



## Winter 2014 Product Testing Program

### Disclaimer

Traveling in the backcountry is inherently dangerous. Understand and accept the risks involved before participating. Before using this product, please read and understand all instructions that accompany it, and familiarize yourself with its proper use, capabilities and limitations. We recommend that you get proper training in its use. Failure to read or follow any of these warnings can result in severe injury or death! The AvaTech Snow Profiler you will be using is a prototype and is not intended to support decision making in avalanche terrain. You are ultimately responsible for your own decisions.

### Overview

AvaTech is developing a portable, easy to use proactive avalanche safety system that helps professionals analyze the snowpack in real-time, make safer decisions, and avoid fatal avalanches. AvaTech integrates a high tech measurement device with data collection, networking, and analytics capabilities to enhance personal safety, area management and avalanche science.

This winter, AvaTech will test the Snow Profiler system with ~50 industry leading organizations and individuals spanning avalanche centers, universities, ski resorts, guiding companies, transportation authorities, professional athletes and special operations units. The purpose of the testing program is to a) gather critical feedback from top experts in the field to ensure products are built to the highest standards of the professional community and b) assess the technical performance of the product. We are incredibly grateful for your participation in our product testing program and are thrilled to have you. Your honest feedback will be enormously valuable in helping us bring a potentially life-saving product to market.

### Timing

The product testing program will run from late February through the end of April 2014. On average, we will have 2-3 testing partners per device (in some cases more), so you may need to share a device with another organization in your area. We will review this with you on a case by case basis.

### Testing partners

We have selected a highly experienced group of testers from across the US (CO, UT, CA, MT, ID, AK, NH) as well as Canada (BC) and Europe. We have selected testing partners with a wide variety of avalanche experience as well as geographic diversity to ensure we test in every type of snowpack possible.



## **Expectations**

AvaTech will provide you with a device for 1-2 weeks during the February – April testing period. Because these devices are work-in-progress prototypes, we will ask you to return the devices at the end of your testing period. We will aggregate all feedback from testing partners, draw insights across multiple prototypes, and use these learnings to prepare for manufacturing.

During your testing period, we will ask you to use the device regularly in your daily operations and record your experiences and feedback. You will be able to upload your testing results and provide feedback as much as you like via our web platform at [beta.avatechsafety.com](https://beta.avatechsafety.com). Ideally, we recommend providing feedback weekly or bi-weekly. We will also be available via phone throughout the program for tech support or other questions and will visit many locations locally as well.

*The program will consist of three types of testing:*

### **1. Functionality**

Functionality is by far the most important part of our program. We want to understand how well the device and web application works for you.

*Key questions:*

- How well does the AvaTech snow profile compare to your side-by-side professional snowpit evaluations?
- Do you trust the device to gather accurate, reliable information in a repeatable way?
- Are snow structure measurements affected by speed or angle of the probe?
- Are slope angle and GPS measurements consistent with your expectations?
- Is battery life sufficient?
- Are you able to resolve the thinnest weak layers of concern to you?
- What do you and don't you like about the devices functional capabilities? How can we improve?

### **2. Durability**

We need to understand how durable the prototypes are and where there may be chinks in the armor. We encourage you to use the prototypes in all kinds of conditions, varying temperature, wind, snowpack, etc. across extreme climates.

*Key questions:*

- Are there any issues with breakage / durability that concern you?
- Do you encounter any challenges with durability of the sensors?

### **3. UI / Design**

User interface and design are critical aspects of our product. We'd like to understand how intuitive you find the user interface, what you do and don't like about the devices design, and what alterations we can make to improve the product according to your needs. We would also like to understand how you envision using the product (how you will carry it and deploy it under various circumstances).

*Key questions:*

- Is the UI intuitive and easy to use? What elements do you like / not like?
- Are there any parts of the UI you find confusing or particularly challenging?
- Is the screen size and data resolution sufficient?

- What are your impressions of the handle design, comfort, overall weight / size of the product, etc.

### **Specific Field Testing Instructions**

Please use the device to take as many measurements as you like, whether you are out on a tour and want to understand the basic snowpack structure on the go or want to compare results to snowpits you dig on a weekly basis. The more you use the tool in real conditions representative of your professional work, the better. For pure validation purposes, we would request that any data you send to us to be accompanied by your own professional snowpit assessment. To make this possible, we have created an easy-to-use web platform that will allow you to upload AvaTech data via USB drive, record your snowpit data, and link AvaTech profiles with your snowpits. While in the field, you simply will record the timestamps in your field notebook that pertain to a given profile and match them to your professional profile on the web platform.

Because we will be collecting so much data throughout this program, we have created a simple, standardized snowpit testing procedure. It is very important that you follow this procedure closely in order for testing results to be valid. Please let us know if you have any questions:

- **Step 1:** Dig your own snowpit and record your standard evaluations (location, time, structure, grain size/type, temps, etc.). In particular, please record snow height so you will know when to stop the probe before hitting the ground (to avoid getting the tip sensor unnecessarily dirty). Also, note any major layers of concern (e.g. layers with concerning results from CT/ECT tests, buried surface hoar, depth hoar, facets, etc.) We want to make sure we are seeing the most dangerous and important layers in the snowpack.
- **Step 2:** Once you have completed your typical snowpit assessment, please take 18 consecutive snow structure measurements in the following order (in the instruction section, you can read more about how to take an actual measurement).

