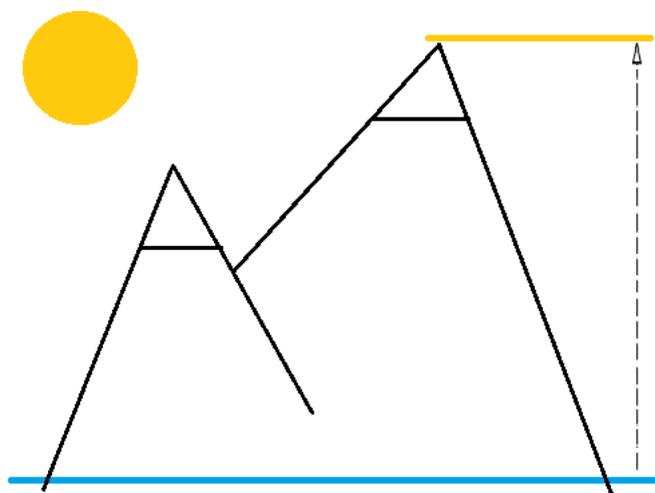


# Android Smart Altimeter



*Android Smart Altimeter*

## USER GUIDE

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## 1 INTRODUCTION

Thank you for downloading this User Guide. The **Android Smart Altimeter** is a great tool for outdoor enthusiasts !

It has been designed for activities like walking, hiking, climbing, mountaineering, mountain-biking and so on, providing precise altitude readings based on pressure measurements.

Android Smart Altimeter delivers real time altitude output, graph chart layout of recorded points up to 12 hours and unlimited recording possibilities of Altitudes and altitudes Waypoints into text files.

Android Smart Altimeter shows important advantages compared to GPS altimeters:

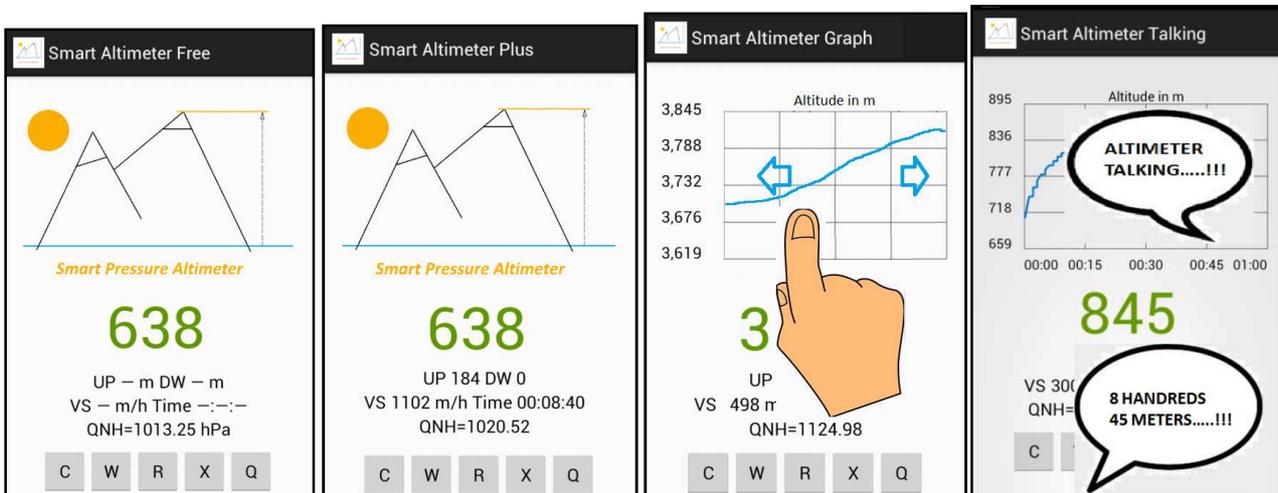
1. It guarantees better accuracy.
2. It is not affected by signal unavailability when deep in a canyons or valleys, or wildly inaccurate altitude readings when all available GPS satellites are near the horizon.
3. It reduces power consumption compared to GPS altimeters, saving the most of battery power for much longer outdoor reliability and endurance.

Definitely Android Smart Altimeter is a portable and flexible measurement instrument based on the widely diffused Android platform.

Android Smart Altimeter is available in 4 versions:

- **Free** version, which gives you precise altitude readings for free
- **Plus** version, which adds important performance indicators as cumulated altitude up and down, vertical speed and elapsed time.
- **Graph** version with a graph to display altitude values over time with autozoom and scroll features
- **Talking** version, which actually talks ! It tells you your altitude together with your altitude gain or loss compared to the previous report, giving you full awareness of your progress along the planned climb or descent !

