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# Software Project Management Plans
# AIIP/S Smart EyeSight
# Version 2.0

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# 1 Introduction

The purpose of this document, named Software Project Management Plan, is to establish in a clear form, the details and specifications of how this Project would be administrated. This document is going to facilitate the organization of the project, and it would guarantee that all the requirements are being fulfilled for the completion of the product. This documents discuss the following topics:

- Evolution of the SPMP
- Project Organization
- Managerial Process
- Technical Process
- Work Packages, Schedule and Budget

The SPMP is directed to:

1. Clients - DARPA and Prof. Arturo Geigel
2. Users - United States Armed Forces
3. Developers - AIIP/S and people responsible for maintenance and making updates to the system.

## 1.1 Project Overview

The project is part of a proposal to Defense Advanced Research Projects Agency (DARPA). This proposal wants to decentralize control of unmanned vehicles, and allows multiple operators to operate a single vehicle or a formation of vehicles. This provides redundancy in the decision process and optimize the course of action to be followed. The main focus is the image segmentation and processing part. The images will be classify using a Probabilistic Neural Network (PNN) depending on the following features:

- Shape
- Color
- Location
- Normalized Area
- Texture

## 1.2 Project Deliverables

This subsection list all the items to be delivered to the customer, the delivery dates, delivery locations, and quantities to satisfy the terms of the project.

- IEEE 1058 Software Project Management Plan
  Due Date: October 31 2012
  Quantity: 1
  Localization: L-310
- IEEE 830 Software Requirements Specification
  Due Date: October 31 2012
  Quantity: 1
  Localization: L-310
- IEEE 829 Software Test Document
  Due Date: October 31 2012
  Quantity: 1
  Localization: L-310
- IEEE 1016 Software Design Description
  Due Date: October 31 2012
  Quantity: 1
  Localization: L-310
- Image AIIP/S Smart EyeSight
  Due Date:
  Quantity: 1
  Localization: L-310

## 1.3 Evolution of the SPMP

This subsection specify the plans for producing both scheduled and unscheduled updates, methods of disseminating the updates and to control subsequent changes to the SPMP.

### 1.3.1 Updating the SPMP

Any member would have all the right to present a motion to express his point of view. If the point of view is valid and is seconded by the two other members, the document would be updated. Each time a member finish a section he/she will give it to the other members for review.

### 1.3.2 Document Version

The final version of the document will have the number 2.000. A change in the tenth position means that a new section was added, a change in the hundredth position means that a new subsection was added and a change in the thousandth position means that some subsection was modified.

### 1.3.3 Tools

Our main tool for updating this document is Github. Github is a repository where any member of the group can make changes without completely overwriting each other updates. As a second option, in case we experience any problems with Github, we will use Dropbox or Ubuntu One to update this document.

## 1.4 Reference Material

This subsection provide a complete list of all the documents and other sources of information referenced in this document. Each document will be at least identified by title, author and date.

### 1.4.1 IEEE Documents

The following documents define the standards for the documentation of the AIPPS Smart EyeSight:

- IEEE Std 1058.1-1987 Software Project Management Plan
  Author: The Software Engineering Technical Committee of the Computer Society of the IEEE
  Date: Approved December 10, 1987
  PDF: ISBN 0-7381-0409-4, SS12138
- IEEE Std 829-1998 Software Test Documentation
  Author: The Software Engineering Technical Committee of the Computer Society of the IEEE
  Date: Approved 16 September 1998 PDF:ISBN 0-7381-1444-8 SS94687
- IEEE Std 830-1998 Software Requirement Specification
  Author: The Software Engineering Technical Committee of the Computer Society of the IEEE
  Date: Approved 25 June 1998
  PDF: ISBN 0-7381-0332-2
- IEEE Std 1016-1998 Software Design Description
  Author: The Software Engineering Technical Committee of the Computer Society of the

IEEE
Date: Approved 23 September 1998
PDF: ISBN 0-7381-1456-1 SS94688

### 1.4.2 Papers

The following research papers are necessary to develop AIIP/S Smart EyeSight:

- Region-Based Image Retrieval Using Probabilistic Feature Relevance Learning
  Author: ByoungChul Ko, Jing Peng and Hyeran Byun
- Probabilistic Neural Networks Supporting Multi-Class Relevance Feedback in Region-based Image Retrieval
  Author: ByoungChul Ko and Hyeran Byun
  Date: 2002
- FRIP: A Region-Based Image Retrieval Tool Using Automatic Image Segmentation and Stepwise Boolean AND Matching
  Author: ByoungChul Ko and Hyeran Byun
  Date: 2005
- A General Method for Unsupervised Segmentation of Images Using a Multiscale Approach
  Author: Alvin H. Kam and William J. Fitzgerald
  Date: 2000

### 1.4.3 Books

The following books are necessary to develop AIIP/S Smart EyeSight:

- Image Processing in C Second Edition
  Author: Dwayne Phillips
  Date: 2000
- The Pocket Handbook of Image Processing Algorithms in C
  Author: Haley R. Myler, Arthur R. Weeks
  Date: 1993

