



Frequently Asked Questions for Using Wanco Traffic Data Collector

Engineering Notes for Wanco Internal Use

joe.chen@wanco.com



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1. Introduction

1.1 Scope of The Document

This document collects some engineering notes that describe procedures of how to use a *Wanco Traffic Data Collector*.

1.2 Acknowledgment

This document is type-set by using $\text{T}_{\text{E}}\text{X}$ and $\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$, an open source type-setting software system.

This document is also type-set by using the template that was downloaded from: <http://www.LaTeXTemplates.com>, created by Mathias Legrand (legrand.mathias@gmail.com) with modifications by Vel (vel@latextemplates.com). The author acknowledges their credits.

Some background graphical images are downloaded and from the website of Wanco, Inc., originally created by the web designers of www.wanco.com. The author acknowledges their credits.



2. Frequently Asked Questions

2.1 What does *WTDC* stand for?

A *WTDC* is an acronym and it stands for *Wanco Traffic Data Collector*.

2.2 What can a *WTDC* do?

A *WTDC* can record traffic data on a road where it is placed on. It consists of a *Wanco Classifier Radar* as a sensor and a embedded micro computer as a data processor. A *WTDC* can detect and record both approaching and departing vehicles.

2.3 What a *WTDC* can be installed with?

By the time when this FAQ is composed, a *WTDC* can be installed with current products of the *Wanco Speed Trailer*, and the *Wanco Message Sign Trailer*.

2.4 Where is the *WTDC* control panel of a *Wanco Speed Trailer*?

The control panel is located inside a box on the back of the sign display cabinet, as shown in Figure 2.1

On the control panel, as shown in Figure 2.2, there are following interfaces that you are going to use or see with the *WTDC*'s data collection functions:

- **Rotary Switch:** It controls power for *WTDC*
- **Push Button:** It acts as an input interface to *WTDC*.
- **Status LED:** It acts as an output interface from *WTDC*.
- **USB Slot:** It has purposes for retrieving recorded traffic data, enabling *Wi-Fi* connection, and updating the software.



Figure 2.1: Control Box of Wanco Speed Trailer

2.5 Where is the *WTDC* control panel of a Wanco Message Sign?

For a *WTDC* that is installed with a *Wanco Message Sign Trailer*, the control panel is inside the control box as shown in Figure 2.3.

2.6 How can I turn ON a *WTDC* installed with a speed trailer?

To turn on a *WTDC* that is installed with a *Wanco Speed Trailer*, you just rotate the *Rotary Switch* from *OFF* position to *RUN*, or *DATA COLLECTOR ONLY* position.

2.7 How can I turn ON a *WTDC* installed with a message sign trailer?

To turn on a *WTDC* that is installed with a *Wanco Message Sign Trailer*, you just flip the *Power Switch* to the ON position that is located inside the *DATA COLLECTOR* zone.

2.8 What first things should I check when I receive a *WTDC*?

When you receive your *WTDC* the first time, you should check and verify the following items:

- **System Clock:** you can check and verify the clock with using the *USB Wi-Fi Adapter* that is included in your purchased *WTDC*, and a mobile device such as an *iPhone*, or an *iPad*. If the clock needs to be corrected, you can set it in the *SETTING* section of the web page, which is near the bottom.
- **Time Zone:** you can check and set a right *Time Zone* for your location with using the *USB Wi-Fi adapter* and a mobile device as mentioned above.

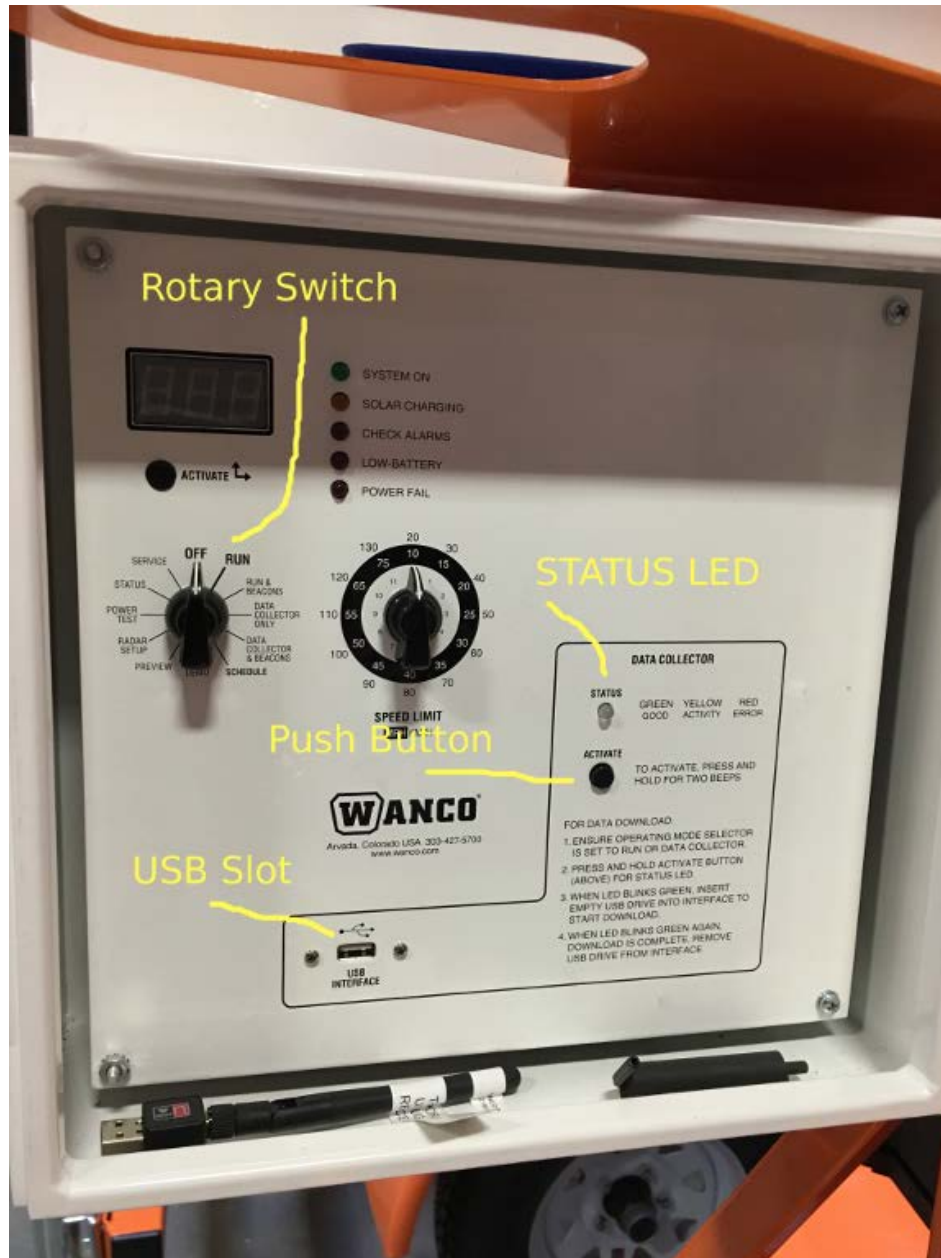


Figure 2.2: Control Panel Interfaces of a Wanco Speed Trailer



Figure 2.3: Control Panel of Wanco Message Trailer

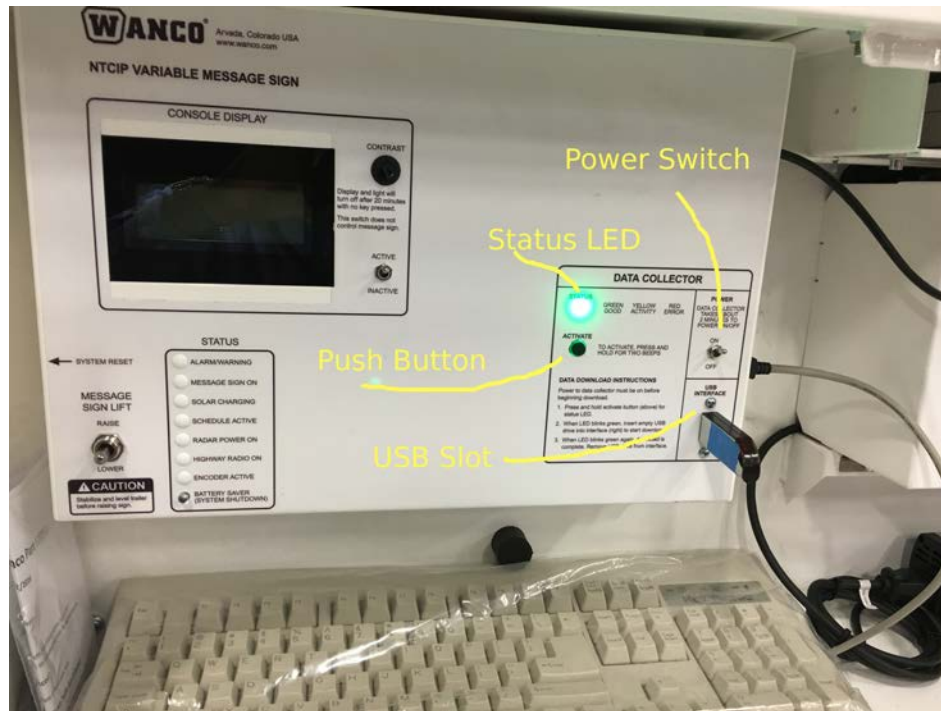


Figure 2.4: Control Panel Interfaces of a Wanco Message Trailer

The worst case of the incorrect clock you can see is that the time-stamps of the traffic data shows the year like 1969 or 1970. An incorrect clock or timezone will result in wrong time-stamps within the recorded traffic data.

