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Electromagnetic Pulse cum Surveillance Rover

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Abstract: The technique with which the war has been fought has evolved a lot. Now the war is fought with all kinds of weapons and technologies in which electrical and electronics components play a major role. In order to win a war, it is sufficient to destroy the electronics and electrical components present in the enemy line. For this we propose our new idea of Electro Magnetic Pulse cum Surveillance Rover (EMP Device) which is based on the principle of Electro Magnetic Pulses. These waves have the property to destroy the electronic devices. These EMP waves are produced when a high voltage is discharged into the coil which in turn produces a series of waves. This series of waves is used to destroy/ damage the electronic components. The efficiency of this device can be varied by altering the voltage. In emergency times this device can be used to fire amino. This device can be used in a wide range of operations.
Keywords: Electromagnetic pulse, Thermal Camera, Surveillance

I. INTRODUCTION

An EMP (Electro Magnetic Pulse) is derived from a short-time discharge of a capacitor bank. Capacitors connected in parallel are charged and then discharged. In any instance, the hundreds to thousands of voltages are instantly discharged, to a coil. This is how an EMP is produced. For spark-gap discharges, wave front that produces noise all along the spectrum and cause serious damage to nearby electronic components.

II. EXISTING SYSTEM

In the present scenario the army uses missiles and other kinds of explosives to destroy or to deactivate the electrical and electronic devices of the enemy. The same technique is used in counter terror operations also. This method has been adopted and is used by almost all the countries in the world.

There are many types of missiles that are used to destroy the enemy's devices. Some of the prominent missiles that are used are:

1) A ballisticmissile is a missile which follows a ballistic trajectory to deliver one or more warheads on a predetermined target. These weapons are only guided during relatively brief periods of flight—most of their trajectory is unpowered, being governed by gravity and air resistance in the atmosphere.
2) Cruise missile is a guided missile used against terrestrial targets that remains in the atmosphere and covers the major portion of its flight path at approximately constant speed. Cruise missiles are designed to deliver a large warhead over long distances with high precision.
3) Explosives are a reactive substance which has a great amount of potential energy stored it and unleashes it when triggered. Generally, TNT and Nitroglycerin (dynamite) are the commonly used explosives.

III.PROBLEMS WITH THE EXISTING SYSTEM

A. Lethal to Humans

Whenever a ballistic missile is fired not only the physical things gets damaged but a large number of soldiers also gets killed. This makes the war to look so bloody and cruel.

B. Unfriendly to the Environment

The ballistic missiles and all the other type of weapons consist of TNT, Nitroglycerin (dynamite) and other chemicals for explosive purposes. This causes environmental degradation at the place where they are fired. Apart from the explosive they also have liquid hydrogen and other fuels for the launching and travel purposes. These fuels damage the atmosphere to a greater extent.

C. Nonregenerative Power

As soon as the missile and the weapons are fired and the explosion takes place then they are good to go to thrash. Not even a single part of them can be recycled or reused again. This leads to only accumulation of solid and chemical wastes.

D. Fixed Power

Once the missile is manufactured then their power of destruction cannot be changed at any situation. It remains as a constant value. It is impossible to change or decrease its destructive power.

E. High Cost

The production of these missiles and explosives demand a lot of expenditures. Every year in the annual budget the Government allocates a huge amount of money (in crores) for the production of these kinds of war equipment.

IV.PROPOSED SYSTEM

As a development of technology, we introduce the new concept of Electro Magnetic Pulse (EMP) cum Surveillance Rover. The proposed system just aims at destroying / damaging the electronic components only.

The proposed system uses a software application that is used to control the entire system. Fig 3.1 shows the block diagram of the proposed system. The proposed system consists of the rover, EMP device and surveillance camera whose controls are integrated through a software application. The rover that is used can travel in all types of terrain. Thermal camera is used here so that we can get the visuals during night times and to find the presence of humans also.

