

# WARFARE MILITARY SITUATION HANDALING USING ZIGBEE SYSTEMS

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**Abstract :** In 21st century, soldier technology growing quicker with new innovations, innovation. The nation's Security depends on the military, Army, Air-force and military. The soldier performs essential role for their country. The spine of all forces are our soldier. There are many concerns regarding the protection and health of soldier. This assignment capability to tracking the fitness and area of soldier in real time software. This system used GPS to tracking the vicinity of soldier and numerous sensors to tracking the health of soldier .The diverse sensor like Temperature sensor, Humidity sensor and Heart Beat Sensor. The manage primarily based station document all parameter of soldier and take suitable moves in case of emergency and disaster at real time. The manipulate base station watch the contemporary reputation of soldier that is displayed on private pc. The most important purposed of system one soldier to some other soldier communique and this verbal exchange may be completed wi-fi networking the usage of Zigbee. This project easy to operate technology that is the most important element of this mission

**IndexTerms** - Messengers, impaired, AT commands, GSM module

## I. INTRODUCTION

The state's protection is stored eye with the aid of army, military and air-pressure. The critical role is of squaddies who sacrifice their lifestyles for their united states. There are many concerns regarding the protection and health of soldier. The soldier lives and died for the nation. During wars, Military search operation, surgical strike and terrorist attacks operation soldier gets injured and someday come to be losses .It is our obligation to assist and guarded our soldier. Soldiers coming into the enemy traces frequently lose their lives due to loss of connectivity, it's far very critical for the military manipulate base station to known the place in addition to fitness status of all infantrymen. So many infantrymen lost in war fields as there was no proper fitness backup and connectivity between the squaddies at the struggle-fields and the officials at the navy manipulate base stations. All need to be certainly worried approximately the protection of the soldiers, so determined to build a project in order to correctly maintain a check at the fitness fame of the soldier, and his specific location to system him with vital clinical remedies as soon as feasible.

Soldier's monitoring is accomplished through using GPS and Zigbee module that's used to provide wireless communication system. To monitoring the health parameters of soldier we are the usage of sensors which include Temperature sensor, Humidity sensor and Heart Beat

Sensor. The Temperature sensor monitor the Temperature of soldier, Humidity sensor display humidity and Heart Beat sensor Monitor pulse rate of soldier.

This gadgets ability enhance control present day situation recognition now not simplest for the host however also for collocated military employees who will change information the usage of wireless networks. The assignment became to integrate these components into a lightweight field that could attain the desired result without being too bulky and requiring too less power. One of the essential challenges in military operations lies that the soldier's aren't capable of speak with control base station. The major proposed of machine soldier-to-soldier conversation and this verbal exchange may be finished wireless networking the use of Zigbee. This task smooth to apprehend, wearable and simple to operated technology that's the most important component of this venture.

## II. LITERATURE SURVEY

Shweta Shelar, Nikhil Patil, Manish Jain, Sayali Chaudhari, Smita Hande, In this paper, they have focused on helping the soldiers by providing medical assistance at the battlefield. They have considered the soldier's health in terms of heart beat and body temperature of the sensor. For providing this type of facility GPS is used for tracking the soldiers. In case if soldier is injured then by using the GSM modem attached to the device an SMS will be sent to hospitals in the vicinity or to the base station to provide help [1].

M. V. N. R. P. Kumar, G.R. Vijay, P.V. Adhikrao and B.S. Vijay kumar, In this paper they found their idea from the mountaineers as mountaineers uses wrist watch for tracking their position, to know the temperature of their surroundings, to know the direction [2].

Govindaraj A., Dr. S. Sindhuja Banu, In this paper, they had focused on tracking the position of the soldier and measuring the various health parameters using different biomedical sensors. The main aim of using GPS is to track the position of the soldier so that the personnel at the base could guide them at the war field and side by side could check the body temperature of the soldier. Keypad is used for giving any type of input if needed [3].

