

MOTORCYCLE LOCATION TRACKER FOR ANDROID

MOHD HISYAIRI BIN MUHD YUSOF

This Report Is Submitted In Partial Fulfillment of Requirements for the Bachelor Degree of  
Electronic Engineering (Computer Engineering) With Honours

FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

JUNE 2014



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**  
 FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN  
 KOMPUTER

**BORANG PENGESAHAN STATUS LAPORAN  
 PROJEK SARJANA MUDA II**

**Tajuk Projek** : MOTORCYCLE LOCATION TRACKER FOR ANDROID

**Sesi pengajian** : 2013/2014

Saya MOHD HISYAIRI BIN MUHD YUSOF mengaku membenarkan Laporan Projek Sarjana Muda ini disimpan di Perpustakaan dengan syarat-syarat kegunaan seperti berikut:

1. Laporan adalah hakmilik Universiti Teknikal Malaysia Melaka.
2. Perpustakaan dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan dibenarkan membuat salinan laporan ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. Sila tandakan (  ) :

**SULIT\***

\*(Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)

**TERHAD\*\***

\*\* (Mengandungi maklumat terhad yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)

**TIDAK TERHAD**

Disahkan oleh:

\_\_\_\_\_  
 (TANDATANGAN PENULIS)

\_\_\_\_\_  
 (COP DAN TANDATANGAN PENYELIA)

Alamat Tetap: LOT 403,  
 KAMPUNG BETA HULU,  
 16450, KETEREH,  
 KOTA BHARU,  
 KELANTAN

Tarikh: 6<sup>TH</sup> JUNE 2014

Tarikh: 6<sup>TH</sup> JUNE 2014

“I hereby declare that this report is the result of my work except for quotes as cited in  
The references”.

Signature : .....  
Author : MOHD HISYAIRI BIN MUHD YUSOF  
Date : 6<sup>TH</sup> JUNE 2014

“I hereby declare that I have read this report and in my opinion this report is sufficient in term of scope and quality for the award of Bachelor of Electronic Engineering (Computer Engineering) with Honours. “

Signature : .....

Supervisor's Name : Engr. Khairul Muzzammil Bin Saipullah

Date : 6<sup>TH</sup> JUNE 2014

Special dedication for my beloved family especially to my parents,  
Mr. Muhd Yusof bin Ab. Rahman and Mdm. Masitah binti Draman.  
Also for my kind hearted supervisor Engr. Khairul Muzzammil bin Saipullah.

## ACKNOWLEDGEMENT

First and foremost, I would like to thank my highest gratitude to God for His blessing I have now complete my final year project for my Bachelor of Electronic Engineering (Computer Electronic) with Honours. Special thanks also to my supervisor Engr. Khairul Muzzammil bin Saipullah for his willingness to take and supervise me for the duration of two semesters completing this project. He had helped me a lot on guiding and giving useful information regarding the needs of my project.

I would also like to thank the lecturer and staff of FKEKK UTeM for their cooperation and help during the progress of the project. I would also like to thank my parents , family members and my friends for their support and suggestion that help me to better understand this project which help in its progress. In time I am having breakdowns during the process of completing this project, they always be there giving me support and comforting me with useful advices.

## ABSTRACT

The project aims to reduce the problem of crime in the country. The crime scene vehicle theft is rampant. Statistics from the report of the Polis Di Raja Malaysia (PDRM) showed this activity is increasing, particularly the theft of a motorcycle. This is due to the high demand for buyers of stolen goods at cheap prices. This project revolves around a system to address the problem of motorcycle theft. An android device should be placed in a hidden place in the motorcycle works sent latitude, longitude, time and date to date and accurate. This system is using internet and GPS connection. Motorcycle owners can find out where the motorcycle was stolen in the event. Owners can find out the location of motorcycles using android system available in the phone. The results of this project will determine the location of where the bikes are. Characteristics of the devices in the first survey and based on these features, the device design parameters have been proposed in line with its function as a transmitter of information. The device should be durable and small size as in put in place hidden in a motorcycle.

