

Software Project Management Plan

Group Fingerprint

June 20, 2013

Abstract

- 5 This is the Software Project Management Plan (SPMP) for the Fingerprint Software Engineering Project. This document is based on the ESA standard for software development. This document provides an overview of the organizational structure and required resources of the project. The SPMP is used to keep track of the planning and to assure that deadlines are met.

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Document Status Sheet

Document status overview

60 General

Document title: Software Project Management Plan
Identification: SPMP0.2.pdf
Author: Luc de Smet
Document status: Internally approved

Document history

<i>Version</i>	<i>Date</i>	<i>Author</i>	<i>Reason of change</i>
0.1	09.05.2013	Luc de Smet	Initial version
0.2	20.06.2013	Areti Paziourou, Simon Burg	Revision after internal feedback

Document Change Records since previous issue

65 General

Datum: 2013-06-20
Document title: Software Project Management Plan
Identification: SPMP0.2.pdf

Changes

<i>Page</i>	<i>Paragraph</i>	<i>Reason to change</i>
5	1.1	Rephrasing
6	1.3	Spelling mistake
16-17	3.4	Spelling mistakes
20	5.2 & 5.3	Spelling mistakes
21	5.5.2	Rephrasing and adjusting time metrics
23	A.3	Adjusting time metrics
25	B.3	Adjusting time metrics
27	C.3	Adjusting time metrics

Chapter 1

70 Introduction

1.1 Project overview

The Fingerprint project group is one of four project groups of the “Software Engineering Project” course, consisting of seven students from the Eindhoven University of Technology (TU/e). The objective of the project is to make a mobile app that visualizes the execution
75 of mixers on a certain input distribution of fluids. The app will provide communication with a server that does the mixer computation.

The project deadline is the 21st of June 2013. There are several intermediate documents which need to be created, these are described in the section below. The budget for the project is 2352 hours in total.

80 1.2 Project deliverables

During the course of the project, several documents have to be produced and delivered to the client and to senior management. All these documents have to be written according to the ESA software engineering standards [15]. All products that will be delivered to the client and senior management are mentioned in the following list:

85

- User Requirements Document (URD) [13]
- Product Backlog [3]
- Software Requirements Document (SRD) [8]
- Architectural Design Document (ADD) [1]
- 90 • Detailed Design Document (DDD) [4]
- Software User Manual (SUM) [11]
- Software Transfer Document (STD) [9]
- Unit Test Plan (UTP) [14]
- System Test Plan (STP) [10]

- 95
- Integration Test Plan (ITP) [5]
 - Acceptance Test Plan (ATP) [2]
 - Software code

The client intends to develop the software further after this project. Therefore the client will receive a copy of all project documents at the end of the project, except for the management documents. All documents have to be delivered both on paper as well as in electronic form.

100

1.3 Evolution of the SPMP

During the project this document will be updated as a plan is refined during the project. These updates will be limited to the refinement of appendices containing more detailed planning for each phase. Because each sprint addresses several phases, the Sprints appendix has to be updated during each sprint with more detailed information (if necessary).

105

1.4 List of definitions

2IP35	The Software Engineering Course
AD	Architectural Design
ADD	Architectural Design Document
AT	Acceptance Test
ATP	Acceptance Test Plan
Client	Patrick Anderson
CM	Configuration Manager
DD	Detailed Design
DDD	Detailed Design Document
ESA	European Space Agency
TU/e	Eindhoven University of Technology
OM	Operations and Maintenance Plan
PM	Project Manager
QM	Quality Manager
SCMP	Software Configuration Management Plan
SEP	Software Engineering Project
SL	Software Librarian
SPMP	Software Project Management Plan
SQAP	Software Quality Assurance Plan
SR	Software Requirements
SRD	Software Requirements Document
STD	Software Transfer Document
SUM	Software User Manual
SVVP	Software Verification and Validation Plan
SVVR	Software Verification and Validation Report
TR	Transfer phase
UR	User Requirements
URD	User Requirements Document
VPM	Vice Project Manager

