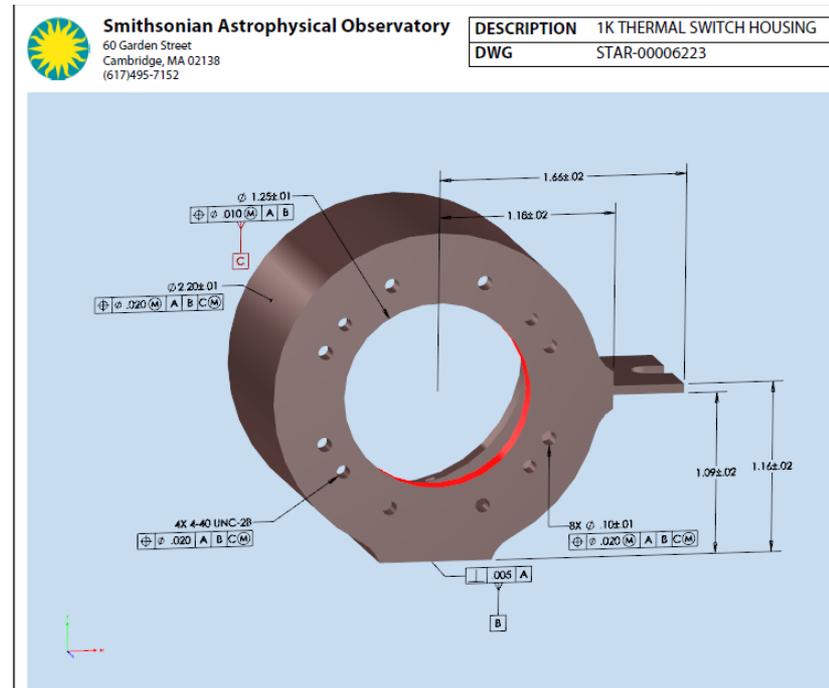


Beyond the TDP

Taking the next steps in the 3D MBE Paradigm Shift...

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 Director, Enterprise Sales
 jim.merry@anark.com
 240 674 5547



Agenda

- A short trip down memory lane: “Why replace 2D drawings with a 3DTDP?”
- Downstream Reuse requirements
- Downstream Use cases/Examples of Deployed 3D PDFs
 - Complete Product Def. to Suppliers (without 2D Drawings)
 - Manufacturing BOM TDPs and Process Planning
 - Quality/Inspection: Planning Docs and FAI Reports
 - Field Service/Maintenance and Repair Operations (MRO)

2008 – BAE Systems at CPDA

BAE SYSTEMS

What Is Model Based Environment?

A fully integrated and collaborative environment founded on 3D product definition detail that is shared across the enterprise to enable rapid, seamless, and affordable deployment of products from concept to disposal.

Proven Benefits

Significant Reductions:

- Non- Recurring Cost reduced By: 50%
- Non-Recurring Cycle Time Reduced By: 50%
- First Article Costs Reduced By: 65%
- TDP Changes Reduced By: 50%
- Product Non-Conformance Reduced By: 90%
- Recurring Cycle Time Reduced By: 50%
- Recurring Costs Reduced By: 50%
- Support Cost Reduced By: 50%

Other Benefits:

- Reduced Learning Curve
- Integrated Learning
- Validated Design & Assembly Integrity
- Validated Operations Sequences & Tooling
- No Traditional Drawings
- Flexibility of Work Force
- Drives & Validates Design Release

This data was initially published by Boeing but has since been validated through real world use at BAE Systems Land and Armaments

EVERETT, Wash. (AP)--A powerful computer system that simulates the assembly of Boeing Co.'s new 787 Dreamliner **cut typical costs by about 20 percent and trimmed a full year** from production, officials said Wednesday.