Shruti Nikam, Supriya Patil, Prajka Powar, V. S. Bendre, In this paper, they mentioned that infantry soldiers face the most fundamental problems like establishing communication with the base station and tracking their position whether they are on the correct path or not, due to this many soldiers either get lost their lives or get stuck in the enemies trap. With the help of this gadget soldiers will be able to make communication with base station, also will be able to find the right path by the guidance that would be provided by the team at the base. This help in reducing the losses of lives of our soldiers. The military personnel will exchange the information through wireless communication and with the help of biomedical sensors, GPS and GSM all this will be possible [4].

P.S. Kurhe, S.S. Agrawal, In this paper, it is possible to transmit the data which is sensed from remote soldier to the base station's PC by using wireless transmission device like GSM. The accuracy of this system may be affected by some factors such as weather, environmental conditions around the soldier's unit and GPS receiver. The future works in this system may include the optimization of the hardware components, by choosing a suitable and more accurate GPS receiver. By improving the routing algorithm can be made this system more powerful and energy efficient. Upgrading this system is easy which makes it open to an advanced future [5].

Prof. Pravin Wararkar, Sawan Mahajan, Ashu Mahajan, Arijit Banerjee, Anchal Madankar, Ashish Sontakke, In this paper, they had proposed an idea of tracking the position of soldier as well as to give the health status of the soldier, which enables the army base station to plan the strategies according to current situation during war. Use of GPS tracking device and RF transceiver module provide the wireless system to monitor the health parameters and location tracking of soldiers. By using this system, the army base station will come to know the position of soldier and the health parameters such as body temperature and blood pressure of soldiers [6].

The health monitoring and tracking system can be implemented by using RF module and GPS tracking system. By using GPS device, we will be able to give proper location of soldier and also can monitor the health parameters by temperature sensor and heart beat sensor. Thus, we can help the soldiers in panic condition from army control room by communicating with them during war [6].

Hock Beng Lim, Di Ma, Bang Wang, Zbigniew Kalbarczyk, Ravishankar K. Iyer, Kenneth L. Watkin, In this paper, we have completed only an initial design of individual sensor nodes and developed a basic prototype of the system to collect the sensed data. In future, we will try to develop an integrated data management system and a web portal which will enable users to have easy access of data [10].

### III. RESEARCH METHODOLOGY

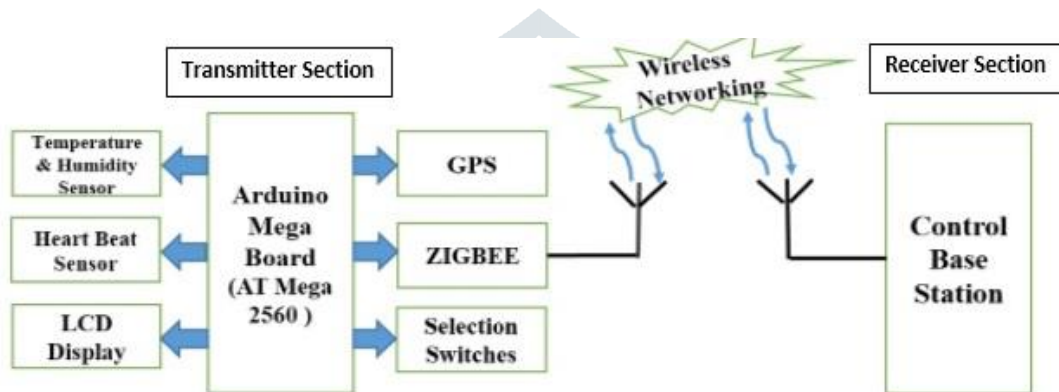


Figure A. Block Diagram of the Soldier Monitoring System Using Zigbee

The preferred block diagram of the Soldier Monitoring System Using Zigbee is given in Figure A. The whole device is divided into segments that are Transmitter Section and Receiver Section.

