

# GPS And IoT Based Soldier Tracking & Health Indication System

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**Abstract:** In today's world the security of the nation is depends up on the enemies' warfare and so the safety of the soldiers is considered as vital role in it. Concerning the soldiers safety there are many instruments to view their health status as well as ammunitions on the soldiers. In soldiers security, bio-sensors systems gives different types of small physiological sensors, Biomedical sensor, transmission modules and processing capabilities, and can thus facilitate low-cost wearable unobtrusive solutions for health monitoring. GPS used to log the longitude and latitude so that direction can be known easily. These devices are being added to weapons and firearms, and some militaries such as the Israeli Army which are exploring the possibility of embedding GPS devices into soldiers vests and uniforms so that field commanders can track their soldier's movements in real time. GSM module can be used for effective range of high-speed transmission, short-range and soldier-to-soldier wireless communications that will be required to relay information on situational awareness, tactical instructions, and covert surveillance related data during special operations reconnaissance and other missions .So by using these equipment's we are trying to implement the basic lifeguarding system for soldier in low cost and high reliability.

**Keywords:** GPS, GSM, Biosensor, Heart rate Sensor, Temperature Sensor, IoT, Mobile App.

## I. Introduction:

The infantry soldier of tomorrow promises to be one of the most technologically advanced modern warfare has ever seen. Around the world, various research programs. The challenge was to integrate th piecemeal components into a lightweight package that could achieve the desired result without being too bulky and cumbersome or requiring too much power. Communicating with the base station become the fundamental challenges in military operations also the proper navigation between soldier's organizations plays important role for careful planning and co-ordination. So this paper focus on tracking the location of soldier from

GPS, which is useful for control room station to know the exact location of soldier and accordingly they will guide them Also High-speed, short-range soldier-to-soldier wireless communications to relay information on situational awareness, such as Bio-medical sensors, GPS navigation, Wireless communication. The Bio Sensor Consist of the Temperature sensor & Heart Rate Sensor.

## II. LITERATURE SURVEY

This paper has an idea of tracking the soldier and navigation between soldier-to-soldier such as knowing their speed, distance, and height as well as health status of them during the war, which enables the army personnel to plan the war strategies. This system enables GPS (Global positioning systems) tracking of these soldiers. 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. One of the basic challenges in military operations lays that the soldiers are not able to Communicate with control room station.

## III. METHODOLOGY IMPLEMENTED

### 1. BLOCK DIAGRAM

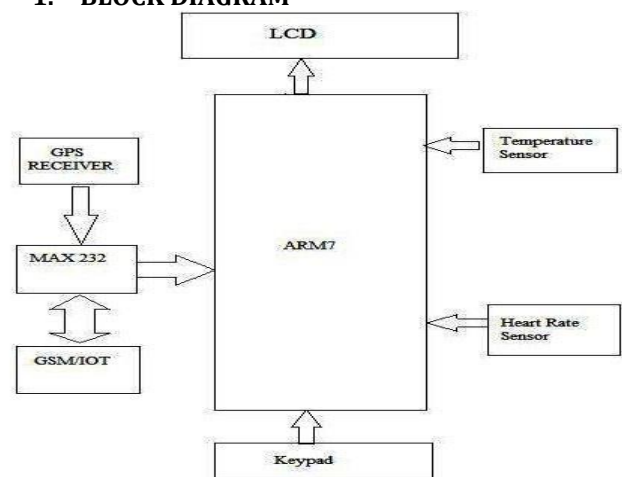
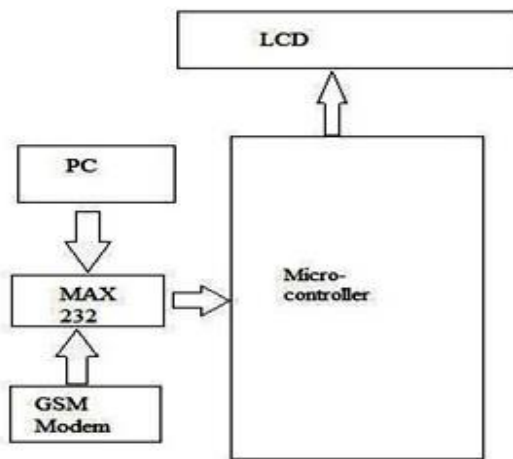


Fig: Soldier Unit

The basic block diagram of Soldier Unit in GPS and IoT based soldier tracking and Health Indication System is show in the fig above. Mainly this block diagram consists of the following essential blocks.

1. ARM 7 (LPC2138)
2. GPS Receiver
3. Max232
4. GSM Module
5. IoT handset
6. Temperature Sensor
7. Heart Rate Sensor
8. Keypad



**Fig: Base Unit**

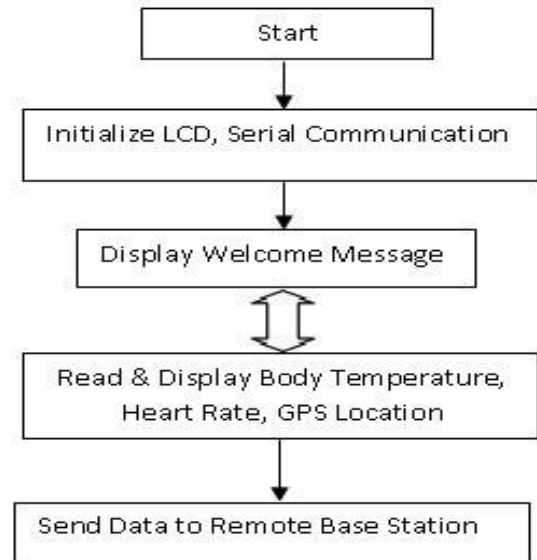
The basic block diagram of Base Unit in GPS and IoT based soldier tracking and Health Indication System is show in the fig above. Mainly this block diagram consists of the following essential blocks.

