CHAPTER 1
PROPOSAL IDEAS

1.1 Background Problem

The term tracking involves looking for, following traces, and checking carefully and discreetly for a person or object. Tracking also means someone who does activity tracking because there is something to be found. Many activities that can usually be caused must be traced. Among them is tracking children or relatives who are outside the house, and tracking humans at tourist attractions like helping strangers to roam somewhere in order for them to not get lost [1]. Tracking is often utilized in the condition of densely populated areas and areas which are prone to child abductions.

In this era, there was already a GPS (Global Position System) technology on a smartphone to be able to find people's coordinates [2]. However, to be able to use the technology. It still needs a signal to be connected to the internet. With the combination of several modules such as the GPS (Global Position System) and the microstrip antenna to send the signal to obtain the latitude and longitude of the GPS module. The writer can find the longitude and latitude coordinates. In addition to the use of GPS, this research also uses a microcontroller component as a data processing center and information [3]. Microcontrollers are used because they are more practical in design and cost less. The microcontroller used is the open source Arduino Nano platform.

Currently, smartphones such as iPhone and Android are never separated from people day to day life. iPhone has a dedicated operating system (iOS), while Android has an open source operating system (OS) [4]. It is possible to download Android source code and use it on your own hardware. There are a number of major smartphone manufacturers that use the Android code and add their own features and software to their products, including Samsung, LG, Xiaomi, and Huawei.

Several system and software developers end up developing and designing Android applications using software that supports Android, such as Android Studio. It is for this reason that the author uses Android Studio, Microsoft Visual Code Studio, or Flutter. For the final project, all of these components will be utilized to develop a human tracker application. Which will be carried out in an open and disclosed venue with a testing of speed and tilt mechanism. The tilt mechanism experiment will be tested in a variety of different positions such as standing, bowing, and prone position.

1.2 Issue Support Information

According to the detik.com website, there were cases of 3 tourists disappearing in Lake Situ Sukabumi on January 1, 2023.It started when they were on vacation in the tourist area of Gunung Gede Pangrango National Park, Situ Gunung.In the case of this loss, two tourists managed to save themselves, but one victim in the name of Nandi has not been found and is still being searched. Therefore, the police decided to sterilize the area.(detik.com 2023)

Missing persons cases are cases that are often found, especially in Indonesia.Along with the increase in tourist areas in Indonesia that can attract tourists from within the country and foreign tourists which causes the density of these tourist areas so that many tourists are lost.

1.3 General Analysis

1.3.1 Economic Aspect

In the production process of gps tools can be said to be high to make. Each component needed has a fairly relatively expensive price, where the most expensive components are GSM SIM 800L module and Neo GPS module with prices reaching RP. 120,000.00. For that, we try to replace the Neo GPS with a handmade Antenna. We will try to adjust the antenna made to the formula and frequency that is arguably optimal for sending signals. Therefore, the technology to be used is expected to have a price that is not burdensome so that it can be applied to daily life.

1.3.2 Manufacturability Aspect

This tracking device is equipped with a gyroscope sensor to determine the position of the tool and speed sensor. If the device is standing or bowing, the gyroscope sensor will detect and then display an image of their position in the maps menu. In addition, the tool can also detect its speed and it will be displayed directly in the application. This device will use Arduino IDE and Flutter software with applications in operation.

1.4 Tools Requirements

The needs that must be met in the design of this device are as follows:

1. Can monitor objects such as latitude longitude coordinates, object speed, tracking time and object tilt in real time and accurately.

2. Making applications as a medium of observation while monitoring tracking objects so that the tool can work remotely without having to have an operator who is always on standby at the location.
3. Use of GSM SIM 800 L V2 Module as a resource on the tool to support real-time monitoring.
4. Prototype tool to be made using materials that are waterproof and resistant to weather.
5. Can provide rechargeable battery power so that it can be used sustainably.

1.5 Proposed System Solutions

In the system solution offered with a communication module that supports monitoring tools to be able to monitor tracking objects and send data automatically which will be received and displayed through the android application. The first solution offered using an ESP 32 microcontroller connected to a lora antenna and WiFi module. The second solution that can be used is an Arduino nano microcontroller connected to the GSM SIM 800 Lv2 module. The GSM SIM module will get internet access from the sim card to send data in real time. Tracking devices use several sensors such as tilt sensors. The components of this tool must be up to standard in order to function properly.

1.5.1 Product Characteristic

1.5.1.1 Product A

Solution A will apply the concept of monitoring the location of tracking devices, humidity by utilizing mobile application technology that uses a microcontroller (Arduino Uno) connected to Wi-Fi. The advantage of this solution is that it has a higher data transfer speed and more flexible WiFi communication for many data transmission and retrieval in real time so that actions can be taken according to the conditions to take quick and precise actions.

1.5.1.2 Product B

Solution B will apply the concept of monitoring the location of tracking devices, humidity by utilizing mobile application technology that uses a microcontroller (Arduino Nano) connected to the Internet through a GSM module. The advantages of this solution are that it can send data anywhere, neat product packaging and can monitor and transmit data in real time so that actions can be taken according to conditions to take quick and precise actions.

1.5.2 Usage Scenarios

1.5.2.1 Schematic A

The mechanism of using the concept is to connect the Arduino Uno and Wi-Fi module with a microcontroller, then the microcontroller is embedded programming to monitor and send data in real time. The WiFi module will get internet access from the hotspot WiFi modem. The breakdown of tool usage is as follows:

1. The tool will initially be paired with components such as Arduino Uno, Wi-Fi Module, MPU 6050, Lithium Polymer Battery, and GPS Neo 7M with a handmade antenna, namely a microstrip antenna.
2. Tools that have been integrated will be configured using the Arduino IDE application. In the application, the tool will be programmed to be able to monitor and send data in real time which can be accessed through the mobile application.
3. After that this tool will be implemented on a waist bag that has a tool with an antenna in it. After that, you will get the location point of the tracker along with additional data.

1.5.2.2 Schematic B

The mechanism of using the concept is to connect the Arduino Nano and GSM modules, then the microcontroller is embedded programming to monitor and send data in real time. The breakdown of tool usage is as follows:

1. The device will initially be paired with components such as Arduino Nano, GSM SIM Module 800L V2, MPU 6050, Lithium Polymer Battery, and GPS Neo 7M with a handmade antenna, namely a microstrip antenna.
2. Tools that have been integrated will be configured using the Arduino IDE application. In the application, the tool will be programmed to be able to monitor and send data in real time which can be accessed through the mobile application.
3. After that this tool will be implemented on a waist bag that has a tool with an antenna in it. After that, you will get the location point of the tracker along with additional data.

1.6 Conclusion and Summary CD-1

This CD-1 document discusses an overview of the problem formulation of monitoring tracking devices and sending data automatically and in real time to generate location data in android applications. This document also discusses the analysis of components such as microcontrollers, accelerometer sensors, gyroscopes, power supplies and handmade microstrip

antennas needed to support the resolution of the problems studied. The solution we offer is to design a monitoring tool for tracking devices that are able to display monitoring and detect user position and speed. and display data in real time on the mobile application. In the CD-1 document we have 2 solutions, the first uses Wi-Fi, the second uses GSM. The difference in these two solutions is that GSM has better specifications and is flexible than Wifi because this tool requires high mobility.