

**MANAGEMENT TOOL SUPPORT FOR
SOFTWARE ACQUISITION AND INFORMATION SYSTEMS
OUTSOURCING PROJECTS
FOR TURKISH LAND FORCES COMMAND**

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ABSTRACT

MANAGEMENT TOOL SUPPORT FOR SOFTWARE ACQUISITION AND INFORMATION SYSTEMS OUTSOURCING PROJECTS FOR TURKISH LAND FORCES COMMAND

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This thesis reviews the software acquisition models and management tools used for managing, tracking and planning the acquisition projects all around the world. Then the requirements of Turkish Land Forces Command (TLFC) for a project management tool are considered. Features of a project management tool that is suitable for TLFC are determined through the ideas of TLFC personnel of IS department. After evaluation of selected tools through the requirements of TLFC the best one is presented. Then an interface module is developed through the requirements of the current acquisition process of TLFC for effective usage of the tool. Finally the study is evaluated.

Keywords: Project management tools, project tracking, project scheduling, IS outsourcing, software acquisition, acquisition projects, Phprojekt.

ÖZ

KARA KUVVETLERİ KOMUTANLIĞI YAZILIM VE BİLGİ SİSTEMLERİ TEDARİK PROJELERİ İÇİN YÖNETİM ARACI DESTEĞİ

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Bu tezde yazılım tedarik modelleriyle birlikte dünyada yaygın olarak kullanılan yönetim, planlama ve izleme amaçlı proje yönetim programları araştırılmıştır. Sonrasında Kara Kuvvetleri Komutanlığı(KKK)'nın böyle bir proje yönetim programıyla ilgili gereksinimleri ortaya konmuştur. KKK bilgi sistemleri çalışanlarının fikirleri doğrultusunda KKK'ya uygun olabilecek proje yönetim programının özellikleri belirlenmiştir. Bu gereksinimler doğrultusunda değerlendirilen programların arasından en uygunu seçilmiştir. KKK'nın mevcut tedarik sürecine uygun olarak seçilen programın en etkili biçimde kullanımını sağlamak için bir arayüz modülü geliştirilmiş ve tezin sonunda değerlendirmesi yapılmıştır.

Anahtar Kelimeler: Proje yönetim programı, proje izleme, proje planlama, dış kaynak kullanımı, yazılım tedariki, tedarik projeleri, Phproje.

To my love

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LIST OF ACRONYMS

APMP	: Acquisition Process Module for Phprojekt 4.1.
SRS	: Software Requirements Specifications.
TLFC	: Turkish Land Forces Command.
PM	: Project Manager.
PO	: Project Office.
TAF	: Turkish Armed Forces.
SDD	: Software Design Description.
RFP	: Request for Proposal.
KPA	: Key Process Areas.
SA-CMM	: Software Acquisition Capability Maturity Model.
WBS	: Work Breakdown Structures.
P3	: Primavera Project Planner.
IS	: Information Systems.

CHAPTER 1

INTRODUCTION

1.1 Statement of the Problem

An acquisition program is an effort to institute a new or improved operational capability in response to identified mission or business needs. An acquisition program deploys products and services into an operational environment to enable or support the effective performance of a corresponding mission. The driving concern of defense acquisition is to ensure a fair and effective competitive selection of a government or industry supplier that will provide the best value toward addressing targeted needs. Software acquisition is the procurement of a software product by using an external source when the acquirer (buyer) does not have adequate resources, skills or experience to develop the product within the desired time period [Marciniak & Reifer, 1990].

Similar with software acquisition, IS outsourcing involves the activities associated with acquiring services from one or more external providers. During outsourcing, a client organization transfers responsibilities for performing one or more IT services to one or more external providers. This responsibility is executed through control and management of the processes, people and technology associated with these services.

Government and military have the need to improve their internal acquisition processes. In order for organizations to make improvements, they must know the ultimate goal and what is required to achieve that goal [Cooper & Fisher, 2002]. Failed projects over the world have also showed

that organizations need more reliable and improved acquisition processes. Like acquisition process, acquisition project management is also a critical factor for the success of the acquisition.

Those who study project management say the ability to identify goals and manage resources, budgets and time efficiently are skills that people learn through time and experience. Considering that many, if not most, projects are composed of hundreds of interrelated tasks, trying to track and control all those tasks effectively turns into a management nightmare. Therefore, using a computerized project management tool has become essential to achieving the requirements of effective project management [Moder, 1994; Shenhar & Laufer, 1995].

No software package can replace a human with good project management skills. Still, regardless of what one's skills are, one needs a good set of tools. Tools that help project managers must do more than just store and retrieve project data. They should assist the user in visualizing the data's significance [Seachrist, 1998]. In contemporary computing environments, project managers have been supplied with tools to assist in their project management tasks.

Like other organizations and armies, Turkish Armed Forces also uses information systems and information technologies opportunities to satisfy its needs. Because defense systems are more expensive, require more safety and are used for a long time period, their acquisition requires more detailed concept development and project management activities.

As a part of Turkish Armed Forces, Turkish Land Forces Command (TLFC) has three supply methods. First one is commercial off the shelf which can be done as domestic procurement and foreign procurement. Second is joint production in Turkey, and the last one is domestic research and development.

When acquiring and developing major systems, TLFC has two cycles. First one is Planning, Programming, Budgeting and Implementation

cycle which refreshes every two years. Second one is project management cycle based on software engineering and project management activities.

TLFC Acquisition Process starts with identifying the mission need and ends with disposal of the product from inventory. Middle phases are; Concept Exploration and System Defining, Design, Engineering and Development, Production and Deployment and Operations and Support.

1.2 Objective of the Study

As explained above, acquisition process for an army is more expensive and critical than other sectors. In TLFC projects are managed by the army officers instead of professional and experienced project managers. In the acquisition projects generally the project staff and manager do not use a tool for project management, scheduling, tracking and communication. The objective of this study is to investigate and implement tool support for software acquisition and outsourcing projects for TLFC.

1.3 Scope of the Study

After a survey of the literature on software acquisition process, project management, tracking, scheduling and communication software have been reviewed. The author has searched the features of the tools by the help of their documents published in web. Besides, some documents are obtained from their representatives in Turkey.

A detailed search is done to find the tools suitable for TLFC acquisition project management. In this search, only project management, tracking, scheduling and communication tools are examined. After elimination of these kinds of tools, 15 are selected. They are compared with each other by the help of the criteria which are determined by the Turkish Armed Forces staff working in IS departments. These criteria are determined and weighted by a survey made by the author.

The comparative evaluation of the tools has been presented in a

tabular form. The best tool that has been chosen for TLFC acquisition projects is adapted to TLFC requirements by a supporting module. First, requirements of that module are specified then design has been made. Finally implementation of the module is accomplished. After implementation, the software is evaluated according to the feedback obtained from potential users.

1.4 Outline of the Study

This thesis consists of six chapters. Following the Introduction in Chapter 1, Chapter 2 reviews software acquisition and IS outsourcing models which are; ISO/IEC TR 15504 (SPICE), Software Acquisition Capability Maturity Model (SA-CMM), Software Acquisition Process of IEEE Std. 1062, Euromethod, Çetin's Adaptation of Euromethod to Turkey, World Bank Approach. In this chapter, these models are explained and compared with each other. In the second part of this chapter, IS outsourcing process in Turkish Land Forces Command is analyzed and problems of current acquisition process are given. Finally, models for IS outsourcing and software acquisition proposed by Çalkayış [2001] and Bilir [2002] are given.

Chapter 3 reviews 16 project management tools, their features and qualifications. After this review, a brief explanation has been made about project portfolio management. Project management tools' feature explanations and tool survey explanations are given. At the end of the chapter, the table for the evaluation of the tools is given.

Chapter 4 is about requirements for a project management tool for IS outsourcing projects in TLFC. This chapter also includes the evaluation of Phprojekt for TLFC project management requirements, and the requirements for interfacing it to the TLFC organization. This chapter is also includes the design of the project management software whose requirements are specified in the beginning.

Chapter 5 discusses the results of this study through evaluating the software product. Advantages and disadvantages of the product are reviewed. What else needs to be done to make the product more useful are also discussed.

CHAPTER 2

SOFTWARE ACQUISITION AND INFORMATION SYSTEMS OUTSOURCING MODELS

To implement and investigate a tool support for TLFC software acquisition and IS outsourcing projects, we should research this acquisition and outsourcing process models to understand the structures of these models. As acquisition process models describes acquisition phases, we need some standards to evaluate and improve these acquisition models. Such models which are called capability maturity assessment models are examined together with acquisition process models to have a sufficient background information to develop a project management tool for software acquisition and IS outsourcing projects.

2.1 ISO/IEC TR 15504 (SPICE)

It has been prepared by The International Organization for Standardization (ISO) and The International Electrotechnical Commission (IEC) in 1998. It is a framework for process assessment including the requirements of performing an assessment and it can be used to improve software processes. It consists of nine parts. Different users can use different parts for reporting different purposes [ISO/IEC, 1998].

The acquisition process of ISO/IEC TR 15504 is indicated as:

1. Acquisition preparation process: Its aim is to establish the needs

and goals of the acquisition.

2. Supplier selection process: The aim of this step is to choose a qualified supplier that will satisfy the contractual requirements.

3. Supplier monitoring process: Its purpose is to monitor the supplier's activities during the software development.

4. Acceptance process: The purpose of this step is to approve the supplier's deliverable when all acceptance conditions are satisfied.

2.2 Software Acquisition Capability Maturity Model (SA-CMM)

The aim of this standard is to enhance product quality and to optimize the resources of the organization by improving the processes that achieve the activities. The SA-CMM [Cooper&Fisher,2002] defines 5 maturity levels that represent a particular level of process performance and capability. Each maturity level (except Level-1) has some key process areas (KPA) that shows where an organization should focus to improve its acquisition process. These maturity levels are:

1. The Initial Level
2. The Repeatable Level
3. The Defined Level
4. The Quantitative Level
5. The Optimizing Level

This model is more suitable for government acquirers because it has very detailed acquisition steps and institutionalization efforts and requirements.

2.3 Software Acquisition Process of IEEE Std. 1062

This model describes software acquisition as a period of time that

begins with the acquisition decision and ends when the product is no longer available to use. It has five phases which are [IEEE,1998-1]:

1. Planning Phase; begins with developing the idea for acquiring.
2. Contracting Phase; begins with request for proposal (RFP) release, ends with signing the contract.
3. Product Implementation Phase; begins with signing the contract and ends with receiving the software product.
4. Product Acceptance Phase; begins with receiving the software product and ends with acceptance of it.
5. Follow on Phase; begins with acceptance of the product and ends when the product is no longer available to use.

2.4 Euromethod

It is European Union procurement directives on standardization on IS . In an acquisition process, the most important issue is the mutual understanding. Because of this, the first objective of Euromethod is to make the mutual understanding between customers and suppliers easy. Second objective is to improve the acquisition of IS and services by taking full account of the problem situation and risks [Euromethod, 1996].

There are two key roles;

Contract authority : person(s) responsible for the issues related with the contract.

Service or project authority: person(s) responsible for the issues related with the service or projects.

2.4.1 The acquisition process of Euromethod

This model consists of two main parts: acquisition initiation and

procurement [Euromethod, 1996].

1. Acquisition initiation
 - 1.1 Acquisition goal definition
 - 1.2 Acquisition planning
2. Procurement
 - 2.1 Tendering
 - 2.2 Contract monitoring
 - 2.3 Contract completion

Euromethod is strong on defining a process for contract management with decision points and guidance on how to define and describe deliverables as the key elements of decision points.

2.5 Çetin's Adaptation of Euromethod to Turkey (TÜBSEM - Türkiye İçin Bilişim Sistemleri Edinme Metodolojisi)

Euromethod requires adaptation for the specific conditions of countries. It has a detailed requirements and delivery plan but, for not being obligatory, it does not provide any tool for determined steps. So it requires a consultancy service to apply. Çetin made some extensions and diversions to adapt it for the specific needs of Turkish information technology market [Çetin, 1998].

2.6 World Bank Approach

In this approach, [Bilir,2002] there are two processes:

Single stage bidding: Used in technically complex systems

Two stage procurement. Used in complex procurements based on not technical but business requirements.

World Bank approach does not have enough detail for technical specifications. This approach's other disadvantage is the need for a long period of IS acquisition.

2.7 Comparison of Software Acquisition Models:

The two models SA-CMM and SPICE provide a framework for software acquisition and can not be used guidance on *how to* proceed when acquiring a software product. But Euromethod and IEEE Std. 1062 describe the activities in an acquisition process on *how to* proceed. Euromethod has a risk management driving factor in designing strategy while IEEE requires considering quality characteristics of the desired product. SA-CMM and SPICE stresses identifying the acquisition approach, contract and tendering types.

