

# **FUNCTIONALITY REQUIREMENTS FOR FLEET MANAGEMENT SYSTEM**

**A thesis submitted to the Graduate School in partial  
Fulfilment of the requirements for the Degree of  
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## **ABSTRACT**

The project aims to identify the functional requirements of fleet management system with Unified Modelling Language (UML). Three main phases were involved in this project, which are defining requirements, analyze requirements and validate functionalities. The functionalities of requirement are presented by using UML diagrams that consists of use case diagram, use case specification, sequence diagram, collaboration diagram and class diagram. The prototype was built to provide a guideline in developing the running system of Fleet Management System on user's needs.

## ABSTRAK

Kertas projek tesis ini bertujuan mengenalpasti keperluan-keperluan kefungsiian yang wujud dalam sistem pengurusan kenderaan dengan menggunakan Unified Modeling Language (UML). Tiga fasa utama terlibat dalam projek tesis iaitu mengenalpasti keperluan, menganalisa keperluan dan menguji kefungsiian. Kefungsiian bagi setiap keperluan akan dipersembahkan dengan menggunakan rajah UML yang terdiri daripada *use case diagram*, *use case specification*, *sequence diagram*, *collaboration diagram* dan *class diagram*. Satu prototaip akan dibangunkan dalam usaha menyediakan satu garis panduan dalam mewujudkan satu sistem sebenar bagi Sistem Pengurusan Kenderaan mengikut keperluan pengguna.

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# CONTENTS

	<b>Page</b>
<b>PERMISSION TO USE</b>	ii
<b>ABSTRACT</b>	iii
<b>ABSTRAK (BAHASA MELAYU)</b>	iv
<b>ACKNOWLEDGEMENTS</b>	v
<b>DEDICATION</b>	vi
<b>CONTENTS</b>	vii
<b>LIST OF TABLES</b>	ix
<b>LIST OF FIGURES</b>	x
<b>LIST OF ABBREVIATIONS</b>	xi
<b>LIST OF APPENDICES</b>	xii
<b>CHAPTER ONE: INTRODUCTION</b>	<b>1</b>
1.1 Introduction	1
1.2 Kota Bharu Municipal Council (MPKB)	2
1.3 Problem Statement	2
1.4 Objectives	3
1.5 Project Scope	4
1.6 Project Significance	4
<b>CHAPTER TWO: LITERATURE REVIEW</b>	<b>5</b>
2.1 Requirement	5
2.2 Fleet Management	6



2.2.1 Fleet Management on Public Sector	6
2.3 Fleet Management System of Texas, USA	7
2.4 Fleet Management Solution for DID	8
<b>CHAPTER THREE: METHODOLOGY</b>	<b>10</b>
3.1 Define Requirement	10
3.2 Analyze Requirement	10
3.3 Validate Functionalities	11
<b>CHAPTER FOUR: FINDING/RESULTS</b>	<b>12</b>
4.1 A List of Functional Requirements	12
4.2 Use Case Diagram	14
4.3 Use Case Specification	14
4.4 Interaction Diagram	15
4.5 Class Diagram	15
4.6 Prototype Testing	16
<b>CHAPTER FIVE: DISCUSSION AND CONCLUSION</b>	<b>18</b>
5.1 Project Summary	18
5.2 Limitation	18
5.3 Recommendation	18
<b>REFERENCES</b>	<b>19</b>
<b>APPENDICES</b>	

## LIST OF TABLES

<b>Table</b>	<b>Title</b>	<b>Page</b>
1	Functional Requirements for Fleet Management System	13
2	Summary Result of Prototype Testing	16

## LIST OF FIGURES

<b>Figure</b>	<b>Title</b>	<b>Page</b>
1	Use Case Diagram for Fleet Management System	14
2	Class Diagram for Fleet Management System	15

## LIST OF ABBREVIATIONS

CHAOS	-	Quarterly Journal from Standish Group Inc.
DID	-	Department of Irrigation and Drainage
FMS	-	Fleet Management System
HTML	-	Hypertext Markup Language
IEEE	-	Institute of Electrical and Electronics Engineers
MPKB	-	Kota Bharu Municipal Council
SQL	-	Structured Query Language
PHP	-	Hypertext Preprocessor
RDBMS	-	Relational Database Management System
SISKEND	-	Fleet Management Solution for DID
UML	-	Unified Modeling Language
VFMS	-	Vehicle Fleet Management System

## **LIST OF APPENDICES**

APPENDIX A	-	Use Case Specification
APPENDIX B	-	Sequence Diagram
APPENDIX C	-	Collaboration Diagram
APPENDIX D	-	Functionality Test Case

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

A Fleet Management System (FMS) is a network of systems that captures and monitors all of the information involved with the each vehicle life cycle of the fleet. It's the key to monitoring thousands of pieces of information. The goal of effectively managing each vehicle's life cycle is to pay the minimum amount in acquisition and maintenance costs while getting the maximum return at disposal (Fleet Vehicle Agency, 2002).

