Welcome, Intro & Purpose

Adele Ratcliff (DOD ManTech)

Q1. In your Pilot programs, have you touched base with the organizations and people who did this for industry? Examples Next Generation Manufacturing Initiative (SCRA), PDES Inc the US proponent office for The Standard Exchange of Product

A1. Many standards organizations have been engaged in the MBE arena including pdes and step. NIST has been a major partner of our pilot project efforts meant to identify technical challenges and advancements on the SoA.

Q2. Does the Manufacturing Data Packages that you used in your pilots have the model data?

A2. Yes we are developing fully annotated models w mfg process info. Our earlier mpdf contained mfg process data only to prove impact but the goal of DMDI is a fully integrated thread from design production to sustainment and to grave.

OEM Perspective on the State of MBE

Paul Segura (Boeing)

Open Questions (3)

Q1. Paul, Is PLM engineering a recognized discipline at Boeing? In industry at large?
A1. Yes. For industry at large it's mixed.

Q2. Are you familiar with the EMARS program? What is the software tool that you use for your PLM environment?
A2. Yes, I am familiar with EMARS. We use Team Center Unified

Q3. What is industry doing to promote the MBE through its partnerships with DoD?
A3. We are looking into how to better align. Some more specific than others. Also, through subcommittees such as the American Society of Mechanical Engineers.

Q4. How do 3d part models connect to the large body of Boeing process and material specification that control how the parts are manufactured and what they are made from?
A4. They are embedded within the model itself.

Q5. Do your downstream customers include your DoD partners?
A5. In some cases - yes. Some customers can access our PDF (the exception, not the rule). We would like to increase the amount.

Q6. Do you use EIA-649 as your definition/guide for PLM?
A6.

Q7. Where is Boeing along the path of a "single source of data" for all Boeing products?
A7. Boeing STL has many SSD activities intended for leaning out various processes and tools

Q8. Are you leveraging the work that Boeing has done in Everett on PDM?
A8. Boeing Everett uses a completely different Product Data Management system for Commercial programs. Enovia and CATIA are the PDM/CAD tools used in BCA

Q9. What are the key improvements you see need to be made to advance current PDM tools?
A9. Not so much the tool, but in spreading its' use throughout the life cycle.

Q10. Will PDM tools compete with existing logistic community ERPs or will they interface with them?
A10. We are currently working PDM-logistics processes and tools.

Q11. Which of the Boeing military aircraft programs have completed the PLM transition and how are these transitions engaging the depot activities?
A11. We don't have a program that has completed the transition through the whole product support life cycle. However, all of them have progressed from Engineering to the shop floor. We are just at the beginning.

Q12. Can you share your strategies to improve data quality and process time going forward?
A12. The ability to work out of the same common set of data, downstream users to pull data from the same source, and reduce replication.

Q13. Do you utilize the same pdm system to manage all programs you support. Including 3D and 2D data definition?
A13. We use the same PDM tool for 3D and 2D. That is the beauty of the PDM tool. Not all of the programs use it, though the capability is there.

Q14. Can you envision a future environment where Boeing and DOD customers will be sharing the same PLM environment for product verification, modification and sustainment?
A14. That is the promise of the future. There is a lot of work to do … how they connect, data rights, etc.

Q15. Not a question but a recommend that ASD(R&E) & ASD(A) or the appropriate OSD office develop a DoD MBE roadmap highlighting DoD level goals for the services. What the service level efforts are and the current gaps to achieving the DoD level goals.
A15. Save for SME panel

Q16. You mentioned the focus so far has been engineering through to the shop floor. Have you also integrated any elements of your supply chain in this?
A16. Yes, in some cases we have.

Model-Based Definition (MBD)

John Schmelzle (NAVAIR, Lakehurst)

Open Questions (0)

Q1. You are using STEP 214 files, why ap-214 versus an AP- 203 Configuration Controlled Design?
A1. We hope one will be available in industry that we can pick up.

Q2. Are we at risk of losing the richness in the tech data if we require the data to be delivered to DoD in other than the native design format?
A2. We would never want to do that. We always want the native format. It is a derivative of the native format.

Q3. How has MBD changed your modeling practices, especially in the area of reuse?
A3. It made a big change. Now the model must be really accurate since it has more uses.

