Avibank Mfg., Inc.

WI-05-CCP-01

CAD / CAM / CAI
Quality Plan / Procedure

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1.2 REVIEWS AND REVISIONS RECORD

REVISION	DATE	RESPONSIBLE PERSON	DESCRIPTION OF CHANGE
New Release	**7/29/00**	**S. Lopez, E. Avetisian**	**Initial Release**
A	**7/25/01**	**Javier Torres, E. Avetisian**	**Paragraph 9.0 – added 2 GB Jaz Disk** **Paragraph 13. – Added Solid Work** **Removed Iron Cad** **Modified Computer Clock speed.**

1.3 DISTRIBUTION

The copies of this Quality Assurance Plan are distributed to the following management personnel:

Copy No.	Position / Responsibility
1.	**Engineer Manager**
2.	**Quality Control Manager**
3.	**Drawing Control**

1.4 DEFINITIONS

CAD
Computer Aided Design (1) Any computer system or program that supports the design process. (2) The use of computers to assist Engineering Design in developing, producing, and evaluating design, data and drawings.

CAD/CAM/CAI
Computer Aided Design/Computer Aided Manufacturing/ Computer Aided Inspection. The integration of CAD, CAM and CAI through the common sharing of part geometry definitions and other data jointly used in design, engineering, manufacturing, and inspection.

CAI
Computer Aided Inspection. The use of computers and computer data in the inspection of parts, assemblies and installations.

CAM
Computer Aided Manufacturing. The use of computers and computer data in the development and production of a part (product) including fabrications, assembly, and installation.

CAD (3-D Solid Modeling)
Computer Aided Three-dimensional Interactive Application. An interactive graphics design software application, for 3D geometric design, with modules to 2D drafting, surface definition, solids, wireframes, etc.

CMS
Coordinate Measurement Systems – Measurement and test equipment used to support CAI activities (:e.g., Coordinate Measuring Machines [CMM]).

DATASET
A name compilation of related data made accessible to computerized systems.

IGES
Initial Graphics Exchange Specification – The American National Standards Institute (ANSI) data standard for the exchange of computer graphics generated product definition (text and geometry) between different manufacturer's computer graphics systems.

MDD
Master Dimensions Definition – A mathematically controlled surface definition, which is computer-generated. This definition consists of control curves defining the surface in two planes and the information in a logical form necessary to develop the third plane.

MDS
Master Dimensions Surface – A computer generated, mathematically controlled 3D surface definition. Each surface is uniquely identified by number and revision letter.

QAID
Quality Assurance Inspection Data – Inspection / data developed from and traceable to engineering datasets and certified as a Media for product acceptance.

AUTHORITY DATA
Avibank approved CAD/CAM/CAI data used in the manufacture and/or inspection of deliverable hardware (including accountable tooling and tooling used as a media of inspection).

REFERENCE DATA
Data which may be used for computer aided design and/or manufacturing purposes. This data shall not be used to produce inspection media for deliverable hardware (including accountable tooling and tooling used as a media of inspection).

2.0 CONFIGURATION MANAGEMENT

Data Media or electronic transferred data shall be handled as part of the CAD/CAM/CAI. Upon receipt, Data Media or electronic transferred data shall be identified with part number, revision level, and date (ref. EOP-04-01).

The Data Media or electronic transferred data shall be loaded onto the CAD/CAM/CAI system for review. After review it will be determined if information is valid and sent to Drawing Control for safeguarding. For discrepant Data Media or electronic transferred data, the procedure described in section 4.0 shall be followed.

Changes to Data Media or electronic transferred data received shall be properly maintained to provide accurate configuration control. Currently applicable revisions shall be maintained by Drawing Control and shall be backed up bi-weekly by MIS. When a new revision is received from the Customer, the Drawing Control Department shall place the older revision into archive. Older revisions placed in archive must be properly identified from currently applicable revisions while kept in storage.

Any digital data received form customer without being transmitted through the appropriate drawing Control release system shall be considered to be nonconforming.

2.1 Control of Data Received by Electronic Transmission

Control of data received by electronic transmission will be done in accordance with Section 2.0, Section 4.0, Section 5.0, and Appendix “A.”

Accepted data will be controlled per Section 2.0, Section 5.0, and flow diagram Appendix “A”.

Rejected data will be controlled per Section 4.0, QOP-13-01, and flow diagram Appendix “A”. Rejected data will not be backed up on physical media or included in any incremental system backups.

3.0 REVIEW AND AUDITS

To assure continued compliance, the functions and procedures of this CAD/CAM/CAI Quality Assurance Plan shall be audited by the Quality at a minimum of once a year.

The audit plan shall include provisions for audit of sub-tier suppliers Data Media or electronic transferred data. The Audit will be the responsibility of the Quality Control Dept. (Ref. QOP-06-01).

Results of all audits and subsequent corrective actions taken shall be documented and maintained.

The CAD/CAM/CAI Quality Assurance Plan shall be reviewed annually by QC Manager for compliance to procurement specifications.

