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U.S. Army Research, Development and Engineering Command



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What is the status of Digital Data Set, and how to Validate and Certify it?

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02 Dec. 2010

- **MBE Overview**
- **3D TDP**
- **3D Validation**
- **Other Topics**
- **Closing**



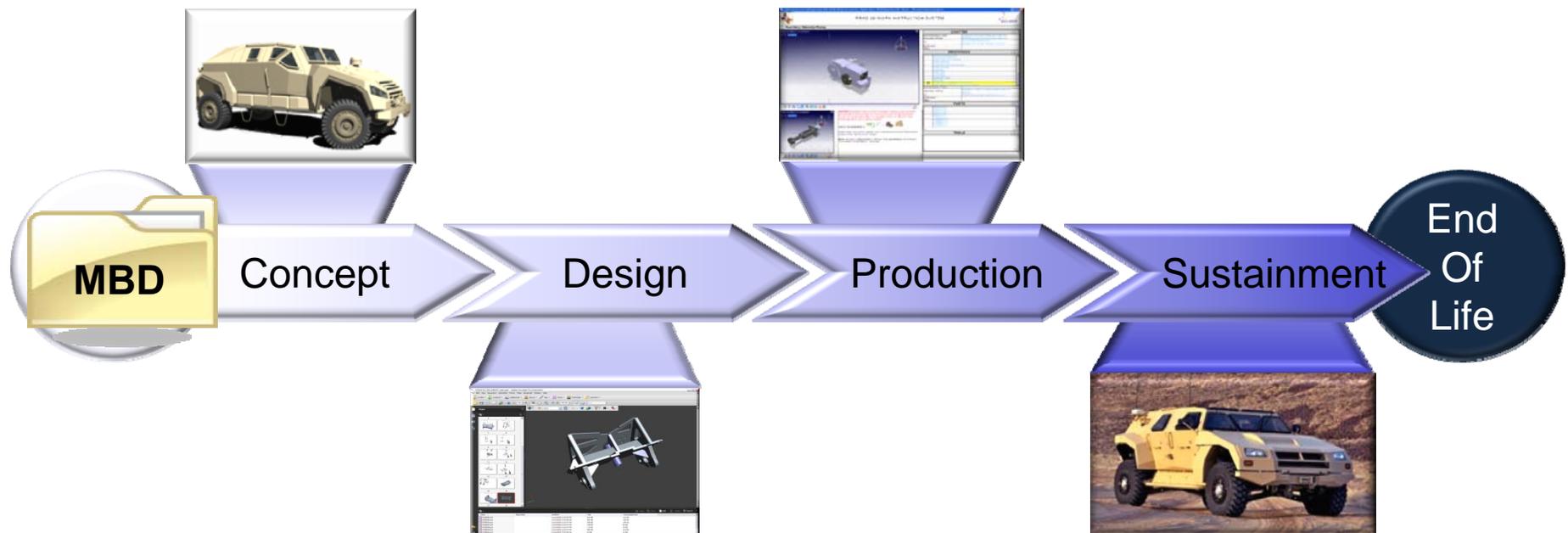
# What is MBD & MBE?

## MBD

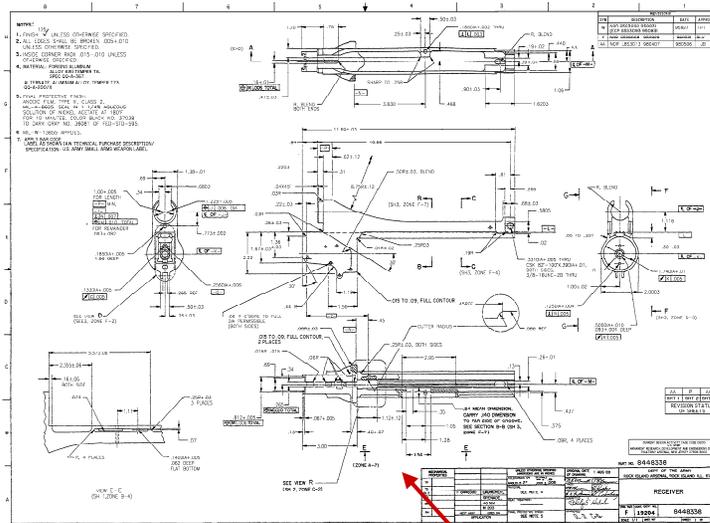
A 3D annotated model and its associated data elements that fully define the product definition in a manner that can be used effectively by all downstream customers in place of a traditional drawing

## MBE

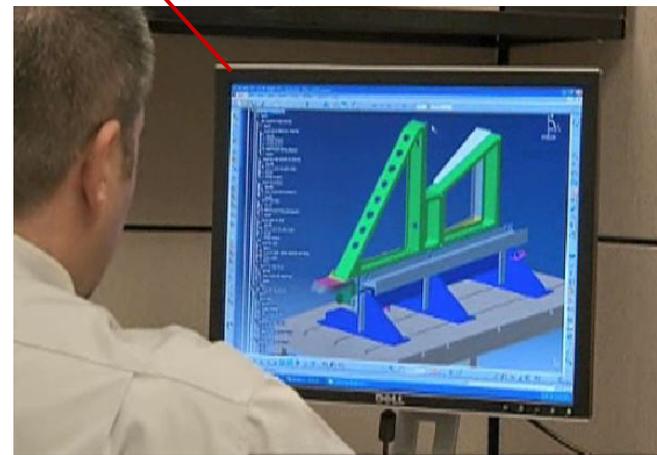
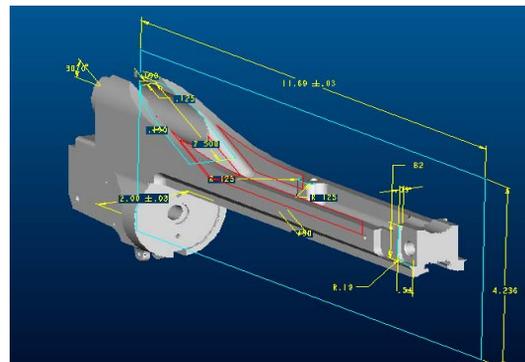
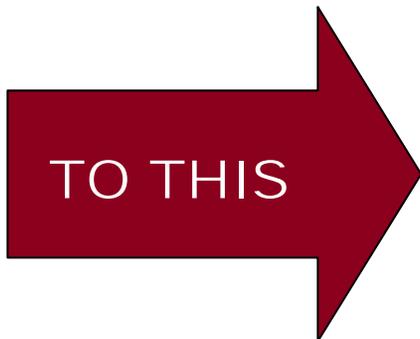
A fully integrated and collaborative environment founded on 3D product definition detail and shared across the enterprise; to enable rapid, seamless, and affordable deployment of products from concept to disposal



