The Mountaineers
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# Navigation Northwest

A Quarterly Newsletter of the Seattle Navigation Committee
**Volume 4, Number2** **July 2016**

## --Navigation Northwest July Features--



## Online, On Demand Wilderness Navigation Pilot Results

By Doug Canfield

Mountaineers Books, the Seattle Navigation Committee and Trillium Publishing (contractor) piloted a wilderness navigation workshop course. It remains live for elective use across branches. As Mountaineers Books project manager I reported on the student course and three instructor training courses at Navigation Summit 2016 in late June. This was addressed in particular to committee chairs across branches with an invite to continue as follows.

"The Seattle Navigation Committee hosted a terrific Navigation Summit this past weekend at Meany lodge, which included a presentation on results from the Wilderness Navigation Online Pilot course. In brief, here are highlights from that presentation:

- 62% of online students earned their navigation badge (vs. 69% of students attending the Seattle/Foothills live workshop -- note that the live workshop results are from a much larger sample group).
- 86% of online students had never taken another Mountaineers course

- 100% of online-student survey respondents said "No" when asked, "In hindsight do you wish you'd taken the in-person workshop?"
- 7 of 10 topic modules in the online course were rated "Clear" or "Very Clear" (the only lesser answer selected was "Fairly Clear").
- 71% of respondents said they are "Very Likely" to take another online course from the Mountaineers (14% answered "Likely" and 14% said "Somewhat Likely").
- Reasons given for taking the course online included:
    - "It was more convenient to study at times of my choosing"
    - There wasn't an in-person workshop near where I live"
    - "I like online learning"
    - "I work nights"

The pilot is coming to a conclusion ... ***unless your branch would like to use it in the next year*** -- either the student course and/or the training courses for assistant instructors. If your branch would like to experiment with these courses I **need to receive an email from you** saying as much, so that I can relay your interest to the Mountaineers Board of Directors and ask them to keep the learning management system (LMS) software active.

To help you consider this new tool and course format, I have set you up in the LMS as an "admin" for your branch committee, which means you can edit the content of the courses you see when you log in. The student course was created to be generic enough for all branches to use. However, the instructor courses that you'll see were created specifically to support the Seattle/Foothills course. And while aspects of the student course would be difficult to edit without help, the instructor courses were kept simple and can easily be customized for each branch. Feel free to open and edit these to any degree that you're comfortable. All of the material has been saved at a "master document" level that you won't have access to, but which can be re-downloaded to your branch committee level if needed.

Please let me know by July 17 of your interest. If you'd like other committee members to be given access, I'm happy to add them. A final recommendation will be made to the Board by the end of July, so the sooner I hear from you the better."

*--Doug Canfield is Sales and Marketing Director for Mountaineers Books and a keen cyclist (75 miles to Meany Lodge, ~6000' elevation gain). He has volunteered at many Seattle Navigation courses.*

## Navigation Summit 2016: Clubwide Minimum Standards

By Brian Starlin

Navigation experts from five of the seven Mountaineers branches held a summit in June at Meany Lodge. The main topic was to be "Minimum Clubwide Standards".

That was preceded by updates on elearning, Freedom of the Hills 9th Edition (Freedom 9), Survey feedback from other committees, and generally getting to know each other and the various branches. We started on a Friday evening, stayed overnight, and adjourned about mid-afternoon on Saturday.

**Introductions**

We started with individual introductions and some description of some tools we each like to have in our Navigation toolboxes. The list became quite long. It included useful equipment and gear, apps, maps, guides, sources of trip reports and tracks, several GPS-related tools, and web links. This newsletter includes many of those summaries, and we hope to include more tool reviews in future editions.

Then we went into Branch introductions, to learn what happened in the last year, what's happening in the next year, what works in the program, and what concerns they have. Practically every branch held some type of navigation course in recent months -- Seattle, Tacoma, Kitsap, Olympia, Foothills, and Everett. The club should graduate well over 500 students from a Wilderness Navigation program. Concerns included things like, needed more instructors, need to train the trainer, need more room or a quieter room, field trip permits are restrictive, and equivalency is difficult.

**Desired End Results?**

After a great chicken dinner by the Meany chef, the group discussed desired end results for the summit. The questions were, "What would you like to get from the summit? What would you like to contribute? And, what would you like to take back to your Branch?" Everyone had expertise and ideas to contribute, from their own experience, as well as their branch experience. Certain people attended to contribute specific information about Elearning and Freedom-9. And the group generally wanted to take back ideas about Train the Trainer, GPS courses, new ways to teach or run a course, ideas about technologies old and new, and the common standards.

**ELearning**

Doug Canfield of Mountaineers Books gave the presentation on Elearning. He described the Board's decision in 2015 to prioritize an online learning method of some kind. Navigation was chosen as a good course to "electrify." The project team came together and created the first Elearning Wilderness Navigation pilot course in Seattle, with 24 students and 3 instructors. Of those 24, there were 18 who followed up with a field trip and completed the course. Doug presented a summary of the Wilderness Navigation Workshop structure, along with a few Instructor Training courses that have just been completed. Seattle plans to use the Instructor courses in August and September. The Learning Management System was licensed for one year, from Oct 2015 to Oct 2016. The Summit members from Seattle recommended that the license be extended for a year so that other branches can have an opportunity to run a pilot of their own. Meanwhile, the other branches had many questions, mostly around the impact

upon instructors and volunteers. Seattle felt that the course could be run with minimal impact, although instructors were very involved in the first pilot.

