**CHAPTER ONE**

**INTRODUCTION**

1. **Introduction**

Security is as important as tracking of assets and that is why the best way to prevent systems from been harmed is to be in the know as much as possible adversary may deploy their plans. Tracking is very essential in today’s environment in almost every facet of life from the shipping industry, wildlife, transportation and even into our homes. Security surveillance has grown beyond the military and other security agencies and has found its way into the economic industry, agroforestry and into our everyday lives.

There have been so many technologies to help in tracking of assets as far back as the inventions of technology. One of the greatest invention so far as tracking is concern is through the use of satellites which puts the whole earth into a view like that of a hawk on a fowl from above. Satellites have provided a lot of breakthroughs for humankind and tracking is one major of such inventions.

Geographical Positioning System (GPS) is one of the greatest use of Satellites to track assets from the surface of the earth and with latest mapping inventions like Google earth, Google Maps, Open Street maps and other Geographical Information Systems, it has become very easier to track assets from anywhere of the earth. This technology is motivating this thesis work with additional addons like GSM and Microcontroller this study researches on the use these technologies to help track a university’s fleet management.

* 1. **Background**

There is tremendous demand for object tracking application for the business process. The real-time tracking information on valuable things and assets like vehicles could solve many problems in the world. GPS is the Global Positioning System which provides the location, using oﬄine and on-line both in any atmospheric conditions. There are several types of GPS tracking system available in the market. Oﬀ- line GPS tracking system, GPRS based tracking, SMS-based tracking, Android phone-based GPS tracking applications etc. The GPS-based oﬀ-line tracking and alert system works oﬀ-line without using the Internet. When the GPS in a device is on the GPS satellites broadcast the signals and GPS receivers uses the signals and provides the latitude, longitude, and altitude information along with the time. The main aim of the present work is to develop a vehicle location Tracker management system that ensures substantial productivity and gains including greater efficiency of fleet operations, higher field workforce productivity, lower fleet operating costs and better customer service with the help of a microcontroller interfaced serially to a GSM Modem and GPS Receiver.

The GPS modem gives many parameters as the output, but only the NMEA data coming out is read and displayed on to the LCD. The same data is sent to the mobile at the other end from where the position of the vehicle is demanded. An EEPROM is used to store the mobile number. When the request by user is sent to the number at the modem, the system automatically sends a return reply to that mobile indicating the position of the vehicle in terms of latitude and longitude.

* 1. **Problem statement**

One of the greatest challenges around the transportation industry in public and other corporate institution aside been in the know the whereabout of assets, vehicles, goods in transit and on top of all the behaviour of drivers around driving ethics. Some drivers may deny driving along prohibited routes, robbing fuel from fuel tanks, tampering with engines and other secured models. A popular model to enforce vehicle tracking and positioning system involving vehicle log books or sheets. This traditional way has its disadvantages as it allows the university drivers to log and input data at their discretion. Vehicle Tracking and Positioning System (VTPS) is a GPS microcontroller based oﬄine device which is aimed at tracking the location of vehicles and flag alerting when there is tamper with any installed module.

1. Tracking the location of vehicles.
2. Flagging on opening of fuel tanks among other.
3. Flagging on breakage in windscreens
4. Flagging on opening of bonnet
5. Speedometer Red Zones
6. Deployment of Airbags
   1. **Main Objectives**

The main objective of this study is to contribute to knowledge in the space of Global Positioning Systems (GPS) and Global System for Mobile Communication (GSM) and propose a design for Vehicle Tracking System and monitoring of other Vehicular modules. The study seeks to particularly broaden the idea of vehicle tracking and positioning system for University Fleet Management to support real time notification to fleet administrators and in our case, University Transport Officers. An SMS alert or message is sent to the authorized number informing him / her if parameters have been exceeded.

* 1. **Specific Objectives**

This designed module will be driver and university management centred and to adapt it as an effective monitoring strategy that will benefit the university. The outcomes to be considered consist the capability of the frame work to read location coordinates from the satellite and the ability to detect the red zone speed limit if a driver exceeds.

The framework also will monitor the fuel tanks and check on openings with alerts sent to administration as the openings happens. The whole surveillance system checks when the bonnet of the vehicle is also opened. All these are done to prevent unscrupulous activities of drivers as they travel along their route. The specific objectives regarding this research thus includes;

1. To investigate the basic operations on Global Positioning System (GPS) and Global System for Mobile Communication (GSM) usage in Vehicular Tracking Systems (VTSs)
2. To provide real time alerts on Vehicle in motion from anywhere in the world.
3. To design a Vehicle Tracking System from an Open Hardware
   1. **Research Question**

In the quest to address the objectives of this research work, the following research questions are constructed as major lead guide for the study. The research questions therefore include the following.

1. How can GPS and GSM be used to track Vehicles in motion
2. Can GPS base Vehicle Tracking System (VTS) give real time information to administrators
3. How can GSM modules communicate outside non-cellular zones?
   1. **Significance of the Study**

This study will contribute to the improvement of GPS car tracking and not only for the university but for any individual or corporate entity who would want to use the system. The study encourages the university fleet management and also ease the drivers of vehicle log books.

* 1. **Scope of the Study**

The research study focuses on institutions like Universities that have vehicles that needs central administration without much difficulties. The proposed system will be built around a microcontroller programmed with a calculated program logical algorithm to maximize productivity with University fleet management. The controller will also be interfaced with a GSM module and GPS module for easy communication over telecommunication networks.

The device would be powered by the 12v D.C battery of the vehicle which runs through a voltage regulator to give an output of 5V. An LCD will show the current state of the vehicle at any point in time.

* 1. **Overview of Research Methodology**

The study adopts a mixture of research methodology such as literature review approach and design and creation approach. It also builds more on a prototyping methodology to come out with a working prototype. The built prototype aids answering the research questions.

* 1. **Organization of the Study**

The research study is made up of five chapters as described below. Chapter one introduces the whole study by mentioning GPS and GSM as a major technology supporting Vehicular Tracking Systems and hits on background in the field of tracking assets and their importance to our everyday life. The chapter then introduces the problem surrounding corporate and public vehicles in motion and the problematic behaviour of drivers in that space. It follows with main and specific objectives and the specific objectives arising thereof. Research questions are coined out of the objects to server as the guiding questions to lead the study. Significance and scope of the study follows with overview of the research methods to finalize the chapter.