Digital Data, Configuration & Control Revision C

Burnham Composite Structures, Inc.

DIGITAL DATA CONTROL …… REV C, 01/01/13

1.0 PURPOSE

The purpose of this procedure is to establish a Quality Assurance Plan that identifies how control of digital data is maintained from receipt through end item acceptance.

2.0 SCOPE

This procedure applies to digital data used to fabricate, assemble, install, or inspect product.

3.0 Digital Data Control

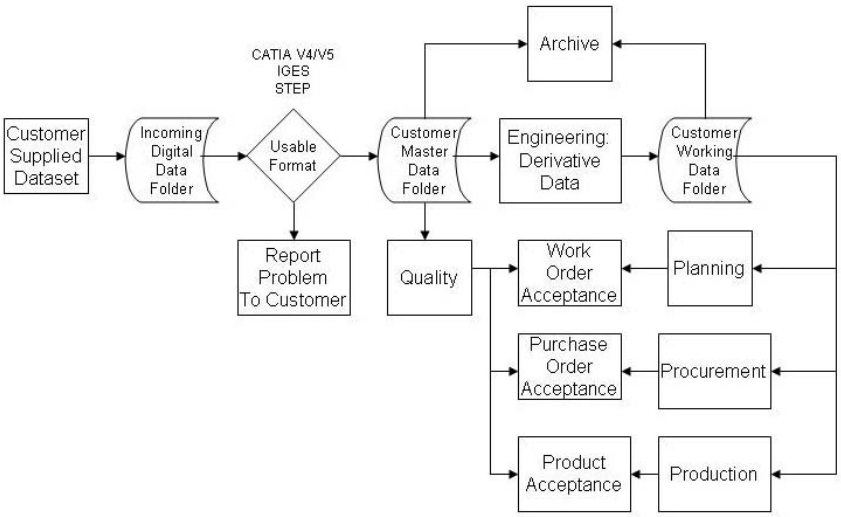
Digital data is controlled per the Quality Policy Manual and this document, regardless of method of transmission.

3.1 The Quality Manager is responsible to interface with customers and suppliers as required to maintain technical coordination and quality control of digital product.

The Quality Manager has full responsibility for maintenance, revisions, and additions or deletions to this process. When required, customers will be notified within 30 days as to any substantial changes to processes, product acceptance software, or measurement equipment. The Quality Manager is responsible to revise the process as required for control of new CMS operations, and for timely communication of changing requirements with customers, suppliers, and regulatory agencies to maintain control of digitally-defined product

3.2 Dataset Configuration Management

Customer supplied datasets are considered master files, and are stored and maintained in their original state and file name on company's server. Datasets that are created for inspection or verification are traceable to the master file, and controlled per the quality policy manual and this document. Working copies or derivative files maintain filename of the master file with configuration nomenclature added. The flow of data is defined in general terms in the following flowchart. Additional details are included later in this procedure or in referenced documents.



3.3 Change Accountability
Revision or change to a controlled file is managed per the Quality Policy Manual Document Control Procedure.

3.4 Hardware Configuration Management
Devices required to process digital data are configured using information that provides a unique identity for each equipment item. The identifier may consist of the manufacturer, model, and serial number, but can use other data as required. A master configuration and certification/calibration list of hardware is maintained per the Quality Policy Manual. Customers are notified of configuration changes where required.

3.4 Review and Audit
CAD/CAM/CAI operations, equipment, procedures, and documents are reviewed during Internal Quality Audit per the Quality Policy Manual. Audit documents are available for review.

3.5 Non-conforming Datasets
Discrepant datasets, to include any working files, are processed and maintained as follows.

1. Datasets are validated at the quoting and contract review phases of the manufacturing process. Discrepant datasets are not moved to the Customer Master Folder on the company server. This segregates discrepant data from data approved for manufacturing purposes while the issue is resolved with the customer.
2. Datasets found to be discrepant after fabrication processes have been started are moved to the Nonconforming Folder on the company server. This segregates the files while nonconforming product procedures per the Quality policy are in-process.

3.6 Media Security
Datasets stored on the server folders (directories) are password protected by authorized user. Access to the folders and files is controlled. The IT department authorizes access and assigns folder access level.

3.7 Back-up of Dataset Folders
Backup is performed daily. A back-up, created twice a week and annually, is secured off-site. The IT department is responsible for back-up operations.

3.8 Dataset Archive
Archive of datasets is controlled per the Document Control Procedure.

4.0 Use of Digital Data

4.1 Inspection Media
Inspection media is produced and/or verified per paragraph 3.7 using master files and configuration control as described in paragraph 3.1 by trained personnel.