4.0 PROBLEM REPORTING AND CORRECTIVE ACTION

All nonconforming CAD/CAM/CAI Data Media or electronic transferred data, graphics and MDD/MDS and/or extractions shall be identified and segregated where they can only be accessed by authorized personnel. Written notification shall be forwarded to customer for review. The discrepant dataset shall remain segregated until a disposition is obtained. Corrective action shall be identified and implemented when required (Ref. QOP-14-01).

5.0 PROCUREMENT CONTROL

A Quality Audit is performed to validate sub-tiers' CAD/CAM systems. No data shall be released to the sub-tier until an acceptable system is in place (Ref. QOP-06-01).

Customer reserves the right to survey, approve, and periodically review the CAD/CAM/CAI quality systems of these sub-tiers.

6.0 TESTING

Testing of Data Media or electronic transferred data to confirm the validity of information shall be accomplished at the verification stage. Testing may also be accomplished at the initial stages of usage through first article verification and production inspection processes (ref. OOP-09-02, QOP-10-02).

7.0 MEDIA SECURITY

Original customer-supplied data shall be read into the CAD/CAM/CAI system and processed for validity. If valid then the file will be stored in a designated area on the computer systems and the original customer tape, with generalized paperwork, will be stored in Drawing Control. At minimum, bi-weekly backups of the menu system containing the files will be done and the backup will be kept in secured storage. The files in designated areas will be copied into a working directory and used for design activity – latest revision of the original file will be controlled in Drawing Control and updated as required (ref. QOP-05-03).

8.0 INSPECTION MEDIA

Media with inspection authority includes Engineering Drawings/Plots, Photo Contact Master (PCMs), QAID printout, etc. QAID extraction data obtained from customer must have customer QA buy-off. QAID data (array of points) converted to IGES by customer is approved for inspection use.

When Data Media or electronic transferred data are used for inspection purposes, any data extracted that is used for product acceptance, must have visible evidence of QA acceptance and be under configuration control. In addition, any output data generated from CMS inspection processes must have evidence of QA acceptance and be under configuration control. Extracted data and CMS data shall be traceable back to original Data Media or electronic transferred data.

The QA representative can extract read only data from supplied data to make their inspection programs designated as such and to be independent of manufacturing programs.

Prior to use of the data, or any programs generalized for it, must be verified for correctness. Quality Manager must establish this criteria. First Article Inspection Report shall be completed if contractually required.

Data Media or electronic transferred data identified as ‘REFERENCE’ / “UNCONTROLLED DATA” shall not be used for inspection purposes.

9.0 DATA EXCHANGE METHODS

IGES, STEP, or other industry accepted formats shall be utilized to exchange data. The exchange medium can be:

- 2 GB Jaz Disk
- 3-1/2 Inch Floppy
- Zip disk
- CD
- 8MM tape
- 4MM tape
- Electronic transfer via FTP site or e-mail attachment (encrypted or nonencrypted).

Data verification shall be accomplished through comparison to customer furnished hard copy representation, if available.

10. TOOLING

Tooling designed, fabricated and/or revised form CAD/CAM/CAI generated programs, shall be traceable to the corresponding Data Media or electronic transferred data (ref. QOP-02-07. Any data used for manufacturing will be controlled.

11. MEASUREMENT & TEST EQUIPMENT (CMM)

Coordinate Measurement Machine data received as Data Media or electronic transferred data shall be handled per sect. 2, 6, and 8. If final inspection for tooling or product is required through Data Media or electronic transferred data, all data shall be acquired directly from Drawing Control which is from the controlled native database.

12. RECEIVING INSPECTION

Product received requiring Data Media or electronic transferred data shall be routed to the CMM Dept for inspection and handled per sect. 11.

13. ENGINEERING'S COMPUTER EQUIPMENT

HARDWARE

Computer Chip:	Pentium, Pentium II & III
Computer Clock Speed:	233 – 866 MHz
Hard Drive Capacity	2 GB – 10 GB
Memory (RAM):	32 MB – 256 MB
Network Card:	3Com Etherlink PCI

SOFTWARE

Windows, Unix

AutoCAD LT

Microsoft Office

MathCad

Pro-Engineer

SolidWorks

MEDIA SUPPORT

3½" floppy drive

CD-ROM drive

2 GB Jaz disk

Zip disk

DAT Tape – 4 mm

FTP Site

8mm Tape

14.0 RECORDS

Quality records associated with the CAD/CAM/CAI system shall be maintained to demonstrate compliance with contractual requirements by Data Control (ref. QOP-05-02).

Records shall be legible and shall be stored and retained in such a way that they are readily retrievable in facilities that provide a suitable environment to prevent damage or deterioration and to prevent loss.

All Quality records shall be retained for a minimum of seven years, unless specified otherwise by contract.

Records shall be made available to the customer for review as required and shall be traceable to specific delivered products.

15.0 TRAINING

All personnel performing activities requiring customer supplied data for use in manufacturing and/or inspection shall receive formal, documented training as required (ref. AOP-18-01).

