3D For The Enterprise
Re-Engineering Culture

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A History of Improving Patients’ Lives

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The demands of being a market and industry leader are high. Maintaining market leadership requires more than just being first to market.
- Embrace Innovation
- Challenge the current culture
- Never settle for status quo
Cultural advancements lead to innovation. The beginning…

Tools:
- Hands, Sticks and Rocks

Medium:
- Cave walls and other large rocks

Usability:
- Long life
- Limited ability to change
- Inability to share
Cultural advancements lead to innovation. The beginning…

Tools used:
- Hammers and chisels

Medium:
- Stone

Usability:
- Long life
- Limited ability to change
- Inability to share
Cultural advancements lead to innovation. The beginning…

Tools used:
  - Sharpened woods and quills

Medium:
  - Papyrus and ink

Usability:
  - Long life depending on environment
  - Limited ability to change
  - Enabled sharing
Cultural advancements lead to innovation. The beginning…

Tools used:
  ▪ T-Squares, triangles and scaled rulers

Medium:
  ▪ Paper, mylar, velum, pencils and ink

Usability:
  ▪ Long life depending on environment
  ▪ Easily shared
Cultural advancements lead to innovation. The beginning…

Usability:
- Able to update easily
- Introduction of rapid change
Cultural advancements lead to innovation. The start of a new age…

Tools used:
- Computers with 2D CAD programs

Medium:
- Paper and ink

Usability:
- Very easy to change
- Easily shared
Challenging the status quo…

Rapid Change:
  * Drawing Board vs. Computer

“I can change my drawing much faster that you can start the computer, load the drawing, make your change and plot it…”

“But your change will not automatically update the 20 other drawings that are also effected…”
We overcame the challenge and entered into the 3D multimedia age…

Tools used:
- 3D Solid Modeling Software

Medium:
- Paper and Ink
- PDF

Usability:
- Change propagates through assembly
- Easily shared
The next step - Redefining what engineering documentation should look like…

Traditional 2D drawing vs. 3D based drawings

The first challenge transitioning to 3D based drawings:

- ASME Y14.41 Product based definition
- PMI grouped by 3D Model Views
- Fully associative to 3D Solid
- Model views plotted to 2D PDF
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How we transitioned to 3D based drawings?

Determined what can be supported and what can’t…

- Cables and Harness drawing not supported in 3D Drawing due to schematic requirements
- Not all legacy data will be converted, convert data has it is updated
How we transitioned to 3D based drawings?

Developed customization to automate as much of the repetitive tasks as possible…
- Plotting and distilling of Model Views to PDF.
- Standard Model View creation.
How we transitioned to 3D based drawings?

Model Views can be plotted to a single PDF file as a replacement for a 2D drawing.
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How we transitioned to 3D based drawings?

Developed an implementation plan…

- Present the plan to Management, Enterprise and Suppliers.
- Address problems and concerns
- Complete automation for I-DEAS and EPDM
- Train Engineers and Designers
How we transitioned to 3D based drawings?

Basic benchmark of 3D vs. 2D:
- Engineering development costs can be reduced using Master Notation.
  - Baseline of 4042 changes:
    - 2D 132 hrs
    - 2D/3D: 88 hrs or 33.71%
    - 3D only: 77 hrs or 41.36%
How we transitioned to 3D based drawings?

Address problems and concerns:
- Concern that 2D drawing format is not maintained.
  - Views not organized in 3rd angle projection.
- Will 3D viewing be supported for legacy data.
  - Yes, 3D viewing is supported for any I-DEAS item in EPDM.
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How we transitioned to 3D based drawings?

3D Model View based documentation has been in place for the past 18 months.

No major problems or resistance to new paradigm.
Redefining what engineering documentation should look like…

The next step, Intelligent 3D PDF’s

Based on existing 3D data
  - ASME Y14.41 Product based definition
  - PMI grouped by 3D Model Views
  - Fully associative to 3D Solid

The only thing that changes is the output.
Overview of Intelligent 3D PDF…

3D Content:
- Dynamic and Animated Viewing
- Measure
- Section
- Multiple display modes

Intelligent:
- Understands the product structure
- Dynamically updates based on user interaction
  - 3D highlighting
  - Title Block and notes update
Overview of process and tools…

Automated process

- Detailed design in Ideas
- 3D Solid and JT data vaulted in EPDM
  “Teamcenter - Enterprise Product Data Manager”
- Product Graphics Management Server
  “DeepServer”

Enables collaboration with Suppliers and the enterprise…
Enterprise utilization of 3D data…

3D Data is accessible via a web interface:

- Viewing via 3D PDF’s and Adobe Reader 7.0.7
- JT’s available for authoring content based on 3D models
- Automated process for export to suppliers
Enterprise utilization of 3D data...

Assembly, Remove and Replace instruction created from 3D data:

- Lightweight JT data derived from 3D model.
- Accessible from EPDM
- Image creation
Automation of design changes throughout the Enterprise...

Advantage of an automated process:
- Enables changes to ripple through the Enterprise
- Automated Image updates based on Design Changes
- Automatic notification and routing
- Minimizes redundancies with bulk of work accomplished in one area
Minimum requirements to develop Intelligent 3D PDF’s

Implement ASME Y14.41 using Master Notation.

Convert ASME Y14.41 design data into JT format.

Utilize DeepExplorer, DeepServer or Acrobat 3D Publishing tools

Install Adobe Reader 7.0.7
Questions?