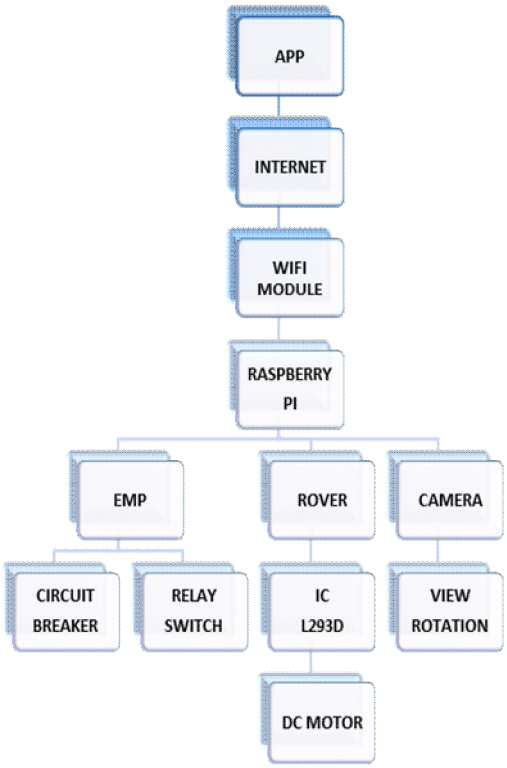

Fig 3.1 Block Diagram of Proposed Syste

V. A. ADVANTAGES OF PROPOSED SYSTEM

A. Nonlethal to Humans

Unlike the existing system the proposed system will not have any effect on humans. The EMP waves is totally nonlethal to humans. A large number of lives can be saved when our proposed system comes into use. In other words, our system saves lives.

B. Environmental Friendly

The EMP waves does not cause any explosive activities or release any radioactive materials. So, the environment remains the same like before even after releasing of the EMP waves. Our proposed system is cent percent environment friendly expect for the damage caused to the electronic equipment's nearby.

C. Regenerative Power

Unlike the ballistic missiles and other weapons, the EMP device is not limited for single time use. Just keep the power supply alive and the EMP will keep on working.

D. Variable Power Depending on The Range

The power and magnitude of the EMP waves can be varied based on the range of target or based on the intensity of damage we want to make. The power can be easily varied by changing the amount of voltage to be delivered.

E. Single Time Investment

Our proposed system involves only a single time investment. As our device can be used for a many number of times a huge amount of money can be saved and used for other welfare measures.

VI. WORKING OF THE PROPOSED SYSTEM

All the devices in this EMP rover model will be controlled with the help of an app through internet by using a WIFI and raspberry pi module which will control the working of all the individual devices separately or as an integrated one.

A. EMP Device

The EMP device consists of

1) High voltage convertor
2) Relay switch
3) Battery
4) Coil

The device is controlled through an app over internet by using the raspberry pi module. Fig 4.1 shows the block diagram how an EMP device works. When the raspberry pi module receives the command to on the EMP device it will turn on the power supply from the battery to the EMP circuit. On receiving the power, the EMP circuit will start to function. The power delivered from the battery is passed through the high voltage convertor. The high voltage convertor will then amplify the given voltage to the desired voltage level. (for e.g. a voltage of 12V when passed through the high voltage convertor is amplified to 1000 KV). The high voltage from the high voltage convertor will now be ready to be discharged. When the raspberry pi receives the command to fire the EMP pulse it will trigger the relay switch. At this moment the high voltage will be discharged from the high voltage convertor to the coil. As soon as the high voltage flows through the coil the electromagnetic pulses are produced and starts to propagate. This EMP device is mounted in the main gun of the rover which can be rotated along 360° by using a dc servo motor. The magnitude of the EMP pulses can be easily varied at the time of firing by changing the magnitude of voltage that has to be delivered to the high voltage convertor.

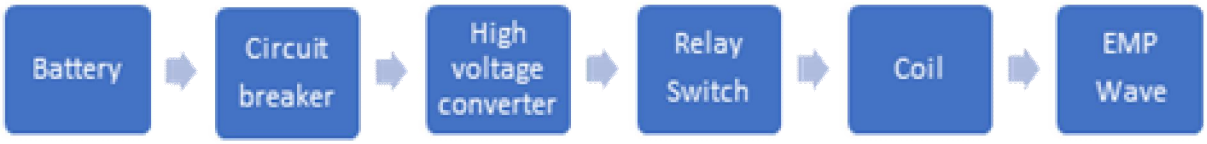

Fig 4.1 Block Diagram of working of EMP Device

B. Rover

The rover components consist of

1) 4 DC motors
2) IC L293D
3) Terrain wheels & Belt
4) Metal Shield
5) 2 DC servo Motors

The design of the rover is similar to that of a military tanker. This design has been implemented so that the rover can travel in all kinds of terrain. Eight high rpm DC motors are used for the rover movement and 2 dc servo motors are used one for the main gun revolution and one for the revolution of turret. In which the camera will be fixed. When the rover is controlled from the app the raspberry pi module will receive the command and then decode it and send it to the IC L293D which is a DC motor controller. The rover can be easily steered with the help of live footage that has been received from the thermal camera. In this way the entire working of rover can be controlled. Fig 4.2 shows the block diagram of rover working. In case of emergency the rover can be self-detonated preventing it from the reach of enemy which will be described in the upcoming topics.

