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| Project Plan |
| Cylinders & Orders Management System (COMS) Project |
| This document establishes the direction of the project and provides a basis for measuring project progress and performance. It defines the development approach, work plan, staff effort requirements, time scales, project structure and staffing, deliverables and risks assessment for the development of the COMS project. |

3/7/2011

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| --- | --- | --- | --- |
| Filing Reference : | GG/COMS/MP.2/v1 | | |
| Document Title: | Project Plan | | |
| Version : | 1.4 | | |
| Prepared by : | Tran Ba Tien | | |
| Date Created : | Thursday, February 1st, 2011 | | |
|  |  | |  |
| Approved by : | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |  |
|  | Maung Tin Kyaw Oo | | Date |
|  | Technical Lead | |  |
|  |  | |  |
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**Document Reference:** GG/COMS/MP.2/1

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| --- | --- | --- | --- | --- |
| **Version** | **Date** | **Author** | **Remarks** | **Authorised by** |
| 1.0 | 01/02/2011 | Tran Ba Tien | Created Document |  |
| 1.1 | 30/03/2011 | Tran Ba Tien | Added WBS, Cost Estimate & Risk Analysis |  |
| 1.2 | 01/04/2011 | Koh Ming Jin | Edited Formatting |  |
| 1.3 | 05/04/2011 | Alvin Chang | Edited Formatting |  |
| 1.4 | 06/04/2011 | Tran Ba Tien | Modified WBS |  |

**Cylinders & Orders Management System (COMS)  
 Project**

**Project Plan**

**Distribution:**

|  |  |  |
| --- | --- | --- |
| **Name** | **Department** | **Organisation** |
| Truong Thieu Duong | Main Office | Hoang Kim Joint Stock Company |
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Table of Contents

[1. INTRODUCTION. 2](#_Toc289797002)

[1.1 Purpose. 2](#_Toc289797003)

[1.2 Audience. 2](#_Toc289797004)

[1.3 Organisation. 2](#_Toc289797005)

[1.4 References. 2](#_Toc289797006)

[2. APPROACH. 2](#_Toc289797007)

[2.1 Project Initiation. 2](#_Toc289797009)

[2.2 Initial Requirements Analysis. 2](#_Toc289797010)

[2.3 Prototype Development. 2](#_Toc289797011)

[2.4 Software Implementation. 2](#_Toc289797012)

[3. WORK PLAN. 2](#_Toc289797013)

[3.1 Activity 1 – Initial Planning 2](#_Toc289797015)

[3.1.1 Produce Project Plan 2](#_Toc289797016)

[3.1.2 Produce Quality Plan 2](#_Toc289797017)

[3.1.3 Set Up Filing System 2](#_Toc289797018)

[3.1.4 Review/Finalize Plan 2](#_Toc289797019)

[3.2 Activity 2 – Requirements Identification 2](#_Toc289797020)

[3.2.1 Interview Users 2](#_Toc289797021)

[3.2.2 Undertake Use Case Modeling 2](#_Toc289797022)

[3.2.3 Produce Use Case Model Survey 2](#_Toc289797023)

[3.2.4 Review/Finalize Requirements Documentation 2](#_Toc289797024)

[3.3. Activity 3 – Requirements Specification 2](#_Toc289797026)

[3.3.1 Identify Domain Objects/Attributes 2](#_Toc289797028)

[3.3.2 Produce Class Diagrams 2](#_Toc289797029)

[3.3.3 Write Use Case Realization Reports 2](#_Toc289797030)

[3.3.4 Review/Finalize Use Case Realization Reports 2](#_Toc289797031)

[3.4 Activity 4 – Design Modeling 2](#_Toc289797032)

[3.4.1 Prototype User Interface 2](#_Toc289797033)

[3.4.2 Create Transition Strategy From Analysis To Design 2](#_Toc289797034)

[3.4.3 Define software architecture 2](#_Toc289797035)

[3.4.4 Create Database Design 2](#_Toc289797036)

[3.4.5 Produce Sequence Diagrams 2](#_Toc289797037)

[3.4.6 Produce Object Specifications 2](#_Toc289797038)

[3.4.7 Produce Design Model Report 2](#_Toc289797039)

[3.4.8 Review/Finalize Design Model Report 2](#_Toc289797040)

[3.5 Activity 5 - Software Implementation 2](#_Toc289797041)

[3.5.1 Software Coding 2](#_Toc289797042)

[3.5.2 Database Set-Up 2](#_Toc289797043)

[3.6 Activity 6 – Database Migration 2](#_Toc289797044)

[3.6.1 Produce Database Migration Plan 2](#_Toc289797045)

[3.6.2 Review/Finalize Database Migration Plan 2](#_Toc289797046)

[3.6.3 Extract Data From Existing Database 2](#_Toc289797047)

[3.6.4 Data Checking And Data Cleaning 2](#_Toc289797048)

[3.6.5 Upload Data Into New Database 2](#_Toc289797049)

[3.7 Activity 7 – System Testing 2](#_Toc289797050)

[3.7.1 Prepare System Test Plan 2](#_Toc289797051)

[3.7.2 Review/Finalize System Test Plan 2](#_Toc289797052)

[3.7.3 Integrate Code Components And Database 2](#_Toc289797053)

[3.7.4 Perform System Testing 2](#_Toc289797054)

[3.8 Activity 8 – User Trial 2](#_Toc289797055)

[3.8.1 Write User Guide 2](#_Toc289797056)

[3.8.2 Review/Finalize User Guide 2](#_Toc289797057)

[3.8.3 Write Trial Test Plan 2](#_Toc289797058)

[3.8.4 Review Trial Test Plan 2](#_Toc289797059)

[3.8.5 Install System 2](#_Toc289797060)

[3.8.6 Perform User Trial 2](#_Toc289797061)

[3.8.7 Review Test Results/Corrective Action 2](#_Toc289797062)

[3.9 Activity 9 – Management & Administration 2](#_Toc289797063)

[4. STAFF EFFORT ESTIMATES. 2](#_Toc289797064)

[5. TIMESCALES AND MILESTONES. 2](#_Toc289797065)

[6. DELIVERABLES. 2](#_Toc289797066)

