

**FLEET
MANAGEMENT
SYSTEM**

A thesis submitted to the Graduate School in partial
fulfillment of requirements for the degree
Master of Science (Information Technology),
Universiti Utara Malaysia

by

Yong Hee Hong

© Yong Hee Hong, 2001. All rights reserved



**Sekolah Siswazah
(Graduate School)
Universiti Utara Malaysia**

**PERAKUAN KERJA KERTAS PROJEK
(Certification of Project Paper)**

Saya, yang bertandatangan, memperakukan bahawa
(I, the undersigned, certify that)

Yong Hee Hong

calon untuk Ijazah
(candidate for the degree of) Sarjana Sains (Teknologi Maklumat)

telah mengemukakan kertas projek yang bertajuk
(has presented his/her project paper of the following title)

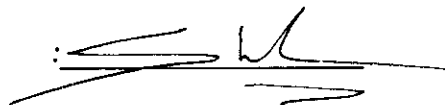
Fleet Management System

seperti yang tercatat di muka surat tajuk dan kulit kertas projek
(as it appears on the title page and front cover of project paper)

bahawa kertas projek tersebut boleh diterima dari segi bentuk serta kandungan,
dan meliputi bidang ilmu dengan memuaskan.
*(that the project paper acceptable in form and content, and that a satisfactory
knowledge of the field is covered by the project paper).*

Nama Penyelia
(Name of Supervisor) : Prof. Madya Shahrums Hashim

Tandatangan
(Signature)

: 

Tarikh
(Date) : 8 Oktober 2001

PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a post graduate degree from Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purposes may be granted by my supervisor(s) or, in their absence, by the Dean of the Graduate School. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part, should be addressed to:

**Dean of Graduate School
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman**

ABSTRACT (BAHASA MALAYSIA)

Mengurus pengembaraan dan pembelian perkerja berpandukan kertas kerja adalah lembap dan proses tersebut berpotensi tinggi dengan pembelian yang tidak terkawal. Akibatnya, terdapat suatu keperluan kepada satu sistem urusan pengembaraan dan pembelian supaya dapat membekalkan suatu kawalan yang lebih baik dan mengurangkan masa urusan. Menyesuaikan suatu pakej perisian taraf untuk syarikat telah dipilih untuk menjamin syarikat dapat menguntungkan daripada industri yang terbaik dalam pengendalian pengembaraan dan tuntutan pembelian. Pada masa yang sama, syarikat juga dapat peliharakan keperluan uniknya.

Laporan ini menerangkan bahawa keperluan untuk menuntut pembelian secara automasi dan proses untuk menyesuaikan suatu pakej perisian dalam sistem urusan pengembaraan dan pembelian. Projek ini menudung penggunaan Model Proses Microsoft Selesai Rangka (*Microsoft Solution Framework Process Model*), penguraian fungsi, gambar rajah alir proses dan gambar rajah alir program untuk menunjukkan sistem semasa dan sistem yang dicadangkan.

Kertas ini memperkenalkan sistem urusan pengembaraan dan pembelian berbentuk web untuk mempertingkatkan proses membuat tuntutan. System analyse menggariskan keperluan sistem dengan menembusi taksiran fungsi, taksiran opsyen dan resolusi perbezaan. Perincian fungsi memberi keterangan untuk perubahan yang diperlukan dengan memfokuskan kepada fungsi, kajian semula teknik, input, pemprosesan dan output.

Sebagai tambahan, kertas menunjukkan kesesuaian Model Proses Microsoft Selesai Rangka di dalam perkembangan projek ini dan mencadangkan bahawa penggunaan Model Pasukan Microsoft Selesai Rangka untuk projek yang melibatkan usaha pasukan. Ia juga menggariskan ciri tambahan yang berpotensi dan fungsi yang boleh memperbaiki system ini.

ABSTRACT (ENGLISH)

Managing paper-driven employee travel and expenses is a slow, fragmented process with abundant potential for uncontrolled spending. As a result, there is a need for a Travel and Expenses Management System to provide a better control and reduce the cycle time. Customizing a standard software package to suit the company operation is selected in order to ensure that the company can leverage from the industry proven best practices of travel and expenses claim processes and at the same time maintain the company unique requirements.