2.8 Information Systems Outsourcing Process in Turkish Land Forces Command

2.8.1 Current Acquisition Process in TLFC

Phases of the current acquisition process in TLFC are indicated below [KKK, 2000]:

1. Identifying The Mission Need Phase
2. Concept Exploration And System Defining Phase
3. Design Phase
4. Engineering And Development Phase
5. Production And Deployment Phase
6. Operations And Support Phase
7. Disposal From Inventory Phase

2.8.2 Problems in Outsourcing in TLFC

Çalkayış [2001] classifies the problems in two main groups. Problems related to regulatory issues and problems related to project management and technical problems. About the problems of project management, the main problem is to define the need correctly. Second one is, problems caused by not using predefined established standards. Third problem is, in the evaluation phase “*choose the cheapest one*” approach always wins (which means *cost/technical score* does not work). There is also an improper staffing problem.

2.8.2.1 Problems with Current Process

In his masters thesis about “A Proposed Model for TLFC Software Intensive Systems Acquisition Process”, Bilir [2002] explains the problems of outsourcing in current process under the following titles:

2.8.2.1.1 Problems Related With Acquisition Process:

- Current process does not treat acquisition of software intensive systems on an exceptional basis.
- The phases of the current process are not very clear.
- The next phase is not evaluated at the end of previous step.
- The current acquisition activities are not based on well-defined policies and strategies, project offices do not use methodologies and international standards.

2.8.2.1.2 Problems Related With Informatics Industry:

- The information technology sector in Turkey is not advanced as in many developed countries. It is still in foundation stage.
- The immaturity of domestic software sector affects acquisition methods, acquisition strategies, contract types, competition

conditions and awareness of quality.

2.8.2.1.3 Resource Problems:

- Staffing and using sophisticated tools becomes a problem.
- The first and most important problem of defense acquisition is the shortage of technical skills on some disciplines like project and contract management, systems analysis, requirement analysis and acquisition program management.

2.8.2.1.4 Legal Problems:

- State tender law does not handle defense procurements on an exceptional basis.
- The terms of IT should be specified.
- Prices of proposals is used as the only criteria.
- There is no regulatory framework to identify the responsibilities of personnel who participate in IS acquisitions.

2.9 Steps of a Proposed Process for TLFC

Çalkayış evaluates the standard approaches which are World Bank, Euromethod and Law 2886 and examines the common steps of these approaches. He determines the steps as follows[Çalkayış, 2001]:

1. Define the goal and expected value of project
2. Build a project team
3. Identify the need
4. Identify the potential vendors
5. Define level of service
6. Conduct assessment

7. Determine feasibility
8. Budgeting and pricing
9. Prepare the specifications
10. Prepare the bidding document
11. Call for tender
12. Evaluate the bidders
13. Prepare the contract
14. Manage the contract

Bilir developed a model consisting of four main and 24 sub-phases which are:

Acquisition Initiation:

1. Establish program management structure
2. Tailor Organizational standard process and define the project's individual process
3. Develop acquisition strategy
4. Plan acquisition life cycle

Implement System Engineering Activities:

5. Develop & manage requirements
6. Develop risk management plan
7. Develop configuration management (CM) plan
8. Implement quality management
9. Prepare cost & schedule estimates
10. Consider contract type
11. Update & review the program management plan

Solicitation & Contracting:

12. Identify the contents of the solicitation package

13. Develop proposal evaluation plan
14. Prepare request for proposal (RFP)
15. Identify potential suppliers
16. Issue the RFP
17. Evaluate the proposals
18. Negotiate the contract
19. Sign the contract

Supplier Monitoring & Product Acceptance:

20. Manage the contract
21. Monitor and assess supplier progress
22. Evaluate actual cost/schedule
23. Test and evaluate the products
24. Accept the product

2.10 Evaluation

After examining the models which were proposed by Bilir and Çalkayış, it could be seen that current acquisition process is not sufficient to satisfy the requirements of TLFC.

These proposed models, especially the model developed by Bilir are defined in detail. It includes system engineering activities such as developing risk and configuration management plan. But in current acquisition process risk and configuration management issues are achieved only by efforts of individuals. Even though it is deficient, the current acquisition process has become the subject of our study. Because it is hard to forecast how long the current acquisition process will survive, it would be rational to give a tool support for it, instead of giving for the proposed ones.

In TLFC, currently, there is no management tool used in common for

software acquisition projects. In our interviews, the TLFC project staff consistently emphasized the importance of a supporting tool for communication, planning, tracking, and scheduling of their software acquisition projects. The requirement for such a project management tool has been detected by the help of the ideas of TLFC staff who have worked in various software acquisition projects.

CHAPTER 3

PROJECT MANAGEMENT TOOLS FOR SOFTWARE ACQUISITION AND INFORMATION SYSTEMS OUTSOURCING

3.1 Features of Project Management Tools

In this study, we examined 16 project management tools whose features are indicated in Table-3. These tools generally have scheduling task functions, and planning resources like time, money, equipment and people. They are suitable for project managers for planning and tracking their project steps. In each step, they assign tasks to their project staff and see the phases of the project. Project manager and staff, prepare and get reports by the help of document management functions of these programs. Most of them support Gantt chart view or other views for statistics and reports. Some tools have web based features like web publishing, e-mail notification etc. Below the fundamental features of the 16 tools to be evaluated will be presented.

3.1.1 MS Project 2002

Microsoft Project is a project planning and management tool used world-wide that enables integration with most of the other project management tools. Its difference with other tools is that is very general while others are specific to one or more subjects. A project manager can plan, manage and schedule any kind of project in any method with MS Project.

It has step-by-step instructions and controls which are¹:

Planning and scheduling the project's tasks: It has some functions to:

- Define the project
- Define general working times
- List the tasks in the project
- Organize tasks into phases
- Schedule tasks
- Add documents to the project
- Publish project information on the Web

Resource planning: It has some functions to:

- Specify people and equipment for the project
- Define working times for resources
- Assign people and equipment to tasks

Track and manage the project: It has some functions to:

- Prepare to track the progress of your project
- Incorporate progress information into the project
- Check the progress of the project
- Make changes to the project

Reporting: It has some functions to:

- Change the content or order of information in a view
- Change the look or content of the Gantt Chart
- Compare progress against baseline work
- See the project's critical tasks

¹ Project map section in Microsoft Project Help

- See how resources' time is allocated
- See project costs

Planning:

1. Plan for and procure resources: It has some functions:
 - Estimate resource needs
 - Build the project team
 - Share resources among projects
 - Assign resources to tasks
2. It allows estimating and managing costs
3. It allows planning for quality and risks

View: It has different views for project information e.g. Network Diagram, Calendar, Gantt diagram and task sheet.

Integration: It helps to integrate with other products: Easily import data from Microsoft Excel and export data back to Excel, as well as other supported file types. Easily import a task list from Microsoft Outlook into Microsoft Project.

Managing: *Multiple managers:* It allows multiple project managers to track tasks and resources in a single project.

Task lists: It helps to create and manage a simple task list with Microsoft Project Server through the tasks page in Microsoft Project Web Access, and open this list in Microsoft Project.

3.1.2 Phprojekt

It is an open source, freeware project management and communication tool that supports 25 languages. It has developed with PHP and works with a server and database. It has a lot of features some of which are [www.phpprojekt.com]:

General features: Modular Structure, different stages of privileges
Optional group system, supports 25 languages, guided installation, update and configuration

Calendar: Single mode: views for day, week, month and full list,

Group mode: view schedules of several users together,

Insert events into the schedule of other users,

Create profiles for frequently used groups,

Repeat events: each day, week, month or year,

Assign a comment, contact or project to an event,

Keep an event private or allow to publish,

Start and end time of an event clickable,

Reserve resources (e.g. rooms) for events, SMS or email reminder.

Contact manager: Import/export contacts in different formats and keep contacts personal or open to the group,

Table view of all project members, sort by all categories up and down,

History, view related notes for a contact and filter system.

Time card system: Quick buttons for 'start' and 'end' in the main screen,

Optional: out on duty back from duty,

Assign working days to several projects,

Shows all users who are at work,

Monthly overview.

Projects: Subprojects with unlimited depth,

List of projects with tree structure,

Status of project maintained by project leader,

Assign appointments to actual projects,

Statistics results: who worked on which project,

Timeline/Gantt diagram of all projects and view related notes or files.

Chat: View members who are online and save actual discussion in a file.

Forum: View threads in tree structure, filter system and print postings.

Request tracker: Its known as help desk or trouble ticket system,
Customer adds request on special page,
Searchable knowledge base of solved requests,
Automatic confirmation by mail,
Automatic or manual assignment to users,
List and Form view,
Sort and Filter functions,
Define a request as a subproject,
Assign work time to request (for later billing).

Mail client:Pop3 or IMAP access, send and receive mails,
ASCII or html format, attachments, supports several accounts,
Rules to assign mails to folders, display mails in tree structure with folders,
Fax and SMS support.

Files: Files, intranet links and directories, tree structure with folders,
Restricted access system for each file, table view of all group related,
Documents, filter for large file lists, sort by all categories, upload section.

Notes: Save your personal memos and thoughts, Quick overview on all notes, Edit function, assign a contact or project to a note,
Keep a note private or open to the group, Copy or mail to another user,
Full text search.

Bookmarks: Bookmark list for a quick access to important URL's,
Editor to insert new bookmarks and check for double entries.

Voting system: Select individual persons for a vote,
Editor to create the voting, table view of all actual and past voting's.

Administration: Access by password only for admin,
Manage group, users, projects, resources, timecards,
Check for dead links in bookmarks, delete old threads from the forum.

Todo list: Quick insert of short memos, User with chief status assigns
todo's to others, List view with delete option.

Reminder: Small window that shows the actual events,
Additional option: alert box reminds you before an event.

Search System: Full text search in single module or complete site search.

3.1.3 Primavera Teampay

This tool is a powerful and complex project management tool. Team leaders can quickly initiate new projects by using established best practices, defined deliverables and planned timelines. The project dashboard notifies the project team lead of critical activities, milestones and pending activities that are coming due within the month, week or day. By using a web browser, staff members can record time spent on projects and time remaining to complete their tasks, alert project managers to issues and communicate new requirements.

Resource Managers can plan, allocate and update resources without becoming a project manager. They have the information they need to ensure the right people are working on the right projects. Primavera Teampay helps managers identify over -or under- allocated resources, determine if resource allocation is in alignment with strategic objectives and forecast future resource requirements

Project stakeholders can select and balance portfolios and projects. A customized portal view of mission-critical projects enables them to quickly monitor performance, statistics and status, obtain project information in varying degrees of detail to make critical conclusions

Project Managers and Portfolio Managers have the tools they need

to ensure project success - advanced precision scheduling, resource modeling and leveling and critical path analysis. From summaries by cost account and work breakdown structures to proactive control of project deadlines, issues and risks, project managers can plan, budget, monitor and control projects with this tool [www.primavera.com/products/team_featspecs.html].

3.1.4 Genius Enterprise Projects

It is a web-based project management tool that allows defining an unlimited number of projects, and distributing projects in an unlimited number of databases. It is a good planning tool that has Gantt diagram support and interface with MS Project, Primavera etc. It is also a documentation tool; it provides some documents some of which are Project Status Reports, Incident Reports, Terms of Reference and Functional Specifications. It allows customizing and designing documents.

All Genius Enterprise Project functionality is accessible through an intranet or internet web browser. It has features to read, create or modify the project data in inter/intranet mode, from anywhere in the world. All Genius Enterprise Project documents are adaptable by the user. New fields, lists, graphics, etc. can be added on according to exact requirements [http://www.geniusproject.com/web/sitegep2003.nsf/web/Project_Planning].

3.1.5 Niku Workbench

Niku is a big project management software brand. Workbench is one of its project management, scheduling and tracking tools. It is one of the most powerful tools of this study.

Niku Workbench is a desktop application for project scheduling and management that conforms to and supports the underlying ideals of project management. Fully integrated with Niku 6, Workbench enables project managers to create work breakdown structures (WBS) with tasks and milestones, set baselines, schedule project plans with dependencies,

assign resources to tasks, schedule work on tasks over a period of time, adjust the schedule as actual work is recorded, link master and subprojects and schedule resources across them, and conduct earned value analysis.

Once the project plan is created, tasks can be scheduled with assigned resources for completion. Project schedules are frequently driven by task dependencies and resource constraints. The project scheduling functionality in Niku Workbench is able to access planning and estimating information stored in Niku Projects to accurately schedule projects by using past successes.

For large projects, scheduling can be a complex process that balances task relationships, resource availability and task duration. The auto schedule feature in Niku Workbench is designed to handle just this type of complexity. This feature uses an internal set of rules to create a schedule that takes into account task constraints, dependencies, priorities and resource constraints automatically, generating the best method for project completion. When the plan is approved, the project manager can create a baseline, which gives a snapshot of the project and allows revisions to be compared against the original plan.

Niku Workbench has full access to the resources defined in Niku Projects, including their categories and availability. Once required resources are determined and project tasks allocated, assignments are automatically sent to team members, who can then access their project schedule in Niku Projects. And because Niku Projects is web-based, team members can access this information regardless of their geographic location and without installing any software. Team members have the ability to update project information in accordance with their user rights, entering their actual time and estimate of remaining time on tasks. These updates are reflected in the project schedule, enabling project managers to review, analyze and adjust the estimates as needed.

