

**SIMULATION OF MOBILE STATION LOCATION  
DETERMINATION USING ENHANCED OBSERVED TIME  
DIFFERENCE (E-OTD)**

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## **ABSTRACT**

Location Based Services (LBS) is a service provided by cellular radio services due to the location of mobile station (MS). This service was first introduced in Global System for Mobile Communication (GSM) system and it become the most important service in Third Generation (3G) system. There are many techniques to determine mobile station location, such as Global Positioning System (GPS), Angle Of Arrival (AOA), Time Of Arrival (TOA), Time Difference Of Arrival (TDOA), Enhanced-Observed Time Difference (E-OTD) and Cell Global Identity (Cell-ID). But, this paper only discussed about Enhanced-Observed Time Difference (E-OTD) technique. E-OTD used triangulation method and a simulation of this technique was created in MATLAB. This simulation is focused on the location error, which is depend on 2 environments. The environments are urban (error of magnitude,  $1e-7$ ) and rural (error of magnitude,  $1e-9$ ). This simulation also performed comparison between the number of base station (BTS) used.

## TABLE OF CONTENTS

CHAPTER	LIST OF TITLE	PAGE
	DECLARATION	i
	DEDICATION	ii
	ACKNOWLEDGEMENT	iii
	ABSTRACT	iv
	TABLE OF CONTENTS	v
	LIST OF FIGURES	viii
	LIST OF TABLES	ix
	ABBREVIATIONS	x
<b>1.0</b>	<b>INTRODUCTION</b>	
	1.1 Review of Enhanced Observed Time Difference	1
	1.2 Project Background	2
	1.3 Problem Statement	2
	1.4 Objective of Project	3
	1.5 Scope of Project	3
	1.6 Significant of The Study	3
	1.7 Organizational of The Thesis	4
<b>2.0</b>	<b>LITERATURE REVIEWS</b>	
	2.1 Introduction	5
	2.2 Service Based On Location	5
	2.3 GSM Network	7
	2.4 Determination Technique Location	9
	2.4.1 Global Positioning System (GPS)	9
	2.4.2 Received Signal Strength	10
	2.4.3 Time of Arrival (TOA)	11
	2.4.4 Time Difference of Arrival (TDOA)	12

# CHAPTER 1

## INTRODUCTION

### 1.1 Review of Enhanced-Observed Time Difference

Location Based Services, (LBS) was a service enables user to enjoy the facilities personally through special information which gave about specific location. Service based on location can link consumer to specific place to go by consumer, given the current information such as traffic situation and whether, or supply consumers by journey information. What most importantly, service based on this location can also be determine location consumer location exactly via mobile phone (mobile station).

Methods applied to determine location of mobile stations (MS) are named as Location Determination Techniques (LDT). Methods used this have the inside track and respective inadequacies, depends on aspects such as accuracy, operating cost, network used, have been implemented easily, coverage and others. Hence this study will discuss a little bit about each basic principles, its technique and application to users. Difference between one technique with the other is stated briefly together with advantages and disadvantages.

This study especially focus on one of the technique namely Enhanced Observed Time Difference's technique (E-OTD). This E-OTD technique is selected base on library research and it's capable to determine exact location after GPS (Global Positioning System). This E-OTD technique will be studied from accuracy aspect through simulation method. This technique accuracy will be visible through error performance tested, circle error and further comparison with results committed by other previous research.

This entire research would be performed one by one so that it would be easy to understand comprehensible and effective. Simulation development which also will be manifested so that this simulation results will be given answer to E-OTD technique's accuracy performance.