Primus Auburn DPD/MBD Assessor Checklist

A. Digital Product Definition:		(Yes / No / NA)	Document
1. Is there a process to control configuration of datasets from receipt throughout the manufacturing and acceptance processes?	• This means from the point when the dataset is received from Boeing, through whatever programming is done, through planning, through manufacturing (including visual aides), in-process inspections, through final inspection, and anything else that is applicable. What we are looking for is that the original model is secure and can not be changed, and only the appropriate people have write access to program and inspection datasets, backups are in place where necessary, identification is clear and consistent, etc. • Competent system administrator(s) with sole access to retrieve and store incoming customer datasets. • What methods does the supplier use to check dataset integrity upon receipt? • Segregation of data types (by status—e.g., release, in-work, obsolete—or by using department, customer, etc.) in secure directories or other distinct environments. • Password or other access protection, regular back up for disaster recovery, archive storage per contract requirements.		

2. Does the supplier verify dataset translations?	• Common scenarios of CAD translation are transfer of a master dataset from one company to another, or from a CAD system to a measurement system—when the sending and receiving CAD systems are not the same brand. Distortion of model surfaces or loss of model elements may occur. • Reliable verification methods are IGES_CHK software or another point cloud method. • Alternatively, customer may control outgoing datasets per supplier equipment to ensure reliable translation, or supplier may use testing to demonstrate capable translation process. • See matrix at end of this Guide for site-specific data exchange requirements.		
3. Does the supplier have a process that includes control of obsolete datasets and dataset derivatives?	• What we are interested in here, is how does the supplier make sure that the old (previous revision) model isn't used as the master dataset past whatever effectivity is attached to the change. • Segregation and clear identification of current and past revision level datasets in supplier's directories.		
4. Does the supplier have a process to control configuration of dataset derivative media?	• Derivatives mean sets of data that are extracted from the original model. Examples are NC/CNC type programs, visual aides, mylars, digital tool designs and tools, inspection datasets (in-process and final), FAI datasets, etc. • Revision level of derivative media and process to keep current with authority dataset revisions. • Is derivative inspection media stored, including obsolete revisions of derivative inspection media per product acceptance documentation retention requirements?		

5. Are dataset derivatives traceable back to the current master dataset?	• Doesn't matter if the product is accepted to paper or a dataset, but is the dataset or paper used for final inspection traceable to the master dataset? Remember to be careful of DCN implementations here when you are looking at the current model and production hardware. • Ensure traceability is complete when several, successive dataset derivatives are created in order to arrive at a derivative used for inspection. • Traceability is looking at whether or not the derivative can be clearly tied back to its master dataset • Are visual aides, if any, traceable back to the current master dataset? For a "stand alone" sketch, typical traceability information includes: • Creator/Date • Sketch Revision Level • Authority Dataset(s) Name, Location, Revision Level • Other Derivative Dataset(s) Name, Location, Revision Level • Feature Requirement(s) Identifier (e.g., GDT frame ID) • Product identification Supplier may have alternative means to ensure traceability and revision control.		
6. Does the supplier have a process to verify dimensional accuracy of dataset derivatives, including plotted media, as compared to the master dataset?	• If multiple steps, software, media are needed to get all needed information to measurement device, does supplier sufficiently control this process? • Methodology to extract/create inspection media (e.g., inspection views/sketches, mylars, tools, CMS programs, nominal dimensions, nominal point values) from authority datasets. • Plotters must be certified and dimensional accuracy of plots checked before use. • Process to assure integrity of measurement program creation.		

7. Is the supplier's CAD system software compatible with Boeing site(s) design system software when required?	• Determine which Boeing sites send or will send datasets to the supplier (see PQAA) • Compatibility requirements may involve CAD systems or data exchange software. Data exchange software could handle encryption, FTP or web connection. • See matrix at end of this Guide for site-specific data exchange requirements.		
8. Is there a process in place to validate product acceptance software?	• Measurement equipment -- OEM calibration/certification met. • Other party or supplier testing/certification of software functions for each version level. • The kind of support the user gets when new versions are installed • Process to identify current software version released for production. • Secure storage of software version master copy. • Artifact • Records of version level control of PAS accreditation		
9. When CMS operations are performed in a non-controlled environment, does the process compensate for environmental variation?	Ambient air temperature measurement. Product temperature measurement. Calculations for coefficient of thermal expansion. Certified and calibrated gages/instruments. Cleanliness.		
10. Does the supplier have a corrective action process for resolution of software and dataset issues?	• Processes to report troubles to OEM, alert all users, and take appropriate measures (including removal of software from production) when product conformity may potentially be impacted by software glitch/failure. • Process to contact customer to resolve problems with received datasets. • Does the supplier have processes to re-inspect, recall, or disclose products inspected with discrepant media, equipment, and/or tooling? (Before and after shipment to customer.)		

