



PLM Vis

**custom visualization for the advancement of
in-house processes**

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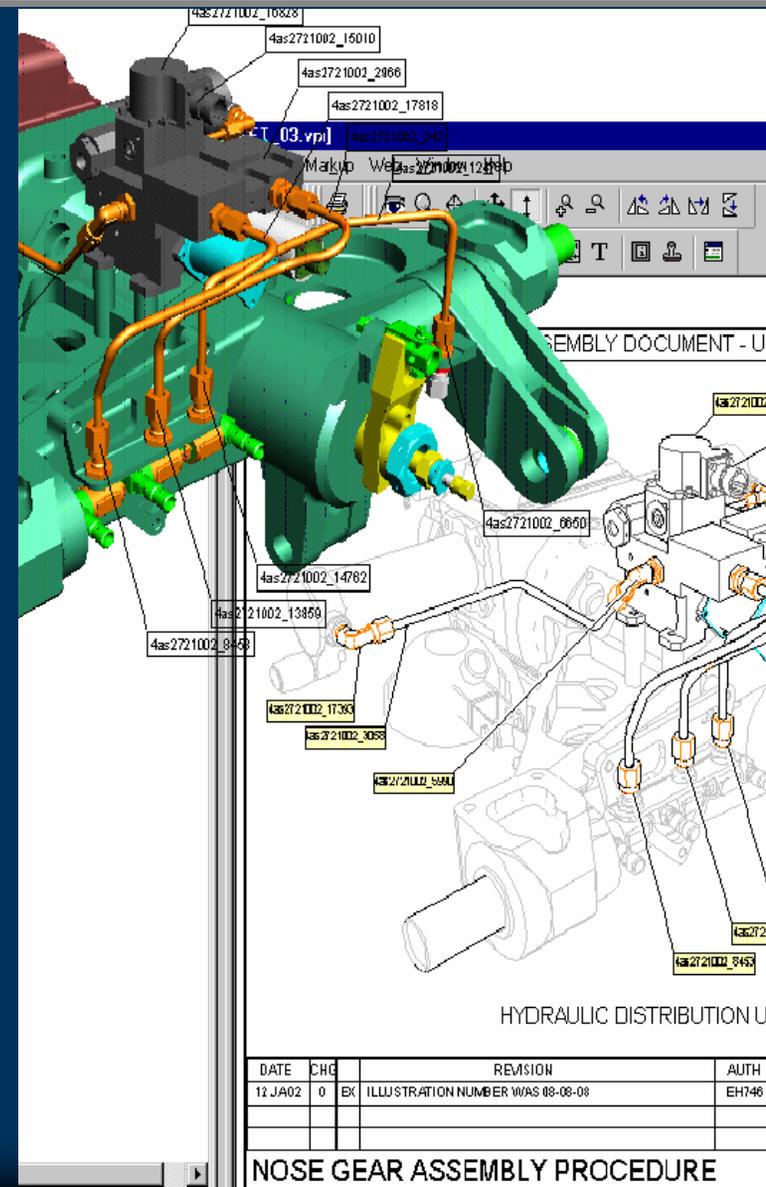
Open Tools, UGS

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Agenda

- ▶ PLM Components
- ▶ In-house Processes
- ▶ PLM Vis
 - ▶ What is PLM Vis?
 - ▶ When is PLM Vis the right solution?
 - ▶ Benefits
- ▶ Versatile Technology
- ▶ Versatile Format
- ▶ UGS uses PLM Vis
- ▶ Customer Successes
- ▶ Summary





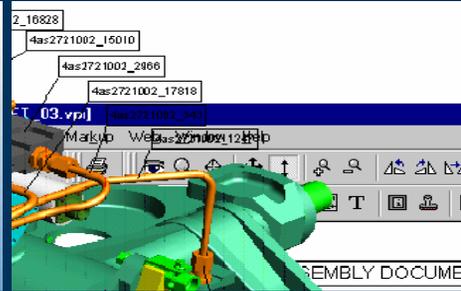
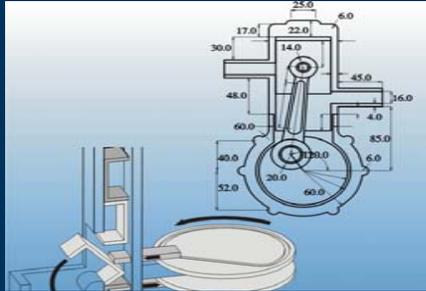
PLM Components

Parasolid

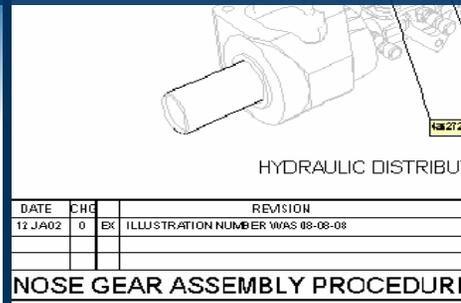
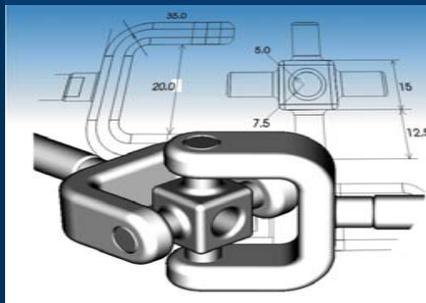
D-Cubed