**Freedom 9**

On Saturday morning, after another wonderful meal from the Meany Chef, John Ohlson and Bob Burns outlined potential changes to Freedom of the Hills, 9th Edition (Freedom 9) related to navigation. This was a very useful presentation that turned into a meaningful discussion. In the 10 Essentials section, the navigation system would include "Navigation and Communication". The Navigation portion would include compass, altimeter, and map, with inclusion of paper and/or digital map sources. The Communication portion would include mobile phones, smartphones, apps, and satellite-based communication devices like messengers and beacons.

In other topics related to navigation, there would be more emphasis on workflow, situational awareness, and an ethic of self-reliance.

- Workflow – At home, At the Trailhead, Enroute, Back Home
- Situational Awareness – Observe, Confirm, Decide, Act. Keep the brain active.
- Ethic of Self Reliance – Tools are limited. Rescues are limited. Be Prepared. Be able to contact SAR. Be able to provide a standard of care on your own.

The Freedom 9 overview was based on a draft of the sections, and they are not yet finalized. But it provided good structure to guide our thinking about Minimum Standards.

**Committee Surveys**

Peter Hendrickson presented survey feedback from other committees, such as climbing and scrambling. The intent was to collect and/or confirm the skills and knowledge that those committees want from our Wilderness Navigation course. In general, we seem to be teaching the right things and preparing their students properly for wilderness off-trail travel.

**Minimum Club-wide Standards**

The final topic, Minimum Clubwide Standards (MCS), could have been very contentious. But I believe we found more common ground than uncommon ground. We needed three sections for the MCS -- gear, courses, and instructors. In a quick poll the night before, a question was asked, "Am I aligned with where this group is?" The answers were Yes or Mostly Yes. Under the question, "I hope we will…," many answered around "come to common ground on standards."

We started with four older documents from 2009, from four different branches. That was the last time the Minimum Standards were attempted. At that time, the effort faded without a documented and approved standard.

On the "Gear" section, the hot topic was "Mirrored vs. Un-Mirrored" compasses. This provided a good example of how we can create a minimum standard allowing

for un-mirrored compasses, but that a specific branch can require more than the minimum and enforce use of the mirrors. The other hot topic had to do with the declination screw versus tool-less declination adjustments. Once again, the minimum can be "adjustable declination" without specifying how it's done. Then the discussion on "Courses" consumed a couple hours, before and after lunch. We focused only on the Wilderness Navigation Course, which is a badged offering and a requirement for other Mountaineers courses. The larger group was split into two smaller groups, and each smaller group came up with their own variation on the topic. Brian Starlin will take that input and amalgamate a draft of Minimum Standards.

**Wrap Up**
In an exit survey, all participants found the Summit very useful, particularly on the topics of Freedom-9 and Minimum Standards. Several found the E-Learning session useful, but didn't quite know how well it might fit into their branch. Several mentioned the venue being a little noisy, since we shared the lodge with a work party the same day. There were many kids and others making background noise. There was feedback to spend more time on topics and less time on personal stories; however, I felt that it was important to get to know each other. All in all, folks thought it was a great summit.

*--Brian Starlin is Seattle Navigation Co-Chair and is active with several other outdoor organizations. He is a Seattle climb leader and Seattle Mountain Rescue volunteer.*

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## Freedom 9 Chapter 2—Navigation & Communication Toolsets Anticipated Updates as of June 2016

The current Chapter 2 draft of the widely anticipated September 2017 9th edition of *Freedom of the Hills* expands navigation to include both navigation and communication tools, now called "toolsets." Editorial work continues to work out both content placement (Chapter 2 or 5) and differences of approach. Text snippets below are not final.

**Navigation & Communication Toolsets**
Modern tools have made navigation and communication inseparable. The lines have blurred with the climber's toolset often performing functions for both: cell phones are now cutting edge navigation tools, Personal Locator Beacons determine location and then communicate with friends or emergency responders. Climbers need to choose a toolset based on the nature of the climb--and possess the skills to use the toolset--to accomplish two objectives. First, they need to know where they are and how to get to their objective and back. Second, they need to be able to communicate with emergency responders should the need arise.

**>>NAVIGATION TOOLSET:**

Today's navigation toolset combines the traditional with the near-science-fiction to allow the freedom to navigate unknown hills with relative ease. The toolset should always include a detailed topographic map of the area you are visiting, an altimeter, and a hand-bearing compass. GPS should be considered for every climb unless the route is known by the party to be straightforward, even in darkness or storm. Climbers should know how to use each of the chosen navigational tools as well as how to use them in combination. Using multiple tools increases confidence in location and route, provides backup when tools fail, and increases situational awareness (see inset below).

Maps. Text addresses protecting physical maps, downloading free maps, and advantages/disadvantages of digital maps.

Altimeter. Text addresses the power of knowing your elevation and free to expensive tools.

Hand-bearing compass. Text addresses baseplate and cell phone compasses.

Navigation workflow. The "workflow" of navigation must now be considered to support situational awareness.

**Situational Awareness**

Experienced navigators have a respect for and a wariness of GPS. Too often they see climbers "heads down" following their tiny screen with a loss of "situational awareness." When the navigator simply follows cues from the GPS unit, the climber ignores cues from the passing terrain, situational awareness and therefore safety are diminished.