4.2 Verification of translated data
Data translated from master files is verified by direct comparison of the translated data to the original master file model via appropriate methods. Translated data is considered unacceptable if a compared point deviates from the original model at a decimal place one order greater than the customer's requirement. Where the data in the original dataset does not allow measurement of included features to verify translation accuracy, reference features will be added prior to translation.

4.3 Reference or Uncontrolled Data
Data marked “Reference” or “Uncontrolled”, or otherwise not controlled per the Quality Policy Manual and this document is not used for fabrication, assembly, installation, monitoring, or inspection of product.

4.4 Inspection Point Verification
Inspection points are planned, documented, and recorded when required by the customer or when the CMS employed requires it. Burnham uses a laser tracker or a PCMM for CMS inspection. As such, inspections points are not planned unless otherwise required by the customer. Trained laser tracker operators adhere to sound metrology practices to ensure that inspection data accurately reflects product condition.

4.5 First Article Planning
FAI inspection is completed using digital files and PAS software as required. When required, FAI plans are created by Quality Assurance per First Article Inspection Procedures.

4.6 Product Acceptance Software (PAS)
PAS is identified in the Digital Data Hardware and Software Configuration Log.

Burnham employs digital artifacts to certify PAS algorithms. The artifact files, artifact.catpart and kitcuttercertfile.cei are stored on the company server. Records of the certification are maintained per the Quality Policy Manual. Verification operations are required when software comprising the PAS system is changed or upgraded. Where possible, a record of the verification is maintained in native format in the Quality Assurance folder on the server. The file name indicates the date the certification was performed and the individual who performed it and accepted the results. A log, PAS Certification Log, is maintained in the Document Control Folder on the server to document completion of the certification.

Quality Assurance affixes a label to the hardware to indicate the version of PAS currently certified for use. Operators check the label against the software version when beginning an inspection operation.

When required, obsolete PAS programs are archived in accordance the Document Control Procedure. Malfunctioning PAS programs are processed per the Nonconforming Product Procedures in the Quality Policy Manual.

4.7 Environmental Conditions
Burnham performs CMS inspection under environmentally controlled conditions. Where operations are required in uncontrolled areas, changing temperature and humidity conditions are recorded by the tracker hardware and measurement coordinates are adjusted accordingly.

Where environmental conditions are not controlled, products and CMS hardware are soaked at temperature for an appropriate period of time before operations are started. Procedures for using the PAS scaling function (automatic or manual) to account for product CTE are contained in the manufacturer’s users manual. Temperature changes during CMS operations sufficient to cause inspection results to be impacted may be cause for rejection of collected data.

CMS operators are trained to verify equipment alignment to an independent physical reference system and make accommodations when a temperature change, vibration, or other conditions

cause concern. Failure of the process to align with the reference system within the hardware's volumetric accuracy capability is cause for rejection of the data collected.

4.8 Reference System

The reference system specified in the master digital file is used for functions within the scope of this document unless otherwise required by the customer. Reference systems referred to in Paragraph 3.11 are established independently of the tool reference system and are not used for any purpose but alignment.

4.9 Flow-down of Requirements to Sub Tier Suppliers

Customer and internal quality requirements are flowed-down via purchase order notes and the Supplier Quality Requirements document. Customer approved sub-tier suppliers are used when required.