Download Android Smart Altimeter and improve you outdoor experience now !



## 2 ANDROID SMART ALTIMETER MAIN FEATURES

- *Low power consumption for optimal outdoor portable usage.*
- *No need for data connection works everywhere anytime !*
- *No need for GPS receiver and signals: works in every outdoor conditions !*

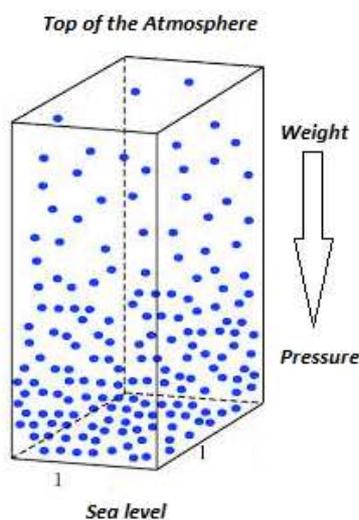
- *Voice Alerts: the Talking Altimeter tells you your altitude together with your altitude gain or loss compared to the previous report, giving you full awareness of your progress along the planned climb or descent ! Time period between Voice Alerts is configurable(Talking Version only).*
- *Altitude reading (updated every 15 seconds)*
- *Calibration: to get the Altimeter calibrated simply enter a known altitude at a specific location or a known equivalent air pressure at sea level (QNH) for your area.*
- *Altitude and Pressure measurement unit configuration (meters, feet, hPa, inHg, mmHg, etc.)*
- *Altitude data recording in a text file (Talking and Graph version)*
- *Altitude Waypoint recording in a text file (Talking and Graph version)*
- *Altitude Graph with configurable size (1h, 3h, 6h, 12h) and scrolling autozoom feature (Talking and Graph version)*
- *Altitude Gain (Talking, Graph and Plus versios)*
- *Altitude Loss (Talking, Graph and Plus versios)*
- *Elapsed Time (Talking, Graph and Plus versios)*
- *VS (Vertical Speed) m/h as average over last 10 minutes period (Talking, Graph and Plus versios)*
- *Reset Counters (Talking, Graph and Plus versios)*

### 3 GETTING STARTED – QUICK USER GUIDE

- Download and install the Android Smart Altimeter from the Anroid Play Store.
- Switch on Smart Altimeter application on your Android device (make sure the buttery is fully charged so to cover require outdoor time and more)
- Select your measurment units by options menu: Set Unit Altitude, Set Unit Pressure.
- At the start of your journey, make sure to properly calibrate your altimeter by pressing C (Calibrate). For details about calibration, please check calibration section.
- Eventually reset counters so their value is 0 at time 0, means at the beginning of your trip
- Along the way eventually start/stop altitude data recording (R button), as you wish
- Along the way eventually register an Altitude Waypoint so to review most important items of your outdoor experience afterwards (like the top of a mountain, a panoramic view point etc.). Check Altitude Waypoint section below for additional details
- Make sure to have your calibration updated when possible. After 6 hours your calibration is considered to be not anymore accurate. To highlight that the altitude value will become red.
- At the end, close Android Smart Altimeter by pressing Q.

### 4 PRESSURE ALTIMETER THEORY

This altimeter rely on a pressure sensor which must be available within your Android device. Pressure sensor measures the air pressure, that is the pressure generated by the weight of the air above you. As you get higher the the column of air above reduces in height and therefore also its weight reduces and so the pressure.



A model has been defined which links altitude to air pressure in standard conditions, that is the International Standard Atmosphere. In this model for every altitude value there's a corresponding pressure value, particularly at sea level the model assumes 0m altitude, 1013,25 hPa pressure and 15 C temperature.

Unfortunately the relationship between altitude and pleasure is not always following the standard atmosphere model: the weight of the column of air is affected by the air mass characteristics such as temperature and humidity which lead to different density. If the weather changes also the these parameters do change and so the air pressure and consequently the altimeter reading.

To compensate the changes and still provide reliable altimeter readings, we need to define an equivalent air pressure at sea level. This is known as QNH in aeronautics. By knowing this equivalent pressure which is broadcasted by weather stations at airports or provided by TV/radio weather reports, you can perfectly calibrate your altimeter. Important: in order to input a proper value, the weather report should be for the closest area to your actual location.

Alternatively the altimeter can be calibrated by knowing the altitude value at a specific point, which is the preferred way to calibrate the Android Smart Altimeter: you can find altitudes on maps for your local areas or public signs along your walking.

Make sure the Android Smart Altimeter is properly calibrated before starting your activity: this simple operation makes it more reliable and useful for your objectives.