Reduces Product Cost By:

- Defining and Validating Factory Processes
- Defining and Validating Assembly Processes
- Defining and Validating Quality Process
- Defining and Validating Tolerance Management



MBE
Model Based Environment

The Next Generation of Business

Data Reuse is the key to 3D MBE ROI

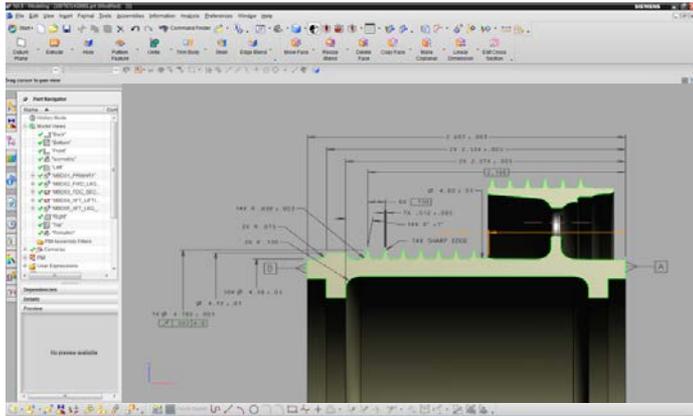
- **TDP data reuse** delivers savings in cost, time, and increased quality
- Enabling TDP data reuse requires:
 - Accurate/Complete CAD Models, PMI, Attributes
 - Upstream processes must embed data for downstream use cases, e.g.,. Inspection of Key Characteristics
 - Open format(s) that support cost-effective access and reuse of the TDP data, and fit-for-purpose templates
- Target Use Cases beyond TDP
 - Complete Product Def. to Suppliers (without 2D Drawings)
 - Manufacturing Planning/Work Instructions
 - Quality Planning and Inspection Reports
 - Field Service/MRO

Use Cases Beyond the TDP require more than 3D MBD

- Complete Product Def. to Suppliers (without 2D Drawings)
 - Native CAD 3D MBD to 3DPDF TDP to Native CAD 3D MBD
 - No 2D Drawings, No Remodeling, Design Intent Maintained.
- Manufacturing Work Instructions
 - 3D MBD, 3D Tooling, process planning information, + 3D Animation
- Quality Inspection Planning
 - 3D MBD, + Key Characteristics Tagged by Inspection SMEs, Data capture via forms
- Field Service/Maintenance Repair Operations
 - 3D MBD, xBOM w/sub assembly rollup, ERP

Complete Product Definition to Suppliers w/o 2D Drawings (At Prime Contractor or DOD)