# What are Models ?

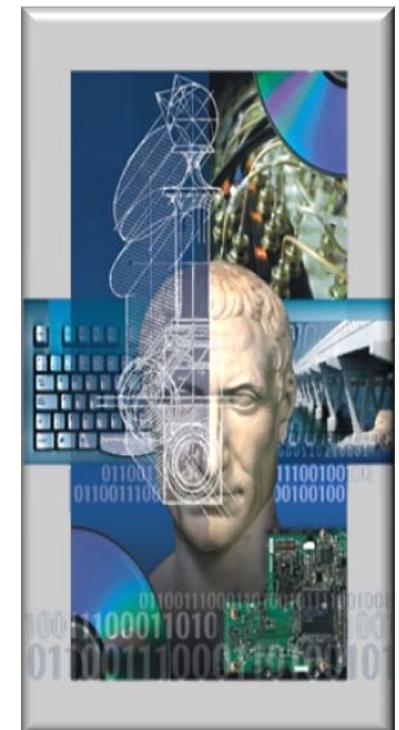
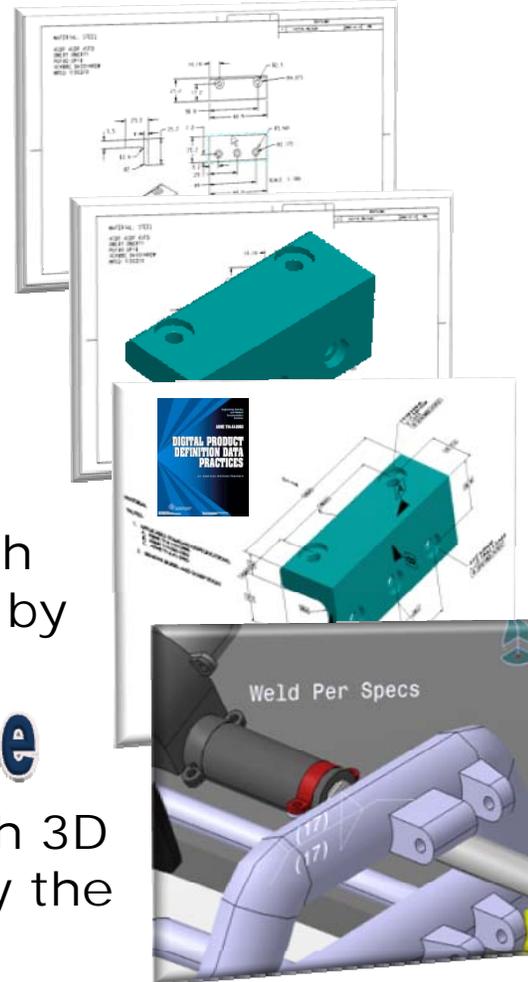


**Today Drawings come from models**



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- Drawing Based**  
Master 2D Drawing
- Model Centric**  
3D CAD Model with  
Master 2D Drawing
- Model Based Definition**  
Master 3D CAD Model with  
3D Drawing, 2D Drawings by  
exception
- Model Based Enterprise**  
Master 3D CAD Model with 3D  
Drawing fully leveraged by the  
Supply Chain