## 1.5 Definitions and Acronyms

This subsection shall define, or provide references to the definition of all terms and acronyms required to properly interpreted the SPMP.

| Term | Definition |
|---|---|
| The Company | AIIP/S |
| Software | Image Segmentation/Processing working code |
| Proposal | DARPA Proposal |

Table 2: Definitions

| Term | Acronym |
|---|---|
| AIIP/S | Artificial Intelligence and Image Processing/Segmentation |
| PNN | Probabilistic Neural Network |
| Defense Advanced Research Projects Agency | DARPA |
| Software Requirements Specification | SRS |
| Software Project Management Plan | SPMP |
| Software Test Document | STD |
| Software Design Description | SDD |
| Institute of Electrical and Electronics Engineers | IEEE |

Table 3: Acronyms

# 2 Project Organization

This section is divided in the following subsections:

- Process Model
- Organizational Structure
- Organizational Boundaries and Interfaces
- Project Responsibilities

## 2.1 Process Model

The organization for the development of the software's documents (SRS, STD, SDD, SPMP and develpment of Smart EyeSight) will be paralleled, lineal and incremental. Each member will have a document assigned, this way the documents can be completed by the due date the client specify.

The following figure (1) shows the process model of the project.

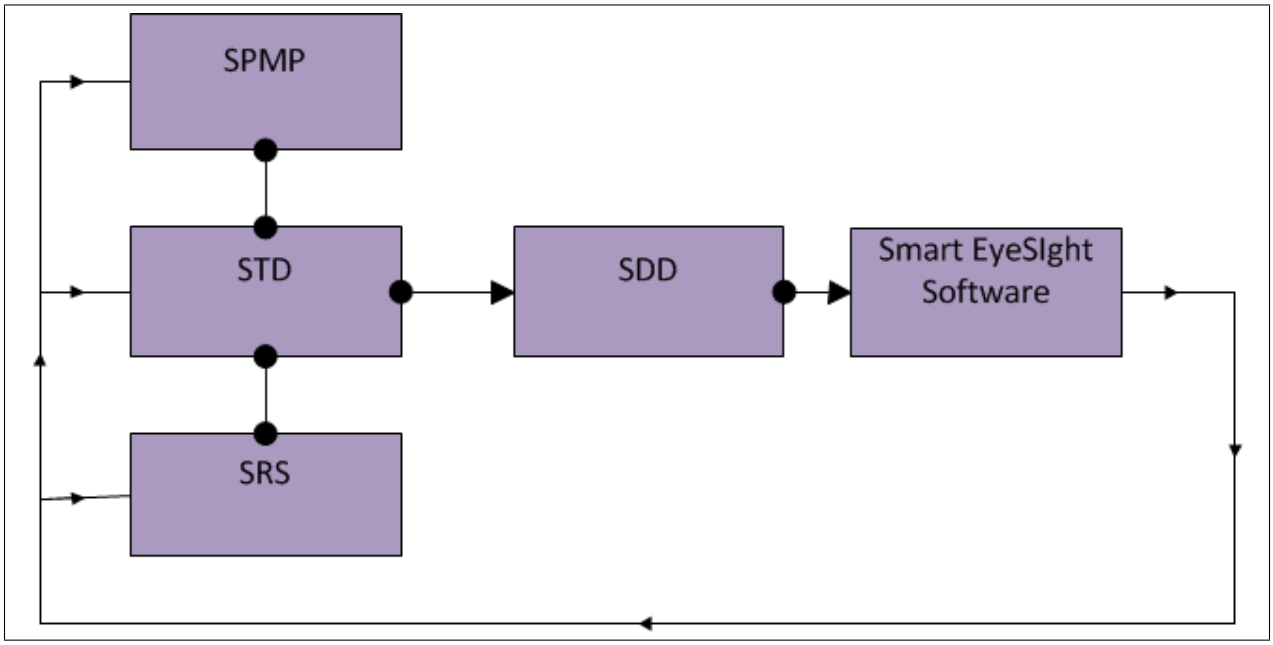



Figure 1: Block Diagram of the Process Model

## 2.2 Organizational Structure

AIIP/S is compose of 3 members, each with a main position in the team, primary and secondary tasks. The following figure (2) shows the positions within the organization, the primary and Secondary Tasks of each member:

