



## Terrorist Scanner Radar Along with Camera using Ultrasonic Frequency and Multiple Object Detection

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**Abstract**— *The aim of this proposed system is to provide more secured approach at nation border. This approach explores the dynamical properties of RADAR system. There are various security systems available such as Terrorist Scanner Radar with Military head quarter informing system, cordless transmitter and receiver, Long range firing equipment, Auto bomb blaster etc. which are used to provide security against terrorism. Compared with these widely used approaches in the literature, the proposed system will give some advancement in the existing systems which provide security at nation border. The objective of proposed system is to build a system which can provide greater security compared to existing system at nation border, at sea boundary and which would be easy to operate, easy to maintain and cost effective. We will specifically address the task of detecting exact kind of obstacles and its count by means of camera and image processing. The purpose of this paper is to review the fundamental principles of radar and image processing which can be used in combination to make a system to prevent terrorism.*

**Keywords**— *RADAR, Ultrasonic Frequency Transreceiver, Feature Extraction, Security*

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### I. INTRODUCTION

In today's world, security system is becoming more essential and as per the need it becomes more advanced. In this fast changing world, electronics has made great impact in each and every field. Just press of button tedious jobs performs easily. Now a day's security system has become more essential at nation border as well. There are various security systems for nation border available such as cordless transmitter and receiver, Terrorist Scanner Radar with Military head quarter informing system, long range firing equipment, Auto bomb blaster etc. But there is some problem with these all systems. Cordless transmitter and receiver uses air as a medium for transmission and reception of its signals, and the medium as an air is common to number of other communication systems so there is possibility of interference problem. In auto bomb blaster due to practical limitations the maintenance of it is very difficult. Then the problem with long range firing equipment is to rotate it in all directions is very difficult and that's why the problem of terrorism becomes more serious day by day. Hence numbers of security systems were designed for nation border security and to control terrorism but still this all systems not sufficient to control terrorism completely. So it becomes necessary to overcome the drawback of the existing system. Cordless transmitter and receiver system is used to transmit and receive the signals from military base camp to border area but the difficulty facing by cordless transmitter and receiver is mixing of sound as the medium for transmission is air which is common to number of communication systems. Then long range firing system is used to fire against attack but the problem with long range firing equipment is to rotate them in all directions is very difficult. So to overcome all these types of problem there is a need of detecting terrorist equipment system like "Terrorist Scanner Radar with multiple object detection". It specifically performs the task of detecting persons by means of various ways. The main goal is to detect all persons, localize them and count them, and that can be fulfil by employing the system like Terrorist Scanner Radar using ultrasonic frequency with multiple object detection.

### II. RELATED WORK

Hugh D. Griffiths and Chirs J. Baker [1] stated the review application of imaging radar systems to counterterrorism. In so doing, it needs to bear in mind the things that radar is good at doing, and the things that it is not good at doing. Here, we will be interested in techniques which allow us to distinguish targets from the background, by exploiting differences in signature, and wherever possible making use of prior knowledge. Further information may be obtainable through the use of techniques such as radar polarimetry and interferometer. Inmarsat Global Limited [2] has identified the Blighter family of surveillance radars as the key component of a solution that will enable border agencies to deliver very significant improvements to the security of their borders at an affordable cost. Blighter radars are designed for remote operation and monitoring, which requires reliable high performance communications. The combination of BGAN with Blighter generates a highly capable, versatile and mobile capability which fully meets the requirement and offers excellent value for money. Ajay Kumar Shrivastava et.al [3] presented the system which gives the effect of variation of

separation between the ultrasonic transmitter and receiver on accuracy of distance measurement. Distance measurement of an object in front or by the side of a moving or stationary entity is required in a large number of devices. To maintain the accuracy of measured distance the separation between transmitter and receiver is very important. In this system the transmitter and receiver separated and readings taken with the distance in the interval of 5cm. When the distance increases the error becomes constant and very less. A correction may be applied to calculate the correct distance. V.P.S. Naidu [4] develops a system for 3D target tracking named fusion of radar and IRST sensor measurements for 3D target tracking using extended kalman filter. Filters and multi-sensors are used to enhance the target-tracking capabilities [5].