## 5 USE CASES

These use cases are for example only. There is almost infinite ways to use your Android Smart Altimeter. We will be happy to hear your preferred ones: write us at [smartaltimeter@mail.com](mailto:smartaltimeter@mail.com).

### **Very simple: just discover your altitude and have a look how it changes over time !**

Take Android Smart Altimeter with you ! You'll be able to know your current altitude anytime and everywhere. Having your altitude displayed in a graph chart for real time checks will enhance your outdoor experience. Remember it is better to calibrate your Android Smart Altimeter at your starting point !

### **Evaluate your performance: your vertical speed (VS) matters...!**

The Vertical Speed (VS) is a value provided by your Android Smart Altimeter, calculated as average over last 10 minutes, measured in meters per hour (m/h).

Take the chance to measure yourself and your performance, bring your Android Smart Altimeter with you and identify your typical, average Vertical Speed (VS). This is useful to enable other use cases and improve your outdoor experience !

The Vertical Speed (VS) you measure will be just a reference value for you which you will have to consider to better plan your trips outside or with the objective to improve it by training and practice.

### **Plan your hiking with Android Smart Altimeter: get to the top on time !**

When you outdoor in the nature, it is important that you have a clear planning of your journey. This is to avoid unpleasant situations and reduce risks at a minimum when you are on the field.

A good planning can be done if you know for example your starting point altitude, your destination altitude and your typical Vertical Speed.

In this way you can calculate your minimum required time to perform your activity:

$$\text{Minimum Required Time} = (\text{starting altitude} - \text{destination altitude}) / \text{VS}$$

Add a safety margin to it and decide for proper departure time. Please also consider additional details like weather forecasts, correct dressing etc. which are not covered here.

### **Record details of your journey by using Android Smart Altimeter Altitude Waypoint feature.**

During your activity outdoor you will find points of interest, like the top of a mountain or mountain features, lakes, panorama views or refuges, which you will like to take a remark about. We call them Altitude Waypoints. This is a wording derived from navigation systems.

Android Smart Altimeter gives you the opportunity to record the Altitude Waypoints details in a text file for following reviews.

Have a look to the ALTITUDE WAYPOINT RECORDING chapter within the User Guide

### **If you are a skier or mountain-biker, have a look to the shape of your preferred slopes !**

When you run down by ski or mountain bike from your preferred slopes, take the chance to have your Android Smart Altimeter with you and record your altitude data within a text file: have a look to the ALTITUDE DATA RECORDING chapter within the User Guide for additional details.

You will have the opportunity to review your descent timing afterwards and perhaps display it in a graph chart altitude-over-time by your own software tools.

## 6 REAL TIME ALTITUDE READING

Displays current Altitude based on calibration. Updated every 15 seconds. Green colour if the calibration has been updated within the preceding 6 hours. Red colour if calibration is older: in this case the reading could be affected by weather changes therefore not precise.

Also the Y-axis altitude values on the graph are red colour if the Smart Altimeter is not calibrated. When the Smart Altimeter is calibrated Y-axis altitude values are black.

## 7 CALIBRATE: ENTER QNH (C)

Allows user to calibrate the altimeter by setting sea level pressure (QNH) in hectopascal (hPa). This is done by pressing C (Calibrate) button: a dialog is activated to pick up the input from the user.

## 8 CALIBRATE: ENTER ALTITUDE (C)

Allows user to calibrate the altimeter by setting known altitude at a certain place. Altitudes are reported on maps, or signs you could find along your way. This is done by pressing C (Calibrate) button: a dialog is activated to pick up the input from the user.

## 9 ALTITUDE WAYPOINT RECORDING (W) (Talking and Graph versions)

The user can record a single altitude point details in a text file called: SavedAltitudeWPTDDMMYYYY.txt (D=Day, M=Month, Y=Year). This is useful when you like to remember the altitude of a specific point, because you have reached the top of a mountain or found a beautiful panorama, or simply would like to take a remark at a specific point.

The recorded altitude waypoints include the following details:

1. Waypoint name/description
2. Date and Time
3. QNH settings
4. Altitude

The single row will have the following layout, comma separated:

*WPT xxxxxxxxxxx, Time 22052014 19:18:30, QNH=1013.25 hPa, Altitude 345.45 m*  
*WPT xxxxxxxxxxx, Time 15062014 11:59:10, QNH=29.92 inHg, Altitude 1116.95 ft*

The file is stored into the external memory which must be present in order to perform the recording. If the external memory is not available any reasons or emulated for the user gets an error message and the recording is not activated.