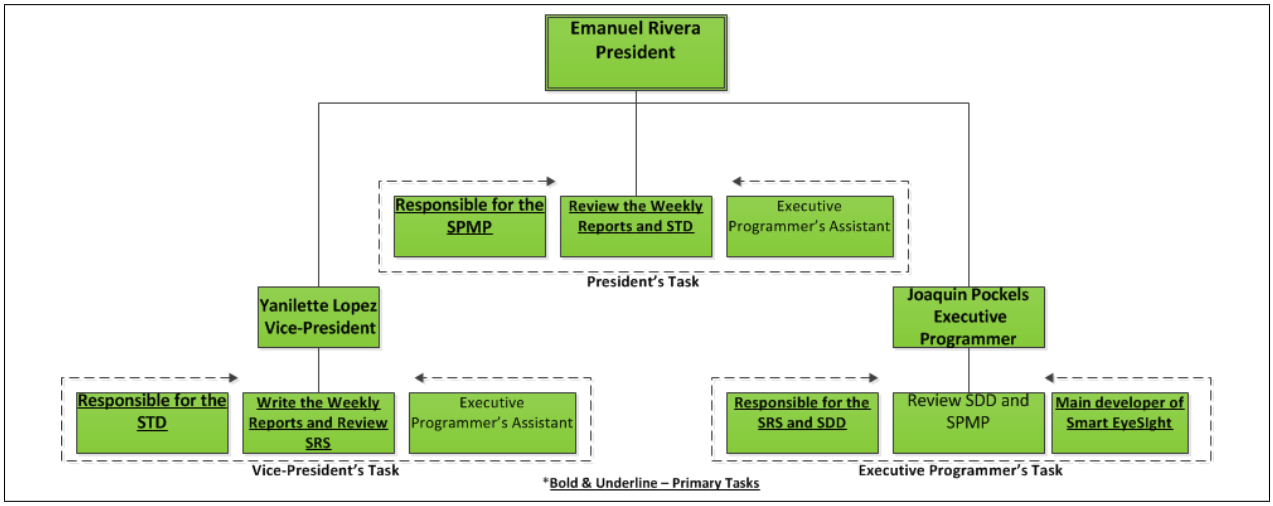



Figure 2: Organizational Diagram

Decisions within the Company are handled through voting. The changes must be discussed by the group, after which a debate will take place to find the advantages and disadvantages. Finally, the group will vote and majority decided whether the change will take place. Each meeting will be documented in a weekly report.

Communication between group members will consist of phone calls, text messages, e-mails and meetings. Generally, meetings take place every Wednesday at 1:30pm with additional meetings taking place whenever the group decide is necessary.

## 2.3 Organizational Boundaries and Interfaces

As section 1 of this documents says the main purpose/objective of this project is to implement the image segmentation/processing of the DARPA proposal. For the purpose of testing 150 images were selected to verify the effectiveness of Smart EyeSight (Please refer to the STD Document for more information). In a real situation Smart EyeSight will be receiving images from an external agent, robot and/or UAV. Then the images will be segmented and classify and the classification will be send to the external agent. Other companies/organizations will take care of the other components of this proposal.

Figure 3 shows the relevant parts for this project of the DARPA proposal. We don't care who or how the other agents do their work, our only concern is to have images as input to our Software.

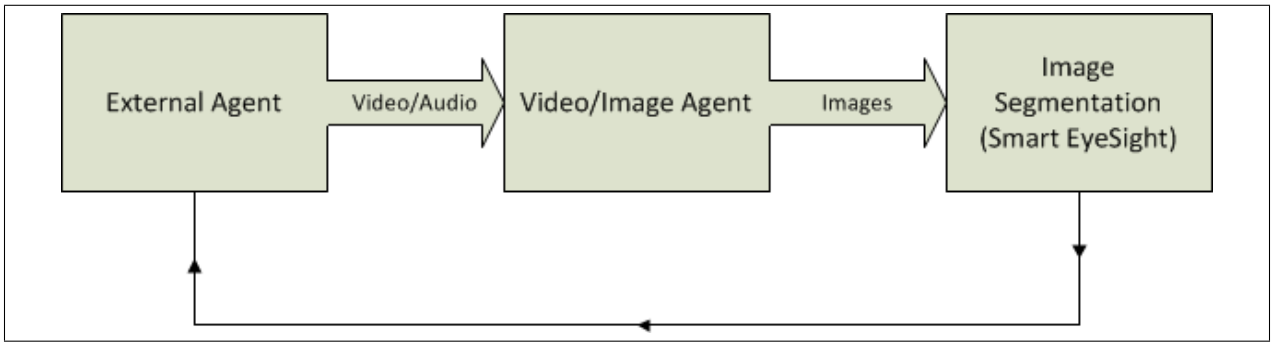



Figure 3: Block Diagram of the Boundaries of our Project

## 2.4 Project Responsibilities

Each document will have at least one assigned member responsible for its completion. Other members will give feedback and can make changes/updates to each document. Tables 4-8 shows the responsibilities of each member.

| Document | Project Manager(s) | Assistant Member(s) |
|---|---|---|
| AIIP/S SRS | Joaquin Pockels | Emanuel Rivera, Yanilette Lopez |
| AIIP/S SDD | Joaquin Pockels | Emanuel Rivera, Yanilette Lopez |
| AIIP/S STD | Yanilette Lopez | Emanuel Rivera, Joaquin Lopez |
| AIIP/S SPMP | Emanuel Rivera | Joaquin Lopez, Yanilette Lopez |
| AIIP/S Software | Joaquin Pockels | Emanuel Rivera, Yanilette Lopez |