The climber using GPS must fight this tendency. **Observe:** Start by observing your surroundings and updating your mental map of the landscape. Where have I come from? Where am I now? Where am I going? What are the dangers? **Orient:** Then correlate your surroundings with your physical map to see if they are in agreement. Myriad details can be used including slope, sun position, ridges, and terrain features. Then confirm your understanding using multiple tools from the toolset. Confirm your elevation with an altimeter, your cardinal directions with your compass, and position with GPS. **Decide:** Where do we go from here? Decide on next steps. **Act:** Climb on! And maintain your heightened sense of situational awareness by repeating the cycle with close observation and continually updating your mental map as you move through the landscape.

Maintaining situational awareness is not just a topic of navigation but of safety generally: What is happening with the weather? What is the condition of the party? How many hours of daylight remain? Maintaining a high level of situational awareness can help to keep you on course, safe, as well as deriving full enjoyment from the experience.

Cell phone and tablet GPS apps. Text addresses smartphone use of cell towers and satellites linked with downloaded maps. Fragility leading to failure is noted.

Dedicated GPS devices. Dedicated GPS devices are promoted for use in extreme environments.

**>>COMMUNICATION TOOLSET:**

Historically, the mountaineer has needed to be completely self-reliant. That ethic should dominate the thinking of those entering the wilderness. But when despite

good tools, preparation, and training, life becomes threatened, most climbers would welcome help from emergency responders.

**Cell phones.** Text advises use but counsels: *Assume that cell phones will not function to make calls from the backcountry.*

**Satellite Communications.** Text advises: Taking form as personal locator beacons (PLBs) and satellite phones, these new tools should be strongly considered to increase the climbing party's margin of safety.

> **Ethic of Self-reliance:** Understanding the limits of communication tools is as important as understanding their usefulness: batteries deplete; cell phones are limited in most mountain locations while satellite communications are limited in many; a rescue may not be possible due to weather conditions or availability of rescuers. Communication tools are not a substitute for self-reliance. No party should set out ill-prepared, inadequately equipped, or attempt a route beyond its ability assuming emergency help can be summoned.
>
> For the climbers who wrote the first editions of this book, there was no easy rescue in the mountains. They knew that freedom could come at great cost and that a safe return would come from reliance on the party's experience, skills and judgment.

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## Freedom 9 Chapter 5 (Navigation) Anticipated Updates for September 2017 Edition…as of June 11, 2016

By Bob Burns

[Note: **Bold Face** herein indicates **new material added for Freedom 9.]**

TRIP PREPARATION

THE MAP

- Relief Maps
- Land Management and Recreation Maps
- Climbers' Sketch Maps and Guidebook Maps
- Topographic Maps
- **Cell phone map apps and websites such as USGS.gov and OpenStreet Map**
- Aerial and Satellite Photos
- **Digital Maps**
- Latitude and Longitude; Scales
- What the Colors Mean
- Contour Lines and Interpretation
- Other Map Information (declination, limitations, adjacent maps, **new USGS TOPOs**)

ROUTEFINDING WITH THE MAP

- Before the Climb (Climb Planning, Handrails, Baselines, Route finding Problems)
- **Other Homework: If using GPS, create important waypoints, download maps, etc.**
- During a Climb (Relate Surroundings to Map, Look Ahead to Return, Think about Route, Possible Route Marking, Keeping Oriented, Monitoring Rate of Travel, etc.)
- On Technical Portions of the Climb and on the Summit
- On the Descent; The Intentional Offset
- After the Climb

THE COMPASS (Features of the Basic Compass; Optional Features)

- Measuring and Plotting Bearings on the Map
- Taking and Following Bearings in the Field
- Magnetic Declination
- Adjusting Bearings for Declination
  - Using Adjustable Declination Arrow
  - Adding a Customized Declination Arrow
- Taking and Following Bearings in the Field using a Compass with Declination Arrow
- Changes in Magnetic Declination
- Compass Dip
- Map and Compass Checklist
- Practicing Compass Use and Cautions with Compass Use
- Using the Clinometer Feature of a Compass

THE ALTIMETER (Description; Analog and Digital Altimeters and **dedicated and cell phone GPS**)

- How Altimeters Aid Climbers ("Every climbing party should have **at least 1** altimeter")
  - Calculating Rate of Ascent
  - Orientation and Navigation
  - Predicting the Weather
- Cautions with Altimeter Use

THE GLOBAL POSITIONING SYSTEM (GPS)

- **Dedicated GPS Devices** (Garmin, Magellan, DeLorme, etc.)
- **GPS Apps for Cell Phones and Tablets**
- What to Look For in GPS Receivers
- Getting Started with GPS
- Using a GPS Receiver in Mountaineering
  - Limitations of GPS Receivers

**Tips for Effective GPS Use [mostly dedicated, e.g., Li and NiMH batteries, etc.]**

**Cell Phones and Tablets**

**The GPS Signal, Wi-Fi, and Cellular Network**

**Effective Use of GPS in Wilderness Navigation [mostly applies to cell phone GPS apps]**

**Navigation Workflow When GPS is Utilized for Navigation**

ORIENTATION BY INSTRUMENT

Point Position
Finding Point Position from Known Line Position
Finding Point Position from Known Area Position
Finding Line Position from Known Area Position
Orienting a Map
Orientation using GPS

NAVIGATION BY INSTRUMENT

Using Map and Compass
Using Compass Alone
Using Intermediate Objectives
Using GPS

LOST

What if the Party is Lost?
What if Lost Alone?