This report describes the needs for expense claim automation and the process to customize a standard Travel and Expenses Management System package. The project covers the use of Microsoft Solution Framework (MSF) process model, functional decomposition, process flow diagram and program flow diagram to represent the current system and the proposed system.

This paper introduces a web-based Travel and Expenses Management System to enhance the expense claim processes. The system analysis outlines the system requirements by going through the functionality assessment, option assessment and gap resolution. The functional specification illustrates the customization needed by focusing on functionality, technical review, input, processing and output.

In addition, the paper shows the fit of MSF process model in this project development and proposes the use of MSF team model for the project involving team efforts. It also outlines the possible additional features and functionalities that could further improve the system.

ACKNOWLEDGEMENTS

I would like to thank my project supervisor, Professor Madya Shahrum Hashim for his helpful comments and advices during the development of this project.

I have benefited greatly in my classes during the course of Information Technology Master Degree and it gives me the confidence to write my own. Appreciations to the professors that have provided guidance and assisted me in enhancing my knowledge;

Prof Madya Nazib b Nordin

Prof Madya Dr Wan Rozaini bt Sheik Osman

Prof Madya Shahrum Hashim

Prof. Madya Dr. Abdul Razak Saleh

En. Ahmad Suki Che Mohamed

En. Helmi b Mohamed Hussain

Dr. Fadzilah bt Siraj

Finally, to all my family and friends, who have missed many events, much attention, and me, during the past few years. Their patients and supports show in many subtle ways and were indeed significant in achieving the final result. Thank you.

YONG, HEE HONG

TABLE OF CONTENTS

	Page
PERMISSION TO USE	I
ABSTRACT (BAHASA MALAYSIA).....	II
ABSTRACT (ENGLISH).....	III
ACKNOWLEDGEMENTS	IV
CHAPTER ONE: INTRODUCTION	1
1.1 Problem Statement.....	2
1.2 Objectives.....	4
1.3 Scope.....	5
1.4 Significant of The Study	7
CHAPTER TWO: LITERATURE REVIEW	9
CHAPTER THREE: PROJECT METHODOLOGY	11
3.1 Envisioning	11
3.2 Planning	12
3.3 Developing	13
3.4 Stabilizing	14
CHAPTER FOUR: ENVISIONING	16
4.1 Vision Statement	16
4.2 Functional Scope	16
4.3 User Profile	16
4.4 Design Goals	17

4.5	Application Architecture.....	17
CHAPTER FIVE: SYSTEM ANALYSIS.....		19
5.1	Functionality Assessment.....	19
5.1.1	Functional Decomposition.....	20
5.1.2	Current Business Process.....	21
5.1.3	Travel Authorization (TA).....	22
5.1.4	Expense Report (ER).....	23
5.1.5	Card Charges.....	25
5.1.6	Review and Query.....	26
5.1.7	Approval Flow.....	26
5.1.8	Payment Processing.....	28
5.1.9	Report Requirements/Audit Setup.....	29
5.1.10	Application Maintenance.....	30
5.2	Option Assessment.....	31
5.3	Gap Resolution.....	31
5.3.1	Approval Flow.....	32
5.3.2	GST/VAT Entry.....	32
5.3.3	Auto-Cancellation of Unmatched TA.....	32
5.3.4	Payment Status Query.....	32
5.3.5	Expense Report/Travel Authorization Matching.....	33
5.3.6	Payment Processing.....	33
5.3.7	Employee and Currency Data Maintenance.....	33
5.3.8	Preferred Hotel Selection.....	33
5.3.9	Account Selection.....	34
5.3.10	Report Requirements.....	34
5.4	Other Considerations.....	34
5.4.1	Travel Authorization/Expense Report Numbering.....	34
5.4.2	Application Availability.....	35
5.4.3	Application Response Time & System Load.....	35
5.4.4	Data Availability.....	35
5.4.5	Human Factor and User Training.....	36
5.4.6	System Backup and Archiving.....	36
CHAPTER SIX: FUNCTIONAL SPECIFICATION.....		37
6.1	Component Naming Convention.....	37
6.2	Proposed System Flow.....	38
6.3	Proposed Business Process.....	42
6.4	ATEUI005 - GST/VAT Entry.....	43
6.4.1	Functionality.....	43
6.4.2	Technical Overview.....	43
6.4.3	Input.....	44
6.4.4	Processing.....	44
6.4.5	Output.....	45

