Westinghouse Non-Proprietary Class 3

ALS VV Plan

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APPROVALS

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WESTINGHOUSE NON-PROPRIETARY CLASS 3

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REVISION HISTORY

RECORD OF CHANGES

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Item	Description	Status
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TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND TRADEMARKS

Acronyms used in the document are defined in 6002-00040 – ALS Terms and Abbreviations, or included below to ensure unambiguous understanding of their use within this document.

Acronym	Definition
[	a.c.e]

All other product and corporate names used in this document may be trademarks or registered trademarks of other companies, and are used only for explanation and to the owners' benefit, without intent to infringe.

GLOSSARY OF TERMS

Standard terms used in the document are defined in 6002-00040 – ALS Terms and Abbreviations, or included below to ensure unambiguous understanding of their use within this document.

Term	Definition

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REFERENCES

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REFERENCES (cont.)

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SECTION 1
PURPOSE

1.1 PURPOSE

As per the ALS (Advanced Logic System) Management Plan, reference 6002-00000 – ALS Management Plan, this document is defining the techniques, procedures, and methodologies used to provide Independent Verification and Validation (IV&V) on ALS projects [

]^{a,c,e}. The ultimate goal of the ALS VV Plan is to ensure that ALS will perform the intended function as defined by the applicable requirements specifications. This document may be updated throughout the lifecycle as required. In the context of this document, V&V, VV and IV&V are synonymous.

The further purpose of this document is to define the intent of IV&V for ALS-based systems. Content falling below a dotted line in a section or subsection represents application-specific information.

(Last Page of Section 1)

SECTION 2
SCOPE

The ALS VV plan describes Independent Verification & Validation efforts performed by the Independent V&V Team as they relate to ALS [ ]^{a,c,e}. This includes IV&V throughout the stages of development as defined in 6002-00000 – ALS Management Plan.

[ ]^{a,c,e}, the ALS board lifecycle spans multiple projects that include both the ALS board development and later integration into an ALS-based system. [ ]^{a,c,e} The following subsections outline the different development and verification flows which are associated with ALS boards.

2.1.1 Development of New Generic ALS Boards

This is where new ALS boards are specified, designed and tested. [ ]^{a,c,e} The objective of this flow is to end up with a complete design package including design data, assembly procedures, test procedures and other documents required for releasing and later manufacturing an ALS design. [ ]^{a,c,e}

2.1.2 Development of an ALS-based System

Development of an ALS-based system is initiated when a customer requests the development and manufacturing of a system to perform an application-specific task. A solution is designed based on ALS boards. ALS boards are configured to meet the customer specific requirements and will be tested against those requirements as a part of the system testing.

The method of providing IV&V on such application-specific systems is determined on a project by project basis. If supporting application-specific IV&V planning documents are necessary for the project, they will be identified in the project's Management Plan.

(Last Page of Section 2)

SECTION 3
IV&V OVERVIEW

3.1 ORGANIZATION

The organizational structure and relationship of the Independent V&V team to the ALS development organization is shown in 6002-00000 – ALS Management Plan. Regulatory Guide 1.168 requires that verification personnel be composed of individuals other than those who performed the original design and that the responsibility for the adequacy of the V&V lies with the organization responsible for the V&V. The person accountable for V&V must also be independent of the person accountable for the design. This independence must be sufficient to ensure that the V&V process is not compromised by schedule and resource demands placed on the design process. [

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3.2 LIFE CYCLE MODEL

IV&V follows the lifecycle stages of development as defined in 6002-00000 – ALS Management Plan or project-specific Management Plan.

3.3 SCHEDULE

The master schedule for the ALS platform is defined in 6002-00000 – ALS Management Plan. IV&V activities are itemized in the overall project schedule to enable accurate tracking by the Project Manager. IV&V inputs are design outputs and are linked accordingly. In order to maintain schedule independence, IV&V determines its activities, the order in which they are executed, and the duration for each, providing this information as schedule input to the Project Manager. In addition, the IV&V team provides status updates to the Project Manager to facilitate tracking.

For an ALS-based system, the absolute milestone dates are agreed upon by the project and will be listed in the appropriate project Management Plan or other document. IV&V maintains schedule independence.

3.4 RESOURCE RESPONSIBILITY SUMMARY

This section identifies the roles and responsibilities of the IV&V team and the design team resources that have a direct interface to the IV&V activity.

3.4.1 Design Team Responsibilities

- The Design Team is responsible for the technical aspects of the design, requirements and specifications. [

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3.4.2 Project Manager Responsibilities

The Project Manager is responsible for the general management of engineering and manufacturing efforts associated with ALS projects and is the primary point of contact to the IV&V team.

