



# 6002-00001-NP

## ALS Quality Assurance Plan

**Revision 4**  
**August 12, 2010**

<b>Function</b>	<b>Name and Title</b>	<b>Signature and Date</b>
<b>Author</b>	Charles Bobbitt QA Manager	Electronic Approval
<b>Reviewer</b>	Joe Lorson Project Manager	Electronic Approval
<b>Approved</b>	Larry Erin Chief Operating Officer	Electronic Approval

**CS Innovations**  
Public Information – Class 0

This document is the property of CS Innovations of Scottsdale, AZ.

**RECORD OF CHANGES**

<b>Revision</b>	<b>Date</b>	<b>Description of changes</b>	<b>Made by</b>
1	2008-02-20	Initial release of document	Sten Sogaard
2	2008-07-28	Added Proprietary / Non-Proprietary statements.	Sten Sogaard
3	2010-07-29	Various changes made throughout are documented in the Release Record and RAI100721-0000	Charles Bobbitt
4	2010-08-12	Updated to create non-proprietary redacted version of the manual.	Fred Lane

**OPEN ITEMS**

<b>Item</b>	<b>Description</b>	<b>Status</b>

**Table of Contents**

1 Purpose..... 5

2 Reference Documents..... 7

3 Management..... 7

4 Documentation..... 8

5 Standards, Practices, Conventions, and Metrics ..... 11

6 Reviews and Audits ..... 12

7 Test ..... 13

8 Problem Reporting and Corrective Action..... 13

9 Tools, Techniques, and Methodologies ..... 13

10 Code Control..... 13

11 Media Control..... 13

12 Supplier Control ..... 13

13 Records Collection, Maintenance, and Retention..... 14

14 Training..... 14

15 Risk Management..... 14

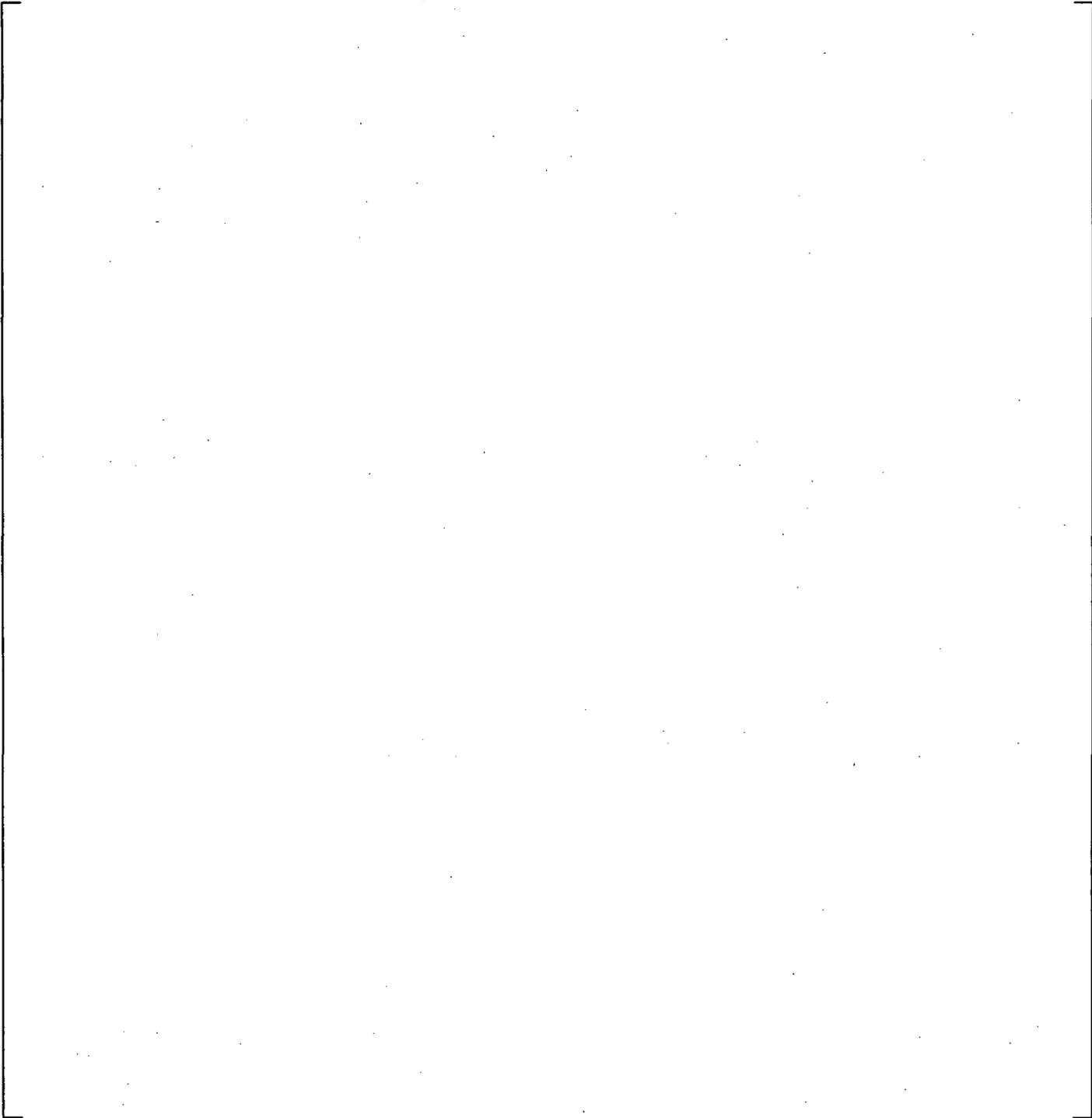
This page intentionally left blank.