### III. SYSTEM OVERVIEW

Ultrasonic transmitter that generates the radio signal with an oscillator. This radio signal is then transmitted using ultrasonic frequency within its working range; if it detects any obstacle in its path then transmitted frequency gets reflected. That reflected signal is then received by the receiver.

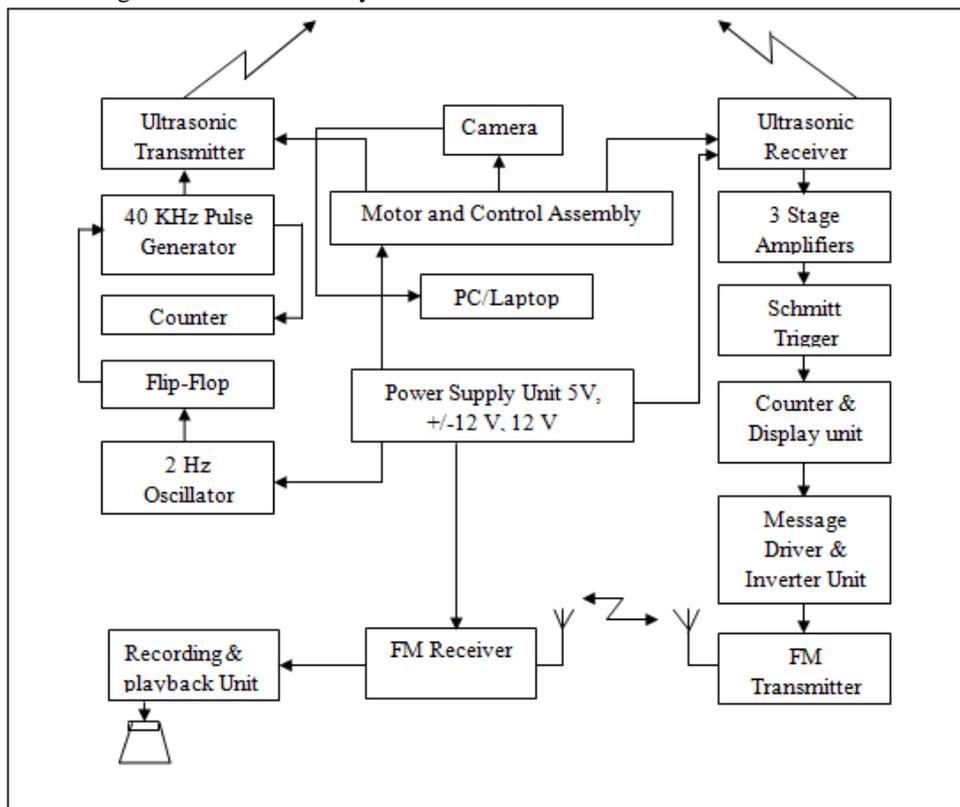


Figure 1. Overview of the system

When transmitter rotates and continuously transmits ultrasonic frequency signal; simultaneously the assembly which consist of camera also rotates and captures the images of entry restricted area. Then these images gets compare with images which are already stored into the database. If the features of captured images match with stored images then immediately control action starts. In control action it starts firing. Firing time will be depends on time constant and type of obstacle can be found by using captured images. Firing time will be little longer for the obstacles like army vehicle, ships etc. As compare to obstacle like person. The processes like scanning of border area, transmission and reception of ultrasonic frequency, capturing of image is continuously going on, simultaneously the FM transmitter which located at transmitter section sends audio messages for necessary control action to its receiver which is situated at military head quarters so that necessary control action can be taken by military.

### IV. EXPERIMENTAL RESULTS

#### Parametric evolution of proposed system

The system analysis consist output voltages at different test points before detection of obstacle and after obstacle detection.

Table No. 4.1 Voltages at different test points before and after obstacle detection.