2.9 How should I turn OFF a WTDC installed with a speed trailer?

You can turn off the WTDC just by just switch the *Rotary Switch* to *OFF* position, and the WTDC system will shut down in about *seventy(70)* seconds. The delay is done by design so that the system will have enough time to save all the data to avoid data corruption. If you want to turn it on again, you should wait for at least *TWO Minutes* and then turn it on again.

2.10 How should I turn OFF a WTDC installed with a message sign trailer?

You can turn off the WTDC just by just flipping the *Power Switch* (that is located inside of *DATA COLLECTOR* zone) to *OFF* position, and the WTDC system will shut down within *two(2) minutes*. The delay is done by design so that the system will have enough time to save all the data to avoid data corruption. If you want to turn it on again, you should wait for at least *TWO Minutes* and then turn it on again.

2.11 What should I see and hear when a WTDC is shutting down?

The moment you rotate or flip the switch to *OFF* position, your WTDC starts its own shutdown process. During this process, you should hear and see the following indications:

- the *STATUS* LED starts blinking *YELLOW* between once per period to twice per period, as time goes by.
- then the LED blinks *YELLOW three(3)* per period, the *WTDC* starts beeping as well. By this time, it is too late to rotate the switch back to *RUN* position because the *WTDC* system has already shutting down its running processes inside the micro computer. (**WARNING:** Rotating the switch back to *RUN* position will result in a wrong state of the *WTDC* system.)
- after it has beeped for *three(3)* times, the *WTDC* becomes silent for a short period time. By now, it takes another *fifteen(15) seconds* to complete the shutting down, and there will be no more LED blinks and no more buzzer beeps.
- Again, the total process of shutting down takes about *two(2) minutes*.

2.12 What is the difference between *RUN* and *DATA COLLECTOR ONLY*?

When you turn the *Rotary Switch* to the position of *RUN* position, both the *WTDC* and the sign display will be *ON*. However, when you turn the *Rotary Switch* to the position of *DATA COLLECTOR ONLY*, the *WTDC* will be *ON* while the sign display will be *OFF*.

2.13 How can I collect traffic data without influencing driver behaviors?

By turning the *Rotary Switch* to the position of **DATA COLLECTOR ONLY**, you can turn off displaying vehicle speeds while continuing to collect traffic data. This way, the driver behaviors are not influenced by the display.

Further more, to make the unit more stealth, you may also want to lower down the solar panel and take off the speed limit number plates.

2.14 How can I tell if an *WTDC* installed with a *Wanco Speed Trailer* is working properly?

When a *WTDC* is installed with a *Wanco Speed Trailer*, you can tell if it working properly with following checks:

- Rotate the switch to *RUN* position, and then the *STATUS* LED in the *DATA COLLECTOR* zone area blinks *RED* for 4 or 5 times.
- Afterwards, the *STATUS* LED blinks *GREEN two (2)* times per period, indicating that the *WTDC* starts receiving *Wanco Speed Radar Head's* heartbeat data.
- Or, the *STATUS* LED blinks *GREEN three (3)* times per period, indicating the *WTDC* has received both the speed radar heartbeat and a valid traffic data entry from the *Wanco Classifier Radar Head*. This is what you are supposed to see and you know the *WTDC* is working properly, and you are done the checking. If not, continue with the next step.
- When you do not see the *STATUS* LED blink *GREEN three(3)* time per period, you can make it happen by inducing the *Wanco Classifier Radar Head* to detect a moving target by swing a piece of metal plate in front of it, to simulate a moving vehicle. When the *WTDC* receives a valid traffic data entry, the *STATUS* LED flashes some *YELLOW* light. And then the LED starts blinking *GREEN three(3)* times per period.

2.15 Why does the *STATUS* LED go off after a while'?

By design, the *STATUS* LED goes off after being activated for *THREE(3) minutes*. This is a feature for reducing unnecessary battery drainage.

2.16 How can I activate the *STATUS* LED to blink again?

You can activate the *STATUS* LED to start blinking again by pressing the *Push Button* inside *DATA COLLECTOR* zone until you see the LED start blinking again.

2.17 How can I simply know if there is something wrong with a *WTDC*?

In a rare situation, you know there is a something wrong with a *WTDC* when you see the *STATUS* LED not blink at all after being activated, or showing *RED* steadily or blinking, In this situation, please call *Wanco*'s support to resolve the issue.

2.18 How do I get the optional *Wi-Fi* connection?

You can find the optional *USB Wi-Fi Adapter* inside the *Control Box*. Plugging the *USB Wi-Fi Adapter* into the *USB Slot* on the control panel will enable the *WTDC* to provide a *Wi-Fi* interface that has a *Wi-Fi SSID WancoTDC*. The *password* for the connection is *wancotdc*.

2.19 When should I unplug *Wi-Fi* Adapter?

You can unplug the *SUB Wi-Fi Adapter* when you do need the *Wi-Fi* connection, regardless your *WTDC*' operation state.

Please note that unplugging the *USB Wi-Fi Adapter* will make your *WTDC* more secure of preventing un-authorized access, plus, to reduce unnecessary battery power drain.

2.20 How can I more accurately adjust classifier radar head's angle?

You generally should turn the classifier radar head in a **45 degree** angle towards the roadway. This is a very crucial step that you should do in order for you to get more accurate traffic data collected by *WTDC* in terms of speed, vehicle types of trucks, cars, or bicycles.

