# GPS Based Soldier Tracking and Health Monitoring System

**Seema Aiwale[1], Mosmin Mulani[2], Manjusha Gaikwad[3], Anita Chavan[4], Prof. Anuradha Waghmode[5]**
[1, 2, 3, 4, 5] Dept of Electronics and Telecommunication Engineerig
[1, 2, 3, 4, 5] Fabtech Technical campus,Sangola.

***Abstract-*** *Army is one of the most important aspects of any country. It is our duty to equip soldier with better advanced technology. This paper helps to track the soldier using GPS. In this paper soldiers health parameters such as heart rate and body temperature are measured and transmitted wirelessly to the control room using GSM. In case of death of the soldier, the controller detects the change in pulse rate and location of the dead soldier; tracked by the GPS module is then communicated to military base station by the use of GSM. It helps to minimize the time, search and safety operation efforts of army base station. This system enables to army base station to track the location and monitor health of soldiers using GPS module and wireless body area sensor network ,such as temperature sensor,heart beat sensor,etc.*

***Keywords***- GSM, GPS, tracking, Health Monitoring.

## I. INTRODUCTION

Now-a-days Defence services are rapidly growing towards new innovation with advance implementation. Soldiers health is more important because they are the defenders who protect our country .In today's world enemy warfare is a important factor in the nation's security .The national security depends on army(ground), navy(sea),force(air).The and important role is played by the army soldier. There are many problems regarding the safety of these soldiers. As soon as any soldier enters the bitter lines it is very important for the army base station to know the location as well as health status of all its soldiers during the war, which enables the army personnel to plan the war strategies. Also the soldier can ask for directions to the army base unit in case he feels that he is lost. By using the location sent by the GPS,the base station can guide the soldier to safe area. The system is combination of two parts, which are portable soldier unit consists of ATmega328P,GPS and GSM, temperature sensor and heart beat sensor.To designa soldier tracking system using GSM and GPS to provide wireless system for monitoring the parameters of soldier are as-Body temperature and blood pressure.These parameters are then signal conditioned and will be stored in the memory. One of the essential challenges in military operations lays in that the soldier not able to communicate with base station administrator. In addition, each organization needs to enforce certain administrative and operational work when they interact over the network owned and operated by other Organizations.

## II. LITERATURE SURVEY

This paper has an idea of tracking the soldier and navigation between soldier and base station such as location and health status during the war. This system enables GPS (Global Positioning System) tracking of the soldier. It is possible by M-health. The M-health can be defined as mobile computing, medical sensors and communication technologies for health care. This device will improve, not only for the host, but also for placed together/correctly arranged military personnel who will exchange information using wireless networks.

## III. PROPOSED METHODOLOGY AND DISCUSSION

The basic block diagram of soldier unit in GPS based soldier tracking and Health monitoring system is shown in figure below. Mainly this block diagram consists of following essential blocks.

A. ATmega328p
B. Heart beat sensor
C. Temperature sensor
D. GSM module
E. GPS module

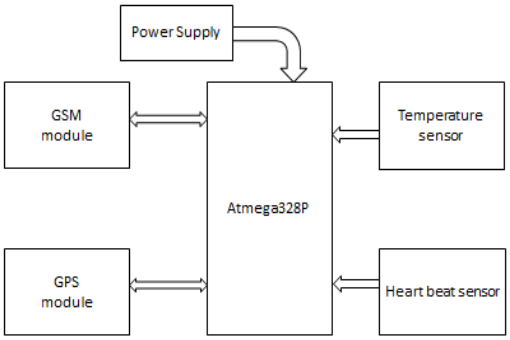


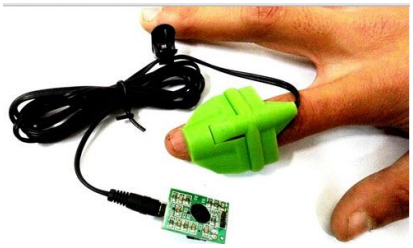

Fig: Soldier unit

**A. Tmega328p:**

ATmega328p is an 8 bit microcontroller. It can handle the data sized of up to 8 bits.It is an AVR based microcontroller. Its builtin internal memory is around 32KB.It operates ranging from 3.3v to 5v.It has an ability to store the data even when the electrical supply is removed from its baising terminals. Its excellent features include the cost efficiency, low power dissipation, programming lock for security purposes, real timer counter with separate oscillator. ATmega-328p is an AVR micro-controller having 28 pins in total. All of the pins in chronological order.