1.5 List of references

- 110 [1] Fingerprint. Advanced design document. *SEP*, 2013.
- [2] Fingerprint. Advanced test plan. *SEP*, 2013.
- [3] Fingerprint. Product backlog. *SEP*, 2013.
- [4] Fingerprint. Detailed design document. *SEP*, 2013.
- [5] Fingerprint. Integration test plan. *SEP*, 2013.
- 115 [6] Fingerprint. Software configuration management plan. *SEP*, 2013.
- [7] Fingerprint. Software quality assurance plan. *SEP*, 2013.
- [8] Fingerprint. Software requirements document. *SEP*, 2013.

- [9] Fingerprint. Software transfer document. *SEP*, 2013.
- [10] Fingerprint. System test plan. *SEP*, 2013.
- 120 [11] Fingerprint. Software user manual. *SEP*, 2013.
- [12] Fingerprint. Software validation and verification plan. *SEP*, 2013.
- [13] Fingerprint. User requirements document. *SEP*, 2013.
- [14] Fingerprint. Unit test plan. *SEP*, 2013.
- [15] ESA. *ESA Software Engineering Standards*. ESA, March 1995.

125 Chapter 2

Project organization

2.1 Process model

130 The project follows the Scrum process model. This model uses a Product Backlog, a prioritized list of high-level requirements written as User Stories. At the start of a sprint, a number of User Stories is selected and put into the Sprint Backlog. These stories are the features that will be implemented during the sprint. For each user story different phases are traversed: requirements, architectural design, implementation and testing. Each sprint has the duration of a week. After the sprints, the product has to be delivered to the customer.

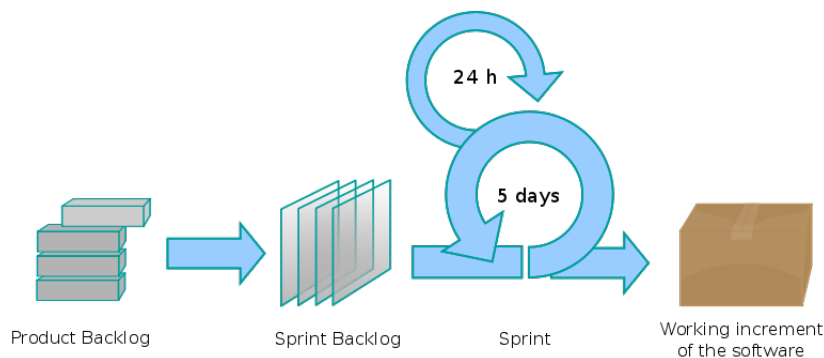


Figure 2.1: The Scrum process. Image © Lakeworks (http://commons.wikimedia.org/wiki/File:Scrum_process.svg)

2.2 Organizational structure

135 The TU/e employs the Senior Management and the technical adviser. Communication between Senior Management and the project group is done via the PM. Otherwise, only the VPM can contact the Senior Management directly and only when he is concerned about the functioning of the PM. Whenever the PM is not able to perform his duties for a certain period of time, this is done by the VPM.

