

# **Bike-O-Meter User Manual**

**for**

**Android Smart phones & Devices**

Version 1

Date 2010-12-25

Thank you for purchasing the Bike-O-Meter App from Cellimagine.

The Bike-O-Meter is an App rich in features and functions.

## **ADVANCED FEATURES:**

- English and Metric Units. Can switch Units at any time.
- Multiple Modes: Feet, Feet/Sec. Miles, MPH, (English Units)  
Meters, meters/Sec., KM, KMPH (Metric Units)
- User Preference settings such as Mode, Units. Upon program exit, automatically save the Odometer and Elapsed time readings
- Wake Lock feature to keep the Screen from going to sleep
- Bike-O-Meter is setup to work in **Unattended Mode** so even with no user activity, the App and GPS device does not stop working when the mobile device goes to sleep (Suspended state).
- Comprehensive set of GPS measurements.
- Configure Waypoint Sampling interval, Duration and file names.
- Save trip data to SD cards in KML and XML format

As one of the first users described - *"It has a cool factor"*

It is a high precision instrument and very reliable.

Before getting started, please follow the checklist below to make sure your Android phone meets the minimum requirements and the GPS is setup properly.

## **SETUP**

### **STEP 1: REQUIREMENTS**

Make sure your Phone has:

Android OS version. 2.1 or higher  
Is GPS capable with internal GPS chip.

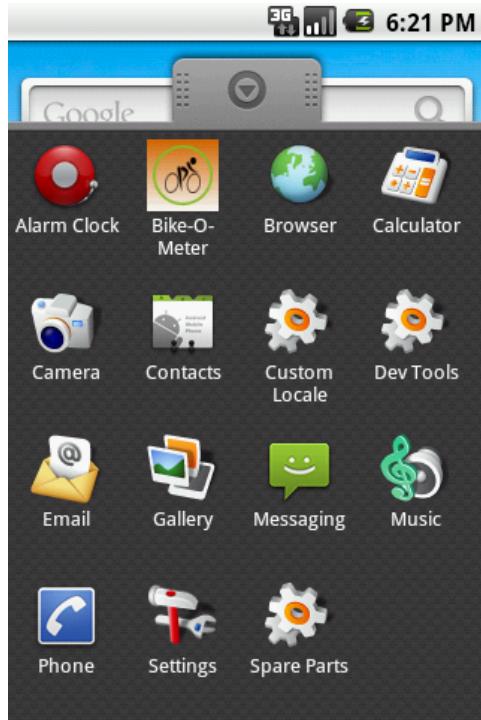
*No data service is required for the Bike-O-Meter to operate.*

### **STEP 2: INSTALLATION**

You can install Bike-O-Meter by downloading the .apk file to your Mobile device. Alternately, you can install the App Over-the-Air (OTA)

The Bike-O-Meter icon will show up in the Application Folder. Click on the Bike-O-Meter Icon to start the Application.

Figure 1 shows the Bike-O-Meter Widget in the Application Folder.