## ABSTRAK

Projek ini bertujuan untuk menangani masalah kejadian jenayah di negara ini. Jenayah berkenaan kejadian kecurian kenderaan semakin berleluasa. Statistik dari laporan Polis Di Raja Malaysia (PDRM) menunjukkan kegiatan ini semakin meningkat terutamanya kes kecurian motorsikal. Ini berikutan permintaan tinggi pembeli terhadap barangan curi kerana harga yang murah. Kajian projek ini berkisar sistem untuk menangani masalah kecurian motorsikal. Satu peranti android akan di letakkan di tempat tersembunyi di dalam motorsikal yang berfungsi menghantar latitud, longitud, masa dan tarikh yang terkini dan tepat. Sistem penghantaran maklumat ini menggunakan sistem internet dan sistem GPS. Pemilik motorsikal boleh mengetahui motorsikal berada di mana sekiranya di curi. Pemilik boleh mengetahui lokasi motorsikal dengan menggunakan sistem android yang terdapat dalam telefon. Hasil kajian dalam projek ini akan menentukan lokasi motorsikal berada di mana. Ciri-ciri peranti telah di kaji terlebih dahulu dan berdasarkan ciri-ciri ini, parameter rekabentuk peranti telah dicadangkan sejajar dengan fungsinya sebagai penghantar maklumat. Peranti tersebut haruslah tahan lasak dan bersaiz kecil kerana di letakkan dalam tempat tersembunyi dalam motorsikal. Dengan terhasilnya sistem ini, kejadian kecurian motorsikal dapat di kurangkan.



**TABLE OF CONTENTS**

<b>CHAPTER</b>	<b>TITLE</b>	<b>PAGE</b>
	<b>PROJECT TITLE</b>	<b>i</b>
	<b>DECLARATION STATUS OF REPORT FORM</b>	<b>ii</b>
	<b>DECLARATION</b>	<b>iii</b>
	<b>SUPERVISOR DECLARATION</b>	<b>iv</b>
	<b>DECLARATION</b>	<b>v</b>
	<b>ACKNOWLEDGEMANT</b>	<b>vi</b>
	<b>ABSTRACT</b>	<b>vii</b>
	<b>ABSTRAK</b>	<b>viii</b>
	<b>TABLE OF CONTENTS</b>	<b>ix</b>
	<b>LIST OF TABLES</b>	<b>xiii</b>
	<b>LIST OF FIGURES</b>	<b>xiv</b>
	<b>LIST OF APPENDIX</b>	<b>xvii</b>

## **CHAPTER 1**

### **INTRODUCTION**

Chapter 1 describes about the introduction of the Final Year Project of Degree. It contains brief explanations of subchapters such as problem statements, objectives, scope of project, and methodology used.

#### **1.1 Project Introduction.**

Motorcycle Location Tracker Using Android is a device that can detect motorcycle anywhere. This device using android and WIFI to communicate with server. The source for this device from the motorcycle battery that means it should convert the power of battery 12V to 5V using voltage regulator. This device will be placed on a motorcycle in a hidden part. This projects it important right now because it can give more safety for motorcycle. User can always know what happen to motorcycle and get more safety to their vehicle. This project is important, appropriate and easy to use because it can track on web platform in real time. The data fast retrieval from centralize redundancy server and user friendly, web tracking with history reporting. Again, user can also login web platform at anywhere.

## **1.2 Problem Statement.**

Problem statement of this project is motorcycle theft is more rampant now. Nowadays, since motorcycle is easy to hack, there are many stolen motorcycle and this case is increasing. The components for motorcycle are high demand in the black market. If motorcycle disappears, user cannot find their motorcycle. They cannot know when their motorcycle disappears. Probability to get back the motorcycle is very low. Many cases of motorcycle theft cannot be completed by the police because there was no evidence that where and when the motorcycle disappears.

## **1.3 Objective.**

The objectives of this project are as the following:

- i. To develop an object locator application based on Android Smartphone.
- ii. To reduce the incidence of crime, particularly theft of a motorcycle.
- iii. To help the authorities to solve these crimes.
- iv. To be a low energy and user friendly device that is very efficient in today life.

#### **1.4 Scope of Project.**

The scope of this project is using embedded system to create the apps. It uses programming (JAVA) and android to detect motorcycle location via GPS and Network sensor. It uses Eclipse and Android to build the apps. Two apps must build for this project, that is apps for detect location for motorcycle and apps for map. The apps to detect location it using longitude and latitude and this app will install to the tracker hardware. This tracker hardware put inside or at hidden place in motorcycle and this tracker sends location info to the server (Appslipper.com). Data from the server will sent to the user phone when user ON the apps. User can know where the motorcycle because it can track on smart phone in real time. User can use it anywhere as long they have internet connection.

