

# Multi-Functional Robot Using Rf Technology for Defense Application



## Engineering

**KEYWORDS :** Military robot, RF Wireless network, Intelligent Unmanned Robot (IUR).

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### ABSTRACT

*Robotic system capabilities have advanced dramatically over the last several decades. According to an ongoing research in the U.S. Army it was found that robots not only can be better than soldiers in conducting warfare in certain circumstances, but they also can be more humane in the battlefield than human. These robots used in military are usually employed with the integrated system, including video screens, sensors, gripper and cameras. Here a new system is proposed with the help of low power RF wireless sensor network to trace out the intruders (unknown persons) and the robot will take the necessary action automatically. Thus the proposed system, an Intelligent Unmanned Robot (IUR) using RF saves human life and reduces manual error in defence side. This is specially designed robotic system to save human life and protect the country from enemies.*

### INTRODUCTION

We are no longer truly surprised when machine artefacts outperform humans in new domains. There are many advantages of these robots as compare to human soldier. One of the most important things about these robots is that they have the capability to perform missions remotely in the field, without any actual danger to human lives. This shows a great impact of military robots. These robots are sturdier and more capable of with-standing damage than human. Therefore they give greater chances of success in dangerous environment. Whenever, a robot is shutdown, the military simply roll out a new one. The military robot is the autonomous robot that consist wireless camera that human able to monitor via computer as a spy. Today wireless system have been widely used by many company because wireless can save cost of wiring, easy to install, occupy lesser space, easy for maintenance and more reliable. There are four types of wireless communications, Infrared, Bluetooth and Radio Frequency(RF) & Zigbee. RF normally is chosen for the wireless military robot because it has large connectivity range and it is more reliable than other wireless communication system. In this proposed system, such a military robot is designed to detect the unknown person in border area, gag leakage detection, bomb detection and diffusion. RF wireless sensor network is used to send the data's to the host system wirelessly. All these functions are done automatically or manually with the help of software which is to be installed in host system

### LITERATURE REVIEW

The field of robotics has changed dramatically during the past 30 years. While the first programmable articulated arms for industrial automation were developed by George Devol and made into commercial products by Joseph Engleberger in the 1960s and 1970s, mobile robots with various degrees of autonomy did not receive much attention until the 1970s and 1980s. The first true mobile robots arguably were Elmer and Elsie, the electromechanical 'tortoises' made by W. Grey Walter, a physiologist, in 1950. These remarkable little wheeled machines had many of the features of contemporary robots: sensors (photocells for seeking light and bumpers for obstacle detection), a motor drive and built-in behaviours that enabled them to seek (or avoid) light, wander, avoid obstacles and recharge their batteries. Since those early developments, there have been major strides in mobile robots—made possible by new materials, faster, smaller and cheaper computers (Moore's law) and major advances in software. At present, robots move on land, in the water, in the air, and in space. Some vehicles capable of moving in more than one medium or terrain have been built. During the past 20 years, military robotic vehi-

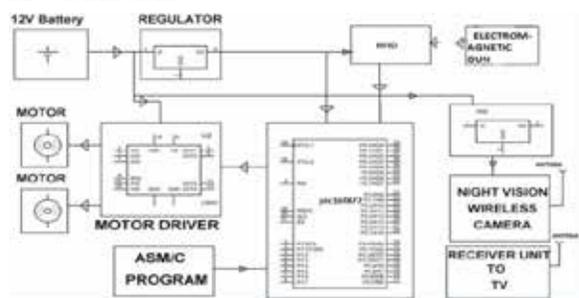
cles have been built using all the modes of locomotion described above and making use of the new software paradigms [US Dept. Of Defence, 2007]. Military robots find major applications in surveillance, reconnaissance, location and destruction of mines and IEDs, as well as for offense or attack. The latter class of vehicles is equipped with weapons, which at the present time are fired by remote human controllers.

In the following sections of our paper, we seek to complement this work by exploring and proposing the implementation of such military robots for defence applications.

### PROPOSED MODEL

In proposed system, the communication can be done with the help of the RF wireless communication network. In this system, the robot is monitored using the CMOS camera. The entire control is resided with the microcontroller. In addition to this an electromagnetic gun is included. In this, the robot can move through the rugged surfaces also. The control of the robot from remote location is done with a computer. The information to the computer is carried out by the Radio Frequency Technology. When control signal is given from computer it is transmitted with the help of RF signals. Video receiver receives the video signals from camera. In case of detecting an enemy the EM gun is shot with help of a push button on a remote control.

### BLOCK DIAGRAM



### HARDWARE DETAILS

This circuit utilizes the RF module (Tx/Rx) for making a wireless remote, which could be used to drive an output from a distant place. RF module, as the name suggests, uses radio frequency to send signals. These signals are transmitted at a particular frequency and a baud rate. A receiver can

receive these signals only if it is configured for that frequency.

A four channel encoder/decoder pair has also been used in this system. The input signals, at the transmitter side, are taken through four switches while the outputs are monitored on a set of four LEDs corresponding to each input switch. The circuit can be used for designing Remote Appliance Control system. The outputs from the receiver can drive corresponding relays connected to any household appliance. This radio frequency (RF) transmission system employs Amplitude Shift Keying (ASK) with transmitter/receiver (Tx/Rx) pair operating at 434 MHz. The transmitter module takes serial input and transmits these signals through RF. The transmitted signals are received by the receiver module placed away from the source of transmission.

