

# SOFTWARE VERIFICATION and VALIDATION PLAN

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*Project Enlightenment*

*Computer Training For Visually Impaired Automation Tool  
(CTVIAT)*

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## Document Change Control

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The following is the document control for revisions to this document.

Version Number	Date of Issue	Author(s)	Brief Description of Change
1.0	30/11/10	Project Enlightenment	Phase 1 - Preliminary draft for Phase 1
1.1	07/01/11	Project Enlightenment	Syntax and view improvements

## Definition

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The following are definitions of terms, abbreviations and acronyms used in this document.

Term	Definition
PM	Project Manager
QA	Quality Assurance
SVVP	Software Verification and Validation Plan
SVVR	Software Verification and Validation Report
TG	Task group
V&V	Verification and Validation
V&V Task	A QA check that is performed on any part of the project. A success or failure in this check indicates that the part of the project did not meet QA standards.

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# 1. Purpose

## 1.1 Overview

This SVVP (Software Verification and Validation Plan) has been written for the 433-440 Advanced Software Engineering Project and more specifically for the CTVIAT.

The main goals of this plan and the V&V (Verification and Validation) effort are:

- ✓ To ensure completeness in the implementation of requirements in each phase of the project (i.e. to ensure traceability from requirements).
- ✓ To maintain and improve the QA (Quality Assurance) of the project.
- ✓ To provide an independent method of checking for completeness of QA Tasks for each phase of the project.

V&V will be the responsibility of the SQA TG (Software Quality Assurance Task Group-this is the all members but especially Emmar and Özge) and TG develop and execute the SVVP. Most of the V&V effort will be verifying that all the QA tasks have been completed for each phase of the project. All phases of the project will be required to pass the QA checks detailed in this plan. The execution of this plan results in the production of the SVVR (Software Verification and Validation Report). This report states the results of all the QA tasks and provides recommendations that can be fed back into SQA (Software Quality Assurance) for the project.

# 2. Verification and Validation

## 2.1 Overview

This chapter details the organization of the V&V effort, the schedule for V&V tasks and the tools, techniques and methodologies employed.

## 2.2 Organization

The SQA TG (led by the QA Manager) is responsible for the V&V effort for CTVIAT. All the decisions and communication for the V&V effort will be conducted in the weekly meetings of the team. There are several organizational entities (Osman as project manager, Emmar as QA manager, others developers) that V&V effort needs to interact with.

## 2.3 Master Schedule

The schedule for V&V tasks (for each phase of the project) is heavily dependent on the Team Project Plan. Therefore, the V&V tasks for a phase will be executed when that phase of the project is deemed complete by the PM (Project Manager). To avoid any incorrect specification of dates for phases, all dates must be referenced in the Team Project Plan. It is the QA Manager's responsibility to ensure that the V&V tasks are executed on the dates specified in the Team Project Plan.

## 2.4 Tools

There are several Tools that will be used during the production and execution of the SVVP:

- ✓ LATEX and VISIO - will be used to write the SVVP and the SVVR.

## 3. Life-cycle Verification and Validation Plan

This chapter contains the checklists for all the V&V tasks which are to be executed for each life-cycle phase. These V&V tasks must be completed before the commencement of the next phase except testing phase.

### 3.1 Management of V&V

The management of V&V is planned and being executed by Emmar and Özge. The SVVP will be generated and maintained by Emmar and Özge. The SVVP was supposed to be generated during the Concept Phase so that it can cover all life-cycle phases. Anyhow, the V&V tasks for the Concept and Requirements Phases had been carried out because these tasks are checked in previous period after preparation of RAD.

The appropriate V&V tasks for the management of V&V are as follows:

V&V Tasks	Input	Output
SVVP Generation	Project Management Plan	SVVP
Change Request	Proposed Changes	Updated SVVP
Internal review	Team Suggestions	Updated SVVP
External review	Kapil and instructor's suggestions	Updated SVVP
Functional audit	System testing cases	Functional audit report
In process audit	Source code	In process audit report
SVV Reporting	SVVP	Phase summary
Final Report	SVVP	SVVR

### 3.2 Concept Phase V&V

During this phase, all the initial managerial documents that governed the operation of the team were written. This was the SPMP which was developed by whole team. They were required to satisfy the V&V criteria which were set for this phase. The appropriate V&V tasks for this phase are as follows: internal and external reviews, proposed changes and some functions enhancements.

