

# Electronic Suit with EMP for Defense

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**ABSTRACT:** The core objective of this project is to design an electronic suit for security purpose. This project is an exoskeleton suit which provides the improvement to defense in battle field for soldiers and spies. It has various gadgets that help soldiers to take out enemies more easily. This suit is equipped with EMP which disables any electronic equipment. And it is equipped with optical weapon laser ammo which helps the soldiers to toggle enemies while reloading the ammo or out of ammo. It reports the location of the soldier to the base by the GPS. The suit assists the soldiers by providing both the rear and front view by the hand display with a spycam and gives a warning with the miniature radar.

**KEYWORDS:** *electromagnetic pulses, GPS, ultrasonic module, spycam, laser.*

## I. INTRODUCTION

In last decades, many modern technologies were improved in various fields like wireless communication, medical, telecommunication etc. But in defense field there was no such improvement. Even today our comrades were struggling to take out terrorist actions. Terrorists too have the technologies like radars, missiles etc. During the fight many of soldiers get shot while reloading ammo and when out of ammo. It is hard for the rescue team to find the location of injured soldiers. Our spies easily caught due to the radar technology in enemy territory. It is difficult to disable certain bombs as the bomb was made with lots of wires to confuse bomb squads. The recent development in defense was war robots, its disadvantage is that it does not act according to the situation and it could be easily hacked. Our defense system has taken many steps to control these actions and tightening the security to prevent terrorist actions. But our soldiers need more upgraded gadgets. This paper proposes a methodology which is the electronic suit to soldier that helps to easily find their location when they were injured. As the soldier was inside the suit he could be able to get the situation under control. It helps to disable the electronic equipment like RADAR and diffuses bombs, even it disables the war robots and it also provided the next generation weapon of optical weapon laser ammo. These project facilities the improvement to defense and provides the support to soldier. There are many types of EMP, except lightning EMP and static discharge and pulse generated by radar and electric war, as EMP weapon which threatening the electronic equipment includes high-altitude electromagnetic pulse (HEMP), ultra-wideband (UWB) and narrow-band high power microwave (HPM). The method of EMP coupling analysis is similar to EMC analysis. EMC technique such as screen, filter, bonding and cable layout can be used in EMP protection design [1]. HPM is in a state of development which makes it very difficult to specify some particular environment or family of environments. It depends on the source, radiating antenna, frequency, range, etc. One could specify limits based on air breakdown at the system but these would be way too large in general. As discussed in Section V-B, the environment would consist of a basically single-frequency waveform tuned to some system resonance for maximum interaction, this giving an order of magnitude more signal inside the system at positions of interest. There are also trade-offs involving antenna directivity and source power as a function of frequency, as well as breakdown limitations at the transmitting antenna. The present is too soon to be definitive [2].

## II. METHODOLOGY

It has three parts tracking, radar and EMP generation. In tracking the location coordinates can get from NMEA code through GPS the code is decoded with Arduino the location of the coordinates is displayed with the help of google maps. The miniature radar can be buildwith the ultrasonic sensor and is connected to the servo motor which is controlled by Arduino, the obstacle detection can be viewed through simulation with the processing. Rear view is provided with the spycam and handheld display. Laser is fitted to both the hands. EMP can be generated by coil toroidal coils and the antenna helps to radiate the pulses in desired direction.