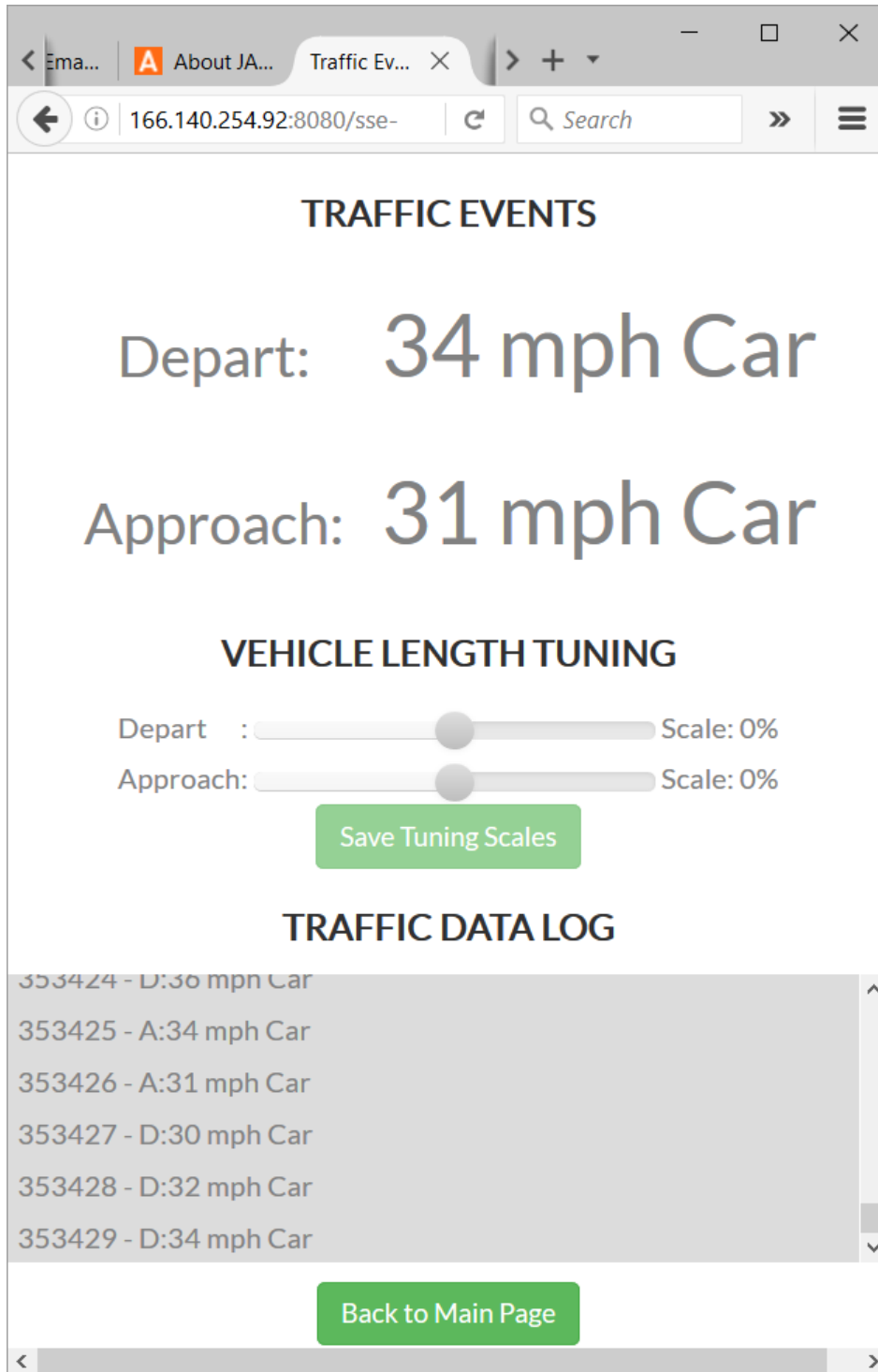
If your *WTDC* comes with a *Wanco Speed Trailer*, you can use the speed reading shown on the speed trailer's display, and the speed reading shown on the web browser of your mobile device that connects to *WTDC*'s *Wi-Fi* interface.

Here are the steps for fine tuning the classifier radar head's angle:

1. After connecting you mobile device (an iPhone, tablet, or a laptop PC) to the *Wi-Fi* interface, enter this URL to connect the web server of *WTDC*: **http://192.168.14.101:8080**.
2. Click **MONITOR** button to navigate into the *Monitor Page*, as shown in Figure 2.5. In a real-time fashion, this page shows detected vehicle speeds of both approachings and departings. You will need to look at the speed reading of approaching vehicles.
3. When a vehicle is approaching towards the speed trailer, you compare both speed readings from the trailer's display and your mobile web page. If the speed reading's difference is within *1 mph*, then your classifier radar head's angle is good. Otherwise you adjust the classifier radar head's angle until you see the difference has converged to *1 mph*.

2.21 How can I fine tune the vehicle classifications?

After you have adjusted the classifier radar head's angle by following the steps described in Section 2.20, you can use the *Sliders* (as shown in Figure 2.5) on the screen to fine tune the classifications of trucks, cars, and bicycles.



The screenshot shows a web browser window with the following content:

- TRAFFIC EVENTS**
 - Depart: 34 mph Car
 - Approach: 31 mph Car
- VEHICLE LENGTH TUNING**
 - Depart: Scale: 0%
 - Approach: Scale: 0%
 - [Save Tuning Scales](#)
- TRAFFIC DATA LOG**
 - 353424 - D:30 mph Car
 - 353425 - A:34 mph Car
 - 353426 - A:31 mph Car
 - 353427 - D:30 mph Car
 - 353428 - D:32 mph Car
 - 353429 - D:34 mph Car
- [Back to Main Page](#)

Figure 2.5: Vehicle Monitor Web Page

In most field applications the classifications are reflecting the detected vehicles by default. However, when the trailer is placed further away from the roadway by some extended distance, you may need to scale down a bit for the vehicles. This is a process of trial-a-n-error, for you to get a optimal setting that gets you a sweet spot for the classifications.

2.22 What a diagnostic tool can I use to know more about a WTDC?

Then WTDC has a built-in *Web Server* running when being powered on. The *Web Server* provides some status data about the WTDC. So your diagnostic tool is a *Web Browser* from a *cell phone*, a mobile device that has a *Wi-Fi* interface.

2.23 How can I know something about the traffic records inside a WTDC?

You can see some *traffic record status* data about a WTDC by using a *Web Browser* to connect to one of the two IP addresses: your cellular modem's IP address that you have obtained from your cellular carrier such as Verizon: `http://aa.bb.cc.dd:8080`, where `aa.bb.cc.dd` is your modem's IP address, or your WTDC's *Wi-Fi*'s local and fixed IP address: `http://192.168.14.101:8080`

To be able to use your WTDC's local IP address, you must plugin the *USB Wi-Fi Adapter* that you have purchased from *Wanco*. If you need to purchase more this Adapter Kit, please contact *Wanco* and request purchasing the *Wanco Part Number 218092*.

2.24 How can I retrieve the traffic data from a WTDC?

You can retrieve the traffic data from your WTDC by plugging in a USB thumb drive into the *USB Slot* on the control panel, or by using *Wanco Traffic Data Analyzer* desktop application software, as described here below.

Procedure for using a USB Thumb Drive:

- Plug in your USB thumb drive into the *USB Slot* on the control panel.
- Now you should hear *three(3)* beeps, and see the *STATUS* LED blinking *YELLOW*, meaning the WTDC is busy with transferring recorded traffic data from its internal storage to your USB thumb drive.
- When the transferring is completed, you should now hear a very long single beep, and see the LED start blinking *GREEN* again, meaning it's safe now to unplug your USB thumb drive.

Procedure for using Wanco Traffic Data Analyzer:

The *Wanco Traffic Data Analyzer* is a separate software application that runs on a Windows based PC and that is designed to work with the WTDC. Please refer to documents that come with the *Wanco Traffic Data Analyzer*.

2.25 How can I know if the traffic data is actually downloaded successfully in my USB thumb drive?

A simple way for you to verify if the traffic data has been actually downloaded onto your USB thumb drive is to plug in your same USB thumb drive into a PC and see if there is a file named like `wc1601191332.csv`. If yes, then you know you have downloaded the data successfully. The data file name has a pattern like `wcYYMMDDHHmm.csv`, where *YY* is the last two digits of the year, *MM* the two digit of the month, *DD* the two digits of the day, *hh* the two digits of the hour, and *mm* the two digits of the minute.

2.26 What can I see from the downloaded traffic data on my USB thumb drive?

You can see the recorded data from the downloaded data file in your USB thumb drive by just *double-click* the file name and the Microsoft Excel will pop up for you with showing the data of the file, as shown in Figure 2.6.

	A	B	C	D	E	F
1	12/18/2015 16:14	0	A	13	M	C
2	12/18/2015 16:14	0	D	11	M	B
3	12/18/2015 17:29	0	D	26	M	C
4	12/18/2015 17:30	0	D	29	M	C
5	12/18/2015 17:30	0	D	26	M	C
6	12/18/2015 17:30	0	D	26	M	T
7	12/18/2015 17:30	0	D	25	M	C
8	12/18/2015 17:30	0	D	24	M	C
9	12/18/2015 17:30	0	D	27	M	C
10	12/18/2015 17:30	0	D	25	M	C
11	12/18/2015 17:30	0	D	25	M	C

Figure 2.6: CSV Traffic Data File

As you can see, Column A contains the time stamp (up to the second) of the traffic record, Column B the fraction of the second, Column C the approaching (A) or departing (D), Column D the speed value, Column E the speed unit of mile per hour(M) or kilometer per hour (K), and Column F the classification of car (C), truck(T), or bike (B).

Or, you can use any spreadsheet software to generate your own charts and graphs.

2.27 What can I do with the downloaded traffic data on my USB thumb drive?

You can use your downloaded traffic data in your USB thumb drive as a data source for the Windows desktop application software of *Wanco Traffic Data Analyzer* to generate some graphical charts for further analysis.

2.28 How many vehicle records a WTDC can store inside WTDC?

The internal storage of a WTDC storage for the traffic records is large enough for up to *five(5) million* vehicles. Please note that this storage capacity subjects to change without notice.

