



## Smart Spying Rover: an Alternative to Gather Intelligence in Hostile Environment

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# Smart Spying Rover: An alternate to gather intelligence in Hostile Environment

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## Abstract

This paper proposes a review for a ‘Smart Spying Rover’ consisting of various payloads such as Object detection, Thermal Sensing and Metal Detection. The rover is solar powered and can be operated remotely from distance. The purpose of rover is to gather intelligence which can be valuable for various objectives. With help of GPS technology rover can pin point exact location of enemy and ensure strategic planning. This rover can prove to be an asset and reduces the risk of casualty during the time of crisis.

## 1. Introduction

The paper present a thorough review on ‘Smart Spying Rover’ for which we are combining various components to create a prototype version for ourselves. The rover has Object Detection for better assessment, Thermal Sensing for detecting enemies and Metal Detector at bottom to detect land mines. The rover can be operated remotely over larger distances with help of Wi-Fi technology. The rover also consists of various equipment to provide better connectivity and to transfer data to operating unit in real time with live location tracking with help of GPS technology.

## 2. Literature Survey

During our research we found out that there is no as such a complete rover dedicated for spying purposes. So, we decided to make our own. In our research time we found out most of the rovers run on the batteries or in some cases it uses rechargeable batteries. It can be tedious job to charge or replace batteries. Well, in that case we are using solar panels for better convenience and efficiency. Because of the wi-Fi technology the rover can be operated remotely over the larger distances and with adding of various other payloads it becomes the most efficient choice for spying purposes. With the addition of Metal Detector, it can detect landmines beforehand and can use for better strategy planning.

## 3. Components

### 3.1 Solar panel

Solar panel act as basic power source to our rover. The solar panel with charge the battery inside rover which can be used furthermore during night time for better efficiency.

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## 3.2 Microcontroller

ESP32 microcontroller will act as a basic microcontroller for the rover which will carry out all the basic functionalities of rover. The camera of ESP32 module is an excellent choice for generating real time video footage for surveillance and object detection.

## 3.3 Microprocessor

Most of the features will be carried out by ESP32 module except for Thermal sensing. The thermal sensing will require more computational power to carry out the task. For thermal sensing we are using Raspberry Pi as our microprocessor.

## 3.4 Thermal Camera

To detect the enemies thermal sensing becomes the most important characteristic of the rover. For Thermal sensing we are using an additional camera to generate thermal images.

## 3.5 Metal Detector

Metal detector will be beneficial for detecting land mines beforehand so that we can be the casualties may be avoided.

## 3.6 Battery

The battery can be considered as the secondary power source which will be charged with help of solar panels. All the modules in the rover will run on the battery and it can act as reserve storage unit during night.

# 4. Methods

We are using Cascade algorithm for Object Detection and FLIR tools for Thermal Sensing which can be changed later till we continue our literature survey.

# 5. Result

The rover will help to save lives of the soldiers or the civilians. The casualty rate will be less as most of the gathering of intelligence work will be done by rover itself. Invading hostile areas or enemy territory will be much easy because of the surveillance information. As result it will be easy to gather intelligence, reconnaissance, target acquisition, communication, hazardous environment exploration, battlefield mapping and counter-intelligence. The rover can be useful in all the respective fields mentioned above. Overall, war field spying rovers play a vital role in modern warfare, enabling enhanced reconnaissance, surveillance, target acquisition, and communication capabilities while reducing risks to human personnel on the battlefield.

# 6. Conclusion

In conclusion, the rover provides the sufficient intelligence which can be valuable during the time of crisis. The main purpose of the rover is to avoid the casualties in any form. The basic strategy planning and surveillance are the two most important factors of the rover. As a result, the rover can be a fruitful in many hostile situations and can provide valuable intelligence without loss of any lives. On the other hand, in attacking or offensive phase it can help to gather information which can be later used to decide strategy of the attack or offense. It will heavily influence in the proper planning of the attack or during rescue missions.

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