Project Managers have access to a library of project views in Niku

Workbench, allowing them to customize the information display to their needs. Multiple views supported, including Gantt and Phase Level Gantt charts, as well as logical, PERT-style displays. Organizations can also define and distribute custom views as corporate standards [http://www.niku.com/02-eBusiness_Applications/01-Products/01-Niku_6/niku_workbench.html].

3.1.6 Welcom Open Plan

Open Plan seems a usable tool. It contains many features to make the project manager's task easier, including wizards, templates, shortcuts, and global edits. It has a Windows Explorer-style interface simplifies the organization of multiple projects and associated resources, calendars, and code files information is organized into hierarchical folders, with a user-specific "My Folder."

Open Plan allows projects to be prioritized, ensuring that resource allocation always reflects an organization's overall business objectives. Resource managers can create and share Resource Breakdown Structures across the enterprise. Resources can be allocated manually, according to skill and availability. Alternatively, Open Plan can automatically present solutions that take into account target dates and resource usage across multiple projects [<http://www.welcom.com/content.cfm/node/403>].

Open Plan provides a variety of means for disseminating project data and reports via the Web, including support for both HTML and PDF formats. XML Web reports can be generated and easily viewed. It has a user-defined bar types and styles with multiple bars allowed for each activity in barchart view. It has manual and automatic scaling of linear and nonlinear date scales on bar charts and histograms.

Its multi-user access allows for team collaboration while security ensures that only the appropriate people have access to information. Welcom's Common Security Model (which is used by Open Plan) supports the definition of users, groups, and roles. Each user or group can be

assigned a role with particular security rights. For example, this could allow business managers to have read-only access to multiple projects and project managers' full access to their own projects [<http://www.welcom.com/content.cfm/node/406>].

3.1.7 AMS Realtime

It is a project management, planning, scheduling and cost management tool. It provides data display as bar charts, network diagrams, histograms, tables or any combination of these graphs. This tool has a reporting function called AMS Realtime Vision. It has a big library with 50 pre-defined reports. AMS Realtime has a scheduling and calendar functions.

AMS Realtime Projects can be used to plan work in Gantt chart, spreadsheet or network/dependency modes, as it provides the most powerful GUI of any product. Networked schedules can be constructed, from which a critical path is calculated in real time as activities and constraints are manipulated. Different constraint types are supported on tasks and dependencies.

AMS Realtime Projects provides flexible calendar definitions. Fiscal calendars can be used to define accounting periods for resource, schedule and cost summarization. A calendar can have an unlimited number of holidays/non-working days. Activities can be scheduled based on any calendar and each resource can have their own working calendar.

In this tool resources assigned to tasks can be profiled to reflect their exact workload. Schedules can be baselined into many separate revisions to enable comparison between approved schedule, contracted schedule, and other project baseline revisions. Resource utilization is calculated and displayed in real time, and resource leveling can be invoked to display and implement possible alternatives to meeting a schedule whilst minimizing resource overloads [<http://www.amsrealtime.com/products/documents/>]

AMS_RTProjects_US.pdf].

3.1.8 Primavera Project Planner (P3)

It is designed to handle large-scale, sophisticated and multifaceted projects. To organize projects up to 100,000 activities, P3 provides a lot of resources and target plans [<http://www.w3c.org/TR/1999/REC-html401-19991224/loose.dtd>]. It allows users to define any number of interrelated projects and project groups. Users can simultaneously update, analyze and report on the same project because P3 uses individual record locking, providing maximum concurrent access to your data. There is a security assurance that P3 can restrict access to certain project data by task, resource, phase or user-defined filter. Project managers can assign read/write, read-only, exclusive-access or no-access on a project level.

P3 has a good graphical interface to plan and manage and report on the projects, it has colored bands to organize data by project code, activity code, resource, cost accounts, WBS, and more. For example, Project managers can organize, filter, summarize, and report on values such as project manager, project location, priority, division or resource.

P3 has scheduling and resource leveling options, including backward resource leveling, smoothing and the ability to level selected portions of a project. Scheduling can be done manually or automatically. It has 150 customizable reports and graphics to report on project goals and priorities. The Primavera Post Office enables remote project team members to receive, update and return activity status via e-mail. Use one or all to keep everyone informed and working towards the same goals [<http://www.w3.org/TR/1998/REC-html40-19980424/loose.dtd>].

3.1.9 Primavera Enterprise

It is another task and resource management tool that team leaders can quickly initiate new projects by using established practices, defined deliverables and planned timelines. The project dashboard notifies the

project team lead of critical activities, milestones and pending activities that are coming due within the month, week or day. Functional and resource managers can plan, allocate and update resources without becoming a project manager. They have the information they need to ensure the right people are working on the right projects. Primavera Enterprise helps managers clearly identify over- or under-allocated resources, determine if resource allocation is in alignment with strategic objectives and forecast future resource requirements [<http://www.w3c.org/TR/1999/REC-html401-19991224/loose.dtd>].

3.1.10 Projistics

It is an enterprise software that provides a framework to maintain project related information, provides a collaboration platform for a company to communicate with its vendors and clients, tracks resource usage and provides enterprise-level reporting.

It fulfils the following requirements [<http://www.projistics.com/site/pt1.asp>]:

- Project Planning
- Collaboration and communication
- Accountability
- Project tracking
- Company-wide cross-project analysis

3.1.11. Primavera PrimeContract

It is one of the tools of Primavera that focused on providing commerce, communication and project control for owners, designers, contractors, subcontractors, and suppliers.

It allows project owners and contractors to use project workflow

templates to track project milestones, generate and route project documents, and create task lists online in a secure environment. With PrimeContract Collaboration, project teams can host threaded discussions, post industry and project news, and broadcast events. Real time information with e-mail notification provides the most accurate and up-to-date project data to each member of the project team anytime, anywhere [<http://www.projistics.com/site/pt1.asp>].

3.1.12 Aceproject

It allows managing an unlimited number of projects within an organization. For example, a business can have three projects headed by three different project managers. Each manager working differently, they can organize their projects along their preferences, defining assigned users, task groups, task types, statuses, and priorities.

It has a multiple user management function that each user can be assigned to several projects. Each task within a project is assigned to a specific user, member of the project.

In Aceproject every task offers some characteristics for an efficient management which are:

- Summary and details,
- Status, priority, group, and type,
- Estimated hours to completion, percentage of completion,
- Last modification, creation, start and end dates,
- Assigned user and reviewer,
- File attachments.

It has statistics and reports for the business leader, the project manager and the team member. It has Gantt charts sorted on a monthly

basis and also illustrate the level of completion of each task, making it easy to see what remains to be done.

It has calendar feature shows task deadlines in a monthly format. Each tasks start and end dates are displayed for each month.

It has an “employee time sheet tracking and approval” function that every user fills out his/her time sheet on a weekly basis. When time sheets are completed, users can send an approval request to their project manager using the email notification feature. Project managers can then approve or reject time sheets. When time sheets are approved, project managers can see how much time each employee has spent on each project.

Aceproject offers two security levels: Administrator and Normal.

Each user may decide to receive an email when he or she is assigned to a new task or when one of his or her tasks is modified.

It has a file attachment feature lets user attach files such as screenshots, images and text documents to tasks.

Each user can specify his or her preferences, adapting Aceproject to his or her use of the system. The user can configure several parameters:

- Password, e-mail address, telephone number,
- The default project to open upon login,
- The activation of email notification when a new task is assigned to the user, or when an existing task is modified.

It has a discussion forum that permits creating as many topics as anyone need in a project. This helps teams improve communications while leaving a record of those conversations.

It has a message center that sends messages to a specific user or a

whole project team knows when you have new messages waiting and know when others read your messages [<http://www.aceproject.com/features.htm>].

3.1.13 Primavera SureTrak

It is one of the project management tools that allow customizing the reports and layouts. It also shows the next week's work in days and the rest of the project in months or years. It has a PERT view which makes it even easier to insert activities, rearrange them, and put them in sequence to model the flow of work. Web Publishing is an integral part of SureTrak. It allows saving layouts and reports in HTML format. Then it allows using the Web Publishing Wizard to group and sorting tabular and graphical reports and layouts into one comprehensive project Web site for the whole team to see. The SureTrak web publishing capability delivers easy access to assignments, deadlines, and project status. It allows using e-mail to send project, screen captures, and selected activities to team members so they can update their work with the Primavera Post Office. When you receive updated project information by e-mail you can audit the information for accuracy, approve it, and automatically merge the updates into the project schedule [http://www.primavera.com/products/sure_featspecs.html].

3.1.14 C-Brat Project

It is a web enabled project management tool which has a feature of risk analyze and evaluation system. It has some features of task management; GANTT charts provide task status, project critical path, and actual baseline comparisons. It manages geographically diverse project teams, in real-time from one central location, with multi-user access.

In addition to these options, C-Bratt Project's standard features include the Oracle Database, Microsoft Project data import, project tree structure, and task and resource information. Project data protection is provided via user authentication [<http://www.cbratproject.com>].

3.1.15 Project Kickstart

It is a simple project management tool which has helpful features such as the "*Knowledge Libraries*" of Phases, Goals and Obstacles serve as both a handy reference and a repository for company-specific information.

Its Gantt chart provides a timeline for each task in your schedule. It has "hot links" with Outlook, Word, Excel and Project. It has a feature for one click transfer of project data to Microsoft Project and import from it [<http://www.projectkickstart.com/html/downpkswin3.htm>].

It has 10 sample projects which are Client Server, Training Seminar, Quality Certification, Web development, Golf Tournament, Home Construction, Company Newsletter, Product Development, Presentation, Event planning.

3.1.16 E-Taskmaker

It is a project planning software which enables project planners and estimators to quickly and easily prepare detailed, professional project schedules complete with task descriptions, durations, resource assignments and customized predecessor logic for export to project management software [<http://www.interplansystems.com>].

3.2 Project Portfolio Management

Project portfolio management is a kind of management approach that organizes a series of projects into a single portfolio consisting of reports which capture project objectives, costs, timelines, accomplishments, resources, risks and other critical factors. Executives can then regularly review entire portfolios, spread resources appropriately and adjust projects to produce the highest departmental returns [<http://www.computerworld.com/managementtopics/management/story/0,10801,69129,00.html>].

This portfolio management approach has some benefits, one of which is to give executives a bird's-eye view of projects so they can spot redundancies and keep close tabs on progress. It also helps reducing risks and produces a higher rate of return. It helps executives see where money is spent, why projects are or aren't necessary and what resources are needed [http://www.computerworld.com/managementtopics/management/story /0,10801,69129,00.html].

For Cabanis-Brewin there are three important reasons that make project portfolio management attractive for project managers which are realism, rationality and visibility [http://www.developer.com/mgmt/article.php/ 3099031].

Realism: Especially with bad estimates made by managers, project failure often begins with unrealistic targets, deadlines, and budgets. Project portfolio management aligns what an organization wants to do with the resources—the money, hours, people, time, and equipment—required to get it done.

Rationality: Project portfolio management brings rationality in the allocation of resources, both human and financial. It is an important process to establish budgets, and define start and finish dates. Future projects or programs are also forecasted and added to the organization's potential portfolio of work.

Visibility: Project portfolio management brings visibility to project work and project people. To manage a portfolio you should see what each person in the pool of potential project personnel is capable of, and when they will be available.

In portfolio management approach it is advised to “use case studies to identify businesses benefits and then quantify those benefits against our organization's current situation”. It is also advised to go with using gurus, enterprise leaders and senior-level colleagues to support our business case

[<http://www.cio.com/archive/101503/exchange.html>]

Finally, project portfolio management would be an important approach for Turkish Armed Forces (TAF) for project management. TAF has a lot of projects some of which has million dollar budgets. These projects are managed separately, and mostly there is no information flow among them. In these projects, objectives, costs, accomplishments, resources and risks should be managed or coordinated by an authority to reduce risks and produce a higher rate of return.

3.3 Project Management Tools Chosen For This Study

In this study project management tools are evaluated for usage for Turkish Land Forces Command (TLFC) information systems (IS) outsourcing projects.

At the beginning of the study, some interviews are made with some of the IS officials and experts in TLFC to get an idea about the requirements about the features of a project management tool. In the direction of the ideas of these experts, some important features for a project management tool for TLFC have been compiled. These features are used to evaluate and compare project management tools which are given in Section 3.1. Explanations of these features are indicated in Table 1.

While this research was being made, it has been seen that different kinds of project management tools exist in project management literature [Fox&Spence,1998]. It is observed that some of the products such as Rational Rose and ARIS are especially used for modeling the processes in projects. They are technical software and do not meet the needs of TLFC which requires a project management tool that helps a project manager(PM) to manage, track, plan and schedule all resources(esp. time, personnel and money). This should be easy for the PM and there should not be technical details to annoy him/her. The second requirement is that the personnel of the project should communicate with each other via this

product.

Table 1: Explanations of the features of the project management tools.

