

**ASTRONOMICAL & SPACE SCIENCE PORTAL
INFORMATION SYSTEM DESIGN FOR LCRSSS CENTER IN
LIBYA**

WISAM HAMDI BENAMER

**UNIVERSITI UTARA MALAYSIA
2009**



**ASTRONOMICAL & SPACE SCIENCE PORTAL
INFORMATION SYSTEM DESIGN FOR LCRSSS CENTER IN
LIBYA**

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

By
WISAM HAMDI BENAMER (801627)



KOLEJ SASTERA DAN SAINS
(College of Arts and Sciences)
Universiti Utara Malaysia

PERAKUAN KERJA KERTAS PROJEK
(Certificate of Project Paper)

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

WISAM HAMDI BENAMER
(801627)

calon untuk Ijazah
(candidate for the degree of) **MSc. (Information Technology)**

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

ASTRONOMICAL & SPACE SCIENCE PORTAL INFORMATION
SYSTEM DESIGN FOR LCRSSS CENTER IN LIBYA

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 Utama
(Name of Main Supervisor): **ASSOC. PROF. FADZILAH SIRAJ**

Tandatangan
(Signature) : 

Tarikh
(Date) : 21/6/2009

PERMISSION TO USE

In presenting this thesis of the requirements for a Master of Science in Information Technology (MSc. IT) 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 or in their absence, by the Dean of 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.

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

Dean of Research and Graduate Studies
Colleges of Arts and Sciences
Universiti Utara Malaysia
06010 Sintok
Kedah Darul Aman

ABSTRACT

The internet technologies are rapidly increasing. The aim of the study is to design and develop an astronomical & space science portal information system (WASSIS). The WASSIS is a real-time application system which provides a convenient graphics user interface (GUI) for both user and Libyan Centre for Remote Sensing and Space Science (LCRSSS) staff. It allows user to make self-registration to become as member of the system, update information, view announcement, view astronomical and space information time-to-time. It also allows administrator to manage user/staff account and view report. All of the services are possible anywhere at any time.

ACKNOWLEDGEMENT

Praise and gratitude to Allah, the Almighty, for bestowing me with great strength, patience, and courage in completing this project.

I am grateful to my supportive and helpful supervisor for assessing and guiding me in the completion of this research. With all truthfulness, without her, the project would not have been a complete one. She has always been my source of motivation and guidance. I am truly grateful for her continual support and cooperation in assisting me all the way through the semester.

Also I would like to thanks to my friends to give me feedback and comments regarding my project. I would like to present my thanks my mother and all my family who has always been there for me. Finally, I would like to express my appreciations to all my friends, colleagues, FTM staff and everyone who has helped me in this journey.

TABLE OF CONTENT

PERMISSION TO USE	i
ABSTRACT	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENT	iv
LIST OF FIGURES	x
LIST OF TABLES	xii
LIST OF CHARTS	xii
LIST OF ABBREVIATIONS	xiii

CHAPTER 1: INTRODUCTION

1.1 Background	1
1.2 Problem Statement	3
1.3 Research Objectives	3
1.4 Research Questions	4
1.5 Research Scopes	4
1.6 Significance of the Research	4
1.7 Thesis Organization	5

CHAPTER 2: LITERATURE REVIEW

2.1 Concepts and Definition	6
2.1.2 WEB and Internet	7
2.1.2 The WWW	7
2.1.3 Web-based System	8

2.2	Web Portal System Architecture	9
2.3	Web Content	9
2.5	Previous Related Works	12
2.6	Advantages and Disadvantages of Web and Web Application	15
2.6.1	Advantages	15
2.6.2	Disadvantages	16
2.7	Summary	17

CHAPTER 3: RESEARCH METHODOLOGY

3.1	Research Methodology	18
3.1.1	Selection & Planning	19
3.1.2	Requirement Analysis	19
3.1.2.1	Hardware & Software Requirements	20
3.1.3	Design Requirement Model	22
3.1.3.1	Design Use Case Diagram	23
3.1.4	Write Codes	26
3.1.5	Functionality Test	26
3.2	Summary	26

CHAPTER 4: FINDINGS

4.1	Analysis Approach	27
4.1.1	Project Selection & Planning	27
4.1.2	Requirements Analysis	27
4.1.2.1	Current System	27
4.1.2.2	Data Acquisition	28