**Figure 1**

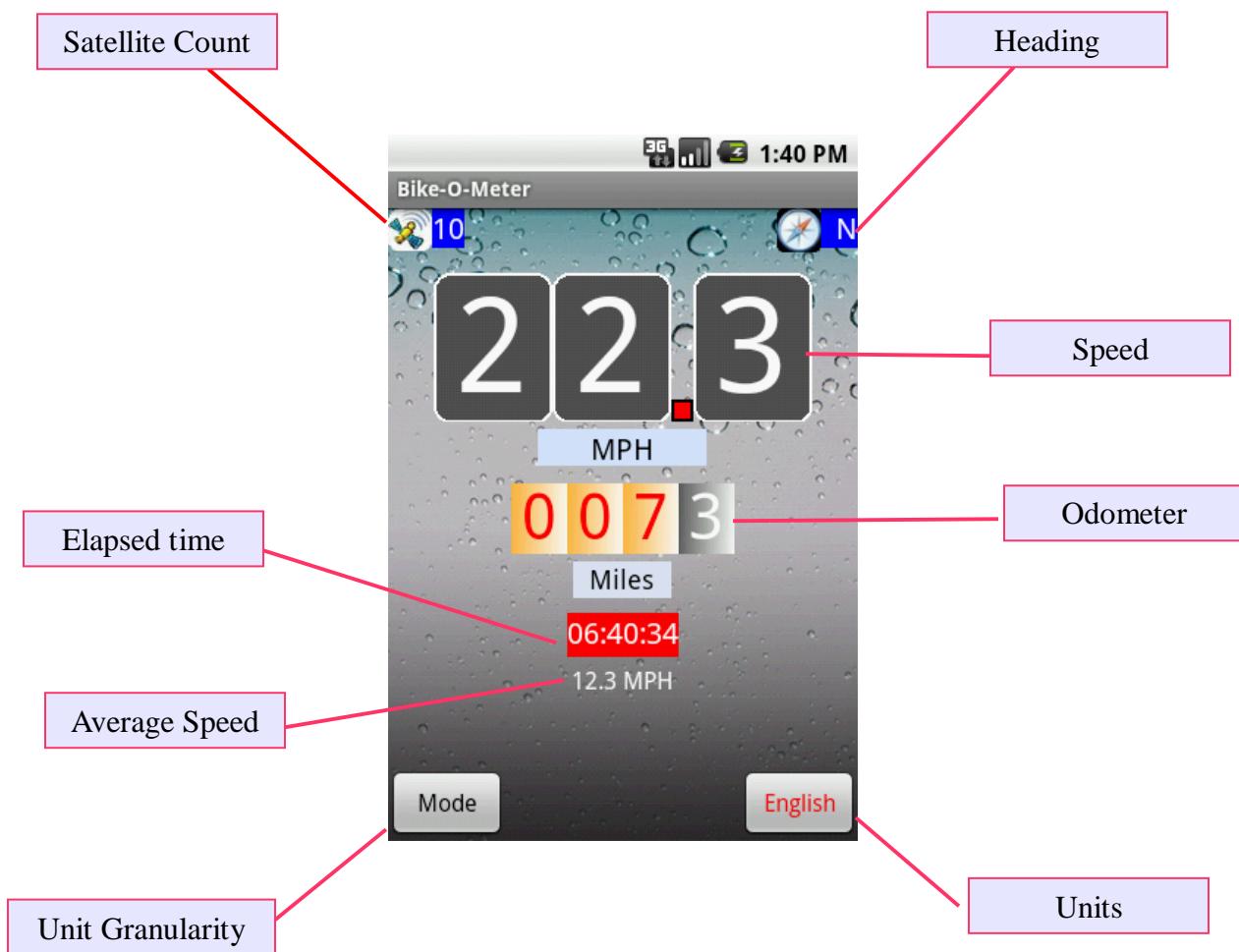


Figure 2

## BIKE-O-METER Main Screen

The main screen displays the following information:

**Satellite Count:** The number of satellites used in solution.

**IMPORTANT: Make sure that the Satellite count is 4 or more before you start using the App.**

**Heading:** This is the true magnetic compass direction. Since Heading is a calculated value, there has to be movement before true heading values are displayed.

**Speedometer:** Displays the speed. Speed is displayed in Meters/Sec., Feet/Sec., Kilometers Per Hour (KMPH) and Miles Per Hour (MPH)

**Odometer:** Displays the total distance traveled. The odometer value is non volatile and saved across application exit and device power off. Distance is displayed in the following units -Meters, Feet, Kilometers and Miles.

**Elapsed Time:** It displays the up-time the Bike-O-Meter App has been running. The elapsed time is preserved across application exit and device power off.

**Average Speed:** Displays the average speed. It is zeroed before starting a new application session.

**Units Button:** The Units button is used to select/toggle between Metric and English units. You can switch units at any time.

**Mode Button:** The Mode button is used to select the granularity of the Units. If English Units are selected, the Mode toggles between Miles per Hour and Feet/Sec. The distance is toggled between Miles and Feet.

If Metric Units are selected, the Mode toggles between KM per Hour and Meters/Sec. The distance toggles between Kilometers and Meters.

**Measurement Units:** English or Metric.

The combination of Mode and Units is used to display the proper measurement units.

For e.g. **MODE 1, English Units** will display Speed in Miles per hour and distance in Miles.

**MODE 2, Metric Units** will display Speed in Meters/Second and distance in Meters.

The table below shows the various combination of mode and units and the resulting measurement units displayed.

**Mode of operation:** There are 2 modes of operation. **MODE 1 and MODE 2.** The **Mode** depend on the Units selected.

For Metric units the Mode toggles between:  
Meters and Kilometers for distance.  
Meters/Second and Kilometers per Hour for speed.

For English units the Mode toggles between:  
Feet and Miles for distance.  
Meters/Second and Miles/Hour for speed.

The Mode and Units combinations are summarized in the table below:

	English Units		Metric Units	
	Speed	Distance	Speed	Distance
MODE1	Feet/Second	Feet	Meters/Second	Meters
MODE2	Miles/Hour	Miles	KM/Hour	Kilometers

In the **Mode1**, the Odometer readings show **whole units** either **Feet or Meters**.  
e.g. 1234 is 1234.0 feet or meters

In **Mode2**, the Odometer last digit shows **Tenth of a Mile or Kilometer**.  
e.g. 1234 is 123.4 Miles or Kilometers.