	FEATURES	EXPLANATIONS
1	RESOURCE PLANNING	planning time and human resources
2	TEMPLATE & REPORT SUPPORT	templates for reports needed for staff to present PM
3	TASK MANAGEMENT	allows project manager to assign tasks and missions to related staff, to see on which staff what tasks are assigned
4	WEB-INTRANET SUPPORT	support for web and intranet.
5	OPEN SOURCE	availability to change and add sth. to source code
6	WBS	work breakdown structure
7	DIAGRAM SUPPORT	diagrams like Gantt , PERT etc...
8	FILE ATTACHMENTS	support for file transfer among member staff
9	E-MAIL NOTIFICATION	notify about events (meetings and tasks like Outlook Express
10	CUSTOMIZATION	allows customization for functions and features
11	DOCUMENT MANAGEMENT	support as an edit tool (cut , paste, save etc...)
12	FISCAL PLANNING	planning the budget of the resources
13	MULTI PROJECTS MULTI USER	support for more than one projects, relationships between them and support one user working in more than one projects
14	CENTRAL RESOURCE POOL	support for a system that a project manager can use a staff that is belong to another project or department.

15 project management tools are chosen to be examined for TLFC requirements. Not only high-level, complex and expensive products (like Primavera Teampay, Niku Workbench and Genius Enterprise Project), but also small, simple and cheap products (like Project Kickstart and E-Task Maker) were included in the survey. Some of these tools are from the same product family like Primavera products.

Microsoft Project is excluded from this selection, mainly because it is more complex than the other project management tools. Managers of TLFC acquisition and outsourcing projects are field officers of Turkish Army. They are assigned to these tasks without such a training of information technologies and are not accustomed to such complex software. Other 15 tools which were selected for our study are more comfortable than MS Project and have practical features for new users of these kinds of project management tools. Furthermore, the difficulty of interfacing has pushed MS Project to a low position in the scale of preference. Lastly, it is already available to TLFC staff but its level of usage has been observed to be very low. This study, in fact, has been essentially the search for a viable alternative to MS Project.

Some of these tools also function as project portfolio management tools. Especially Primavera Teamplay and Niku Workbench are good examples for this. These tools are developed to support not only one project but also portfolios of projects. They have a central resource pool that helps the manager of a system to allocate resources in more than one project.

3.4 Explanation of the Tool Survey

Project management tool features survey aims to get an idea for evaluation of the features which are common for a project management tool. These features were specified by the help of the tools documents which were especially found from web and by the help of ideas of specialists of IS business in Turkish Armed Forces (TAF). Evaluation was also made by these specialists who were chosen by the author among the personnel of TAF who were especially from the Turkish Land Forces Command (TLFC). These personnel are all assigned to IS departments in the TAF and they all have experience in IS projects implemented by TAF.

In our study the Delphi technique has been used for deciding on the importance of tool features. The Delphi technique has been described as “a

method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem” [<http://www.britishcouncil.org/learning-innovation-awards-delphinu>]. Another definition is “A technique that was originally conceived as a way to obtain the opinion of experts without necessarily bringing them together face to face”[<http://www.w3c.org/TR/1999/REC-html401-19991224/loose.dtd>]

It is a means of group decision making representing one of the first formalized methods of systematically obtaining and aggregating group judgments. It was developed at the Rand Corporation in late 1960s. It is especially effective for technological forecasts. Technological experts, typically composed of people who represent a wide range of professional modes of inquiry, fill a questionnaire about future events, and the responses are summarized and returned to participants. They then complete a new questionnaire based on their own previous responses and the estimates of other experts [<http://www.ie.metu.edu.tr/~ie704/Delphi/delphi.html>].

In our study this technique was used while making a survey with Turkish Land Forces Command staff. They were asked about their aspects and ideas about required features for a project management tracking, scheduling and planning tool. Each specialist responded to the questions about evaluating the features of a required tool individually. After all answers were obtained from specialists, they were evaluated and their arithmetic average was calculated. This value was accepted as a result of the evaluation of the TLFC specialists.

Evaluation of project management tools features made by these specialists is indicated in Table 2. In this table these six personnel (mostly from Turkish Land Forces Command) are symbolized by the alphabetic characters between A and F. They were asked about these 14 features to evaluate their importance for an IS outsourcing project. The evaluation of

this staff was enumerated by the author in a scale of 1 to 5:

- 5** : it is a vital feature.
- 4** : important feature, the tool should have it.
- 3** : the feature is required, but not critical.
- 2** : it is weakly required
- 1** : it is not required, useless feature.

Table 2: Evaluation of project management tools features.

	FEATURES	A	B	C	D	E	F	average
1	RESOURCE PLANNING	5	5	5	5	5	4	5
2	TEMPLATE & REPORT SUPPORT	5	5	5	4	5	5	5
3	TASK MANAGEMENT	5	5	4	5	5	5	5
4	WEB-INTRANET SUPPORT	4	5	5	5	4	5	5
5	OPEN SOURCE	5	5	5	4	4	5	5
6	WBS	5	4	4	5	5	4	5
7	DIAGRAM SUPPORT	4	3	4	4	4	4	4
8	FILE ATTACHMENTS	3	4	4	4	4	4	4
9	E-MAIL NOTIFICATION	4	4	4	4	4	3	4
10	CUSTOMIZATION	4	4	3	4	3	4	4
11	DOCUMENT MANAGEMENT	2	3	3	4	3	3	3
12	FISCAL PLANNING	3	3	3	3	4	3	3
13	MULTI PROJECTS MULTI USER	3	2	2	2	3	3	3
14	CENTRAL RESOURCE POOL	2	2	2	3	2	2	2

It is easily seen from the table that this evaluation accumulated between the numbers of 5-3.

After this evaluation of tools features, the table that shows all these features of 15 project management tools are multiplied by the values

inferred from the evaluations which are given by Turkish Armed Forces specialist personnel of IS projects.

The level of support for various features is evaluated on a six point scale where zero indicates definite lack of support and five indicates full support.

After these simple feature values and weights (shown in Table 2) were multiplied, we got weighted average value for a tool. These final values are the criteria/final points for the evaluation of these 15 project management tools. The maximum value for this weighted average could be 20,4. Table 3 includes both values which are weighted or simple. Simple values are indicated in parentheses in all columns including weighted average column in which these values are shown by a decimal number.

In this table, it is easily seen that first five tools that have a weighted value over 14 are close to each other. As indicated before, Primavera Teamplay and Niku Workbench are good samples for project portfolio management tools. They generally have critical features which are weighted by 5 (like task management, resource planning etc.) completely.

In literature, there were some project management tool surveys. One of an important survey was made by Fox&Spence in 1998. They evaluated the ideas of 159 project managers. As different from our study, they didn't examine tools features but evaluation of tools by project managers. For instance they asked from project managers to evaluate the project management tools of their satisfaction, training hours, amount of adequacy, primary usage, exclusivity and frequency of usage [Fox&Spence,1998]. As we are searching a tool that satisfies TLFC acquisition projects requirements and trying to make the project managers usage of a tool comfortable, we ought to get the ideas of TLFC project member staff to find and customize a tool for their requirements.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
		RESOURCE PLANNING	TEMPLATE & REPORT SUPPORT	TASK MANAGEMENT	WEB-INTRANET SUPPORT	OPEN SOURCE	WBS	DIAGRAM SUPPORT (e.g.GANTT CHART)	FILE ATTACHMENTS	E-MAIL NOTIFICATION	CUSTOMIZATION	DOCUMENT MANAGEMENT	FISCAL PLANNING	MULTIPLE PROJECT MULTI-USER	CENTRAL RESOURCE POOL	AVERAGE
	weights	5	5	5	5	5	5	4	4	4	4	3	3	3	2	
1	PHPROJEKT	20(4)	20(4)	20(4)	25(5)	25(5)	10(2)	16(4)	16(4)	16(4)	20(5)	9(3)	6(2)	15(5)	8(4)	16 (3.9)
2	NIKU WORKBENCH	25(5)	20(4)	25(5)	25(5)	0(0)	20(4)	20(5)	16(4)	12(3)	12(3)	12(4)	12(4)	9(3)	4(2)	15 (3.7)
3	PRIMAVERA TEAMPLAY	25(5)	25(5)	25(5)	25(5)	0(0)	20(4)	16(4)	8(2)	8(2)	16(4)	9(3)	12(4)	15(5)	8(4)	15 (3.7)
4	GENIOUS ENTERPRISE PROJECT	25(5)	20(4)	25(5)	20(4)	0(0)	10(2)	20(5)	12(3)	12(3)	16(4)	12(4)	15(5)	12(4)	8(4)	15 (3.7)
5	WELCOM OPEN PLAN	25(5)	15(3)	25(5)	20(4)	0(0)	20(4)	20(5)	12(3)	12(3)	16(4)	12(4)	9(3)	12(4)	8(4)	15 (3.7)
6	AMS REAL TIME	25(5)	25(5)	25(5)	20(4)	0(0)	15(3)	16(4)	8(2)	8(2)	16(4)	12(4)	12(4)	12(4)	6(3)	14 (3.5)
7	PRIMAVERA PROJECT PLANNER	20(4)	20(4)	20(4)	25(5)	0(0)	20(4)	12(3)	16(4)	16(4)	12(3)	6(2)	9(3)	12(4)	2(1)	14 (3.3)
8	PRIMAVERA ENTERPRISE	25(5)	15(3)	25(5)	20(4)	0(0)	20(4)	16(4)	4(1)	4(1)	16(4)	6(2)	9(3)	12(4)	6(3)	13 (3.1)
9	PROJISTICS	25(5)	15(3)	20(4)	20(4)	0(0)	10(2)	8(2)	12(3)	16(4)	16(4)	12(4)	6(2)	3(1)	4(2)	12 (2.9)
10	PRIMAVERA PRIME CONTRACT	15(3)	15(3)	15(3)	20(4)	0(0)	5(1)	8(2)	4(1)	16(4)	12(3)	9(3)	12(4)	12(4)	2(1)	10 (2.6)
11	ACEPROJECT	5(1)	15(3)	25(5)	10(2)	0(0)	5(1)	16(4)	16(4)	16(4)	8(2)	9(3)	3(1)	12(4)	4(2)	10 (2.6)
12	PRIMAVERA SURE TRAK	10(2)	20(4)	15(3)	20(4)	0(0)	5(1)	16(4)	12(3)	12(3)	16(4)	6(2)	3(1)	3(1)	2(1)	10 (2.4)
13	C-BRAT	15(3)	5(1)	20(4)	5(1)	0(0)	5(1)	16(4)	16(4)	4(1)	4(1)	15(5)	9(3)	9(3)	2(1)	9 (2.3)
14	E-TASK MAKER	15(3)	20(4)	15(3)	5(1)	0(0)	10(2)	12(3)	4(1)	4(1)	12(3)	6(2)	3(1)	3(1)	2(1)	8 (1.9)
15	PROJECT KICKSTART	15(3)	15(3)	15(3)	15(3)	0(0)	5(1)	12(3)	8(2)	4(1)	4(1)	9(3)	3(1)	3(1)	2(1)	8 (1.9)

Table 3: Evaluation of project management tools.

CHAPTER 4

REQUIREMENTS AND DESIGN FOR A PROJECT MANAGEMENT TOOL FOR INFORMATION SYSTEMS OUTSOURCING PROJECTS IN TLFC

Turkish Land Forces Command Software Intensive Acquisition Process starts with Identifying the Mission Need Phase. Our study comprises the processes between Establishing the Project Office and Disposal from Inventory Phase. This choice is made due to the fact that project management activities begin after project office establishment. Before project office establishment, activities are carried out by Ministry of Defence, Turkish Armed Forces Command and TLFC Headquarters. These activities are not team or project activities but generally correspondence between military offices.

For TLFC Software Intensive Acquisition Process there are some models proposed by TLFC members who studied this subject [Çalkayış, 2001; Bilir 2002]. These proposed models were excluded from our study because our aim is to contribute to the current system rather than proposing a new one. Our references consist of existing military instructions and TLFC software acquisition projects documents.

4.1 Possible Requirements for a Project Management Tool for Information Systems Outsourcing Projects in TLFC

These requirements are prepared by the help of the ideas of a personnel of TLFC who work in software acquisition and IS outsourcing projects. Requirements are classified according to their subjects. These

requirements are specified in Software Requirements Specification document [Appendix-C]. Possible requirements for a project management tool for software acquisition and IS outsourcing projects in TLFC are:

1. The tool must allow PM to track the project.
2. The PM must be able to see the phases of the project.
3. The PM must be able to see the milestones of the project.
4. The tool must allow PM to see the project is behind or ahead of the schedule.
5. The tool must enable PM managing tasks.
6. The PM must be able to edit task information.
7. The PM must manage the time.
8. The PM must be able to determine the start/finish dates.
9. The PM must be able to assign relationships to tasks (changes task's being dependent or independent)
10. The PM must manage resources:
11. The tool must allow defining individual hour rates.
12. The tool must allow PM to see the changes if he make any change by the amount of working time and number of human resource.
13. The tool must allow PM to divide the project into subprojects as he likes.
14. Each subproject must be a part of a main project and changes must be synchronized automatically.
15. The tool must notify the PM :
 - About the schedule when the project is behind or ahead of it.

- About the missions of staff that he/she must control.
- About the meetings and activities he/she organized and being responsible.