4.2	Use Case Specification	29
4.3	Sequence Diagram	30
4.3.1	Login [WASSIS_UCD001]	30
4.3.2	View General Info [WASSIS_UCD002]	31
4.3.3	Join Forum [WASSIS_UCD004]	32
4.3.4	Do Registration [WASSIS_UCD005]	33
4.3.5	View Announcement [WASSIS_UCD007]	34
4.3.6	Add Announcement [WASSIS_UCD008]	35
4.3.7	Add Member Account [WASSIS_UCD010]	37
4.3.8	Edit Member Account/ Profile [WASSIS_UCD011]	39
4.3.9	View Member Profile [WASSIS_UCD010]	41
4.3.10	Delete Member Account [WASSIS_UCD013]	43
4.3.11	Search Member Account [WASSIS_UCD014]	44
4.3.12	Add User Account [WASSIS_UCD015]	45
4.3.13	Edit User Account [WASSIS_UCD016]	47
4.3.14	View User Profile/ Account [WASSIS_UCD017]	49
4.3.15	Delete User Account [WASSIS_UCD018]	51
4.3.16	Search User Account [WASSIS_UCD019]	53
4.3.17	Request Password [WASSIS_UCD020]	55
4.3.18	Change Password [WASSIS_UCD021]	57
4.4	Class Diagram	59
4.5	Functionality Testing	60
4.5.1	Login Interface	60
4.5.2	View General Info	61
4.5.3	Join Forum	61

4.5.4	Do Registration	62
4.5.5	View Announcement	63
4.5.6	Add Announcement	63
4.5.7	Add Member Account	64
4.5.8	Edit Member Account/ Profile	65
4.5.9	View Member Profile	66
4.5.10	Delete Member Account	67
4.5.11	Search Member Account	68
4.5.12	Add User Account	69
4.5.13	Edit User Account	70
4.5.14	View User Profile/ Account	71
4.5.15	Delete User Account	72
4.5.16	Search User Account	73
4.5.17	Request Password	74
4.5.18	Change Password	75
4.6	User Feedback and Functionality Testing Result	76
4.7	Summary	78

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1	Recommendation	81
5.2	Future Work	81
5.3	Conclusion	82

REFERENCES

LIST OF FIGURES

Figure 2.1: General Web Portal System Architecture

Figure 2.2: Web Content Information Architecture

Figure 2.3: Web Content Structure based on Web Layer

Figure 3.1: Agile Software Development Methodology (XP Approach)