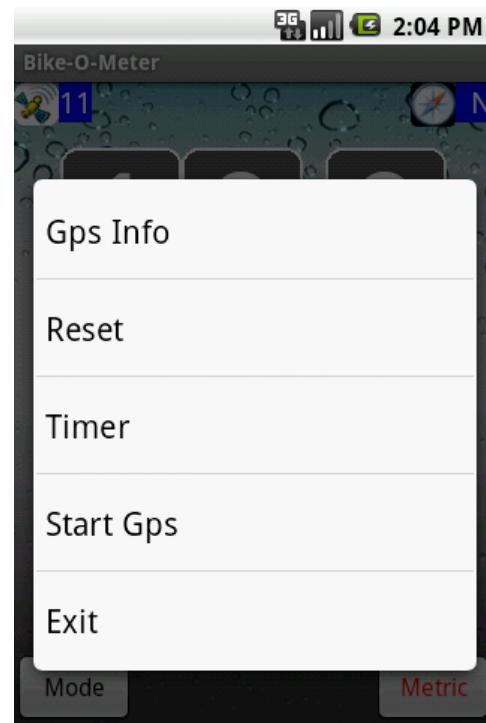
**IMPORTANT:** The user settings such as Mode and Units are automatically remembered when exiting the App and restarting it.

The Odometer readings and Elapsed Time are also saved while exiting the App and restored back on re-starting the App.

**MAIN SCREEN MENUS:** The Main Screen menus can be accessed as Option Menus as shown in Figure 3.



**Figure 3**



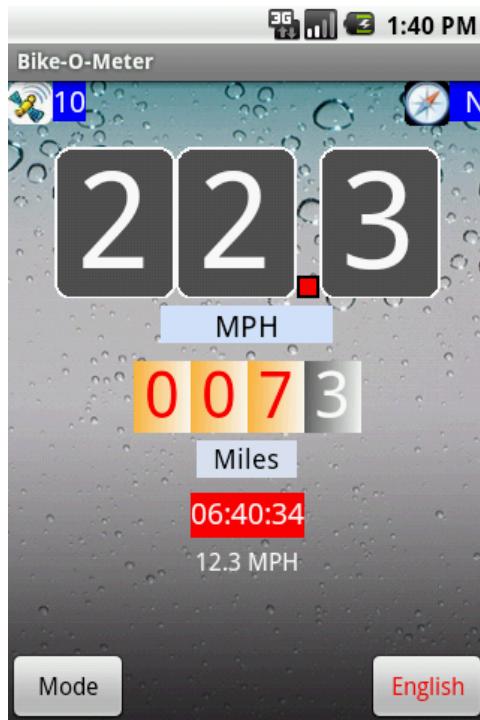
**Figure 4**

The Main Menu can also be accessed as Context menu as shown in Figure 4. To invoke the Context Menu, simply touch the screen for a while (long touch) and the menu will appear.

## STEP 1: SETUP - GETTING A SATELLITE FIX:

Step outdoors to get a clear view of the sky. Turn on the Bike-O-Meter App and wait for about a minute to get a satellite fix. (For the first time you may have to wait for about **5 to 8** minutes). When you get a good satellite fix, you should see the satellite count (in the blue block) on the main screen at top left hand corner.

A screen shot of the Bike-O-Meter main screen is shown below:



**Figure 5**

Once you get a satellite fix (more than 6 is good), if you move about 20 meters (60 feet) in any direction you will see the speed and distance readings change.

We have tested the App while walking, on a bike and in a car. With good GPS coverage (7 to 10 satellites) the speed and (odometer) distance readings are very accurate.

## **OPERATION:**

Bike-O-Meter is real simple and easy to use; we will explain how it works.

Keep in mind that the App requires the use of GPS. **The GPS accuracy is about 20 meters (60 feet), and this technology requires movement to detect speed, distance and heading.**

1. To start the App, simply click on the **Bike-O-Meter icon**. The main Bike-O-Meter screen shows up and it starts working as soon as it gets a satellite fix.

2. As with any regular speedometer/odometer, the speed readings and the distance readings will **not change unless there is movement**.

If you are walking, set the mode to **MODE1**. This way, you will see how much you moved in feet (or meters) as opposed to miles (or kilometers). If you walk more than 10,000 Meters or (2 Miles) switch to **MODE2** so that your distance readings **DO NOT** warp around.

3. If you are on a bicycle or in a car, switch to the **MODE2**. In this mode, you can use the **English** units (speed in Miles per Hour and distance in Miles). You can also set units to Metric (speed in Kilometers per Hour and distance in Kilometers)

4. The Android phone does not have Magnetic Compass. So the **HEADING (direction)** is calculated based on GPS locations.

To obtain proper heading values you need movement. Once you start walking or driving, you will get correct **HEADING**.