1. Define 3D MBD data in Native CAD

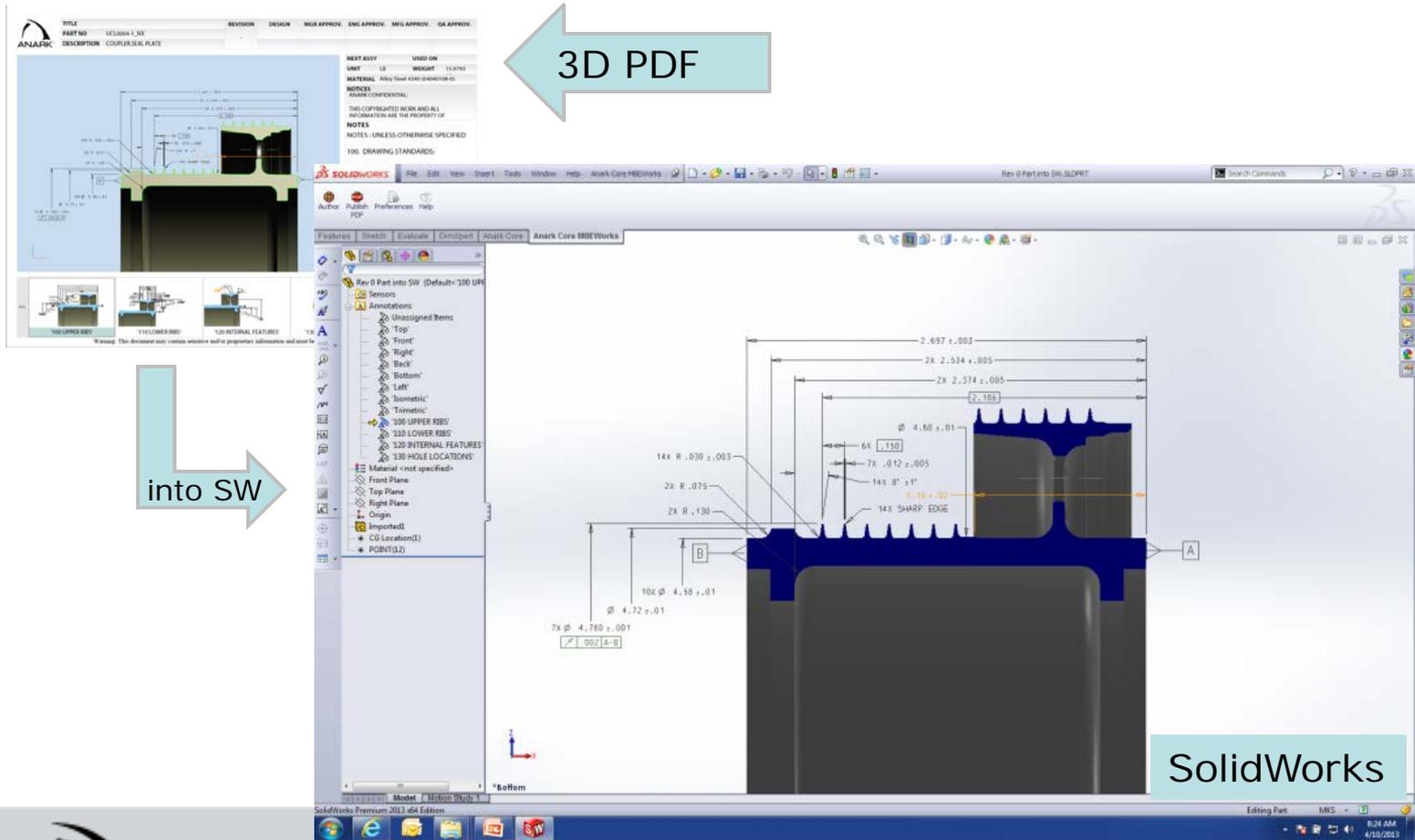


2. Automatically Transform 3D MBD into 3D PDF TDP



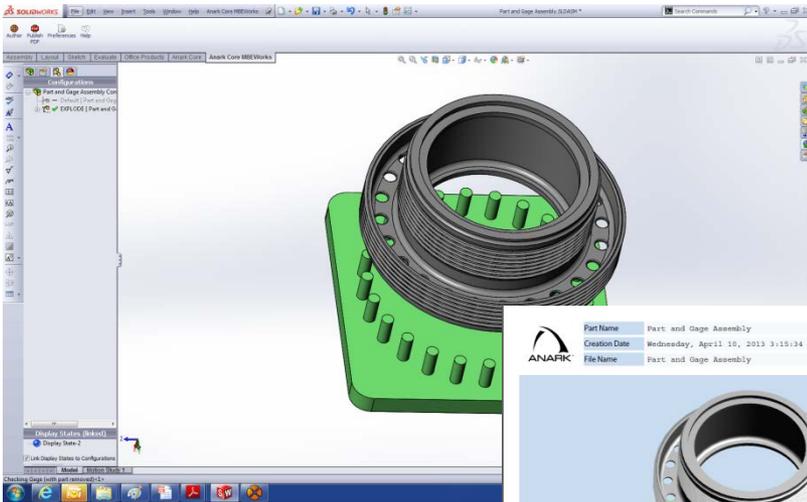
Complete Product Definition to Suppliers w/o 2D Drawings (At DOD Supplier)

