UNIVERSITI TEKNOLOGI MARA

THE IMPROVEMENT OF COMMUNICATION TECHNOLOGY FOR ELECTRONIC SHOOTING TARGET GALLERY SYSTEM

SARIFAZURA BINTI MOHAMMAD ISA

2009558353

Thesis submitted in partial fulfillment of the requirements

for the Degree of

Master of Computer Networking

Faculty of Computer and Mathematical Science

Jan 2013

ABSTRACT

Effective firearms training requires much more than simply shooting at a stationary target. In the real world/ in reality, threats move, hide behind covers, and protect themselves behind innocent hostages. To ensure that the force or department is completely or fully prepared for all types of shooting scenarios, it is critical that training activities mimic real-life encounters closely. For this reason, Electronic Shooting Target Gallery is an effective system that will be useful for firearms training at all levels, from the new recruit training to mandatory qualifications to advanced reactive training exercises for special units. Target Shooting System is developed by the convergence of sensor, network and wireless communication technologies. Target Shooting System is a new research area for training purpose and its technology features has a wide application future. Militaries are very interested in this system. Wireless sensor networks are designed not for universal applications but for specific applications as the necessity for hardware and software in different application platforms are not the same. These papers present a research and comparison of the old and new upgrade that applies to Target Shooting System communication. Using wireless LAN would provides new solution for the training evaluation of hitting the target. Not only it will improve the efficiency of target practice training but also enhance the army's combat effectiveness. In addition, this solution also promote the process of information construction for the army and develops a control system application. In accordance to the requirement of orientation precision of target in shooting range, some of the analysis for several object orientation technologies in common use in wireless, contrasted advantages and disadvantages of each technology have been carried out.

ACKNOWLEDGEMENT

First of all, I would like to say Alhamdulillah, for giving me the health and strength to finish this dissertation. I would like to dedicate my highest gratitude to those persons who have been involved and gave their meaningful support.

To my beloved husband Hasan Syazali; this thesis would not have been possible without support and encourage non-stop from him. Not forgotten to my parents and my officemate from Softlabs Technologies Sdn Bhd for their warmest support and endless love while I am working with this dissertation.

Moreover, I would like to express my sincere gratitude to my supervisor Prof. Dr Saadiah Yahya for her guidance and support, ideas, tolerance and encouragement for this project to be completed.

Last but not least, I would like to thank to all my family and friends for giving support and advice to complete this project. May Allah bless all of you for the kindness and support that you had gave to me.

Thank you

DECLARATION OF ORIGINALITY i
ABSTRACT ii
ACKNOWLEDGEMENT iii
TABLE OF CONTENTS iv
LIST OF TABLES vii
LIST OF FIGURES vii
LIST OF ABBREVIATIONS x

CHAPTER 1: INTRODUCTION
1.0 Introduction 1
1.1 Problem Statement 3
1.2 Research Question 4
1.3 Objective of the research 4
1.4 Scope of the Project 5
1.5 Project Significant 5
1.6 Summary 6

CHAPTER 2: LITERATURE REVIEW
2.0 Introduction 7
2.1 An Overview of Radio Network 8
2.1.1 Transmitter and Modulation 8
2.1.2 Antenna 10
2.1.3 Propagation 10
2.1.4 SNR 11
2.1.5 Receiver and Modulation 12
2.1.6 Radio Band 13
2.2 An Overview of Wireless Network 14
2.2.1 Wireless Local Area Network (WLAN) 14
2.2.2 OFDM 15
2.3 An Overview of IEEE 802.11 20
2.3.1 802.11-1997 23
2.3.2 802.11a 23

CHAPTER 1

INTRODUCTION

1.0 Introduction

Accuracy in the shooting was an important element in a military organization. To seek this efficiency in shooting, a system of effective training is required.

Target shooting system is one of the most effective methods for this task. Range target systems have been used as a substitute for an opposing force when training with live ammunition, or as force reinforcement training. One of the effective methods of shooting training is the Moving Infantry Target (MIT). It comprises a triple target lifter mounted to a wirelessly controlled and battery self powered mover. The target holder has an integrated hit sensor mounted to it. When the target board is hit by a bullet the hit sensor will register the impact and the MIT will react as preset to the control system.

Old system of data network using basic approach of 40 MHz Radio Frequency with only 10 kb per second data rate. With the low bandwidth, low data transmission and low signal strength it cause some data loss and had poor reliability. To make matters worse there is a case where target continuously hit but data and status of target not