These measurements should be conducted right behind the wall of your snowpit or off to the side, as close as possible to where you completed your hand hardness test. The primary goal is to test the probe at different speeds and different angles. The first 9 measurements will be oriented vertically (3 medium speed, 3 fast speed, 3 slow speed) and the second 9 measurements will be oriented perpendicular to the snowpack (3 medium speed, 3 fast speed, 3 slow speed). Gathering data at different speeds will help us build the appropriate algorithms to eliminate speed as a variable when we graph snow profiles. Gathering data at different angles will help us understand if the probe performs better when oriented vertically or perpendicular to the snow.

#### **Vertical tests**

- *Measurement 1:* Probe vertically at a constant, medium speed (e.g. 1-2 seconds from start to stop).
- *Measurement 2:* Probe vertically at a constant, medium speed (e.g. 1-2 seconds from start to stop).
- *Measurement 3:* Probe vertically at a constant, medium speed (e.g. 1-2 seconds from start to stop).
- *Measurement 4:* Probe at a rapid speed (e.g. <1 second, be wary of hitting the ground though, please stop before you hit any rocks)
- *Measurement 5:* Probe at a rapid speed (e.g. <1 second, be wary of hitting the ground though, please stop before you hit any rocks)
- *Measurement 6:* Probe at a rapid speed (e.g. <1 second, be wary of hitting the ground though, please stop before you hit any rocks)

- *Measurement 7:* Probe at a very slow speed, as constant as possible but lasting 4-5 seconds
- *Measurement 8:* Probe at a very slow speed, as constant as possible but lasting 4-5 seconds
- *Measurement 9:* Probe at a very slow speed, as constant as possible but lasting 4-5 seconds

#### **Perpendicular tests**

- *Measurement 1:* Probe vertically at a constant, medium speed (e.g. 1-2 seconds from start to stop).
  - *Measurement 2:* Probe vertically at a constant, medium speed (e.g. 1-2 seconds from start to stop).
  - *Measurement 3:* Probe vertically at a constant, medium speed (e.g. 1-2 seconds from start to stop).
  - *Measurement 4:* Probe at a rapid speed (e.g. <1 second, be wary of hitting the ground though, please stop before you hit any rocks)
  - *Measurement 5:* Probe at a rapid speed (e.g. <1 second, be wary of hitting the ground though, please stop before you hit any rocks)
  - *Measurement 6:* Probe at a rapid speed (e.g. <1 second, be wary of hitting the ground though, please stop before you hit any rocks)
  - *Measurement 7:* Probe at a very slow speed, as constant as possible but lasting 4-5 seconds
  - *Measurement 8:* Probe at a very slow speed, as constant as possible but lasting 4-5 seconds
  - *Measurement 9:* Probe at a very slow speed, as constant as possible but lasting 4-5 seconds
- **Step 3:** After completing structural measurements, be sure to record test numbers of all 18 measurements (for matching purposes later).
  - **Step 4:** Please take a slope angle and aspect measurement with the device. To do so, simply lay the device on the ground with the handle on the higher part of the slope and press 'slope test'. Please note, some devices may or may not have slope angle measurements enabled.
  - **Step 5:** If possible, note whether GPS data and temperature data align with other devices you carry with you in the backcountry that you know to be accurate. Please note, some devices may or may not have GPS enabled.

By following these five simple steps, you will be helping enormously to ensure validity and comparability of the data. In addition, there may be various types of tests we have not thought of that could help us learn a lot about how well the system is working. Please feel free to suggest other ways of testing that you would like to do. While we want to be very rigorous and scientific in our approach and validation process, we also know that you are the true experts and we are happy to have you be creative and help us think of new ways to make the most of this testing program.

#### **How to use the AvaTech Snow Profiler**

There are several key steps required to most effectively use the Snow Profiler:

- 1) First, remove the profiler from the bag and extend by holding the handle grip in one hand the aluminum pole segment (silver) below the handle in the other hand. Pull the aluminum pole away from the handle (pull your hands apart) until the pole snaps together. It is easiest to do this while standing up, with the handle at eye level and the pole segments hanging freely.
- 2) Once the pole is extended, press any button to turn the device on.
- 3) When the device is turned on, you will have several options:

- a. Review old tests by time or day
  - b. Conduct a new snow structure test
  - c. Conduct a new slope angle test
- 4) When conducting a snow structure test, stand uphill from the device and hold the probe vertically an inch or so above the snow. When you are ready to test, press the “TEST” button. You will then hear a beep which will indicate it is okay for you to begin probing through the snow. Please note, our sensors will know when the probe is in the snow, so even if you delay a second or two after the beep by accident, this should not impact the data. If for any reason you do not hear a beep, you can also look at the screen – when you press test you will see “Calibrating” appear on the screen for 1 second. After this second, it will say “Collecting” and you can start probing the device into the snow”. Once the test is complete, you will see “Processing” for one second prior to the profile being displayed on the screen.
- 5) When conducting a slope angle and aspect measurement, simply lay the probe on the snow surface with the handle uphill and press the “TEST” button.
- 6) If you test snow structure and slope angle one after the other, you can also link these measurements together easily via the user interface.