## **1.5 Thesis Organization**

This report contains five chapters. The summary of each chapter will be explained as follow. Chapter 1 will describe about introduction of the automated visual system quality inspection, problem statement that describe the reason for developing the project, objective of the project, scope of work, significant study of the project and thesis organization. Chapter 2 is about review on previous research by other researcher in foreign country. Various methods and approaches that related to our project have been discussed and reviewed. Chapter 3 explains about method that will be used in this project. Android system, hardware and rule-based classifier will be applied in this project. Chapter 4 explains about result of the tracker. It shows the latitude, longitude, time, date and map. Chapter 5 shows overall conclusion for the project. There are some issues in recommendation or suggestion rises about this field of study of project is discussed in this chapter.

## **CHAPTER 2**

### **LITERATURE REVIEW**

Chapter 2 describes on the analysis and review about component and its importance in this project. This chapter discuss about the contents of the apps application, power circuit and tracker hardware.

#### **2.1 Smartphone.**

A Smartphone or smart phone is a mobile phone which is built with an operating system far more advance than those of standard cell phone. The earliest Smartphone function as a personal digital assistant that provides word processing software and email functionally combines with features of standard mobile phones. The latter model came with media players, digital camera, pocket video camera and GPS navigation which lead to the Smartphone becoming the multi-tasking device it is today. Current technology enables the implementation of touch screens capabilities eliminating the need for keypads as well as high speed data to access through network data connection (Bluetooth and WiFi) thus being an ideal choice for those who prefer mobility.

2access through network data connection (Bluetooth and WiFi) thus being an ideal choice for those who prefer mobility.



Figure 2.1: Android Smartphone interface [1].

Smartphone usually come with built-in operating system such as Google's Android, Apple iOS , Windows Phone and Blackberry and usually the operating system is permanent which mean that one type of phone can only use one type of operating system although it will get updates throughout its lifetime. The automatic determination of a user's social context is a desirable functionality for the next generation of adaptive, personalized mobile phone applications. Everyday smart phone devices generate tremendous amount of data on user preferences, on device intercommunication on user context. By exploiting built-in sensors, smart phones have become attractive options for large-scale sensing of human and social behavior [2].

## 2.2 Android.

Android is an operating system that used Linux Kernel and developed mainly for mobile devices such as tablet computer and Smartphone. It uses direction manipulation method for its user interface in which the user interact directly with their device by swiping, tapping, pinching. Accelerometers, gyroscopes and proximity sensor are usually integrated into the hardware that could be use to respond to additional user's action such as adjusting the screen based on how the device is oriented.



Figure 2.2: Android and Eclipse software [3].

Google release the source code for android under the Apache License which made it an open-source operating system which lead it to be one of the main choice for developers as they are free to develop application based on the OS as they like. This help to expand the community and the functionality of the devices which is written in Java programming language. The platform used for development is Android Operating System, as described [3] is been proven as the best operating system for a context-aware location based services. Customer friendly user interface letting user to enter the task and store it for future retrieval is done using the exclusive SQLite inbuilt database available in Android mobile. User can align task associated with any location and retrieving details as alert before reaching a desired location of interest. User entering into this application is given an option for connecting to the database so as to verify the location updates. Information is then delivered at the right time in the right place to the right person. The mobile user will also be able to receive retail offers and discount information in the surrounding by



this intelligent observer module. Android operating system is suggested as a best tool for designing context aware applications. Towards the end, author had featured an analysis report on performance of various mobile devices for a location aware computing [4]

### **2.3 Android as an operating system.**

Android operating system is build using Linux Kernel. Its application is designed and developed using Java programming language and run within a virtual machine. One of this virtual machine is the Dalvik Virtual Machine which resides within a Linux-Kernel managed process. A virtual machine is like a physical computer software implementation that works like a real physical computer. This means that the virtual machine can compile and run a program such as the physical computer is not for us. In other words we can say it is one such emulator compared to actual physical machines. But there is a dark side virtual machine because it is less effective than the actual physical computer and gives the unstable performance when multiple virtual machines exist on the same machine. Components of Android platform such as Activity, Services, Content Providers and Broadcast Receivers were introduced thus providing a better insight of application development [5].