6.5	ATEUI010 – Preferred Hotel Selection.....	46
6.5.1	Functionality	46
6.5.2	Technical Overview	46
6.5.3	Input	47
6.5.4	Processing	48
6.5.5	Output	49
6.6	ATEUI015 – Account Selection	50
6.6.1	Functionality	50
6.6.2	Technical Overview	50
6.6.3	Input	50
6.6.4	Processing	51
6.6.5	Output	52
6.7	ATEUI020 – Expense Report/Travel Authorization Matching.....	54
6.7.1	Functionality	54
6.7.2	Technical Overview	54
6.7.3	Input	54
6.7.4	Processing	55
6.7.5	Output	55
6.8	ATEAD005 – Employee Data Pull.....	56
6.8.1	Functionality	56
6.8.2	Technical Overview	57
6.8.3	Input	58
6.8.4	Processing	58
6.8.5	Output	59
6.9	ATEAD010 – Currency Data Pull.....	63
6.9.1	Functionality	63
6.9.2	Technical Overview	63
6.9.3	Input	64
6.9.4	Processing	64
6.9.5	Output	64
6.10	ATERL005 – Approval Flow	64
6.10.1	Functionality	64
6.10.2	Technical Overview	67
6.10.3	Input	67
6.10.4	Processing	69
6.10.5	Output	74
6.11	ATEAD015 – Payment Processing	75
6.11.1	Functionality	75
6.11.2	Technical Overview	76
6.11.3	Input	77
6.11.4	Processing	77
6.11.5	Output	79
6.12	ATEAD020 – AutoCancellation of Unmatched TA.....	80
6.12.1	Functionality	80
6.12.2	Technical Overview	80
6.12.3	Input	81

6.12.4	Processing	81
6.12.5	Output	82
6.13	Report Requirements.....	82
6.13.1	Functionality	82
6.13.2	Technical Overview	83
6.13.3	Input	83
6.13.4	Processing	87
6.13.5	Output	91
CHAPTER 7: CONCLUSIONS		92
APPENDIX A – BUSINESS REQUIREMENT WORKSHEET		95
APPENDIX B – GAP ANALYSIS WORKSHEET		104
APPENDIX C – REPORT OUTPUT LAYOUT		119
APPENDIX D – SAMPLE SCREEN SNAPSHOT		123
APPENDIX E – SAMPLE REPORT PRINTOUT		132
APPENDIX F – SOURCE CODE LISTING.....		135
REFERENCES:		199

LIST OF TABLES

Table 5.1 – Company Expense Policy	23
Table 5.2 – Prefix and Initial Number for TA/ER.....	34
Table 6.1 - Data flow within and between systems	39
Table 6.2 – GST/VAT Process Description.....	44
Table 6.3 – Additional Screen Field for VAT/GST.....	46
Table 6.4 – Preferred Hotel CSV file	47
Table 6.5 – Preferred Hotel Process Description	48
Table 6.6 – Selection Field for Preferred Hotel.....	49
Table 6.7 – Accounting Segment Process Description	51
Table 6.8 -- Accounting Segment Screen Field	52
Table 6.9 – Travel Authorization Matching Process Description	55
Table 6.10 – Role Map CSV file.....	58
Table 6.11 – User Pull Process Description.....	59
Table 6.12 – Screen Fields on User Profile: Personnel Info Screen	60
Table 6.13 – Screen Fields on User Profile: Account/Ship Screen	61
Table 6.14 – Screen Fields on User Profile: Default Locale/Curr Screen.....	62
Table 6.15 – Currency Conversion Rate Process Description	64
Table 6.16 - Responsible Manager CSV file.....	68
Table 6.17 - Approval Limit CSV file	68
Table 6.18 – HR Operations Approver CSV file.....	69
Table 6.19 – HR Operations Head Approver CSV file.....	69
Table 6.20 – Approver Source Process Description.....	69
Table 6.21 – Approver Assignment Process Description	71
Table 6.22 – Expense Report Push Process Description	77
Table 6.23 – Expense Report Push Detail Field on History screen	79
Table 6.24 – Unfulfilled TA Process Description	81
Table 6.25 – Criteria Selection Field for ATERP005 report	84
Table 6.26 – Criteria Selection Field for ATERP010 report	85
Table 6.27 – Criteria Selection Field for ATERP015 report	86
Table 6.28 – Criteria Selection Field for ATERP020 report	86
Table 6.29 – Report Definition Setup.....	87
Table 6.30 – Report Field Mapping.....	88

