UNIVERSITY ASSET MANAGEMENT SYSTEM
(UniAMS)

CHE FUZIAH BINTI CHE ALI

UNIVERSITI TEKNOLOGI MALAYSIA

JUNE 2006

UNIVERSITY ASSET MANAGEMENT SYSTEM

CHE FUZIAH BINTI CHE ALI

A thesis submitted in partial fulfillment of the
requirements for the award of the degree of
Master of Science (Information Technology -Management)

Faculty of Science Computer and Information System
Universiti Teknologi Malaysia

JUNE 2006

To my loving and caring father and mother, my two sons, Ahmad Nur Ehsan and Ahmad Nur Rezwan and my daughter Nur Akhmah who provide me with the constants source of inspiration, motivation and true meaning of life.

ACKNOWLEDGEMENTS

The author would like to express her greatest gratitude to many people who have contributed to the successful completion of this thesis. In particular, the author would like to thank her project supervisor Associate Professor Dr. Harihodin Selamat for his genuine advice and guidance towards the accomplishment of the project. His guidance has led the author to produce the thesis successfully within the specified time frame.

The author would deeply appreciate En. Amin Mad Idris (Director of Universiti Utara Malaysia, Kuala Lumpur, Campus), En. Ilias Musa (Information Technology Manager – Operation), Ministry of International Trade and Industry), Pn. Zalehah Muyet (Database Administrator, Ministry of International Trade and Industry), En. Sritharan Chandrasekaran, Pn. Suzana Abidin and her fellow colleagues for their information, constructive criticisms, and cooperation.

The author thanks also to the Public Services Department of Malaysia for granting her a scholarship to pursue the study.

Apart from that, the author would like to thank Universiti Technologi Malaysia (UTM) for giving such a valuable prospect to exercise her knowledge and potential in completing the project. In addition, appreciations goes to the reviews, assessments and comments from the Panel of Assessor, which are significant in contributed towards the betterment of the thesis.

Last but not least, the author would like to thank her sons and daughter for their precious support and understanding throughout the crucial time.

ABSTRACT

This thesis studies, analyzes and develops a system to manage the implementation of procurement through quotation proposal and management of asset information at Advance Information Technology Institute (AITI) as a case study with ultimate aim that the system is to be used at Universiti Technologi Malaysia (UTM) in particular, and at Public Higher Learning Institute of Malaysia (IPTA) in general. This is because all IPTAs are covered by a circular and a letter of Treasury of Malaysia for instance *Surat Pekeliling Perbendaharaan Bil.6 Tahun 1998 dan Pekeliling Perbendaharaan (PP) Bil. 2 Tahun 1991*.

University Asset Management System is a web-based application that was developed using object oriented approach while Hypertext Preprocessor (PHP) is used as a programming language, Multi-user Structured Query Language (mySQL) for database, Apache Web Server for the server and PhpMyAdmin as an editing tool for database.

Through the University Asset Management System, activities of procurement through quotation proposal and management of asset can be administered online which involve user categories such as System Administrator, Applicant / Custodian, Approver, Administrator Officer, Quotation Assembler ,Quotation Committee, Administration Officer, Site Officer, Inspector, Building Property Office and Supplier.

In general, University Asset Management System is a system that advocates managing information with more efficient, correct and accurate, uniform besides minimizing typing error/s due to typing are only done during the beginning of the process.

ABSTRAK

Tesis ini dilaksanakan bagi mengkaji, menganalisa dan membangunkan system bagi mengurus pelaksanaan proses perolehan melalui sebutharga dan penyelenggaraan aset di Advance Information Technology Institute (AITI) sebagai bahan kes yang mana maklumat akhir sistem ini dengan pengubahsuaian yang minima boleh digunakan di Universiti Teknologi Malaysia (UTM), khasnya dan di Institusi Pengajian Tinggi Awam (IPTA) amnya. Ini adalah kerana semua IPTA menggunakan prosidur perolehan sebutharga dan penyelenggaraan asset berdasarkan prosidur yang digariskan dalam Surat Pekeliling Perbendaharaan contohnya Bil.6 Tahun1998 dan Pekeliling Perbendaharaan (PP) Bil. 2 Tahun 1991.

University Asset Management System adalah sistem berasaskan web yang dibangunkan menggunakan pendekatan berorientasikan objek, manakala bahasa pengaturcaraan ialah Hypertext Preprocessor (PHP), Multi-user Structured Query Language (mySQL) untuk pangkalan data, Web Apache Server sebagai pelayan dan phpMyAdmin untuk melakukan kerja pengeditan pada pangkalan data.