4.10 Controlled Release of Digital Data

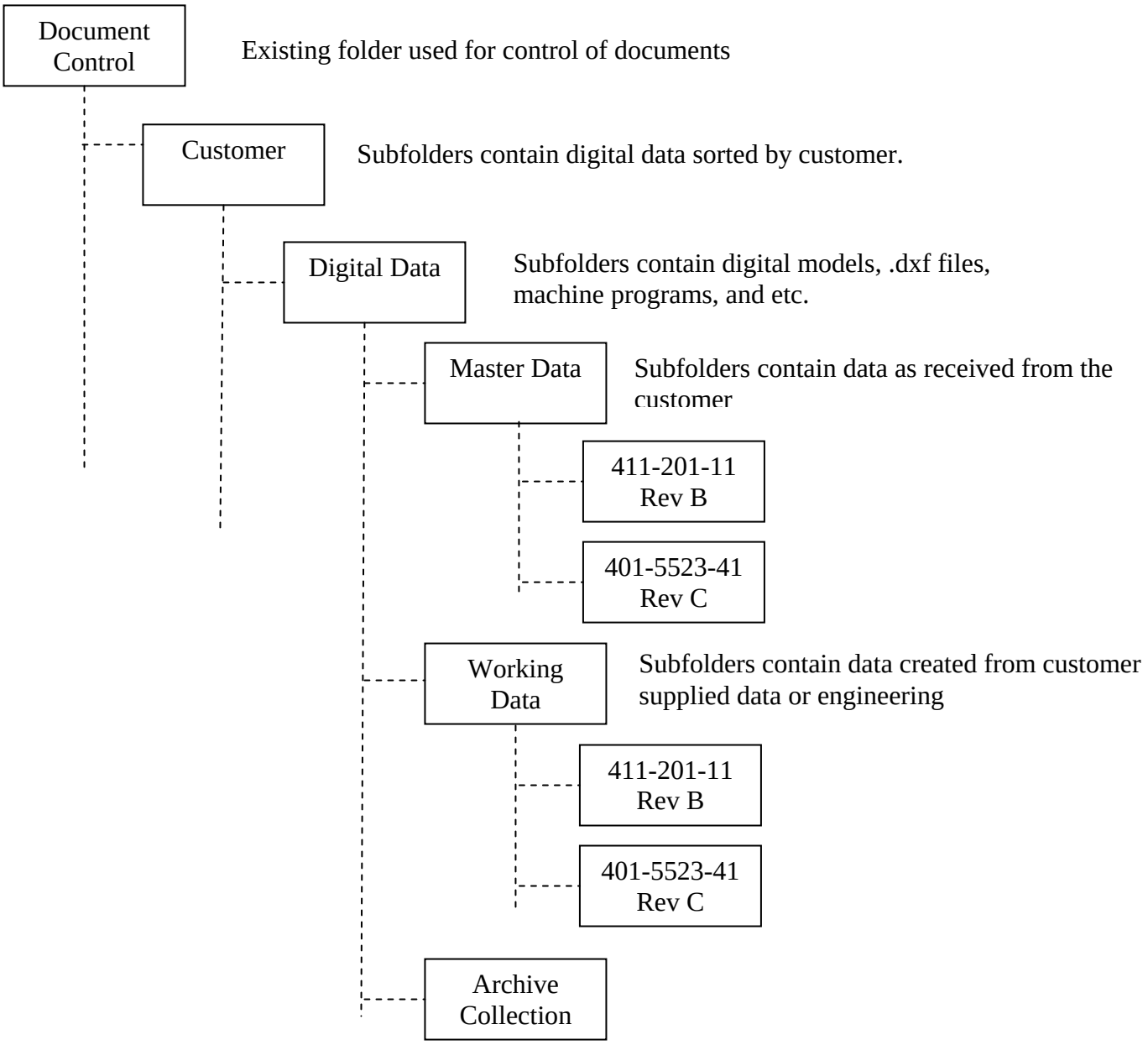
Controlled datasets are transmitted to sub tier suppliers via means suitable to insure data is received intact. File security is also considered and transmission method modified or data encrypted accordingly. Instructions regarding handling and disposition of datasets are included on purchase order.

5.0 Dataset Configuration Management

5.1 Data Storage File Structure

Controlled digital data is stored on the server. Folders are used to segregate data into logical categories. Figure 1 illustrates folder structure and purpose.

Figure 1, Folder Structure for Storage of Digital Data



5.2 Naming Conventions for Copied or Created Data

Controlled digital data files received from customers are stored in the Customer Master folder and maintain the original file name and extension as supplied by the customer. Digital data files copied or created from these files are stored in the Working Master folder. The original file name is maintained with additional nomenclature added to uniquely identify the file. File extension will depend on the format of the file.

5.3 Receiving Digital Data

Controlled digital data received from customers and outside agencies, or copied, created, or translated internally is received (configured) paragraph 3.2. Files are unique and exist in a folder depending on their function, current requirement, and verification/inspection status.

6.0 REFERENCES:

Quality Policy Manual

7.0 DEFINITIONS: N/A

CAD – Computer Aided Design – Any computer system or program that supports computer graphic design process.

CAM – Computer Aided Manufacturing – The use of computer data in the development of a product including fabrication, assembly, and installation.

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

CAD/CAM/CAI – Integration of CAD, CAM, CAI through common sharing of part geometry definitions.

DATASET – A named compilation of related data or files.

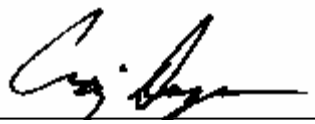
PRODUCT ACCEPTANCE SOFTWARE (PAS) – The software used to compute the relationships between points measured by CMS hardware for purposes of product acceptance. This definition is also extended to include 3D modeling software and software for NC control where their outputs are used as acceptance media.

8.0 ATTACHMENTS: N/A

9.0 REVISION NOTES:

1. Rev. NC was the original release.
2. Rev. A 1-15/10, Changes to meet requirements of Boeing D6-51991
3. Rev. B 1-1-13, Changes to incorporate requirement of AC7118 Rev C.
4. Rev. C 11-01-13, Changes to clarify requirements of AC7118 Rev C.

10.0 REVIEWED AND APPROVED BY:



Craig Dugan, Vice President