

# Virtual Blueprinting Robot for Indoor Surveillance

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**Abstract**—This project aims at constructing a robot that can do a very thorough scan of the whole building from corner to corner and while doing so prepare a virtual blue print of the building so that the security personnel can be absolutely sure that the whole place has been scanned and then they can take manual action wherever required. For the virtual blue printing the robot uses an interruption counter based odometer for calculating the distance covered in any direction. The wireless video camera and a gun firing mechanism arranged over the vehicle are designed to control for hunting the enemies by capturing the live video of surrounding area is also controlled through the same remote. In addition with the sensors that are equipped with the vehicle will sense the abnormal conditions like fire, harmful gases, obstacles, etc. and will send the information through the ZigBee communication.

**Index Terms**—Robot, Sensors, Transceivers, ZigBee

## I. INTRODUCTION

Manpower scarcity has been a perennial problem for many armed forces around the world. Over the years, there has been a decline in the absolute numerical make-up of these organizations, which, if not managed properly, can affect their operational capabilities. This scarcity is a situation that is unlikely to improve in the foreseeable future, given the current low birth rates and conflicting demands for manpower. The applications and advantages of remote controlled robots are plenty and especially in specific areas where people cannot go there to perform specific task, there these robots are playing major role. The technology implemented in the system offers many latest expectations; the main advantage is that the Robot can be controlled from the safe zone through wireless video analyzing system and can get the virtual blueprint of the locality. The vehicle that is equipped with wireless video monitoring system that can be controlled through ZigBee based remote controlled technology, based on the concept of video analyzing. The wireless video camera and a gun firing mechanism arranged over the vehicle are designed to control for hunting the enemies by capturing the live video of surrounding area is also controlled through the same remote.

In addition with the sensors that are equipped with the vehicle will sense the abnormal conditions like fire, harmful gases, Obstacles, etc. and will send the information through the same ZigBee communication. Here ZigBee communication Technology is preferred as two ways communication is required in the project work. The same system can be used as warfare vehicle in war fields. Another important application is that, this system can be used to guard the highly secured zones. The system designed as unmanned vehicle is equipped with wireless video camera and a gun firing sound which is controlled through the remote. With the help of a wireless video analyzing system, the operator can chase the rivals from a secured place and can also get the virtual blueprint of the locality and can also get the enemies

count, hostages, weapons, etc. The vehicle can be controlled in all directions; similarly the gun firing can be controlled through the same remote. When the system is utilized at boarders, the system can be controlled from the bunker through remote designed with ZigBee modules.

## II. FUNCTIONAL DESCRIPTION

The unmanned warfare vehicles are either operated autonomously or through tele-communications i.e., remote. The module constructed here is the remote operated one. Through this remote the vehicle is controlled and the view of that area is seen in the television set at the control station as the vehicle is equipped with the camera.

## III. BLOCK DIAGRAM

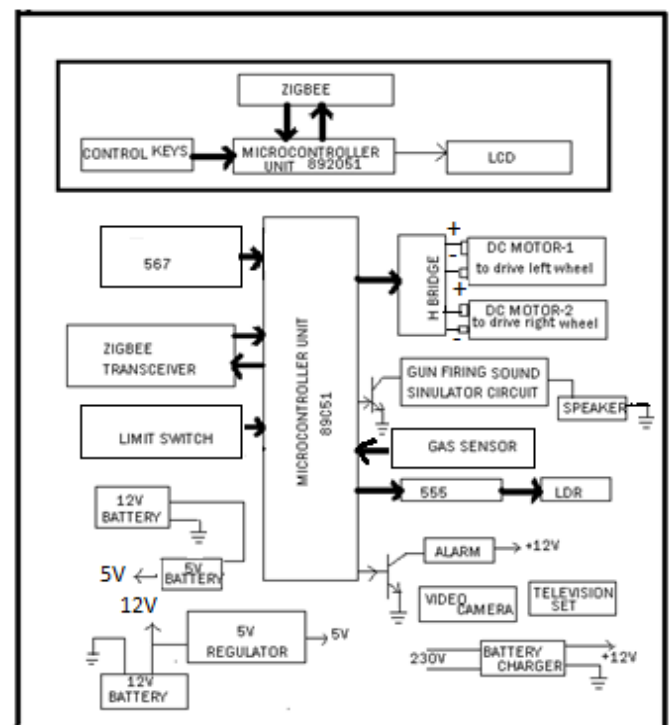


Fig 1. Block diagram of virtual blue printing robot.

The remote is designed with six control keys, micro-controller, LCD and the ZigBee transmitter. Out of these six keys, four keys are used to control the vehicle's direction i.e., to operate in forward, backward, right and left directions. Two keys are to switch ON and switch OFF. The gun sound simulation IC that simulates that the bullets are fired from the gun. In addition the vehicle is equipped with the sensors like fire, gas, obstacle, etc. that senses the abnormalities and transmits this information to the remote monitoring station where the information will be displayed in the LCD present in the remote control.

#### IV. HARDWARE DETAILS

The receiver unit is nothing but the vehicle. This unit consists of zigbee, micro controller (89C51), H-bridge IC (L293D), relay, gun sound simulator IC (UM3561), 2 DC motors, a wireless video camera and a battery for providing power supply to all these devices. Depending on the keys pressed from the remote, the data is modulated and transmitted by the zigbee, which will be demodulated by the zigbee present on the vehicle and is fed to the 89C51 micro controller. The controller decodes the data and takes the necessary action depending on the program written in it. And as the vehicle moves along the picture signals are transmitted through the wireless video camera that will be monitored in the central station from where the vehicle is being controlled. low rating DC motors are used to create motion in the robotic arm and the robot. These motors are constructed within built reduction gear mechanism internally in the motor. The motor driver package L293D is interfaced with 89C51 microcontroller through IN1 to IN4 of H Bridge (L293D). The MQ-2 Gas Sensor module senses the release of any toxic gases and gives indication to the controller that transmits the information to the authorized person mobile through GSM modem by activating the exhaust fan through the relay.

#### V. CONCLUSION

In this concept the warfare vehicle is controlled by a remote that will be operated by the operator. The camera placed over the vehicle will broadcast the video signals to the centralized monitoring station, where the security personals are monitoring the zone and the triggering of the gun can also be done through the remote by which the gun sound simulator IC produces the gun shot sensation. The employment of unmanned platforms in the battlefield serves not only to overcome the constraints arising from manpower and resource shortages, but also increases the operational capability of a fighting force. They will provide tangible increases in combat range, firepower, speed, element of surprise, command and control, etc. As unmanned warfare and the mastery of unmanned technology will become increasingly important parts of a nation's strategic architecture.

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