11. Does the planning process document traceability to the current master dataset?	• Planning meaning the usual, route sheet, travelers, work instructions, etc. Traceable and current master dataset are the important parts here. We need to know that the info from a model that needs to get into the planning is getting there. • Watch out for change notices (CNs) here. Which dataset is master may change based on the effectivity of a CN. (Ex: production run is 10 parts, change notice #1 has an effectivity at s/n 5, and you are in the shop performing a PVA when s/n 4 is being manufactured. Master here would be the original model. If you were in when s/n 6 was being manufactured, master would be model rev 1.)		
12. Does the supplier have a process to ensure verification of all engineering feature requirements of the master dataset?	• Process for reduced content datasets (MBD, RDD, SD, etc.) to ensure all engineering feature requirements (GDT frames, notes) are planned for verification. • Unique identification of each feature requirement in the 3D model is likely the most effective method when feature requirements are not provided on a 2D sheet. • Has the supplier defined typical (guidelines) surface and feature measurement practices (i.e., quantity of points)? • This process is best verified by review of the FAI for a specific product. • When master dataset specifies mandatory inspection criteria, supplier must measure and retain results for these features for every unit.		
13. Is there a process to maintain configuration of digitally defined tools to the current master dataset?	• Digital definition of physical tooling (including templates, check fixtures) must conform to digital engineering definition or approved tool design. • Release process and secure storage of released tool design datasets. • Process to review tool configuration when engineering authority dataset is revised. • Clear identification/traceability of tools and tool design/inspection datasets to current revision of engineering authority dataset.		

14. Is there a process to periodically verify accuracy and repeatability of digitally defined tooling used as media of inspection?	• Re-inspection of tools verifies the digital tool definition and occurs at a frequency related to tool wear and stability. • Typically referred to as periodic tool inspection (PTI)		
15. Does the supplier have a process to flow down DPD requirements to sub-tier suppliers who receive digital data?	• Supplier's purchase contract notes that flow DPD requirements • Compare list of suppliers receiving datasets to list of suppliers approved to receive datasets • Flow down of configuration changes		
16. Does the supplier have a process to assess, monitor and control sub-tier compliance with DPD requirements?	• What we're looking for is if the supplier is aware of the digital data ability of their sub-tiers so they don't send a dataset of some kind to a sub-tier that can't work with it. • Supplier has records of current sub-tier DPD capabilities (equipment and process) sufficient to provide confidence in sub-tier quality control of digital data/processes when used to accept Boeing product. • If the supplier sends datasets to a sub tier, but doesn't assess the sub tier capability, answer this 'no'. If the supplier doesn't send datasets to a sub tier, then answer this 'N/A'. • Supplier records of sub-tier CAD systems/format and provision of means to verify CAD translations when used by sub-tier for acceptance of Boeing product. • Periodic review of sub tier's compliance to DPD requirements by supplier		
17. Has the supplier identified specific training requirements for all functions associated with use and control of digital datasets?	• Have quality assurance or other persons responsible for product acceptance been brought into the digital measurement and measurement planning process? • How does the supplier train and document tasks when product acceptance or media generation is performed by non-QA personnel? • Is OJT encouraged and documented? • What is the supplier's program for training users of CAD, NC, CMS equipment? What training occurs at software version rolls?		

B. Portable Coordinate Measurement Systems (PCMS):			
1. Does the supplier have a process to control critical functions of the PCMS? (e.g., temperature compensation / scaling, targeting, data collection parameters, operator calibration / field checks, manipulating of coordinate systems, data format and storage, and multi station setups)	• In addition to certification and data input/output requirements common for all measurement devices, the critical functions for portable ones are: Setting survey scale, coordinate system establishment, targeting and measuring features, use of correct operating parameters (per OEM or supplier procedures), field calibration, and survey stability (acceptance). • Supplier performance of a measurement survey is an effective method to check these processes. • If supplier does not have or use portable CMS, mark this 'N/A'.		
2. Are scale bars of comparable coefficient of thermal expansion (CTE) used in the supplier's PCMS process?	• Scale bars should be of like material to product being measured • Scale bars should be calibrated		
C. Model Based Definition (MBD):			
1. Does the supplier's CAD system have the ability to view annotation based on Boeing site-specific requirements?	• Determine which Boeing sites send or will send MBD datasets to the supplier (see PQAA/SQID web) • See matrix at end of this Guide for site-specific data exchange requirements. • Compatibility requirements may involve CAD systems or data exchange software.		
2. Does the supplier have a process to determine when visual aides (e.g., views/sketches) are needed to supplement the master dataset?	• Process to determine when inspection views/sketches are needed to supplement authority dataset. • Are work instructions and illustration of product features clear? • Utilization of equipment capability (CAD, LEV, CMS) to minimize/automate creation of inspection views.		