Dalvik Virtual Machine is a custom clean-room implementation of virtual machines that provides application portability and runtime consistency. While developing the Dalvik Virtual Machine Dan Bornstein and realized the specific constraints of the mobile environment that will not change in the near future at least, such as battery life, processing power and more. So Dalvik virtual machine optimized. Dalvik virtual machine using register -based architecture It runs optimized file format (.dex) and Dalvik bytecode which convert Java.class/.jar files to .dex build time.



Figure 2.3: Dalvik virtual machine architecture [6].

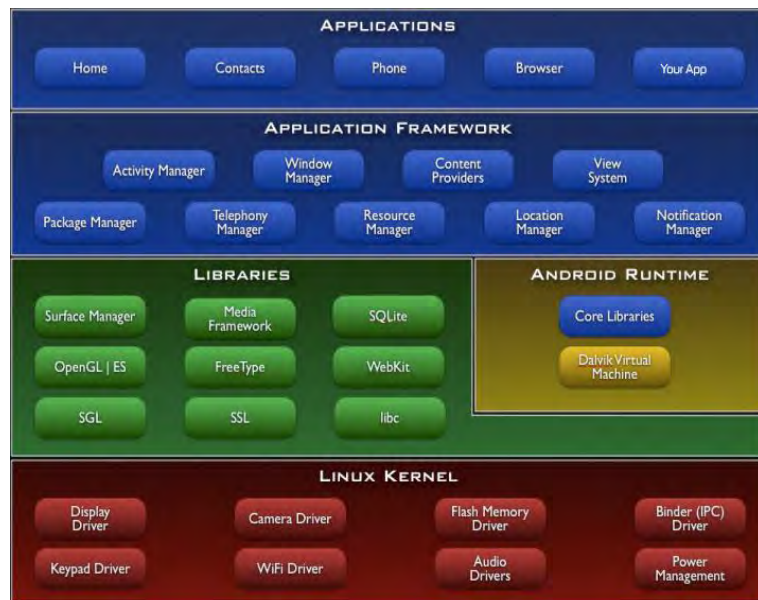


Figure 2.4: Basic android terminologies [7].

Technological development in an exponential manner have paved a way to access hardware directly by customized application interface such as GPS, web service, programming cameras were elucidated. Ubiquitous Computing is an emerging technology and has lot of challenges in design, modeling and user interaction which are identified and implemented in this organizer application [8].

Table 2.1: Definition of Smartphone [9].

Item	Explanation
Appearance	Slim and light, easy to carry.
Basic Functions	Embedded modules of wireless communication function for data and voice information.
Data Communication	1. PIM included, including the functions of data book, contact, to do list, memo and HotSync. 2. Able to access internet and email systems
Voice Communication	Embedded function of voice communication
Input	Any format from touch panel, keystroke to voice-control
CPU & OS	Multi-task embedded micro-processor and OS.

#### 2.4 Development tools.

Android applications are designed using the software and tools development. Advantages of android is that it is open source so there are many ways one can use to design and software needed can be downloaded for free online. Android applications designed using java language it is compiled and executed through the Dalvik Virtual Machine (VM). Coding with android development software are known to be user-friendly because they usually provides rich Java environment include context-sensitive help and code suggestion hints as well as error corrections.

Table 2.2: Android tools [10].

Tools	Description

Android Software Development Kit ( SDK)	Allows developers to create applications based on android platform. It includes sample projects with source code, development tools, emulator, and required android libraries.
Android Development Software	Software development that supports java and plugging for Android Development Tools (ADT), which allows the Android operating system that, will run on the computer.

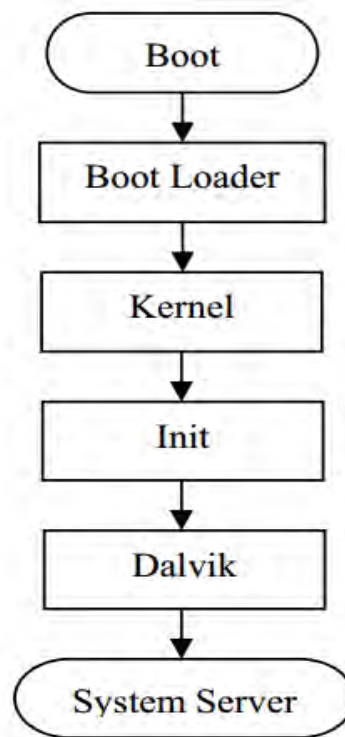


Figure 2.5: Android OS booting flow chart [11].

