



## RF COMMUNICATIONS DIVISION

### PROJECT NAME:

Intruder Detection Sensor System

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### ENGINEERING DISCIPLINES:

EE, CSE

YOU DON'T EXPECT TO BE A

# VICTIM OF INTRUDERS

IN YOUR  
OWN HOME

## SENIOR PROJECT OVERVIEW

Military and homeland security forces are faced with the ever-increasing challenge to provide security for troops and important assets. Their effectiveness can be greatly increased with a network of remotely located sensors that detect the movement of personnel and vehicles. At home, you can secure a perimeter around valuable items, important rooms, or the entire house to assure the safety of your family and belongings.

Sensors can be used in various forms to detect anything from acoustics and seismic motion to infrared and magnetic detection. Sensor system designers must overcome challenges to achieve low-power, highly sensitive systems that are capable of filtering out false alarms before sending an alert for detected intrusions.

## PROJECT OBJECTIVE

Design and build a working system that will detect intruders and transfer the sensor data to a remote location using a low-power wireless technology such as ZigBee (802.15.4). Detection sensor methods could include IR proximity sensors, optical sensors, or ultrasonic range finders. The system must contain at least two transmitter nodes with one or more sensors attached to each node. The sensor data must be transmitted to a remote base station receiver that interfaces to a PC to display the data in a readable format (such as a graphical map).

Displayed data should include when the intruder was detected, distance from sensor/location, and an estimate of the number of intruders. The sensor system will be responsible for detecting human-sized intrusions within a 15' x 15' x 8' tall area. The system should be able to ignore false alarms from small animals wandering through the sensor field.

## The main project components include:

- Sensor hardware
- Intruder detection software algorithms
- Wireless network with two transmitters and one receiver
- Software to display intrusion events on a PC

## PROJECT DELIVERABLES

The project deliverables should include:

1. Definition of problem and proposed solution
2. Block diagram of system and any circuits built
3. Software code developed
4. Prototype of system and demonstration of its functionality



A great example of low-power wireless technology that transfers sensor data to a remote location is the **ZigBee (802.15.4)**.