Digital Product Definition Supplier Assessment

Digital Product Definition or DPD is digital data that specifies the 3D CAD geometry and design requirements for a product. DPD ensures that the authority, 3D CAD model, stays true to design intent--eliminating interpretation errors or unintended changes and includes derivatives such as 2D prints/drawings, NC and CMM Programs.

This checklist applies to suppliers who use a customer-provided engineering model, print or drawing to manufacture or ensure conformance of a part, tool, or tool repair. All references in this checklist are current to the latest released version of D6-51991 – Quality Assurance Standard for Digital Product Definition at Boeing Suppliers. https://www.boeingsuppliers.com/quality.html

If Supplier has Boeing D6-51991 approval, provide a copy of Boeing Approval Letter with this assessment.

Supplier is to complete the following sections 1- 4, as applicable to their scope of work with Astronics PECO.
The checklists for Sections 2, 3 and 4 are designed to build upon the basic DPD capability assessment from Section 1, therefore, Section 1 must be performed prior to performing assessment for MBD or CMS. The MBD, CMS and Plotting sections may not be applicable if the supplier does not require these capabilities for tooling or production use.

- Section 1 of the checklist is used to perform a basic Digital Product Definition (DPD) capability verification.
- Section 2 is used to perform Model Based Definition (MBD) capability verification.
- Section 3 is used for Coordinate Measurement System (CMS) capability verification.
- Section 4 is used to perform Plotter capability verification.

Supplier Name:			
Street:			
City:		**State:**	
Zip Code		**Country:**	
Primary Business Scope (Production/Tooling/Service):			

Completed by	**Name**	**Title**	**Phone & Email**
			Phone: **Ext**:
			Email:

PECO Reviewed (as applicable)			
Quality Assurance		**Date:**	
Mechanical Engineering		**Date:**	
Other		**Date:**	

Description	Response			Supplier Supporting Documents	Comment
	Y	N	NA		
Section 1 - Digital Product Definition					
1. Does the supplier had a documented DPD process or procedure based upon or compliant to Boeing D6-51991 which includes? • Dataset security and back up. • Availability of trained personnel to retrieve and store incoming datasets. • Check dataset integrity upon receipt • Segregation of datasets by status e.g., release, in-work and obsolete • Security including password and access protection, regular back up for disaster recovery and archive storage	☐	☐	☐		
2. Does the documented DPD procedure include a flow diagram of the DPD processes?	☐	☐	☐		
3. Is the procedure under document control, with a defined process owner and recorded approvals for changes made?	☐	☐	☐		
4. Does the procedure document the need to notify customers within 30 days of any changes to the DPD procedure, or, at a minimum, annually if no changes occur?	☐	☐	☐		
5. Does the supplier ensure the integrity of data sets from receipt through production and inspection, including? • Storage of provided DPD and supplier created derivatives • Archiving old revisions • DPD encryption during send/receive of data • Backup system • Access control and password protection (read/write)	☐	☐	☐		

6. Does the supplier have a process to control configuration of dataset derivative media including? • Derivative revision level control • Reference to authority dataset revision • Date created • Feature requirements • Product identification	☐	☐	☐		
7. Are derivatives (e.g. 2D drawing, CNC or CMM Program,) traceable back to the current authority dataset?	☐	☐	☐		
8. Does the supplier production planning process identify and is it traceable to the current authority dataset? Planning may include job travelers, work instructions, NC and CMM programs	☐	☐	☐		
9. Does the supplier have a change control process that updates the dataset derivatives when the authority dataset is revised, including? • Tooling • NC and CMM Programs • 2D Drawings • FAI Documentation • Sub tier impact/notification	☐	☐	☐		
10. Does the supplier have a process that includes control of obsolete authority datasets and dataset derivatives, including segregation and the clear identification of current and past revision?	☐	☐	☐		
11. If providing Type Design or Tool Designs does the supplier have a documented process for tool design and development?	☐	☐	☐		
12. Does the supplier perform internal audits of their DPD process and documentation, including audits of their sub-tiers, where applicable?	☐	☐	☐		