3. Read 3D PDF TDP into SolidWorks

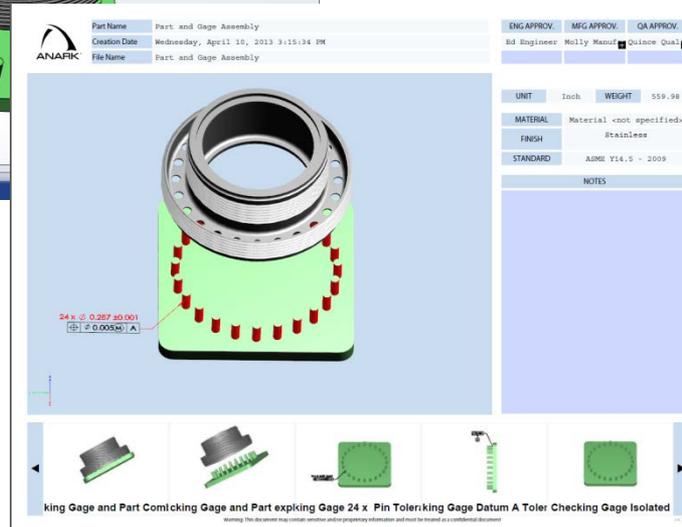


Complete Product Definition to Suppliers w/o 2D Drawings (At DOD Supplier)

4. Create Tooling/Gage/Design Upgrades in SolidWorks



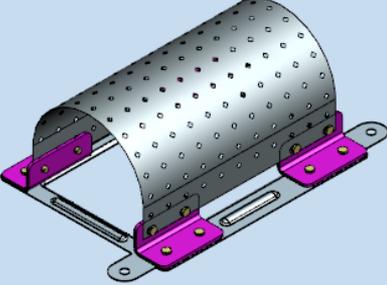
5. Transform into 3D PDF MBE Document



6. Email 3D PDF MBE back to DOD



Assembly BOM TDP from Navistar



NAVISTAR[®]

NAVISTAR, INC. CONFIDENTIAL PROPRIETARY
THIS DOCUMENT IS IN ACCORDANCE WITH ASME Y14.5M-1994 AS AMENDED BY NAVISTAR, INC.
DIMENSIONING AND TOLERANCING ADDENDUM - 2000
THIS DATASET CONFORMS WITH ASME Y14.41-2003.
SOLID MODEL IS MASTER FOR ALL SURFACES, FEATURES, NOMINAL DIMENSIONS, AND TOLERANCES
ALL MATH DATA IS BASIC
ALL PARTS SUPPLIED TO NAVISTAR MUST COMPLY WITH CEMS 8-50 FOR RESTRICTED CHEMICAL SUBSTANCES

PART NUMBER: 353358C1			
MATERIAL: MODULAR IRON GRADE 5006 NAVISTAR SPEC E10	LINEAR MEASURE: MILLIMETER WEIGHT: Rough (Kg) 0.1 Finishhd (Kg) 0.095		
NAME: HEAT SHIELD ASSEMBLY 33# SPRING CENTERS FRT,16-20K, SB N/REINF,			
PART TYPE CODE: InitPart	ORIGINAL RELEASE: (2)63, (3)67		
CAGE CODE:	CONTRACT NUMBER: CONTROL JKH 889		
CURRENT REVISION:			
MODELED:	ENGINEER: JOHN DOE		
DATE:	DATE: 01/11/2000		
REVISION DESCRIPTION: REPLACED BOLTS WITH MS2450 IF I NEED ADDITIONAL LINES THEY WILL GO HERE WITH AS MANY LINES AS NEEDED TO EXPLAIN. I CAN TYPE MORE HERE AS WELL. MORE LINES IF NECESSARY			
BILL OF MATERIAL:			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	1234568C1	16	BOLT, MS2450 BRASS
2	1234569C1	1	PERFORATED SHIELD
3	1234570C1	4	BRACKET
4	1234571C1	1	BASE
5	1234572C1	16	NUT, AM100 BRASS (NOT SHOWN)
6	1234568C1	16	BOLT, MS2450 BRASS
7	1234569C1	1	PERFORATED SHIELD
8	1234570C1	4	BRACKET
9	1234571C1	1	BASE
10	1234572C1	16	NUT, AM100 BRASS (NOT SHOWN)
11	1234568C1	16	BOLT, MS2450 BRASS
12	1234569C1	1	PERFORATED SHIELD
13	1234570C1	4	BRACKET
14	1234571C1	1	BASE
15	1234572C1	16	NUT, AM100 BRASS (NOT SHOWN)
16	1234568C1	16	BOLT, MS2450 BRASS
Isolate		Zoom Fit	Show All