16. The tool must give unlimited support for standard reports and documents.

17. The tool must allow staff members to get these documents, to edit and change them.

18. The tool must allow project staff to communicate each other.

19. The tool must allow to horizontal communication as well as vertical communication.

20. The tool must allow to share, get and send documents and files between staff.

21. The tool must allow displays like GANTT or PERT charts which are accepted worldwide.

22. The tool must allow multiple project support.

23. The tool must allow multi-user support.

24. The tool must support Intranet for the I/T infrastructure of TLFC.

25. The tool must allow users to show and plan their activities by WBS.

26. The tool must allow web support for communication with the software company.

27. The tool must support some checklists in each phase that would be prerequisites of passing to next phase.

4.2 Analysis of Phprojekt for TLFC Project Management Requirements

Phprojekt has a lot of functions suitable for a project management and communication tool for TLFC. Some of these important features are:

“Projects” is the most important module of Phprojekt for project management. Projects are indicated with their progress status, statistics and timeline. Projects beginning and ending time, category, status, project leader and hourly rate are also indicated. From the project form, PM can edit these properties and create subprojects and notes.

There is some deficiency in the projects module. Alternatively “Acquisition Process Module”, there can be a template that satisfies the needs of TLFC which helps the project manager to see all the project phases with the documents that he must fulfill.

This module must also help PM to assign missions to the project staff to prepare these documents.

This module must also help PM for tracking project phases.

For a users view, this module must enable users to see all the phases, all the documents in these phases, their status and PM notes for the missions.

4.3 Preparation of the SRS Document

The Software Requirements Specification Document for The Acquisition Process Module for Phprojekt 4.1 [Appendix-C] was prepared by the help of the ideas of Turkish Armed Forces personnel about requirements of a project management tool for TLFC software acquisition projects. After these ideas were analyzed, Phprojekt was chosen as a suitable project management tool. As an adaptation of Phprojekt to the requirements of TLFC, an Acquisition Process Module was needed to be developed as an attachment to the original software. Requirements of this module were specified in the SRS document.

The SRS document is prepared in compliance with IEEE Std 830-1998, SRS Recommended Practice for Software Requirements Specifications. It complies with the templates recommended in this standard. Third template of the standard is used to specify the “Specific Requirements Section” of the SRS document.

After being prepared, this SRS document was verified by the author with the criteria specified in IEEE Standard 830-1998. When compared with the needs of TLFC personnel, it is observed that the requirements in the SRS document agree with them correctly. Every term which was used in the SRS document has one meaning and for some terms and abbreviations the glossary was prepared.

In the SRS document, the significant requirements such as specific requirements which are based on user interfaces and functional requirements are specified. Besides the definition of user interface requirements, their inputs, outputs and relationships to other input and outputs were specified in Section 2 which is named Specific Requirements.

Because all the requirements specified in the SRS are essential (there is no optional or conditional requirement), there was no ranking between the requirements. In the SRS document references were used to make the document easy-to-use.

4.4 Design of a Project Management Infrastructure Based On Phprojekt

4.4.1 Preparation of the SDD Document

Software Design Description Document prepared for the Acquisition Process Module for Phprojekt 4.1 [Appendix-D] shows how the software system will be structured to satisfy the requirements identified in the SRS document. It is a translation of requirements into a description of the software structure, software components, interfaces, and data necessary for the implementation phase [IEEE Std 1016-1998].

The SDD document has been prepared in compliance with the standard called IEEE Recommended Practice for Software Design Descriptions [IEEE Std 1016-1998].

After being prepared, this SDD document was tested by the author with the criteria specified in a standard of Tuffley Computer Services [<http://www.tuffley.aust.com/tcs20004contents.htm>] which has a compliance with IEEE Std 1016-1998. It was tested by the author that all the requirements specified in the SRS were satisfied by design entities in the SDD. Each design entity described in the SDD document satisfies a specific requirement specified in the Software Requirements Specification.

The SDD addresses each issue specified in IEEE standard. But if a paragraph heading is not applicable to the design it is not included in the document. It is observed by the author that the SDD document provides all information that the programmer requires coding the module described.

4.5 Implementation of the Module (APMP)

APMP was developed in Turkish as Phprojekt supports it. While Phprojekt was developed in PHP, APMP interfaces were developed in ASP and added to original software. These interfaces were added to the “addons” folder which was under the Phprojekt folder by the name of “Tedarik Süreci”(as :\Phprojekt\addons\Tedarik Süreci). While testing the APMP, WinMySQL v1.4 was used as a database platform and IIS v5.1 was used as a server support.

To evaluate the APMP by the users, five TLFC staff were asked to express their ideas as explained in page 44. Besides APMP, these staff examined and commented all the modules of Phprojekt.

CHAPTER 5

EVALUATION AND CONCLUSION

5.1 Evaluation

Phprojekt, which is proposed within this study as a suitable project management tool for TLFC, is selected after evaluated by 14 features among 15 project management tools. It is obvious that no project management tool alone is specific enough to satisfy the needs of TLFC requirements for an acquisition process. Acquisition Process Module for Phprojekt (APMP) is developed for this reason.

This module helps a project manager to follow the steps of acquisition process of TLFC easily. In each acquisition phase the project manager is informed about the documents to be prepared. APMP directs the project manager to the suitable modules of Phprojekt.

It could be easily seen that APMP is very simple and provides an easy to use interface for every user. It is prepared in Turkish as Phprojekt supports this language. Its interfaces are also compatible with Phprojekt. Required explanations for project managers about the acquisition process of TLFC are given in these interfaces.

Phprojekt is freeware and open source software. TLFC personnel can easily use this software both at work and home regardless of license problem.

One of the best qualifications of the Phprojekt is its unlimited customizability because it's free software. Its settings and screens can be

set by the user, furthermore its functions and modules can be deleted or new ones can be added by changing its source code.

The most important disadvantage of APMP is its not being suitable for any other software. It is not a standalone application and depends on Phprojekt 4.1. Another handicap is that it was designed for current acquisition process which has some problems as explained in Chapter 2. But it can be easily adapted to another project management software on condition that it must be an open source one. Similarly APMP can easily be adapted to a new acquisition process of TLFC.

As an evaluation of APMP for fulfilling requirements of TLFC acquisition project management, it could be easily said that APMP satisfies most of the requirements of TLFC.

APMP is also by five TLFC staff members who are working in a software acquisition or information systems outsourcing projects. All of them found Phprojekt a useful project management tool as required for TLFC software acquisition projects. "Open source" feature is appreciated by three staff. They all evaluated APMP as a successful application. Three of them stated that they would use this tool in their project management activities. Two of them appreciated Phprojekt's Turkish language support but one of them warned for some of words used in English in some interfaces and menus of the original software. After this warning, interfaces of Phprojekt have been implemented entirely in Turkish.

5.2 Conclusion

Within this study, a project management, tracking, scheduling and communication tool support for TLFC software acquisition and IS outsourcing projects is proposed. Starting with the literature overview, acquisition models in literature and proposed models for TLFC acquisition projects are analyzed.

APMP can be further developed. A particular possibility is incorporating an optional feature that dictates the specific staff to be

assigned to specific tasks. The current version allows the user define any assignment under any task with no restriction.

After the general literature review, features of project management tools are examined. 15 project management tools evaluated with the evaluation criteria of army personnel working in IS business. This tool survey showed that Phprojekt is the most suitable for TLFC requirements for a project management tool. Because of Phprojekt is open source software it is adapted for TLFC requirements by adding an Acquisition Process Module.

While choosing project management tools a wide range is used. Expensive, cheap, simple and complex tools are evaluated together.

As discussed in the preceding section, APMP helps a project manager to track the acquisition phases easily. Phprojekt also has some project tracking functions that satisfies the tracking requirements of TLFC. Phprojekt has functions for editing task information.

Concerning managing time, Phprojekt satisfies the TLFC acquisition process requirements. Its timecard system is suitable for assigning working hours to staff and making overview periodically. Its calendar function has single and group mode that helps project member staff in planning and visualizing their activities in an easy manner.

The tool also has file attachment and e-mail notification system which are the important requirements of TLFC acquisition project management. The reminder function helps member staff and project manager to be reminded about all activities and tasks.

5.3 Future Work

To make Phprojekt and APMP more useful, users of the software must be trained. Users must read the help menu of Phprojekt carefully.

They can try the demo version on its web site* to learn Phprojekt. Users must also do the settings after installing the software.

This study is limited to current acquisition process of TLFC. If this acquisition process changes, APMP can easily be adapted to new acquisition processes of TLFC in the future. Its source code is open and can be upgraded or revised by any software developer.

This study is also limited to project management, scheduling, tracking and communication tools. There are various kinds of tools used in project management for risk management and project modeling purposes. A similar study can be done about different kinds of tools for TLFC acquisition project management in the future.

Open source and freeware project management tools could not be found easily during this research. Phprojekt was the only suitable software among the freeware project management tools. In the future more comprehensive project management tools can be developed. APMP can be adapted to such kinds of a project management tools.

After implementation of APMP, it was evaluated by the author and the users in a limited time. This evaluation may be performed in a comfortable and long time period. In a such time period to evaluate APMP, it could be installed to related departments of TLFC and tried by the project managers and staff members in software acquisition projects. After used in these projects, APMP could be evaluated more precisely.

* <http://www.phprojekt.com/demo/index.php>

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APPENDICES

APPENDIX-A

DIAGRAMS OF SOFTWARE ACQUISITION PHASES IN TLFC

Notation: The processes realized in acquisition management of TLFC, are presented below (Appendix A and C) according to the activity diagram formalism [Dumas,2001]. In particular responsible parties in various activities are represented as horizontal slices in some of the diagrams.