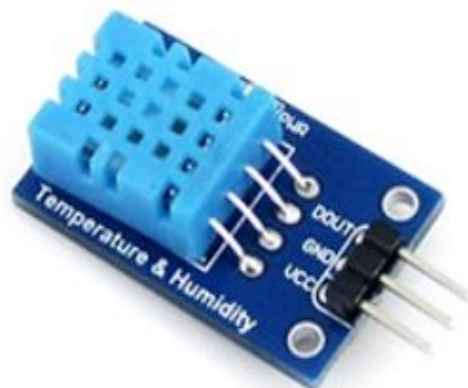
In the Transmitter Section the Temperature Sensor, Humidity Sensor and Heart Beat Sensor to display the soldier health & GPS is for location Detector. Temperature Sensor, Humidity Sensor & heart Beat Sensor sense the variations then those signals are fed to the Arduino Mega. In the Arduino Mega it compares with predefined values. If any variation in Temperature Sensor, Humidity Sensor & Heart Beat Sensor and co-ordinates which is received from GPS it's going to ship the to another receiving station through Zigbee that's in situation staff or Head office. Then signal is given to the output load for indication motive. In this gadget provide predefined message choice switches. This message like Ammunition, Help, backup, and many others.

The Receiver Section acts as Control Base Station. The Control Base Station unit consists of a PC and a Zigbee transceiver. The Zigbee module will be linked to PC with the assist USB-to-Serial driver established in that PC. The records coming from Zigbee module will be displayed on PC screen with the assist of graphical person interface (GUI) coded using visual fundamental language.

### IV. HARDWARE DESCRIPTION

1. The Hardware required for this system are as following.
2. Temperature & Humidity Sensor
3. Heart Beat Sensor
4. Zigbee Module
5. LCD Display
6. Arduino Mega 2560
7. GPS Module
8. Switches

**A. Temperature & Humidity Sensor**



**Fig A. Temperature & Humidity Sensor**

DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital sign output. By the use of the specific virtual-sign-acquisition technique and temperature & humidity sensing era, it guarantees excessive reliability and first-rate lengthy-term stability. This sensor includes a resistive-type humidity dimension aspect and an NTC temperature size element, and connects to a excessive overall performance 8-bit microcontroller, supplying high-quality best, fast response, anti-interference potential and price-effectiveness [13].

DHT11’s power deliver is 3-5.5V DC. When energy is provided to the sensor, do not ship any preparation to the sensor in inside one 2d in an effort to bypass the unstable reputation. One capacitor valued 100nF can be added between VDD and GND for strength filtering. Single-bus statistics layout is used for communication and synchronization among MCU and DHT11 sensor. communication process is about 4ms. Data consists of decimal and integral parts. A complete data transmission is 40bit, and the sensor sends higher data bit first [13].

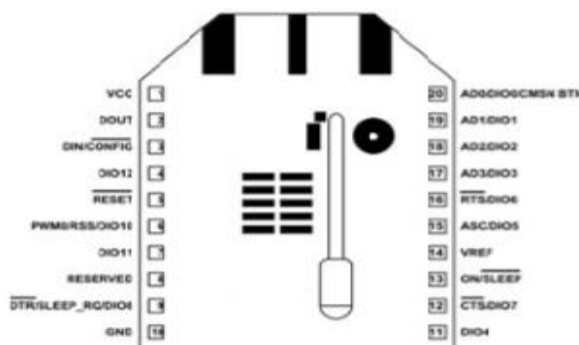
**B. Heart Beat Sensor**



**Fig B. Heart Beat Sensor**

Heart beat sensor is designed to offer digital output of heat beat while a finger is located on it. When the coronary heart beat detector is operating, the beat LED flashes in unison with each heart beat. This virtual output may be related to microcontroller directly to degree the Beats Per Minute (BPM) price. It works on the principle of light modulation by using blood flow through finger at each pulse. The goal pulse costs for humans elderly between 20 and 70. The target variety is the pulse rate wanted so one can provide appropriate workout for the coronary heart. For a 25-yr vintage, this variety is set one hundred forty-a hundred and seventy beats consistent with minute even as for a 60-yr old it’s miles generally among one hundred fifteen and one hundred forty beats in step with minute [14].Features:Heat beat indication via LED, Instant output virtual sign for directly connecting to microcontroller, Compact Size, Working Voltage +5V DC [14].