Nowadays, fleet becomes most important asset in assist daily job routine and increases productivity in the organization. It is happened at Kota Bharu Municipal Council (MPKB) as local government where many and major activities in municipal management is depending on fleet. However, the current or the manual system that based on old logbook still used now especially in managing record about fleet. Based on the increasing numbers of fleet and its benefits, it is essential to change from manual system to electronic system. It is important for MPKB management to manage their fleet information in electronic method in order to enhance their administrative activities and as well as to identify additional cost savings.

In building the electronic system that meet the expectations of users or stakeholders and are delivered on time and within the budget, specific guidelines such as identifying functional requirements should be considered. Based on literatures, there are no specific functional requirements for Fleet Management System to support local government needs. Therefore, this project aims to identify functional requirements for fleet management as a reference in building the fleet management system.

The contents of  
the thesis is for  
internal user  
only

## REFERENCES

- Alan Dennis, B. H. W. (2003). *System Analysis Design: Second Edition*. United States of America, John Wiley & Sons, Inc.
- Alan Dennis, B. H. W., David Tegarden (2002). *Systems Analysis and Design: An Object Oriented Approach with UML*. United States of America, John Wiley & Sons, Inc.
- Asprey, L. (2004). "Specifying Requirements." *AIIM E-Doc Magazine* 18(3): 10.
- Bennett, S., McRobb, S. and Farmer, R. (2002). *Object-Oriented Systems Analysis And Design Using UML*. Berkshire, UK, McGraw-Hill Education.
- Booch, G., Rumbaugh, J. & Jacobson, I. (1999). *The Unified Modeling Language User Guide*. Boston: Addison-Wesley.
- Carole Keeton Strayhorn Website. (2005). *Improve State Vehicle Fleet Management*. Retrieved June 2, 2005, from the World Wide Web: <http://www.window.state.tx.us/>
- Department of Irrigation and Drainage of Malaysia website, Retrieved June 2, 2005, from the World Wide Web: <http://www.water.gov.my>
- Fleet Vehicles Agency. (2002). *What is Leasing and Fleet Management?*. Retrieved May 23, 2005 from the World Wide Web: <http://www.fva.gov.mb.ca/>
- Greenspan, J. & Bulger, B. (2001). *MySQL/PHP database applications*. USA: M&T Books.
- Halbleib, H. (2004). "Requirements Management." *Information Systems Management* 21(1): 8.



Jeenicke, M., Bleek, W.-G., Klischewski, R.: *Revealing Web User Requirements through e-Prototyping*, In: Proceedings of the Fifteenth International Conference on Software Engineering and Knowledge Engineering (SEKE 03), San Francisco, USA, July 1 - 3, 2003.

Kelly, B & Hatfield, G. (2002). *Fleet Management in the Electronic Age*. Retrieved June 3, 2005, from the World Wide Web: <http://www.mercury-assoc.com/resources/>

Kementerian Kewangan Malaysia (1980). Pekeliling Perbendaharaan Bil 2 Tahun 1980: Peraturan Mengenai Penggunaan, Pengurusan dan Penyenggaraan Kenderaan Kerajaan.

Kementerian Kewangan Malaysia (1985). Pekeliling Perbendaharaan Bil 7 Tahun 1985: Peraturan Penyewaan Kereta Rasmi dan Kereta Jabatan dibawah Penswastaaan Kereta-Kereta Saloon Kerajaan.

Kementerian Kewangan Malaysia (1987). Surat Pekeliling Perbendaharaan Bil 7 Tahun 1987: Peraturan Bagi Pembaikan Dan Penyenggaraan Alat-Alat, Jentera dan Kenderaan Kerajaan.

Kementerian Kewangan Malaysia (1993). Pekeliling Perbendaharaan Bil 13 Tahun 1993: Kemalangan Yang Melibatkan Kenderaan Kerajaan Malaysia.

Kementerian Kewangan Malaysia (1999). Pekeliling Perbendaharaan Bil 6 Tahun 1999: Pelaksanaan Penggunaan Kad Inden Untuk Pembelian Minyak Petrol/Diesel Bagi Kenderaan Kerajaan.

Lauria, P. (2003). Understanding Your Fleet Costs. *Fleet Financials*. January/February 2003.

Lombardo D.A. (2002). *Software takes a megabite out of paperwork hassles*. . Retrieved June 9, 2005, from the World Wide Web: <http://www.ainonline.com/>

Transit ITS Impacts Matrix. (2000). *Glossary*. Retrieved August 3, 2005 from the World Wide Web: <http://web.mitrettek.org/its/aptsmatrix.nsf>

Waddell, J. S. (2005). "The Requirements Engineering Handbook." *Project Management Journal* 36(2): 65.

Wiggins, D. (2001). *Improving the Way you manage your Documents and Information*. Document Advantage Corp. Retrieved May 17, 2005, from the World Wide Web: <http://www.docuantage.com/>