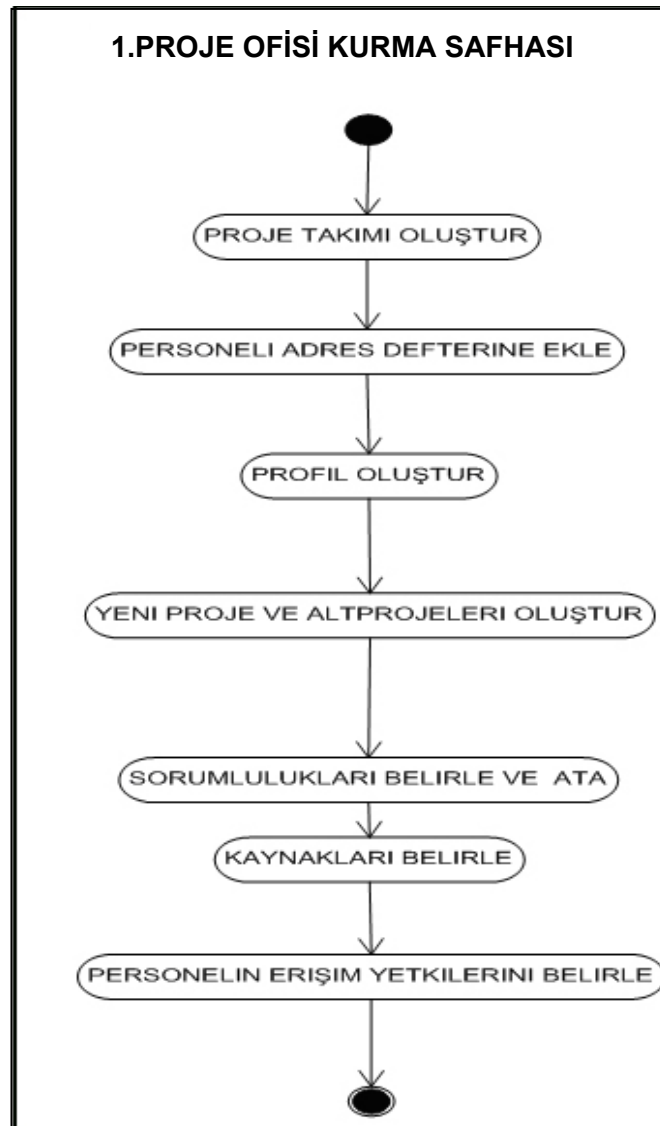


Figure 1- Phase 1 of Acquisition Process of TLFC

2.HAZIRLIK SAFHASI

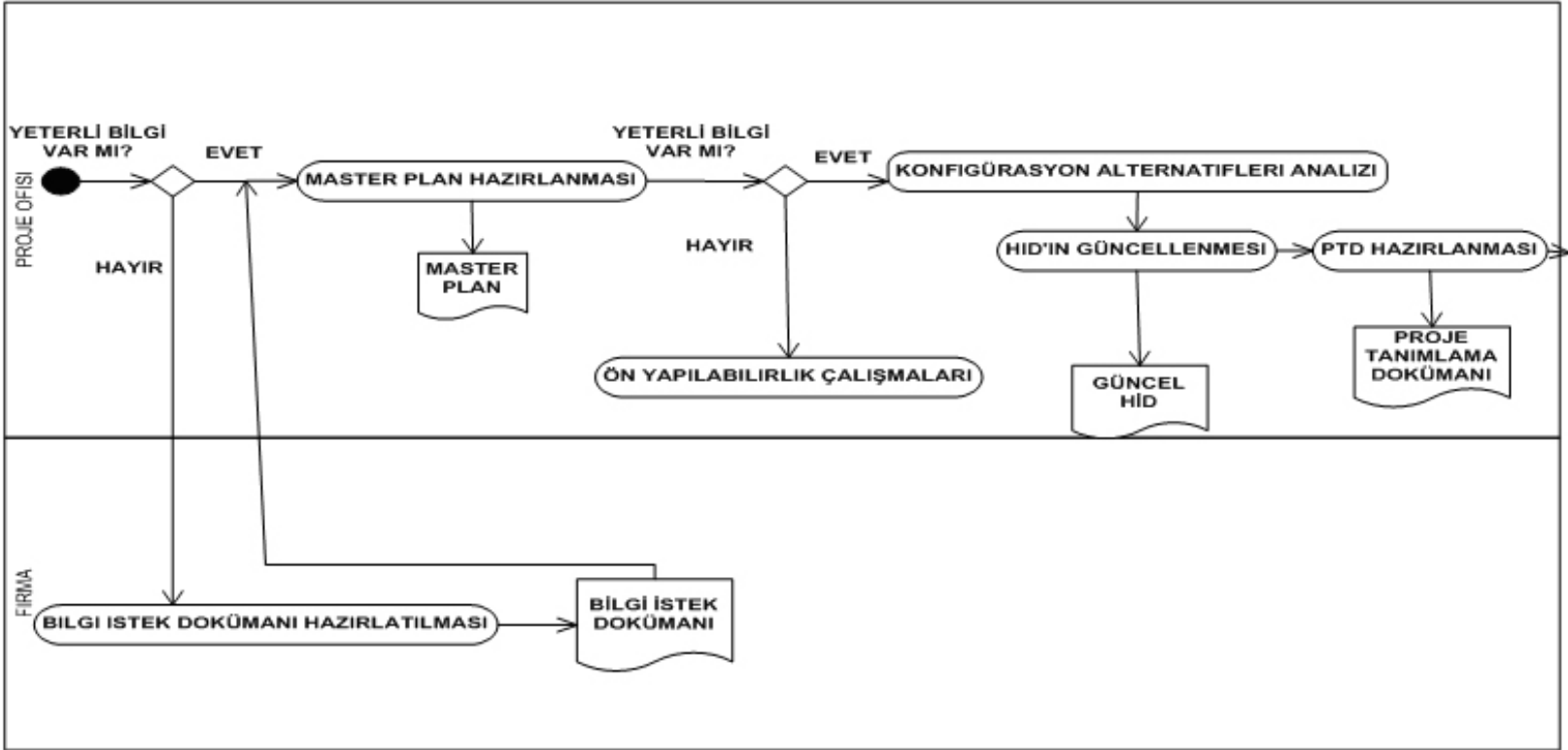


Figure 2- Phase 2 of Acquisition Process of TLFC

3.TASARIM SAFHASI

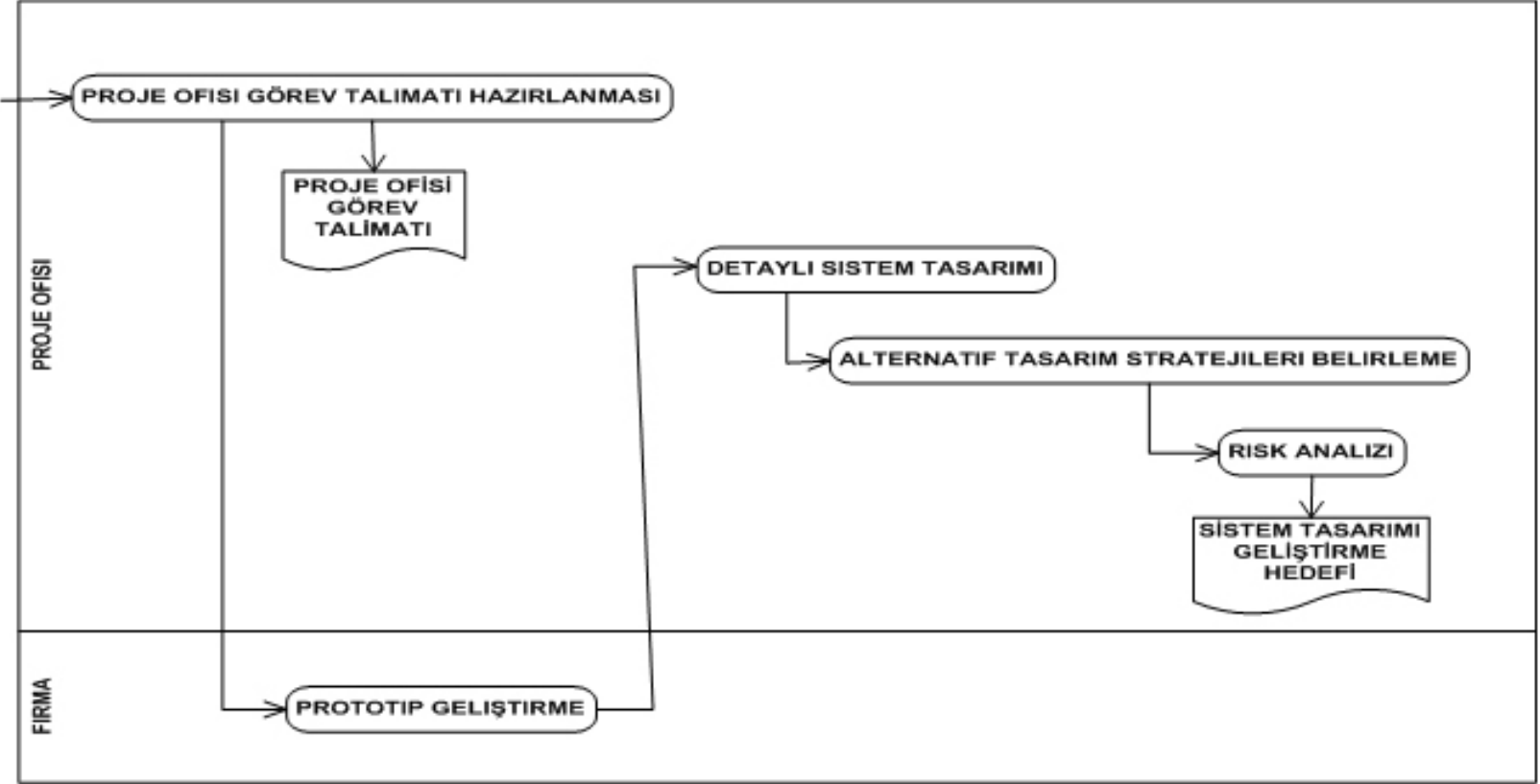


Figure 3- Phase 3 of Acquisition Process of TLFC

4.GELİŞTİRME SAFHASI

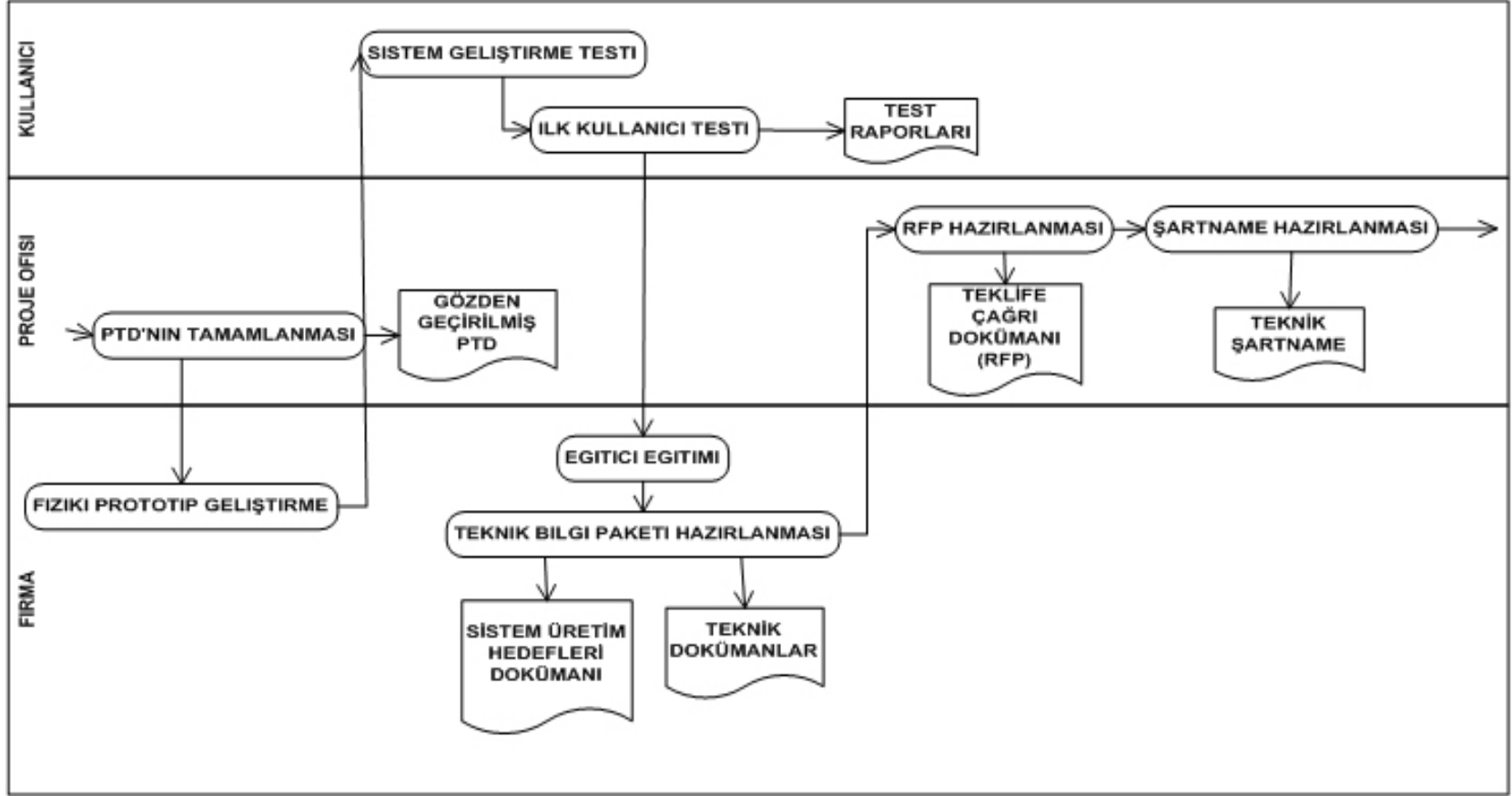


Figure 4- Phase 4 of Acquisition Process of TLFC

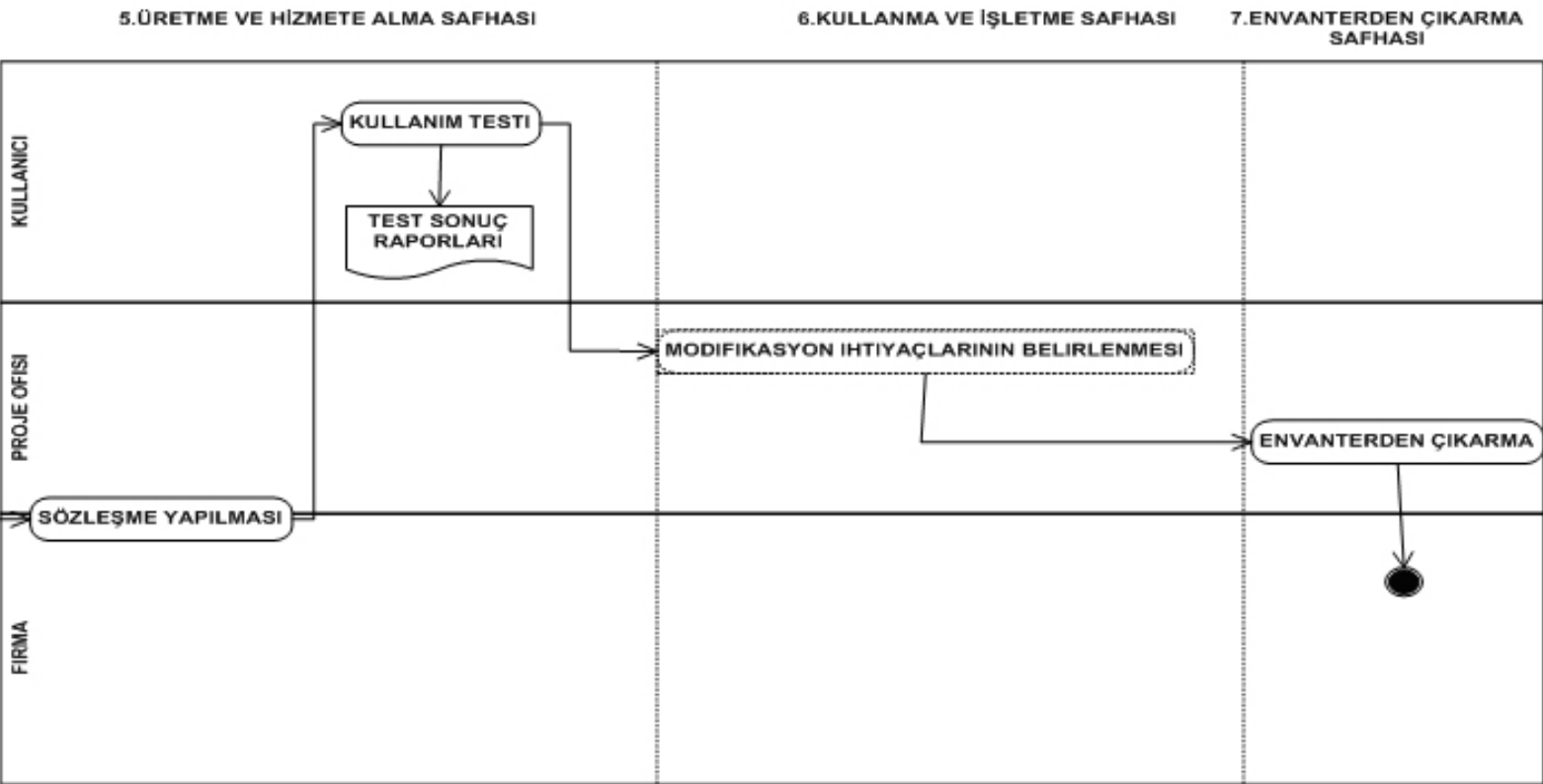


Figure 5- Phases 5,6 amd 7 of Acquisition Process of TLFC

APPENDIX-B

USER INTERFACES

1. Decision Interfaces

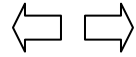
This is a sample of a decision interface:

Master Plan yapmak için elinizde yeterli bilgi var mı?