The SavedAltitudeWPTDDMMYYYY.txt file can be found in the following folder:  
Android\data\com.smartpressurealtimeter\files.

Altitude waypoints added within the same date will be appended to the file.

## 10 ALTITUDE DATA RECORDING (R) (Talking and Graph versions)

Altitude data can be recorded in a text file called: SavedAltitudeDataDDMMYYYY.txt (D=Day, M=Month, Y=Year). The single row will have the following output:

*Time 22052014 22:02:23, Start Time 22052014 21:09:08, QNH=1013.25 hPa, Altitude 355.1 m, UP 0 m, DW 0 m, VS 0 m/h*

*Time 15062014 11:58:29, Start Time 15062014 11:58:14, QNH=29.92 inHg, Altitude 1115.07 ft, UP 0 ft, DW 0 ft, VS 0 ft/h*

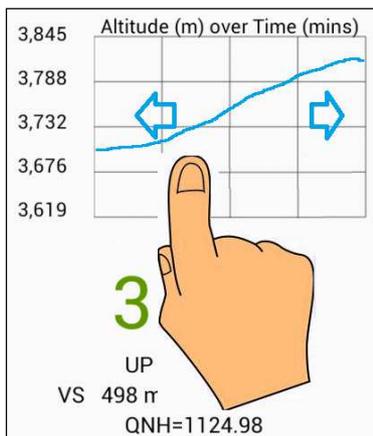
Altitude is in meters or feet and rounded to 2 decimal digit resolution. Recording period is fixed to 15 seconds.

The file is stored into the external memory which must be present in order to perform the recording. If the external memory is not available for any reasons or emulated the user gets an error message and the recording is not activated.

The SavedAltitudeDataDDMMYY.txt file can be found in the following folder: \Android\data\com.smartpressurealtimeter\files.

If the recording function is activated multiple times within the same day, the altitude data will be appended. If the recording function is activated on a new date a separated file will be generated.

### 11 GRAPH LAYOUT *(Talking and Graph versions)*



Altitude data are displayed in a graphical layout. The Android Smart Altimeter generates a new altitude point every 15 seconds which is added to the chart, up to 12 hour history.

After that graph and counters are re-set to zero. If recording is active it will keep recording data value to the .txt file (no data will be lost).

The display shows by default a time window of 60 minutes or 1 hour. If the data history is longer, you can move the graph over time by touching the graph area and moving the graph forward or rearward. This activates the auto zoom feature which adapts the Y axis according to the data to be displayed for best visibility.

Set Graph size (h)
1h
3h
6h
12h

The Graph window size can also be adjusted by Optionsn Menu between the following possible values: **1h, 3h, 6h, 12h**.

### 12 ALTITUDE GAIN *(Talking, Graph, Plus versions)*

Shows the cumulated altitude gain over the period, which is from Android Smart Altimeter start up or last Reset Counters (X button), up to a period of 12h. After that period the counter re-set to zero automatically. *Should not be affected by altitude changes due to calibration.*

### 13 ALTITUDE LOSS *(Talking, Graph, Plus versions)*

Shows the cumulated altitude loss over the period, which is from Android Smart Altimeter start up or last Reset Counters (X button), up to a period of 12h. After that period the counter re-set to zero automatically.. *Should not be affected by altitude changes due to calibration.*

### 14 VS (Vertical Speed) *(Talking, Graph, Plus versions)*

It's the vertical speed in meters per hour as average over the last 10 minutes. Reset to zero by Reset Counters button (X) or automatically after 12h from start up. *Should not be affected by altitude changes due to calibration.*

### 15 TIME *(Talking, Graph, Plus versions)*

Time elapsed from Application start or Reset Counters. Automatically reset to zero after 12h from start up.