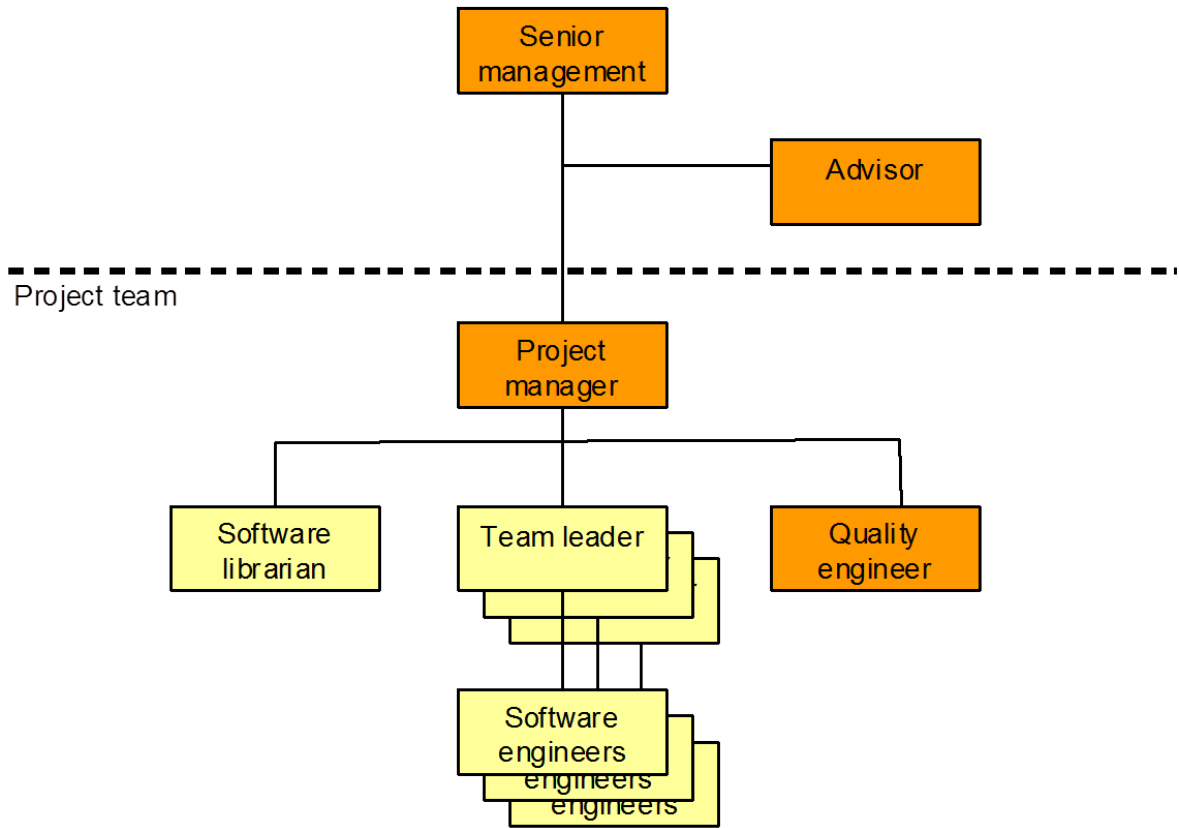


Figure 2.2: The organizational structure.

2.3 Boundaries and interfaces

There are several persons and groups for the project group to interact with. These are:

- The university: The Software Engineering Project (SEP) is a project of TU/e. The PM and the QAM are responsible for, respectively, the project progress and its quality, and report to the SM. The university is the owner of the software and documents produced in this project.
- The technical adviser: is a staff member of the Computer Science department of TU/e. Team members may consult him on technical issues. The technical adviser is generally invited to the weekly meeting.

Due to the small scale and duration of the project, no direct relationship with end users and subcontractors can be defined.

2.4 Project responsibilities

In the project, certain management tasks need to be performed. The risk exists, that a member of the team with a management function, is suddenly unavailable. Therefore every manager will be assisted, and if necessary, replaced by a vice-manager.

155 **Project Manager (PM)**

The primary goal of the project manager is to ensure the completion of the project in the available time, within budget. The PM makes the planning and ensures that it is feasible. Whenever problems occur the planning must be adapted in order to obtain a feasible planning again. The PM must ensure the progress of the project. He will be assisted by the vice PM.

160 In case of absence of the PM, the vice PM takes over the PMs tasks. The tasks the PM must perform are:

- Being the chairman during meetings,
- Motivating team members,
- Forming teams and assigning tasks,
- 165 • Checking progress,
- Managing the time budget,
- Defining work packages and goals,
- Providing feedback to the Senior Management through progress reports.

Quality Manager (QM)

170 The primary goal of the quality manager is to ensure the quality of the end product and the overall process. In case of absence of the QM, the vice QM takes over the QMs tasks. The tasks the QM must perform are:

- Writing the SQAP [7]
- Verifying that procedures and standards which are defined in the SQAP are adhered to
- 175 • Checking that all project documents are consistent,
- Arranging internal and external reviews,
- Monitoring and reviewing all testing activities.