## 2.5 Android application in market values.

Android applications have become an important system to developers today. It helps that one of the main support is Google who saw the potential of mobile devices and the possibilities of technology. As mention before, the basis of the open source android helps to encourage developers to experiment with it and introduce and incorporate technological advancements [12].

Google has been a strong advocate for android development with the introduction of Google Play Store which allows developers to upload their completed applications to be downloaded by users as free or paid applications.

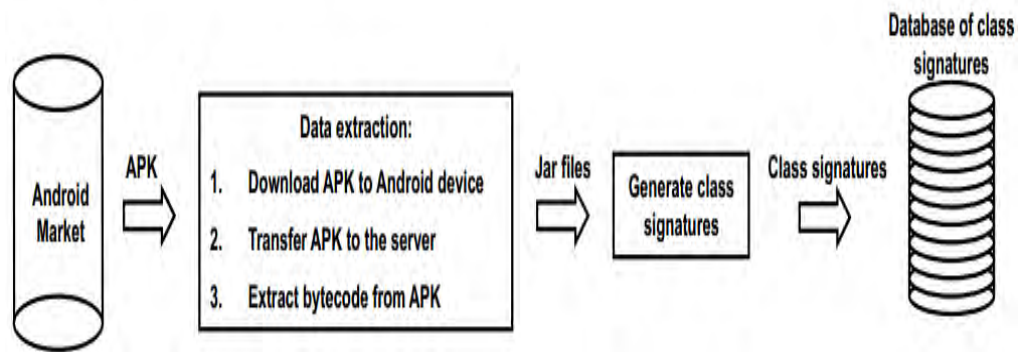


Figure 2.6: Steps for the generation of class signatures from mobile apps in the android market [12].

## 2.6 Location technology.

Assisted GPS (generally abbreviated as A-GPS, and less commonly as a GPS) is a system that can in many cases greatly improve the startup performance, or time-to-first-fix (TTFF) of a GPS satellite-based positioning systems. The GPS location of the mobile device that is equipped obtained by comparing the signals received by the device from multiple GPS satellites.

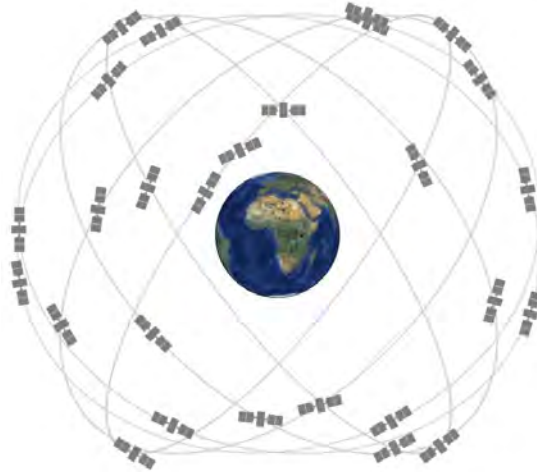


Figure 2.7: Satellite surrounding earth [13].

A- GPS works well in situations where direct line -of - sight to the satellite (open sky) can be maintained, as in the suburbs and rural areas. For mission-critical applications, such as law enforcement, A- GPS technology often comes with another method of geographic location, because the GPS receiver in the phone is switched off by the end user. Satellite periodically emits short pulses of radio signals to GPS receivers. GPS receivers receive signals from at least three satellites to calculate distance and using triangulation techniques to calculate the two-dimensional (latitude and longitude) position or at least four satellites to calculate the three-dimensional (latitude, longitude, and height) position [13]. Once the location is calculated, it can calculate the average speed and direction of travel. Therefore, GPS is a key technology to provide the device itself.

A- GPS additionally use network resources to locate and use satellites in weak signal conditions. In very poor signal conditions, for example in a city, these

signals may suffer multipath propagation where signals bounce buildings, or weak through atmospheric conditions, walls or tree cover. When first turned on in these conditions, some GPS navigation devices may not be able to stand in position as fragmentary signal, rendering them unable to function until a clear signal can be received continuously for a long enough period. Setting can take as long as 12.5 minutes. Google Cloud Messaging for Android (GCM) is a service that allows to send data from Android powered device user server and also to receive messages from the device on the same [13]. GCM Services handles all aspects of queuing of messages and delivery to target Android application running on the target device. GCM is free no matter how big your order requirements, and there is no quota. GPS Device to receive GPS coordinates and sends it to the server each time after the designated time. Device Server receives information from GPS and save it. Consumer demand for a particular vehicle. The server processes the request and shows the latest available to the customer.