FINDING THE FREEDOM OF THE HILLS

*--Bob Burns is a long-time Mountaineers member, author and volunteer. He notes that editorial work continues to harmonize Chapter 2* Clothing and Equipment *and Chapter 5* Navigation*.*

## Wilderness (Basic) Navigation Course Offerings 2016--Seattle

Basic Navigation transitioned to Wilderness Navigation in 2016, clearly focused on wilderness/back country travel including off trail navigation to meet requirements for Alpine Scramble, Basic Climbing, Snowshoe and BC Ski students (and others). Altimeters and GPS units (basic point position) are included. We are developing a Seattle version of Foothill's Staying Found, which does not meet other back country course requirements. https://www.mountaineers.org/about/branches-committees/seattle-branch/committees/seattle-navigation-committee/course-templates/basic-navigation-course/basic-navigation-course-seattle-2016

| Date & Day | Workshop | Date & Day | Fieldtrip |
|---|---|---|---|
| Thur, Nov 3 | Program Center | Sat & Sun,Nov 5 & 6* | Heybrook Ridge |

**Note: Sunday 6 November date is pending Forest Service approval.*

## Smart Phone and Dedicated GPS Navigation Course--Seattle

Are you interested in learning to use your smart phone as a wilderness GPS? Maybe you have had a dedicated GPS for years and want to get the most out of it? The Smart Phone and Dedicated GPS Navigation course is for you! We will cover basic usage of both dedicated GPS units and some select GPS apps for smart phones, as well as common issues that can affect GPS accuracy and ways to avoid them. This course is an evening at the Mountaineers Seattle Program Center in Magnuson Park, split between a classroom lecture and a hands on outdoor exercise. This course is open to Wilderness (Basic) Navigation students and graduates. Fee and Badge.

**Topics include:**

- Overview of how GPS works
- Common accuracy issues and solutions
- Review of UTM coordinates
- Entering waypoints
- Navigating to a way point
- Back tracking a route
- Overview of emergency locating beacons (SPOT, PLB)

Students need to bring a GPS enabled device to the class; loaners are not available. We cover both Gaia for iOS and Android devices ($20, pro not required) and Garmin dedicated units. Other brand GPS units are welcome, but instructors may not be familiar with them. Lead course administrator is Brain Seater.

The current URL provides a description and the 2016 dates are on the calendar: https://www.mountaineers.org/about/branches-committees/seattle-branch/committees/seattle-navigation-committee/course-templates/smart-phone-dedicated-gps-seattle/smart-phone-dedicated-gps-seattle-2016

| Smart Phone & Dedicated GPS Course | Location |
|---|---|
| Tuesday, August 9 | Seattle Program Center |
| Monday, October 3 | Seattle Program Center |

## Introduction to Map & Compass—Getting Started--Seattle

The Seattle Navigation Committee scheduled six 2016 Introduction to Map and Compass dates at the Seattle Program Center from 6:30 to 8:30 p.m. Instructors are drawn from the pool of Wilderness Navigation Course teachers. You can enroll at: https://www.mountaineers.org/about/branches-committees/seattle-branch/committees/seattle-navigation-committee/course-templates/introduction-to-map-compass/introduction-to-map-compass-seattle-2016-1. Administrative lead is Brian Carpenter. This Getting Started introductory class does not satisfy the navigation requirement for Alpine Scramble, Basic Climbing, Snowshoe or Backcountry Ski.

| Introduction to Map & Compass 2016 | Location |
|---|---|
| Monday, August 15 | Seattle Program Center |
| Thursday, September 15 | Seattle Program Center |
| | |

## Other Branches 2016 Navigation Courses

| Branch | Course | Dates |
|---|---|---|
| Tacoma | Wilderness Navigation Lectures 1 & 2 | August 10 & 17 |
| Tacoma | Wilderness Navigation Field Trip | August 20 |

## Navigation Project(s)

>>Our Seattle Volunteer Park effort to create a self-guided navigation map, compass, and SmartPhone (altimeter & UTM coordinates) practice course is online. You may download the PDF (with answers) here: https://www.mountaineers.org/about/branches-committees/seattle-branch/committees/seattle-navigation-committee/files/seattle-navigation-self-guided-practice-volunteer-park/ Thanks to Nancy Temkin and Bob Boyd for their beta testing last fall.

>>A second practice course focused on GPS use is under development for Lincoln Park in West Seattle by Mountaineers Safety Chair Dave Shema.

## Navigation Gear, Apps & Links of Interest

Your comments and suggestions are ever welcome regarding the Seattle Navigation website and links in Navigation Northwest.

**The Gear… [Navigation Summit 2016 participants contributed several.]**

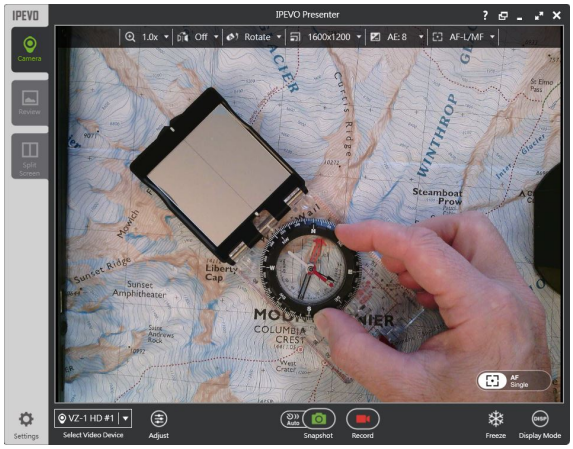
## Document Camera Helps Instruct Navigation