Q4 What PDM tool is Lakehurst using to support your MBE?
A4. PDM link Winchell

Q5. How difficult is it to create the 3D PDF with section views, dimensional associativity, etc.?
A5. Created in CAD software. It's a simple process to create PDM with third party software.

Q6. What is the process necessary to get to the 3D PDF?
A6. It is a simple process. The next step is to make it all automated. The template is Adobe Lifecycle manager.

Q7. How difficult is it to translate JT files to 3D PDF?
A7. We have not done that, but it is probably not difficult. We haven't used JT files.

Q8. What software are you using to create the 3D PDFs from the native files? Anark or some other software?
A8. Anark

PLM Overview
Dr. Nate Hartman (Purdue University)

Open Questions (0)

Q1. Are PLM systems scalable enough to provide single source data and facilitate configuration change and management processes across enterprises the size of the US Army? … to the DoD as a whole?
A1. The software business says “Yes”. However, the jury is still out. I don’t know if it is practically possible. There are many factors…network traffic, model sizes, security requirements, etc. One suggestion is to segment the DoD…i.e., functionally, organizationally, system (weapon platform), etc., making it more feasible.

Q2. Since there seems to be some confusion in DoD as to the differing functions of a PLM system and an ERP, can you succinctly compare and contrast the two?
A2. ERP is transactional; PLM is a system. (ERP could be a subset of PLM)

Q3. If you were going to incrementally implement an enterprise level PLM system, where would you begin? Is there a "best practices" process for implementing PLM systems?
A3. There are basically two approaches…1) the “Big Bang” where you implement it enterprise wide, or 2) Begin by setting up a small sub-group first. The main thing is that whatever approach you choose, stay within your scope.

Q4. Do you think that there should be a DoD common Data Model?
A4. Yes, all organizations ought to go to a common product data model.

Q5. Could you clarify the 3rd bullet on the last slide w/r to "ERP". Are you referring to the Navy ERP system?
A5. No, I cannot clarify more.

Q6. Would you recommend possibly PLMs platform by platform....since Boeing stated that although they use the same PDM platform there are differences on how it is configured platform by platform?
A6. It might depend on the particular organization. For Caterpillar, it was easy. I would not recommend it as a “blanket” solution.

Q7. Comment: Be careful about the concept of the common data model. All model based definitions are not created equally.

MIL-STD 31000A

Open Questions (0)

Q1. If industry has been operating in a MBE for the last decade or longer, what standard are they using? Why did DoD create their own Mil-Std?

A1. They are basically proprietary and optimized for their particular business case.

Q2. For 31000 a schema was created for a mechanical piece-part based on solid geometry. Do you anticipate the definition of additional schemas to support different applications that, for lack of a better term, are modeled using nominal geometry? One example of nominally defined geometry is ascantling model.

A2. There definitely need to be digital schemas created.

Model-Based Work Instructions

Open Questions (0)

Q1. Are standards expected for the DWI Authoring Tool? I assume once it is in lightweight format, changes are no longer possible, and without DWI Authoring standards, the Gov't might be paying multiple times for editing a work instruction.
A1. Yes, that's true. Once you go to lightweight format you lose connection to native format. We are not eliminating that step.

Q2. Have you used other tools to create DWI besides Anark's?
A2. Yes, PTC has one – PTC Illustrate – which is more like a technical manual. There are other tools, most of our experience, however, is with ANARK

Q3. With your authoring tool, what is your mean time to create a DWI?
A3. It is dependent on the number of steps. It takes approximately 30 minutes per animation step. I would say it ranges from 1 – 14 days. Some changes can be done in hours.

Q4. Regarding MBI file size, is there ANY file size compression from original CAD data, through ANARK, into the 3D PDF MBI?
A4. From native CAD to 3D PDF there is usually some compression. Most of the time the animation file is larger than the assembly file.

Q5. Do you have any concern over the bleeding across domains by the standards continuing to increase their scope? For example, the inclusion of a tesselated lightweight rep in STEP and exact forms in jt and 3DPDF.
A5. At this stage, competition is a good thing. They capture geometry and other data that sometimes gets buried in the native model.

AME & DMDI
Greg Harris (U.S. Army RDECOM)

Open Questions (0)

Q1. Have you had any interaction with DARPA's Advanced Vehicle Make program
A1. Yes. We are working with DARPA AVM to be the transition activity for the tolls they have developed to date. There was an announcement about 1 ½ months ago that announced the partnership. There will be a project call in June for proposal teams to submit for maturing the tools they developed during the Fang 1 challenge.