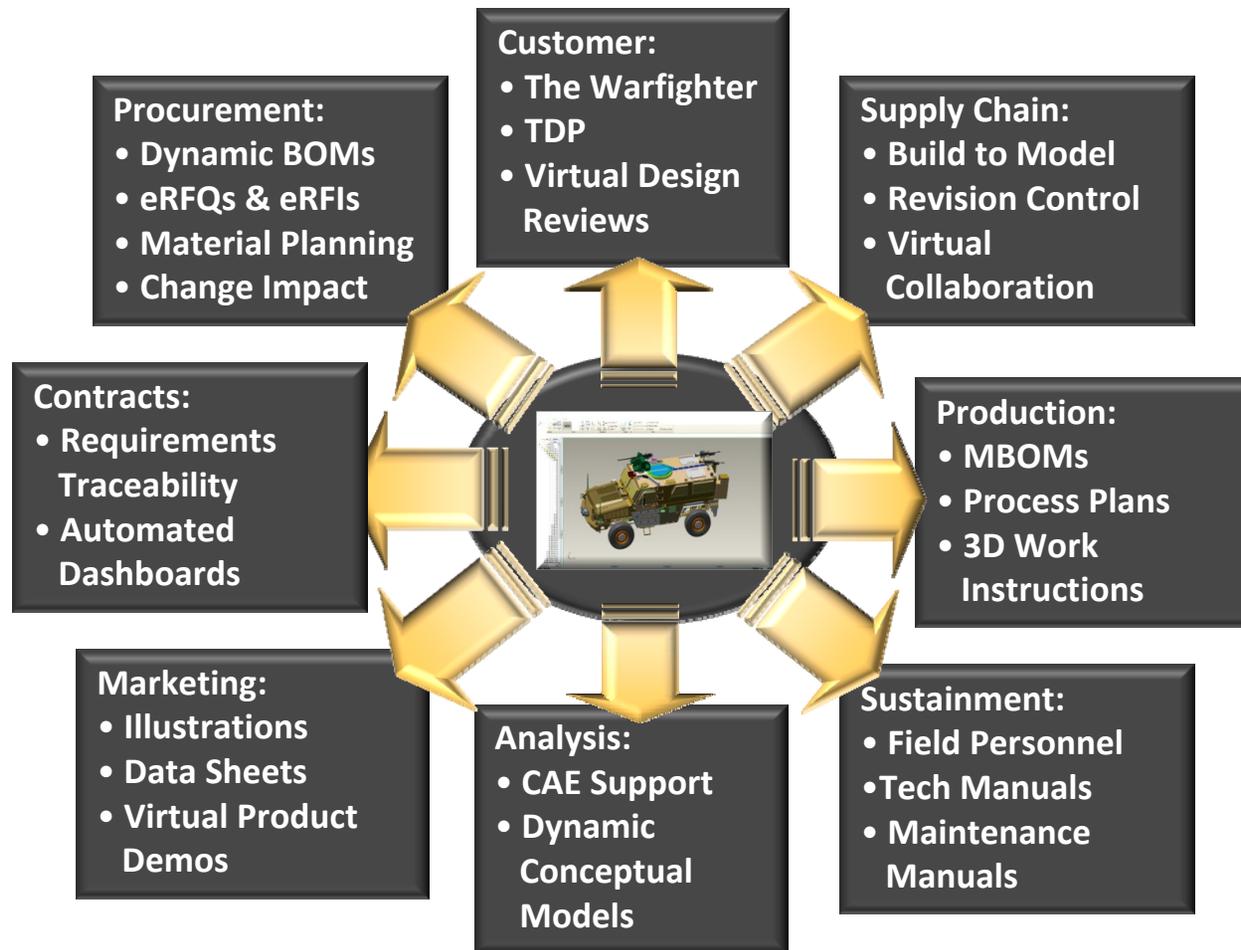


# Why Are We Doing This?

The main purpose of the 3D TDP is to provide all Downstream users a 3D data set that they can reuse with out re-mastering the data

For suppliers this means they will have the ability to drive their CAM software straight from the model along with numerous other process

All of this reduces the time to mission for the Warfighter





# 3D Technical Data Packages

- MBE Overview
- 3D TDP
- 3D Validation
- Other Topics
- Closing

- Current DoD TDP requirements are focused on 2D not 3D
- DoD Policy and Guidance is unclear for TDP requirements for PM/PEOs
- MIL-STD-31000 does not clearly define 3D TDPs: Contents, User Requirements, and Delivery Formats
- There are no uniform DoD guidelines or standards that define a 3D TDP and specifies the content requirements

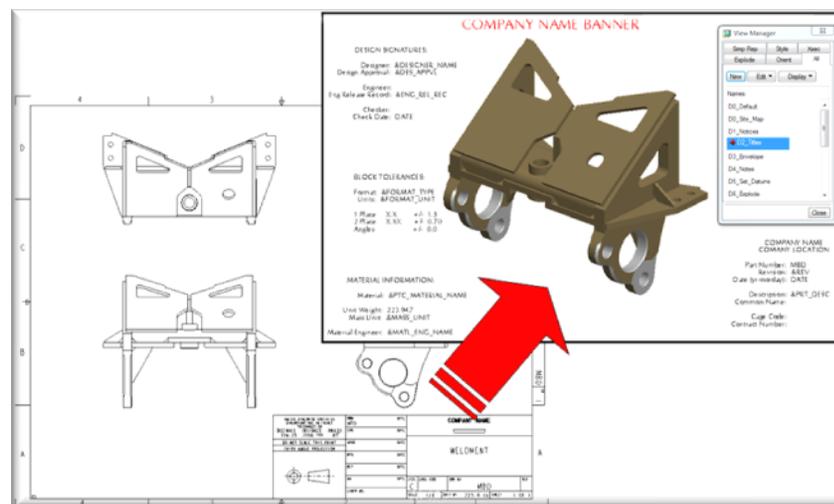
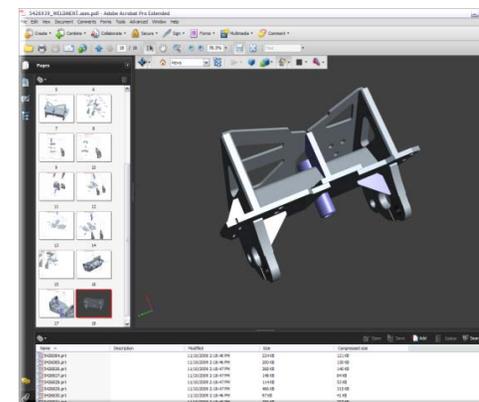


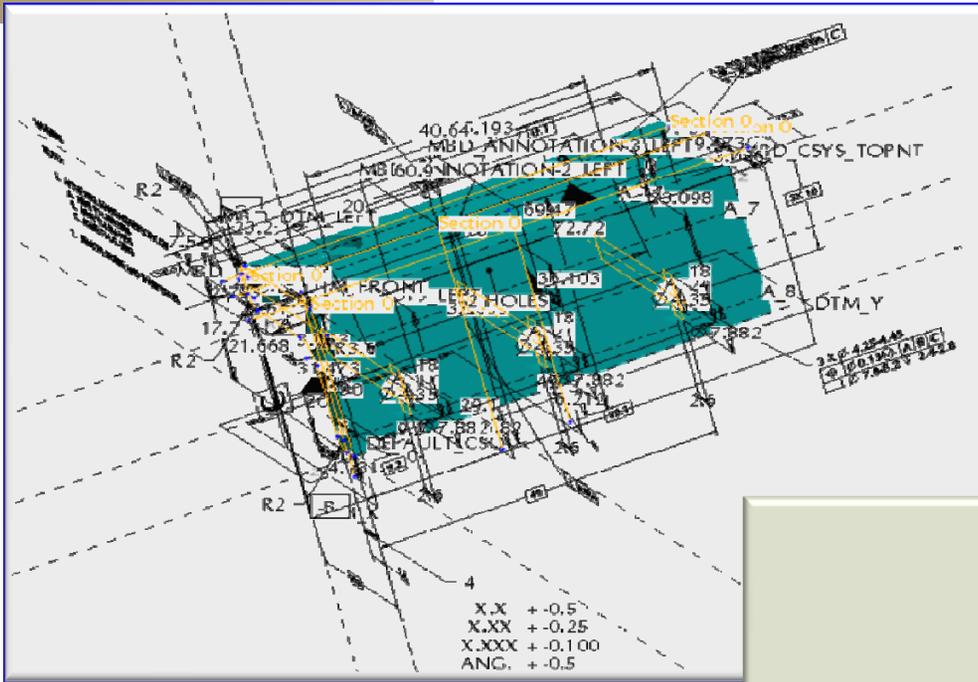
- Identify and evaluate existing DoD, Industry and Commercial TDP standards and practices
- Establish current DoD and Agencies policy and guidance for 3D TDPs
- Recommend DoD level standard or document required for 3D TDP implementation
- DoD Engineering Drawing and Modeling Working Group (DEDMWG) to revise/update standards related to TDPs.