2.29 How do I delete the recorded data from a WTDC internal storage?

While your WTDC is operational, you can delete the recorded traffic data from your WTDC's internal storage by one of the following two methods:

- Method 1 – **Using the Push Button:** Pushing and hold the button until it beeps *THIRTY(3) times in a row*. This pushing starts WTDC's data deleting process. During the process, you see the *STATUS LED* flashing *YELLOW*, indicating the activity state. Once it completes the process, you hear a long single beep and see the LED blinking *GREEN* again, indicating the recorded traffic data has been deleted.
- Method 2 – **Using the desktop application** of *Wanco Traffic Data Analyzer*: Refer to its own the document for detailed steps.

2.30 How can I update/upgrade my WTDC's software/firmware?

You can update or upgrade your WTDC's software or firmware by yourself. Here are the steps to do it:

- Log in *ftp://ftp.wanco.com*.
- When the pop-up window (as shown in Figure 2.7), enter *quest* for both the user name and password.
- Navigate to folders as shown in Figures 2.8 to 2.10, and you download the ZIP file.
- Follow the HOWTO instruction that comes with the downloaded ZIP file.
- After you have your USB thumb drive ready for updating, it will just plug in the USB thumb drive into the USB slot of the control panel of your operational WTDC, and then your WTDC will be updated automatically.



Figure 2.7: Wanco FTP Site Login

2.31 Can I access a WTDC through the Internet

Yes, you can, as long as you have a *Wanco* supported cellular modem installed and activated.

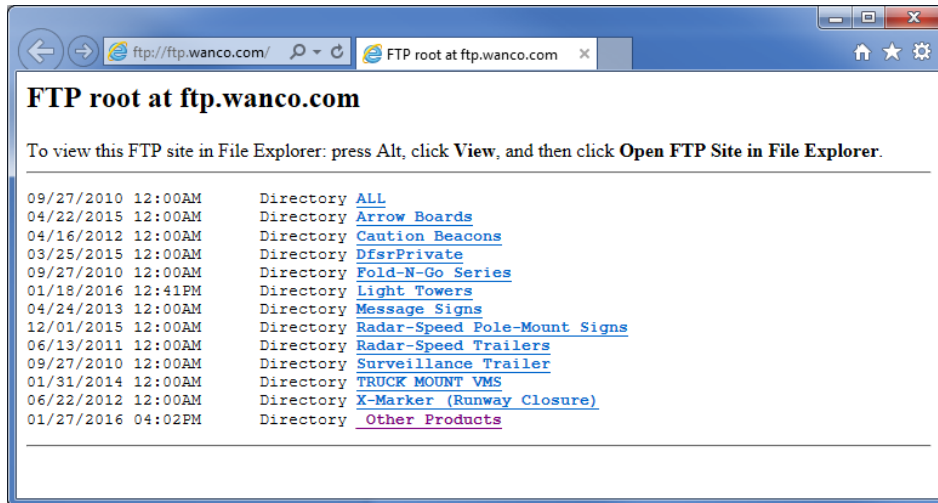


Figure 2.8: First Page of Wanco FTP Site Folders



Figure 2.9: Second Page of Wanco FTP Site Folders

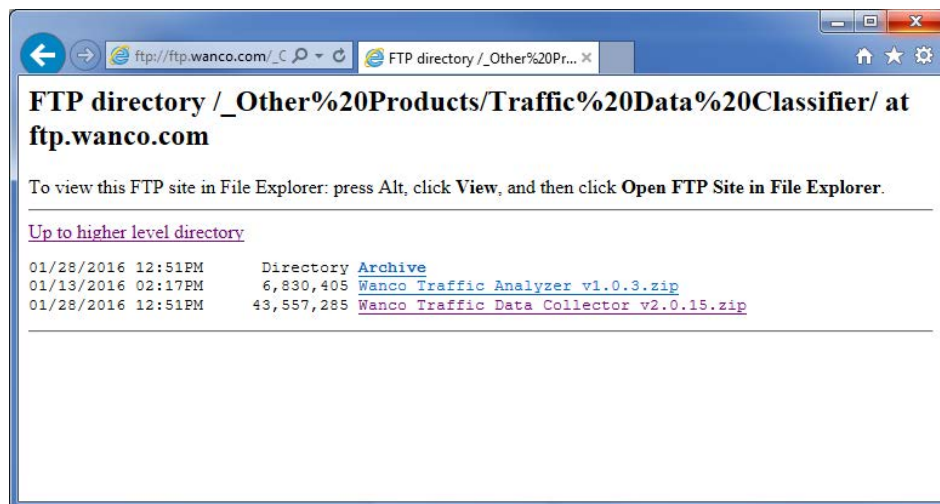


Figure 2.10: Third Page of Wanco FTP Site Folders



3. Using WTDC's Web Interface

In this chapter we are going to see some screen-shots that are captured through using *Firefox* web browser. The browser is sized to simulate a size of a web browser that we find often in a smart phone such as *iPhone*.

3.1 Enable the Wi-Fi Interface

You need to plug in the *USB Wi-Fi Adapter* shown as in Figure 3.1 in to the *USB Slot* of the Control panel, as shown in Figure 3.2.

The optimal way to enable the Wi-Fi interface is let your *WTDC* on and you see the *STATUS LED* blink *GREEN*, and then plug the adapter.

3.2 Connect to WTDC's Wi-Fi

The first step you should do is to connect you mobile device's Wi-Fi to your *WTDC*'s Wi-Fi Access Point. Here is the credentials you need to look and use:

- *SSID*: **WancoTDC**
- *Password*: **wancotdc**

Once you have connected your mobile device to the *WTDC*'s Wi-Fi, you are good to explore some status data that are provided by the *WTDC*'s web server.

3.3 Using the Local IP Address to Connect to WTDC's Web Server

The local and fixed IP address and the port number of your *WTDC*'s Wi-Fi interface is always **192.168.14.101:8080**. This is only parameters you need to enter in your mobile device to connect the web server.



Figure 3.1: The USB Wi-Fi Adapter of a WTDC



Figure 3.2: The USB Wi-Fi Adapter That Is Plugged In

Once your web browser connects to the web server, you will see the first web page as shown in Figure 3.3. This page is constructed in such way so that you do not need to enter more than just the IP address and the port number, and it will automatically navigate to the main page, as shown in Figure 3.4, where you can navigate to the web page sections or other sub pages.