[7. PROJECT STRUCTURE AND STAFFING. 2](#_Toc289797067)

[7.1 Project Manager : Tran Ba Tien. 2](#_Toc289797072)

[7.2 Quality Manager : Alvin Chang 2](#_Toc289797073)

[7.3 Technical Leader : Tin Kyaw Oo. 2](#_Toc289797074)

[8. RESOURCES. 2](#_Toc289797075)

[8.1 Accommodation. 2](#_Toc289797077)

[8.2 Computer Hardware and Software. 2](#_Toc289797078)

[8.3 Word Processing. 2](#_Toc289797079)

[Appendix A: Function Point Count and Effort Estimate 2](#_Toc289797080)

[Data Functions 2](#_Toc289797081)

[Data Transactions 2](#_Toc289797082)

[Unadjusted Function Point Count Summary 2](#_Toc289797083)

[Appendix B 2](#_Toc289797084)

[Risk Assessment Questionnaire For COMS Project 2](#_Toc289797085)

[Risk Items and Control Type 2](#_Toc289797086)

[Risk Check-box List 2](#_Toc289797087)

[Prioritisation of COMS Project Risks 2](#_Toc289797088)

[Approval Record ISS/Forms/Approval 2](#_Toc289797089)

# 1. INTRODUCTION.

Hoang Kim Joint Stock Company is one of the leading providers of printing cylinders in Vietnam. They are currently using the latest technologies from Germany and Japan, and their client bases include various Vietnamese corporations as well as across Southeast Asia.

The company would like to have an integrated IT system that can:

* Manage the main manufacturing process, i.e. sales orders and cylinders.
* Benchmark employees’ performance to calculate bonuses.
* Give management reporting tools for daily operations.
* Be easy to maintain and to add new features in the future.

## Purpose.

The purpose of this document is to provide a Project Plan that establishes the direction of the project and provides a basis for measuring project progress and performance. It defines the development approach, work plan, staff effort requirements, time scales, project structure and staffing, deliverables and risks assessment for the development of the COMS project.

## Audience.

The intended reader of this Project Plan is the project team to:

* provide them with a plan for the activities that they are to perform;
* inform them the required deliverables that they are to produce and;
* notify their respective roles in the development work.

## Organisation.

The approach to be adopted by the project to carry out the project work is summarised in Section 2 and section 3 will describe the major activities of the project. The staff effort estimates to undertake the work are defined in Section 4 and timescales are given in Section 5. Section 6 describes the deliverables and Section 7 gives details of the project's structure and staffing. Finally, the resources required to support the work are specified in Section 8.

## References.

To fully understand the background to this project, the reader should also be familiar with the COMS Quality Plan (reference GG/COMS/MQ.1/v1).

# 2. APPROACH.

The approach for the development of the COMS will be based on the ISS software development life cycle. This will involve undertaking the development phases outlined below.



## Project Initiation.

To initiate the project, a formal project plan will be produced (this document). Subsequently, a Quality plan will be produced. To complete the project initiation tasks, a project filing system will be set-up.

## Initial Requirements Analysis.

The project will undertake requirements analysis by:

* liaising closely with Mr.Truong Thieu Duong to identify the user requirements;
* producing a user requirements specification; and
* conducting additional user interviews to resolve any remaining requirement issues.

## Prototype Development.

Based on the high level user requirements specification, a series of prototypes will be produced by using the .NET framework under WINDOWS. The prototype program will be demonstrated to Mr.Truong Thieu Duong, to determine the acceptability of screen layouts, report formats and methods of operation (menus, function keys, etc.).

As a result of the prototype demonstration, changes will be agreed upon to be included in the final system. Hence, it should be agreed with Mr. Truong Thieu Duong that the prototype represents the detailed requirements for the software to be developed. These requirements will be documented in a prototype study report document.

## Software Implementation.

When the prototype has been produced and requirements for the software have been agreed, the software will be implemented by:

1. analyzing the requirements and designing the system in the chosen technology and platform;
2. coding the new software (the COMS);
3. undertaking system testing;
4. producing user and programmer documentation;
5. undertaking user trial with Mr. Truong Thieu Duong;
6. deploying the accepted system on the production environment; and
7. user training.

# 3. WORK PLAN.

The following work program has been identified to complete the development of the system according to the approach described in Section 2.

* Activity 1 : Initial Planning
* Activity 2 : Requirements Identification
* Activity 3 : Requirements Specification
* Activity 4 : Design Modeling
* Activity 5 : Programming
* Activity 6 : Database Migration
* Activity 7 : System Testing
* Activity 8 : User Trial
* Activity 9 : Management and Administration

The work to be performed in each activity is described in the following subsections.



## Activity 1 – Initial Planning

### Produce Project Plan

This activity involves the detailed planning of the project, resulting in the production of this document (ref GG/COMS/MP.2/v1). It consists of work breakdowns, staff effort estimates, resource requirements, time schedules, milestones and deliverables.

### Produce Quality Plan

A project quality plan (ref GG/COMS/MQ.1/v1) will be produced to specify how the project will assure the quality of its deliverables, and its main mechanism by which the project is monitored and managed for quality assurance.

In particular, the plan will specify the standards and procedures that will be applied to the project's technical and management activities, and will detail the reviews to be performed and the acceptance procedure for each deliverable.

### Set Up Filing System

The project filing system for management and technical files will be set- up in accordance with the pre-defined standards.

### Review/Finalize Plan

The produced documents will be reviewed and signed off by the management.

## Activity 2 – Requirements Identification

### Interview Users

**This activity involves conducting multiple interviews with Mr. Truong Thieu Duong, to gather his requirements for the system. A user requirement specification will be produced for Mr. Truong Thieu Duong to verify his requirements.**

### Undertake Use Case Modeling

This activity involves creating all the use cases which the users are allowed to perform. Users will be classified into actors with multiple roles and corresponding use cases.

### Produce Use Case Model Survey

This activity involves creating the Use Case Model Survey document with a list of actors and a list of use cases, including use case diagrams.

### Review/Finalize Requirements Documentation

This activity involves reviewing the User Requirement Specifications document with Mr. Truong Thieu Duong and finalized the document by having him to sign the document.