# The Purpose of the Schema

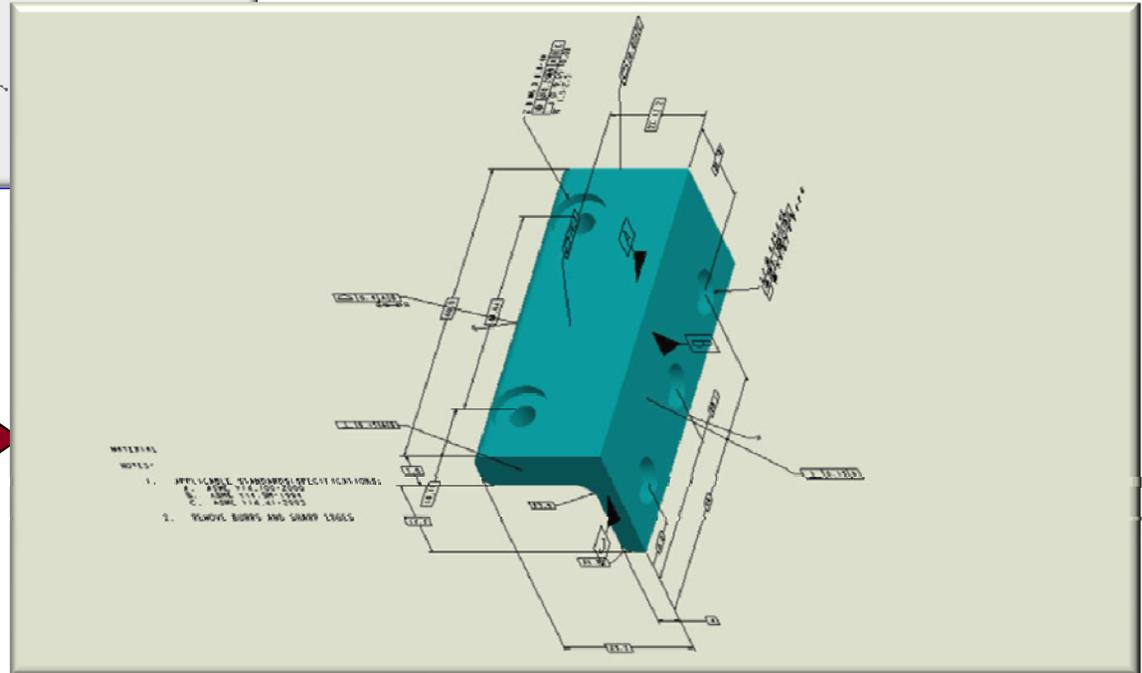
- In order for all the downstream users to consume the annotated model in place of a drawing it must be organized in a consistent and intuitive manner
- The Annotation Schema provides this consistency
- Also, it enables much of the information to be programmatically extracted



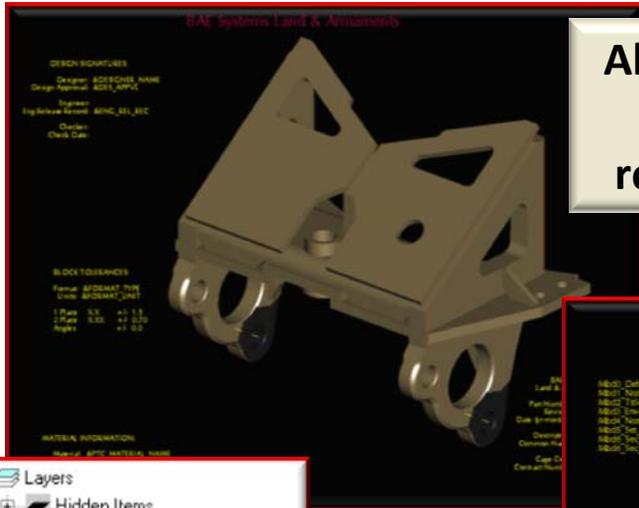


Without the Schema...

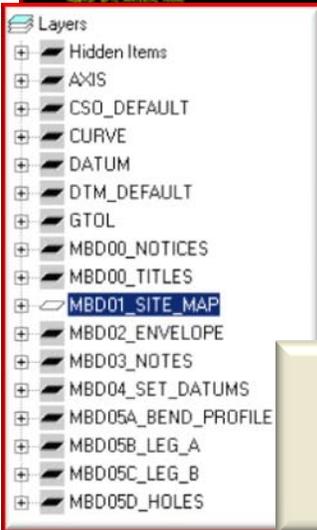
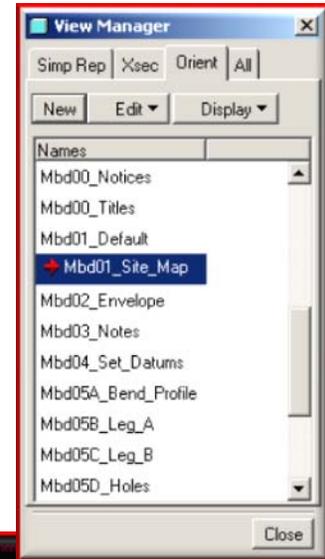
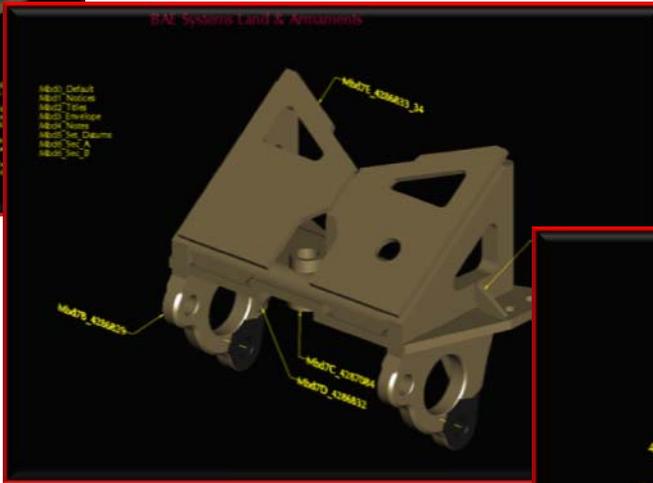
With the Schema...