Figure 3.2: Use Case Diagram

Figure 4.1: Sequence Diagram for Login

Figure 4.2: Login Interface

Figure 4.4: View General Info Interface

Figure 4.5: Sequence Diagram for Join Forum

Figure 4.6: Join Forum Interface

Figure 4.7: Sequence Diagram for Registration

Figure 4.8: Registration Interface

Figure 4.9: Sequence Diagram for View Announcement

Figure 4.10: View Announcement Interface

Figure 4.11: Sequence Diagram for Add Announcement

Figure 4.12: Add Announcement Interface

Figure 4.13: Sequence Diagram for Add Member Account

Figure 4.14: Add Member Account Interface

Figure 4.15: Sequence Diagram for Edit Member Profile/ Account

Figure 4.16: Edit Member Account Interface

Figure 4.17: Sequence Diagram for View Member Profile

Figure 4.18: View Member Profile Interface

Figure 4.19: Sequence Diagram for Delete Member Account

Figure 4.20: Delete Member Account Interface

Figure 4.21: Sequence Diagram for Search Member Account

Figure 4.22: Search Member Account Interface

Figure 4.23: Sequence Diagram for Add User Account

Figure 4.24: Add User Account Interface

Figure 4.25: Sequence Diagram for Edit User Account

Figure 4.26: Edit User Account Interface

Figure 4.27: Sequence Diagram for View User Account/ Profile

Figure 4.28: View User Profile Interface

Figure 4.29: Sequence Diagram for Delete User Account

Figure 4.30: Delete User Account Interface

Figure 4.31: Sequence Diagram for Search User Account

Figure 4.32: Search User Account

Figure 4.33: Sequence Diagram for Request Password

Figure 4.34: Request Password Interface

Figure 4.35: Sequence Diagram for Change Password

Figure 4.36: Change Password Interface Figure

Figure 4.37: Class Diagram

Figure 4.38: Login Interface

Figure 4.39: View General Info Interface

Figure 4.40: Join Forum Interface

Figure 4.41: Registration Interface

Figure 4.42: View Announcement Interface

Figure 4.43: Add Announcement Interface

Figure 4.44: Add Member Account Interface

Figure 4.45: Edit Member Account Interface

Figure 4.46: View Member Profile Interface

Figure 4.47: Delete Member Account Interface

Figure 4.48: Search Member Account Interface

Figure 4.49: Add User Account Interface

Figure 4.50: Edit User Account Interface

Figure 4.51: View User Profile Interface

Figure 4.52: Delete User Account Interface

Figure 4.53: Search User Account

Figure 4.54: Request Password Interface

Figure 4.55: Change Password Interface

LIST OF TABLES

Table 3.1: Hardware Requirements

Table 3.2: Software Requirements

Table 3.3: List of Software Tools and Programmer Languages

Table 3.4: Use Case Look-up Table

LIST OF ABBREVIATIONS

ASP Active Server Page

IIS Internet Information Service

MCQ Multiple Choice Question

OO Object-Oriented

CHAPTER 1

INTRODUCTION

1.1 Introduction

Web informational system or portal technology has been used to aggregate scattered, distributed information, application and processes across world boundaries. A web portal system provides the clients a single point of access to information and applications regardless of their location or storage mechanism. Through the portal system, multiple applications can be accessed, related and integrated into a workflow. It provides a centralized storage of information and a unified hub to the integrated information, application and services. Clients can access to multiple system or application via the web portal with a single registration and authentication (Awre, 2002).

The web services model can be implemented using a web portal system. Applications and information sources are wrapped and deployed as individual web portals, which are web services units that a web portal system can integrate and reuse. Web portals are subprograms that encapsulate a single or a number of web applications (Dar, 2008). Web portals contain in a portal system and become visible and accessible via the portal system. The sessions and user preferences of each portlet are also stored and managed in the portal system.

The contents of
the thesis is for
internal user
only

REFERENCES

Awre, C. (2002). Portals and the JISC Information Environment Strategy. *Portals 2002*.
www.nottingham.ac.uk/portals2002/ChrisAwre.ppt

Antovski, L., & Gusev, M. (2003). *M-Payments. Information technology Interfaces*, 2003. ITI 2003. *Proceedings of the 25th International Conference*, 95-100.

Berners-Lee, T. (2000) *Weaving the Web* HarperCollins: New York.

Beck (2000). Agile Development Methodologies: Extreme Programming (XP) Approach. , McGraw-Hill, Singapore.

Bennett, S., McRobb, S., & Farmer, R. (2006). *Object-oriented systems analysis and design using UML*. London: McGraw-Hill.

Bolino, M.C., & Feldman, D.C. (2000). "Increasing the skill utilization of expatriates", *Human Resource Management*, Winter 2000, Vol. 39, No. 4

Boehm, Gray & Seewaldt (2004). A spiral model of software development and enhancement. *IEEE Computer*, 5, 61-72.

Burdman, J.R. (2003). *Collaborative Web Development: Strategies and Best Practices for Web Teams*, Addison Wesley Longman, Reading, Mass.

Booch, G., Jacobson, I., & Rumbaugh, J. (1998). *The Unified Software Development Process*. Massachusetts, Addison-Wesley.

Clifford Mass, Susan Joslyn, John Pyle, Patrick Tewson, Tilmann Gneiting, Adrian Raftery, Jeff Baars, J. M. Sloughter, David Jones and Chris Fraley (2008). PROBCAST: A Web-Based Portal to Mesoscale Probabilistic Forecasts, Department of Atmospheric Sciences, University of Washington.

Compton, K., & Huggins, J. (2003). *Execution of a Requirement Model in Software Development*. Dept. of Computer Science, Western Michigan University.

Connolly, C.G. (2000). From Static Web Site to Portal. *Educause Quarterly* 23 (2).
<http://www.educause.edu/ir/library/pdf/eq/a002/eqm0024.pdf>

Conallen, J. (2002). *Building web applications with UML*. The Addison-Wesley Object Technology Series.

Dennis C., Patel, T., King, T., & Hilton, J. (2000). *Qualitative Studies of Shoppers' Motivations, 9th International Conference on Recent Advances in Retailing and Services Science*. Germany: EIRASS, Heidelberg.

Dr. Daud Mohamad (2005). Malaysia Institute for Nuclear Technology (MINT). Retrieved on 27th April, 2009 from <http://online.nuclearmalaysia.gov.my/>

Dar, S. (2008). *The Missing Link in Web Engineering*, Artech House, McGraw-Hill.

Daigle, S. L. & Cuocco, P. M. (2002). 'Portal Technology Opportunities, Obstacles, and Options: A View from the California State University'. In: Katz, R.N. et al. *Web Portals in Higher Education: Technologies to Make IT Personal*. Jossey-Bass, San Francisco.

Eriksson, H., & Penker, M. (1999). *UML Toolkit*, United States of America, John-Wiley & Sons, Inc.

Horvat, B., Ojstersek, M. and Cajic, Z. (2003). SRAKA: A Case of Web Portal Architecture Centered around Horizontal Services. Retrieved on 20th May, 2009 from <http://www.actapress.com/PaperInfo.aspx?PaperID=14106&reason=500>

Hoffer, J.A., Valacich, J.S., & George, J.M. (2004). *Essential of system analysis and design*, Prentice Hall, Upper Saddle River, NJ.

Holcomb, R. & Tharp, A. (1991). "Users a software usability model and product evalution", *Interacting with Computers*, Butterworth-Heinemann, Oxford, Uk, Vol.3(2) pp.155-166.