Table 4: Main Responsibilities for each member

| SRS | | |
|---|---|---|
| **Title** | **Section(s)** | **Member(s)** |
| Introduction, General Description, External Interface Requirements, System Features and Other Nonfunctional Requirements | 1-5 | Joaquin Pockels |

Table 5: Shows who works in each section of the SRS

| SDD | | |
|---|---|---|
| **Title** | **Section(s)** | **Member(s)** |
| Introduction | 1 | Emanuel Rivera |

Table 6: Shows who works in each section of the SDD

| STD | | |
|---|---|---|
| **Title** | **Section(s)** | **Member(s)** |
| Introduction, Equipment, Test Plan, Test Design Specification and Test Description | 1-5 | Yanilette Lopez |

Table 7: Shows who works in each section of the STD

| SPMP | | |
|---|---|---|
| **Title** | **Section(s)** | **Member(s)** |
| Introduction, Project Organization, Managerial Process, Technical Process, Work Packages, Schedule, and Budget | 1-5 | Emanuel Rivera |

Table 8: Shows who works in each section of the SPMP

# 3 Managerial Processes

This section is divided in the following subsections:

- Management objectives and priorities
- Project assumptions, dependencies and constraints
- Risk management techniques
- Monitoring and controlling mechanisms to be used
- Staffing Plan

## 3.1 Management Objectives and Priorities

This section contains the philosophy, goals and priorities on management activities for the project. Also it specify the format used for reporting and the expected frequency of reports, priorities of requirements, schedule and budget.

### 3.1.1 Philosophy

The philosophy adopted for the development and documentation of Smart EyeSight is: divide and conquer. The group will usually meet; either physically or via other means of communication, such as, internet conference calls using Skype, phone calls, text messages, email and file sharing services/cloud services like Dropbox and Ubuntu One. Afterwards, different tasks are given to each member.

### 3.1.2 Goals

The goals are simply to be able to fulfill the objectives of the Proposal, write each document receive feedback from our client, review, audit and complete the development and documentation of the Software.

### 3.1.3 Priorities

The priorities on a task may vary on the difficulty and/or length of the it. The priorities are the following:

1. Documenting the plan (SPMP) and the requirements (SRS) of the Project.
2. Documenting the design (SDD) and testing methods (STD) of the Project.
3. Work on AIIP/S Smart EyeSight.
4. Meet with our client for feedback.

### 3.1.4 Project Budget Priorities

The priority on the project budget allocation is the following:

- Computers for the project staff
- Required hardware and software for the projects completion. (Refer to section 4.1 for list of software and hardware)
- Papers and books necessary for a better understanding of the process/steps to complete this Project. (Refer to sections 1.4.2 and 1.4.3 for list of papers and books)

### 3.1.5 Risk Management Procedures

In the event that a risk or problematic situation occurs during the development of the project, an emergency staff meeting will take place in order to address the problem or situation. On these meeting its imperative to hear each of the staff members opinion and possible solutions on the matter. Afterwards the project staff will proceed to make a democratic vote election to determinate the course of action to be taken based on the proposed or accepted solutions to the given risk or problem.

### 3.1.6 Software Acquisition Statement Management

The proper format to deliver a statement which states the intention of acquiring, modifying or using existing software should follow the following procedure:

- Mention the Software in question during a staff meeting.
- State the reasons why the existing software is needed.
- Mention and justify the amount of software licenses needed
- Afterwards the staff will vote to decide the acquirement of the software or not.

## 3.2 Assumptions, Dependencies and Constraints

This section will contain the following information:

- The necessary assumptions on which the project is based.
- External events the project is dependent upon in order to be completed.
- Constraints on which the project will be conducted.

### 3.2.1 Assumptions

The assumptions for this project are the following:

1. AIIP/S will not design the external agent that will capture the video and audio. The client needs the agent that will capture the video and audio.
2. AIIP/S will not design the communication protocol to send the video. The client needs to have the communication protocol to send the video.
3. AIIP/S will not design the process/algorithm to ”change” the video into frames/images. The client need to have the process/algorithm to take the video and divide it in frames/images.

### 3.2.2 Dependencies

Most of the dependencies of external events the project will be dependent upon will be due the completion of the project documentations. For example SDD and STD documents will be dependent on the completion of the SRS and SPMP documentations in order for their completion to be successful. Other dependencies would be the feedback from our client that may change/alter the code and/or documents.

### 3.2.3 Constraints

The following are the constraints of the project:

1. Smart EyeSight have a time constraint of 3 months for documenting the software and 6 months to have a working code.
2. Project documents must comply with IEEE software documentation format.
3. All the requirements mentioned in the SRS.

## 3.3 Risk Management

This subsection identify and assess the risk factors associated with the project. It prescribe mechanisms for tracking the various risk factors and implementing contingency plans.