Q2. Could you clarify if the $70-75M total funding amount available for the stand up of Agency-led Institutions is per institute or for all institutes stood up within the Gov. Is there guidance available for standing a new institute up?
A2. Each of the three institutes established in FY 14 are funded at $70M over the 5 year POP. The Pilot Institute is currently funded at $50M (up from the original $30M).

Q3. Does the AME innovation focus include the development and issuance of Model based definition standards for sharing "single source" data across the enterprise?
A3. Yes, standards are a big part of the effort. There are many partners of the DMDII that are already involved in standards development and improvement. We will not be issuing standards but we will be working with the standards development bodies to influence the common development.

Q4. While focusing on Design and Manufacturing Innovation, will we at the same time develope sound sustainment strategy?
A4. Yes. We are very concerned with the needs of the sustainment community and the full product life cycle. DLA is participating in the Technical Advisory Committee and will be able to influence the Technology Roadmap and the Strategic Investment Plan.

Q5. When is the next MBE summit and is the agenda set already? Is there an opportunity for the maintenance community to help shape the agenda?
A5. The next MBE Summit is scheduled for December 16-17, 2014 in Gaithersburg, MD. The agenda has not yet been set and the maintenance community is encouraged to contribute. If there are specific persons interested in participating in the Summit please forward the information to me.

Q6. Is there room on the AME subpanel for a member of the DoD maintenance community?
A6. I am sure we could make an ex-officio position on the SP for the maintenance community.

Q7. What is additive manufacturing?
A7. Additive Manufacturing, commonly called 3D printing, is the process of making something by adding material in successive layers. Much like an inkjet printer deposits tiny dots of ink to make a 2D image, many 3D printers build nearly any object imaginable by depositing tiny amounts of material, layer by layer. By contrast, traditional manufacturing processes often work in the opposite way, removing material by cutting, grinding, milling and other methods. I suggest you investigate http://americamakes.us/

Q8. Would you be amenable to entertaining the idea of establishing a maintenance and sustainment subpanel working group?
A8. I think the SP would be open to the idea. It has not been easy to this point to get the Maintenance and Sustainment engaged with the AME SP.

2D to SD Process
Rick Mendoza (FRC-SW)

Open Questions (0)

Q1. What scanning geometric tolerances are required to ensure that the part model truly represents the part?
A1. With the ROAMER mobile handheld laser scanner we find we are + or – 10,000th of an inch which is within tolerance.

Q2. What software do you use to compare the model to a scan of the actual part?
A2. Verisurf

Q3. Is there a specification for the 3D PDF Technical Package and is there a requirement that all of the data in the PDF is viewable when printed (i.e. Note lists)?
A3. There is a specification for the tech data; the standard for PDF is adobe. Yes, there is a requirement that the data is viewable, though printable is not specified, but ours is.

Q4. Can any of the automated tools that John highlighted be used in the 3MS process that Rick presented?
A4. Yes, we are looking at ITI software for parts that are solid model based. CADIQ is one.

Q5. There are other DoD organizations already following a similar validation approach. The Armament Branch of the Air Force requires a physical validation of all critical parts that are newly modeled either by a first article inspection or form fit and function (FFF) testing with qualified UNUSED parts. We do not typically utilize on-air craft parts for this audit due to dimensional changes from wear/corrosion and the inability to confirm what revision of the TDP the part in question was manufactured to. How are you accounting for these dimensional risks when validating a new model to parts physically taken off the air craft? Also, it seems the Navy's approach relies heavily on laser mapping and point cloud generation, are you using first article inspections or FFF when laser mapping is not possible (e.g. parts with a large quantity of internal dimensions)?
A5. Kind of a first article test, and I want to emphasize that we are not reverse engineering.

DLA Perspective
Jim Jobe (DLA)

Open Questions (0)

Q1. Does DLA have any projected benefits you can share in moving toward M-B tech data acquisition processes?
A1. We see alot of benefits. We see a reduction in lead times, administrative times & production times for starters.

Q2. Does DLA have a strategic timeline which addresses those actions defined as needing to be developed and deployed?
A2. Not yet. We are still in the R&D area. We do not have a strategic timeline yet.

