Navigator, MC-2DIN, MC-2 D/L, MC-2G Global Navigator, MC-2DLIN Navigator, MC-2 Global Navigator...

Flawed Compass? Take Action.

Mirror Warped? Try this – set the compass on a table with the mirror vertical. Now back up 30" to 48" and look at yourself in the mirror. If the image is very distorted, it is because of a warped mirror. Perhaps the mirror is too thin, and maybe a little too large – thus the warping. With a warped mirror the reflected image of the compass needle is also distorted. This distortion may be worse at the bottom of the mirror at the window.

Other Issues? Sticky needles or other issues may present.

Resolution. Confirm your issue with a Mountaineers or ESAR instructor. If not acceptable, return your compass to the vendor for a new one. You may wish to test the new compass before you leave the store. ESAR returned several compasses to Suunto with the support of a local representative in exchange for new ones.

Bob Boyd provides DIY compass aficionados a path to repair if you do not care to return the tool to the vendor. Upon examination of 7+ dozen compasses and fixing 27, I found the following problems with the mirrors:

The mirrors can be sorted into three groups. Some mirrors are good, some have few distortions and many have concaved distortions so bad that the compass cannot be used. All of the compasses are the MC-2 Explorer Model, delivered summer & winter of 2013 by UPS. All of the mirrors are 2 3/8" x 2 3/4" x 1/16" thick, with an oversized sighting hole along the bottom edge and a forked notch on the top edge. All mirrors are cut plastic with an unsanded edge; all are held in place by two plastic clips, resting on four pads, and are otherwise unsupported from behind.

Small Distortions: The compasses, with only some distortions, are fixable by removing the mirror, removing the small piece of plastic film remaining at the forked notch, removing any other small amounts of debris, sanding all edges of the mirror, snapping the mirror back into the compass lid, and inspecting the mirror for distortions, usually none.

Bad Concavity: The compasses with bad concaved distortions are unusable. When the mirror is removed, the mirror remains concaved. Inspecting for manufacturing debris and sanding of the edges has no effects on the reflected image. It is unknown as to how these mirrors became warped. If these bad mirrors are replaced with new mirrors with sanded edges, the small piece of plastic removed from the forked notch, and the small

amount of debris is removed, you might have a functional compass.

Bob Boyd's Story—From Surveying to Search and Rescue

As a Land Surveyor since 1964, I'm constantly aware of instrumentation and calibration. In 1992, I became part of King County ESAR, the largest search & rescue unit in the state. It wasn't long before someone said surveying is just a refinement of navigation, and put me to work fixing navigation problems. I say that was the beginning of keeping King County Search & Rescue on the "straight and narrow."

I've been evaluating compasses since 1992, when my mirror fell out, during a nighttime compass course in the rain. My training partner and I found the mirror, cleaned off the mud, secured the mirror in place with band aids, and finished the course by sunrise.

I think we have all seen compass manufacturers change their product and or go out of business, as GPS is becoming the navigational tool of the masses. I have Silva, Brunton, Suunto, vintage wooden box compasses, and an 1890 brass surveyor's compass.

About the time you've seen it all, something else shows up. Minor problems you can expect, after all, most are +/- 2° compasses. But when compass oil freezes solid, needles are painted backwards, and now we find mirrors that should be in an amusement park, it makes you ask, what's next?

--Editor

GPS for Mountaineers: The absolute minimum you need to know to get started **By Bill Fortney**

This introduction to GPS is for you if you:

- are an avid outdoorsperson of any make, model, or creed,
- know little or nothing about backcountry use of GPS,
- don't know what equipment you need for backcountry GPS use,
- aren't sure where to start asking questions when shopping for the right GPS gear,
- and don't want to be bothered with techno challenges when exploring the outdoors.

What is GPS?

A high-tech way to know where you are, anywhere on earth, using radio signals from satellites. A GPS receiver, or gizmo (a small device with a particular function), receives the signals and uses a programmed microchip to compute your latitude and longitude. Your gizmo can then simply display your location coordinates on the screen, or can pass them on to more complicated software for further use.

What do I need to know?

- How to read your location coordinates and find your location on a map.
- That GPS is passive - your gizmo receives signals, but doesn't need to send any.
- That GPS has nothing to do with maps.
- That your gizmo can fail.
- That your gizmo can do a lot more with your location than just display its coordinates.

