**SpO2 primarily based supplemental substance constituent delivery system for troopers at excessive altitudes**

# ABSTRACT

This idea presents Associate in Nursing automatic system to deliver supplemental gas to troopers patrolling at extreme altitudes supported their SpO2 (blood gas saturation) levels. the thought emphasizes on electronic hardware designed for engaging at extreme altitudes that includes low measuring instrument pressures, low temperatures and wetness. The package safety checks incorporated into the system ar vital in guaranteeing the useful dependableness of the system in field conditions. The system reads SpO2 levels of the topic from a wrist-worn pulse measuring instrument module through wireless interface and controls a proportional magnet valve to manage the gas provide to the topic. The gas is delivered from a light-weight moveable gas cylinder through nasal nares.

**1. INTRODUCTION**

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# A large range of troop’s area unit often deployed in extreme altitude areas like Siachen ice mass and range of mountains regions of Indian borders thanks to military and strategic reasons. These extreme altitudes create a significant threat to physiological functions and physical performance of a private. The foremost vital feature of utmost altitude is drive or deficiency of element in body. Supplemental element dose will greatly facilitate relieve a private from hypoxic stress. Thanks to constraints within the support needed at extreme altitudes, supplemental element dose is needed to incline in a cheap however adequate manner. This paper presents a system developed to fulfill the higher than field needs and conjointly track the troopers via GPS and also the health constraints are going to be updated victimisation internet server.

# NodeMCU

NodeMCU is an open source LUA based firmware developed for ESP8266 wifi chip. By exploring functionality with ESP8266 chip, NodeMCU firmware comes with ESP8266 Development board/kit i.e. NodeMCU Development board. Since NodeMCU is open source platform, their hardware design is open for edit/modify/build.

NodeMCU Dev Kit/board consist of ESP8266 wifi enabled chip. The **ESP8266** is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol.

NodeMCU Dev Kit has **Arduino like** Analog (i.e. A0) and Digital (D0-D8) pins on its board.It supports serial communication protocols i.e. UART, SPI, I2C etc. Using such serial protocols we can connect it with serial devices like I2C enabled LCD display, Magnetometer HMC5883, MPU-6050 Gyro meter + Accelerometer, RTC chips, GPS modules, touch screen displays, SD cards etc.

### Temperature Sensor:

LM35 is a temperature measuring device having an analog output voltage proportional to the temperature. It Provides output voltage in Centigrade (Celsius). It does not require any external calibration circuitry. The sensitivity of LM35 is 10 mV/degree Celsius.

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**SPO2 Sensor**

This sensor is useful in making Pulse oximetry, which is a test that measures what proportion of the oxygen-carrying molecules in the blood (called hemoglobin) are actually carrying oxygen. This is known as oxygen saturation or SpO2. One hundred percent oxygen saturation is attained when all hemoglobin in the blood is completely saturated with oxygen. This simple test does not require a blood sample and is called non-invasive.

A pulse oximeter is a medical device that indirectly measures the oxygen saturation of a patients blood (as opposed to measuring oxygen saturation directly through a blood sample) and changes in blood volume in the skin, producing a **photoplethysmograph**. It is often attached to a medical monitor so staff can see a patients oxygenation at all times. Portable battery-operated pulse oximeters are also available for home blood-oxygen monitoring.

**GPS MODEM**

The Global Positioning System (GPS) comprises three segments:

* The space segment (all functional satellites)
* The control segment (all ground stations involved in the monitoring of the system master control station, Monitor stations, and ground control stations)
* The user segment (all civil and military GPS users).

# RELAY (SPST)

A hand-off is an electrically worked switch. Relays utilize an electromagnet to mechanically work a switch. Relays were utilized broadly in phone trades and early PCs to perform coherent operations. Relays are utilized where it is important to control a circuit by a different low-control flag, or where a few circuits must be controlled by one signal. They gets the rehashed flag rolling in from one circuit and re-transmitted it on another circuit. At the point when a present moves through the loop an electro-attractive field is set up. The field pulls in an iron armature, whose flip side pushes the contacts together, finishing the circuit.

# OBJECTIVES

Proposed system for watching of gas level conditions of troopers within the main victimization sensors, GPS, IOT-based technologies. However, most of those solutions solely address information assortment and information observation. So as to tackle the matter of watching with avoiding health risks, it's imperative that the system ought to collect information via a self-sufficing system that is applicable for observations and relocate to a server remotely.

# METHODOLOGY

The proposed framework manages the way toward monitoring and providing the oxygen for the troopers at high altitude and also the parameters including with location details are updated with the idea of IOT. The working model of The SpO2 primarily based supplemental substance constituent delivery system for troopers at excessive altitudes contains the accompanying units and sensors:

* NodeMCU
* GPS Modem
* SPO2 Sensor
* Temperature Sensor
* Relay and Solenoid valve

**BLOCK DIAGRAM:**

Power supply

GPS MODEM

Spo2 Sensor

Buzzer

Temperature Sensor

**NODEMCU**

Solenoid Valve with Relay