5. If you lose Satellite fix/count (for example you go indoors), the reading become unreliable.

6. With good satellite fix, the readings are reliable and the errors are less than 2%.

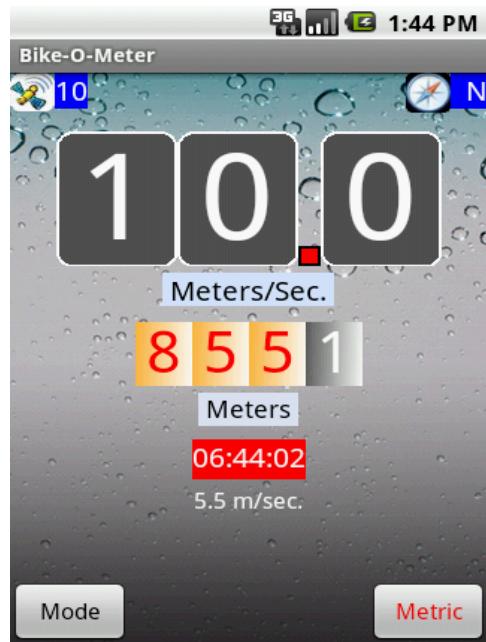
7. The **GPSInfo** screen gives you detailed information of both the GPS readings and calculated values: Latitude, Longitude, Altitude, Distance, Vertical Distance, Heading, Speed, Grade, Start Time and End Time stamps.

8. You can store and view the Waypoints. Waypoints are locations along you travel path along with other GPS information such as speed, distance, altitude, vertical distance etc.

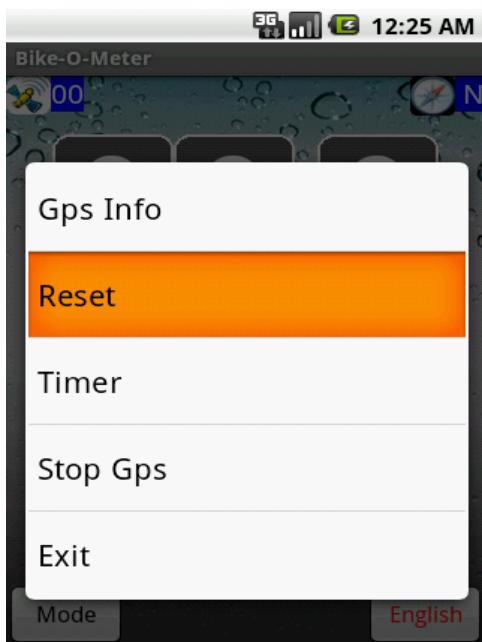
## **USE CASES**

### **Example 1: Running/Jogging**

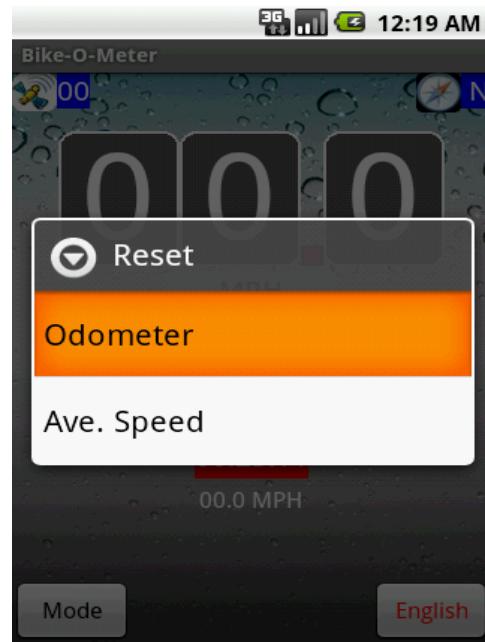
1. Step outside, turn on the Bike-O-Meter, and wait for about 30 seconds to acquire the satellites. Usually you get 7 to 10 satellites. The satellite count is shown on the top left corner in the blue block.