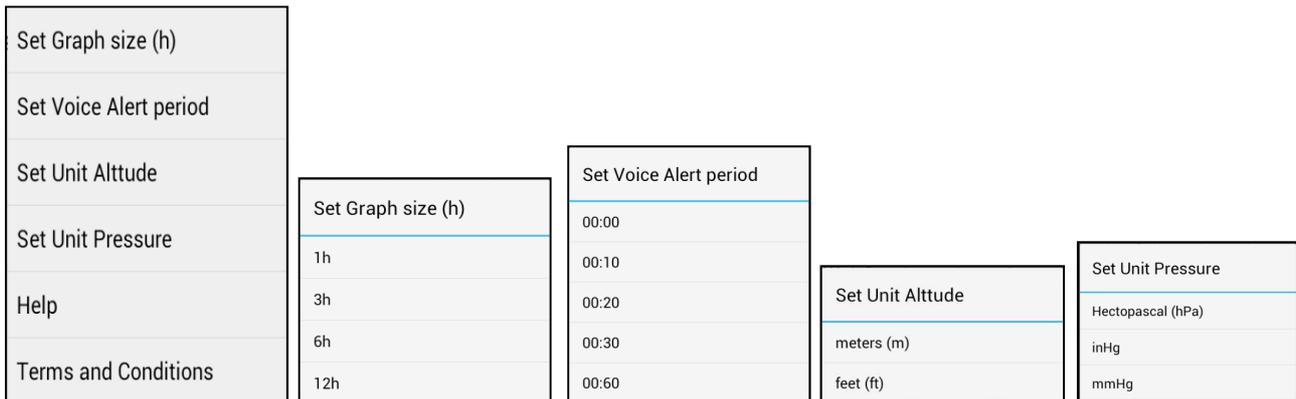
### 16 RESET GRAPH AND COUNTERS (X) *(Talking, Graph, Plus versions)*

It resets altitude gain, loss, vertical speed and time to zero. It also removes altitude data from the graph.

## 17 OPTIONS MENU

Standard Options menu enables several important features:

1. Set Graph size (h): allows to select Graph size 1h, 3h, 6h, 12h. (Talking, Graph versions)\n\n
2. Set Voice Alert period: allows to select the time interval between Voice Alerts (10, 20, 30, 60 minutes). Select 0 to desable Voice Alerts. (Talking version only)\n\n
3. Set Unit Altitude: allows to select Altitude measurement units (meters, feet)\n\n
4. Set Unit Pressure: allows to select Preassure measurement units (hPa, inHg, mmHg)\n\n
5. Help: displays application help\n\n
6. Terms and Conditions: displays application Terms and Conditions



## 18 USER INTERFACE BUTTONS



Buttons of the User Interface from left to right are explained below:

1. *Calibrate (C). It is activated by a click and allows you to calibrate the Altimeter by entering an Altitude or an equivalent Pressure at sea level (QNH).*
2. *Record Altitude Waypoint (W). It is activated by a click and allows to record an Altitude Waypoint to a text file (Talking and Graph and versions).*
3. *Start / Stop Recording (R) Altitude points. It is activated by **long** click. Once activated the R becomes red color and bold until deactivated. Activation (ON) and de-activation (OFF) is confirmed by a message (Talking and Graph versions).*
4. *Reset Graph and Counters (X). It is activated by **long** click. Reset is confirmed by a message. (Plus, Talking and Graph versions)*
5. *Quit Application (Q). It is activated by long click.*

## 19 SUPPORTED SMARTPHONES

There are a lot of compatible smartphone and more and more will come as sensors will be common also on antry level handsets.

Make sure your smartphone has a pressure (barometric) sensor to run Android Smart Altimeter.

One additional remark, when Android Smart Altimeter is running minimise the number of other applications running at the same time so to avoid the risk to be killed by Android system.

## 20 TERMS AND CONDITIONS

By downloading and or using this application software the end user agrees with the following terms and conditions.

These terms and conditions are subject to change without notice. Visit the site <http://smartpressurealtimeter.yolasite.com> to get the most recent version.

The Android Smart Altimeter Developers use reasonable endeavours to ensure that the data on this mobile application is accurate and to correct any errors or omissions as soon as practicable after being notified of them.

#### WARRANTIES BY DEVELOPERS.

The Android Smart Altimeter software applications and related documentation, are provided "AS IS" without warranty of any kind, express or implied, including but not limited to fitness for a particular purpose, altitude measurements accuracy, altitude data storage, application availability quality and reliability. the user agrees that the use of the software is at his sole risk.

#### DEVELOPERS LIABILITY.

In no case the Developers shall be liable for any direct, indirect, incidental, exemplary, special or consequential damages arising from the use or inability to use or otherwise relating to the Android Smart Altimeter software applications.

#### LANGUAGES AND CUSTOMER SUPPORT

The end user agrees that the Developers have no obligation whatsoever to furnish any maintenance or product support services. The product support after sales if provided, might be in English language only.

Although the application user interface (UI) might be provided in local languages, the end user agrees that the product documentation might be provided in english language only.

#### INTELLECTUAL PROPERTY OWNERSHIP, RESERVATION OF RIGHTS

The Android Smart Altimeter software applications are the intellectual property of the Developers. No intellectual property rights in the applications are granted to the end users and all rights are reserved by the Developers, unless otherwise agreed in written.

#### REVERSE ENGINEERING

This application software must not be decompiled, disassembled, reverse engineered or otherwise modified.