- Sistem ihtiyaçlarını bütün yönleri ile tanımlamak için proje ofisi veya tespit edilecek kuruluşlar tarafından Master Plan hazırlanabilir.
- Master Planı hazırlamak için tek kaynak veya ihale yöntemi ve MSB.İği kanalı ile ihtiyaç duyulan hizmet satın alınır.
- K.K.K.İğınca doğrudan yürütülmesi planlanan projeler için ihtiyaç duyulan ödenek Loj.K.İğına aktarılarak Master Plan veya Yapılabilirlik Etüdü için gerekli hizmet ilgili kuruluş veya firmalardan alınır.
- Master plan için uygulanacak standart bir form yoktur. Projenin özelliğine göre düzenlenebilir.
- Bu hizmetlerin alınabilmesi için üniversiteler veya araştırma kuruluşları ile işbirliği yapılabilir.

Evet

Hayir



2. Task Assignment Interfaces:

This is a sample of a task assignment interface:

Proje Tanımlama Dokümanı(PTD) hazırlayınız.

PTD, İhtiyaçların bütün yönleri ile görülmesi ve planlaması için hazırlanan temel proje yönetim dokümanıdır.

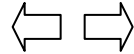
Eklerinde belirtilen planlardan hangilerinin hazırlanacağı, tedarik yöntemi de dikkate alınarak belirlenir

Plan metni Komuta Kat'ı tarafından onaylanır.

Başlangıçta detayları hazırlanamayan ekler projenin gelişim sürecinde tamamlanır.

PTD'nı, Kuvvet Tekliflerine dahil edilmek üzere 2 suret Gn.P.P.Bşk.lığına gönderilir.

GÖREVLENDİRME



APPENDIX-C

SOFTWARE REQUIREMENTS SPECIFICATIONS FOR THE ACQUISITION PROCESS MODULE FOR PHPROJEKT 4.1

1. Introduction

1.1 Purpose

This is the Software Requirements Specification (SRS) for the Acquisition Process Module for Phprojekt 4.1(APMP) [1.4.1,1.4.2]. The purpose of this Software Requirements Specification is to explain requirements for APMP. This SRS addresses all functions, interfaces, performance requirements and constraints which will be a base for all design, coding, and testing phases.

Turkish Land Forces Command Project Office, the Supplier (Firm) and the User (Military Unit) who is responsible for using and maintaining the software are the intended audience for this document.

1.2 Scope

APMP, which is the software product proposed by this SRS is defined below;

APMP helps the project manager (PM) of a TLFC software acquisition project for tracking all the phases fitting the military instructions for acquisition management. APMP guides the PM from establishing Project Office until disposal from inventory phase of acquisition management. These phases are indicated in Appendix-A. The PM first establishes the project office and the project team, assigns responsibilities to related staff and plans resources. Then the PM is guided by APMP through six phases of acquisition, which are Preparation Phase, Design Phase, Development

Phase, Production and Serving Phase, Using Phase and Disposal from Inventory Phase

1.3 Definitions, Acronyms and Abbreviations

Administrator : A personnel who is responsible for maintaining the system.

Module : A program unit that is discrete and identifiable with respect to compiling, combining with other units, and loading; for example the input to or output from, an assembler, compiler, linkage editor, or executive routine (IEEE Std 610.12 - Standard Glossary of Software Engineering terminology)

APMP : Acquisition Process Module for Phprojekt 4.1.

SRS : Software Requirements Specifications.

TLFC : Turkish Land Forces Command.

PM : Project Manager.

PO : Project Office.

1.4 References

1.4.1 Help menu of Phprojekt 4.1.

1.4.2 Users Manual of Phprojekt [Users Manual Of Equal TCA 866's Communication And Controlling Tool Version 1.4 UK of 19/8/02]

1.4.3 SRS Recommended Practice for Software Requirements Specifications [IEEE Std 830-1998]

1.5 Overview

This SRS will provide a detailed description of the requirements of APM. It will also provide an overview of the characteristics and constraints. Section 1 provides an overview of the entire SRS document and describes

the product in overview. Specific Requirement (Section 2) describes the specific requirements in more detail for the Module.

1.6 Product Perspective

APMP will not be an independent system but it's intended to operate together with Phprojekt which is a project management, communication and collaboration tool. APMP will provide a user interface (only in Turkish), guide the project manager through the acquisition process and provide linkage to appropriate modules of the Phprojekt tool.

1.6.1 User Interfaces

1.6.1.1 APMPs' user interfaces will have the same page template.

1.6.1.2 User interfaces will have hyperlinks to call functions from other modules of Phprojekt.

1.6.1.3 User interfaces will have buttons for decision making.

1.6.2 Hardware Interfaces

APMP has no hardware interface.

1.7 User Characteristics

APMP will be used by three types of users as in the other modules in Phprojekt; Administrator, Chief User and Normal User.

1.1.1. Administrator is a unique person for the system.

1.1.2. Administrator must have a right to assign a manager,

1.1.3. Administrator must have a right to set up project groups,

1.1.4. Administrator must have a right to assign user properties and do all other settings.

1.1.5. Chief User shall set his/her project staff properties

1.1.6. Chief User shall create/edit projects.

1.1.7. Chief User shall set up profiles,

1.1.8. Chief User shall assign responsibilities to staff and plan resources.

1.1.9. Chief User shall use the module to assign tasks to related staff.

1.1.10. Chief User shall set his/her project staff properties.

1.1.11. Normal User can only set his/her user properties.

1.1.12. Normal User shall use the module read only.

2. Specific Requirements

2.1 External Interfaces

2.1.1 User Interfaces

These user interfaces will have the same page template for standardization (figures showing the user interfaces will be the standard of APMP). There will be a manual for the user to read and understand how to use the Module. These interfaces will be compatible with Phprojekt 4.1. The user interfaces will look and behave the same regardless of the client's platform. There are two types of interfaces: decision interfaces and task assignment interfaces. User interfaces and their explanations are given below;

2.1.1.1 Decision Interfaces (Internal)

There are two decision points in the acquisition process all of which are in the Preparation Phase. These decision points are figured in the Appendix-E.

Purpose: It is used to make a decision. Depending on the decision, user is guided to the next step (if the response of the user is yes) or an intermediate step (if the response of the user is no).

Inputs: The decision of a user which can be Yes (Evet) or No (Hayır). In acquisition process there are two decision points. First one is in the first activity of preparation phase, second one is the next activity of the same phase.

Outputs: According to the decision of the user, the Module guides him/her to the next suitable step. It performs like this:

In interface 2.1 - if response is yes- it must link the user to interface 2.2

-if response is no - it must link to the user interface 2.1.1

In interface 2.3 - if response is yes- it must link to the user interface 2.4

-if response is no - it must link to the user interface 2.3.1

Relationships to other inputs/outputs: According to the decision of the user, the Module guides him/her to the next suitable step indicated above.

2.1.1.2 Task Assignment (Görevlendirme) Interfaces (External)

Purpose: It is used to assign a task to a staff member. This interface calls an appropriate module of Phprojekt.

Inputs: Task Assignment Interface. These interfaces which are indicated below, must be task assignment interface:

Interface 2.1.1 must link the user to TODO module of Phprojekt.

Interface 2.2 must link the user to TODO module of Phprojekt.

Interface 2.3.1 must link the user to TODO module of Phprojekt.

Interface 2.4 must link the user to TODO module of Phprojekt.

Interface 2.5 must link the user to TODO module of Phprojekt.

Interface 2.6 must link the user to TODO module of Phprojekt.

Interface 3.1 must link the user to TODO module of Phprojekt.

Interface 3.2 must link the user to TODO module of Phprojekt.

Interface 3.3 must link the user to TODO module of Phprojekt.

Interface 3.4 must link the user to TODO module of Phprojekt.

Interface 3.5 must link the user to TODO module of Phprojekt.

Interface 4.1 must link the user to TODO module of Phprojekt.
Interface 4.2 must link the user to TODO module of Phprojekt.
Interface 4.3 must link the user to TODO module of Phprojekt.
Interface 4.4 must link the user to TODO module of Phprojekt.
Interface 4.5 must link the user to TODO module of Phprojekt.
Interface 4.6 must link the user to TODO module of Phprojekt.
Interface 4.7 must link the user to TODO module of Phprojekt.
Interface 5.1 must link the user to TODO module of Phprojekt.
Interface 5.2 must link the user to TODO module of Phprojekt.
Interface 6.1 must link the user to TODO module of Phprojekt.
Interface 7.1 must link the user to TODO module of Phprojekt.

Outputs: Link to an appropriate Phprojekt module.

Relationships to other inputs/outputs: After the user clicks “Görevlendirme” hyperlink the APMP links the user to the TODO module of Phprojekt and the user enters related data for task assignment.

In the “Establishing Project Office” phase PM does the settings of his project and project team. While doing this APMP links PM to Phprojekts’ three modules which are; “Adres Defteri”, Admin and Project modules. These interfaces also have the same structures as task assignment interfaces.

2.2 Functional Requirements

2.2.1 User classes

There will be three types of users [Administrator, Chief User and Normal User of APMP. The Administrator and Chief User have an access to use and assign tasks in the Module. Normal User can only use the Module as read only. The requirements are indicated below;

2.2.1.1. APMP shall enable the project manager of related project to have full access to APMPs’ project settings.

2.2.1.2. APMP shall enable the Administrator not to access the project settings which only PM must.

2.2.1.3. APMP shall enable the Normal User to use the module read only.

2.2.1.4. APMP shall enable the project manager to set his/her project staff properties.

2.2.1.5. APMP shall enable the project manager to create and edit projects.

2.2.1.6. APMP shall enable the project manager to set up profiles.

2.2.1.7. APMP shall enable the project manager to assign responsibilities to staff.

2.2.1.8. APMP shall enable the project manager to plan resources.

2.2.1.9. APMP shall enable the project manager to assign tasks to related staff.

2.3 Performance Requirements

Performance requirements are as same as Phprojekt 4.1.[reference 1.4.2]

2.4 Logical Database Requirements

They are as same as Phprojekt 4.1.[reference 1.4.2]

2.5 Software System Attributes

Software system attributes are as same as Phprojekt 4.1.[reference 1.4.2]

APPENDIX-D

SOFTWARE DESIGN DESCRIPTION FOR THE ACQUISITION PROCESS MODULE FOR PHPROJEKT 4.1

1. Introduction

This document is the second artifact in the development life cycle of the product. It defines the software architecture.

1.1 Purpose & Scope

This document defines how the requirements specified in the SRS of the Acquisition Process Module for Phprojekt 4.1(APMP) are satisfied using an appropriate software architecture. The relationship between APMP and Phprojekt is defined.

1.2 Glossary of Terms

Administrator: The personnel, who are responsible for maintaining the system.

Data : Describes the numbers, text, graphics, images, and voice stored in a form that can be used by a computer.

Function : A defined objective or characteristic action of a system or component. A software module that performs a specific action, is invoked by the appearance of its name in an expression, may receive input values and returns a single value.

Module :A program unit that is discrete and identifiable with respect to compiling, combining with other units, and loading; for example the input to or output from, an assembler, compiler, linkage editor, or executive routine (IEEE Std 610.12 - Standard Glossary of Software Engineering terminology)

Project : The combined resources (people, machines, materials), processes, and activities that are dedicated to building and delivering a product to a customer.

Requirements: The statement of needs by a user that triggers the development of a program, system, or project.