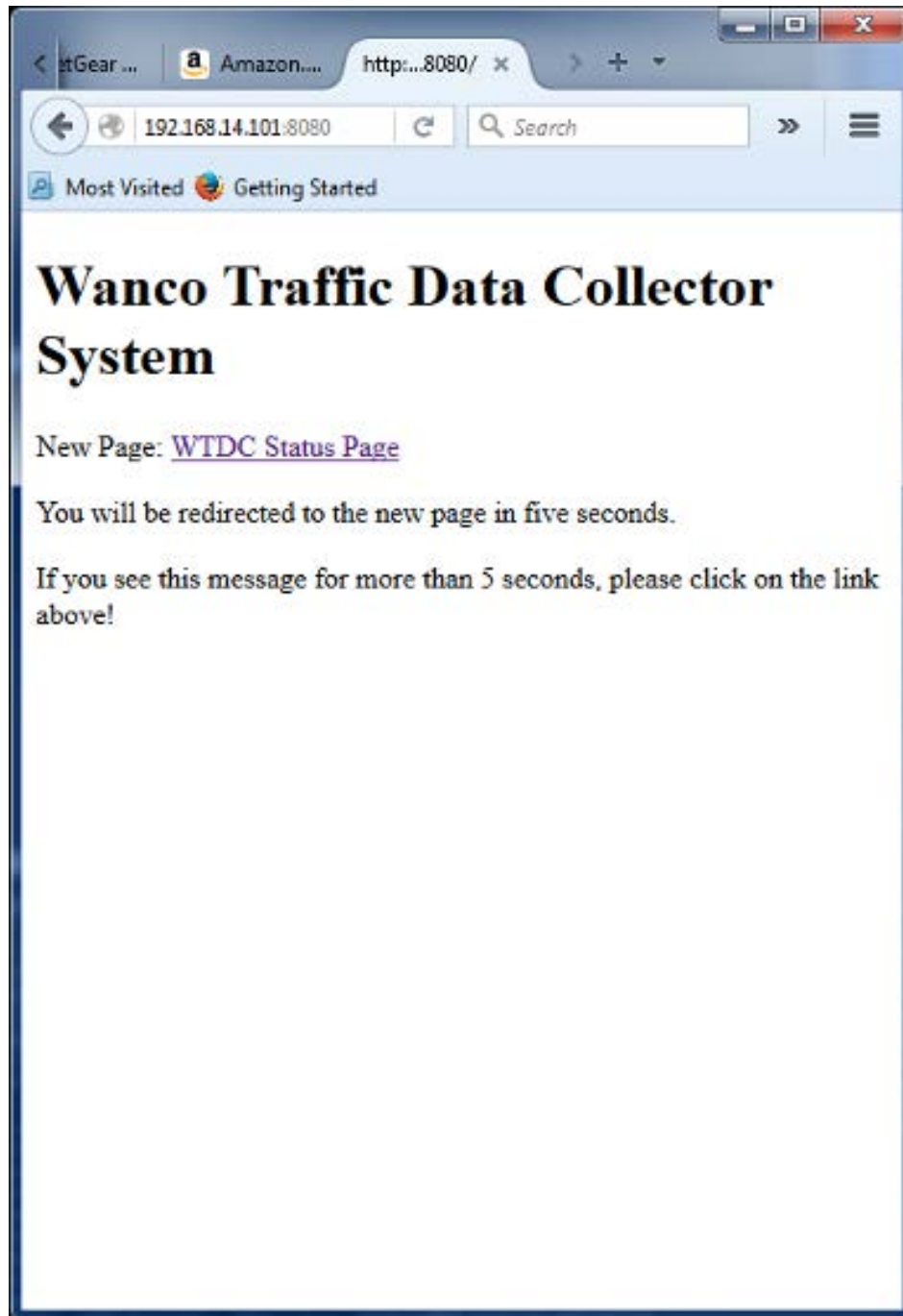


Figure 3.3: WTDC Web Server's First Page

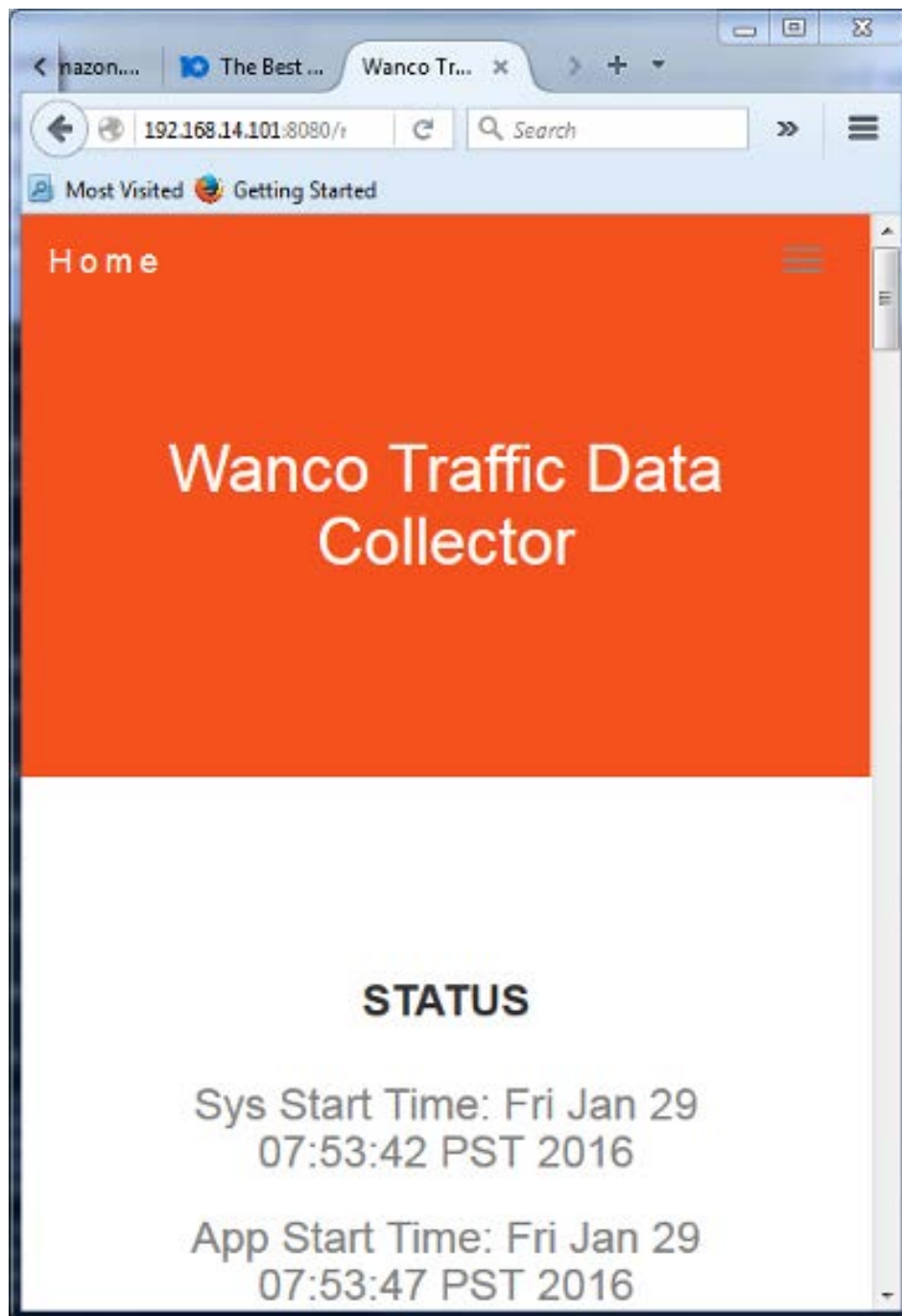


Figure 3.4: WTDC's Web Home page

3.4 Navigate Web Page Sections

Sections in the *WTDC*'s web page are divided containers that are for a specific information or function as the section name suggests.

From the main web page, you can navigate the sections by tap or click the *Section Bar*, as shown in Figure 3.5

Once you have tapped the *Section Bar*, you see the list of the sections as shown in Figure 3.6.

When you tap a section name, you will go to the named section within the web page.

3.5 Web Page Sections

Here we are going to examine the available sections.

3.5.1 STATUS

This is an area where you can see some status data that reflect your *WTDC* when you refresh the web page. There may be more status data provided in the web page than that you are interested, as this web interface was originally created and designed as an engineering tool for *Wanco*'s developers.

The most interested status information you would want is the *System Time*, and *Time Zone Name*. If these data are not right, such as time is way off, or timezone is wrong, you can correct them in *SETTING* section.

And then, you can see the earliest and the latest records' time-stamps getting a bit more of insights about when your *WTDC* has started collecting traffic data, or if your *WTDC* is running up to now.

3.5.2 STATISTICS

This is an area where you can see a summary of more detailed traffic data that your *WTDC* has collected. You would want to rotate your mobile device sideways for a optimal view of the web page.

3.5.3 LOCATION

When your *WTDC* has a cellular modem installed, which has a built-in GPS receiver, this is an area where you can see a *Google Map* that has a marker for your *WTDC*'s location, as shown in Figure 3.9.

Note that this section only shows a live location map when your browser's connection to the *WTDC*'s web server through the installed cellular modem's IP address. Accessing with the Wi-Fi interface IP address, the section shows only a blank space for the location.

3.5.4 REPORT

Currently this is a blank space as the time of this writing.

3.5.5 SETTING

This is an area where you can change and set the following parameters:

- **TimeZone**
- **Radar Clock**

Setting TimeZone

When setting the timezone or clock, you would want to rotate your mobile device the sideways for an optimal viewing area of the web page, the view would be similar to what is shown in Figures 3.10 and 3.12.