13. Where requirements of DPD have been flown down, does the supplier have a process to assess, monitor and control their sub-tier compliance with these DPD requirements?	☐	☐	☐		
14. Does the supplier Quality organization have responsibility for the approval of all inspection media, including 2D Drawings, CMM Programs, as applicable?	☐	☐	☐		
15. Does the supplier have a documented process to create inspection media from a 3D model in addition to the 2D drawing and includes the coordinate system, datum targets, and datum features?	☐	☐	☐		
16. Are FAIs produced and have traceability to the authority datasets using 2D and 3D models, accounting for all implicit and explicit requirements with unique identification for each feature?	☐	☐	☐		
17. Does the supplier document the current level of hardware configuration, software, software revisions and other digital system information (e.g. PTF(s), project files) required to maintain compatibility with Boeing supplied datasets and/or data exchange formats per applicable Boeing system(s) requirement documents?	☐	☐	☐		
18. When translations of digital datasets occur between Native CAD systems or digital equipment, does the supplier verify all dataset translations, Boeing CATIA, NX or CREO, from their as received format to a neutral format (STEP)?	☐	☐	☐		
19. Does the supplier have a documented process to review, revise, and control tooling when authority dataset changes affect tooling configuration? Are tools and tool design/inspection datasets traceable to the authority dataset and the affected revision?	☐	☐	☐		

20. Does the supplier ensure that when Tool Design responsibility is flowed down to sub tier suppliers, that the sub-tier supplier is approved by the supplier? Has the supplier assessed sub-tiers to ensure their capabilities to manage and use the Boeing DPD/MBD datasets being provided?	☐	☐	☐		
21. Are digitally defined special tools and physical inspection media (check fixtures, templates, etc.) identified and traceable to the authority tool design dataset?	☐	☐	☐		
22. Are special tools and tooling media accepted and periodically validated to the authority design at a frequency determined to ensure accuracy and repeatability? • Visual Inspection • Dimensional validation • Observe tools for damage or wear	☐	☐	☐		
23. Does the supplier define training requirements for the DPD system to assure employee competence and maintain employee-training records?	☐	☐	☐		

Description	Response			Supplier Supporting Documents	Comment
Section 2 - Model Based Definition	**Y**	**N**	**NA**		
1. Does the supplier have a CAD system with the ability to view annotation based on customer or Boeing site-specific requirements, for example Boeing Commercial use of CATIA?	☐	☐	☐		
2. Does the supplier have a documented process to create inspection media from a 3D MBD model?	☐	☐	☐		
3. Does the supplier have a process to ensure verification of all design requirements of the authority dataset? (e.g., all defined by feature control frames, annotation, specifications, notes and other specified requirements in the authority DPD dataset and associated parts list including dimensional and other properties) Note: Compliance for this process can be verified by reviewing AS9102 FAI documentation for a specific product.	☐	☐	☐		
4. Is there a process in place to document AS9102 FAI's for product produced from MBD datasets?	☐	☐	☐		
5. Does the supplier have a process to assure sub-tier suppliers' ability to work with MBD information? Has the supplier assessed sub tiers to ensures their capabilities?	☐	☐	☐		
6. Has the supplier identified specific training requirements for all functions associated with use and control of MBD datasets? (e.g. planning, purchasing, contract review and Mfg?	☐	☐	☐		

Description	Response			Supplier Supporting Documents	Comment
Section 3 - Coordinate Measurement Systems	**Y**	**N**	**NA**		
1. Does the supplier use CMS equipment for tooling and/or product acceptance? Identify all that apply a) Articulating Arm – Portable Coordinate Measuring Machine b) Digital Theodolite c) Fixed Coordinate Measurement Machine d) Fixed Scanning Coordinate Measurement Machine e) Indoor Global Positioning System f) Laser Projectors – Optical Layout Template g) Laser Radar h) Laser Scanner i) Laser Tracker j) Numerical Control Machine Inspection k) Photo or Video - Grammetry l) Other – explain in comments	☐	☐	☐		
2. Does the supplier have accreditation to NADCAP AC7130 Measurement and Inspection? • If accredited, provide a copy of your AC7130 certificate	☐	☐	☐		
3. Does the supplier have a process to control critical functions of the CMS? • N/A if NADCAP approved.	☐	☐	☐		
4. Does the supplier maintain certification/calibration for equipment used for inspection, including calibration records, calibration frequencies, physical identification of equipment? • N/A if NADCAP approved	☐	☐	☐		