Melalui *University Asset Management System*, aktiviti perolehan secara sebutharga dan penyelenggaraan aset boleh dilakukan sepenuhnya dalam talian yang melibatkan peranan seperti Pentadbir Sistem, Pemohon, Pelulus, Pegawai Tadbir, Pembuka Sebutharga, Jawatankuasa Sebutharga , Pemeriksa, dan Syarikat Pembekal.

Keseluruhannya, *University Asset Management System* dapat membantu menggalakkan pengurusan informasi sebutharga dan aset secara lebih effisen, tepat dan seragam di samping mengurang kesilapan menaip informasi kerana ianya hanya ditaip sekali semasa permulaan proses.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
1	**PROJECT OVERVIEW**	1
1.1	Introduction	1
1.2	Background of problem	2
1.3	Statement of the Problem	4
1.4	Project Objectives	5
1.5	Project Scopes	6
1.6	Importance of Project	8
1.7	Summary	9
2	**LITERATURE REVIEW**	10
2.1	Introduction	10
2.2	Understanding about Asset and Asset Management	11
2.3	E-Perolehan	15
2.4	Motivation to Develop the System	17
2.5	Review Samples of the Asset Management System	18
2.6	Summary	24

3	**METHODOLOGY**		25
	3.1	Introduction	25
	3.2	Information Gathering and Analysis	26
	3.3	Project Methodology	26
	3.4	Project Schedule	32
	3.5	Summary	36
4	**ANALYSIS AND DESIGN**		37
	4.1	Organizational Analysis	37
	4.2	Current Business Process and Data Model	40
	4.3	User Requirement Specification	45
	4.4	Conceptual Design	46
	4.5	Physical Design	73
	4.6	Hardware Requirement	83
	4.7	Test Plan	83
	4.8	Summary	89
5	**DESIGN IMPLEMENTATION AND TESTING**		90
	5.1	Coding Approach	90
	5.2	Test Result	105
	5.3	User Acceptance Test	111

5.4 User Manual for System Administrator 112

5.5 Summary 116

6 ORGANIZATIONAL STRATEGY 118

6.1 Implementation Strategy 118

6.2 Change Management 119

6.3 Data Migration Plan 121

6.4 Business Continuity Plan 121

6.5 Expected Organizational Benefit 122

6.6 Summary 123

7 DISCUSSION AND CONCLUSION 125

7.1 Achievement 125

7.2 Constraints And Challenges 127

7.3 Aspiration 128

7.4 Summary 128

REFERENCES 130-131

LIST OF TABLES

TABLE NO.	TITLE	PAGE
Table 2.1	Comparable On Information Captured	23
Table 4.1	Relationship User Category - Information/ Form In Quotation	42
Table 4.2	Relationship User Category - Information/ Form In Managing Asset	43
Table 4.3	Use Case Description - Make Application	49
Table 4.4	Use Case Description - Approve / Reject Application	51
Table 4.5	Use Case Description - Prepare Quotation Detail	52
Table 4.6	Use Case Description – Register Asset	54
Table 4.7	Use Case Description – Prepare Quotation Proposal	56
Table 4.8	Use Case Description – Endorse/Reject Quotation	57
Table 4.9	Table Name	73
Table 4.10	Interface Chart	76
Table 4.11	Hardware Requirement	83
Table 4.12	Test Plan - User Registration Module	84
Table 4.13	Test Plan - Requirement Application Module	84
Table 4.14	Test Plan - Requirement Approval Module	85
Table 4.15	Test Plan - Quotation Preparation Module	85
Table 4.16	Test Plan - Supplier Module	86
Table 4.17	Test Plan - Quotation Assemble Module	86

Table 4.18	Test Plan - Quotation Valuation Module	87
Table 4.19	Test Plan - Asset Placement/Reallocation Module	87
Table 4.20	Test Plan - Asset Disposal Module	88
Table 4.21	Test Plan - Security Integration Module	88
Table 5.1	Test Result - User Registration Module	105
Table 5.2	Test Result - Requirement Application Module	106
Table 5.3	Test Result - Approval Module	107
Table 5.4	Test Result - Quotation Preparation Module	107
Table 5.5	Test Result - Supplier Module	108
Table 5.6	Test Result - Quotation Assemble Module e	109
Table 5.7	Test Result - Quotation Valuation Module	109
Table 5.8	Test Result - Asset Placement/Reallocation Module	110
Table 5.9	Test Result - Asset Disposal Module	110
Table 5.10	Test Result - Security Integration Module	111