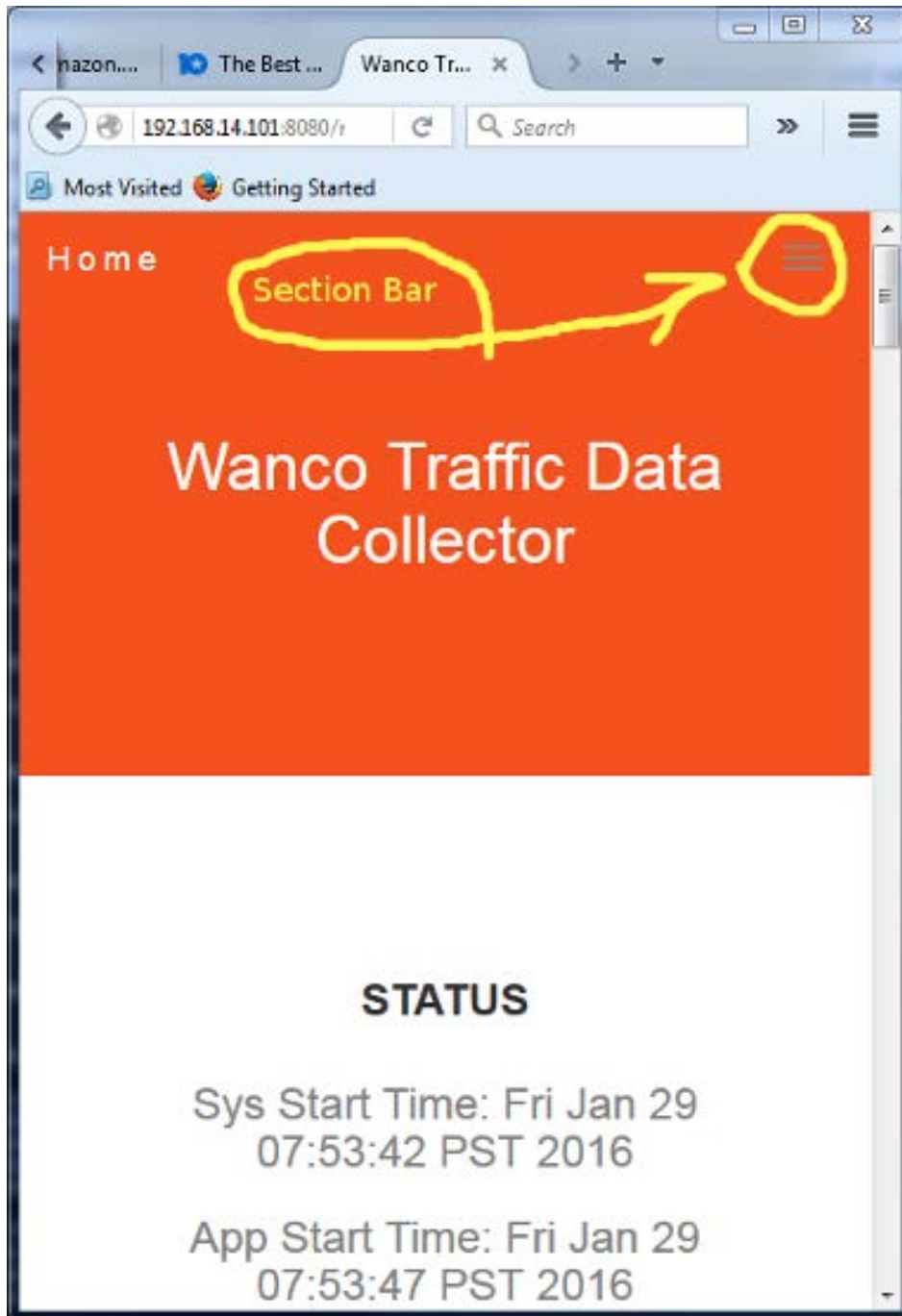


Figure 3.5: Tap the Section Bar to Expand Section List

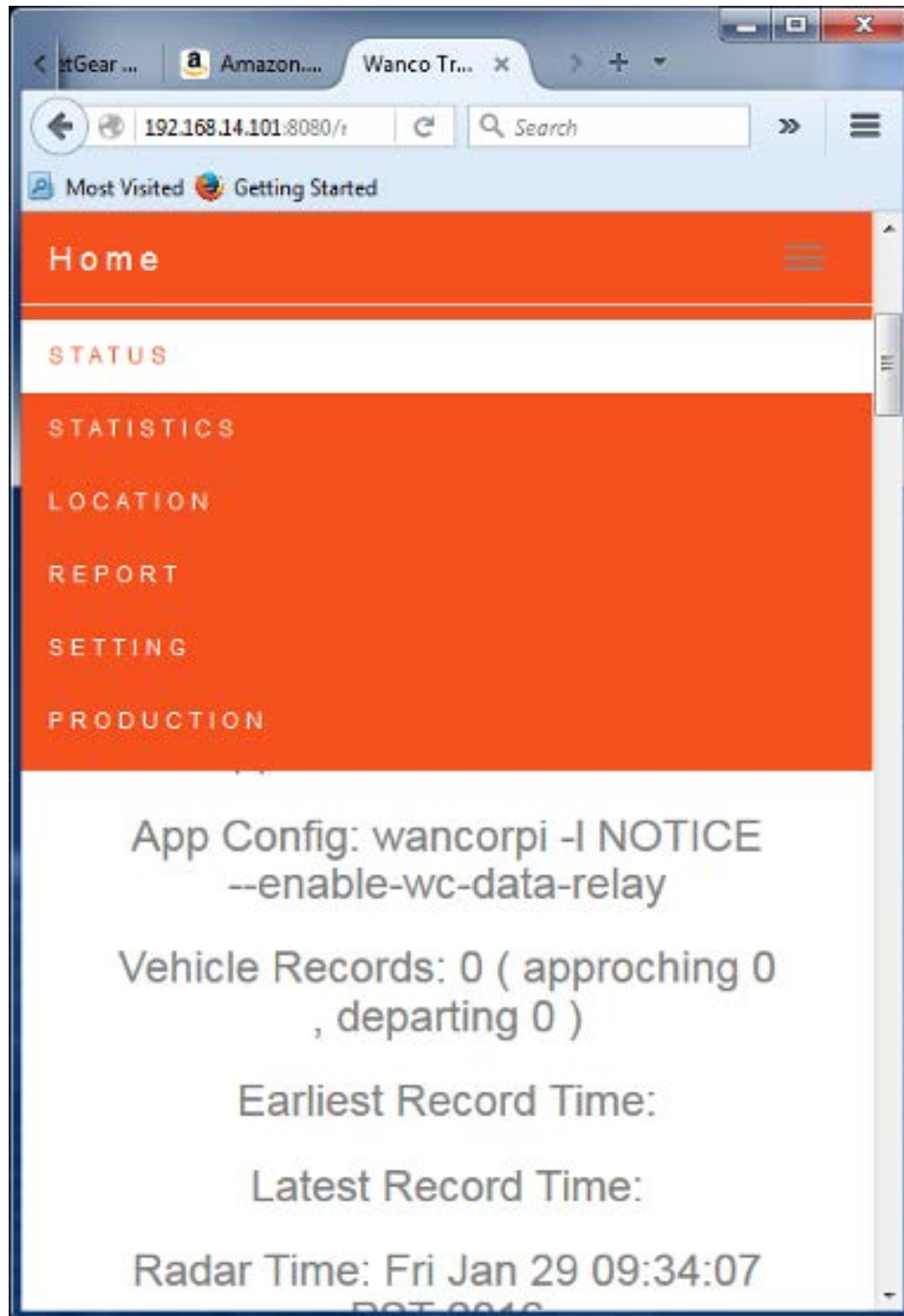


Figure 3.6: Expanded Section List

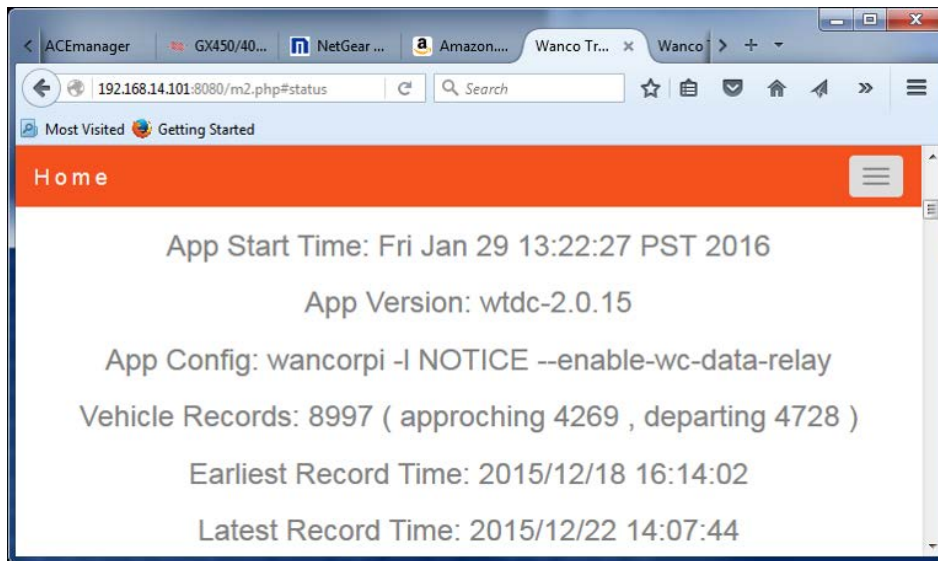


Figure 3.7: Status Section of Web Page

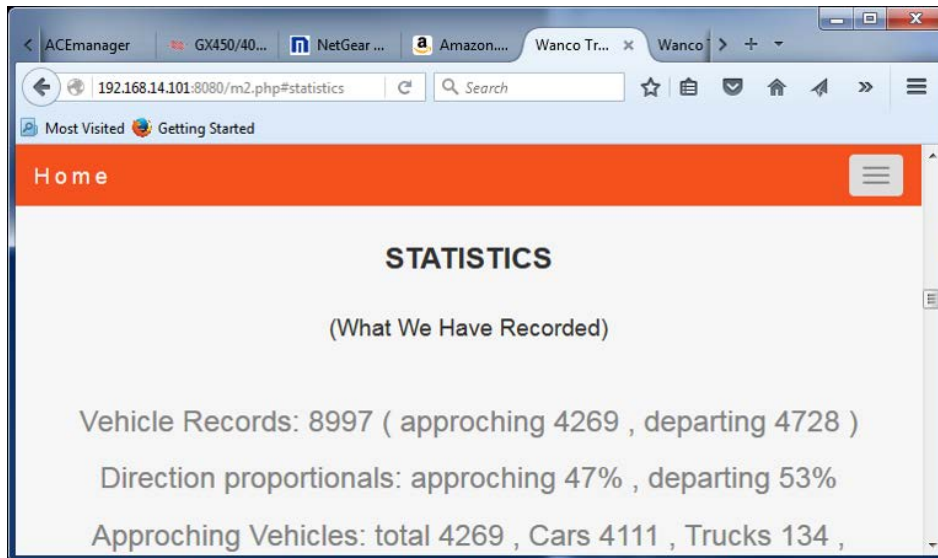