### 3.3.1 Risk regarding contract

Any violations of the contract terms and agreements (from our clients) would be dealt, at first with a proposals and/or counter-proposals, if our clients do not accepts any of our proposals the last option is a lawsuit. If we are the ones that violate any term or agreement, the steps would be the same (proposals and/or counter-proposals) and try not to get a lawsuit.

### 3.3.2 Risk regarding technology related on the project

Anyone that damage or alter any project data resulting in its loss, damage or theft of computer equipment or other materials will be fired. All tools mentioned in sections 1.3.3 are use for precautions against data loss. Sadly, if any damage or theft of computer equipment or other materials the only solution is to acquire new equipment.

### 3.3.3 Risk regarding consumer acceptance of the product

If the customer do not express the desired product correctly and with clarity, and mid development forces the staff member to redo most of the currently developed product on the project, then more time will be ask to clients to finish the project. If the product doesnt meet the clients expectations or needs, we'll update the products in the time frame that is explain in section 4.3.

## 3.4 Monitoring and Controlling Mechanisms

Process to request a change in the document:

1. Client, Users and/or Developer(AIIP/S member) request a change in a document after reviewing it.
2. The member assigned to that particular document makes the changes necessary to comply with the change request using WinEdt 7 or Emacs. The responsibility to makes the changes can be given to another member if there is a valid reason. (sickness, minor changes, education, family)
3. The member assigned to that particular document uploads the document to GitHub and DropBox, this keeps each member informed about the documentation progress.

For more information about each member responsibilities go to section 2.2 and 2.4

## 3.5 Staffing Plan

The Project can be developed with a small group consisting of three (3) members. They have to meet the following requirements:

1. Have Experience with C.
2. Start working in August 13, 2012.
3. Work until February 2013.
4. Have time to attend meetings.
5. Have a Bachelor degree on computer science or Computer Engineering.
6. Work on flexible schedules.
7. Have knowledge or experience with PNN.
8. Follow instructions.
9. Work in a team.
10. Basic knowledge of IEEE standard software documentation.

# 4 Technical Process

This section specify the technical methods, tools, and techniques to be used on the project. This section is divided in the following subsections:

- Methods, Tools, and Techniques
- Software Documentation
- Project Support Functions

## 4.1 Methods, Tools, and Techniques

In order to complete this project, the following tools/software are needed:

- Microsoft Office Projects 2010
- Linux Ubuntu 12.04.1
- Microsoft Windows 07
- Microsoft Office Visio 2010
- ASUS A53S Series
- ASUS G53SX-XT1
- ASUS Notebook G60 Series
- Visual Studios 2010
- GCC, the GNU Compiler Collection
- Emacs, Winedt 7, Miktex 2.9 (Latex)

For the Methods and Techniques to be used please see section 2.1 and 2.2

## 4.2 Software Documentation

The Process of documentation is based on the standard documents of The Institute of Electrical and Electronics Engineers (IEEE). Here is a description of the documents that we use on this project.

### 4.2.1 Software Project Management Plan

The software project management plan is the controlling document for managing a software project; it defines the technical and managerial processes necessary to satisfy the project requirements.

### 4.2.2 Software Requirements Specification

The software requirements specification is an important part of the requirements process of the software life cycle and is used in design, implementation, project monitoring, verification and validation. It gives a complete description of the behavior of the system to be developed.

### 4.2.3 Software Test Document

The standardized test document can facilitate communication by providing a common frame of reference. Serves as a completeness checklist for the associated testing process; can also provide a baseline for the evaluation of the current test practices.

### 4.2.4 Software Design Description

The software design description is a representation of a software system that is used as a medium for communicating software design information. A representation of a software system is created to facilitate analysis, planning, implementation, and decision making.

## 4.3 Project Support Functions

Updates for Smart EyeSight will be made periodically every month for the first year after launch. After the first year, updates will be make every four (4) months and after the second year, every six (6) months. Only a client request for an update can change the establish time. After each update AIIP/S will test the software and write a detail report of the changes to Smart EyeSight. Then the software, with the updates, will be implemented back in the system. The following figure (4 shows the procedure to deliver an update.

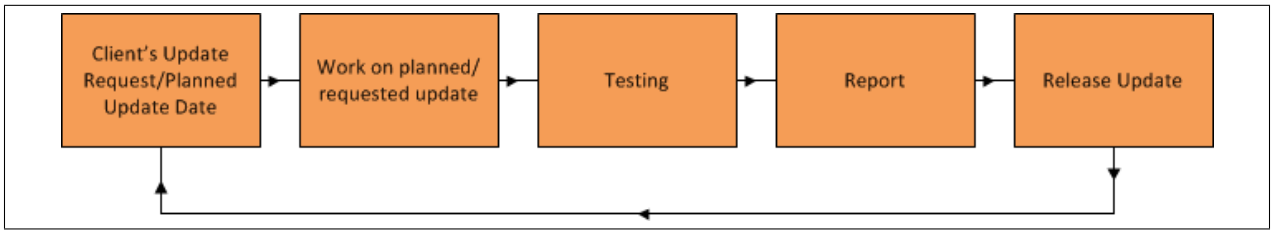



Figure 4: Block Diagram of the Process to maintain and deliver updates to Smart EyeSight

# 5 Work Packages, Schedule, and Budget

This section specify the work packages, identify the dependency relationships among them, state the resource requirements, provide allocation of budget and resources to work packages, and establish a project schedule. This section is divided in the following subsections:

- Work Packages
- Dependencies
- Resource Requirements
- Budget and Resource Allocation
- Schedule

## 5.1 Work Packages

In order to complete the project agreement, the client will receive four (4) documents described in the Software Documentation section (4.2) and in the following 3-4 months a working code of Smart EyeSight.