## 1 Purpose

- 1.1 To define the techniques, procedures, and methodologies that will be used by CS Innovations to assure quality in the design and test developments of the Advanced Logic System (ALS) Platform, and in particular in the FPGA design and test activities performed as a part of the platform developments.
- 1.2 The ALS QA Plan has been written in accordance with the requirements defined by Reference 13.
- 1.3 The plan covers the entire FPGA development process, which includes processes such as Requirements Specification, Design, Implementation, Source/Data control, Reviews, Change Management, Configuration Management, and Release Management.
- 1.4 The ALS QA Plan is intended for use on the generic Platform where the target system is a Class-1E safety related or mission critical system.
- 1.5 The ALS QA Plan will be referenced in the Management Plan together with the CM Plan, VV Plan, and Test Plan.
- 1.6 The ALS QA Plan is a platform specific QA Plan and works under the umbrella of the CS Innovations 10CFR50 Appendix B compliant Quality Assurance Program (Reference 2).
- 1.7 The ALS boards are developed to be generic ALS boards which can be configured and reused for different applications. Because of this, the ALS board lifecycle spans the ALS board development integration into an application-specific system. The objective is for CS Innovations to develop and produce generic ALS boards to stock and then later integrate them into dedicated systems. The following subsections will outline the different development, manufacturing and test flows which are associated with ALS boards. Figure 1 shows a graphical representation of these flows.



a c e



a, c, e

## 2 Reference Documents

A complete list of references is provided by the CS Innovations document 6002-00020: "ALS Reference Overview". The following documents are referenced in this document.



a.c.e

IEEE Std 730-1998 –Standard for Software Quality Assurance Plans (Reference 13)

## 3 Management

- 3.1 The ALS relationship between organizational units along with roles and responsibilities are documented in Reference 1.
- 3.2 ALS development efforts within the scope of this document will be performed by personnel associated with the Engineering team.
- 3.3 Quality efforts within the scope of this document will be performed by personnel associated with the Quality team.
- 3.4 The goal of the Quality Assurance Manager assigned to the project (QA Manager) is to assure the quality and safety of ALS by:



a.c.e

- 3.5 The ALS Quality team must have a close interaction with the development team in order to function effectively and meet its goals, the QA Manager:



