International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.07, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

IMPLEMENTATION OF GPS BASED SOLDIER TRACKING AND TELEMETRY

Sharada N S[1], Shravanthi D G[2], Dabbugottu Sujana[3],

Syed Mujtaba Hussaini[4],Jyothy S T[5]

[1,2,3,4,5] *ECE Department, REVA University,(Bengaluru, India)*

ABSTRACT

In today's global scenario, enemy warfare is an important factor in any nation's security and safety. This vital role is played by the army soldiers.Along with the security comes concern about their safety. With recent advances in technology, various measures have been incorporated for monitoring of human physiological parameters. To achieve this, several body sensors are extensively used to continuously analyse their health condition in real-time environment. In addition to this, location of soldier is tracked using GPS.When any of the soldiers enters the enemy location, it is important for the base unit to know the location and the health condition of all soldiers. By using the location sent by the GPS, the base station can guide soldier to safe area &GSMwill help to communicate the Soldier unit with Base unit. By receiving the exact location of soldiers it will help the soldiers to prepare war strategies and take guidance from Base unit. The various Health Sensors such as Temperature sensor, Heart rate sensor will help to decide the health status of that particular soldier.

Keywords:*Body Temperature Sensors, GPS, GSM, Heart beat Sensor, Tracking*

I.INTRODUCTION

The infantry soldier in the near future promises to have a fully integrated combat system. One of the fundamental challenges in military operations lies in the fact that the soldier's inability to communicate with the base station during crunch situations [1].So in this paper, focus is laid on tracking the soldier's exact location using GPS which will intimate the base station to provide the necessary war strategies[2]. It is vital for the base unit to guide the soldier on correct direction if he is lost in the warfield[3].In addition,it aims at designing a system that can acquire the soldier's health parameters and transmit it to the monitoring place[4]. The Project houses the biomedical parameter acquisition system, Wireless Transmission and reception and display system.Suitable sensors are used for obtaining health parameters from the soldiers thereby ensuring hassle free transmission along with providing a low cost and reliable system [5].The GPS is used to determine the longitude and the latitude ofsoldier, which is stored in the microcontroller memory.

The objective of the project is the incorporation of wearable systems in army.This paper presents an overview of the recent application of systems forevaluation of health status of soldiers in war-field and thereby indulge in relevant decision for their well-being. This project serves as a tool for choosing efficient and appropriate

systems for tracking using GPS and monitoring health parameters of soldiers. Without a doubt, this technology delivers reliability,efficiencyand quality.

II. PROPOSED WORK

2.1 Block diagram

The block diagram of GPS based soldier tracking and health monitoring system is as shown in figure. It consists of two units namely, soldier unit and base unit. To achieve high speed communication, it is important to use ARM processor which is 32 bit component with the real-time emulation and embedded support which combines the microcontroller with 512 Kb of embedded high speed Flash memory. Biosensors such as Body temperature and heart beat sensor are integrated to ARM processor to monitor the health parameters and status. GPS information is stored in the microcontroller memory [6]. GPS receiver receives and compares signal from the orbiting GPS satellite to determine the exact position. Using keypad, we can send the information to the base unit. RF Transceiver tracks the latitude and longitude of soldier unit and calculates distance and height between them. In addition to this, it also sends information to the base unit regarding the health parameters and the exact position of the soldier. At base unit, it receives the details of thesoldier unit through GSM module,the soldier's location and health status is displayed on mobile phone or PC at base unit using software VB for the front end.

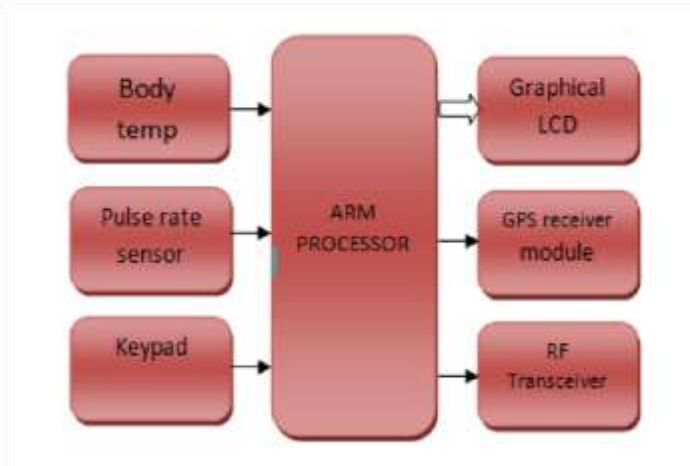

Fig.1 Soldier unit

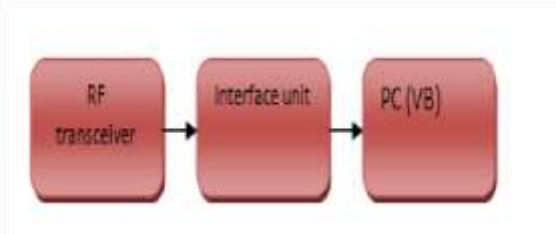

Fig.2 Base unit

2.2 Experimental setup

The Global Positioning System (GPS) is a space-based satellite navigation system. It provides the location and real time information anywhere on the Earth, where there is an uninhibited line of sight to four or more GPS satellites. The system provides critical capabilities to civil, military and commercial users around the world.Each