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
Figure 2.1	Literature Review Approach	11
Figure 2.2	Five Type of Asset (*Ministry of Finance, Financial Management Course*)	13
Figure 2.3	Asset Management (*Ministry of Finance, Finance Management Course)*	14
Figure 2.4	The Asset Management Process Flow (*Ministry of Finance)*	14
Figure 3.1	Process Structure of Unified Approach	28
Figure 3.2	Project Schedule	33 - 35
Figure 4.1	AITI Organizational Structure	38
Figure 4.2	Use Case For As Is System	44
Figure 4.3	Use Case For UniAMS System	47
Figure 4.4	Sequence Diagram - Application For New Item	59
Figure 4.5	State Diagram – Application Process	60
Figure 4.6	Sequence Diagram – Update Application	60
Figure 4.7	State Diagram – Update Application	61
Figure 4.8	Sequence Diagram – Approval Process	61
Figure 4.9	State Diagram – Approval Process	62
Figure 4.10	Sequence Diagram – Create Quotation Detail	62
Figure 4.11	State Diagram – Create Quotation Detail	63
Figure 4.12	Sequence Diagram – Asset Registration	63

Figure 4.13	State Diagram – Asset Registration	64
Figure 4.14	Sequence Diagram – Inspection Process	64
Figure 4.15	State Diagram – Inspection Process	65
Figure 4.16	Sequence Diagram – Quotation Scheduling	65
Figure 4.17	State Diagram –Quotation Scheduling	66
Figure 4.18	Sequence Diagram – Endorsement Process	66
Figure 4.19	State Diagram – Endorsement Process	67
Figure 4.20	Sequence Diagram – View Invitation Letter	67
Figure 4.21	State Diagram – View Invitation Letter	68
Figure 4.22	Sequence Diagram – Undertaking Letter Preparation	68
Figure 4.23	State Diagram- Undertaking Letter Preparation	69
Figure 4.24	Sequence Diagram – Staff / Supplier Registration	69
Figure 4.25	State Diagram – Staff / Supplier Registration	70
Figure 4.26	Sequence Diagram – Specification Requirement Proposal	70
Figure 4.27	State Diagram – Specification Requirement Proposal	71
Figure 4.28	Process Framework For UniAMS system.	72
Figure 4.29	Database Diagram	75
Figure 4.30	Structure Chart	76
Figure 4.31	System Architecture	82
Figure 5.1	Shown the Installer Language	91
Figure 5.2	Welcome to the XAMPP 1.5.1 Setup Wizard.	91
Figure 5.3	Setup Completed	92

Figure 5.4	XAMPP Control Panel Application.	92
Figure 5.5	Welcome to phpMyAdmin 2.7.0-pI1	93
Figure 5.6	Dreamweaver MX 2004 InstallShield Wizard	93
Figure 5.7	:Dreamweaver MX 2004 Installation	94
Figure 5.8	Dreamweaver MX 2004 default editor	95
Figure 5.9	Dreamweaver MX 2004 Installshield Wizard Complete	95
Figure 5.10	Integrated Dreamweaver MX 2004 Workspace	96
Figure 5.11	UniAMS Main Menu	112
Figure 5.12	Transit Menu for all actors of UniAMS system.	113
Figure 5.13	Denied Screen	113
Figure 5.14	Main Menu for System Administrator	114
Figure 5.15	Approval Screen.	114
Figure 5.16	List The Registered User.	115
Figure 5.17	User Profile	115
Figure 5.18	Company Detail	116

LIST OF ABBREVIATIONS

UniAMS	**Uni**versity **A**sset **M**anagement **S**ystem
PHP	**H**ypertext **P**reprocessor
MySQL	**M**ulti-user **S**tructured **Q**uery **L**anguage
URS	**U**ser **R**equirements **S**pecification
SA	**S**ystem **A**dministrator
AC	**A**pplicant / **C**ustodian
AE	**A**pprover / **E**ndorser
AO	**A**dministration **O**fficer
CO	**Co**mpany
QA	**Q**uotation **A**ssembler
QC	**Q**uotation **C**ommittee
SO	**S**ite **O**fficer
BP	**B**uilding **P**roperty **O**ffice
UAT	**U**ser **A**cceptance **T**est
DHM	**D**aftar **H**arta **M**odal (Asset Registrar)