## III. BLOCK DIAGRAM

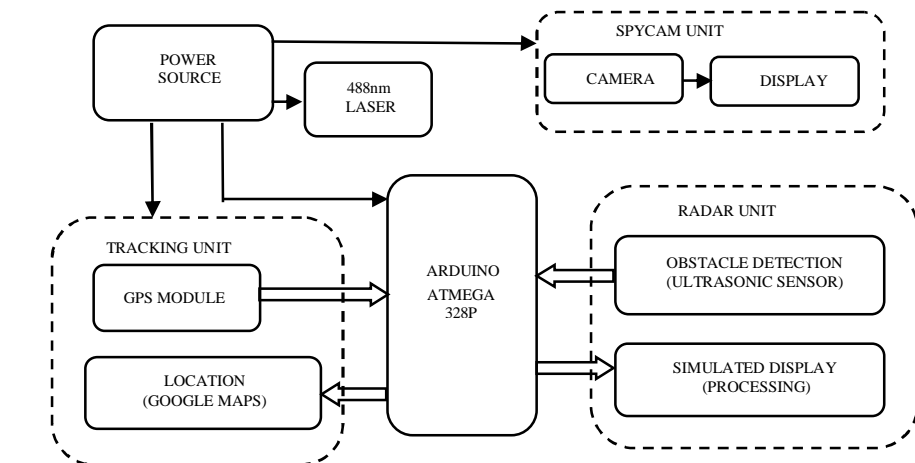


Fig 1: Block Diagram for Tracking & Radar Unit

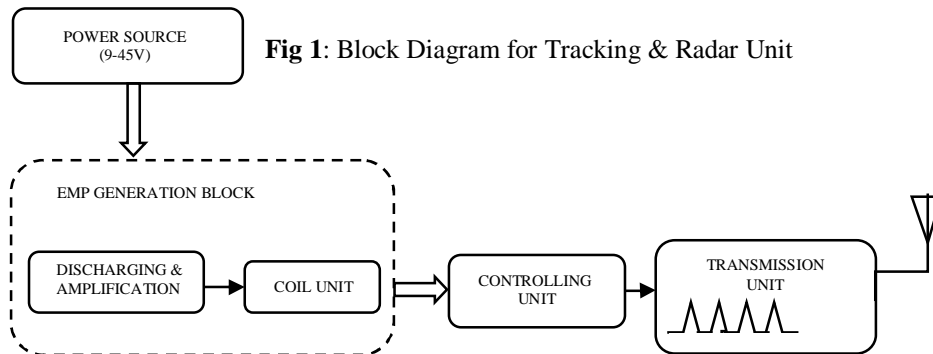


Fig 2: Block Diagram for Emp Generation and Transmission

### A. Tracking Unit

The GPS module is connected to Arduino Nano, the NMEA (National Marine Electronic Association).it receives four GPS formats,

\$GPGGA: Global Positioning System Fix Data

\$GPGSV: GPS satellites in view

\$GPGSA: GPS DOP and active satellites \$GPRMC: Recommended minimum specific GPS/Transit data

\$GPMRC is the commonly used format to find coordinates. The received code and format is given.

$\$GPRMC,hhmmss.ss,A,llll.ll,a,yyyy.yy,a,x.x,x.x,ddmm yy,x.x,a,m*hh$

This provides the UTC time, data, latitude, longitude, UTC date. to find the location this form is decoded by Arduino and the latitude longitude alone is available in serial monitor by using this the location is plotted in google maps by simply inserting the coordinates. This module is fixed with the soldier and the location is updated to the base which is helpful for rescue operations.



**FIG 3:** GPS with Arduino Nano

### B. Radar Unit

The radar unit is designed with the ultrasonic sensor module HC-SR04. this module can detect and measure the distance of objects. The continuous information of objects with time limits in microseconds is captured and by reconstructing this details, the size, distance and movement of the object is obtained. The ultrasonic module is fitted with servo motor which gives 180° rotation to the sensor. Arduino controls the rotation of servo and the reconstruction of collected details. With all these gathered details the radar is simulated by the processing IDE. The information from the sensor and Arduino was send to processing through COM ports then the radar sweep is displayed in the simulation window with the distance and degrees. This unit is fixed on back of the soldier neck by this it covers the rear side of the soldier and alert when any movement were detected.



**FIG 4:** RADAR module

### C. Spycam Unit

The spy cam unit consists of miniature camera with the hand held display. The camera is fixed below the radar module and the display is fixed at the forearms. So that a soldier can easily check his rear view.

### D. Laser unit

Optical lasers with wavelength above 488nm are harmful, it produces first degree burns on human skin. These high power lasers bring the weapons to next level this laser is equipped in hands it can help soldiers to capture the target alive and to toggle enemies while reloading the ammo. The trigger is fixed at the thumb, when the soldier presses his thumb the laser is triggered when he releases his thumb lasers gets off, by using laser multiple targets can be hit easily and make them unconscious instead of killing. And reloading time can be avoided.