one transmits information about its position and the current time at regular intervals. These signals are intercepted by your GPS receiver and transmitted to base station, which calculates how far each satellite is based on the time it took for the messages to arrive. The approximate range for working of GPS is about 4 -5 Kms over which it can give accurate results. The range of GPS is about Ten meters which can be increased according to applications. The GPS determines the longitude and the latitude of soldier, which is stored in the µc memory. The GSM unit sends the SMS to the army base unit containing the health parameters and status and the location of soldier.In order to find the health status of soldier we are using a body temp sensor as well as heart beat sensor. These two sensors will measure the body temperature and the heartbeat of soldier and store them in microcontroller memory. Also these sensors will help in informing to the base unit through GSM.

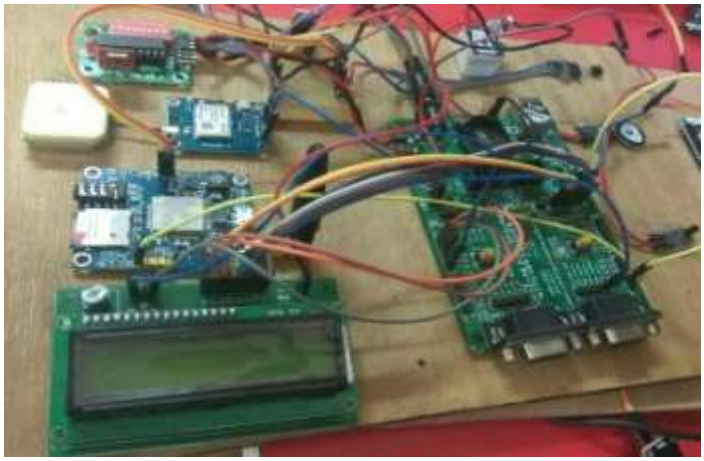

Fig.3 Experimental setup

IV. RESULT

The figure below shows the temperature and heart beat value sensed by the temperature sensor and heartbeat sensor respectively. The temperature and heart beat value is sent to the base unit. The value sensed by the sensors are compared with the threshold value. If the value is above the specified value the message is sent as high, if it is less than the specified value, the message is sent as low for both the sensors.

Fig.4 Results obtained by the sensors

V. CONCLUSION AND FUTURE WORK

Soldier's safety and security: GPS navigation helps in findingthe position of soldier worldwide and Continuous communication is possible between base unit and soldier unit[7]. The system also analyzes various health parametersthrough biomedical sensors [8]. Implementation of tracking and navigation system proves useful for the soldiers at the time of war in the field [9].Usage of ARM processor along with low power peripherals reducesoverall power usage of entire system. Lightweight and small sized modules are used so that they are portable [10]. At the same time, base station receives real-time data and view of soldiers on field displayed on PC. This is achieved by low cost, less complex and reliable circuitry. This system can be further developed for incorporating device to device communication. In this way, communication can be easily set up among soldiers without much reliance of base unit. Byimplementing encryption, data transmission can be made secure and reliable. Recent advancement in bio-medical sensortechnology can make the sensors portable.

REFERENCES

[1] Matthew J. Zieniewicz, Douglas C. Johnson, Douglas C. Wong, and John D. Flat ―The Evolution of Army Wearable Computers‖ Research, Development and engineering center, US Armu communication October–December 2002.

[2] Wayne Soehren &Wes Hawkinson ―Prototype Personal NavigatioNavigationn system‖ ,IEEE A&E system magazine April-2008.

[3] Simon L. Cotton and William G. Scanlon ―Millimeter - wave Soldier –to- soldier communications for covert

battlefield operation‖ Defence science and Tecnlogy laboratory, IEEE communication Magzin October 2009.

[4] Alexandrous Plantelopoulous and Nikolaos ,G. Bourbakis‖ A Survey on Wearable sensor based system for health monitoring and prognosis‖ IEEE Transaction on system,Man and Cybernetics ,Vol.40,No.1, January 2010.

[5] Jouni Rantakoko,Joakim Rydell and peter Stromback,‖ Accurate and Realiable soldier and first responder Poasitioning :Multisensor System and cooperative localization‖ April-2011

[6] Hock Beng Lim "A Soldier Health Monitoring System for Military Applications‖ 2010 International Conference on Body Sensor Networks (BSN).

[7] A uderey Giremus,Jean-yves Tourneret,Senior member,IEEE &Arnaud Doucet—A fixed-Lag particle filter for the joint Detection/Compensation of interference effects in GPS Navigation—December-2011.

[8] Ravidra B.Sathe ,A.S.Bhide.‖ Gps-based soldier tracking and health monitoring system‖ conference on Advances in communication and computing April 2011-12.

[9] Vincent Pereira,Audrey Giremus,anderic grivel —Modeling of multipath environment using copulas For particle filtering based GPS navigation‖ June2012

[10] Warwick A. Smith; "ARM Microcontroller Interfacing Hardware and Software".