Training will be administered for this program to all affected employees. The Engineering Manager and Quality Assurance Manager are responsible for:

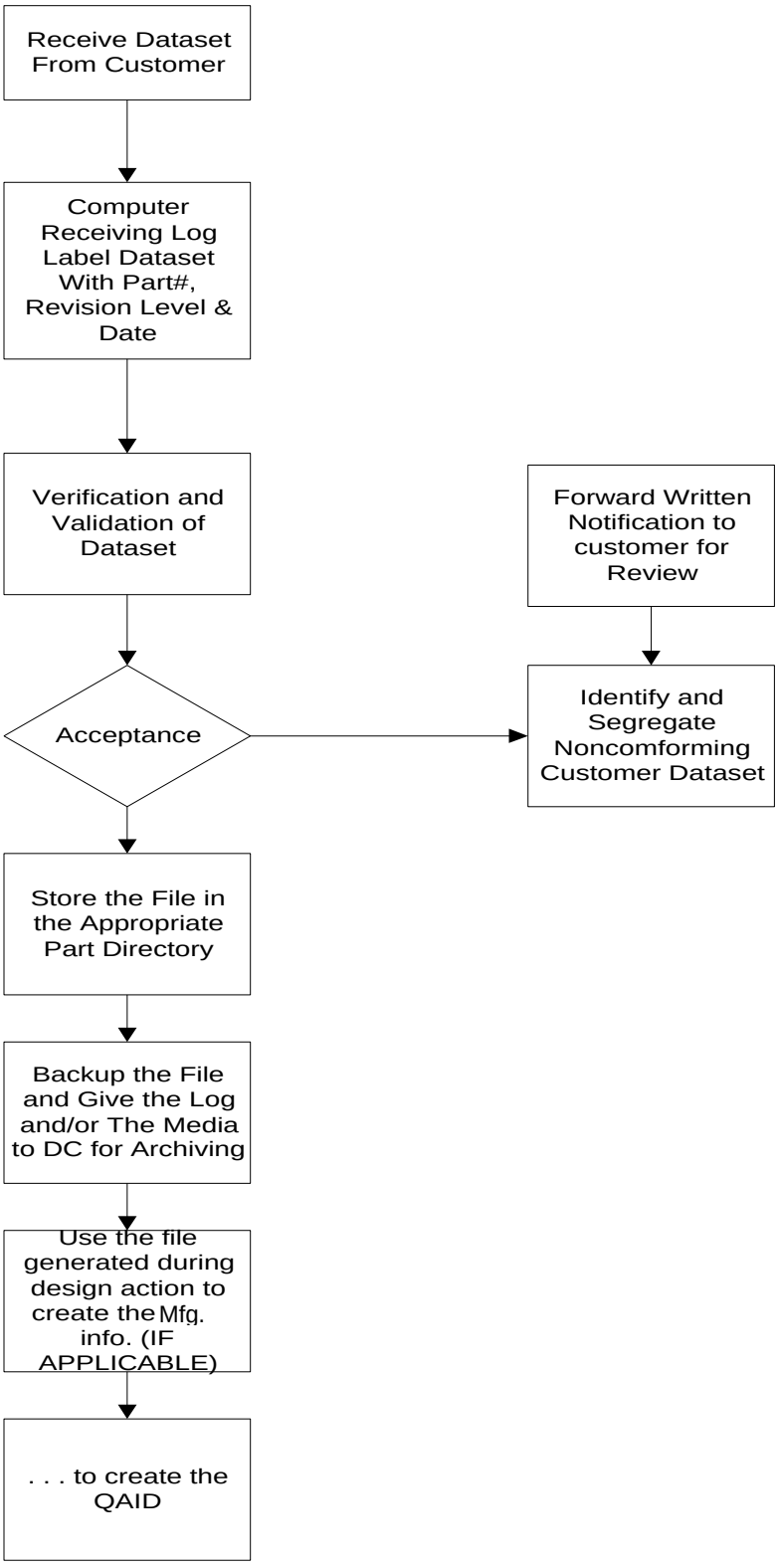
1) Identifying personnel for training.

2) Providing the training.

3) Evaluating the proficiency of the personnel being trained.

4) The Quality Assurance Manager is responsible for maintaining records of training file and making them available to the customer.

APPENDIX A
CAD/CAM/CAI FLOW DIAGRAM



APPENDIX B CAD/CAM/CAI DATASET RECEIVING LOG

NO:.	DATE:	PART NO.:	REV. LEVEL:	FORMAT:	COMMENTS:

APPENDIX C

ELECTRONIC DATA REPORT

Avibank Mfg., Inc.

3. ELECTRONIC DATA REPORT		1. DATE RECEIVED:
		2. PART NUMBER:
		4. PURCHASE ORDER NUMBER:
5. TO (Name, Company, Department)		6. FAX NUMBER
		7. PHONE NUMBER
8. ORIGINATED BY: (Name, Department)		8. E-MAIL
10. ELECTRONIC MEDIA	11. PHYSICAL MEDIA	12. ACCEPT / REJECT
☐ FTP ☐ E-MAIL ATTACHMENT ☐ OTHER	☐ DISKETTE ☐ CD-ROM ☐ OTHER	ACCEPT: ☐ REJECT: ☐ DATE:
13. MESSAGE:		