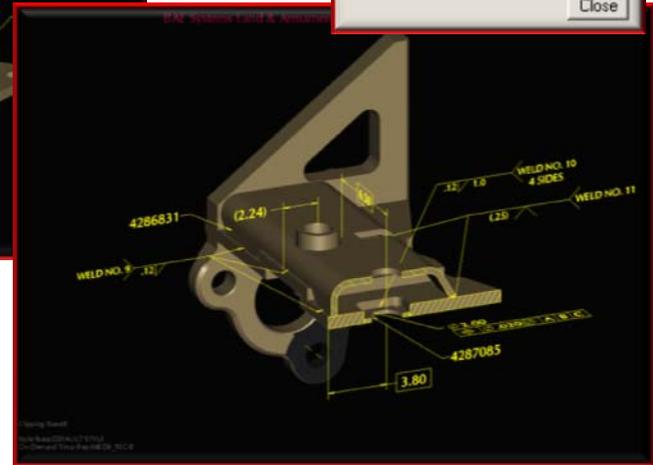
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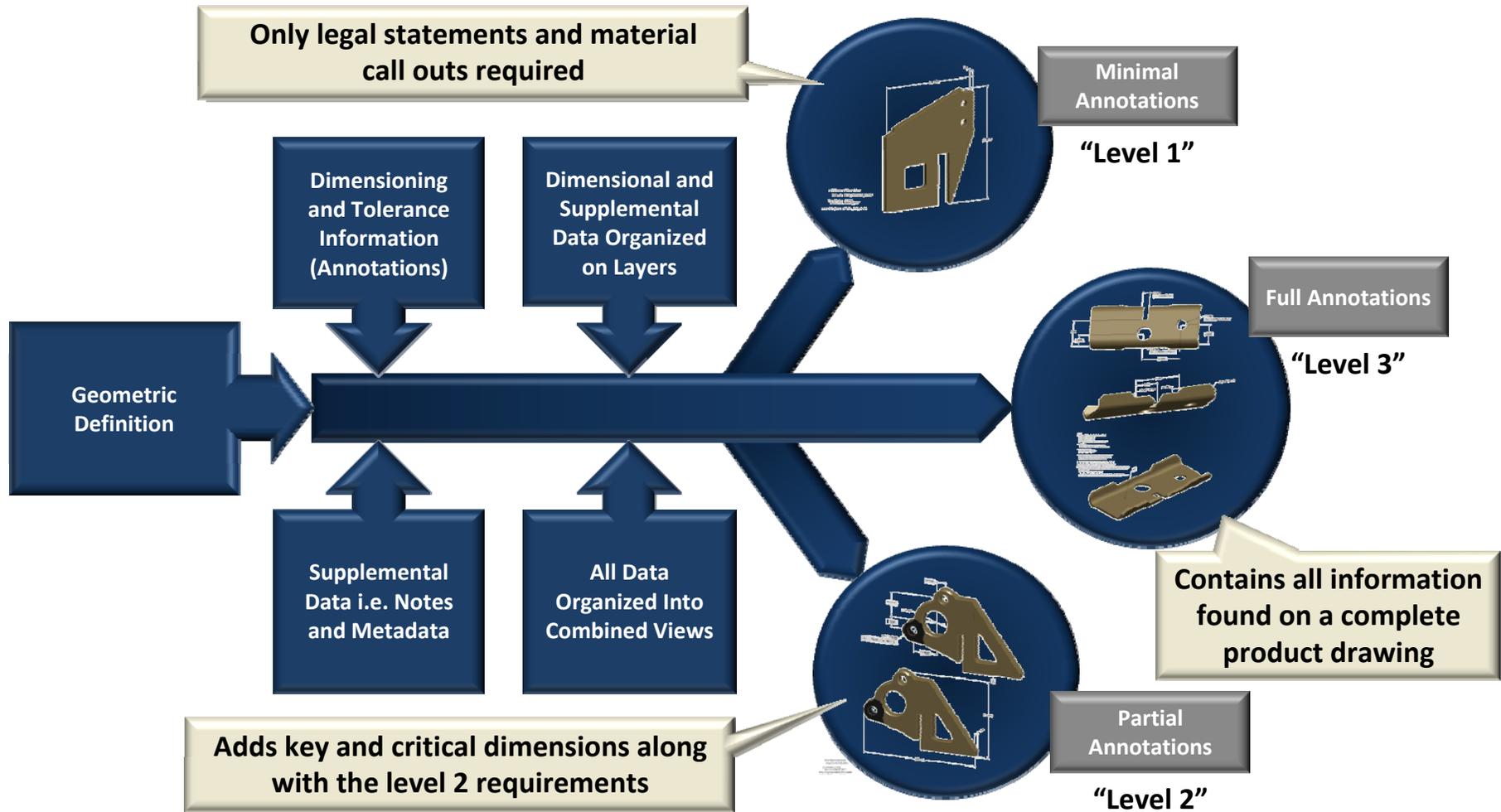
All data that is normally contained in a drawing is now available in a readable format in the Pro/E Model



Pro/E Wildfire provides increased organizational abilities through combined views and layers