IBM. (2003). Portal Definition. Retrieved on 2nd May, 2009. From www-3.ibm.com/software/webservers/portal/whatis.html

Jacobsen, C. (2000) 'Institutional Information Portals', Educause. <http://www.educause.edu/pub/er/erm00/articles004/horizons.pdf>

Jacobson, I., Christerson, M., Johnsson, P., & Overgaard, G. (2000). *Object-oriented Software Engineering: A use case driven approach (revised)*. Harlow, England: Addison-Wesely.

Looney, M. & Lyman, P. (2000). Portals in Higher Education. *Educause Review*. March, 2009. <http://www.educause.edu/pub/er/erm00/articles004/looney.pdf>

Lowe, D. and Hall, W. (2005). *Hypermedia and the Web: An Engineering Approach*, John Wiley & Sons, New York.

Libyan Centre for Remote Sensing and Space Science (LCRSSS) www.lcrss.org

Nunes, N.J., & Cunha J.F.E. (2006). Rewards a UML Profile for Interaction Design: the Wisdom Approach. Retrieved on 25th May 2008, form Website: <http://citeseer.ist.psu.edu/cache/papers/cs/23122>

Michelinakis, D. (2004). *Open Source Content Management Systems: An Argumentative Approach*, Master Thesis, Warwick Manufacturing Group, University of Warwick.

Murugesan, S. et al. (2004). "Web Engineering: A New Discipline for Web-Based System Development," *Proc. First Int'l Conf. Software Engineering (ICSE) Workshop on Web Engineering*, Univ. of Western Sydney, Australia, 2004,
<http://aeims.uws.edu.au/WebEhome/ICSE99-WebE-Proc/San.doc>.

Powell, A. (2004). *Web Site Engineering: Beyond Web Page Design*, Prentice Hall, Upper Saddle River, N.J.

Pressman, R.S. (2000). "Web Engineering," *Software Engineering: A Practitioner's Perspective*, 5th ed., McGraw-Hill, New York, 2000, pp. 769-798.

Pressman, R.S., and Lowe, D. (2008). *Web Engineering, A Practitioner's Approach*, International Edition, Singapore, McGraw-Hill.

Paadre, H & King, S. *Electronic Community and Portals*.
<http://www.mis2.udel.edu/jasig/holycross.doc>.

Sarker, et. al., (2005). "Knowledge transfer in virtual systems development teams: an explanatory study of four key enablers", *IEEE transactions on professional communication*, Vol. 48, No.2

Sommerville, I. (2007). "Software Engineering". 8th Edition, New York, Harlow: Addison Wesley.

Shneiderman, B. (1998). *Designing the User Interface*, 3rd ed., Addison-Wesley. Retrieved from
Website: <http://www.w3.org/People/Berners-Lee/WorldWideWeb.html>

Strauss, H. (2002). All About Web Portals: A Home Page Doth Not a Portal Make, In: Katz, R.N. et al. *Web Portals in Research Institute: Technologies to Make IT Personal*.
<http://www.educause.edu/ir/library/pdf/pub5006g.pdf>

Stefan SARADETH, GAF AG, Munich (2004). Remote Sensing for Management of Transboundary Aquifers in Libya. *UN International Workshop on the Use of Space Technology for Disaster Management*, Munich

Sendall, S., & Strohmeier, A. (2000). From Use Cases to System operation Specification. In *UML 2000—The Unified Modeling Language Advancing the Standard. Third International Conference, York, UK*, October 2000, vol. 1939 of LNCS, pp. 1-15, Springer.

Turban E.M. (2006) Marketing Notes and communications: why do people shop?. *Journal of Marketing*, Vol. 36, October, pp46-59.

Urdan & Weggan (2006). *PHP and MySQL for Dynamic Web Sites* (1st Edition). London: Peachpit Press.

Whitten, J.L., Bentley, L.D., & Dittman, K.C. (2001). *Systems Analysis and Design Methods* (5th ed.), Boston: McGraw- Hill.

Web Engineering Homepage,

<http://aeims.uws.edu.au/WebEhome/>

World Wide Web Consortium,

<http://www.w3.org/>

Web Engineering Resources, R.S. Pressman and Associates,

<http://www.rspa.com/spi/webe.html>

Zanev, V. (2007). Wireless Student Testing, Proceedings of the International Conference on Pervasive Computing and Communications, Las Vegas, Nevada. Retrieved on 14th May 2008, from

Website:<http://delivery.acm.org.eserv.uum.edu.my/10.1145/1170000/1167282/p118zanev.pdf?key1=1167282&key2=0205770121&coll=Portal&dl=GUIDE&CFID=27880100&CFTOKEN=90226379>