Washington State University

Theia Navigation App for the Visually Impaired
Process Specification

Version <1.0>

Team Members
Christopher Young
Cong Trinh
Taryn Burns
Anne Lin
Sean Luchessa

Revision History

Date	Version	Description	Author
08/11/19	1.0		<name>

Table of Contents

Introduction **2**

Purpose 2

Scope 3

Stakeholder 3

Definitions and Glossary 4

References 7

Process Specification **8**

Modified Waterfall 8

Weekly Process Flow Diagram 9

First Phase 9

Requirements Elicitation 9

Requirements Analysis and Negotiation 10

Second Phase 10

Requirements Elicitation 10

Requirements Analysis and Negotiation 10

Project Organization **10**

Project Organization 10

Interim Phase I – Description: 10

Final Phase I - Description: 11

Interim Phase II - Description: 11

Final Phase II - Description: 12

Traceability 12

IDEF0 12

IDEF1 13

1. Introduction

1.1. Purpose

The purpose of this document is to show previous progress and activities prominent to the project's development process. This includes essential documents, as well as visual diagrams, to demonstrate the necessary steps that are to be taken in order to achieve the best outcome possible for this project's development.

1.2. Scope

The scope of this document includes plotting the modified waterfall engineering model phases to encapsulate the team's development plan. The individual project phases are layed out with the deliverables for the project described.

1.3. Stakeholder

Dream Team

1.3.1.1. Development Team

Primary Visually Impaired User

1.3.1.2. Visually impaired users will be the main audience for the Theia app. Because of this, they are one of our top stakeholders for the project.

System Analyst

1.3.1.3. The person responsible for turning user requirements into a blueprint of the project system. Thus, also one of our top stakeholders for the project.

Requirements Specifier

1.3.1.4. The person responsible for explaining and maintaining the requirements specifications

Technical Reviewer

1.3.1.5. Gives appropriate technical feedback on each part of the project system.

Software Architect

1.3.1.6. Envisions and provides the designs/models based on customers' and developers' needs.

Project Manager

1.3.1.7. Is overall responsible for planning, designing, managing, and executing the project

Maintainer

1.3.1.8.

Caregiver

1.3.1.9. The person who is looking after the user. Could be a family member, they can help the user set the configuration of the app and help them in case of emergency.

Emergency Contacts

1.3.1.10. The people who will come to aid the user in case of emergency.

Market Analyst

1.3.1.11. The person responsible for studying the market and assessing the profit of the products and services.

1.4. Definitions and Glossary

A

Acceptance testing - A level of software *testing* where a system is tested for acceptability. The purpose of this *test* is to evaluate the system's compliance with the business requirements and assess whether it is acceptable for delivery.

Android - An open-source operating system used for smartphones and tablet computers.

C

C# - An object-oriented programming language made by Microsoft.

D

Discord - Freeware VoIP application and digital distribution platform. This was originally used for the video game community. The platform allows text, image, video, and audio communication between users in chat servers.

F

Functional Requirements - Defines a function of a system or its component, where the function is described as a specification of behaviour between inputs and outputs.

G

General risk - An activity or event that may compromise the success of a software development project.

Goals - Refers to achieving a desired outcome at a specific end date

GPS - Stands for Global Positioning System. It is a radio navigation system that allows users to determine their exact location in the world.

Gyro sensors - A device that senses the change in rotational angle per unit of time.

H

Hardware - The collection of physical parts of a computer system.

I

Interface - Shared boundary across where two or more separate components of a computer system exchange information.

Internet Operating System - An operating system used for mobile devices manufactured by Apple Inc.

M

Model View Controller (MVC) - A software design pattern commonly used for developing user interfaces which divides the related program logic into three interconnected elements. They include the *model* (data), the *view* (user interface), and the *controller* (processes that handle input).

N

Non-Functional Requirements - A requirement that specifies criteria that can be used to judge the operation of a system rather than specific behaviors

O

Object Detection - A software feature that assists the computer to detect potential objects for different reasons.

P

Problem - A situation that needs to be solved

Prototype - An early sample, model, or an early release of a product built in order to test or lay out a concept or process for the later product. This prototype does not define the finished product (i.e. Interface wise, functionality, etc).

R

Requirements - A feature that is absolutely necessary in a software development project. There are different levels of requirements that may be more important in a project over another.