## Activity 3 – Requirements Specification



### Identify Domain Objects/Attributes

This activity involves identifying the domain objects participating in the system, together with their attributes.

### Produce Class Diagrams

This activity involves creating the Class Diagrams with all domain objects in the system. These class diagrams will be a part of the Use Case Realization Reports.

### Write Use Case Realization Reports

This activity involves creating the Realization Report for each of the use cases in the system. Each report should have a main flow and any alternative or exception flows, if possible.

### Review/Finalize Use Case Realization Reports

This activity involves reviewing the Realization Reports with Mr. Truong Thieu Duong, to obtain an agreement for the proposed flow.

## Activity 4 – Design Modeling

### Prototype User Interface

As described in Section 2, the detailed requirements for the software to be developed, will be determined by creating a series of prototypes using the .NET framework under WINDOWS. This will eventually lead to the production of a prototype study report.

### Create Transition Strategy From Analysis To Design

The transition strategy will be created, showing how language-specific, platform-specific and other considerations will be taken into account. This strategy will be included in the high level design specifications.

### Define software architecture

The software architecture will describe the hardware and software platform for deployment and software distribution across the architecture (ex: client-server considerations). This architecture will be included in the high level design specifications.

### Create Database Design

The database design, including Entity-Relationship diagrams will be created and this will be a part of the high level design specifications.

### Produce Sequence Diagrams

Each use case will have at least one sequence diagram created. These diagrams will be included in the Design Model Report.

### Produce Object Specifications

The object specifications describing all design objects will be created. It will be a part of the Design Model Report.

### Produce Design Model Report

A Design Model Report will be produced. It will comprise the object specifications as well as the sequence diagrams for all the use cases.

### Review/Finalize Design Model Report

The Design Model Report will be reviewed and finalized by the project team.

## Activity 5 - Software Implementation

The software requirements are defined during the prototyping activity mentioned above, and documented in the system specification. The software will be coded using an appropriate programming language to produce the required application. The following tasks will be performed.

### Software Coding

The software development will be using the .NET framework. During cthe development, the programmer will apply the programming standards specified in the project's Quality plan, to ensure the consistency and quality of the software produced.

### Database Set-Up

The system will use the tables defined in the database server for data storage. The format of the tables will be designed and then set-up by using the database software utilities.

## Activity 6 – Database Migration

### Produce Database Migration Plan

A database migration plan will be produced to detail how data will be migrated from existing production database to the new database. The plan will be contained in a migration plan document.

### Review/Finalize Database Migration Plan

The database migration plan will be reviewed and finalized by project team.

### Extract Data From Existing Database

Data from existing production database will be extracted to a medium format (e.g. text file).

### Data Checking And Data Cleaning

The extracted data will be verified against the existing production database to check for any mismatch. Any errors found will be corrected immediately.

### Upload Data Into New Database

The extracted data will be uploaded into the new database. The inserted data will be verified again to ensure there are no mismatches.

## Activity 7 – System Testing

To exercise quality control over the software produced, various testing procedures will be carried out. The following tasks will be performed.

### Prepare System Test Plan

The testing work to be performed will be formally planned, resulting in the production of a system test plan document. This document will define the tests to be performed, to demonstrate all the circumstances in which the software is required to operate, as specified in the system specification. Any standards and guidelines that are required for carrying out the tests will also specified in the system test plan.

### Review/Finalize System Test Plan

The system test plan will be reviewed and finalized by the project team.

### Integrate Code Components And Database

All code components kept by project team member will be merged and finalized. The database structure will also be finalized.

### Perform System Testing

The runs of the software, defined in the system test plan, will be undertaken, checked and documented in the system testing work file. Any errors detected during testing will be corrected and the appropriate tests will be re-run, to ensure the software is operating correctly.

## Activity 8 – User Trial

The next stage in the development of the system will be for the users to test the system in a User Trial Test. This trial test will form the basis of the process by which the user will accept the system. The following tasks will be performed.

### Write User Guide

This document will describe the functions of the program and provide help to users in their daily use of the software.

### Review/Finalize User Guide

The user guide will be reviewed and finalized by the project team. A copy will be sent to Mr. Truong Thieu Duong for verification.

### Write Trial Test Plan

The Project Manager will liaise with Truong Thieu Duong to arrange the User Trial Test and ensure that appropriate user staff are available to conduct the test. The Manager will also liaise with the user to discuss on the duration of the trial and the method by which the users should report errors, observations and suggestions. This will be documented in a User Trial Test Plan and Testing Work File documents.

### Review Trial Test Plan

The User Trial Test Plan will be reviewed and finalized by the project team. A copy will be sent to Mr. Truong Thieu Duong for verification.

### Install System

The system will be installed at the Hoang Kim Co.’s manufacturing plant server. The project team members will be on-site to ensure the system is properly installed and is able to operate.

### Perform User Trial

Users will carry out the test, according to the testing work files, and record the results into the files. The Project Leader will provide continuous support to the users during the trial period. All errors detected, observations and suggestions will be reported in the form agreed.

### Review Test Results/Corrective Action

At the end of the test, a meeting will be held at which the user and the project team will review the reports from the trial (errors, observations and suggestions), and agree the changes to be made to the software. The project team will then implement the agreed changes.

When the final changes have been successfully completed by the project team, a formal acceptance meeting will be held at which the project will demonstrate that the "agreed final changes" have been made.

If all the features are performed as required, Truong Thieu Duong will be requested to accept the system. Otherwise, further modifications will be made until the "agreed final changes" are acceptably implemented. The system will be deemed accepted when written confirmation of acceptance is received from the user.

## Activity 9 – Management & Administration

This activity covers all aspects of the general management and administration of the project to be performed. The following tasks will be involved.

* detailed planning of activities;
* progress reporting;
* production of meeting minutes;
* project tracking; and
* maintenance of the project filing system.

# 4. STAFF EFFORT ESTIMATES.

Estimates of the staff effort required to undertake the activities described in Section 3 are given in Figure 4.1.

