

# DESIGN OF DEFENCE ROBOT USING NEUTRAL RADIO FREQUENCY TRANSCEIVER TECHNOLOGY

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**Abstract :** This project is developed for more secure capabilities of home and military security. Certainly, most nations are trying to avoid wars and battles, in order to achieve peace in conflict zones, a well prepared military is crucial. The realistic concept that the military still performs life-threatening tasks is the reason enough to develop robots that will support soldiers on their missions. In this system, it consists of two sections Warfield section and the monitoring section, in the former section consists of Passive Infrared (PIR) motion detectors are usually designed to provide an indication to the monitoring unit. When a person or motor vehicle enters, PIR sensor immediately detect and give alert to the monitored area. Someone enters in to the secured places, immediately it will send an indication to the monitoring section through wireless communication. Metal detector is used to detect the bomb and other metal related objects in the war field section. At the same time wireless camera in the robot keep on capturing images at the security place and saved into the server. When the security people in the supervisory room, they got an indication to the host section lively then and there through wireless communication and they operate the laser gun to shoot if the entered people were opponent persons. The robot can return to the docking station for recharging operations when the on-board battery is too low. It will wander over the area through the motor driver.

**IndexTerms - Laser gun,transceiver,robot,defence system,wireless camera.**

## INTRODUCTION

Military robot are autonomous [HYPERLINK "https://en.wikipedia.org/wiki/Autonomous\\_robot"](https://en.wikipedia.org/wiki/Autonomous_robot)robots or remote-controlled mobile robots designed for military applications, from transport to search & rescue and attack. Machines don't get tired; they don't close their eyes; they don't hide under trees when it rains and they don't talk to their buddies; a human's attention to detail on duty drops dramatically in the first 30 minutes, Machines don't have emotions. Merriam-Webster defines robot as "a machine that looks like a human being and perform various complex acts; a device that automatically performs complicated, often repetitive tasks; a mechanism guided by automatic controls." Broadly defined, military robots date back to World War II and the Cold War in the form of the German Goliath tracked mines and the Soviet teletanks. The MQ-1 Predator drone was when "CIA officers began to see the first practical returns on their decade-old fantasy of using aerial robots to collect intelligence". The most prominent system currently in use is the unmanned aerial vehicle (IAI Pioneer & RQ-1 Predator) which can be armed with Air-to-ground missiles and remotely operated from a command center in reconnaissance roles. India has recently got its first military robot called 'Daksh'. Developed by Defense Research and Development Organization it is fully automated. It can climb stairs to reach hazardous materials. Using its robotized arm, it can lift a suspicious object and scan it using its portable X-Ray device. If the object is a bomb, Daksh can defuse it with its water jet disrupter. Daksh can be armed with a shotgun, if necessary.

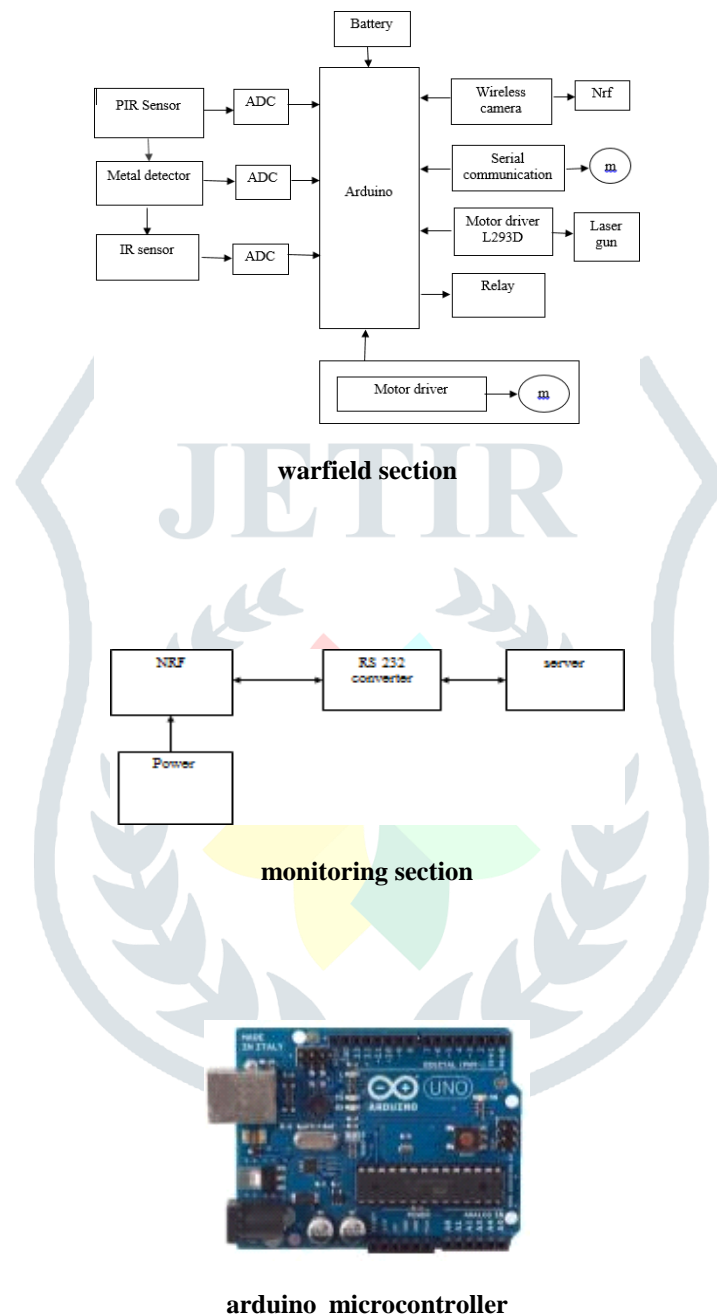
- ✦ The main purpose of military robot is as follows:
- ✦ Exploration of hazardous areas.
- ✦ Search and Rescue operations. To substitute humans in warfare.
- ✦ To be used for espionage purpose.