Sr. No.	Test point	Test point description	Voltage available at TP before obstacle detection	Voltage available at TP after obstacle detection
1	TP1	Across pin no. 4 and pin no. 6 of IC CA3140 which is output of ultrasonic receiver.	0V	11.80V

2	TP2	Across pin 1 and pin no. 3 of IC 555 which output of motor control circuit.	0V	9.25V
3	TP3	Across pin 1 and pin no. 3 of IC 555 which output of counter circuit.	0V	7.53V
4	TP4 to TP7	Output of display circuit (IC 74C926) Across Pin no.7 and 9 Across Pin no.8 and 9 Across Pin no.10 and 9 Across Pin no.11 and 9	1.58V 1.60V 1.60V 1.61V	1.58V 1.60V 1.60V 1.61V
5	TP8	Across pin 1 and pin no. 3 of IC 555 which is output of message driver circuit.	Count below 8 0V	Count Above 8 10.52V

The system analysis also consist output response of ultrasonic transceiver when there is obstacle into its scanning path.

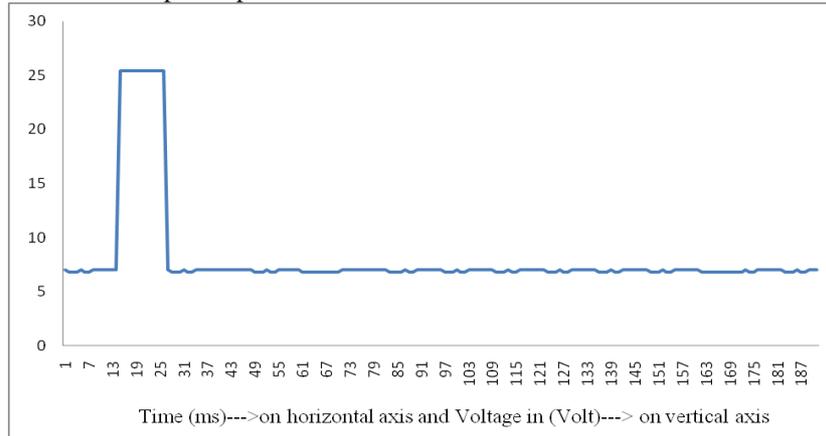


Figure 2. Waveform of one obstacle

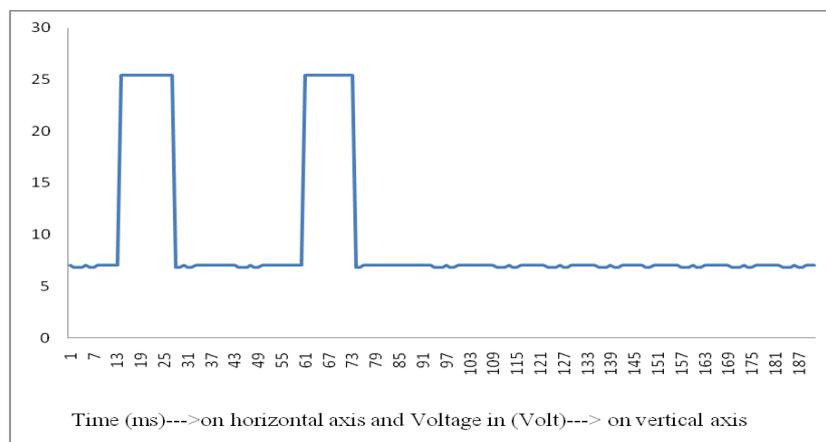


Figure 3. Waveforms of two obstacles

#### IV. CONCLUSION

Mainly for counterterrorism, Government is spending a lot of money for the security of the border of the nation. So by employing such type of system like terrorist scanner radar along with camera using ultrasonic frequency and multiple object detection using image processing we can achieve higher security at the nation border with very nominal cost. The basic aim of the project is to provide a security at nation border. This system is basically design to provide continuous scanning of entry restricted area, to find any obstacle which is coming into that entry restricted area and to detect exact kind of obstacle. The system is more efficient as compare to other existing systems because it gives images of the detected obstacles. While scanning the entry restricted area given to the system, if it found any obstacle into its path it first detect exact type of obstacle then according to type of obstacle necessary control action takes place. In control action it not only starts firing only but also additional necessary control action can be taken by military as the FM transmitter transmits message to military head office. There is a more research work should be done in order to make the system more secure.

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