**Figure 6**



**Figure 7**

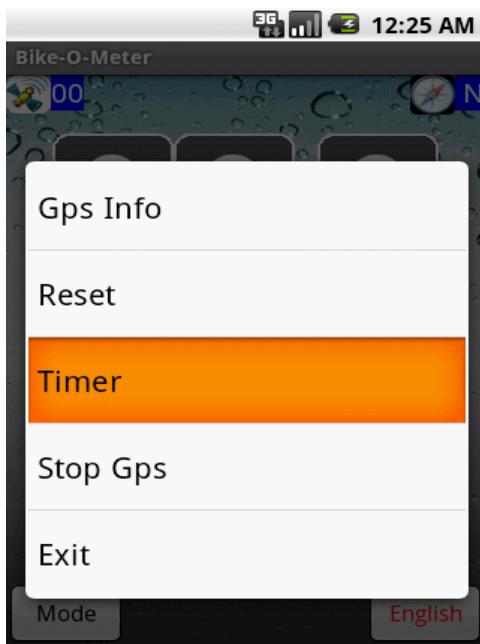


**Figure 8**

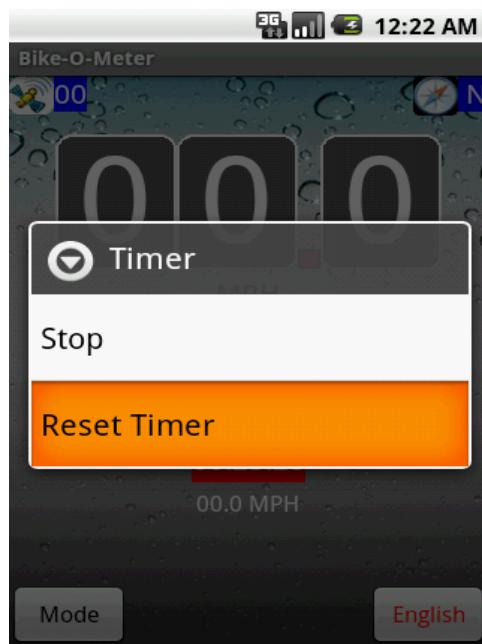
2. Using the Mode button select the appropriate mode - **MODE1** or **MODE 2**.
3. Next using the **Units button**, toggle the Units to English or Metric.

4. From the Main menu **Reset the Odometer.**

5 If necessary reset the Timer.



**Figure 9**



**Figure 10**

6. **That is it!** Start running or walking. When your speed is **above 3 Miles per hour (4.8 KMPH)**, you will see the speedometer shows readings.

7. While walking (even at Speed less than 3 miles per hour) you will see the Odometer (in feet or meters) changing and showing distances.

8. At any time, using the menus you can switch between the various MODES and UNITS.

### **Helpful Tips:**

Internally the distance is stored as a "big number". The largest number it can store is 4,294,967,295 (4.2 Billion feet)

So even if you walk more than 9999 feet the distance is correctly stored internally.

Let us say you walked 5 miles =  $5 * 5280 = 26400$  feet.

The walk mode reading will show 6400 feet. Because the display has 4 digit positions, it can only display the last 4 digits. So you won't see the number 2. If you switch to the Vehicle mode, it will show 5 miles.

Since the odometer display has 4 positions, in mathematical terms it does Modulo 10000 arithmetic. It is like you keep subtracting 10000 from 26400 until what is left is less than 10000. In this case 6400. More simply it is as if you cannot see the digit 2 in 26400.

If you are walking more than 2 miles, it is easier to read the distance in miles and use a little math to find the distance in feet.

### Example 2: On a bicycle or in a car

9. The App works exactly the same way whether you are on a bicycle or a car.

10. In this case, you would set to MODE2 and the units to **English** or (Metric as the case may be). The Bike-O-Meter provides very accurate readings for both speed and distance. We have checked that the readings closely match with the readings of the car.

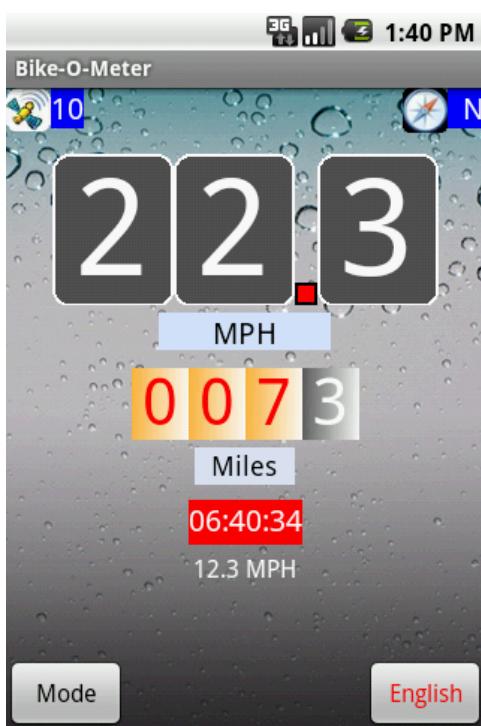


Figure 11



Figure 12

11. With the **Mode2, English Units**, the Odometer shows distance in Miles . The right most odometer position (the black box/digit) now shows **10th of a mile**.

12. In the **Mode2, Metric Units**, the Odometer shows distance in Kilometers. The right most odometer position (the black box/digit) now shows **10th of a Kilometer**.

13. When you are moving, the **HEADING values show the correct Magnetic direction** such as N

(north), NE, E (east), SE, S (south), SW, W (west), NW etc.

The actual values in degrees are displayed in the GPSInfo screen.

14. At any time you can also permanently **save** your Waypoints (Latitude, Longitude, Speed, Heading, etc) and **view** them later. The Waypoints are stored on the SD card and can be downloaded or e-mailed to a Computer or a server.

## **STORING AND VIEWING WAYPOINTS:**

The current version of Speed-O-Meter will allow you to:

1. Save Waypoints for a trip to a file on the SD card
2. View Waypoints
3. Download the Waypoints Files

You can manually store single waypoints, or automatically store multiple waypoints.