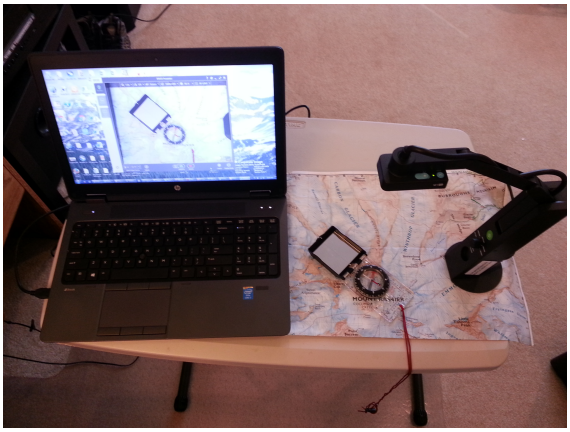
By Brian Starlin

This isn't a piece of equipment to take into the field. Rather, it's a teaching tool. Seattle uses the IPEVO VZ-1HD. The reviews are great and it lives up to its reputation.

It feeds a live camera image into your laptop, which can then be fed to the projector. Or, it can plug directly into the projector. However, it seems best to feed it through the laptop and then use it in the middle of a presentation by just switching applications.

The benefits for navigation are to demonstrate the compass or map/compass together in real time. Or, you can record a video to use over and over. Rather than a static slide of directions, the task can be demonstrated step by step, with the same map that students have in hand. The student feedback has been very positive. It now fits well into Wilderness Navigation, GPS, and the Intro to Map and compass courses offered by Seattle. At Navigation Summit 2016 one presenter used the doc cam to project his smartphone photos.



For more information see http://www.ipevo.com/. The company specializes in school sales. The IPEVO VZ-1 HD, a dual mode VGA/USB document camera, lists at $139 and is also available through Amazon at https://amzn.com/B00ETT3WB2.

*--Brian Starlin is Seattle Branch Navigation chair and a climb leader.*

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## Navigation Gear—Compasses

Brunton is promoting the new, hand-bearing Axis Transit Compass. Compass north is oriented to the hollow hinge (sighting tube) and the lid can rotate 360 degrees on the minor and major axis. Yes, this was designed by geologists for geologists. No, it does meet standard for Wilderness Navigation Here's the YouTube link: https://www.youtube.com/watch?v=NBls4iPO11Y&feature=youtu.be&mc_cid=b40f677501&mc_eid=5e19c99105

# Thinking About Freedom 9: Navigation & Communication Toolsets

By Bruce Crawford

A recent draft of Freedom 9, Chapter 2, links navigation and communication as "toolsets." Further editing lies ahead but bringing communication into navigation territory provokes many considerations. Here's how I react to GPS workflow counsel about situational awareness (Observe, Orient, Decide and Act) and use the toolsets on wilderness outings.

In the situational awareness section, the Decide task includes where you're headed next, how you'll know when you're there, and how long it should take to get there. So I proceed through a series of intermediate points with time limits which force a serious analysis of where I'm (Orient) at and whether I'm on schedule should I miss any of them. In our family there are even greater demands on communication devices such as SPOT.

The additional thing a SPOT can do is to act as a tracker, which is how I use mine. It attempts to send a position every 10 minutes and will do so until it dies. So, whether or not I activate my Res-Q-Link+, my wife can call the county sheriff and inform them of the SPOT tracking info. That being said, I've learned the SPOT doesn't do well the first part of the hike. Is it the GPS having trouble downloading the almanac? Is it the transmitter failing to see a Low Earth Orbit commercial satellite low in the sky with a smaller visibility footprint until I'm out of the valley? Not sure which yet, but I've been collecting SPOT points to ponder.

So my SPOT is set up to send information to a website on an ongoing basis, while the Res-Q-Link allows me SOS definitively.

The two way messaging an InReach provides is yet another function. Pilots like it because it meets an FAA requirement. But is it worth double the capital and operating cost of a SPOT? InReach does have more global and ocean coverage. But, InReach uses yet another Low Earth Orbit satellite system with similar visibility limits to SPOT.

The Res-Q-Link uses the COSPAS/SARSAT system, which is starting to include location satellites like the European Galileo sats. The next generation will also have an ability to echo a "message received" back to new devices. But even current devices will benefit as more satellites with bigger footprints listen for SOS's. The new capabilities are scheduled to be fully operational in 2019 last I heard. Here's a link: http://www.cospas-sarsat.int/en/2-uncategorised/177-meosar-system

Now, testing is an issue. SPOT and InReach allow the user to change batteries and send non-emergency messages. PLB's using the COSPAS/SARSAT system are much more limited in testing.

So, it isn't just about pushing an SOS button. There are other functions that may better fit your use and there are limitations to consider. And just pushing the button is no substitute for mountaineering survival skills. The tale of two Rainier climbers and a fast moving storm lays bare the ill-founded belief that SPOT = Rescue Soon. And what happens when your digital compass and GPS device chill out? Here's the June 2016 *Tacoma News Tribune* link:
http://www.thenewstribune.com/outdoors/article85638042.html

*--Bruce Crawford is a longtime Mountaineers navigation leader and wilderness hiker and musher.*

**The Apps… [Navigation Summit 2016 participants contributed several.]**

## A Fast Look At Bruce Crawford's Apps

Long time Seattle Navigation Committee leader Bruce Crawford walked the Navigation Summit 2016 group through his iPhone 6s navigation apps. He is a principal architect of Seattle Branch navigation renewals. Bruce is often the first to use and review navigation apps and he waited for several months to purchase the iPhone with maximum memory, some would say "phablet." Following is a spare look inside his device by function.