Figure 3.8: Statistics Section of Web Page

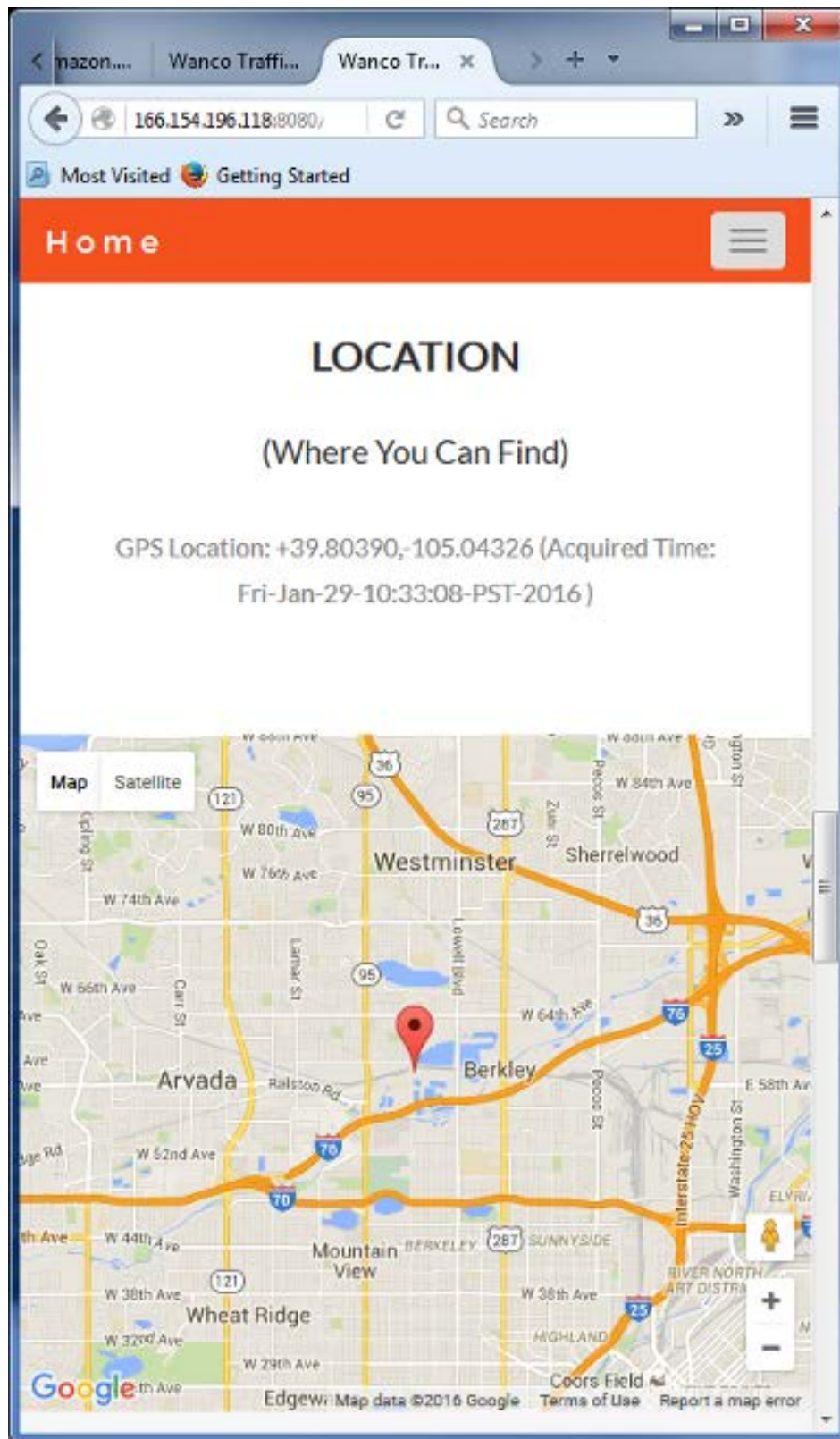


Figure 3.9: Location Section of Web Page

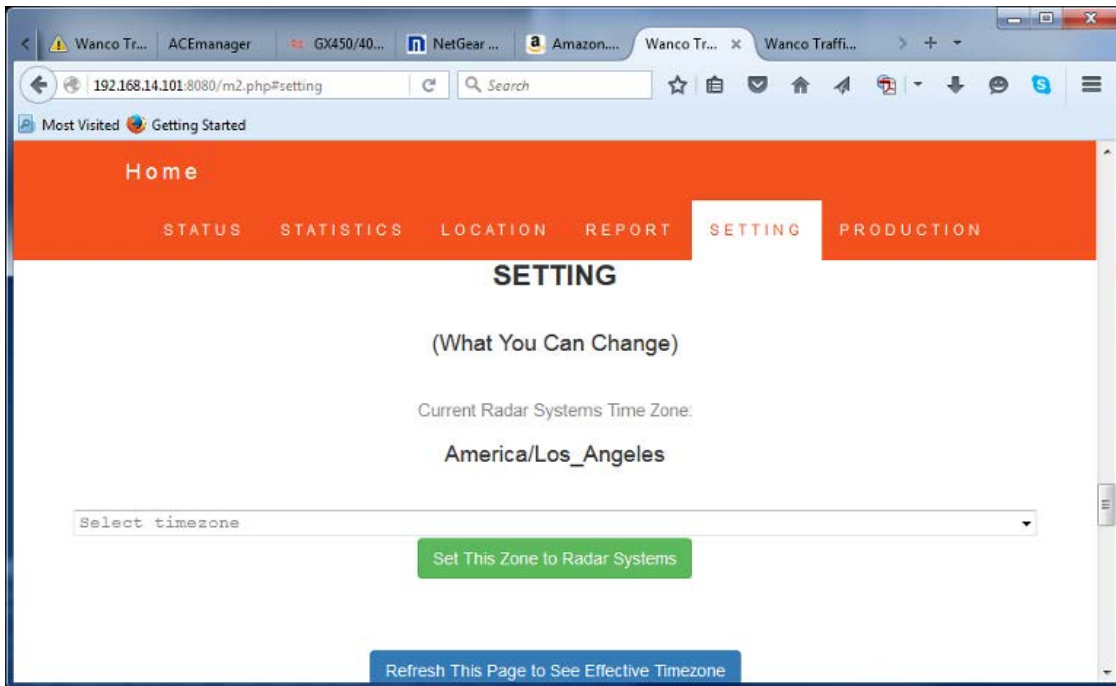


Figure 3.10: Setting Timezone Section

To select a timezone, you just tap the *Selection List* area as shown in Figure 3.11.