What kinds of gizmos are there?

For backcountry use, including sea kayaking, you have two fundamentally different choices: the dedicated handheld receiver, which I'll call a *GPSer*, and the smartphone. Popular *GPSer* brands are: Garmin, Magellan, Trimble, Lowrance, and DeLorme. They're called "dedicated" because they typically don't do much *except* deliver GPS information. Smartphones are, well, smartphones. For our purposes, the hardware doesn't matter so much as the operating system-- iOS for Apple's iPhones and Android for many makes and models are the two big ones. Although virtually all of the world's 1.5+ billion smartphones have a GPS radio signal-processing chip inside, the gizmo won't tell you where you are just because you've turned it on; if you use one, you'll need to install a GPS app.

Which is better—the dedicated *GPSer* or the smartphone?

If you already have a smartphone, no question—use it! If you don't, now is a good time to seriously consider buying one. A smartphone can do all manner of tricks; if you have some sort of contract with a service provider, you can even use one to call friends and talk to them! (It's kinda like a telephone!) However, here's what almost seems to be a secret, a little fact you're not likely to learn from any of the friendly salespersons at any of the service providers' retail shops: *you don't need any kind of service contract whatsoever to use your smartphone for *GPSery*!* Your phone does not need voice service, texting service, or data service. It need not be "rooted," "unlocked," "jailbroken," or otherwise hacked. All it needs is its GPS chip and WiFi capability.

Your dedicated *GPSer* is, of course, ready to use when you open the box, whereas your smartphone will need an app. Fortunately, a number of GPS apps are available free, and the rest are currently (2013) priced between about six euros and ten dollars (well, twenty dollars on the iPhone platform). Some second-hand smartphones can be bought for under a hundred dollars (try Swappa or eBay if you don't have a technophile friend who wants to unload his obsolete two-year old model so that he can get the latest and best one). As we'll see, there may be additional reasons to prefer the smartphone over the *GPSer*.

What should I expect my gizmo to do for me?

It probably can do a great many things, most of which you don't want. Here are a few important things that you *do* want it to do:

(1) Display location in UTM (Universal Transverse Mercator) coordinates. It *must* be able to display where you are, using UTM coordinates. So far as I'm aware, *all* gizmos can do this, but some will default to latitude and longitude, so you may have to diddle with the settings to get UTM. It goes without saying that it's more complicated than this, but you can usually get by with thinking of your UTM location as a pair of numbers, of which the first tells you how far east you are and the second how far north. Although I'm going to refrain from recommending any one of the many makes and models of *GPSers* or any one of the myriad of powerful GPS-map apps, I will make mention of the app "GPS Status", available gratis on both iOS and Android smartphones. The really good feature of GPS Status is that it doesn't do much more than show you where you are, by displaying your coordinates.

(2) Allow you to specify the datum for your location coordinates. Think of a datum as a reference system for your coordinates—the lines from which the coordinates are measured. We may be grateful that the world has largely moved to acceptance of a single universal datum, known as “WGS 84”, but the fact is that tens of thousands of North American maps are still in print that are referred to the older North American Datum of 1927 (“NAD 27”). Between WGS 84 (or NAD 83 as a North American equivalent is called) and NAD 27 the difference in coordinates is quite significant, amounting typically to more than a hundred meters. So if you're using one of these old printed maps—be it USGS, Green Trails®, Custom Correct®, or National Geographic—be sure to check its datum and set your gizmo to match.

If you're using digital maps exclusively, chances are good that they are internally referred to WGS 84, which is doubtless the default datum for your gizmo, so you will *probably* be all right—but don't count on it. The datum-shift problem is still the most common source of GPS positioning errors in North America.

Unfortunately, not all apps *will* display coordinates for the obsolete NAD 27. *If* you're still using published printed maps, this *may* be a reason to select an app that will. A better solution may be to print your own map from a digital source, overlaying a WGS 84/NAD 83 grid on it.