# The Framework





- This project shall result in a clear 3D TDP definition enabling a more streamline acquisition process. Which will lead to an overall program reduction in lifecycle costs
- In addition a 3D TDP will result in:
  - A overall faster delivery from concept to production
  - The ability to reuse data throughout the product lifecycle
  - Easier to use Tech Pubs & Manuals through the availability to reuse 3D models





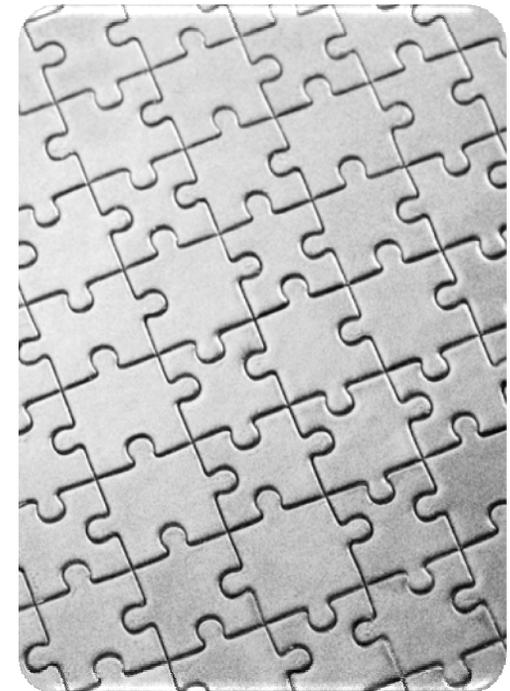
# 3D Validation

- MBE Overview
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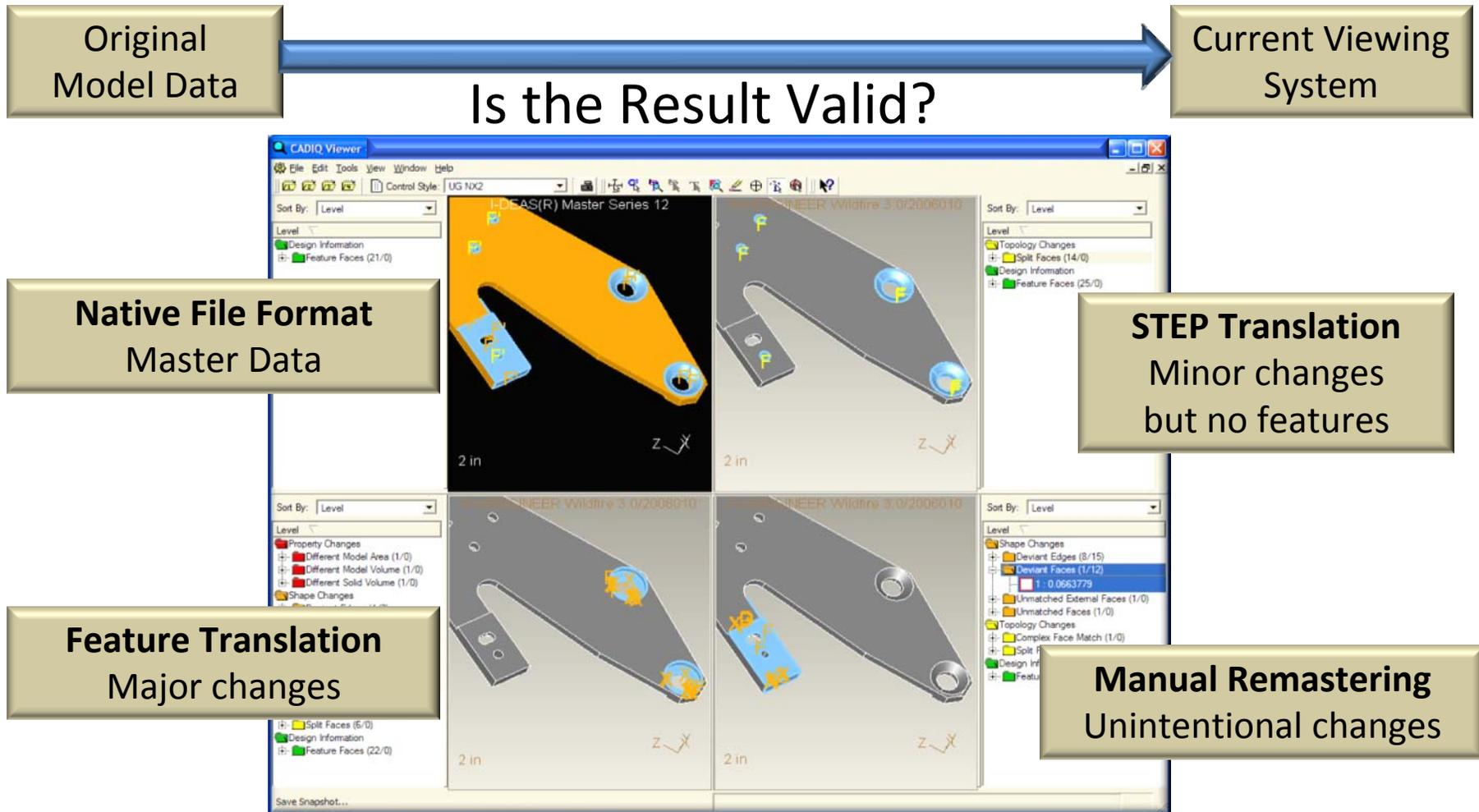
- **Currently DoD has no standardized process defining model quality**
- **Without this process there is no way to insure that the 3D model data being received will work in downstream processes**
- **Substantial time is lost though out the product lifecycle due to the need to rework low quality models**