2.4.1 Configuration Manager (CM)

The task of the Configuration Manager is to create and maintain the project library. More information about the project library can be found in SCMP[6].

The CMs tasks include but are not limited to:

- Writing the SCMP,
- Creating a repository for all documents and code,
- Checking that the repository is used appropriate (that is according to the SCMP) by
- 185 all team members,
- Maintaining the repository according to the SCMP

2.4.2 Team Leader

During the project, several teams will exist. A team leader is responsible for the activities of his team. The tasks a team leader must perform are:

- 190 • Planning and coordinating team activities,
- Providing feedback about team progress to the PM,
- Motivating team members,
- Chairing internal reviews of the items made by his team.

2.4.3 Development Team Member

195 The team members are all members of a team including the team leader. The tasks a team member must perform are:

- Assisting the Team Leader or Project Manager by signaling problems in an early stage,
- Executing plans made by the Team Leader and by the Project Manager,
- Keeping track of time spent on various tasks,
- 200 • Following procedures and plans.

2.4.4 Scrum Master

The role of the Scrum Master is twofold. He ensures that the Scrum process is followed and used as intended. Furthermore he acts as buffer between the development team and any distracting influences.

205 Tasks that belong to this role are:

- Ensure that the Scrum process is followed
- Check that the backlog is updated and that stories are clear
- Make sure that sprint items are clear
- Send reminders about demos that are held
- 210 • Create the sprint backlog
- Lead the daily scrum and make sure that afterwards everybody knows what to do
- When time is almost up the Scrum master tries to summarize concrete suggestions about what we can do better next sprint

2.4.5 Product Owner

215 The Product Owner represents the customer. He is accountable for a good product backlog.
The tasks of the product owner are:

- Make sure that all requirements asked by the customer are represented by user stories
- Check that the items in the product backlog are user centered rather than technical
- Prioritize items in the product backlog according to the wishes of the customer and the

220

suggestions given by the development team

Chapter 3

Managerial process

3.1 Objectives and priorities

225 The management objective is to deliver the product in time and of high quality. The PM and QAM work together to achieve this by respectively checking that progress is made as planned and monitoring the quality of the product at various stages.

3.2 Assumptions, dependencies and constraints

Partly due to the educational nature of the project, it is limited by a rather large number of factors:

- 230 • The budget is $(7 \text{ team members} * 12 \text{ ECTS} * 28 \text{ hours}) = 2352$ working hours
- The PM budget of $(5 \text{ ECTS} * 28 \text{ hours}) = 140$ hours
- The following hard deadlines, set by senior management:
 - Project deadline: June 21st, 2013
 - Intermediate presentation: March 27th, 2013
 - 235 – Final presentation: June 17th, 2013
- Public holidays on April 27th, 28th, May 10th, 11th and 20th
- Exam period June 24th - July 7th
- Scheduled lectures and homework for classes other than this project - different for every team member
- 240 • Planned holidays and educational travels of the team members and customer. See Section 5.5.3

There may be other constraints depending on the project itself, for example other project developments beyond the control of the group or the current status of the project and its documentation.

245 **3.3 Risk management**

Miscommunication

Probability: High

Impact: High

250 Misinterpretations of what other team members say and write might stand in the way of a common understanding of what to do and how to do it. This might lead to delays, unwanted results and double work.

Prevention: Throughout the project, and especially during weekly meetings, the PM has to make sure every team member understands the task given to him, by having frequent talks with each group member about their task. It is important that the minutes of the meeting 255 are correct and complete, and they should be read by everyone with care.

Correction: When a problem occurs, the QAM arranges a meeting with all involved people to come to a common understanding of the situation. After this meeting, its results are briefed to all team members.

260 **Too many planned features lead to infeasible design**

Probability: High

Impact: high

Prevention: The Technical Advisor should be consulted on whether the delivery of the planned product can be done within the time budget. Every item should have a priority.