## OVERVIEW

This system is developed for the soldiers in the war field to help them in arduous situations. The system is semiautomatic. There are two sections, one is monitoring section and another one is war field section. The robot is placed in the war field sections and the control unit in the monitoring section which is used to control the robot, when any interrupt occurs. Initially the robot wanders in the war field section. If it sense any interrupt the control take over

by the security people in the monitoring section. The security people can view the interrupts in the war field through wireless camera, whether it is a person or not. If it is a unauthorized person, the decision is taken by the security soldier. The robot can also detect the bomb using metal detector.

### SYSTEM DESIGN



It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with AC-to-DC adapter or battery to get started. Arduino consist of both the physical programmable circuit board and the piece of software or IDE that runs on your computer, used to write and upload computer code to physical board. Its operating Voltage is 5V. It has 14 digital I/O Pins and 6 analog Input Pins. The flash Memory is 32 KB (ATmega328). The clock Speed of the controller is 16 MHz.



PIR Sensor

PIR sensors allows to sense human, always used to detect whether a human has moved in or out of the sensor range. The range of the sensor used here is about 180 degree. PIR detector doesn't emit the infrared rays, it receives the infrared rays that is emitted by the objects.



IR sensor

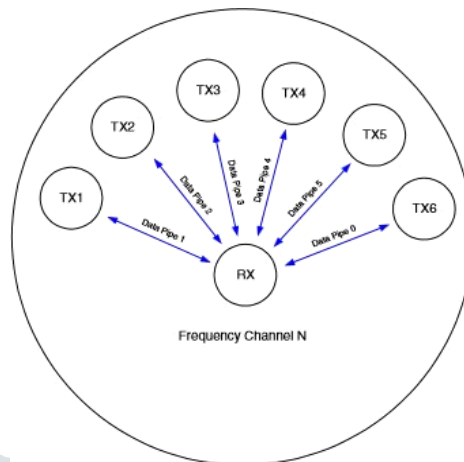
An Infrared Sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared Sensors are also capable of measuring the heat being emitted by an object and detecting motion. Usually, in the Infrared spectrum, all the objects radiate some form of thermal radiations.

- *Neutral Radio Frequency transceiver*
- *Laser Sensor*



NRF24L01 is a single chip radio transceiver for the worldwide 2.4- 2.5 GHz ISM band. The transceiver consists of a fully integrated frequency synthesizer, a power amplifier, a crystal oscillator, a demodulator, modulator and Enhanced Shock Burst™ protocol engine. Output power, frequency channels, and protocol setup are easily programmable through a SPI interface. Current consumption is very low, only 9.0mA at an output power of -6dBm and 12.3mA in RX mode. Built-in Power Down and Standby modes makes power saving easily realizable. It is a true single chip

GFSK transceiver. It can complete OSI Link Layer in hardware. It is auto ACK & retransmitter. The air data rate is 1 or 2Mbps. It has 20-pin package (QFN20 4x4mm). It uses low cost chip inductors and 2-layer .Power supply range: 1.9 to 3.6 V.



**fig.nRF24L01 star network configuration**

An nRF24L01 configured as primary RX (PRX) will be able to receive data through 6 different data pipes, see Figure 4. A data pipe will have a unique address but share the same frequency channel. This means that up to 6 different nRF24L01 configured as primary TX (PTX) can communicate with one nRF24L01 configured as PRX, and the nRF24L01 configured as PRX will be able to distinguish between them. Data pipe 0 has a unique 40 bit configurable address. Each of data pipe 1-5 has an 8 bit unique address and shares the 32 most significant address bits. All data pipes can perform full Enhanced Shock Burst™ functionality.

Laser sensors can detect, count, trigger, map, profile, scan and guide as well as verify level, proximities and distance to practically anything you can think of. All laser sensors from laser technology are eye safe and highly configurable allowing the user to optimize and customize the measurement performance to meet demanding condition easily, safely, reliably and inexpensively.