Figure 4.1 : Staff Effort Estimates and Progress.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activity** | **Task** | **Ba Tien** | **Alvin** | **Tin** | **3 people** |
|  |  | PL | QM | TL | PR1,2,3 |
| Activity 1: | Initial Planning |  |  |  |  |
| Task 1.1 | Produce Project Plan | 3 |  |  | 3 |
| Task 1.2 | Produce Quality Plan |  | 3 |  | 3 |
| Task 1.3 | Set-up filing system |  | 2 |  |  |
| Task 1.4 | Review/finalize Plan | 1 | 1 | 1 | 3 |
| Activity 2: | Requirements Identification |  |  |  |  |
| Task 2.1 | Interview Users | 5 |  |  |  |
| Task 2.2 | Undertake Use Case Modeling | 2 | 2 | 2 | 6 |
| Task 2.3 | Produce Use Case Model Survey | 3 |  |  |  |
| Task 2.4 | Review/finalize Requirements documentation | 2 | 2 | 2 | 6 |
| Activity 3: | Requirements Specification |  |  |  |  |
| Task 3.1 | Identify Domain Objects/Attributes | 3 |  |  |  |
| Task 3.2 | Produce Class diagrams | 3 |  |  |  |
| Task 3.3 | Write Use Case Realization Reports | 3 | 3 | 3 | 9 |
| Task 3.4 | Review/finalize Use Case Realization Reports | 2 | 2 | 2 | 6 |
| Activity 4. | Design Modelling |  |  |  |  |
| Task 4.1 | Prototype User Interface | 3 | 3 | 5 | 9 |
| Task 4.2 | Create transition strategy from analysis to design |  |  | 3 |  |
| Task 4.3 | Define software architecture |  |  | 3 |  |
| Task 4.4 | Create DB Design |  |  | 3 |  |
| Task 4.5 | Produce Sequence Diagrams | 3 | 3 | 3 | 9 |
| Task 4.6 | Produce Object Specifications |  |  | 3 |  |
| Task 4.7 | Produce Design Model Report |  |  | 3 |  |
| Task 4.8 | Review/finalize Design Document | 2 | 2 | 2 | 6 |
| Activity 5: | Programming |  |  |  |  |
| Task 5.1 | Software Coding | 3 | 3 | 10 | 30 |
| Task 5.2 | Define Database tables and fields |  |  | 5 |  |
| Activity 6. | Database Migration |  |  |  |  |
| Task 6.1 | Produce Database migration plan |  |  | 5 |  |
| Task 6.2 | Review/finalize Database migration plan | 2 | 2 | 2 | 6 |
| Task 6.3 | Extract Data from existing database | 5 |  |  |  |
| Task 6.4 | Data Checking & Data cleaning | 2 | 2 | 2 | 6 |
| Task 6.5 | Upload data into new database | 5 |  |  |  |
| Activity 7: | Systems Testing |  |  |  |  |
| Task 7.1 | Prepare Systems Test Plan | 3 |  |  |  |
| Task 7.2 | Review/finalize Systems Test Plan | 2 | 2 | 2 | 6 |
| Task 7.3 | Integrate Code components & Database |  |  | 5 |  |
| Task 7.4 | Perform Systems Testing | 2 | 2 | 2 | 6 |
| Task 7.5 | Review Results/Corrective Action | 2 | 2 | 2 | 6 |
| Activity 8: | User Trial |  |  |  |  |
| Task 8.1 | Write User Guide |  | 5 |  |  |
| Task 8.2 | Review/finalize User Guide | 1 | 1 | 1 | 3 |
| Task 8.3 | Write Trial test plan | 3 |  |  |  |
| Task 8.4 | Review/finalize Trial test plan | 2 | 2 | 2 | 6 |
| Task 8.5 | Install System | 2 |  |  |  |
| Task 8.6 | Perform User Trial | 3 |  |  |  |
| Task 8.7 | Review Test Results/Corrective Action | 2 | 2 | 2 | 6 |
| Activity 9: | Management & Administration |  |  |  |  |
| Task 9.1 | General Management & Administration | 5 | 5 | 5 |  |
|  | Total | 79 | 51 | 84 | 135 |

# 5. TIMESCALES AND MILESTONES.

The time scales for the activities described in Section 3 using the staff effort specified in Section 4 are shown in Figure 5.2. From these time scales, major milestones have been identified, as shown in Figure 5.1.

Figure 5.1: Details of Milestones.

|  |  |  |
| --- | --- | --- |
| **Project Milestone** | | **Approx. Date** |
| Activity 1: | Initial Planning | 1/2/2011 |
| Task 1.1 | Produce Project Plan | 4/2/2011 |
| Task 1.2 | Produce Quality Plan | 7/2/2011 |
| Task 1.3 | Set-up filing system | 9/2/2011 |
| Task 1.4 | Review/finalize Plan | 12/2/2011 |
| Activity 2: | Requirements Identification |  |
| Task 2.1 | Interview Users | 17/2/2011 |
| Task 2.2 | Undertake Use Case Modeling | 23/2/2011 |
| Task 2.3 | Produce Use Case Model Survey | 26/2/2011 |
| Task 2.4 | Review/finalize Requirements documentation | 4/3/2011 |
| Activity 3: | Requirements Specification |  |
| Task 3.1 | Identify Domain Objects/Attributes | 7/3/2011 |
| Task 3.2 | Produce Class diagrams | 10/3/2011 |
| Task 3.3 | Write Use Case Realization Reports | 19/3/2011 |
| Task 3.4 | Review/finalize Use Case Realization Reports | 25/3/2011 |
| Activity 4. | Design Modeling |  |
| Task 4.1 | Prototype User Interface | 3/4/2011 |
| Task 4.2 | Create transition strategy from analysis to design | 6/4/2011 |
| Task 4.3 | Define software architecture | 9/4/2011 |
| Task 4.4 | Create DB Design | 14/4/2011 |
| Task 4.5 | Produce Sequence Diagrams | 23/4/2011 |
| Task 4.6 | Produce Object Specifications | 28/4/2011 |
| Task 4.7 | Produce Design Model Report | 1/5/2011 |
| Task 4.8 | Review/finalize Design Document | 7/5/2011 |
| Activity 5: | Programming |  |
| Task 5.1 | Software Coding | 6/6/2011 |
| Task 5.2 | Define Database tables and fields | 11/6/2011 |
| Activity 6. | Database Migration |  |
| Task 6.1 | Produce Database migration plan | 16/6/2011 |
| Task 6.2 | Review/finalize Database migration plan | 22/6/2011 |
| Task 6.3 | Extract Data from existing database | 27/6/2011 |
| Task 6.4 | Data Checking & Data cleaning | 3/7/2011 |
| Task 6.5 | Upload data into new database | 8/7/2011 |
| Activity 7: | Systems Testing |  |
| Task 7.1 | Prepare Systems Test Plan | 11/7/2011 |
| Task 7.2 | Review/finalize Systems Test Plan | 17/7/2011 |
| Task 7.3 | Integrate Code components & Database | 22/7/2011 |
| Task 7.4 | Perform Systems Testing | 28/7/2011 |
| Task 7.5 | Review Results/Corrective Action | 3/8/2011 |
| Activity 8: | User Trial |  |
| Task 8.1 | Write User Guide | 8/8/2011 |
| Task 8.2 | Review/finalize User Guide | 11/8/2011 |
| Task 8.3 | Write Trial test plan | 14/8/2011 |
| Task 8.4 | Review/finalize Trial test plan | 20/8/2011 |
| Task 8.5 | Install System | 22/8/2011 |
| Task 8.6 | Perform User Trial | 25/8/2011 |
| Task 8.7 | Review Test Results/Corrective Action | 31/8/2011 |