(3) Allow you to import and save waypoints and tracks. A *waypoint* is nothing more than a location identified by a name and its location coordinates. A gizmo will be capable of calculating your bearing and distance to a waypoint, which is what you need if you're going to find your way to it by compass. A *track* is a long list of locations identified only with their coordinates; a trail or cross-country route can be converted into a track. A gizmo with a track in its memory can give you guidance for following it and let you know if you deviate from it. And if a gizmo can track you on your outing, that track, if stored and saved, can be used to guide you back the way you came. A gizmo with a stored track can literally save your life in foul weather.

(4) Let you import and save waypoints and tracks in the .gpx format. This is a universal standard for compatibility, so that different programs and apps can interpret data passed from one to another. Many gizmos and apps will have different default formats that their developers think are superior. Whether they're right or wrong, what is important is to use a universal standard—and that's .gpx. Probably every gizmo, every smartphone app, and every cartography program nowadays *can* read and write files in the .gpx format—but it will be up to you to make your gizmo use it, always. (Note: it is part of the definition of .gpx that waypoint and track files in that format be referenced to the WGS 84 datum—but don't assume that that requirement is always observed! Yes, I *have* downloaded .gpx files from the Web with incorrectly referenced coordinates.)

(5) Make use of both American (Navstar) and Russian (GLONASS) systems. This is a really big deal for backcountry navigators. GPS navigation in mountainous terrain, in forests, and in canyons is vastly more robust now that there is a surfeit of satellites available. Older gizmos process only the American signals, and frequently encounter difficulties (and infrequently actually report seriously erroneous locations) under certain rather specific, but by no means unusual, conditions. The completion of GLONASS in 1995, together with the widespread adoption of chips that process it in gizmos, has

virtually ended this problem. Early 2011 was when most manufacturers made this change, and this is something you might want to consider if you're getting a second-hand gizmo. If you don't know for sure, bring up the satellite sky map screen on a gizmo you're contemplating buying—run “GPS Status” if the gizmo's a smartphone. If more than a dozen satellites are shown, almost certainly some are GLONASS. On GPS Status, the Navstar and GLONASS satellites are distinguished by different shapes on the sky map. GLONASS satellites are identified by numbers greater than 31.

This is all nice, but you say GPS has nothing to do with maps. Can't I get my gizmo to show my location on an on-screen map (like in car navigation systems)?

Yes, of course you can, but this gets a bit tricky. Car navigation systems assume that you'll be within reach of a cell tower network and use your gizmo's GPS location to figure out what map ought to be on your screen. This process repeats unceasingly as you move. Most cell networks don't roam the backcountry, so *you* have to get your map and install it *before* you leave civilization, preferably while you're at home. This isn't really horrible—after all, you formerly had to go to REI to buy a Green Trails® or USGS map before an outing. But you *do* have to do it.

Unfortunately, I can't tell you exactly how to do it, because the method will depend on your gizmo. At present there are three broad classes of methods gizmos use, which I'll outline. The first two apply only to smartphones.

(1) Web-to-gizmo, caching. This is the easiest. You choose one of the maps your app offers, browse and zoom through the region you're going to visit, and hope the app will remember the map when you get there. Most of the time it will, provided that you don't virtually visit anywhere else in between times. Usually the available maps are available gratis.

(2) Web-to-gizmo, downloading. Again, you choose one of the maps your app offers, but now you *specify*—perhaps by dragging a rectangle over your displayed on-screen map—the region you want your digital map to cover. You may be asked to name the region, which you can subsequently invoke repeatedly because the map will be stored permanently, rather than at the whim of the app, in your gizmo's memory.

(3) Computer-to-gizmo. This can be done with both GPSers and smartphones, but some models of GPSer will accept only the manufacturer's proprietary maps—which you *purchase*. More expensive models will let you transfer the map *you* want, one *you* made or found, to the GPSer. Nearly all smartphone apps will accept arbitrary maps transferred from your computer—but will insist on their own peculiar formats. Hence you will need the invaluable computer program MAPC2MAPC if you want to use one of these maps. (This is the only software I am specifically recommending, because, so far as I know, in 2013 its capability is unique.) It takes as input a computer digital map (for example, but not necessarily, in geoTIFF format) and produces as output a digital map explicitly formatted for your app or gizmo, be it a GPSer or smartphone, which you then simply *copy* into the correct folder in the gizmo's storage. Please note that this currently works only with a select few apps on iPhones, so if you're an Apple person and this feature is important to you, you'll want to verify that the app you choose to install has the capability.

