

HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

CONSTRUCTION OF A REMOTE CONTROL  
SEARCH VEHICLE

E. 1188

BY: DIANELLOS YIANNIS

JUNE 1999

**HIGHER TECHNICAL INSTITUTE**  
**ELECTRICAL ENGINEERING COURSE**

**DIPLOMA PROJECT**

**CONSTRUCTION OF A REMOTE CONTROL  
SEARCH VEHICLE**

**( E / 1188 )**

by

**DIANELLOS YIANNIS**

**JUNE 1999**

HIGHER TECHNICAL INSTITUTE	PROJECT NO. 2984
----------------------------------	---------------------

# **CONSTRUCTION OF A REMOTE CONTROL SEARCH VEHICLE**

**SUBMITTED BY : Dianellos Yiannis**

**In partial satisfaction of the award of diploma of technician  
engineer in Electrical Engineering of the Higher Technical institute  
of Cyprus.**

**PROJECT SUPERVISOR : Mr S . Voskarides**

**EXTERNAL ASSESSOR : Mr C . Christou**

**JUNE 1999**



**This project is dedicated  
to my family, to my friends  
and to all the people who  
fights for a better and  
peaceful WORLD.**

## **Acknowledgements**

I would like to express my thanks to my project supervisor Mr.Sotiris Voskaridis for his assistance and guidance throughout the completion of the project. Special thanks to my friends who have helped me in finding the various parts needed for the construction of the project : Antoniou Lampros, Anastasiou Georgios, Antoniou Antonis , Costas Tsingis and Antoniou Iakovos and to my roommates George Ioannides and Matheos Kondarinis who helped me with typing and also to all my friends. Especially I would like to thank my father who gave me courage and helped me to overcome all the difficulties I faced while I was constructing the RCSV.

# CONTENTS

Summary

Introduction

## PART I

### ELECTRICAL CONTROL AND OPERATION

#### CHAPTER I : MOTION

1. Motion	4
1.1 Control circuit	5
1.1.1 Circuit operation	6
1.1.2 Construction	8
1.1.2.a transistor driver	8
1.1.2.b Transistor and relay board	11
1.1.2.c Motor installation	13

#### CHAPTER II : OBSERVATION

2. Observation	15
2.1 Camera module	16
2.1.1 Features	16

2.1.2 Output signals	19
2.1.3 Camera installation	21

### CHAPTER III : TRANSMISSION AND RECEPTION

3. Transmission and reception devices	23
3.1 Transmission devices	23
3.1.1 Remote control Tx	23
3.1.2 VHF video and audio TX	24
3.2 Reception devices	25
3.2.1 RF remote control	25
3.2.2 TV reception set	25

## PART II

### MACHINE DESIGN AND PERFORMANCE

#### CHAPTER IV : MACHINE DESIGN

4. Machine design	27
4.1 main chassis	28
4.2 Suspension system	29
4.3 Front wheels	30
4.4 Rear wheels	31

## CHAPTER V : PERFORMANCE

5. Performance	32
5.1 Tests	32
5.2 Advantages and disadvantages	34
5.3 Improvements	36

## PART III

### PHOTO ALBUM

The actual photos	37
Detail drawings	40
Conclusion	45
References	46
Appendices	47



## **SUMMARY**

This project deals with the design and construction of a **remote control search vehicle** made of used electronic and electrical equipment and scrap pieces of metal.

At the first part , it deals with electrical and electronic equipment and the arrangement of the different modules.

The second part deals with the machine design which gives detailed drawings of the RCSV.

Finally, in part three the photo album is presented.

## Introduction

Through out the years it was observed that unmanned missions had to demonstrate a great technological progress and they taught us that human beings learn to defend him self against the unknown. Even though this enormous progress people are let to die or injured ,e.g in minefields , continuing the mad game of death , either by their own mistakes or their partners because they come face to face with danger. Handling this kind of situations such as explosives it is always very dangerous and as they say ‘the first mistake is and the last one’. Anyone can see the danger , and many people must have wondered ‘why don’t they use something to protect themselves and minimize the risk ? ‘. And yet the answer is simple. Either the cost of an appropriate machine is too high or the lack of technical knowledge and support lead people to death.

**‘Remote control search vehicle’ (RCSV).** As the title of the project implies it is a vehicle that in general lines enters an unknown area which might be hazardous for humans and send data to the to the receiver ( still pictures, video ,audio or simple signals).There , the recipient can pass the data through any kind of processing and after the evaluation of the results he can make its own conclusions about the area under investigation.

The **RCSV** can be used in the following cases :

1. When a pipe in a sewage system is blocked it can be guided to crawl through and with the aid of the video camera to spot the problem and thus help us to take action.
2. In cases of the police needing to disarm a bomb.
3. In cases of industrial accidents where certain actions are needed to be taken ( e.g switch power supply off, or disables the operation of certain equipment e.t.c) but the environment is dangerous for human beings.
4. In military missions such as :
  - a) trace hidden mines
  - b) spy the enemy lines
  - c) plant / disarm bombs.
5. In warehouses where it can take the role of watchdog.

The most important is that it can do all these with out any human life being in danger. It is like having a second chance against death.