5. Is there a process in place to validate Product Acceptance Software (PAS) independent of the software developer? Is the supplier PAS verified prior to product acceptance use? • N/A if NADCAP approved	☐	☐	☐		
6. Does the supplier develop software for inspection and acceptance of product? Is there a documented process to define creation of plans, instructions for the building, configuration management, loading and testing developed product acceptance software? • N/A if NADCAP approved	☐	☐	☐		
7. Does the supplier define training requirements that: • Assure employee competence and maintain training records, including on-the-job-training, for all CMS system users. • Respond to changes to the CMS process, equipment, or software? • N/A if NADCAP approved,	☐	☐	☐		

Description	Response			Supplier Supporting Documents	Comment
Section 4 - Plotter	**Y**	**N**	**NA**		
1. Does the supplier receive Boeing Product Definition Template (PDT) used for manufacturing and inspection?	☐	☐	☐		
2. Does the supplier have a documented process for creating plots for product acceptance use or as media of inspection? Those procedures shall include at a minimum the following: • Plotter Calibration • Plotting Environment • Verification of engineering definition • Plotted media material • Part number Identification & revision • Verification of plotted media • Quality acceptance stamping • Accuracy of plots used for inspection	☐	☐	☐		
3. Does supplier have a documented process for validation of plot accuracy prior to use, environmental controls, handling & storage and Destruction of Obsolete/Unusable?	☐	☐	☐		
4. Does the supplier define training requirements that: a) Assure competence and maintain employee-training records, including on-the-job-training, for all DPD system users? b) Respond to changes to the DPD process, equipment, or software?	☐	☐	☐		

DEFINITIONS:

AUTHORITY
This is the engineering definition provided in a 3D representation of the product, viewable on a Computer Aided Design (CAD) system. In addition to the Authority dataset (aka CAD model), the entire product definition may typically include additional media such as parts lists, part coordination documents, material specifications, etc.

CATIA
Computer-graphics Aided Three-dimensional Interactive Application. A CAD system with interactive graphics design software modules used to create 3D and 2D geometric designs of products.

CMS
Coordinate Measurement Systems - Also known as Computer Aided Inspection (CAI) and Computer Aided Measurement Systems (CAMS). CMS devices check the 3D Features of products. Measurement equipment such as Coordinate Measuring Machines (CMM), Laser Tracker, and numerical controlled machinery with inspection probe capability which are used to support inspection activity.

DATASET
Information prepared and maintained by electronic means (CAD/CAM), and provided by electronic data access, interchange, transfer, or on electronic media.

DERIVATIVE
A reproduction of all or part of an authority dataset. Derivatives include 2D drawings, paper and mylar plots, tool designs, inspection datasets created to analyze as-built designs, check templates, numerical control (N/C) datasets/media, datasets with nominal values for CMS use, QA inspection plans and other extractions (dimensions, views, etc.) for inspection/measurement use.

DPD
Digital Product Definition – The electronic data elements that specify the 3D Computer Aided Design (CAD) geometry and all design requirements for a product (including notation and parts lists), and the use of this data throughout an integrated CAD/Computer Aided Manufacturing (CAM) and Coordinate Measurement Systems (CMS).

MBD
Model Based Definition – A Boeing dataset containing the exact solid, its associated 3D geometry and 3D annotation of the product's dimensions and tolerances (and may include parts/notes list) to specify a complete product definition. This dataset does not contain a conventional 2D drawing. MBD is one possible format of DPD. (Note: Model Based Definition is the undisputed source of definition)

PAS
PAS (Product Acceptance Software) is considered software that performs product or tooling acceptance without subsequent inspection. Common PAS applications include: CMS software (CMM, Laser Trackers, Laser Radar, PCMM's), CAD translators, and CAD Analysis Software.

TRANSLATION
Translations occur when a digital dataset is changed from its original CAD system format to another CAD, CAM, and CAI application format and require verification.