## 5.2 Dependencies

The dependencies for these work packages are detailed in Figure 5.

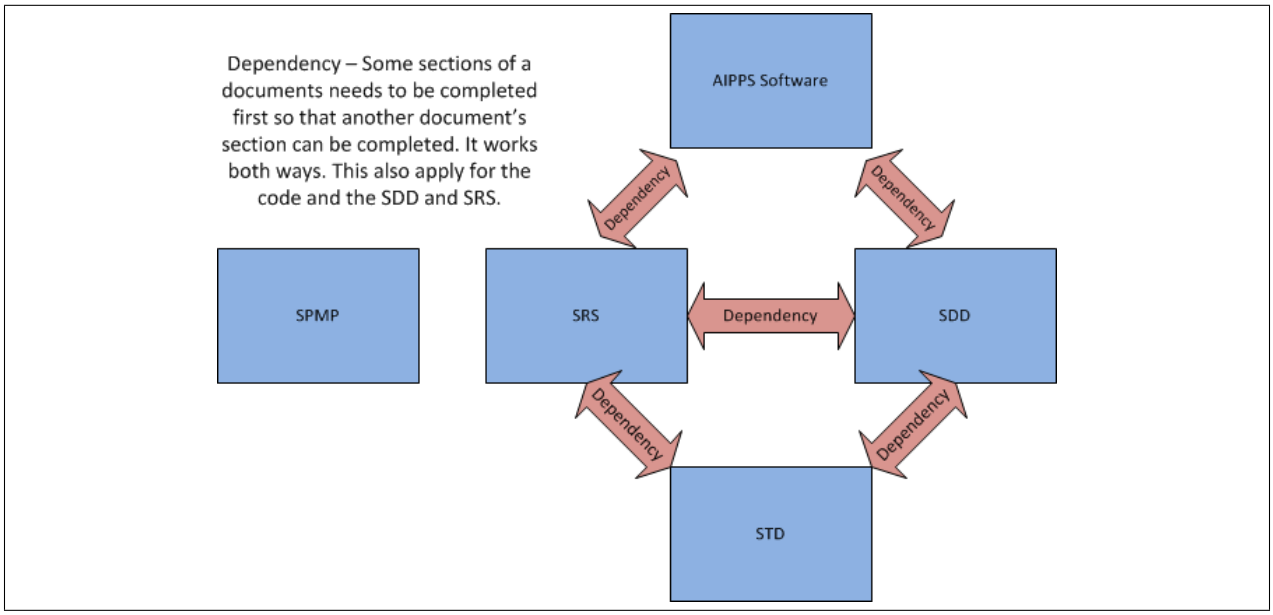



Figure 5: Block Diagram of the Dependencies of our Project

## 5.3 Resource Requirements

Please see section 4.1 for the Resources/Tools needed for the completion of this project.

## 5.4 Budget and Resource Allocation

| Items | Quantity | Amount | Total |
|---|---|---|---|
| Laptops | 3 | $750 + $900 + $ 1200 | $2850 |
| Gasoline | 2 | $250 | $500 |
| Office 2010 Professional | 3 | $408.99 | $1226.97 |
| Office Project 2010 | 1 | $499.80 | $499.80 |
| Visual Studio 2010 Professional | 3 | $799 | $2397 |
| TOTAL | | | $7473.77 |

Table 9: Shows the cost of Resources for this Project

| Personnel | Months | Amount(Per Month) | Total |
|---|---|---|---|
| Emanuel Rivera | 6 | $2500 | $15000 |
| Joaquin Pockels | 6 | $2000 | $12000 |
| Yanilette Lopez | 6 | $2000 | $12000 |
| TOTAL | | | $39000 |