**motor driver**

A motor driver is a little current amplifier, the function of motor drivers is to take a low-current control signal and then turn it in to a high current signal that can drive a motor. Drivers are not only used for motors. They are used for any device that usually draws more than 50 to 100 mA. The maximum current of microcontroller output (typically 10-20mA) is not enough to drive motor coil connecting directly to the microcontroller will damage microcontroller output transistor. It can be used to run two DC motor with the same IC. The speed and direction control is possible. The motor voltage Vcc1 is 4.5v to 36v. There is automatic thermal shutdown is available. It is available in 16-pin DIP, TSSOP, SOIC packages.

## WIRELESS CAMERA

Wireless security cameras are closed circuit television (CCTV) cameras that transmit a video and audio signal to a wireless receiver through a radio band.



Many wireless security cameras requires atleast one cable or wire for power, wireless refers to the transmission of video/audio. All you need to do is to get a whole wireless security camera system, which comes with a Wi-Fi NVR (Network Video Recorder) and several Wi-Fi surveillance cams.

## METHODOLOGY

### WARFIELD SECTION

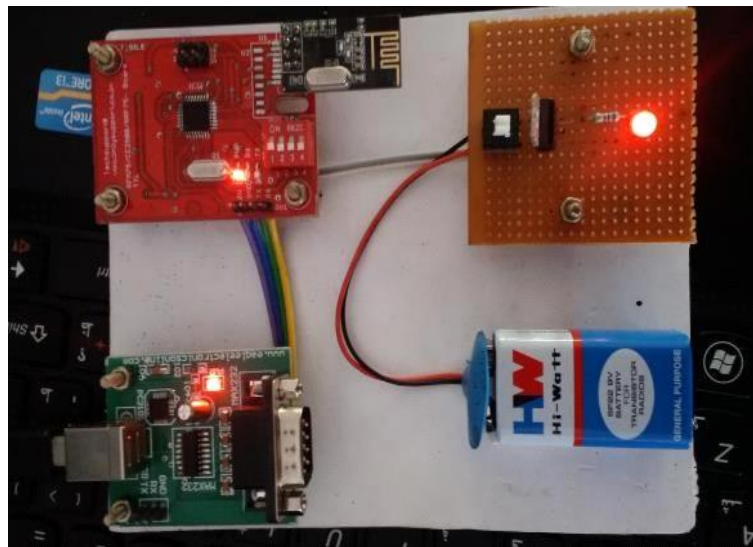


The robot is wander in this section automatically. The command used for the action of robot is fully depend on the program which is dumberd in the arduino controller. The programming language used here is embedded C. All the information are transferred through Nrf transceiver which is placed in both sections. Initially, it is programmed to wander in the Warfield for certain range. Here we use three motors which is handled by two motor drivers. When any of the sensor detect the object/human it immediately give alert to the control field. After that the whole control of the robot is taken by people in the control field. If there were any opponment person, whether the situation is bad then we can use laser gun to attack the person. The laser gun is controlled by the relays which is normally opened. At the rest of the time, it will collect the waste by using an arm setup in the robot. This arm setup will clean the waste in its path.

### MONITORING SECTION

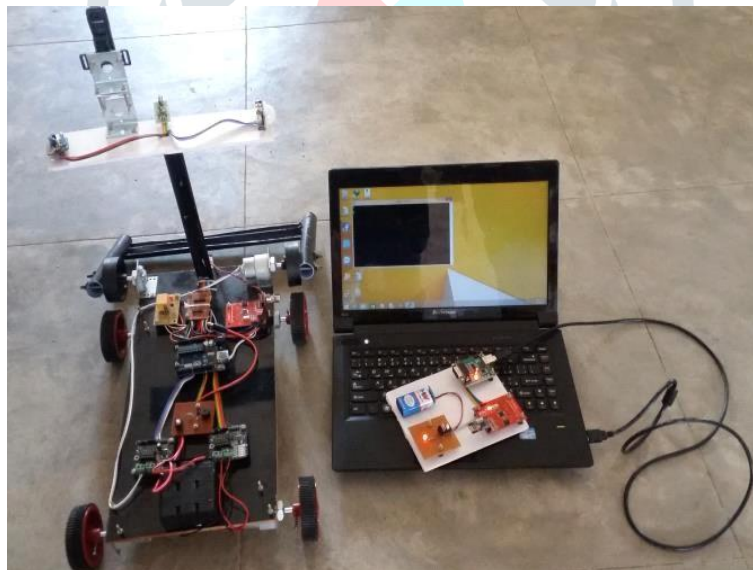
The server in this section is used to monitor the action of the robot in the warfield section through the wireless camera which is fitted on the robot. The Warfield is viewed lively, by means of video. The key command used here is to control the robot in the warfield. Using Nrf transceiver it sends a data up to the range of 1.2kms. The key command used here is,

Z □ Forward direction V □ Reverse direction X □ Towards right C □ Towards left  
 B □ Arm up N □ Arm down S □ Stop  
 I □ gun shoot



## EXPERIMENTAL RESULT

The appropriate response of the project was achieved. Thus, the information was successfully transferred from transmitter to the receiver.



## CONCLUSION

Here the wireless technology is used, there is a chance for weak signal strength. At that situation we need an antenna with high directivity. For this purpose the directional antenna is suggested to rectify that.

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