LIST OF FIGURES

Figure 6.1 – T&E Management System and External Systems.....	38
Figure 6.2 – New Business Process Flow.....	42
Figure 6.3 – Program Process Flow for VAT/GST.....	43
Figure 6.4 – Split Accounting screen snapshot.....	45
Figure 6.5 – Program Process Flow for corporate preferred hotel.....	47
Figure 6.6 – Expense Line Item screen snapshot.....	49
Figure 6.7 – Program Process Flow for accounting codes.....	50
Figure 6.8 – Split Accounting screen snapshot.....	52
Figure 6.9 – Add Expense Report screen snapshot.....	55
Figure 6.10 – Travel Authorization Selection screen snapshot.....	56
Figure 6.11 – Program Process Flow for employee data population.....	57
Figure 6.12 – User Profile: Personal Info screen snapshot.....	60
Figure 6.13 – User Profile: Account/Ship screen snapshot.....	61
Figure 6.14 – User Profile: Default Locale/Currency snapshot.....	62
Figure 6.15 – Program Process Flow for currency conversion rate.....	63
Figure 6.16 – Program Process Flow for Approval flow.....	67
Figure 6.17 – Approval Flow Output Layout.....	75
Figure 6.18 – Program Process Flow for payment data interfaces.....	76
Figure 6.19 – Expense Report History screen snapshot.....	79
Figure 6.20 – Program Process Flow for Unmatched TA cancellation.....	81
Figure 6.21 – Unfulfilled TA E-Mail Output Layout.....	82
Figure 6.22 – Program Process Flow for Reporting Engine.....	83
Figure 6.23 – ATERP005 Selection Criteria screen.....	84
Figure 6.24 – ATERP010 Selection Criteria screen.....	85
Figure 6.25 – ATERP015 Selection Criteria screen.....	86
Figure 6.26 – ATERP020 Selection Criteria screen.....	86

CHAPTER ONE: INTRODUCTION

This is a study that involves the development of a Fleet (Travel) Management System, namely Travel and Expenses (T&E) Management System. It is part of the company initiative to automate the paper-based, enterprise-wide administrative tasks that pass through a number of people and systems before reaching resolution.

Managing paper-driven employee travel and expenses is a slow, fragmented process with abundant potential for uncontrolled spending. For instance, the process becomes complicated and difficult to control where managers have their subordinates located remotely. For examples; employees located in Malaysia report to a manager in the Singapore Head Offices. In some cases, claims may end up taking months to be processed and often causes employees frustration. It also posts additional workload to the Finance Department that has to track the forms and provide answers.

As a result, there is a need for a T&E Management System to provide a better control and reduce the cycle time. However, developing a T&E Management System from scratch could be time-consuming. Therefore the company is looking into the possibility of having purchase a system and customizes it to suit the company requirements. i.e. company policy, approval flow, interface to current Financial System, etc. This is also to ensure that the company can leverage from the industry proven best practices of travel and expenses claim processes and at the same time maintain the company unique requirements.

The contents of
the thesis is for
internal user
only

REFERENCES:

Louise Fickel. Solutia's Expense Reporting System. http://www.idg.net/crd_web_65175.html

Gelco Delivers Web-Based Business Intelligence Solutions that Manage Travel and Business Expenses Anytime, Anywhere.
<http://www.gelcoexpense.com/casestudies/casestudies/08001909.html>

Ariba Press Release. <http://www.ariba.com>

Microsoft Solution Framework, 1996 Microsoft Corporation, Microsoft Solution Framework Reference Guide

Geoff Cutts (1991) Structured Systems Analysis and Design Methodology. Blackwell Scientific Publications, Oxford.

Whitten-Bentley-Ho. Systems Analysis & Design Methods. Times Mirror/Mosby College Publishing, St. Louis.

H.L. Carpron (1990) Computers. Tools for an information age. The Benjamin/Cummings Publishing Company, Inc. California.