1.3 Definitions, Acronyms and Abbreviations

APMP : Acquisition Process Module for Phprojekt 4.1.

SRS : Software Requirements Specifications.

SDD : Software Design Description. It is a detailed description of the workings of each software component. A representation of a software system created to facilitate analysis, planning, implementation, and decision making. It's a blueprint or model of the software system. The SDD is used as the primary medium for communicating software design information.

TLFC : Turkish Land Forces Command.

PM : Project Manager.

PO : Project Office.

2. References

2.1 Help menu of Phprojekt 4.1.

2.2 Users Manual of Phprojekt [Users Manual of Equal TCA 866's Communication and Controlling Tool Version 1.4 UK of 19/8/02]

2.3 SRS Recommended Practice for Software Requirements Specifications [IEEE Std 830-1998]

3. Decomposition Description

3.1 Module Decomposition

Acquisition Process Module will operate together with the 16 modules of Phprojekt 4.1. APMP helps the project manager (PM) for tracking all the phases of acquisition management. APMP guides the PM from the phase of establishing Project Office until disposal from inventory.

3.1.1 Data relationships of APMP and Phprojekts' Modules

APMP deals with acquisition phases which could be examined under two categories according to their data relationships with Phprojekts' modules:

3.1.1.1 First Phase of APMP: APMP calls the modules of Phprojekt. In APMP there are seven phases; the first one is project office establishment phase in which PM does the settings of his project and project team. While doing this, APMP calls Phprojekts' three modules which are; "Adres Defteri", Admin and Project modules. These relationships are displayed in Appendix-E.

3.1.1.2 2nd -7th Phases: After the first phase is accomplished, the acquisition process begins with the Preparation Phase. From this phase to the last one, all the interfaces of APMP call the same module, TODO, of Phprojekt. After the user clicks "Görevlendirme" hyperlink the APMP, it calls the TODO module of Phprojekt and the user enters related data for task assignment. These relationships are displayed in Appendix-E. The Preparation Phase is given as an example for APMP functions-Phprojekt TODO module relationships.

4. Interface Description

4.1 Decision Interfaces (Internal)

In preparation phase there are two decision interfaces. First one is about preparing master plan another is analyzing configuration alternatives. Both interfaces are same in form. Samples for interfaces are indicated in Appendix-B. Their form is explained below;

Purpose: It is used to make a decision.

Inputs: The decision of a user which can be Yes (Evet) or No (Hayır).

Outputs: According to the decision of the user, APMP guides him/her to an appropriate step.

Screen formats: There are four items in this interface:

Yes (Evet) : Button.

No (Hayır) : Button.

Next Step : Right arrow.

Previous Step : Left arrow.

Relationships to other inputs/outputs: According to the decision of the user, APMP guides him/her to the next suitable step which is shown in the activity diagram of the acquisition process in Appendix-A. If the response is “yes” the module goes on with next step, else the module diverts the PM to an intermediate step which is the prerequisite of the main step.

4.2 Task Assignment (Görevlendirme) Interfaces (External)

Purpose: It is used to assign a task to a staff. A sample of a task assignment interface is indicated in Appendix-B. This interface calls one of

four modules of Phprojekt which are; TODO, “Adres Defteri”, Admin and Project.

Inputs: Task Assignment Interface. Hyperlinks links the user to the modules as indicated above:

In Phase 1.1, “Proje Takımı Oluştur” hyperlink links the user to “Admin” module of Phprojekt.

In Phase 1.2, “Personeli Adres Defterine Ekle” hyperlink links the user to “Adres Defteri” module of Phprojekt.

In Phase 1.3, “Profil Oluştur” hyperlink links the user to “Adres Defteri” module of Phprojekt.

In Phase 1.4., “Yeni Proje ve Altprojeler Oluştur” hyperlink links the user to Admin module of Phprojekt.

In Phase 1.5, “Proje Takımı Oluştur” hyperlink links the user to Admin module of Phprojekt.

In Phase 1.6, “Sorumlulukları Belirle ve Ata” hyperlink links the user to Admin module of Phprojekt.

In Phase 1.7, “Personelin Erişim Yetkilerini Belirle” hyperlink links the user to Admin module of Phprojekt.

In phases 2 to 7 the “Görevlendirme” hyperlink links the user to “TODO” module of Phprojekt.

Outputs: Link to one of four Phprojekt modules.

Screen formats: There are three items in this interface:

Task Assignment (Görevlendirme) : Hyperlink

Next Step : Right arrow.

Previous Step : Left arrow.

Relationships to other inputs/outputs: After the user clicks “Görevlendirme” hyperlink the APMP (between 2nd and 7th phases) calls the TODO module of Phprojekt and the user enters related data for task assignment.

In the Establishing Project Office Phase, PM does the setting of his project and project team. While doing this, as shown with an activity diagram in Appendix-E, he calls Phprojekts’ three modules which are; Adres Defteri, Admin and Project modules. These APMP functions-Phprojekt modules relationships are indicated below;

- a) Establishing project team links to Admin module.
- b) Adding staff to Address book links to “Adres Defteri” module.
- c) Setting up profile links to Address book.
- d) Create projects and subprojects links to Project module.
- e) Assigning responsibilities to staff links to Admin module.
- f) Determining resources links to Admin module.
- g) Determining authorization of personnel links to Admin module.

These interfaces also have the same structures as task assignment interfaces.

APPENDIX-E

DIAGRAMS OF APMP- PHPROJEKT DATA RELATIONSHIPS

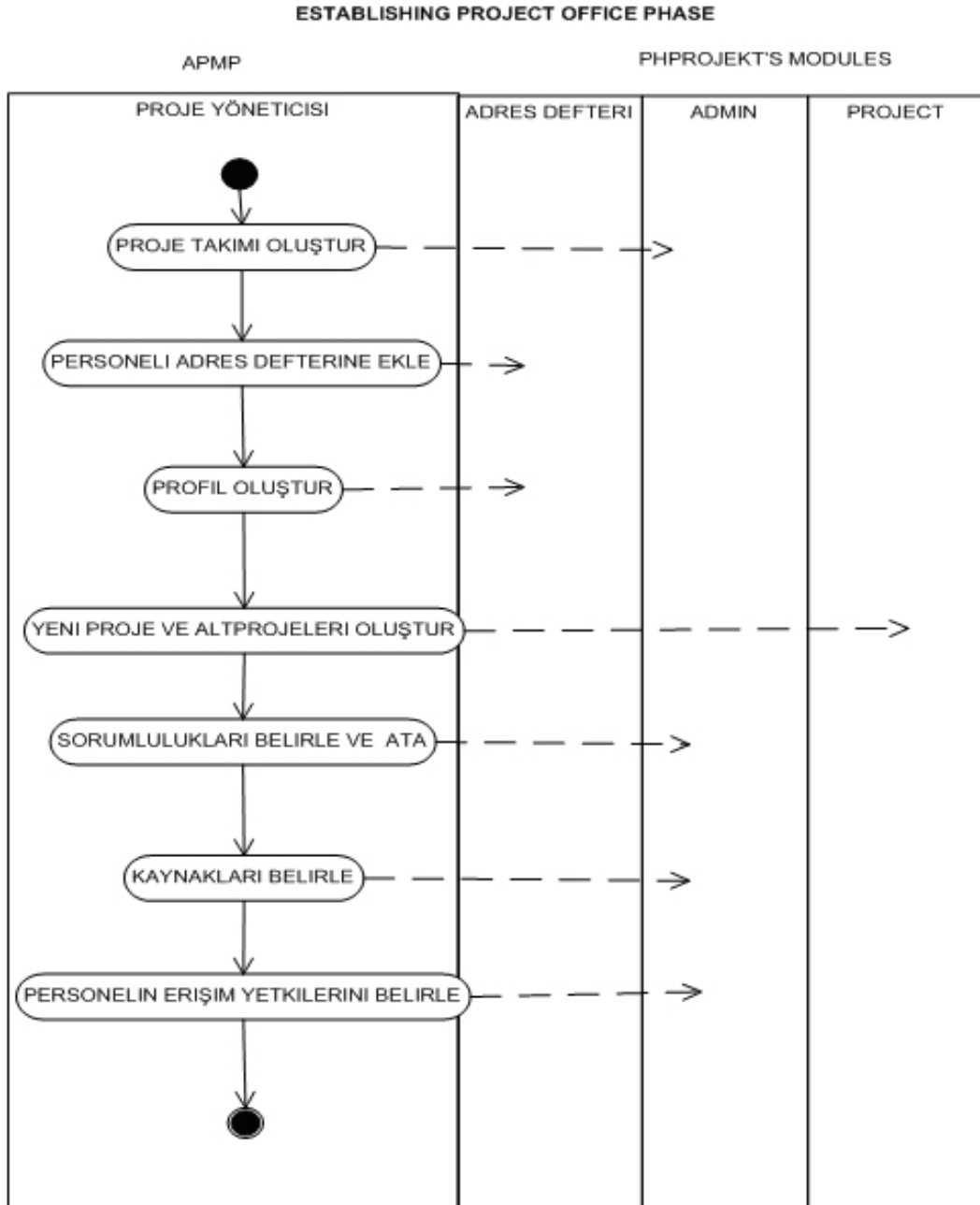


Figure 6- Data Relations of Phase 1 and the Software

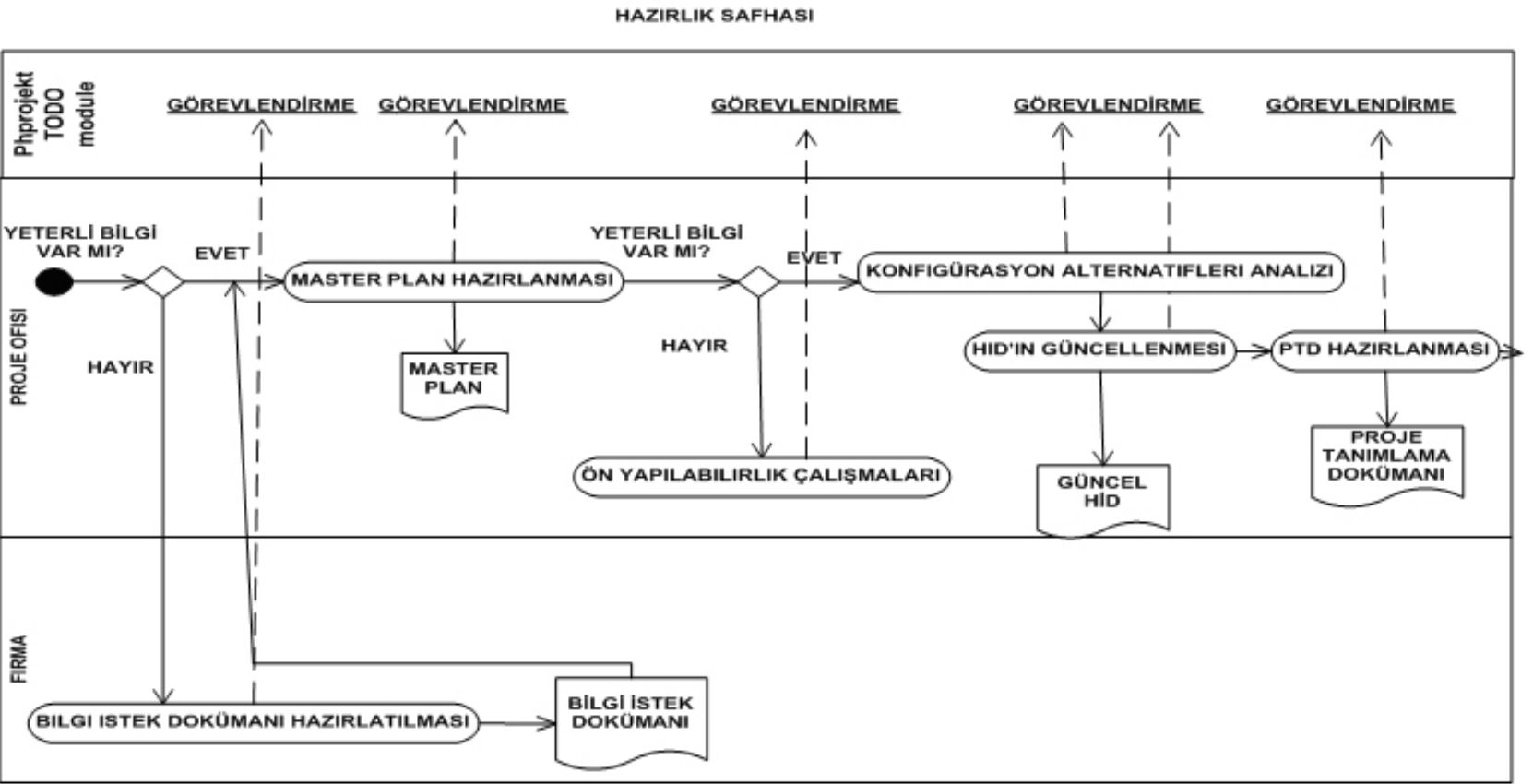


Figure 7- Data Relations of Phase 2 and the Software