S

Stakeholders - People or a group of people affected by a software development project

T

Theia - Greek Titan Goddess of sight (Thea) and shining ether of the bright, blue sky.

Traceability - Ability to relate the various types of software artefacts created during the development of software systems.

U

Unified Modeling Language (UML) - Diagrams that visually representing a system along with its main actors, roles, actions, artifacts or classes, in order to better understand, alter, maintain, or document information about the system.

User Friendly - A machine or a system that is easy to use and understand.

User Interface - is the point of human-computer interaction and communication in a device. This includes displays on screens, appearance on a monitor, keyboard, mouse, etc.

User Manual - Lays out the steps and actions required to use the app.

V

Visually Impaired - Known as vision impairment or vision loss. It is the decreased ability to see to a degree such that it causes problems that cannot be fixed through usual means such as glasses and contacts.

Voice Recognition - The ability of a machine or program to receive and interpret dictation or to understand and carry out spoken commands.

W

Waterfall Model - A breakdown of project activities into linear sequential phases, where each phase depends on the deliverables of the previous one and corresponds to a specialisation of tasks.

WRS - Resource File including the problem, functional requirements, and non-functional requirements.

X

Xamarin - An extension of C# that allows for the development of cross-platform mobile applications

1.5. References

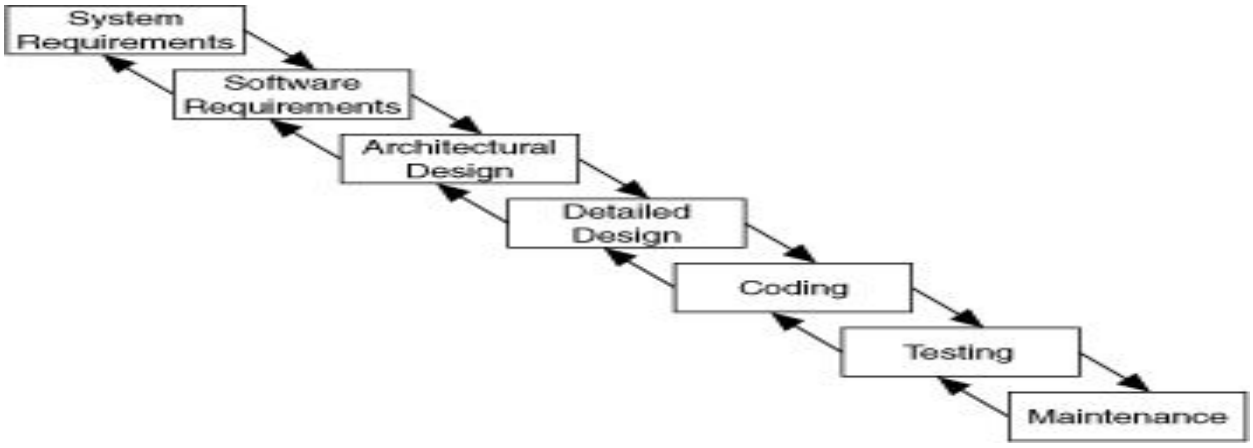
http://zone.ni.com/reference/en-XX/help/371361R-01/lvdevconcepts/lifecycle_models/