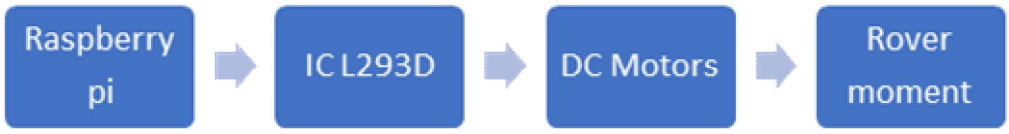

Fig 4.2 Block Diagram of working of Rover

C. Surveillance Camera

For surveillance purpose thermal imaging camera is used since it has better visibility during night, smoke and fog conditions. The main advantage of using thermal camera is that it can detect the presence of humans nearby. The angle of the camera will be controlled through the raspberry pi. The camera will be mounted on a 360° rotatable turret. the camera will directly telecast the video to the user by using the raspberry pi.

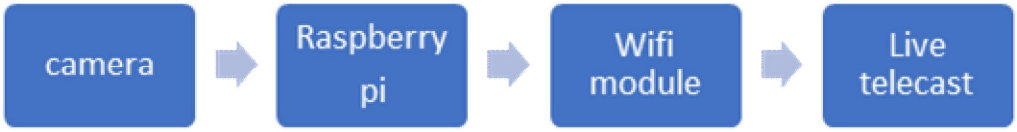

Fig .4.3 Block Diagram of working of Surveillance Camera

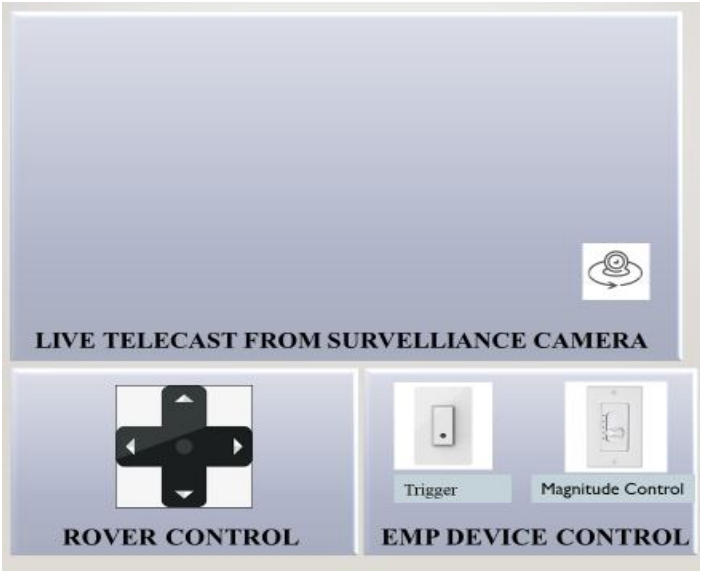

Fig 4.4. Outlook of the User Interface Application

D. Self- Detonating Property

In the Rover we introduce the self-detonating property, where if the rover is mishandled or taken into the enemy line of control(LOC) the self-detonating circuit detects the situation and detonates immediately which also prevents the enemy from

knowing our rover technology. This is achieved by a group of sensors which monitors the rover motion and the surface contact if the rover is lifted without the proper Key off it will detonate, hence proper handling of the Rover is essentially important. Hence only a trained group of military personnel can handle the rover

VII. CONCLUSION

In this paper we have introduced the new concept of electromagnetic pulses cum surveillance rover for making the war activities have a very low effect on the human beings as well as on environment. The proposed system reduces the expenses on the military side to a great extent. It can be used for surveillance purpose also. The self-detonating system ensures that our device does not fall in the hands of the enemy. We assure that our system will be far more advantageous and very much technically developed and entirely new from the system being in use.