# 6. DELIVERABLES.

As a result of undertaking the work described in this plan, the following deliverables will be produced by the project.

1. Project Plan.
2. Quality Plan.
3. User Requirement Specification.
4. 1st Quality Audit Minutes.
5. Use Case Model Survey.
6. Use Case Realization Reports (Analysis).
7. High Level Design Specifications.
8. Prototyping Study Report.
9. 2nd Quality Audit Minutes.
10. Design Model Report.
11. Use Case Realization Reports (Design).
12. Source and Executable Code.
13. System Test Plan
14. System Testing Workfile (incorporating test log and results).
15. User Trial Plan.
16. Trial Testing Workfiles.
17. User Guide.
18. Progress Reports.
19. End Of Project Report.

# 7. PROJECT STRUCTURE AND STAFFING.

To undertake the work described in Section 3, the following staff will be used.



## Project Manager : Tran Ba Tien.

He will be responsible for the project on a month to month basis be reviewing progress against the plan and instituting appropriate action. In addition, he will provide advice to the Technical Leader on the structure and content of the deliverable project documents and will be responsible for the production of the required planning documents. The tasks to be undertaken by him are defined as belows:

1. production of Project Plan;
2. production of User Requirement Specification;
3. production of Use Case Model Survey;
4. general project administration activities;
5. production of System Test Plan;
6. production of User Trial Plan;
7. production of progress reports;
8. user training and user trial support;

## Quality Manager : Alvin Chang

He will be responsible for ensuring the project progresses according to the standard set out in the Quality Assurance Plan. The tasks to be undertaken by him are defined as below:

1. production of Quality Plan;
2. setting up and maintaining the project filing system;
3. production of User’s Manual;

## Technical Leader : Tin Kyaw Oo.

He will be responsible for undertaking the technical aspect of the work described in Section 3. The tasks to be undertaken by him are defined as belows:

1. production of High Level Design Specifications;
2. prototyping development and production of prototyping report;
3. production of Design Model Report;
4. database define and set-up;
5. software coding;
6. testing and installation;

# 8. RESOURCES.

The supporting resources required to enable the project team to undertake the activities specified in Section 3 are described as belows:



## Accommodation.

The development work will be undertaken in the ISS. No additional office space is required.

## Computer Hardware and Software.

The existing computers in ISS will be used by the project team to undertake all coding, testing and documentation tasks. The following software support will be required:

1. MS SQL Server 2008 database;
2. Microsoft Visual Studio 2010 software package;
3. Microsoft WINDOWS XP/Vista/7;
4. Microsoft EXCEL spreadsheet package;
5. Microsoft WORD for WINDOWS word processing package.
6. Microsoft PROJECT for WINDOWS.

## Word Processing.

No additional word processing support from administrative staff is required.

# Appendix A: Function Point Count and Effort Estimate

## Data Functions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Internal Logical File/External Interface File | | | Elements of complexity | |  |
| Type | Reference | Description | DET | RET | Complexity |
| ILF |  | Sales Order Records |  |  |  |
|  |  | * Sales Id | 10 | 3 | Low |
|  |  | * Timestamp |  |  |  |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Price |  |  |  |
|  |  | * Quantity |  |  |  |
|  |  | * Product Description |  |  |  |
|  |  | * Dimension |  |  |  |
|  |  | * Cylinder Image |  |  |  |
|  |  | * Remarks |  |  |  |
|  |  | * Order status (complete/in progress/cancelled) |  |  |  |
|  |  |  |  |  |  |
| ILF |  | Task Records | 3 | 7 | Average |
|  |  | * Task Id |  |  |  |
|  |  | * Task description |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| ILF |  | Task List | 4 | 5 | Low |
|  |  | * Task List Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| ILF |  | Personnel Roles | 4 | 2 | Low |
|  |  | * Personnel Id |  |  |  |
|  |  | * Role |  |  |  |
|  |  | * Status (whether is it approved) |  |  |  |
|  |  | * Effective Timestamp |  |  |  |
|  |  |  |  |  |  |
| ILF |  | Workflow | 4 | 14 | Low |
|  |  | * Workflow Id |  |  |  |
|  |  | * Sequence |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| ILF |  | Error List | 6 | 2 | Low |
|  |  | * Error Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Error Description |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| ILF |  | Cylinder production process | 4 | 2 | Low |
|  |  | * Timestamp |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  |  |  |  |  |
| ILF |  | Cylinder production Priority List | 6 | 1 | Low |
|  |  | * Prioritize List Id |  |  |  |
|  |  | * Sequence |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  |  |  |  |  |
| ILF |  | Cylinder Status | 7 | 7 | Average |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Next task Id |  |  |  |
|  |  | * Status |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| ILF |  | Accounting formulas | 4 | 4 | Low |
|  |  | * Formula Id |  |  |  |
|  |  | * Formula |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Timestamp |  |  |  |