a.c.e

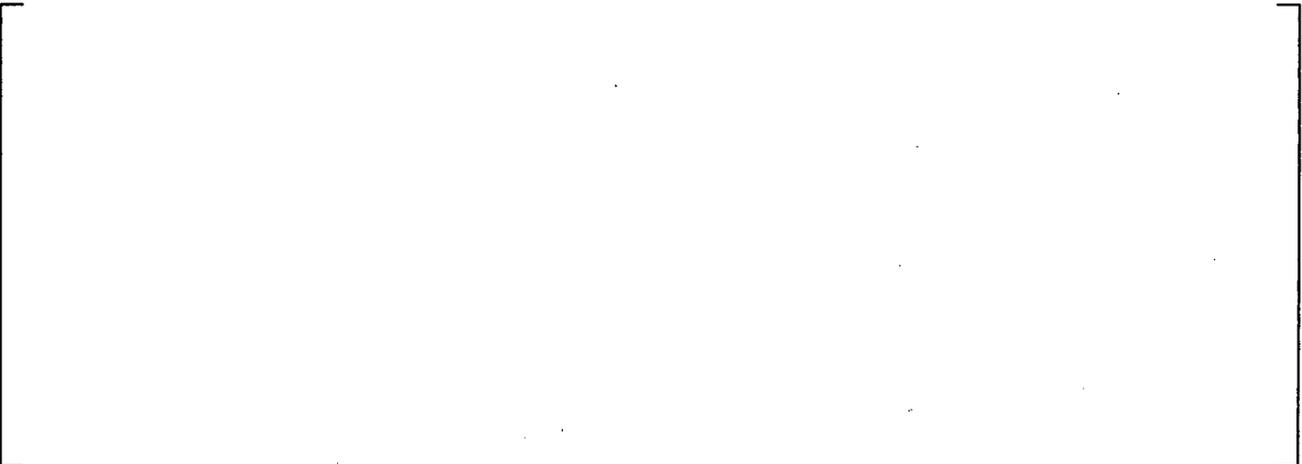
- 3.6 The ALS QA Plan covers the CS Innovation Life Cycle model as documented in Reference 1.

## 4 Documentation

- 4.1 **Management Plan** – Describes management aspects of the project, such as organization, responsibilities, security aspects, project life cycle and schedule with milestones. The Management Plan must be reviewed by the QA Manager before exiting the Planning stage.



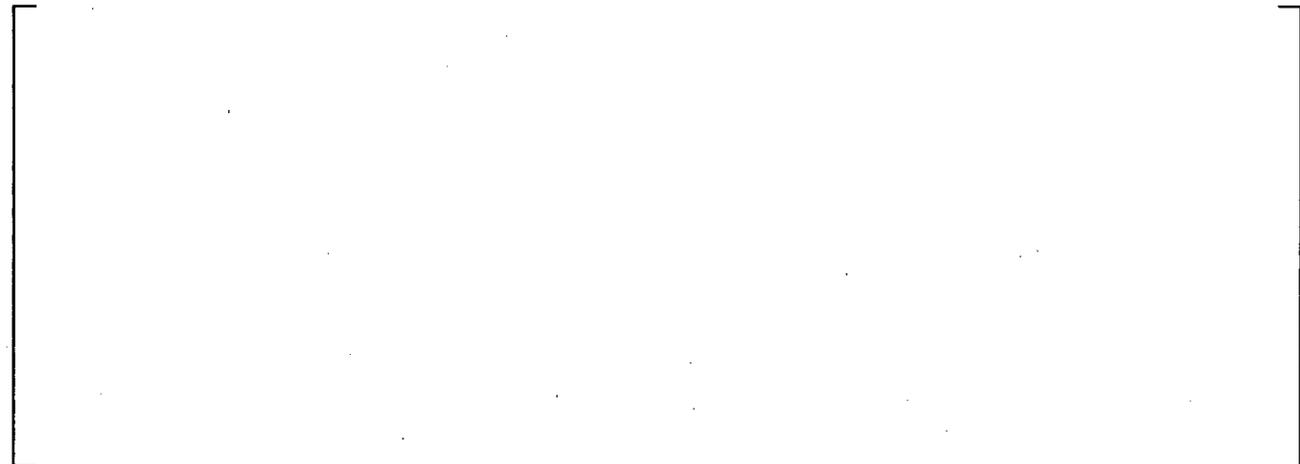
- 4.1.2 The Management Plan is created by the Project Manager.
  - 4.1.3 The Management Plan must be reviewed for contractual and technical contents by the Contract Administrator, VV and the Customer before exiting the Planning stage.
  - 4.1.4 The Management Plan must be updated by the Project Manager upon completion of each Project Life Cycle. If the update includes significant changes to content, the document must be redistributed for review according to the requirements in section 4.1 and 4.1.3.
- 4.2 **Test Plan** – Describes the planned scope, approach, resources and schedule for testing activities.