Q3. How does DLA foresee its role as maintenance activities are able to more easily create parts for themselves? Will DLA take on more of a data broker and validator role?
A3. We have had discussions concerning storing models on shelves versus parts. One area we need to get our arms around is data validation.

NAVAIR Perspective
Howard Owens (NAVAIR)

Open Questions (0)

Q1. Does NAVAIR have an instance of an NAE wide PLM system in which to operate their MBE?
A1. One PLM across the enterprise is not our strategy. We want to match the OEM tools.

Q2. You highlighted many gaps in NAVAIR's ability to operate in a MBE. Does NAVAIR have a strategic roadmap to transition to the MBE?
A2. Yes, but I cannot share our roadmap at this time. We still need buy-in to implement.

Q3. Not a question, just a comment. In the AME Sub Panel and Army MT we are using the term "Forensic Manufacturing" instead of Reverse engineering to get past the idea that we are somehow trying to reverse design a part to bypass an OEM source for parts.

Q4. Are you open to access to F/A-18 data vs. replicating data?
A4. We have been doing that. Rick and John spoke about the issues in doing that.

Army Perspective

Adam Frey & Roy Whittenburg (US Army ARDEC)

Open Questions (0)

Q1. What type of organization is your MBE maturity index model designed for…military, industry, …?

A1. You can use it either way. It is not geared to DOD or to a specific industry.

A-10 Wing Replacement Program - #D MBE

Rich Billings (AFLCMC)

Open Questions (0)

Q1. Do you think that if the A-10 had established a PLM environment up front, the issues you highlighted could have been avoided or resolved more quickly?
A1. With the data, yes.

Q2. Are you using an internally configured version of Teamcenter for your data? Meaning: is this an A-10 only instance of Teamcenter?
A2. It is a Boeing flavor.

Q3. What is the issue with giving DLA access to the appropriate data in the A-10 PLM?
A3. Changes may be performed by different contractors, so there is no “final” data.

Q4. Is your Teamcenter instance installed on AF public servers? I noticed you're using Teamcenter 9.0 but that version is not yet approved and on the AF EPL, only 8.1 is.
A4. It’s not.

Q5. In the PLM, how are you differentiating between tail numbers for the as built/as maintained configurations?
A5. We are moving in that direction. I’m not sure we have a solution. We are looking at the “Sustain BOM” similar to the EBOM.

Q6. Are you leveraging IUID to do your serialized Item management and as maintained BOM?
A6. I would love to, but I’m not sure the USAF has a mechanism in place.

Q7. You mentioned the cost associated with gaining a verified model of your system. Do you believe you have realized an ROI yet?
A7. Yes, we realized a high ROI on the proposal using the CAD model.

Q8. What peripheral devices are used by shops in the production environment to view model based instructions, MBD, etc?
A8. The JT model, which is updated weekly.

Q9. It sounds like a lot of your obstacles in Teamcenter 9.0 are the same we at the Armament Branch ran into during our alpha/beta testing in Teamcenter 8.1. We've solved A LOT of these problems in Teamcenter 10.1 and are just awaiting approval for its use on the AF network to launch. But it sounds like you may be ahead of us in terms of handling FEA. I'm the architect for the Armament Branch's modernized PLM system using Teamcenter 10.1 and would welcome the opportunity to swap notes with you. With so many parallel Teamcenter efforts going on in the AF alone (PLMI, C-5 TOs, CENTRA, etc.) I think it's important for similar organizations like ours to have a consistent strategy in regards to PLM and ideally, operate in the same PLM environment.
A9. Definitely, let’s collaborate.

Q10. Have you tried to manufacture directly from a "heavy" JT file or are you using native NX CAD?
A10. We have not yet tried to manufacture from a "heavy" JT file. We have the native, STEP (AP 203) and JT files available for manufacture, but have not used the JT files yet. It has always been the native NX file or STEP for detail parts. I will get with our maintenance group counterparts to see if we can try this with our JT files to test this out.

USMC Perspective

Greg Russell (USMC LOGCOM)

Open Questions (0)

Q1. With Additive Manufacturing ramping up and ability to potentially fabricate Parts in the field, seems the USMC would want to embrace....

A1. We do. We just do not have much demand. You have to remember that we are primarily dealing with truck parts which are available on the shelf. Also note that the PM needs to approve the AM fabrication of each type of part.