## **MANUALLY STORE WAYPOINTS**

1. To Store a Waypoint:

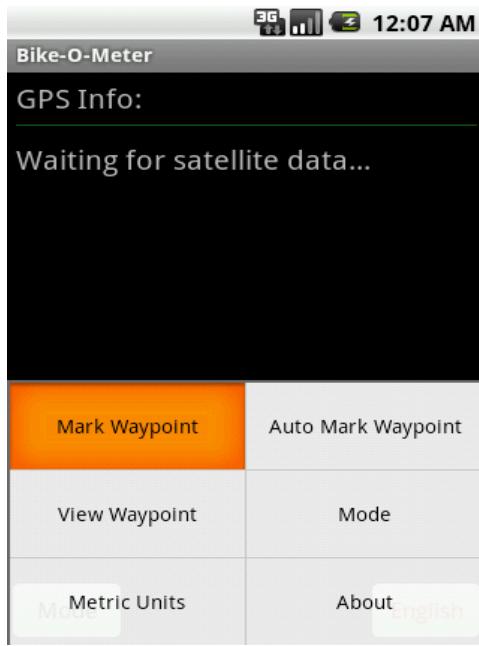
From the Main Screen go to the GPSInfo screen. Then use the Mark waypoint menu item:

***Bike-O-Meter->GPSInfo->Mark waypoint***

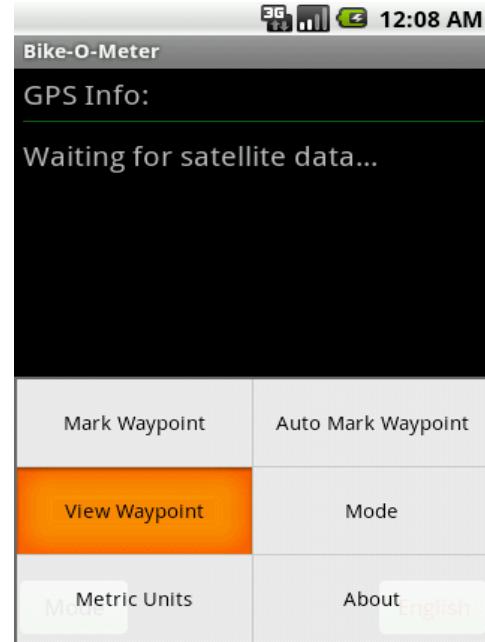
2. To View a WayPoint:

From the Main Screen go to the GPSInfo screen. Then use the View Waypoint menu item:

***Bike-O-Meter->GPSInfo->View Waypoint***



**Figure 13**



**Figure 14**

## AUTO STORE WAYPOINTS

To automatically store trip waypoints, go to the WPSaveScreen

**Bike-O-Meter->GpsInfo->Auto Mark Waypoint**

The **WPSaveScreen** is displayed as shown below.