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
Appendix A	System Request	132 - 134
Appendix B	Workflow For The Current System	135 - 138
Appendix C	User Acceptance Test	139 - 144
Appendix D	Screen Design	145 - 153

CHAPTER 1

PROJECT OVERVIEW

1.1 Introduction

The University Asset Management System (UniAMS) is proposed to be used by the Public Higher Education Institute of Malaysia (IPTA). IPTA is a group of the higher learning institutes under direct jurisdiction of the Ministry of Higher Education, Malaysia (MOHE). IPTA is set-up under the Federation of Statutory Body Act that requires it to practice procurement procedure according to the Surat Pekeliling Perbendaharaan Bil. 6 1998 and asset management according to the Pekeliling Perbendaharaan bil 2 Tahun 1991. Based on the circular, UTM is using *the Pekeliling Bendahari Bil 2/2000* and *The Pekeliling Bendahari Bil 2/98* which is circulated by their Treasury Offices.

Ministry of Finance (MOF) establishes the baseline standards and procedure through circulars and treasury directive to ensure that government offices including IPTA are fully responsible in procuring, recording, tracking, maintaining and disposing assets throughout their lifecycles. Asset management function is part of the

Government's framework of resource allocation throughout government offices.

University Asset Management System is a complete system that includes the process of procuring, recording, tracking, maintaining, and disposing. It also includes a series of operational and managerial reports.

Since the study case's user for this system is Advanced Information Technology Institute (AITI), therefore the Institute will become the primary reference while the Building Property Office and the Treasury Office will be the supporting references. The system will be installed and executed at AITI for evaluation, utilization and where appropriate, would be recommending to other faculties/departments/centres of UTM as well as other IPTA.

1.2 Background of The Problem

The background of the problem described about the core business of the Institute and the problem area which leads to the need to simplify and automate the current business process.

1.2.1. Core Business of The Institute

The Institute core business is to carry out research and consultancy in the area of information technology and communication (ICT), and running academic programs.

1.2.2 Problem Area

Currently, a procurement process and an asset management at the Institute is performed manually, through a manual process. This, however, makes the process laborious and time consuming. Since the information could quickly become obsolete due to the dynamic nature of information involving the activities such as document preparation, assemble, valuation, recording, reallocating, upgrading, inspecting, replacing and disposing.

The manual process normally will involve extensive paperwork and is prone to human errors. The MS word and MS excel which is currently used to record information of assets sometimes can be mistyped, incomplete and miscalculate as well as non-integrated.

It is also troublesome and tedious to trace the physical asset and to track their movement. This is because the asset record sometimes does not match with the exact location of the asset due to the problem of misplaced, relocated or removed. The problem becomes critical during an audit exercise where the record will show that the particular asset is not at the physical location as stated in the asset registrar.

1.3 Statement of The Problem

According to problems discovered above, vulnerabilities arise because of the manual process flows and its affect on almost all categories of user such as an applicant, an approval, an administration office, a quotation assembler, a quotation committee, a staff and a supplier.

Basically, there are two foremost statements of the problem which is to be solved by the developed system;

i. How the University Asset Management System, can be used to improve and simplify current process.

ii. How and what asset information can be integrated and shared among processes or users.

Seeing such problems exist among the users, it motivates the author to develop UniAMS system, which is a computerized system solution that is developed based on AITI circumstances.

1.4 Project Objective

The following is a list of objectives for the University Asset Management System, UniAMS.

i To study the current business process by gathering, understanding and analyzing the existing information and process flow;

ii. To design and develop a web-based computerized system using Object Oriented System Development Methodology and Unified Modeling Language notation;

iii. To provide a platform for information sharing and relationship among the users, which can be used to improve efficiency and effectiveness of the Institute in Procurement and management of an asset.

iv. To formulate organizational strategy for the successful implementation of the system.

1.5 Project Scope

The scopes are defined as the boundary of the project in term of functionality, data, software, hardware and platform, feature, user and type of testing.

1.5.1 Functionality;

a. Login and logout with access level for preventing illegal access to valuable information.
b. Preparing the environment by enabling the activities that would be performed online.
c. Creating and storing of a procurement and asset information.
d. Searching, viewing and listing of procurement and asset information.
e. Updating and deleting of procurement and asset information.
f. Locating the placement and movement of asset at site.
g. Keeping a inspection record
h. Updating a disposal information.
i. Supplier can submit and view the relevant information required by online.