http://ininet.org/se-4351-001-software-requirements.html

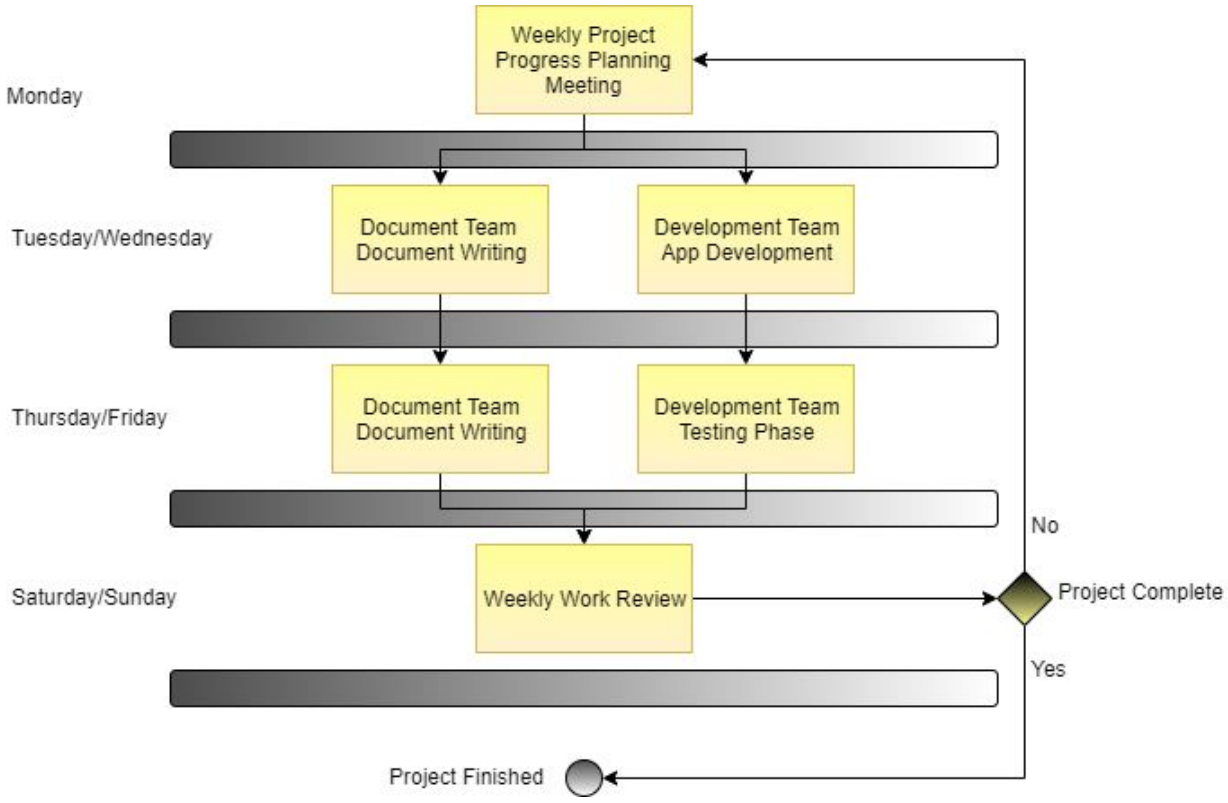
2. Process Specification

2.1. Modified Waterfall

Modified Waterfall model is the structure for the design process. Time constraints of the semester made a waterfall method feasible in order to cover all aspects of the project. Consistent updates to our project plan are integrated into each stage of the deliverables. The process starts with preliminary project plans outlining the goals of each deliverable, leading into requirements elicitation to create a vision document along with a process specification outline, ending with the final deliverable of a prototype product.



2.2. Weekly Process Flow Diagram



2.3. First Phase

This is where the project background, goals, and deliverables were first drafted. The team was defined and the various tools and resources were selected in order to begin working on the project.

Requirements Elicitation

For phase I, the team was given a set of preliminary requirements from the client on what is to be expected for the initial prototype of the application. The issue of helping blind people navigate through a building was established with a clear goal in mind of helping to mitigate this problem.

Requirements Analysis and Negotiation

Our team organized multiple team meetings in order to figure out the specifics of each requirement that was laid out to us by Professor Bolong. In those meetings, the requirements we worked out were figuring out the platforms, the tools needed for a safe and reliable GPS, a way for the injury detection and emergency contact to work, and how to create a user-friendly interface through voice commands. The negotiations our team did were through Professor Bolong, as he was the person who gave out the requirements.

2.4. Second Phase

For the second phase our team was focused on reviewing the PMP and WRS documents to update them to reflect the Phase II requirements. The delivery of the system is dependant on the elicitation of FR and NFR which defined the scope and direction for project development. The Vision and Scope document outlined high-level features and needs while relating them to the stakeholders and use cases of our application.

Requirements Elicitation

There were no additional software requirements for Phase II. A review of the PMP and WRS was performed and updates were made to reflect techniques and processes used to complete Phase II deliverables. Vision and Process Specification documents were created to outline the project's direction and primary goals. Prototyping the system put requirements into a physical product which the development team used to review FR and NFR ensuring all are covered in the application.

Requirements Analysis and Negotiation

There were no additional software requirements for us to analyze. However, we still organized multiple team meetings, some of them with Bolong, in order to figure out the priorities of each feature and to divvy up the responsibilities among team members. In those meetings, we discussed the various sections of each new document, how to put together a functional prototype, and more or less set out a schedule to tackle for the final demo. Any negotiation we did was through emails to

Bolong. Most of them were about clarification on a document section or what was specifically needed for the final demo. The features for our final prototype featured basic navigation with visual and verbal instructions, settings, and an emergency contact.