265 *Correction:* By closely monitoring progress the decision to drop certain requirements can be made in time.

Illness or absence of team members or the PM

Probability: Medium

270 *Prevention:* Team members should warn their team leader or the PM timely before a planned period of absence. The PM should make planned absence a point on the first meeting to make sure that absence that is known at that time is taken into account in the schedule.

Correction: Every role has a person to replace him. Communication between these two people is very important. The “vice” person should be actively involved in all work in order to be 275 able to replace his counterpart. All important information and design decision should be in documents or in the meeting notes, to make sure that as little information is lost as possible.

Impact: High

Loss of critical information, documents or code

280 *Probability:*Medium

Impact: High

Prevention: The SCMP [6] should be written and used with care. The base assumption should be that there is a backup of every single piece of information at any single time.

285 *Correction:* Use the latest backups to recover the most recent version. If the missing parts are necessary, replace these as soon as possible.

The customer changes his mind about the requirements, or there is disagreement about the requirements interpretation.

Probability: High

290 *Impact:* Medium

Prevention: It should be made very clear to the customer that after a certain date the requirements can't change anymore

Correction: If the customer changes his mind during the UR phase his new requirements can be incorporated in the URD. Procedures in SQAP [7] detail if the URD may be changed after approval, and (if so) how to implement changes.

The customer is not available when needed

Probability: Medium

Prevention: Meetings with the customer should be planned well in advance. The customer has been given room in his schedule for his Software Engineering related work. Holidays and other travel plans of all people involved should be put in this document in section 5.5.3.

Correction: When the customer is not available, meetings may have to be rescheduled.

Impact: Medium

3.4 Monitoring and controlling mechanisms

The monitoring of progress is done by the PM using the following means:

Daily Scrum Each day during the sprint a daily scrum is held. Daily scrums take place on 9:00, except on Monday (13:30), and held in front of the taskboard. The daily scrum is a project status meeting where the taskboard is updated. Each person describes what he did yesterday and what he will do today. Then he updates the taskboard by updating his time estimates, adding new post-its, and shift post-it to done. The Scrum Master has to make sure that the daily scrum does not exceed 15 minutes. Furthermore he has to ensure that everybody knows what to do this day.

Sprint Planning Session The sprint planning session is held at the start of each sprint, that is on Friday on 13:30. The client must be present at the session. First the client has to determine which stories are the most important. Next, the development team plays planning poker and makes time estimates for the most important stories. Then the velocity is determined and the number of story points available for this sprint. The client may shift some stories after the story points are estimated. What is determined during the meeting:

- sprint goal
- velocity of the team
- sprint backlog of the stories that will be included in this sprint
- defined sprint demo date
- defined time and place for the daily scrum

Sprint Demo At the end of each sprint a demo is held to present the completed stories to the client. The date, time and location of this demo are set in the sprint planning meeting. The demo takes at most 30 minutes.

Sprint Retrospective After the sprint demo the sprint retrospective is held. During the retrospective the members of the development team reflect on the sprint. Before the meeting starts everybody has to write down items in the categories “keep”, “stop”, and “change”. During the session everybody mentions these items.

Project metrics Every week, the work done by the members, needs to be administrated. Each team member has to fill in their hours on a web-based log. This log needs to be filled in every week. A week starts at Monday and ends at Sunday. Every entry in a log has to belong to one of the following work-packages: SPMP, SVVP, UTP, ITP, STP, ATP, SCMP, SQAP, URD, SRD, Prototype, Research, ADD, DDD, Code, IT,ST,AT, STD, Formal reviews, Meetings or Presentations.

The PM sends an e-mail to the SM every week, containing the hours spend on the different work packages and the hours spend on following categories: Non project related, General project related, Documentation, specification, design, Source code, Testing, verification, consolidation and rework. Further, for every work-package, an estimation of remaining hours is added.