**C. Zigbee Module**



**Fig C. Zigbee Module**

Zigbee is primarily based on an IEEE 802.15.4 well-known which is a packet-primarily based radio protocol. It is used to offer the communication which needs Wi-Fi packages which have low data costs and calls for low electricity consumption. Zigbee has a defined rate of 250 Kbit/s, that is great desirable for intermittent records transmissions from a sensor or enter device. This module has worldwide 2.4GHz ISM (The commercial, clinical and clinical radio bands) bands and ultralow electricity operation. The Zigbee general affords Wi-Fi networking, security, and application aid services that function on the basis of IEEE 802.15.4 Medium Access Control (MAC) and Physical Layer (PHY) Wi-Fi standard. It makes use of a suite of technologies which enable the self-organizing, self-recovery and scalable networks that is efficient sufficient to manipulate diverse records site visitors styles.

Zigbee is a low-cost, low-power, and Wi-Fi mesh networking popular device. The low price permits this technology to be extensively widely wide-spread in Wi-Fi control and tracking applications. The low strength intake gives longer life with smaller batteries and the mesh networking presents excessive reliability and larger variety of statistics transmission. Zigbee technology has been advanced to fulfill the need of superior wireless networking among various low electricity devices, sensors and modules [15].

#### D. LCD Display



Fig D. LCD Display

Alphanumeric displays are used in a wide range of applications, including palmtop computers, word processors, photocopiers, point of sale terminals, medical instruments, cellular phones, calculators, etc. The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols. We are using this LCD to display the health parameters measured by different sensors used and location information given by GPS module.

#### FEATURE:

5 x 8 dots with cursor, Built-in controller (KS 0066 or Equivalent), +5V power supply (Also available for +3V), 1/16 duty cycle, B/L to be driven by pin 1, pin 2 or pin 15, pin 16 or A.K (LED), N.V. optional for +3V power supply

#### E. Arduino Mega 2560



Fig . Arduino Mega 2560

The Arduino Mega 2560 is a microcontroller board based totally on the ATmega2560. It has fifty four digital input/output pins (of which 14 can be used as PWM outputs), sixteen analog inputs, 4 UARTs (hardware serial ports), a sixteen MHz crystal oscillator, a USB connection, a energy jack, an ICSP header, and a reset button. It consists of the whole lot had to support the microcontroller; surely join it to a laptop with a USB cable or power it with a AC to-DC adapter or battery to get commenced. The Mega is like minded with maximum shields designed for the Arduino Duemilanove or Diecimila.[12]

The Arduino Mega may be powered via the USB connection or with an external electricity deliver. The power source is chosen mechanically. External (non-USB) power can come both from an AC-to-DC adapter (wall-wart) or battery. The adapter may be related through plugging a 2.1mm middle-tremendous plug into the board's energy jack. Leads from a battery may be inserted inside the Gnd and Vin pin headers of the POWER connector. The board can perform on an outside deliver of 6 to twenty volts. If furnished with less than 7V, but, the 5V pin may additionally supply less than 5 volts and the board may be volatile. If the use of greater than 12V, the voltage regulator can also overheat and damage the board. The recommended variety is 7 to twelve volts. The Mega2560 differs from all preceding forums in that it does now not use the FTDI USB-to-serial driving force chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.[12]

The ATmega2560 has 256 KB of flash reminiscence for storing code (of which 8 KB is used for the boot loader), eight KB of SRAM and 4 KB of EEPROM (which may be read and written with the EEPROM library).[12]

#### FEATURE:

High Performance, Low Power Atmel eight-Bit, Advanced RISC Architecture, High Endurance Non-unstable Memory Segments, JTAG (IEEE std. 1149.1 compliant) Interface, 8/16-channel, 10-bit ADC (ATmega2560), Temperature Range -40°C to 85°C, Operating Voltage 5V, ATmega2560 0 - 16MHz and 4.5V - 5.5V, Active Mode 1MHz, 1.8V at 500µA, Power-down Mode: 0.1µA at 1.8V [12].