**B.Heart Beat sensor:**

The heart beat sensor used for study the hearts function. This sensor monitors the flow of blood through the finger.As the heart forces blood through the blood vessels in the finger,the amount of blood in the finger changes with time.The sensor shines a light lobe through the finger and measure the light transmitted to the LDR.The signal from the LDR is amplified by the amplifier and will be filtered. Heart Beat sensor is designed to give digital output of heart beat when a finger is placed on it. This digital output can be connected to the microcontroller directly to measure the beats per minute(BPM) rate.



**C.Temperature sensor:**

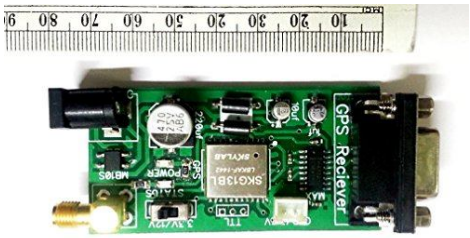
The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature.The LM35 device is rated to operate over a -55$^0$C to 150$^0$C temperature range,while the LM35 device is rated for a –40$^0$C to 110$^0$C range. The low output impedance, linear output, and precise inherent calibration of the LM35 device makes interfacing to readout or control circuitry especially easy. It haslinear +10-mV/$^0$C scale factor. 0.5$^0$C Ensured Accuracy(at 25$^0$C). It is suitable for Remote Applications.


**D.GSM module:**

GSM module is used to establish communication between a computer and a GSM-GPRS system. Global system for mobile communication is an Architecture used for mobile communication in most of the countries.GSM is anopen and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHZ, 900MHZ, 1800MHZ, 1900MHZ frequency bands. The GSM unit sends the SMS to the army base camp containing the health parameters and the location of soldier.It requires the SIM card for its operation but advantage of GSM module is that it has an serial connectivity that can bedirectly connected to the microcontroller for sending the AT(Attention) commands for sending SMS.

**E.GPS module:**

The satellite Global Positioning System(GPS) distributes precise time, frequency and position worldwide. At a height of about 20,000Km satellites circle around the earth on a different orbits. The GPS receiver records the data of the received satellites and uses this information to calculate its position. The transmitted orbit data are used to determine the travel time of the signals of the individual satellites. This values from the basis for a very precise GPS-time. Which is maintained in the system via and adjustable crystal at an accuracy of 1microseconds. In this paper The location of the soldier can be tracked with the help of a GPS module. The GPS is used to log the longitude and the latitude of soldier,which is stored in the microcontroller memory.




**BASE STATION BLOCK DIAGRAM:**

Figure below shows the block diagram of base station for GPS based Soldier Tracking and Health Monitoring System. Here the GSM module sends the signal to the Mobile or PC. Mainly this block diagram consist of following:

1.GSM module
2.Mobile/PC

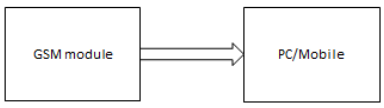



Fig: Base station

**IV. EXPERIMENTAL RESULTS:**

The figure below shows the result at base station. At the result the message is received and location of soldier shows on our mobile with the help of Google map.

1.Fig. a) shows the message is received at base station from the Soldier unit. In that message Soldier's Body temperature and its Heart Beat indicated.


**Fig a) . Message is Received at Base station.**

2.Fig b) shows the message is received from the soldier then this message is copied on the google map. After that the location of the soldier is indicated on the google map.

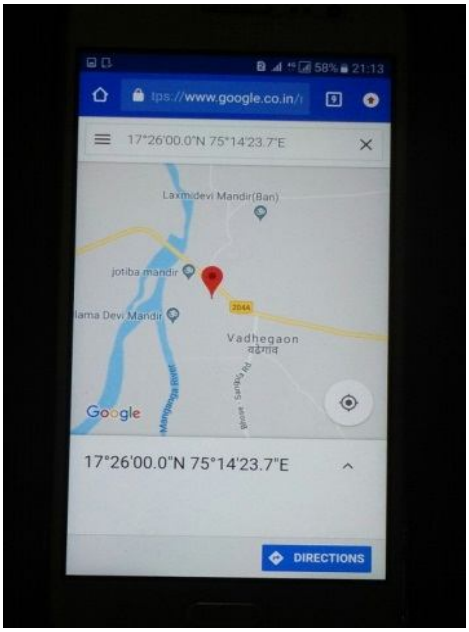



**Fig b) . location of the soldier is indicated at the base station eith the help of google map.**

## V. CONCLUSIONS

This system monitors the health parameters of soldier such as body temperature and heart beats. Army base station can provide help to the soldier in difficult situation. Also this system provides the location information and health condition of soldier to the army base station. Thus this system is design to Provide safety and security to our soldiers.

## VI. ACKNOWLEDGMENT

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