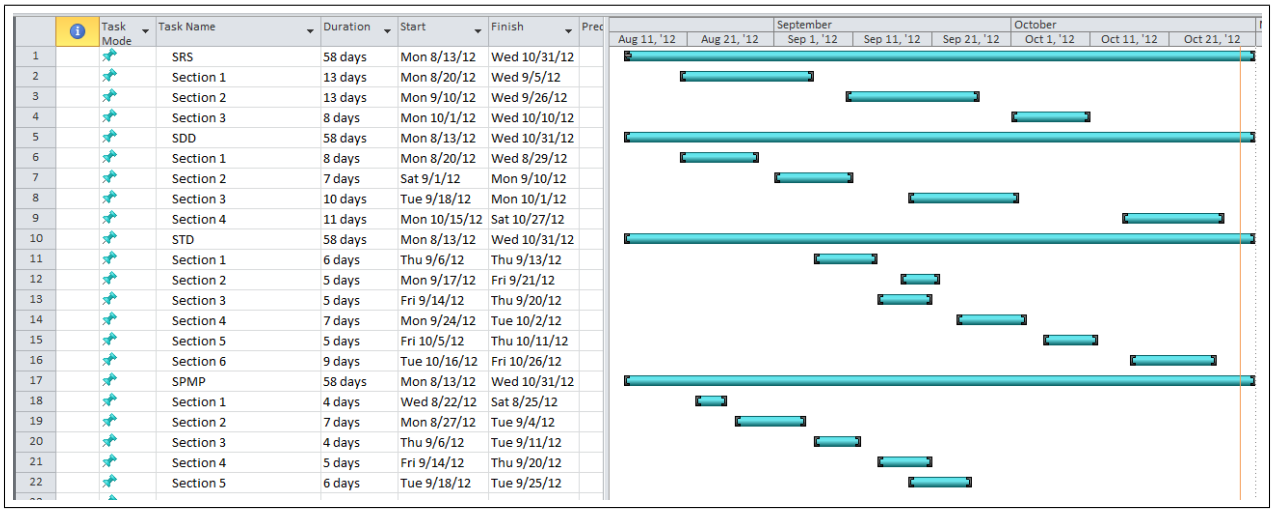
Table 10: Shows the cost of Personnel for this Project

| Resources | Total |
|---|---|
| Materials/Tools | $5076.77 |
| Human Resources | $39000 |
| TOTAL | $44076.77 |

Table 11: Shows the total cost for this Project

## 5.5 Schedule

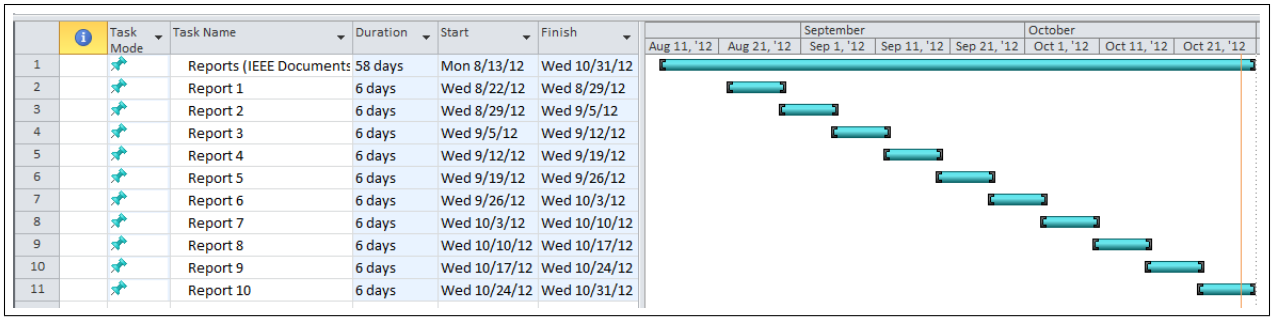
This section shows the plan schedule for each step in the developing of Smart EyeSight. The dates that appears in the following figures 6-8 are subject to change depending on the risk mentioned in section 3.3.



| | Task Mode | Task Name | Duration | Start | Finish | Prec |
|---|---|---|---|---|---|---|
| 1 | | SRS | 58 days | Mon 8/13/12 | Wed 10/31/12 | |
| 2 | | Section 1 | 13 days | Mon 8/20/12 | Wed 9/5/12 | |
| 3 | | Section 2 | 13 days | Mon 9/10/12 | Wed 9/26/12 | |
| 4 | | Section 3 | 8 days | Mon 10/1/12 | Wed 10/10/12 | |
| 5 | | SDD | 58 days | Mon 8/13/12 | Wed 10/31/12 | |
| 6 | | Section 1 | 8 days | Mon 8/20/12 | Wed 8/29/12 | |
| 7 | | Section 2 | 7 days | Sat 9/1/12 | Mon 9/10/12 | |
| 8 | | Section 3 | 10 days | Tue 9/18/12 | Mon 10/1/12 | |
| 9 | | Section 4 | 11 days | Mon 10/15/12 | Sat 10/27/12 | |
| 10 | | STD | 58 days | Mon 8/13/12 | Wed 10/31/12 | |
| 11 | | Section 1 | 6 days | Thu 9/6/12 | Thu 9/13/12 | |
| 12 | | Section 2 | 5 days | Mon 9/17/12 | Fri 9/21/12 | |
| 13 | | Section 3 | 5 days | Fri 9/14/12 | Thu 9/20/12 | |
| 14 | | Section 4 | 7 days | Mon 9/24/12 | Tue 10/2/12 | |
| 15 | | Section 5 | 5 days | Fri 10/5/12 | Thu 10/11/12 | |
| 16 | | Section 6 | 9 days | Tue 10/16/12 | Fri 10/26/12 | |
| 17 | | SPMP | 58 days | Mon 8/13/12 | Wed 10/31/12 | |
| 18 | | Section 1 | 4 days | Wed 8/22/12 | Sat 8/25/12 | |
| 19 | | Section 2 | 7 days | Mon 8/27/12 | Tue 9/4/12 | |
| 20 | | Section 3 | 4 days | Thu 9/6/12 | Tue 9/11/12 | |
| 21 | | Section 4 | 5 days | Fri 9/14/12 | Thu 9/20/12 | |
| 22 | | Section 5 | 6 days | Tue 9/18/12 | Tue 9/25/12 | |