## F. GPS Module

The NEO-6 module series brings the excessive overall performance of the u-blox6 function engine to the miniature NEO shape aspect. U-blox6 has been designed with low strength consumption and occasional costs in thoughts. Intelligent electricity control is a breakthrough for low-electricity applications. These receivers integrate a excessive degree of integration functionality with flexible connectivity options in a small bundle. This makes them ideally suited for mass-marketplace cease products with strict length and cost requirements. The DDC interface gives connectivity and enables synergies with u-blox LEON and LISA wireless modules. All NEO-6 modules are synthetic in ISO/TS 16949 certified websites. Each module is examined and inspected throughout manufacturing. The modules are certified consistent with ISO 16750 - Environmental conditions and electrical testing for electrical and digital gadget for street motors [11].

### FEATURES:

Navigate down to  $-162$  dBm and  $-148$  dBm coldstart, Faster acquisition with AssistNow, Autonomous o Configurable energy control o Hybrid GPS/SBAS engine (WAAS, EGNOS, MSAS) o Anti-jamming technology, Simple integration with u-blox wi-fi modules, A-GPS: AssistNow Online and AssistNow Offline offerings, OMA SUPL compliant, Backward well suited (hardware and firmware); smooth migration from NEO-5 own family or NEO-4S, Compatible with u-blox GPS Solution for Android, Based on GPS chips certified according to AEC-Q100 Manufactured in ISO/TS 16949 licensed manufacturing websites, Qualified in step with ISO 16750[11]

## G. Switches



Fig F. Switches

A switch will be providing in this system, so that a soldier can request for his help in panic and emergency situation by pressing it. As a soldier will press the button, of another fellow soldier's unit and he will able to get help of that fellow soldier which is present within the Zigbee range.

## V.SOFTWARE DESCRIPTION

The Software language required for this system are as following.

Embedded C Language.

VB.Net Language

For programming of Arduino Mega 2560, embedded c language using Arduino software is used. The Arduino has been designed to enhance developer's productivity, also enabling faster and more efficient program development. Arduino introduces a flexible window management system, enables us to drag and drop individual windows anywhere on the visual surface including support for Multiple Monitors.

The Graphical user interface (GUI) coding needs VB.Net language. Visual Basic is a legacy third generation event

Driven programming language and integrated development environment (IDE) Microsoft. Microsoft intended Visual Basic to be relatively easy to learn and use. Visual Basic was derived from BASIC (Beginner's All-purpose Symbolic Instruction Code) and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using Data Access Objects, Remote Data Objects, or ActiveX Data Objects, and creation of ActiveX controls and objects.

To display the data received by Zigbee on servers PC, a driver for USB-to-Serial adapter has installed on that PC. This driver helps to access the data on PC, through USB adapter of Zigbee transceiver.

## VI.CONCLUSION

From this challenge, It is concluded that the proposed machine the use of Zigbee module as a primary conversation medium. So, we're the usage of Zigbee now not most effective for soldier-to-soldier conversation take location however also paintings as a Wireless facts transmission system. Soldier can talk with every other in the range of 1 to 1.3 km the usage of Zigbee module. We have used Arduino mega is the primary control unit here because it has many enter and output ports are available and it's miles very reasonably-priced than any other to be had controllers. The important gain of soldier-to-soldier conversation is that it is able to speak with nearest soldier. In this system, we have our control base station for receiving soldier information like Health as well as soldier tracking. This gadget is also paintings as a transceiver. This task clean to apprehend, wearable and easy to operated generation that is the most essential component of this mission.

## VII.FUTURE SCOPE

- There is always chance to improve any system as research and development is an endless process. The following details are as follows [5]:
- I.E.D & Metal Detector System.

- It can track the location of children.
- A Camera can be fitted into the system.
- Automatic Surveillance Robot.
- Soldier Voice Recognition System.

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