## Data Transactions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Input/Output/Enquiry | | | Elements of complexity | |  |
| Type | Reference | Description | DET | FTR | Complexity |
| EI |  | Create sales order | 10 | 1 | Low |
|  |  | * Sales Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Price |  |  |  |
|  |  | * Quantity |  |  |  |
|  |  | * Product Description |  |  |  |
|  |  | * Dimension |  |  |  |
|  |  | * Cylinder Image |  |  |  |
|  |  | * Remarks |  |  |  |
|  |  | * Order status (complete/in progress/cancelled) |  |  |  |
|  |  |  |  |  |  |
| EI |  | Update sales order | 10 | 1 | Low |
|  |  | * Sales Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Price |  |  |  |
|  |  | * Quantity |  |  |  |
|  |  | * Product Description |  |  |  |
|  |  | * Dimension |  |  |  |
|  |  | * Cylinder Image |  |  |  |
|  |  | * Remarks |  |  |  |
|  |  | * Order status (complete/in progress/cancelled) |  |  |  |
|  |  |  |  |  |  |
| EI |  | Delete sales order | 2 | 1 | Low |
|  |  | * Sales Id |  |  |  |
|  |  | * Reason for cancellation |  |  |  |
|  |  |  |  |  |  |
| EI |  | Create task | 3 | 1 | Low |
|  |  | * Task Id |  |  |  |
|  |  | * Task description |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Update task | 3 | 1 | Low |
|  |  | * Task Id |  |  |  |
|  |  | * Task description |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Delete task | 2 | 1 | Low |
|  |  | * Task Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Create task list | 3 | 1 | Low |
|  |  | * Task List Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Update task list | 3 | 1 | Low |
|  |  | * Task List Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Delete task list | 2 | 1 | Low |
|  |  | * Task List Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Manage personnel roles | 4 | 1 | Low |
|  |  | * Personnel Id |  |  |  |
|  |  | * Role |  |  |  |
|  |  | * Status (whether is it approved) |  |  |  |
|  |  | * Effective Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Create workflow | 4 | 1 | Low |
|  |  | * Workflow Id |  |  |  |
|  |  | * Sequence |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Add step(s) in cylinder work flow process | 4 | 1 | Low |
|  |  | * Workflow Id |  |  |  |
|  |  | * Sequence |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Update step(s) in cylinder work flow process | 4 | 1 | Low |
|  |  | * Workflow Id |  |  |  |
|  |  | * Sequence |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Delete step(s) in cylinder work flow process | 2 | 1 | Low |
|  |  | * Workflow Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Delete Workflow | 2 | 1 | Low |
|  |  | * Workflow Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Update error list | 6 | 1 | Low |
|  |  | * Error Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Error Description |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Initiate cylinder production process | 4 | 1 | Low |
|  |  | * Timestamp |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  |  |  |  |  |
| EI |  | Terminate cylinder production process | 5 | 1 | Low |
|  |  | * Timestamp |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Reason |  |  |  |
|  |  |  |  |  |  |
| EI |  | Prioritize cylinder production | 6 | 1 | Low |
|  |  | * Prioritize List Id |  |  |  |
|  |  | * Sequence |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  |  |  |  |  |
| EI |  | Update cylinder status | 7 | 1 | Low |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Next task Id |  |  |  |
|  |  | * Status |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Update cylinder's next task | 7 | 1 | Low |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Next task Id |  |  |  |
|  |  | * Status |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EI |  | Modify accounting formulas | 4 | 1 | Low |
|  |  | * Formula Id |  |  |  |
|  |  | * Formula |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View Sales Order |  |  | Low |
|  |  | Input | 1 | 1 |  |
|  |  | * Sales Id |  |  |  |
|  |  | Output | 10 | 1 |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Price |  |  |  |
|  |  | * Quantity |  |  |  |
|  |  | * Product Description |  |  |  |
|  |  | * Dimension |  |  |  |
|  |  | * Cylinder Image |  |  |  |
|  |  | * Remarks |  |  |  |
|  |  | * Order status (complete/in progress/cancelled) |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View task list |  |  | Low |
|  |  | Input | 1 | 1 |  |
|  |  | * Task List Id |  |  |  |
|  |  | Output | 4 | 1 |  |
|  |  | * Task List Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Task description |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View personnel roles |  |  | Low |
|  |  | Input | 1 | 1 |  |
|  |  | * Personnel Id |  |  |  |
|  |  | Output | 4 | 1 |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Role |  |  |  |
|  |  | * Status (whether is it approved) |  |  |  |
|  |  | * Effective Timestamp |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View cylinder work flow process |  |  | Low |
|  |  | Input | 1 | 1 |  |
|  |  | * Cylinder Id |  |  |  |
|  |  | Output | 7 | 1 |  |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Next task Id |  |  |  |
|  |  | * Status |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View worker’s mark list |  |  | Low |
|  |  | Input | 1 | 1 |  |
|  |  | * Personnel Id |  |  |  |
|  |  | Output | 5 | 1 |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Name |  |  |  |
|  |  | * Marks |  |  |  |
|  |  | * Formula Id |  |  |  |
|  |  | * Updated Timestamp |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View cylinder information |  |  | Low |
|  |  | Input |  |  |  |
|  |  | * Cylinder Id | 1 | 1 |  |
|  |  | Output |  |  |  |
|  |  | * Cylinder Id | 7 | 1 |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Next task Id |  |  |  |
|  |  | * Status |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View error list |  |  | Low |
|  |  | Input | 2 | 1 |  |
|  |  | * Task Id |  |  |  |
|  |  | * Worker’s Name |  |  |  |
|  |  | Output | 6 | 1 |  |
|  |  | * Error Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Error Description |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View schedule in Excel format |  |  | Low |
|  |  | Input | 1 | 1 |  |
|  |  | * Workflow Id |  |  |  |
|  |  | Output | 7 | 1 |  |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Next task Id |  |  |  |
|  |  | * Status |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View order progress |  |  | Low |
|  |  | Input | 1 | 1 |  |
|  |  | * Sales Id |  |  |  |
|  |  | Output | 3 | 1 |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Status |  |  |  |
|  |  | * Percentage Completed |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View cylinder status |  |  | Low |
|  |  | Input | 1 | 1 |  |
|  |  | * Cylinder Id |  |  |  |
|  |  | Output | 7 | 1 |  |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Next task Id |  |  |  |
|  |  | * Status |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EQ |  | View accounting formulas |  |  | Low |
|  |  | Input | 1 | 1 |  |
|  |  | * Formula Id |  |  |  |
|  |  | Output | 4 | 1 |  |
|  |  | * Formula Id |  |  |  |
|  |  | * Formula |  |  |  |
|  |  | * Personnel Id |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| EO |  | Print cylinder information | 7 | 1 | Low |
|  |  | * Cylinder Id |  |  |  |
|  |  | * Sales Id |  |  |  |
|  |  | * Workflow Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Next task Id |  |  |  |
|  |  | * Status |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |
| EO |  | Print worker's mark list for a period | 5 | 1 | Low |
|  |  | * Personnel Id |  |  |  |
|  |  | * Name |  |  |  |
|  |  | * Marks |  |  |  |
|  |  | * Formula Id |  |  |  |
|  |  | * Start Timestamp |  |  |  |
|  |  | * End Timestamp |  |  |  |
|  |  |  |  |  |  |
| EO |  | Print task list | 4 | 1 | Low |
|  |  | * Task List Id |  |  |  |
|  |  | * Task Id |  |  |  |
|  |  | * Task description |  |  |  |
|  |  | * Timestamp |  |  |  |
|  |  |  |  |  |  |