1. Microcontroller
2. Max232
3. GSM Module
4. PC (Server).

#### IV. FLOWCHART

A flowchart is a visual representation of the sequence of steps and decisions needed to perform a process. Each step in the sequence is noted within a diagram shape. Steps are linked by connecting lines and directional arrows.

Here is the Flowchart of Soldier unit and base Unit.



**Fig: Flowchart of Soldier Unit**

In this module, we have come up with an idea of tracking the soldier as well as to give the health status of the soldier during the war, which enables the army personnel to plan the war strategies. In addition, 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. Here to find the health status of soldier we are using a body temp sensor as well as pulse rate sensor. These sensors will measure the body temperature and the pulse rate of soldier and will be stored in  $\mu$ c memory. These signals, travelling at the speed of light, are intercepted by your GPS, which calculates how far away each satellite is based on how long it took for the messages to arrive. These sensors will help to sense physical parameters & informs to Base Station through GSM. This unit is carry by the soldier.

It has mainly 4 parts:

- Biomedical Sensor
- Keypad
- GPS Receiver
- GSM Module
- Wi-Fi Module (IoT)



**Fig: Flowchart of Base Unit**

This creates a database that contains information about the soldier. Server is use to monitor the status of the soldier. In addition, if there is any abnormality in the status of soldier it indicates a message.

In this unit upon receiving the SMS, the VB s/w shows the solder's location on Google maps based on the

GPS co-ordinates also the health status is displayed. In this way, the army officials can keep a track of all their solders.

**V. INTERNET OF THINGS (IoT)**

IoT is simply the network of interconnected things/devices, which embedded with sensors, software, network connectivity and necessary electronics that enables them to collect and exchange data making them responsive.

More than a concept Internet of Things is essentially an architectural framework, which allows integration, and data exchange between the physical world and computer systems over existing network infrastructure.

Internet-of-things frameworks might help support the interaction between "things" and allow for more-complex structures like distributed computing and the development of distributed applications. Currently, some internet-of-things frameworks seem to focus on real time data logging solutions like JasperTechnologies, Inc. and Xively(formerly Cosm and before that Pachube): offering some basis to work with many "things" and have them interact.

Future developments might lead to specific software-developmentenvironments to create the software to work with the hardware used in the internet of things. Companies are developing technology platforms to provide this type of functionality for the internet of things. Newer platforms are being developed, which add more intelligence. Foremost, IBM has announced cognitive IoT, which combines traditional IoT with machine intelligence and learning, contextual information, industry-specific models and even natural language processing.

**VI. GPS (Global Positioning System)**

The GPS (Global Positioning System) is a “constellation” of 24 well-spaced satellites that orbit the earth and make it possible for people with ground receivers to pinpoint their geographic location. The location accuracy is anywhere from 100 to 10 meters for most equipment. Accuracy can be pinpointed to within 1 meter with special military-

approved equipment .GPS equipment is widely used in science and has now become sufficiently low-cost so that almost anyone can own a GPS receiver.

The GPS has three components namely:

1. The space segment: consisting of 24 satellites orbiting the earth at an altitude of 11000 nautical miles.
2. The user segment: consisting of a receiver, which is mount on the unit whose location has to be determined?
3. The control segment: consists of various ground stations controlling the satellites.

**VII. RESULT**

- The program developed and implemented on ARM 7 using Proteus Software, according to the mentioned algorithm has been compiled and loaded to the microcontroller board successfully.
- The Bio-sensors can successfully detect the pulses, heartbeat and temperature at a close proximity.
- The GPS shows the location of the soldier



**Fig: Soldier Unit Result LCD Display**

## VIII. CONCLUSION

Following conclusion can be retrieved from above work are:

- Continuous Communication is Possible: Soldiers can communicate anywhere using RF,DS-SS,FH-SS which can help soldier to communicate among their squad members whenever in need.
- Less complex circuit and power consumption. Use of ARM processor and low power requiring peripherals reduce overall power usage of system. Modules used are smaller in size and also lightweight so that they can be carried around.
- Security and safety for soldiers: GPS tracks position of soldier anywhere on globe and also health system monitors soldier's vital health parameters which provides security and safety for soldiers.

## IX. FUTURE SCOPE

This system can provide more safety to soldiers by adding heart rate sensors, temperature sensors and GSM and GPS modules for the purpose of communication and location of soldiers. By using this sensors base station can monitor physical status of soldier. And they can be given medical instruction to overcome the problems. We can add display section to this project. This will help to display digital map, which shows the position of all soldiers to the unit, which will help them to locate the target, and attacks can be avoided.

## X. REFERENCES

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## XI. BIOGRAPHIES



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