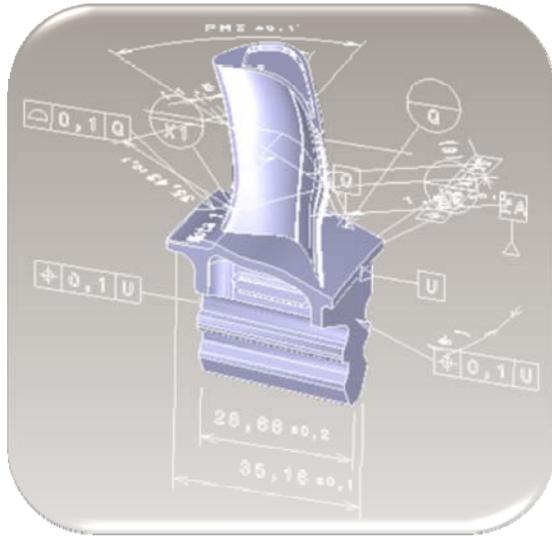


- **Identify and evaluate existing DoD, Industry and Commercial TDP standards and practices**
- **Establish a cross functional team of government and industry SMEs to develop a recommended standard process**
- **Pilot and validate the recommended process and proposed tool suite**



# Translations Can be Validated





Specialized Data  
Geometry Graphics  
Annotations (GD&T, PMI)

Model Structure

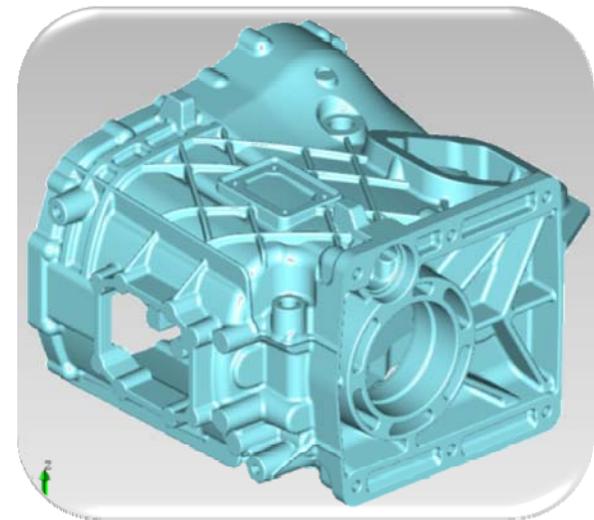
Model Attributes

Geometry Attributes

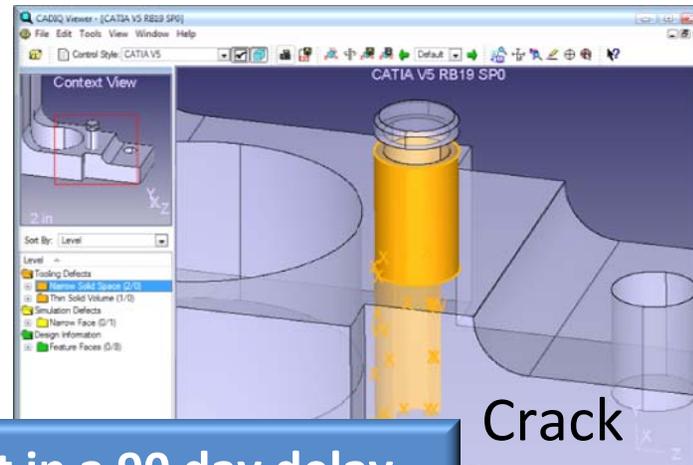
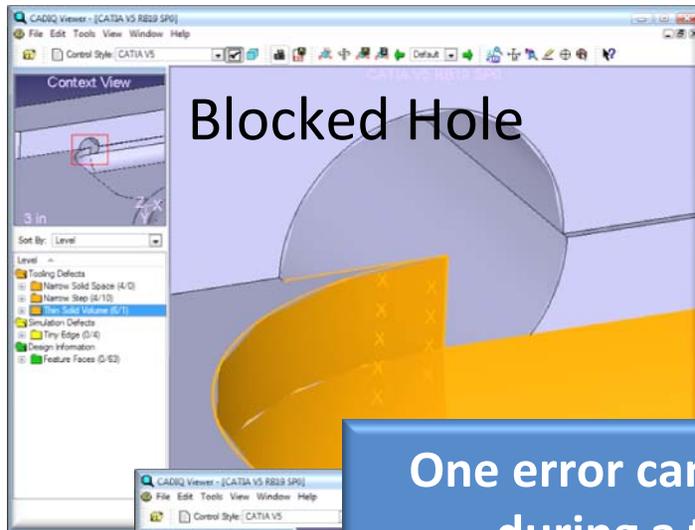
Wireframe Geometry

Solid & Surface Geometry

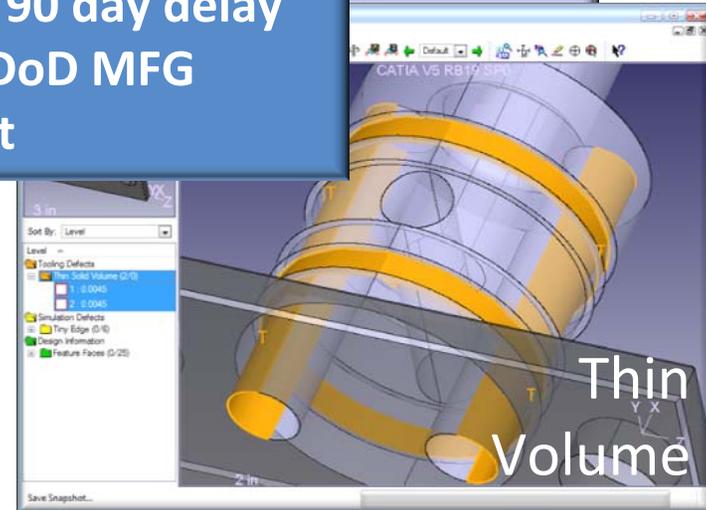
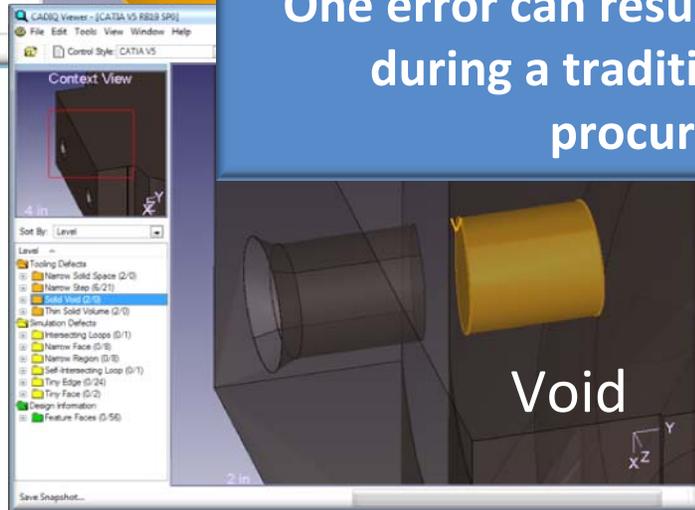
Metadata