3.4.3 IV&V Team Responsibilities

The IV&V Team is responsible for implementing the ALS VV Plan and associated test plans and for performing IV&V in required stages of the ALS life cycle [

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- [ ]^{a,c,e} IV&V Team is responsible for subsystem and/or system integration testing of ALS-based systems.

3.5 IV&V METHODS

This section provides the general techniques and methodologies followed when performing verification and validation tasks. A single technique or a combination of techniques is used to perform a verification/validation task. These techniques are elaborated in the following sections.

3.5.1 Reviews

Reviews are conducted to determine whether established requirements, design concepts, and specifications have been met. The review findings are documented as stated in Section 5. Examples of planned reviews include, but are not limited to:

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3.5.2 Testing

Testing of the final system is done to ensure that the system satisfies its requirements as stated in the requirements documents. [

]^{a,c,e} IV&V has the final responsibility for determining if sufficient testing has been performed on the product.

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3.5.3 Traceability Analysis

A requirements traceability analysis (RTA) is performed utilizing the RTMs [ ]^{a,c,e}. The requirements documented in the RTMs provide a method to cross-reference each specific requirement against documents, including test documents, and other development process products that satisfy the specific requirements.

3.5.4 Checklists

Checklists are used to assist in both the design and verification and validation of a product. The text in a checklist provides a basic set of considerations that the reviewer considers in the review. Checklists should be updated to include specific problem areas and incorporate lessons learned. Refer to Appendix A for an example of the IV&V checklist being applied to this project. IV&V checklists will be living documents and will be appended to with lessons learned over time.

3.5.5 Inspection/Analysis

Inspection/Analysis consists of examining the product being verified. It may be a formally documented evaluation or calculation to confirm some aspect of the design. The analysis includes an evaluation of completeness and correctness.

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3.5.6 IV&V Regression (Change) Analysis

After a validation task(s) has been completed and a change is made to the design or documentation, the change is reviewed to assess the impact on the completed task. The analysis examines the effects of modifications from the necessary starting point in the design process and considers the appropriate baseline. Impacted items are identified and necessary regression IV&V occurs.

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3.6 IV&V TOOLS

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]^{a,c,e} Design Tools are outside of the scope of the discussion of this document, but are listed for comparison. For more information on tools, see 6002-00030 ALS Design Tools.

For applications, testing will include Subsystem and/or System level testing and will be described further in project specific test planning documents.

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Figure 3.6-1. [ ]^{a,c,e}

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(Last Page of Section 3)

SECTION 4
IV&V PROCESSES

IV&V Activities: The IV&V tasks performed on an ALS project are organized by lifecycle stage and are described in terms of the platform development process and the project-specific system development process. Most of the activities are iterative in nature and will be repeated several times before the project is completed. IV&V reviews released versions of these documents either by doing a complete review or by reviewing changes from a previously reviewed version. [

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4.1 PLANNING STAGE

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- The VV Plan (this document) is prepared during the Planning stage to determine the IV&V scope and planning. [

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4.1.1 Requirements Review

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4.2 DEVELOPMENT STAGE

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4.2.1 Requirements Traceability Analysis

- The Requirements Review differs for Platform and System activities. Requirements Traceability Analysis (RTA) is done continuously throughout the Platform development stage. IV&V reviews the matrix to assure correctness, consistency, accuracy and completeness.

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- The customer requirements are translated into requirements tracked via a project-specific RTM, which is reviewed by IV&V to verify that ALS System specifications meet the customer requirements.

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4.2.2 Design Specification Reviews

The design specifications, which are verified to be under configuration management in the release database, are reviewed by IV&V to ensure they meet the related requirements listed in the associated requirements specifications.

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- System Design Review Activities: The IV&V team is responsible for verifying system design activities. [

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4.3 MANUFACTURING STAGE

In this stage, the hardware is assembled in the factory and tested. [

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4.4 SYSTEM TEST STAGE (APPLIES TO SYSTEMS ONLY)

4.4.1 System Integration Testing

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4.5 INSTALLATION STAGE (APPLIES TO SYSTEMS ONLY)

Installation activities are determined on a project by project basis. The extent of involvement with the customer is defined in project-specific plans.

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SECTION 5
IV&V REPORTING

IV&V activities are documented in a VV Summary Report. [

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The VV Reports are used to document the on-going efforts taking place on the product and must describe both positive and negative results. [

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5.1 VV SUMMARY REPORTS

The VV Summary Reports summarize the results of the IV&V tasks performed in support of each IV&V activity. [

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Each ALS system is documented in a separate VV Summary Report.