How long will my gizmo's batteries last?

Not long enough. With care and luck, maybe long enough for a one-day outing, but you'll need to allow for reprovisioning. This is one characteristic where the dedicated GPSers have the edge over smartphones—they almost always use standard AA batteries that you can easily swap in the field. Smartphones are more challenging—but, as always, it's Technology to the rescue. Although rather incredibly, some makes don't allow you to change the batteries, and although each smartphone model uses its own unique kind of battery, you do have choices for dealing with the problem.

The simplest is to buy and carry replacement batteries for your model. Those sold by your gizmo's manufacturer will be *very* pricey, but if your model is a popular one, you can buy cheap knockoffs for a small fraction of the manufacturer's price. They won't be as potent as the Real Thing, but they'll probably be good enough. Alternatively, you may be able to order third-party replacements that are considerably *more* potent than the originals.

A second solution is to buy and carry a *powerpack*, essentially a battery that can be connected to your gizmo, usually by a USB cable, and transfer its energy to your gizmo's run-down battery. These are available in many flavors. Some may be specific to your gizmo; others may be generally useful so long as you have the charging cable for your model. Some must be charged at home, while others can be pumped up in the field, using either human or solar energy for the task. Some devices will transfer joules from AA batteries into your gizmo.

Although using a power pack to recharge your gizmo is a generally attractive solution to the Battery Problem—because you can keep the gizmo running while you are recharging its battery—you'll want to be aware that quite often the power pack will cease discharging before it is exhausted and before your gizmo is fully recharged. (Think of a siphon that maybe won't transfer all the water from the source to the target.) You may have to learn the idiosyncrasies of yours by trying it out at home, so you won't be unpleasantly surprised in the backcountry.

One technological fix you'll probably want to avoid is the portable photovoltaic cell that *directly* charges your gizmo using solar radiation; although it may be lightweight, you almost certainly will not be able to use it while you're moving.

Summary

- You need GPS.
- Your GPS gizmo needs to display your coordinates in UTM.
- Your gizmo needs to display and save waypoints and tracks in .gpx format.
- If you use published printed maps, your gizmo ought to be able to display coordinates referred to the NAD 27 datum as well as the standard WGS 84.
- Your gizmo ought to work with both GLONASS and American GPSes.
- If you want a spiffy moving map display on your gizmo, you'll have to ensure that your map is stored on it *before* you set out into the backcountry.
- You'll need to carry replacement batteries or a charged power pack that works with your gizmo.
- You *still* need to carry a compass and a paper (or Tyvek®) map. M

Bill Fortney, a founding member of the Seattle Branch Navigation Committee, has never been lost in the hills, merely confused, on a few rare occasions, about where in &@\$! he was, on mountains ranging from Squak and Rattlesnake to Rainier. He steadfastly continues to deny that it was his fault that, on one memorable field trip, fully thirty Alpine Scramble Course instructors and students in his charge lost their way for a couple of hours while descending Mt. Erie. Now retired from The Mountaineers, he still continues to hike on those increasingly infrequent days when he remembers where he put his GPS gizmo. If extant, he can be reached at billfortney@gmail.com.

Links, Apps of Interest

- Current navigation apps on my iPhone include UTM Convert (useful worldwide, free), Declination (useful worldwide, free), GAIA GPS (still learning this, \$20), Avalanche (risk by region, essential in the Northwest, free) and Heading (includes a flashlight, accuracy +/- 10 degrees, free).

Navigation Publications

- *Wilderness GPS, A Step-by-Step Guide* (2013) by Bob and Mike Burns made it to bookstores this fall. Completely up-to-date, there is even a chapter on GPS with your smart device. The writing is straight-forward, the information useful. And the father/son team includes appendices on interpreting and using maps and charts plus using a map and compass together. They even challenge manufacturers to develop markedly improved models (touch-screen, energy sippers, large displays, field rechargeable, Bluetooth...)

Navigation Gear

- Approved and recommended compasses for the Basic Navigation Course are noted on the revised website <http://www.mountaineers.org/seattle/navigation>. (Thanks Morgan Robinson.)

Inquiries, contributions, Letters to the Editor to Peter Hendrickson
p.hendrickson43@gmail.com

OK to Forward

Email Navigation Northwest to any friends/outdoors partners to distribute

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