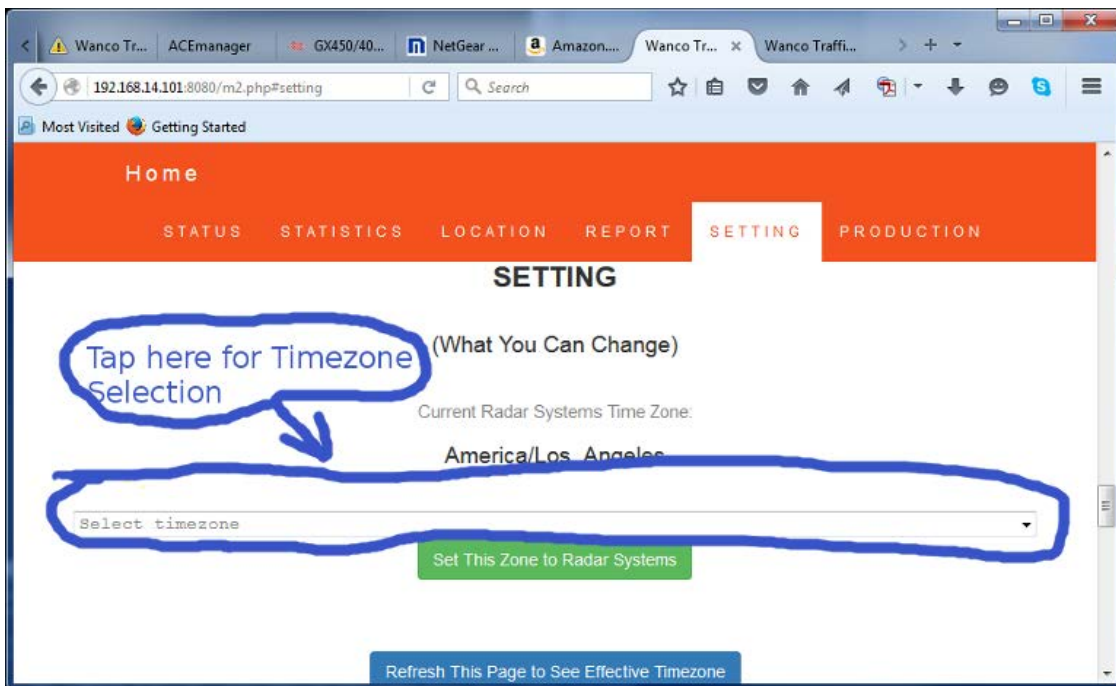


Figure 3.11: Selecting a Timezone

Once you have selected a correct timezone for your *WTDC*'s location, you then tap the button of **Set This Zone to Radar Systems**, and then you can tap the button of **Refresh This Page to See Effective Timezone**.

Setting the Clock

When setting the clock, you just need to compare the two *UTC*, or *GMT* clock times of your *WTDC*'s radar clock and your *mobile device*'s clock. The reason why the web page is using the *UTC* times is that it will reduce confusions when you are in one time zone while your *WTDC* is in another timezone. This situation can happen when you are in some place far away, for example, New York City, and are connecting to your *WTDC*' where it is placed in another place, for example, Los Angeles, using the Internet through the installed cellular modem.

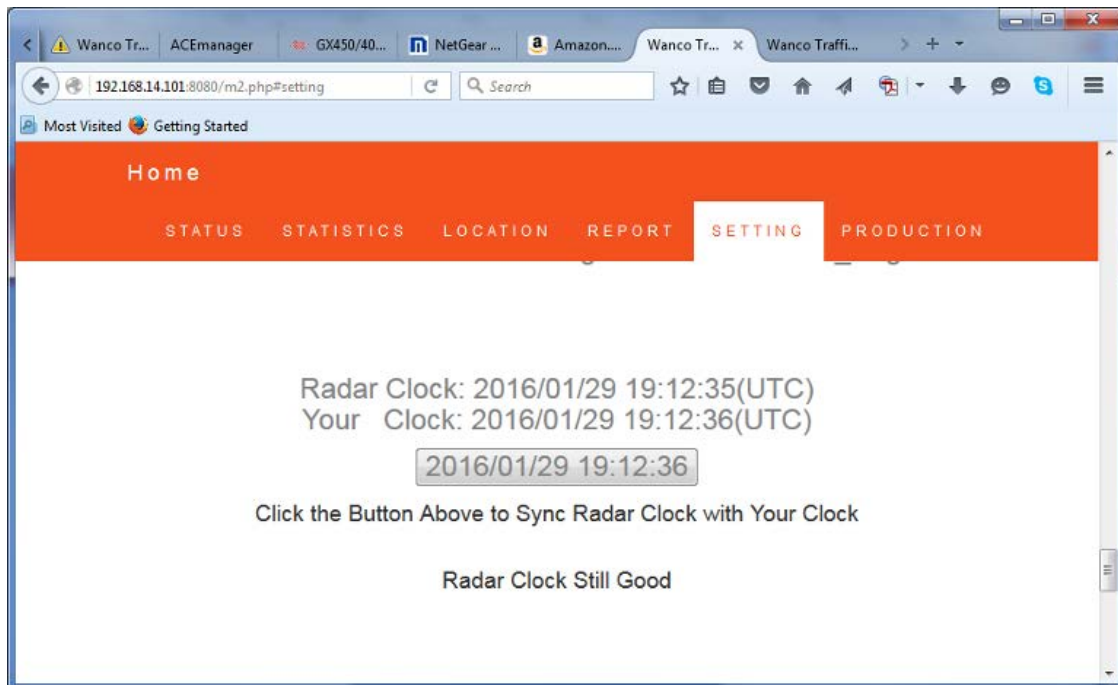


Figure 3.12: Comparing the Clocks

When you see there are more than *30 seconds* in deference, you can set the Radar's Clock with your mobile device's clock by just tap the button below the tow clocks, as shown in Figure 3.13

3.5.6 PRODUCTION

This is an area meant for *Wanco* factory production personnel only, who can set some parameters according to individual product types. So as an end user, you never need to do anything in this section.

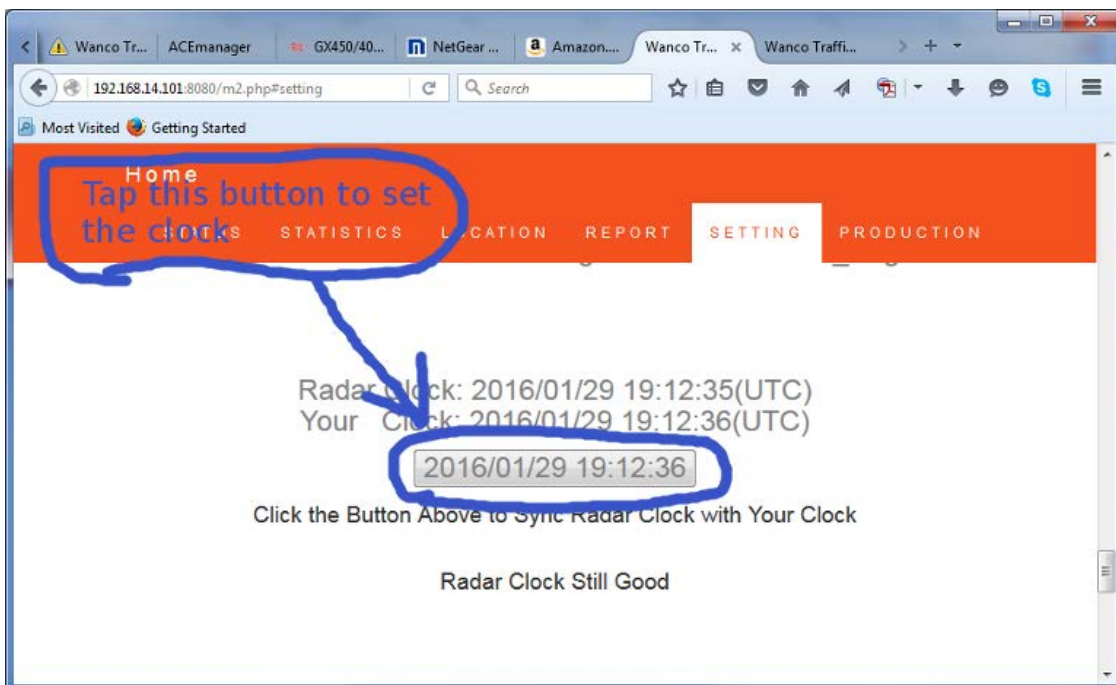


Figure 3.13: Button for Setting the Clock