Work Instruction from PA Breaker

Procedures
SSM-1.6 Mechanism Assembly

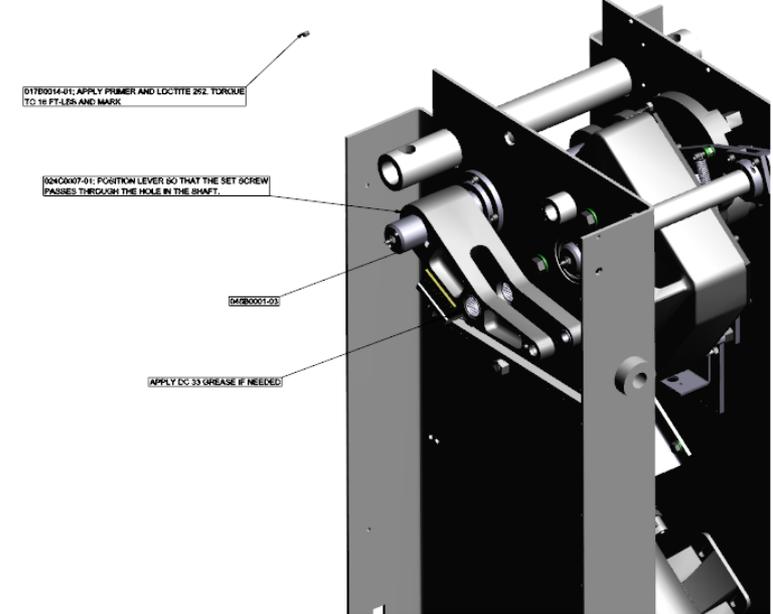
Assy Number Revision Date

Views

Step	Description
10.	Assembly Preview
11.	Install Roller Cam, Shaft, & Catcher Spring
12.	Install Latch Lever & Shaft
13.	Install Trip Latch
14.	Install Close Latch
15.	Install Spring Transfer Levers
16.	Install Dual Trip Assembly
17.	Clearance Check

Detailed Instructions

Grease the main lever ends, add key and install dual trip assembly. Be sure to line up the hole on the assembly with the hole on the shaft.



01789014-01; APPLY PRIMER AND LOCITITE 262. TORQUE TO 18 FT-LBS AND MARK

02020017-01; POSITION LEVER SO THAT THE SET SCREW PASSES THROUGH THE HOLE IN THE SHAFT.