The system allows one way communication between two nodes, namely, transmission and reception. The RF module has been used in conjunction with a set of four channel encoder/decoder ICs. Here HT12E & HT12D have been used as encoder and decoder respectively. The encoder converts the parallel inputs (from the remote switches) into serial set of signals. These signals are serially transferred through RF to the reception point. The decoder is used after the RF receiver to decode the serial format and retrieve the original signals as outputs. These outputs can be observed on corresponding LEDs.

For the movement of our robot, we are using DC motors. It is operated by 12VDC power supply. In any electric motor, operation is based on simple electromagnetism. A current carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field.

It also consists of mini wireless monitoring video camera and wireless receiver set for surveillance and is used here for demonstration purpose. Simply install the wireless camera in the room where we want to monitor and set the wireless receiver in the next room (up to 15 meters away) and hook it up to a TV or DVR to watch the action or record the footage for the security records.

An electromagnetic gun is made using PVC tube and copper wire where the bullet will be energised and will acquire velocity due to electromagnetic induction.

**SOFTWARE DETAILS**

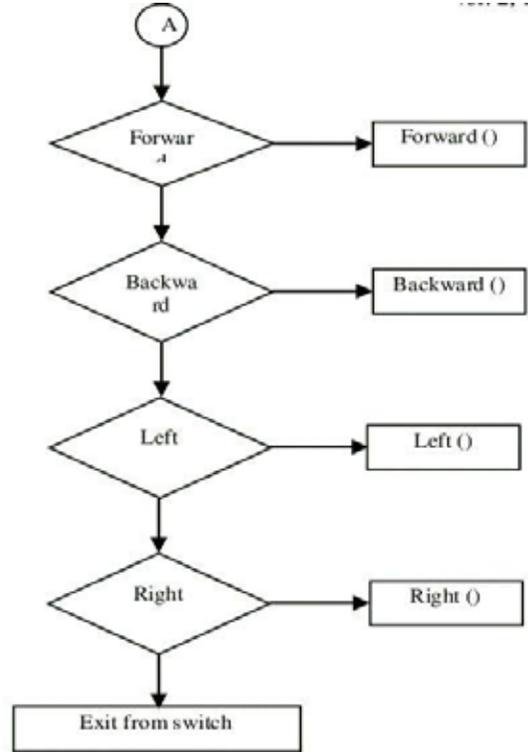
PIC Simulator IDE is powerful application that supplies Microchip microcontroller users with user-friendly graphical development environment for Windows with integrated simulator (emulator), pic basic compiler, assembler, disassembler and debugger. PIC Simulator IDE supports the extensive number of microcontrollers (MCUs) from the Microchip 8-bit PIC Mid-Range architecture product line (selected PIC16F, PIC12F, PIC10F models).

**PIC Simulator IDE main features:**

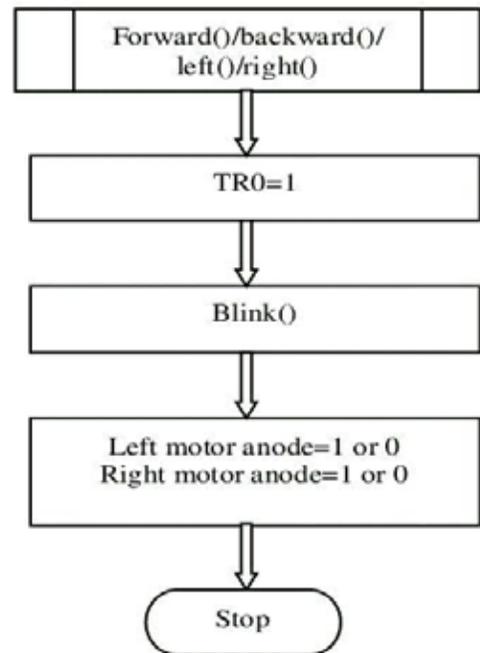
- Main simulation interface showing internal microcontroller architecture,
- FLASH program memory editor, EEPROM data memory editor, hardware stack editor,
- Microcontroller pinout interface for simulation of digital I/O and analog inputs,
- Variable simulation rate, simulation statistics,
- Breakpoints manager for code debugging with breakpoints support,

**FLOWCHARTS**

**1. Robot movement**



**2. Robot movement**



**RESULTS and CONCLUSION**

This proposed system gives an exposure to design a simple robot that can be used to do multifunction in defence. Manual control is also employed to control the robot from the control room which is located far away from the border area. The system uses non-commercial RF standard for wireless communication since this provides access to the as-yet unpublished specifications and permission to create products for market using the specifications.

Our system is aimed towards the RF technology up to 30 meters

distance. In future we can increase the distance up to 100m distance. The remote controlled motion and attacking abilities of the robot using the electromagnetic gun using a wireless camera can make a significant difference to our defense systems. The proposed system is focusing on the welfare infantry to minimize the casualties to a great extent. In order to strengthen the security and defense of our country we desperately require robotic system which will forearm our defense system. We wish to contribute to the same.

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