**\*Important notes about sensors** – During snow profile tests, be sure not to put your hand between the black window on the handle and the snow, as this will interfere with readings. Similarly, there is a small ‘eye’ sensor at the probe tip. Make sure this ‘eye’ is out of the snow (and clear of any snow/ice) prior to probing as once it enters the snow it will trigger the test.

### **Web Platform Instructions**

In addition to the AvaTech device, we are building a web platform for professionals that will provide a home base for your AvaTech information. The first version you see will allow you to upload AvaTech Snow Profiler data via USB, enter your own snowpit information to compare, and submit your field tests.

*To upload device data and submit field test reports:*

**Connect Device:** Remove your device’s battery cover to expose the USB port. Connect your device to your computer with the USB cable that came with your device. A drive called “AvaTech” will show up on your computer.

**Step 1:** In the web platform, click “Sync Device” to open the device sync screen. Clicking “Select Device” will prompt you to select a folder – select the “AvaTech” drive. Your device data will now begin uploading to the AvaTech cloud. This process may take anywhere from one to ten minutes, depending on your internet connection speed and the amount of data on your device. Once the upload is complete, your data is viewable in “Device Profiles”.

**Step 2:** After syncing your device, create a new manual snow profile of your field snowpit (“Manual Profiles” > “New Profile”)

**Step 3:** After syncing your device and creating a manual profile, you’re ready to create a field test report (“Field Tests” > “New Field Test”). In the field test report screen, select the manual profile from step 3, and for each of the 18 field tests, select the corresponding device profile (per your field notes).

### **Tech Specs**

- *Weight:* 1.2 lbs
- *Dimensions:* 4 x 21 inches when folded, 4 x 60 inches extended

- *Battery life*: Estimate of ~2-4 hours. The device has been programmed to go into sleep mode after ~60 seconds. That said, the batteries will continue to be drained even when the device is in sleep mode. Please remember to remove batteries at the end of your time in the field.
- *Battery type*: 3 X AAA
- *Batter door access*: The batteries can be accessed via an access door on the backside of the handle. The door will clip in and is also secured by two screws. We will provide each of you with a special screw driver for opening and closing this battery door.
- *Exposure to wet snow*: The device is water resistant – however, please try to limit excessive exposure to water.

### **Periodic cleaning**

The most important part of the Snow Profiler to clean is the probe tip. At times, particularly if you hit the ground during a measurement, dirt may cover the probe tip. Please take time to wipe this off with your hands while testing to ensure the dirt does not impact measurements. Similarly, once you return home, we suggest dipping the probe tip in water to eliminate any debris or cleaning with a tooth brush.

In addition the probe tip, during testing be sure to keep snow and other debris clear of the sensor at the bottom of the handle (black window) as well as the small window at the tip of the probe (clear window).

### **Storage**

Please store devices in a safe location, ideally at or near room temperature. When not in use, please keep the device in the dry sack provided. Please also remember to remove batteries when storing the device.

### **Suggested transport methods**

It is completely up to you how you would like to carry the device. We recommend using the dry sack and carrying the device in a backpack when not in use. When you are using the device frequently, for example, on the uphill during a tour or in a snowpit, most bags have clips that will make it very easy to attach the device vertically to the side of your pack. We would also appreciate your feedback on your preferred/suggested transport methods.

### **Confidentiality**

Because this is a private product testing program, we ask that you refrain from sharing any results from testing with outside parties without first notifying and discussing with our team at AvaTech. Because we are going through the patent process, this is very important. If you believe there are other parties or individuals interested in learning more about our product, please contact us first before showing them. It goes without saying, but please do not open, tamper, or reverse engineer the device (or allow anyone else to open, tamper, or reverse engineer).

### **Final thoughts**

We hope this testing program will be a rewarding experience for you and we are immensely grateful for your support and feedback. With your help, we believe we have a unique opportunity to bring a new and exciting technology to the market that can help all of us be safer in the backcountry. There may even be opportunities to collaborate on scientific papers in the future, ISSW, etc. so please let us know if you would be interested in that as well. Thank you and we look forward to working with you throughout this winter and beyond!

--AvaTech Team  
(Brint, Jim, Sam, Andrew, Craig)

**Contact information**

Throughout the testing program, we will be available to answer any questions that may arise. Please direct questions to each of us based on the general subject matter of the issue:

Field Support: Sam Whittemore – [sam@avatechsafety.com](mailto:sam@avatechsafety.com)

Device Support: Jim Christian – [jim@avatechsafety.com](mailto:jim@avatechsafety.com)

Web Support: Andrew Sohn – [andrew@avatechsafety.com](mailto:andrew@avatechsafety.com)

General Support & Feedback: Brint Markle – [brint@avatechsafety.com](mailto:brint@avatechsafety.com)