### E. EMP Generation Unit

This pulse of energy produces a powerful electromagnetic field, particularly within the vicinity of the weapon burst. The field can be sufficiently strong to produce short lived transient voltages of thousands of Volts

on exposed electrical conductors, such as wires, or conductive tracks on printed circuit boards, where exposed [3]. The static discharge EMP is generated by suddenly discharging the capacitor. This discharged pulses are amplified by 2sc2078 transistor. toroidal coils provide support to amplification. The generated EMP are transmitted to desired direction using antenna. the static discharge EMP is generated with 45v by controlling the voltage radiation level of emp can be controlled which governs by voltage controller circuit. The EMP unit is fitted on the hand which is easy to disable digital equipment like radar, mobiles, computers etc.

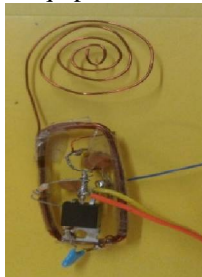


FIG 5: Coil Unit

#### IV. RESULT

##### A. Tracking Unit

The coordinates from the GPS module is obtained through serial monitor of Arduino Nano the obtained latitude and longitude indicates the current location of target. the map is plotted by inserting the coordinates in google maps.

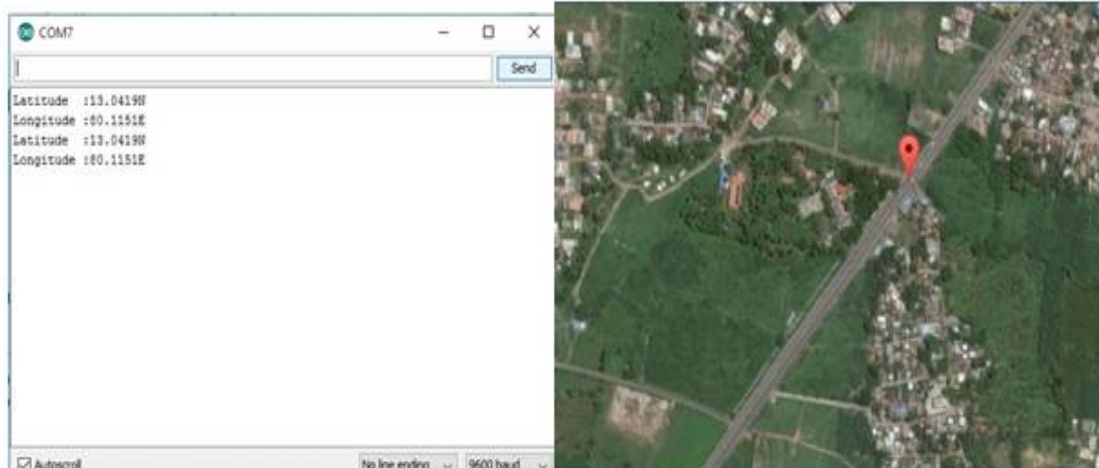
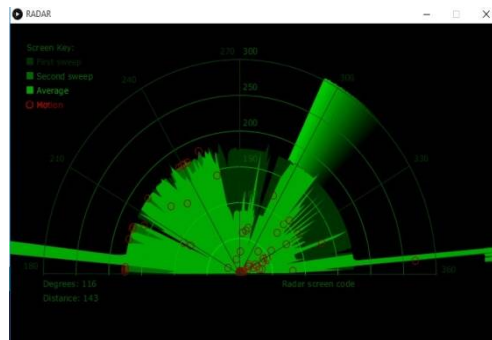


FIG 6: Coordinates on Arduino serial monitor FIG 7: Plotting location on maps

##### A. RADAR Unit

when the com port is open the ultrasonic sensor starts to measure the size and distance the servo gives 180° rotation to sensor. the details from the sensor is send to arduino and processing. The detected obstacles are plotted in simulation window using processing ide with the degrees and distance of object. light green indicates the first sweep and dark green indicates the detected obstacle and the red circle indicates the movement of obstacle.



**FIG 8:** RADAR sweep in processing ide

## V. ACKNOWLEDGMENT

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