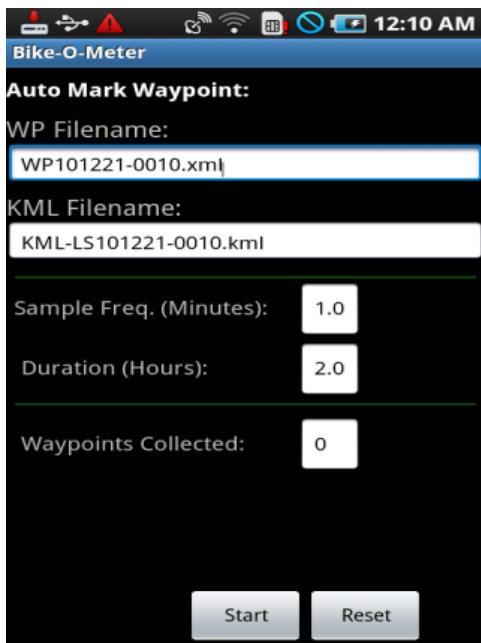


Figure 15

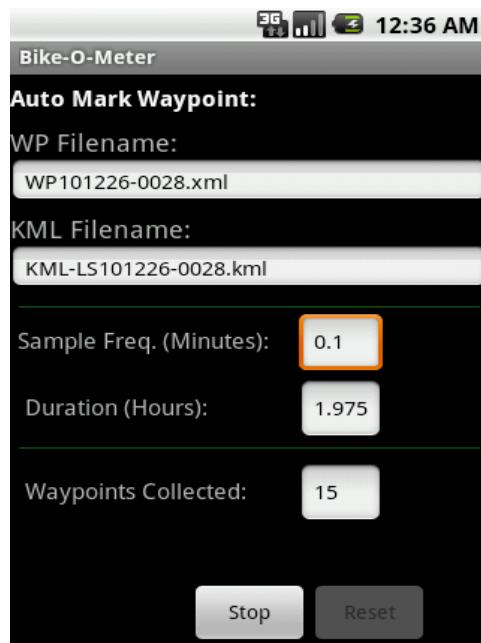


Figure 16

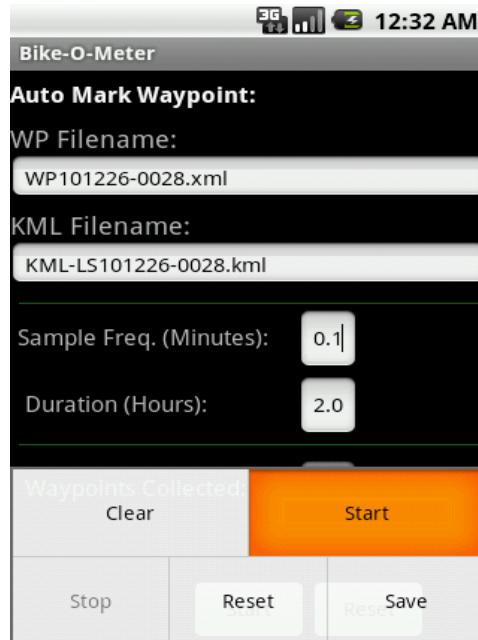


Figure 17

For each trip **two files** will be generated.

One is an XML file that contains the vital Waypoints data and statistics. XML is an open standard data interchange format and any application can read this file. An XML file is a simple text file in an easily readable form for both machines and people.

The XML filename that is displayed is a unique name based on the date and time when the Auto Mark Waypoint function is invoked. The file extension .xml. For e.g.

### **WP101012-1905.xml**

This file was created on 2010 October 12 at 19 hrs and 05 minutes.

The second file is a KML file and has .kml extension. This is a special file that contains the trip points that can be displayed in Google Earth. Again a kml file is an open standards XML file understood by many Location Based Applications (LBS).

The KML file also has a unique name based on the date and time it was created. It has an extension of .kml

### **KML-LS100901-0140.kml**

This file was created on 2010 September 01 at 01 Hrs and 40 minutes

Both the XML and the KML file names can be changed if the user decides to do so.

The next field is the Sampling Frequency in Minutes. This specifies how often the Waypoints are marked and stored. This is a ComboBox (drop down box) where the user can select one of the values or enter a valid sampling value. **Fractional values are also accepted.**

For example a sampling frequency of 1 Minute specifies that trip locations are marked every 1 minute. A value of 0.25 minutes specifies sampling frequency of 15 seconds.

The Duration field specifies the Total time duration for which the waypoints are collected.. The duration is specified in hours. This is also a ComboBox (drop down box) where the user can select one of the values or enter a valid sampling value. **Other values including fractional values are also accepted and can be directly entered.**

For example a Duration of 2 Hours specifies that trip locations are marked at the sampling rate for two hours.

If the Duration is 2 hrs and the sampling rate is 1 minute, then Waypoints are collected every minute for 2 hours for a total of 120 Waypoints.

The Waypoints collected field shows how many waypoints have been collected so far since the start of the Auto Mark Waypoint. This field increments with time.

The Duration field serves a second dual purpose. Once started, this field shows the remaining time the time left to collect waypoints. It decrements and when it reaches zero, the Waypoint collection stops.

For a given trip, a maximum of 250 waypoints will be collected. After that the waypoint collection is stopped.

Once the Waypoint collection is stopped either manually or automatically, the waypoints are stored in the specified files on the SD card.

**IMPORTANT:** The xml and kml files are stored in the /WapPoint directory of the SD card

The **Start, Stop, Reset** and **Save** menu items are context sensitive and designed to be fool proof to prevent the user from accidentally overwriting a saved Waypoint file.

## UNLIMITED TRIP FILES

Any number of trip files can be created. The only limitation is the size of the SD card. Each trip generates two files that have unique names and help keep track of the trips chronologically.

Once a trip is started, the user can exit the WPSaveScreen and go back to the Bike-O-Meter (main screen) to view the Speed and Distance instrumentation. Since the state of the WPSaveScreen is preserved, the user can return to this screen any time to check the status of waypoint collection or stop and save the files.

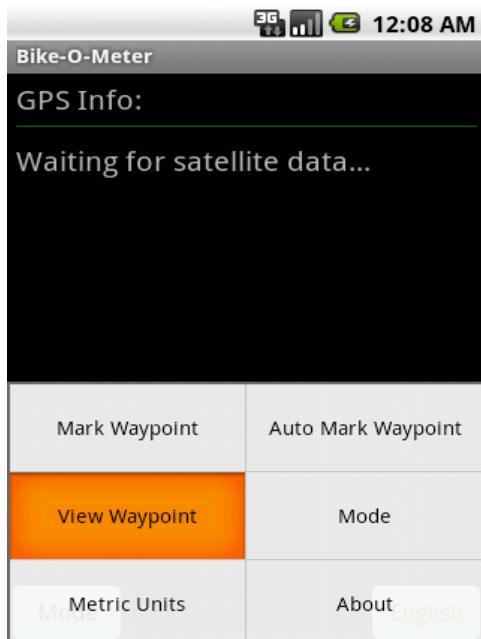
The Reset button can be used to reset the filenames, and sampling interval and duration to default values. The Reset button cannot only be activated while the trip is active and waypoints are being recorded.