**Altimeter**
--Pro Altimeter (Hunter), http://hrtapps.com/proaltimeter/, iOS only, $1
If your phone has a pressure sensor this allows you to set an elevation for that and compare it to the GPS elevation.

**GPS**
--Gaia <— use religiously, https://www.gaiagps.com/, iOS and Android, $20
My favorite. Still learning tricks on how I can use this. One can use Gaia before (predefine waypoints, load a track), during (navigate & record a track) and after a hike (edit & share a track). Note: Gaia (Pron. guy-ya) is the app of choice for Seattle GPS instruction.

--iHike GPS (don't use), http://ihikegps.com, iOS, $10

--MotionX-GPS (don't use), http://gps.motionx.com, iOS, $2
Some people like this app (WTA suggested it) and the price is low. It is good, but I personally will stick with Gaia.

**Guides**

--WTA Trailblazer, http://www.wta.org/about/trailblazer-mobile-app, iOS and Android, free
If you'd rather look for trails and trip reports on your phone, this app is for you. Requires network access.

--All Trails, http://www.alltrails.com/, iOS and Android, free
Want a list of trails near you, or near a location on the map? This is a source. This is a before you hike research tool requiring network access. Since it is at least somewhat crowd sourced, take it all with a grain of salt. See review below.

--Ebooks - Some Mountaineers guides are available in various electronic formats. I use the Kindle app and format. Some guides have better linking than others. Cascade Alpine Guide without the ability to use the index or table of contents to get to what you want to read, not much fun. Day Hiking Snoqualmie Region, useful when you need an alternative, now.

**Instrumentation**
--Theodolite, http://hrtapps.com/theodolite/index.html, iOS only, $6
Allows you to use your phone's compass and orientation sensors to know the direction, slope and angle of rotation, while using the phone's camera to verify what it is pointed at. Mostly I just use it for slopes, though since there is an add on for state plane coordinates, surveyors, engineers and construction people might find it useful.

**Maps**
--GTM - Green Trails
This is an iOS app I use, no web site. The app is free, but you pay per map, typically a few dollars per map. My use for this is to check trail options before a hike.

--HistoryLink.org Seattle & Washington (what happened near where you are?)
This app will show if there is a short essay on the history of a town or spot near you. There is not a link on the web site to the app, but it shows up in the iOS app store.

--Topo Maps (don't use)

**Recognition**
--Peak Finder. See review in April 2006 Navigation Northwest.

**Tools**
--Map Tools

--mDeclination [Java code for declination determination.]

--SPOT App - on someone else's device if your SPOT is in tracking mode

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## AllTrails A Good Fit for Front Country Hikes

By Peter Hendrickson

**AllTrails (AT)** for Android or iOS (http://alltrails.com/) competes with Gaia and CalTopo for users. A Gaia review (http://blog.gaiagps.com/gaia-gps-vs-alltrails-2/) notes, "The AllTrails app shines for its trail search feature...many well-reviewed trails, typically day-hikes near your current location." I tested this in the greater Tiger Mountain area plus my hometown (Amherst, MA). The coverage was dense and largely accurate (Chirico is great all year) including several trip reviews—not bad for free. If you want to save, print or customize, that'll be $29.99 a year while Gaia is one-time $19.99 for a more powerful feature set. Front country, back country? At no cost, an AT hard copy topo map with trail is at hand if you have a screen capture app—see Figure 1. And you can call up an online map or record a track free with AT—great for local day hikes. I'll stick with Gaia for back country travel and cough up $20 annually for a companion CalTopo basic subscription.

Figure 1. Chirico Trail to Poo Poo Pt, W Tiger Mt AllTrails screen shots


*--Peter Hendrickson is a Seattle Navigation past chair and current Seattle Branch chair. He stumbled on this app in an Alaska Airlines in-flight magazine.*

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**And the links… [Navigation Summit 2016 participants contributed several.]**

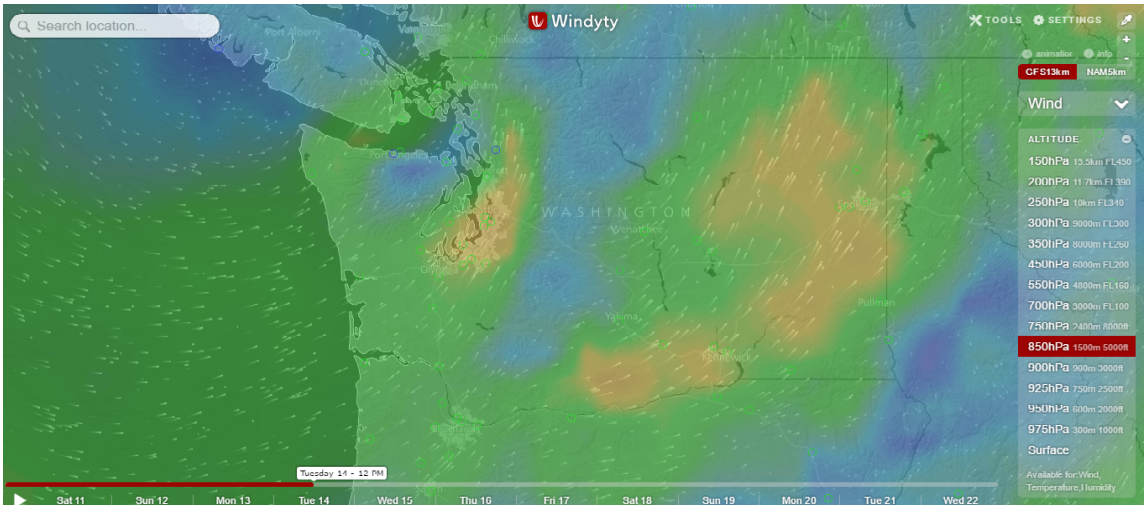
- Don't forget our friends at REI who instruct (and sell) map and compass. https://www.rei.com/learn/expert-advice/navigation-basics.html
- Mazamas have posted a remarkable collection of Northwest printable maps (PDF), climbing routes, GPS tracks (.GPX or .KML). Links to Gaia and CalTopo tutorials are also included. http://mazamas.org/resources/maps-for-climbing-and-hiking/ *--Thanks to Pat Podenski*