## Unadjusted Function Point Count Summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ITEM | LOW | AVERAGE | HIGH | TOTAL |
| External Input | 22X3=66 | 0X4=0 | 0X6=0 | 66 |
| External Output | 3X4=12 | 0X5=0 | 0X7=0 | 12 |
| Internal File | 8x7=56 | 2X10=20 | 0X15=0 | 76 |
| Interface File | 0X5=0 | 0X7=0 | 0X10=0 | 0 |
| External Inquiry | 11X3=33 | 0X4=0 | 0X6=0 | 33 |
|  |  | Unadjusted Functions Points: | | 187 |
|  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| General Information Processing Factor | DI |  |
| Data Communication | 4 |  |
| Distributed functions | 4 |  |
| Performance | 3 |  |
| Use of configuration | 2 |  |
| Transaction rates | 0 |  |
| On-line Data Entry | 5 |  |
| Design for End-user Efficiency | 5 |  |
| On-line Update | 3 |  |
| Processing Complexity | 5 |  |
| Usability in other applications | 1 |  |
| Installation ease | 0 |  |
| Operational ease | 0 |  |
| Use on multiple sites | 0 |  |
| Change facilitation | 5 |  |
| TOTAL DEGREE OF INFLUENCE (TDI) = | 37 |  |

Below is the estimated development effort needed and the project duration (using Costar application)

The development effort needed = 16.5 man-months / Duration = 10.1 months

# Appendix B

## Risk Assessment Questionnaire For COMS Project

Project Name: Cylinder & Order Management System (COMS)

1.System Size & Functionality

(1) Total effort and duration for systems development

Possible Score Score for this project

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Project Duration | | | |
| 0-12 months | 13-24 months | >24 months | Unknown |
| Total effort  for.  system dev | 100-300 man-  Hours | 2 | 3 | 3 | 8 |
| 3000-15000  man-hours | 4 | 3 | 3 | 9 |
| 15000-30000  man-hours | 7 | 8 | 7 | 9 |
| >30000 man-  hours | 10 | 10 | 10 | 10 |
| Unknown | 10 | 10 | 10 | 10 |

4

(2)Number of sub-projects within the project

None or one 1

Two 2

>Two 3 1

(3)Number of user department involved with the project

None or one 1

Two 2

>Two 3 3

(4)Number of user personnel (both end-users and

User IT staff) required to operate system after installation

<20 1

20 – 50 2

>50 3

Unknown 2 3

(5)Number of different geographical locations that will be encompassed by the system

One 0

Two – three 1

>Three 2

Unknown 2 0

(6)Number of existing systems that the new system must interface with

None 0

One 1

Two 2

>Two 3

Unknown 2 0

(7)Technical complexity of system

Straightforward 0

Average 1

Complex 2

Very complex 4

Unknown 3 2

2.User organization and Systems requirements

Possible score Score for this project

(1)The system may be best described as:

Totally new system 2

Replacement of an existing computerized system 1

Enhancement of an existing computerized system 0 1

(2) How well understood are the User requirement by

the development team

Well understood, only minor uncertainties 1

Mostly understood, but one or two uncertainties 2

Major areas of uncertainty 4 1

(3) Real-time performance of the system is

Not critical 0

Critical due to throughput 1

Critical due to response time 3

Critical due to availability 3

Unknown 2 3

(4) Does the User organization and/or procedures have to

change to meet the requirements of the new system?

No 0

Minimal changes 1

Major changes 2

Unknown 1 2

(5) What degree of flexibility and judgment can be exercised by the

development team in modifying the user requirements

Can negotiate changes of >10% of the requirements 0

Can negotiate changes of 0 – 10% of the requirements 1

User requirements cannot be changed by

the network integrator 3

Unknown, degree of flexibility not yet determined 2 2

(6) What degree of flexibility and judgment can be exercised by the user in modifying the user requirements

User has considerable flexibility in modifying requirements 4

User has flexibility in modifying requirements, but

will use formal change control procedures and/or will

accept incremental 2

User requirement cannot be changed by

the User after initial agreement in req. analysis 1

Unknown, degree of flexibility not yet determined 2 2

(7) Is this project dependent upon the output or

products of another project?

No 0

Yes, but the project which this project is

dependent on is of low or normal risk 1

Yes, and the project which this project is

dependent on is high risk 3

Yes, and the project which this project is

dependent on is of unknown risk 2 0

(8) What is the general attitude of the user?

Poor, anti-IT solution 2

Fair, some reluctance to use IT Solution 1

Good, is eager to adopt & use system 0

Unknown 1 0

(9) How committed is the user executive management to

the project?

Reluctant to commit 2

Restrained level of commitment 1

Extremely enthusiastic 0

Unknown 1 0

(10) How great is the user involvement in the project

No involvement other than formal

project/contract management 2

Part-time user representatives involved in

project design reviews, etc 1

Full-time user representative involved in

requirements specification, design team 0

Unknown, commitment not yet made 2 2

3. Technology & external dependencies

Possible score Score for this project

(1) Is Hardware required that is new to the developer?