### **3.3 Requirements Phase V&V**

In this phase, software requirements were gathered and analyzed for the production. Some prototyping, searching market interest and reusable packages are analyzed and research reports are written and the research reports were required to meet the specific V&V criteria before the commencement of Design Phase. However, in this phase V&V tasks are met in previous period.

The appropriate V&V tasks for this phase are as follows: internal and external reviews, client review is also added because while gathering the requirements client is the only source, proposed changes and generation and maintenance of requirement traceability table.

### **3.4 Architectural Design Phase V&V**

The tasks to complete are internal, external reviews, and proposed changes and architecture evolution.

### **3.5 Test Plan Generation Phase**

Software Development Life Cycle is Extreme Programming which requires extremely lots of testing. All code must be tested by unit test. Writing test cases will go on parallel with implementation. The tasks to meet for successful functionality are internal and external reviews, proposed changes and of course test case traceability.

### **3.6 Development Phase V&V**

#### **3.6.1 Implementation**

During this stage, the Detailed Design will be translated into source code with appropriate documentation. The executable code is then produced by compiling the source code. The source code and source code documentation are required to meet the specific V&V criteria for conformity and ease in maintenance. The executable code depends on the source code. Therefore, if the source code and its documentation fulfill the V&V criteria, the executable code is considered as the verified and validated version.

The appropriate V&V tasks are as follows: internal and external reviews of source code and documentation, and module traceability.

#### **3.6.2 Documentation**

Other than source code documentation, documentation of module is a necessity because these module specifications will be used final user manual.

#### **3.6.3 Test Plan Execution**

The tests are executed in this phase. Testing results are reported for traceability. The output of this phase is required to meet the specific V&V criteria for this phase.

### 3.7 Installation and User Documentation Generation Phase V&V

Both the installation package and the user documentation are required to meet some specific V&V criteria.

The appropriate V&V tasks for this phase are as follows: internal and external reviews on documentation, testing for deployment, test of the usability of the system by client.

## 4. Software Verification and Validation Reporting

This chapter describes how the results of the SVVP will be documented, detailing the content, format and timing of all V&V reports. The V&V reports produced will together comprise the SVVR document.

The general structure of the SVVR will be a LATEX and Visio document. LATEX is for task reporting and Visio is for specifying dependency of V&V tasks to repeat tasks to get successful result.

### 4.1 Task Reporting

This section describes how task reports will be written and inserted into the SVVR. When a V&V task is completed, a task report will be written and inserted into the SVVR under the relevant phase section.

Each task report shall describe for a particular V&V task the following items in the format specified:

**Task Name:** The V&V tasks name

**Description:** A brief description of the task

**Outcome:** Whether it was successful

**Evidence:** The location of evidence of the task being performed

**Date(s):** The date(s) when the task was performed

**Team members:** The team members involved in performing the task

Where a task does not succeed in the first task report, subsequent task reports will be made for the repeated V&V task until it succeeds.

### 4.2 Phase Summary Report

This section describes when and how Phase Summary Reports will be written and inserted into the SVVR.

When a phase is completed a Phase Summary Report will be written and inserted into the SVVR under the relevant phase section, after the individual task reports.

### **4.2.1 Phase Tasks**

The Phase Summary Report will summarize the V&V tasks performed during the relevant phase containing the following information for each task. For each V&V task, the Task Name and Outcome fields shall be obtained from the individual task reports as described in section 5.1. The format for this information will be in a table which specifies the Outcome (marked S or F for Success or Failure) for each Task Name.

### **4.2.2 Phase Summary**

After the table summarizing the outcome of V&V tasks performed during the phase, a brief statement will be written by the QA Manager summing up the V&V tasks performed, outlining any major problems or successes and any possible lessons learned that could be applied to other subsequent phases.

## **4.3 Final Report**

When the final V&V phase is completed at the end of the whole project, a Final Report shall be made and inserted into a section at the end of the SVVR. The Final Report will be a summary written by the QA Manager, summarizing all of the phases of the project and how the V&V process affected the quality and progress of the project. Rather than delving into particular details of phases, it will provide an overview of the V&V efforts as part of the project.