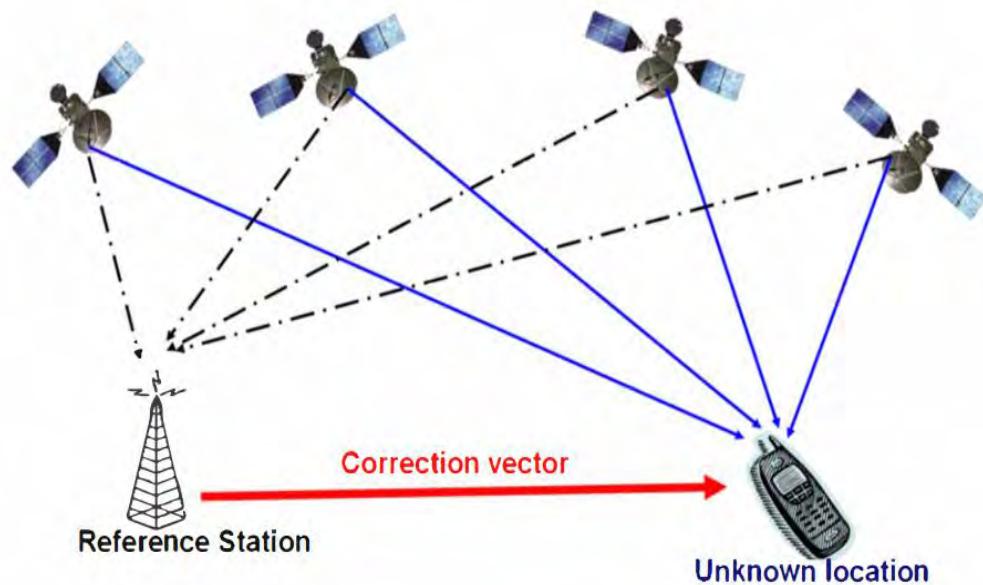


Figure 2.8: AGPS system [14].

## 2.7 Internet Technology Background Information.

Communication and dissemination of information are the two most important aspects of daily life. With the advent of the Internet, the ability to make information instantly accessible by millions around the world has come true. This thesis uses Internet as a medium of distribution of data collected by the GPS location receiver. This data is provided via the World Wide Web, and therefore, this section will give a brief overview of the HTTP protocol used to communicate between the Web browsers and Web clients. As location data is sent to the web server via TCP / IP connection protocol suite will also be examined. The firmware of the GPS Tracking module is written and compiled using an open source compiler [14]. The firmware performs three phases, the initialization, the GPS position reading, and the GPS data formatted and transmitted to GCM server via GPRS networks.

## 2.8 How GPS work.

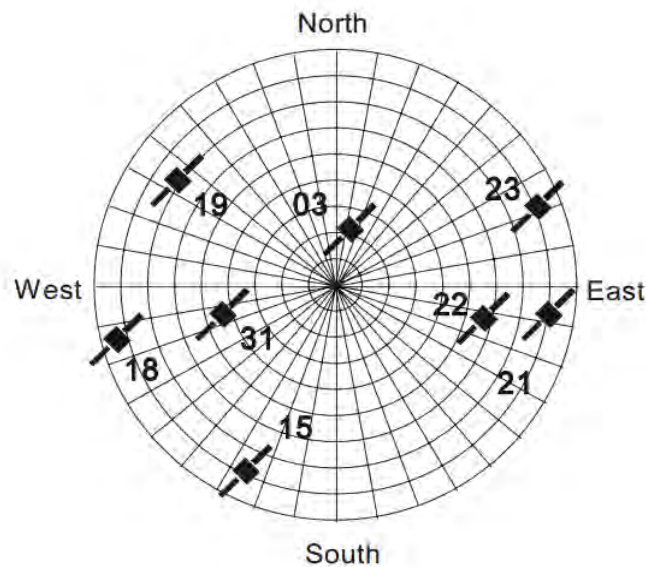


Figure 2.9: GPS satellite constellations view [15].

First of all, when people talk about GPS, they actually refer to the GPS receiver