## Links For Hiking and More--Seattle and Beyond

By Lynn Graf

We are likely all familiar with the WTA website and have our favorite sources for weather information for trip planning purposes. I'll describe three perhaps less familiar ones that I use on a regular basis.

**Weather**: Windyty (https://www.windyty.com/) *[Hint: Tuck in browser window.]*




What if offers: wind, temperature, rain/snow etc. ... worldwide or zoom in, select a location ... at your selected elevation … for 10 days. It's a fascinating view of weather patterns developing over time and easy to use for specific locations in the mountains.

**Alpine backcountry scrambling ideas and conditions**:
http://www.nwhikers.net/, specifically the Trip Reports, but there is much more, from history to finding partners for trips. The tradition of lots of photos and detailed route descriptions accompanying the reports can provide critical information on snow levels and overall conditions. It's an amazing source of new peaks and rarely visited backcountry areas. Caution is advised on descriptions of the technical difficulty of trips unless one knows the person posting and their definition of "easy."

**A clearinghouse for FREE trail maps and route descriptions for the Seattle area**: http://www.weekendhike.com/2011/01/free-trail-maps-seattle.html. This website has live links to the trail maps for Cougar, Squak, Big Finn Hill, Vashon, Tiger, Taylor Mountain, Soaring Eagle ... you name it, as well as detailed hike descriptions for specific popular trails in many of these areas. Since many of the maps are PDF's they can be downloaded to a smart phone to make them available offline. I like the one-stop shopping for such maps but am not sure all of the many links are still active.
*--Lynn Graf is a past Seattle Navigation chair and frequent hike and scramble leader. She is a principal architect of Wilderness Navigation course renewals.*

**Teaching About Land Forms and Topo Maps—Short Stack of Fine Slides**
Glacial landforms are a staple of hikes, climbs and scrambles in the Northwest. Instructors and navigation course designers may find this slide deck on glacial features useful. Slides cluster glacial features on topographic maps in relation to photographs and satellite images. Other decks are also posted— in© SlideShare source is not provided.
*--Editor*
http://www.slideshare.net/expattam/glacial-features-on-topographic-maps?next_slideshow=1
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# Navigation Gear--Compasses

## Required Compass Features: Seattle Wilderness (Basic) Navigation Course & Foothills Staying Found

**Seattle Mountaineers—Revised July 2016**

1. **Adjustable declination**: If there is one feature that simplifies map and compass work, this is it. Compasses with adjustable declination can often be identified by the presence of an adjustment screw, usually brass or copper-colored, and a small key attached to the lanyard. It allows you to move the orienting arrow in relation to the azimuth ring.

· All students MUST have a compass with adjustable declination. The presence of a declination scale does not guarantee that it can be adjusted. Avoid the 'tool-less' declination feature on the Brunton (see below).

· Even if you already have a compass without adjustable declination, you may not use it in this course. Experience indicates that such compasses detract from the learning experience.

2. A **transparent rectangular base plate** with a direction of travel arrow or a sighting mirror.

- · Transparency allows map features to be seen underneath the compass.
- · A rectangular shape provides straight edges and square angles to plot and triangulate on the map.

3. A **0 to 360 bezel** (the rotating housing) marked clockwise from 0 to 360 degrees in increments of two degrees or less. In general, bezels should be large to allow use while wearing gloves - the larger size also improves accuracy. Do not get one marked in 0-90 degree quadrants OR one marked in O-6400 mils!

4. **Meridian lines**: Parallel 'meridian lines' on the bottom of the interior of the circular compass housing rotate with the bezel when it is turned. Longer lines are better. Meridian lines run parallel to the north-south axis of the bezel, however turned, for plotting and triangulating on the map.

5. A **ruler and/or gradient scale** engraved on one of the straight edges, used for measuring distances. In the U.S. 1:24000 scales (rather than 1:25000) are preferred.

6. A **3 to 4-inch base plate**. A longer straight edge makes map work easier.

**Additional recommendations**

- A sighting mirror in the cover: Reduces error introduced when moving compass from eye-level after sighting to waist-level for reading the dial.
- A liquid-filled housing: Reduces erratic needle movement (common on better compasses). In some cases, steadying the compass needle can be difficult
- An inclinometer: A gravity driven arrow that allows you to measure slope angle.

**Current favorites:** Silva, Suunto, Kasper & Richter, and Brunton are the common favorites. Their quality and usability varies, so **keep any receipt**. We have unfortunately seen many defective compasses in the past. Beware the UST ~$7 knock-off baseplate compass available via Amazon and other outlets. Our gear tests show it to be unreliable.