04/200012-01

APPLY DC 33 GREASE IF NEEDED

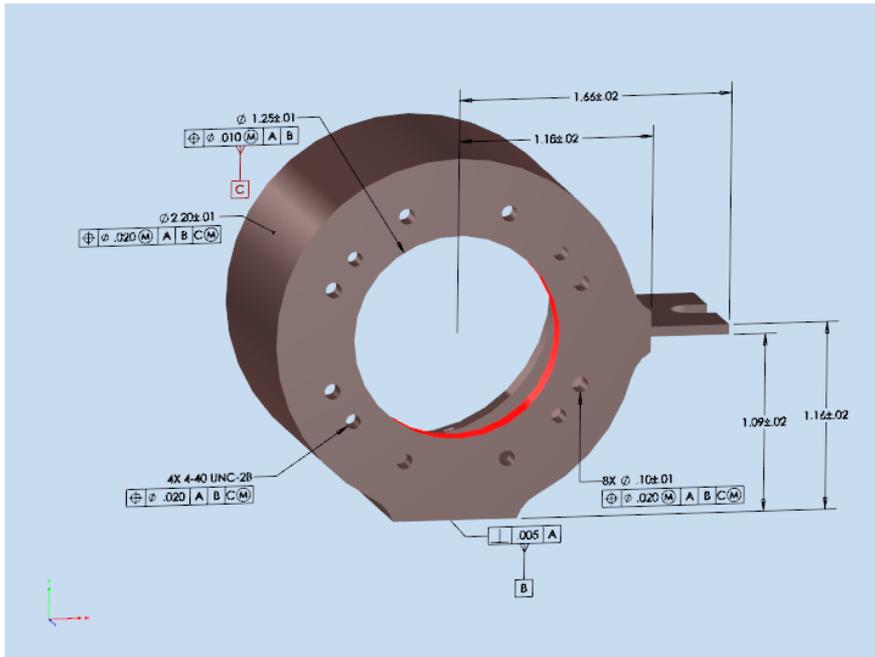
Navigation icons: Home, Back, Forward, Stop, Refresh

First Article Inspection from Smithsonian



Smithsonian Astrophysical Observatory
 60 Garden Street
 Cambridge, MA 02138
 (617)495-7152

DESCRIPTION	1K THERMAL SWITCH HOUSING	REVISION A	SERIAL #
DWG	STAR-00006223	DATE PUBLISHED	12-10-2012



FIRST ARTICLE INSPECTION	
CHARACTERISTIC DETAILS	
REQUIREMENT VALUE	
MEASURED VALUE	
NOTES / COMMENTS	
<input type="checkbox"/>	CHARACTERISTIC IN SPEC
Generate Inspection Report	

CHARACTERISTIC/DESIGNATOR	Previous	View 1 of 6	Next
1: TXD1			
3: DetailItem19			
4: DetailItem20			
5: TXD2			
9: TXD6			
10: TXD7			

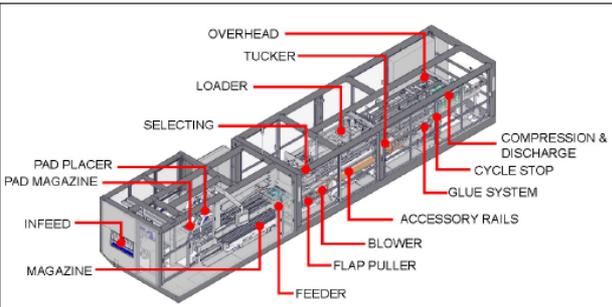


Field Service/MRO from GPI

**QFTSG3-022**

Sections

- ACCESSORY RAIL '5044258
- BED PLATES '5044508
- CAN FLIGHTS '5044500
- CARTON FLIGHT '5044567**
- CHANGE PARTS 5044504
- COMPRESSION & DISCHARGE '5044547
- CYCLE STOP 5044505
- FEEDER '5044687



Drawings

Section Num	Drawing	Description
5044567	5044567-3D	QFTS G3 CARTON FLIGHT, (RH), W/ NTF LUGS 3D

Parts

Section Num	Part Num	Qty	Units	Parts Description	Order
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Summary

- Significant 3D MBE benefits can be gained by leveraging the data in the TDP for down stream use cases like Complete Prod Def w/o 2D Drawings, Mfg Work Instructions, QIP, MRO, RFP, etc.
- TDP Reuse requires:
 - Fully semantic information in the TDP, including the PMI, attributes
 - Additional information from SMEs embedded upfront, e.g., Inspection KCs
 - Cost effective, programmatic access to data in the TDP



Unleash the Model Based Enterprise



Advanced 3D Solutions