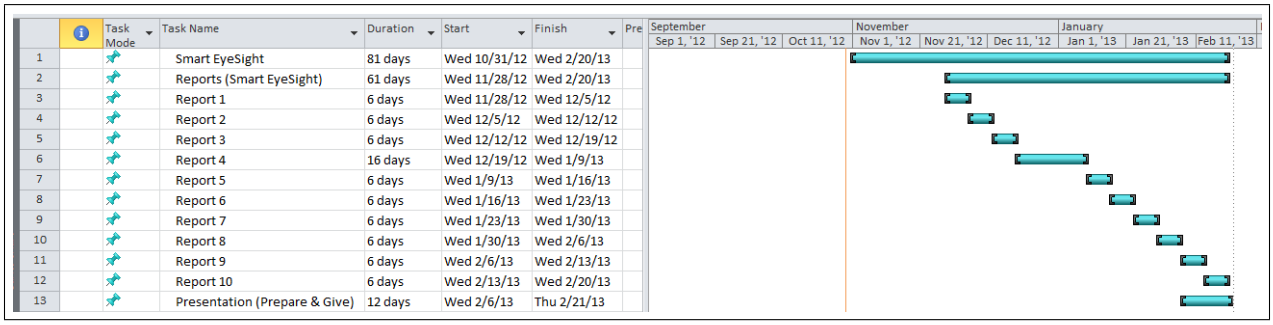
Figure 6: Schedule for the IEEE Documents



| | Task Mode | Task Name | Duration | Start | Finish |
|---|---|---|---|---|---|
| 1 | | Reports (IEEE Documents | 58 days | Mon 8/13/12 | Wed 10/31/12 |
| 2 | | Report 1 | 6 days | Wed 8/22/12 | Wed 8/29/12 |
| 3 | | Report 2 | 6 days | Wed 8/29/12 | Wed 9/5/12 |
| 4 | | Report 3 | 6 days | Wed 9/5/12 | Wed 9/12/12 |
| 5 | | Report 4 | 6 days | Wed 9/12/12 | Wed 9/19/12 |
| 6 | | Report 5 | 6 days | Wed 9/19/12 | Wed 9/26/12 |
| 7 | | Report 6 | 6 days | Wed 9/26/12 | Wed 10/3/12 |
| 8 | | Report 7 | 6 days | Wed 10/3/12 | Wed 10/10/12 |
| 9 | | Report 8 | 6 days | Wed 10/10/12 | Wed 10/17/12 |
| 10 | | Report 9 | 6 days | Wed 10/17/12 | Wed 10/24/12 |
| 11 | | Report 10 | 6 days | Wed 10/24/12 | Wed 10/31/12 |



Figure 7: Schedule for the weekly report for the first 3 months



| | Task Mode | Task Name | Duration | Start | Finish | Pre |
|---|---|---|---|---|---|---|
| 1 | | Smart EyeSight | 81 days | Wed 10/31/12 | Wed 2/20/13 | |
| 2 | | Reports (Smart EyeSight) | 61 days | Wed 11/28/12 | Wed 2/20/13 | |
| 3 | | Report 1 | 6 days | Wed 11/28/12 | Wed 12/5/12 | |
| 4 | | Report 2 | 6 days | Wed 12/5/12 | Wed 12/12/12 | |
| 5 | | Report 3 | 6 days | Wed 12/12/12 | Wed 12/19/12 | |
| 6 | | Report 4 | 16 days | Wed 12/19/12 | Wed 1/9/13 | |
| 7 | | Report 5 | 6 days | Wed 1/9/13 | Wed 1/16/13 | |
| 8 | | Report 6 | 6 days | Wed 1/16/13 | Wed 1/23/13 | |
| 9 | | Report 7 | 6 days | Wed 1/23/13 | Wed 1/30/13 | |
| 10 | | Report 8 | 6 days | Wed 1/30/13 | Wed 2/6/13 | |
| 11 | | Report 9 | 6 days | Wed 2/6/13 | Wed 2/13/13 | |
| 12 | | Report 10 | 6 days | Wed 2/13/13 | Wed 2/20/13 | |
| 13 | | Presentation (Prepare & Give) | 12 days | Wed 2/6/13 | Thu 2/21/13 | |



Figure 8: Schedule for the developing Smart EyeSmart and weekly report for the last 3 months