3. Project Organization

3.1. Project Organization

Interim Phase I – Description:

In the interim phase of Phase I, the team received the preliminary project requirements from Professor Bolong. Upon receiving these project requirements, the project overview and project deliverables were established in the Project Plan document. The process model that was used was also designed. This project is using a modified waterfall process model. Additionally, the group wrote up the Project Specifications document.

- Goals
    - Establish Problem Statement
    - Establish
    - Continuously update WRS and Project Plan document
    - As-Is To-Be Scenarios

Final Phase I - Description:

In the final phase of Phase I, the WRS elements, Functional Requirements, Non-Functional Requirements, Traceability, Prototype, Domain Objectives, Stakeholder Requirements, Function Objectives, and Non-Functional Objectives was conducted to ensure the goals of the project. After gathering all of the necessary information, the initial specifications were drafted. The mock-up prototype was modeled based off of the high-level requirements needed for the project. A user manual was produced and was based off of the use-cases and the software system.

- Goals
    - Validate all WRS elements
    - Mock-up Prototype

- Finished Project Plan
- Finished Project Specifications
- Finish PowerPoint and Present Project to Bolong

Interim Phase II - Description:

In the interim phase of Phase II, the team received more requirements from Professor Bolong in preparations for the final demo and project submission. These requirements include creating and fulfilling a Process Specification document, a Vision document, an updated WRS document, a Final project plan, and a final presentation and prototype.

- Goals
  - Final Project Plan
  - Process Specification Document
  - Vision Document
  - Updated WRS
  - Functional App prototype

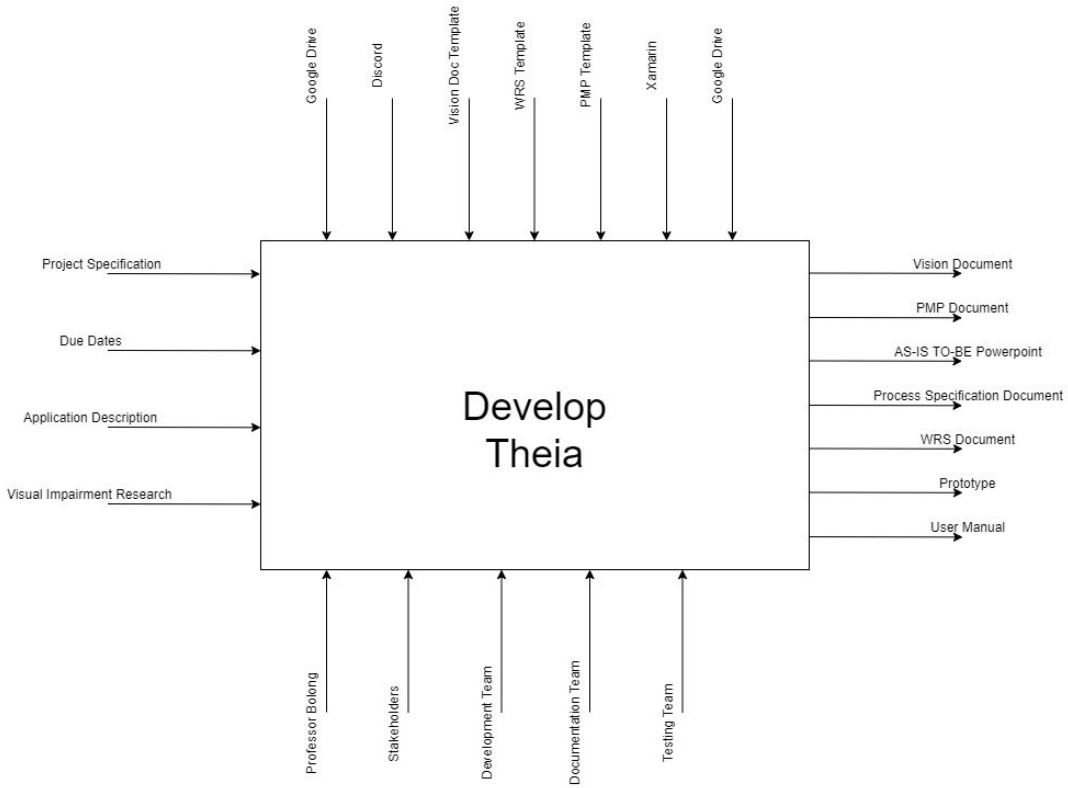
Final Phase II - Description:

In the final phase of Phase II, the Process Specification document, Vision document, updated WRS document, final Project Plan, final Presentation, and prototype were completed in order to ensure the full success of the project.