None 0

Processor 1

Terminals/PC’s 2

Networking Hardware 3

Hardware not yet identified 2 2

(2) Is special non-standard hardware required?

None 0

Processor 1

Terminals/PC’s 2

Networking Hardware 2

Hardware not yet identified 1 2

(3) What portion of the Software component to be used in the system is to be developed as new

No new software to be developed 0

0-25% of the software to be developed as new 1

25-50% of the software to be developed as new 2

50-75% of the software to be developed as new 3

>75% of the software to be developed as new 4

Unknown 4 4

(4) If a significant portion of the Software component to be used in the system consists of exiting software products, what familiarity does the developer have with the products?

Developer has no experience of these products 3

Developer has some experience, or has used

similar products 1

Developer has thorough experience with product 0

Unknown, not yet identified 2 0

(6) Novelty of proposed development methods & System

First time the proposed development methods

have been used by development team 4

First time the development methods have

been used by 50% of the development team 2

None of the above 0 0

(8) How good is the Hardware vendor/methodology?

Vendor/tools vendor support? 0

Unknown/Poor 3

Adequate 1

Good 0 1

4. Project management & Characteristics

Possible score Score for this project

(1) Project schedule

Major milestones and operational dates are

Flexible; may be established and adjusted by

the project team 1

Firm; established internally, but thereafter are

considered “fixed” by the client 2

Fixed; established by the client and not

easily negotiable 4

Unknown, not yet discussed or agreed 4 1

(2) Project manager availability, experience & training

Project manager not yet identified 5

Project manager identified and his experience

level can be best described as:

Successful recent experience in

managing a project similar in size

or application, 1

Successful recent experience in

managing part of a project similar

in size or application, or a

dissimilar project, 2

No recent experience, but has had

formal training, 4

No recent experience or training 7 4

(3) Approved project planning, tracking and reporting techniques

Are document and committed to this project

Yes 0

No 4 0

(4) Key project skill and manning-level requirements can be

met by :

Team members within the developers organization

who will be working full-time on the project 1

Team members within the developers organization

who will be working part-time on the project 3

No team members have been formally identified 5 1

(5) A plan for chief architect or centralized technical control

is documented and committed for this project

Yes 0

No 3 3

Quantitative assessment

Summary sheet

|  |  |  |  |
| --- | --- | --- | --- |
| Section | Maximum  Score | Minimum  Score | Total score for this project |
| 1.System size and functionality | 28 | 5 | 13 |
| 2.User organization & system requirement | 27 | 2 | 13 |
| 3.Technology & external dependencies | 22 | 0 | 9 |
| 4.Project management & characteristics | 23 | 3 | 9 |
| Total |  |  | 44 |

Implications

If score of project is < 30 then project is of **low** risk

If score of project is > 30 & < 50 then project is of **medium** risk

If score of project is > 50 then project is of **high** risk

Therefore our project is of medium risk.

Risk Monitoring Technique

We are going to use the Top-10 Risk Items Tracking technique.

We will be having the Regular Risk Analysis (Prioritize Risks, Highlight risks in progress reports) every month.

## Risk Items and Control Type

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Risk Item | Control Type | Specific Details |
| 1 | Miscommunication | Risk Localisation | - To produce prototype UI diagrams  - To verify customer's requirements  - Educate the customer on how to accept the software life cycle i.e. It is not easy to change the requirements  - User Manual has to be very clear and precise  - Programmer Manual has to be very clear and precise  - Put more effort in giving user training |
| 2 | Personnel shortfalls | Risk Insurance | - Identify team member to cover duties/ task  - One of the team member might drop/ defer next semester  - But another member will help/ share his tasks. |
| 3 | Resolution of Technical Issues | Risk Localisation | - Simulate deployment in Lab/ VMWare before actual deployment  - Test the system with real barcode scanner |
| 4 | Unforeseen Requirement Changes | Risk Minimise | - Mitigate the Requirement Changes that may cause instability to the System  - Conduct thorough software testing |
| 5 | PM Skill Set | Risk Transfer | - Already have Technical Lead and Quality Manager  - All of the team member will co-ordinate and discuss if any issue comes out. |

## Risk Check-box List

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Risk Item | Impact | | | | | | Likelihood | | | | | |
| 1 | 2 | 3 | 4 | 5 | TOTAL | 1 | 2 | 3 | 4 | 5 | TOTAL |
| 1 | Miscommunication | 1 | 1 | 1 | 1 | 1 | 5 |  |  |  | 1 | 1 | 2 |
| 2 | Personnel shortfalls |  |  | 1 |  |  | 1 |  | 1 | 1 | 1 |  | 3 |
| 3 | Resolution of Technical Issues | 1 | 1 | 1 | 1 | 1 | 5 | 1 | 1 |  | 1 | 1 | 4 |
| 4 | Unforeseen Requirement Changes | 1 | 1 | 1 |  |  | 3 | 1 |  |  | 1 |  | 2 |
| 5 | PM Skill Set |  |  | 1 |  | 1 | 3 |  | 1 |  | 1 |  | 2 |

## Prioritisation of COMS Project Risks



|  |  |  |
| --- | --- | --- |
| Approval Record ISS/Forms/Approval | | |
| **Project Name COMS Project** | | |
| **Document Ref** GG/COMS/MP.2/v1 |  | |
| Approved by | Date | |
| Authorised by | Date | |
| The document authorisation appears on the title page. | |  |
| The structure of the publication is logical. | |  |
| The distribution list is correct. | |  |
| The title page is signed. | |  |
| Calculations appear reasonable, are neatly presented and have been checked. | |  |
| Theory and formulae are correct and properly applied. | |  |
| Illustrations are relevant, readable and logically placed. | |  |
| There are no typographical errors. | |  |
| Units are consistent throughout. | |  |
| The security classification is correct. | |  |
| There are no obvious omissions. | |  |
| The document complies with the Client's requirements, however specified. | |  |
| Responsibility is accepted for all opinions, conclusions and recommendations. | |  |
| The document does not run counter to company policy. | |  |
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