3.5 Staffing plan

Name	E-Mail	Telephone	Function
Lou Somers	l.j.a.m.somers@tue.nl	(040-247) 2805	Senior Management
Mark van den Brand	m.g.j.v.d.brand@tue.nl	(040-247) 2744	Senior Management
Ion Barosan	i.barosan@tue.nl	(040-247) 3764 / 2526 06-22467426	Technical Advisor
Luc de Smet	l.p.j.d.smet@student.tue.nl	06-20503097	PM Scrum Master
Simon Burg	s.burg@student.tue.nl	06-22123451	VPM
Areti Paziourou	apaziou@yahoo.gr		QM
Tessa Belder	t.belder@student.tue.nl	06-43209446	Vice QM
Thom Castermans	t.h.a.castermans@student.tue.nl	06-81634163	CM
Lasse Blaauwbroek	l.blaauwbroek@student.tue.nl	06-31172162	Vice CM
Patrick Anderson	p.d.anderson@tue.nl		Client Product Owner

345 Chapter 4

Technical process

4.1 Methods, tools and techniques

The methods, tools and techniques used during the course of the project are listed in the SCMP.

350 4.2 Software documentation

During the project, documents should conform to a number of aspects:

Documents must be of good quality The standards all documents are required to meet are documented in the SCMP [6] with respect to style and in SQAP [7] with respect to content.

355 **Documents must be reviewed** The manner in which document reviews are performed is described in the SVVP [12].

The purpose of document reviews is to get docs of high quality The requirements which apply to the approval of documents are given in the SVVP [12].

4.3 Project support functions

360 Besides Project Management, three other management functions are present. Below a short description of each of them is given. All these management plans are standard part of the ESA standard [15]. More detailed descriptions can be found there.

Configuration Management The purpose of software configuration management is to plan, organize, control and co-ordinate the identification, storage and change of software
365 through development and transfer. The Configuration Manager writes the SCMP in which plans are outlined for performing these tasks.

Verification and Validation Software Verification and Validation activities check the software against its specifications. The Quality Manager writes the SVVP as one of his tasks. In it he outlines how he plans to perform his verification and validation activities.

³⁷⁰ **Quality Assurance** During the project, all documents should be tested against quality standards; both to conform to the chosen project documentation style and to contain correct information of reasonable quality. The QAM states the regulations and the way in which he plans to check whether these are followed in the Software Quality Assurance Plan [7].

Chapter 5

375 Work packages, schedule, budget

5.1 Work packages

The work packages are defined in the appendix detailing their phase.

5.2 Dependencies

380 There are no dependencies when creating the Product Backlog and the User Requirements Document. The sprints in the sprint phase are dependent on these two documents. The transition phase, when the product is delivered to the customer, is dependent on both the other phases.

5.3 Resource requirements

385 The most important resources during the project are human resources. An overview of resource utilization during the various project phases is given in Section 5.4.

5.4 Budget and resource allocation

In most projects the only resource is the number of man-hours of the people involved. This is described in the next chapter, schedule.

5.5 Schedule

390 This section gives a rough planning of resource usage. The only important resource are man hours.

5.5.1 Deadlines

Management documents approved	May 13th
URD approved	May 8th
Intermediate presentation	May 27th
Prototype approved	May 8th
SRD approved	May 31st
Peer review	May 27th and June 24th
ADD approved	June 14th
DDD approved	June 14th
Coding complete	June 14th
Acceptance test successful	June 21st
Final presentation	June 17th
The project deadline	June 21st

5.5.2 Hour planning

395 During the project we distinguish 3 phases: The user requirements phase in which require-
ments will be determined and transformed into a backlog. At the same time research and
setup will be done, as well as prototyping. This phase will take approximately 590 hours.
Next is the spring phase, in which the actual development will take place. Coding, documen-
tation and testing fall under this phase and it will take approximately 1468 hours. Finally
400 we have the transition phase in which all the work is wrapped up, the acceptance test is done
and user manual and transfer document are produced. This final phase will take about 294
hours. This gives a total of 2352 hours.