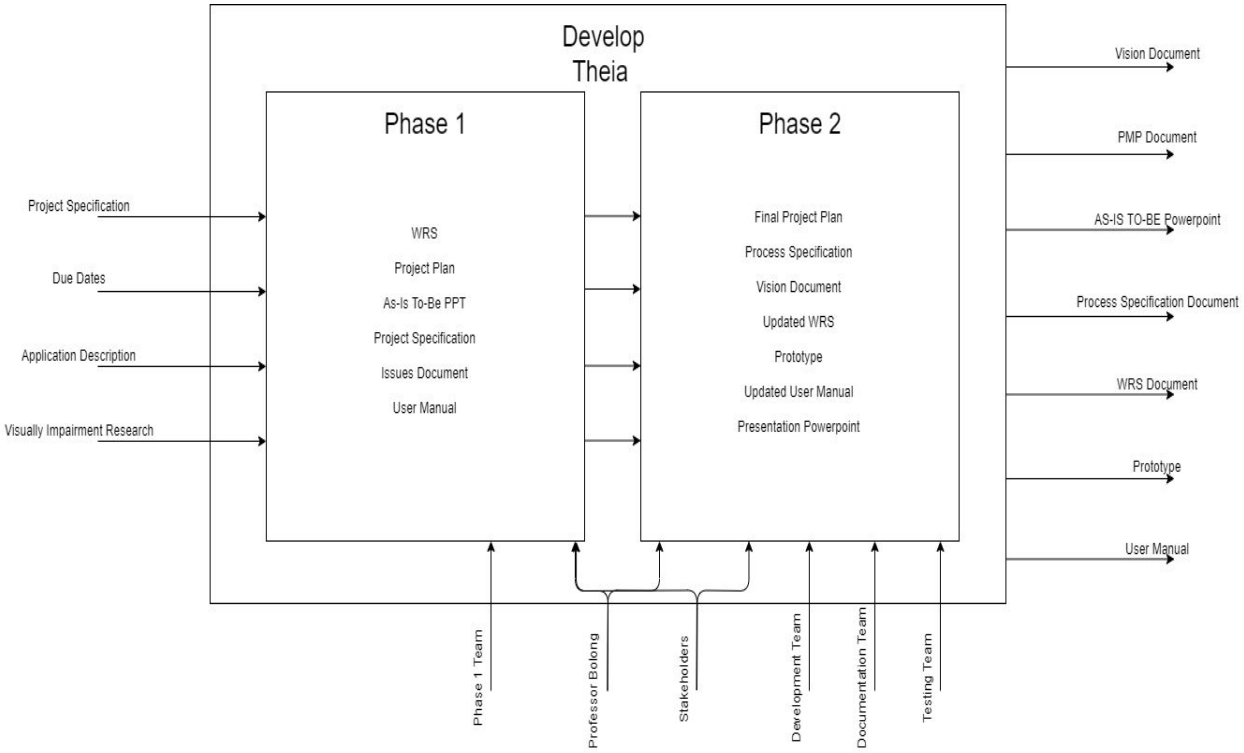
- Goals
  - Finalize Process Specification Document
  - Finalize Team Vision Document
  - Finalize Prototype

3.2. Traceability

IDEF0



IDEF1


Develop Theia
Phase 1
WRS
Project Plan
As-Is To-Be PPT
Project Specification
Issues Document
User Manual
Phase 2
Final Project Plan
Process Specification
Vision Document
Updated WRS
Prototype
Updated User Manual
Presentation Powerpoint
Project Specification
Due Dates
Application Description
Visually Impairment Research
Vision Document
PMP Document
AS-IS TO-BE Powerpoint
Process Specification Document
WRS Document
Prototype
User Manual
Phase 1 Team
Professor Bolong
Stakeholders
Development Team
Documentation Team
Testing Team