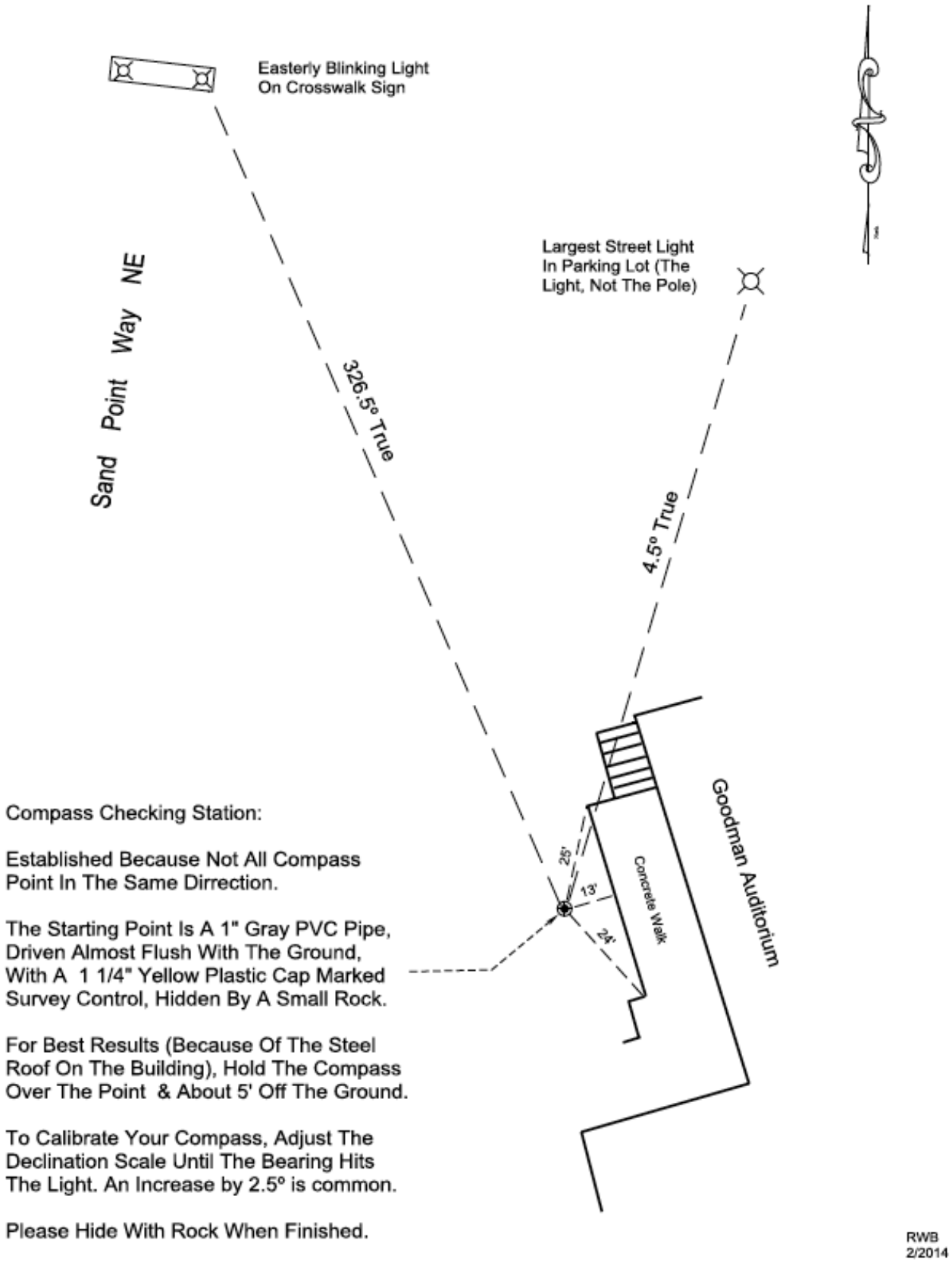
--From Silva, with a sighting mirror, is the Silva Ranger 515 CL (not the CLQ). Without a mirror is the Silva Explorer Pro (not the 203 or Polaris). Silvas are available at Cabela's or online.

--K & R has the Sherpa and Alpin using 1:25,000 vs. 1:24,000 rulers. They are available online.

--Brunton has several compasses that meet our requirements but present issues with "tool-less declination", lack of clearly visible meridian lines or scales and curvy shapes. Several tool-less declination models have come apart in user hands. Preferred models are TruArc 15 (mirrored), and TruArc 5 (non-mirrored). The TruArc 10 has measurement scales (good) but curvy sides (not good). The TruArc 3 lacks clear meridian lines and is short. Bruntons are available at REI, Cabela's or online.

--Newly available retooled Suunto MC-2 (mirrored) and M-3 (non-mirrored) 2016 models passed all bench tests with flying colors—a batch of eight was locally tested. Older MC-2s frequently needed to be set 2-3 degrees higher (i.e., 165 degrees East became 18-19 degrees East). Suunto is currently available at REI, Feathered Friends and online. Manufacturers make continuing improvements and corrections in models.

***(Rev July2016/bs.ph)***




## Seattle Program Center Compass Calibration Station

## Navigation Northwest Copy and Publishing Deadlines 2016

| Calendar 2016 | Copy Deadlines | Publish Dates |
|---|---|---|
| Volume 4, Issue 3 | September 1 | Late September 2016 |
| Volume 4, Issue 4 | December 1 | Late December 2015 |

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

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**"Do not go where the path may lead, go instead where there is no path and leave a trail."** *--Ralph Waldo Emerson, American writer, 1803-1882*

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