5.5.3 Unavailability overview

405 No group members have a planned unavailability during this project.

Appendix A

User Requirements phase

In the UR phase the main focus is on the definition of the user requirements and user stories. Besides the URD, the management documents and Product Backlog are written during the
410 UR phase.

A.1 Output UR Phase

The UR phase can be called the problem definition phase. User requirements are documented in the URD, giving the customers view of the problem. The main outputs of the UR phase are the:

- 415 • URD
- SPMP/Sprints phase (SR)
- SCMP/Sprints phase (SR)
- SQAP/UR and SQAP/Sprints phase (SR)
- SVVP/UR and SVVP/Sprints phase (SR)

420 A.2 Work packages UR phase

The work packages defined for the UR phase are

- URD
- SPMP
- SCMP
- 425 • SQAP
- SVVP
- Project Group Meetings
- Research

- Management & initialization

430 The work package Management & initialization embodies the creation of a document repository, mailing list, etc as well as management activities, the creation of a document template, etc. SPMP embodies the time spent on reviews. The VPM can also spend hours on this work package when he writes parts of the SPMP. The assignment of teams to various work packages is as follows:

435

Document	Members
SQAP	QA
SPMP	PM
URD	URD team
SCMP	CM
SVVP	anyone
Project group meetings	everyone
Research	anyone
Management & initialization	PM, VPM
Formal reviews	anyone

A.3 Budget and resource allocation UR phase

The following table lists packages for the UR phase and the budget that has been assigned to each.

440

Work package	Budget estimate (man hours)
SQAP	10
SPMP	10
URD	300
SCMP	30
SVVP	20
Project group meetings	60
Research	100
Formal reviews	60

Appendix B

Sprints phase

In the sprints phase the main focus is on the implementation of requirements. Besides the
445 implementation, the product documents are written during the sprint phase and tests are
done.

B.1 Output Sprints Phase

The Sprints phase can be called the problem solving phase. User requirements are imple-
mented in a system, creating the customers wanted piece of software. The main outputs of
450 the Sprints phase are the:

- SRD
- ADD
- DDD
- ITP
- 455 • UTP
- Code

B.2 Work packages Sprints phase

The work packages defined for the sprints phase are

- SRD
- 460 • ADD
- DDD
- ITP
- UTP
- Code

465

- IT, ST, AT
- Formal reviews
- Meetings
- Presentations

The assignment of teams to various work packages is as follows:

470

Document	Members
SRD	Anyone
ADD	Anyone
DDD	Anyone
ITP	Anyone
UTP	Anyone
Code	Anyone
IT, ST, AT	Anyone
Formal reviews	Document creators and reviewers
Meetings	Everyone
Presentations	Everyone

B.3 Budget and resource allocation Sprints phase

The following table lists packages for the sprints phase and the budget that has been assigned to each.

475

Work package	Budget estimate (man hours)
SRD	120
ADD	120
DDD	16
ITP	20
UTP	120
Code	735
IT, ST, AT	100
Formal reviews	55
Meetings	150
Presentations	32

Appendix C

Transition phase

In the transition phase the main focus is on laying a finishing touch on the product, doing
480 the acceptance test and transferring the product to the customer.

C.1 Output Transition Phase

The main outputs of the transition phase are the:

- SUM
- ATP
- 485 • STD

C.2 Work packages Transition phase

The work packages defined for the transition phase are

- SUM
- ATP
- 490 • STD
- IT,ST,AT
- Formal reviews
- Meetings
- Presentations

495 The assignment of teams to various work packages is as follows:

Document	Members
SUM	Anyone
ATP	Anyone
STD	Anyone
IT, ST, AT	Anyone
Formal reviews	Document creators and reviewers
Meetings	Everyone
Presentations	Everyone

C.3 Budget and resource allocation Transition phase

The following table lists packages for the transition phase and the budget that has been assigned to each.

Work package	Budget estimate (man hours)
SUM	32
ATP	80
STD	16
IT, ST, AT	80
Formal reviews	36
Meetings	30
Presentations	20