- 4.3 **QA Plan** – this document.
  - 4.3.1 The ALS QA Plan is maintained by the QA Manager.
  - 4.3.2 Revisions to the ALS QA Plan must be reviewed and approved by the same organizations that performed the original review and approval.
- 4.4 **VV Plan** – describes procedures, responsibilities and requirements for a comprehensive evaluation of the item being developed. The VV Plan must be reviewed by the QA Manager before exiting the Planning stage and after each update to the plan.



4.5 **CM Plan** – describes the planned method for change control of Configuration Items (CIs) throughout the project life cycle. The CM Plan must be reviewed by the QA Manager before exiting the Planning stage.



4.6 **EQ Plan** – The Equipment Qualification (EQ) Plan presents and defines the methodologies and procedures used to conformance/type test a representative test specimen according to the requirements listed in the requirements specification. The EQ Plan will normally include electrical, environmental and seismic testing. The EQ Plan must be reviewed by the QA Manager before exiting the Planning stage.



4.7 **ALS Requirements Specification** – This specification focuses on common architectural aspects of the ALS design such as inter board communication, backplane connector definitions, mechanical constraints on the system and other general requirements to ALS boards.



4.8 **ALS-xxx Requirements Specification** – Is a complete description of the behavior of an ALS board. A new requirements specification is created for each ALS Board.



4.9 **ALS-xxx Design Specification** – Is a detailed description of the ALS Hardware Design excluding the internal FPGA Design.



4.10 **ALS FPGA Design Specifications** – Is a detailed set of documents that describe the ALS FPGA Design. The ALS Management Plan lists the FPGA design documents.



## 5 Standards, Practices, Conventions, and Metrics



## 6 Reviews and Audits

- 6.1 The QA Manager maintains an ALS QA Report with updated information for ALS QA activities. The ALS QA Report follows the format defined by the CS Innovations QA Program (Reference 4).



- 6.5 The QA Manager performs in-process audits of the ALS development and related processes according to the procedures identified in this section. The QA Manager plans and maintains audit schedules based on life cycle phases, the complex electronics products of each phase and past audit results.



- 6.6 Design Data reviews are performed by the QA Manager as a part of the design reviews or as a separate review verify compliance to the design and coding standards and to verify traceability to the requirements.
- 6.7 Managerial reviews

- 6.7.1 The QA Manager shall attend scheduled project meetings in order to remain current on development status, activities, etc.
- 6.7.2 The QA Manager attends project Management reviews with the Project Manager to present and discuss the status of Project Quality activities.
- 6.8 Audit and Document Review Reports
  - 6.8.1 Document reviews are performed each time an ALS document is released or revised.

## 7 Test

- 7.1 Testing of the ALS boards are covered by the VV Plan and the Test Plan.
- 7.2 Test Plan and Test Reports are reviewed or audited by the QA Manager.

## 8 Problem Reporting and Corrective Action

- 8.1 Audit findings and results are documented using the "Review Action Item" form, and by reference in the ALS QA Report. (Reference 11)
- 8.2 When performing in-process audits or reviews, minor issues or recommendations made by the QA Manager may be tracked using a less formal problem tracking systems such as:

- 8.3 The QA Manager shall initiate a Corrective Action Request (Reference 12) to address audit noncompliance's and document review findings using the following process:

## 9 Tools, Techniques, and Methodologies

No additional tools, techniques, or methodologies have been identified.

## 10 Code Control

- 10.1 Code control of development/Engineering versions of design data are maintained in a separate project repository which full revision control. This will be covered by the ALS CM Plan (Reference 2).
- 10.2 All released design data are reviewed and released according to CS Innovations document control procedures (Reference 7).

## 11 Media Control

- 11.1 The methods and procedures used for media control are identified in the ALS CM Plan.

## 12 Supplier Control

- 12.1 Supplier control is implemented as defined by the CS Innovations Quality Assurance Manual, Reference 3. No additional supplier control is needed.

### 13 Records Collection, Maintenance, and Retention

13.1 All records are maintained according to CS Innovations QA Program (Reference 8).

### 14 Training

[

a, c, e

### 15 Risk Management

[

a, c, e