VIII. ACKNOWLEDGMENT

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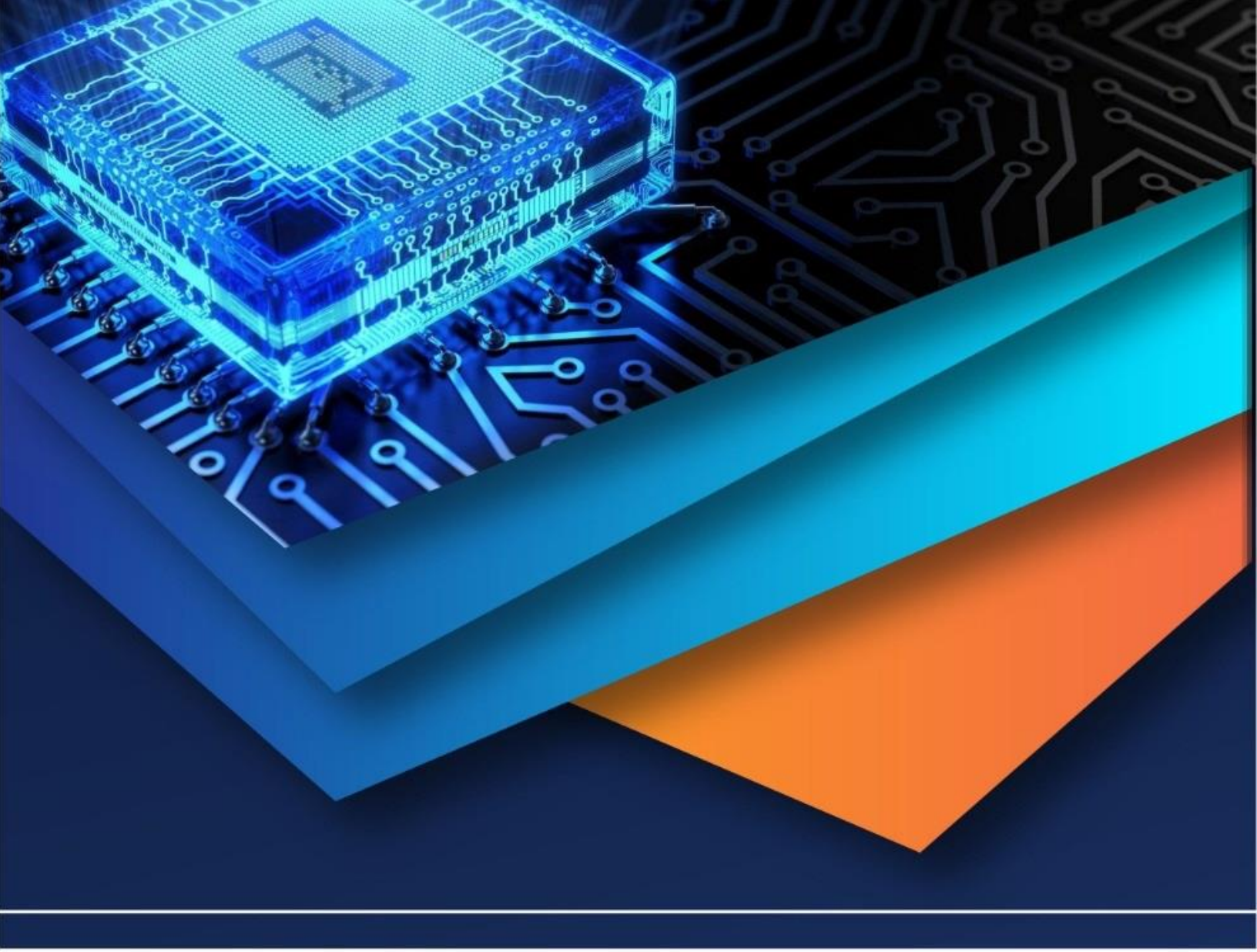
REFERENCES

[1] P Zarchan -Tactical and strategic missile guidance(Book) - Washington, DC: American Institute of Aeronautics and …, 1994
[2] DM Gormley - Missile contagion: Cruise missile proliferation and the threat to international security - 2008 - Praeger Publishers
[3] G Halfacree - Raspberry Pi user guide E Upton, – 2014
[4] WK Wong, PN Tan, CK Loo - An effective surveillance system using thermal camera … - Signal Acquisition and …, 2009
[5] K.E.Oughstun, G.C.Sherman - Electromagnetic Pulse Propagation in Dielectrics



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