3. Is there a process in place to document FAI's for product produced from MBD datasets?	• Process for reduced content datasets (MBD, RDD, SD, etc.) to ensure all engineering feature requirements (GDT frames, notes) are planned for verification. • Unique identification of each feature requirement in the 3D model is likely the most effective method when feature requirements are not provided on a 2D sheet. • Has the supplier defined typical (guidelines) surface and feature measurement practices (i.e., quantity of points)? • This process is best verified by review of the FAI for a specific product.		
4. Does the supplier have a process to assure sub-tier suppliers' ability to work with MBD information?	• What we're looking for is if the supplier is aware of the digital data capability of their sub-tiers so they don't send a dataset of some kind to a sub-tier that can't work with it. • Supplier has records of current sub-tier DPD capabilities (equipment and process) sufficient to provide confidence in sub-tier quality control of digital data/processes when used to accept Boeing product. • If the supplier sends datasets to a sub tier, but doesn't assess the sub tier capability, answer this 'no'. If the supplier doesn't send datasets to a sub tier, then answer this 'N/A'.		
5. 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.)	• Have quality assurance or other persons responsible for product acceptance been brought into the digital measurement and measurement planning process? • How does the supplier train and document tasks when product acceptance or media generation is performed by non-QA personnel? • Is OJT encouraged and documented? • What is the supplier's program for training users of CAD, NC, CMS equipment? What training occurs at software version rolls?		
D. Best Practice (optional):			
1. Are terminals for viewing datasets available on the manufacturing floor?	• Terminals (LEVs) are a best practice to improve clarity and accessibility of engineering requirements for manufacturing personnel. • Is the viewer capable of transmitting product definition information? • Validated software capability.		

2. Is simulation software being used?	• Is there a system or software in place to verify NC cutter path (e.g.Vericut). The use is to verify a program (NC machine cutter path) on the computer before cutting chips. • Simulation software is a best practice to reduce NC machine try out time. • S/W such as Vericut can confirm amount of NC program deviation from master dataset definition. Guideline for acceptable program is 25% of engineering tolerance.		
3. Does the supplier have a process to assure parts are machined to nominal? (e.g., programming to nominal, simulation software, down-stream controls, weighing parts)	• Nominal machining is a best practice that improves accuracy of manufactured product to engineering definition. Special cases may exist where nominal machining is not advantageous. • Finished or final NC programs shall machine to the nominal 3D model feature location. • If nominal machining is a requirement, there will be an engineering general note stating "Part shall be NC programmed and machined to the nominal 3D model feature location…" Look for statement of requirement in the supplier's planning media. • Check NC planning and programming process. • Is there any possibility of modification of the NC program after it has been verified. • Does supplier have adequate controls to prevent modification or control results of necessary modifications? • Do machine operator choices potentially alter the nominal machining program? • Does the machine operator understand how to make operation adjustments that maintain nominal parameters? • If part weight is not a requirement, it is a best practice to warn that NC processes are moving out of control – even when all features remain within engineering tolerance.		

4. Is there a process to install Enhanced Reference Systems when used on large assembly tools?	• ERS is a best practice for datuming large assembly tools. • Installation procedures should address tool structure condition, fixed target type/location, measurement device, source of (datum) nominal values, and scaling method. • Configuration control of released ERS dataset. • If the supplier doesn't have large assembly tools or doesn't use ERS, mark as 'N/A'.		
5. Is coordinate measurement system equipment used to troubleshoot problems with tooling and/or problems throughout the manufacturing process?	• Portable coordinate measurement systems collect measurements at different locations in the manufacturing process to discover the source of dimensional product discrepancies. This is a tooling best practice. • Supplier responds to and investigates/resolves assembly center reporting of problems.		
6. Does the supplier have a process for NC probing?	• NC probing uses NC manufacturing equipment to measure the product for SPC or product acceptance purposes. It is a best practice for in-process acceptance but only useful in certain situations. • Check for machine baseline and periodic calibration, and probe calibration. • Does process take part restraint and other subsequent feature changes into account when used for product acceptance? • If the supplier does it, but has no process, answer 'no'. If the supplier doesn't do it, mark 'N/A'.		