**Figure 18**

Waypoints that are stored can be viewed as a List in the PointScreen

#### Bike-O-Meter->GpsScreen->View Waypoint



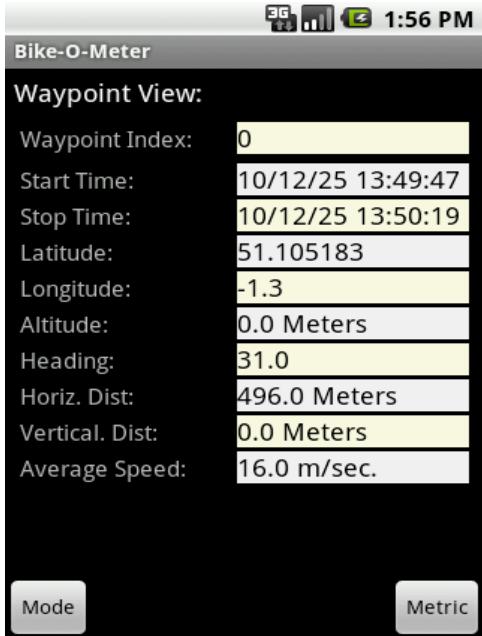
**Figure 19**



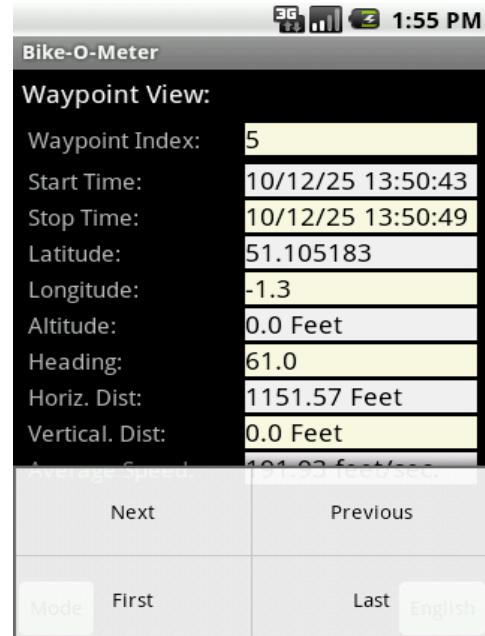
**Figure 20**

Details of a Waypoint can be viewed by selecting a particular Waypoint. Select the Waypoint you want

to view e.g. Waypoint 7 and click for details:



**Figure 21**



**Figure 22**

The WayPoint View Screen menu allows you to navigate and view the different recorded waypoints. The menu items **Next**, **Previous**, **First** and **Last** are self explanatory.

## GESTURES FOR SCROLLING

Use Swipe, Drag and Fling gestures to scroll through waypoints quickly and easily. The Waypoint View Screen also supports Gesture (touch screen) capabilities such as **Swipe** and **Fling**. This allows the user to quickly scroll through the waypoint screens by simply dragging the screen.

Drag the Screen to scroll through the Waypoints. Drag the screen right to left to scroll forward. Drag the screen left to right to scroll backwards.

Fling the screen to move forward or backward by a quanta of waypoints. For e.g. 8 waypoints. Again you can fling forward or backward.

## **ADVANCED ANALYTICS**

The Trip Waypoints and measurements can be downloaded to a computer for complex analysis and advanced graphing.

The XML files can be easily imported to Microsoft Excel spreadsheets and various trend analysis can be performed.

Since all the measured and calculated data are available, various graphs can be easily plotted such as:

- speed vs distance,
- Distance vs. Time
- vertical distance vs distance
- altitude vs distance

All these advanced capabilities that are normally reserved for expensive GPS devices and software are available a virtually no cost.

Similarly the KML files can be used to display Line segments on Google Earth on your local computer. Alternately, they can be uploaded to Web servers such as:

***MapMyRide.com*** and ***RideWithGps.com***

These sites can accept kml files and plot contour maps, street maps, hybrid maps etc. The possibilities are endless and comparable to expensive professional GPS biking gear.

## **SCREEN RESOLUTION**

The Bike-O-Meter Screens are smart. The App can automatically detect screen sizes and resolutions and scale the App graphics to properly fit the various device screens.

When a device is rotated, if the device has accelerometers to detect orientation of the screen, the App will re-orient itself to the correct landscape or portrait modes.

**Android allows for the screen orientation to be locked.** The user can manually rotate the screen from portrait to landscape mode and vice versa.

Questions? Please contact: [Support@Cellimagine.com](mailto:Support@Cellimagine.com)

Please contact [info@Cellimagine.com](mailto:info@Cellimagine.com) for a version of the Bike-O-Meter that run on other platforms such as the BlackBerry, Windows Mobile and iPhones.