1.5.2 Data;

The test data is used to test the usability of the system. The test data are chosen since some of actual data are confidential and accessibility is restricted to outsiders.

1.5.3 Software, hardware and platform;

a. The software for implementation is PHP V 5.01 and Apache Web Server.
b. The database is My SQL V 4.0.
c. The hardware for server is a Pentium Based server or equivalent, Network Interface Card and Hub/Switch and for client is a Pentium Based PC or equivalent, Network Interface card.
d. The platform for the server is Windows NT or equivalent and for client is Window 98 or higher.
e. The documentation software is Rational Rose, Microsoft Visio 2003 Professional**,** Microsoft Office 2000 and Microsoft Project 2000.
f. The architecture is a two-tier client/server

1.5.4 Features;

a. Centralize database
b. Web based system
c. Provide user-friendly interface
d. Provide on-line inquiry
e. Assign multiple access responsibilities according to the tasks and access rights of each user

1.5.5 Users;

Users are divided into several categories and will have different access level when using the system. Among of them are system administrator, applicant, approver, quotation assembler, quotation committee, administration officer and supplier

1.5.6 Type of testing;

The laboratory testing will be carried out by the developer to ensure the system is free from syntax, logic and run-time errors. The users might be asked to assist in performing the usability and satisfaction test.

1.6 Project Importance

In general, the system will help to improve the accuracy, efficiency, and productivity in managing asset. It also increases the accessibility of the information regardless of location and time, and most importantly the system is able to integrate information among processes or users. Specifically, the system will help to;

i. Increase the accuracy of the information, since most of the data that need to be keyed in is validated through pre-defined and pre-coded data.

ii. Increase the efficiency and productivity of the staff involved in managing the asset. Most of the information need to be keyed in only once, except for those information which need to be updated such as placement/ reallocation and inspection history.

iii. The information can be accessed by the users with different access level after they have successfully authenticated themselves to the system; this will

enhance the consistency of the data.

iv. One of the objectives of the audit exercise is to make sure that the practice of managing asset complies with the government procedures and regulations. Having the system implemented, the potential problems which might occur during the audit exercise will be minimized.

1.7 Summary

The chapter has provided an overview on the system UniAMS, which is a system solution that is customized to AITI's existing circumstances. Based on the chapter, a reader can have a general overview on problem statement, objective, scope and importance of the system.

Computerization has complimented many organizations in managing their business process flow. One of the main objectives of the project is to assist the Institute in managing the information. It is hope that the system will have some effect to the Institute in managing their asset in a more systematic and organized manner. Besides that, the usage of the computerized management system will prove that the Institute is proactive to the current technological requirement and always put it credibility one-step a head.

REFERENCES

Ali Bahrami (1999). ”*Object Oriented Systems Devlopment using The Unified Modelling Languange*.”Singapore: McGraw-Hill International Editions.61-317

Alan Dennis, Barbara Haley Wixom, David Tegarden (2002). “*System Analysis And Design – An Object-Oriented Approach with UML*” John Willey & Sons, Inc

Commercedotcom, 2002 “ *ePerolehan – Manual Pengajar*” Commerce Dot Com Sdn. Bhd.

Ministry of Finance, Malaysia (2003) ‘*Kursus Pengurusan Kewangan Kerajaan*’ Kampus INTAN, Bukit Kiara.

(Ivar Jacobson, Martin Griss & Patrik Jonsson (1997)) - “*Software Reuse: Architecture, Process and Organization for Business Success*“ : Addison Wesley Longman

(Jason T. Roff (2003)) UML – “*A beginner’s Guide*.” McGraw-Hill/Osborne

Ministry of Finance, Malaysia “ *Surat Pekeliling Perbendaharaan Bil. 1 Tahun1992 – Garis Panduan Pengurusan Aset dan Barang Kerajaan*”

Peter C. Maroon (2000)- “*Inventory Management System (IMS), Software Requirements Specification*”. . The University of Scranton/Scranton Public Library

Treasury Office, UTM 2002" *Pekeliling Bendahari Bil 2/2002 – Aturaca Perolehan Universiti*".

www.eperolehan.com.my

www.ambysoft.com/books/inceptionPhase.html