5.2 ANOMALIES

An anomaly report and/or ticket is created for each anomaly found by the IV&V efforts. [

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SECTION 6
IV&V ADMINISTRATION

IV&V Activities are recorded and archived to allow for independent checking.
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APPENDIX A
IV&V REVIEW CHECKLIST

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APPENDIX B

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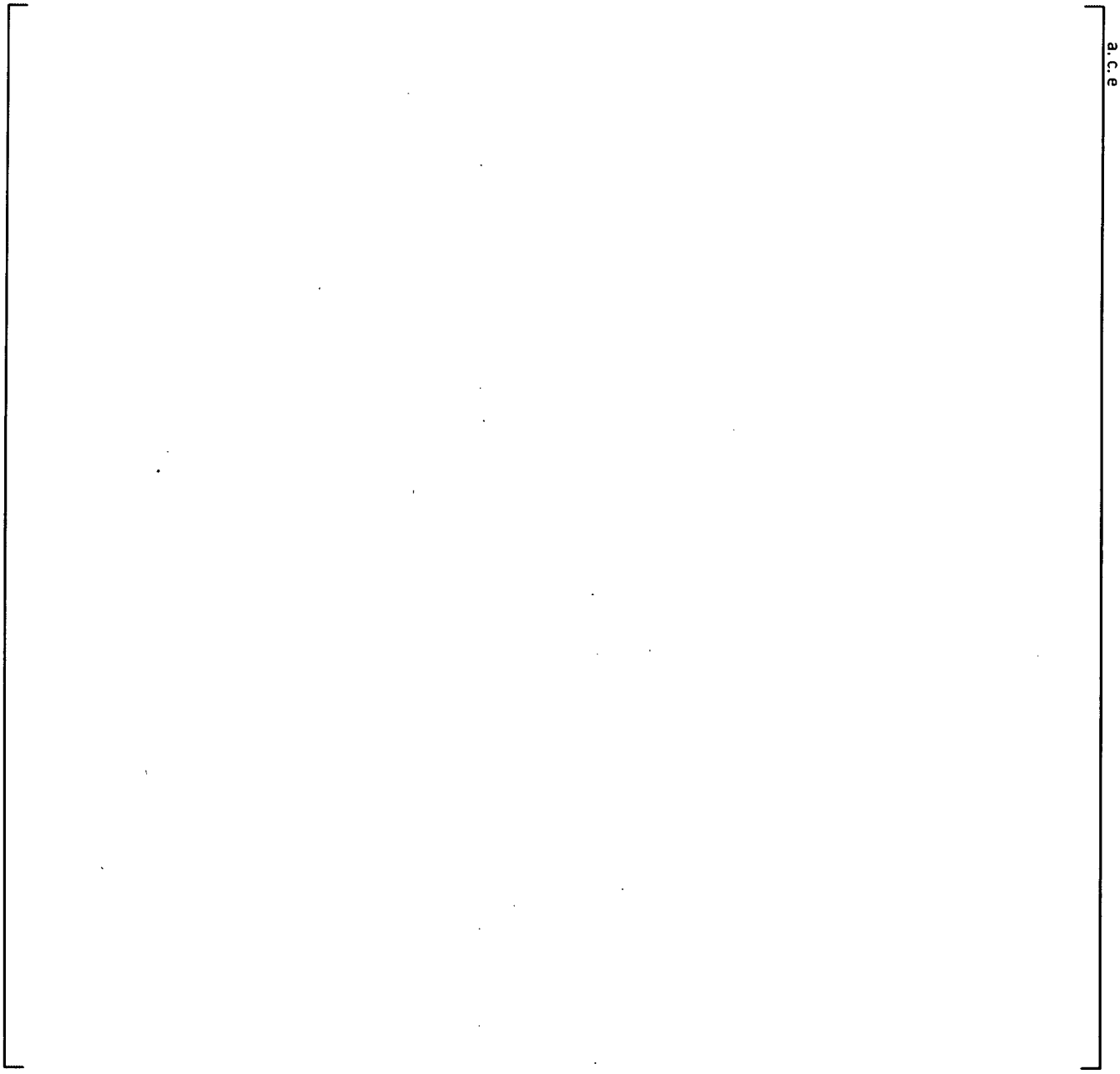

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Figure B-1. [ ]^{a,c,e}

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Table B-1. [ ]a,c,e

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Table B-2. [ ]a,c,e

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(Last Page of Appendix B)