# Examples of Bad Quality



One error can result in a 90 day delay during a traditional DoD MFG procurement



- **This project shall result in a unambiguous set of requirements defining an acceptable level of model quality for use in contractual documents**
- **In addition these requirements will result in:**
  - **A reduction in downstream error rates thus reducing the time to mission**
  - **A dramatic increase in the ability to reuse data throughout the product lifecycle**
  - **Clear and consistent expectations between the government and industry**





# Other Topics

## Other Related Projects

- MBE Overview
- 3D TDP
- 3D Validation
- Other Topics
- Closing

- Conducted a summit at DLA – DLIS Battlecreek, MI with over 80 attendees
- Conducted a summit at Letterkenny Army Depot, PA with over 100 attendees
- Consisted of a full day of technical and business presentations intended to raise their MBE literacy
- Participants completed a survey whose results will be used to modify the content of the next summit
- The surveys also indicated that the both summits was a success by the attendees

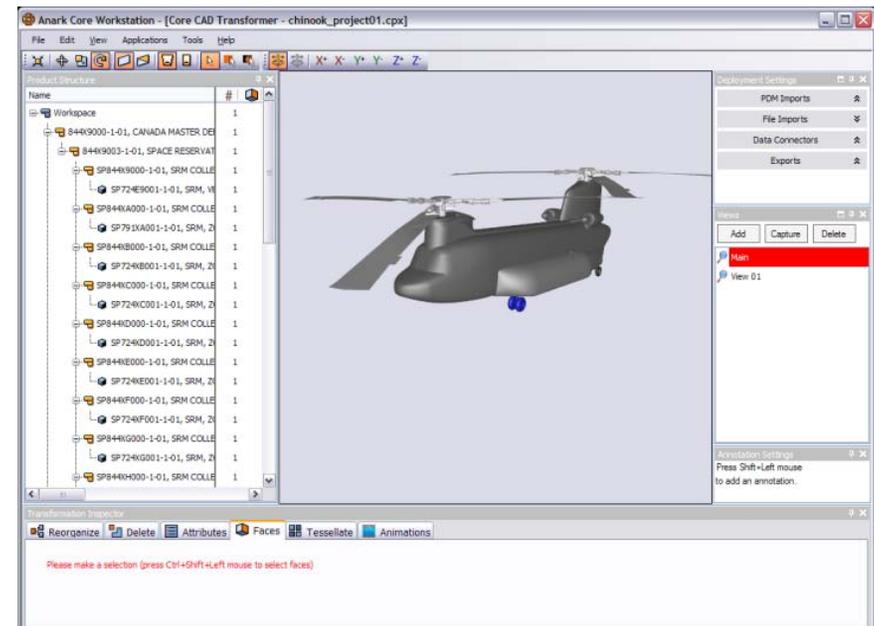


- The team has launched a MBE Website
- It is intended to act as an information source for the supply chain
  - It contains the assessment results are distributed via this site
  - Provides a information database for MBE
  - A Place to communicate to with the supply chain



[www.model-based-enterprise.org](http://www.model-based-enterprise.org)

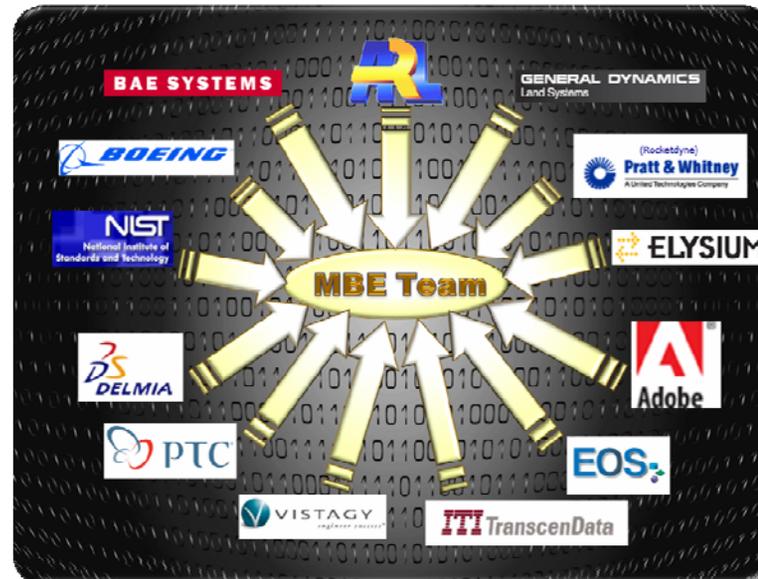
- Currently working with the Army Tech Pubs community to influence the S1000D standard to make it more graphic/visualization based as opposed to text and 2D
- Working with on a proof of concept work instruction showcasing the graphics based approach





## Original Team (2008)

This slide illustrates the key partners in defining the 3D Tech Data Package (TDP) process discussed in this presentation



## Current Members

### Govt. Partners:

**Air Force, Army, DLA, Navy, Marine Corps, NIST, NASA, USCG, and DoE/NNSA**

### Industrial Partners:

**Primes, Software Vendors, and Standard Associations**





## Closing Wrapping It All Up

- MBE Overview
- 3D TDP
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- The DoD has made a commitment to adopting MBE
- The team has made great progress towards creating a standard 3D TDP
- A process for validating 3D TDP quality is under construction
- We are committed to raising the MBE literacy throughout the supply chain and the DoD





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# Questions?



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