PLM Vis

JT Open



- ▶ Central to UGS PLM Open Strategy
 - ▶ produce component technology, translators
 - ▶ technology available to entire PLM community



PLM XML

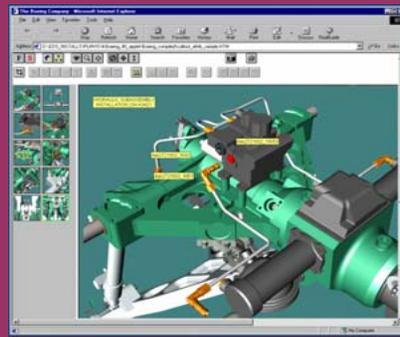


In-house processes – competitive differentiation

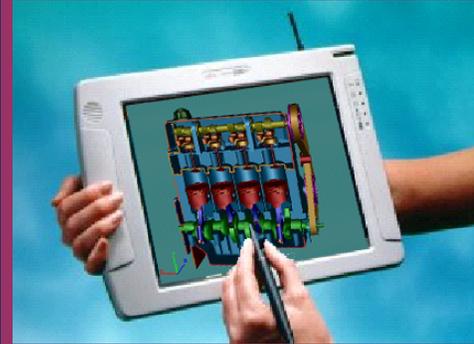
...shop floor



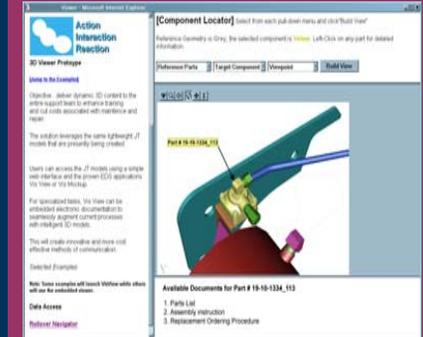
...maintenance



...field activity



...Explorer



- ▶ Reflect the company
- ▶ Evolve over time as a company develops
 - ▶ Culture
 - ▶ Methodology
 - ▶ Partnerships
- ▶ In-house software (by definition, Custom)
 - ▶ Not part of core-competency
 - ▶ Reluctantly developed
 - ▶ No suitable off-the-shelf applications
 - ▶ The “glue” that make some processes work
 - ▶ Hard to access data embedded in proprietary formats
 - ▶ Collaborating with third parties and suppliers

A stylized icon consisting of three overlapping triangles in white and light blue, positioned to the left of the text.

PLM Vis

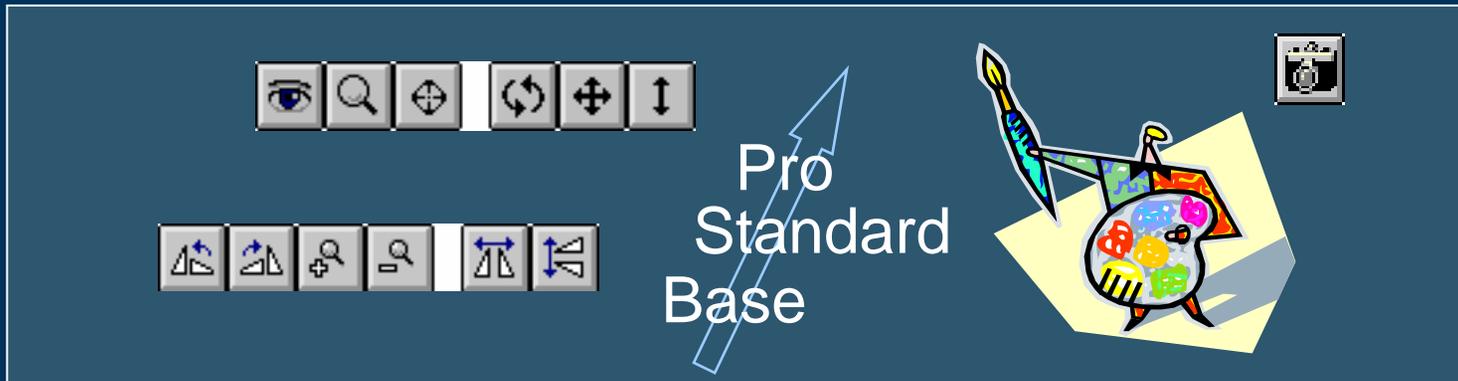
Overview



What is PLM Vis?

PLM Vis is leading-edge visualization component technology that enables:

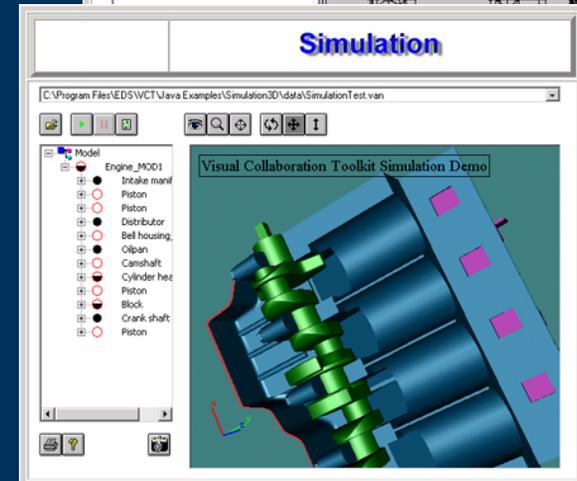
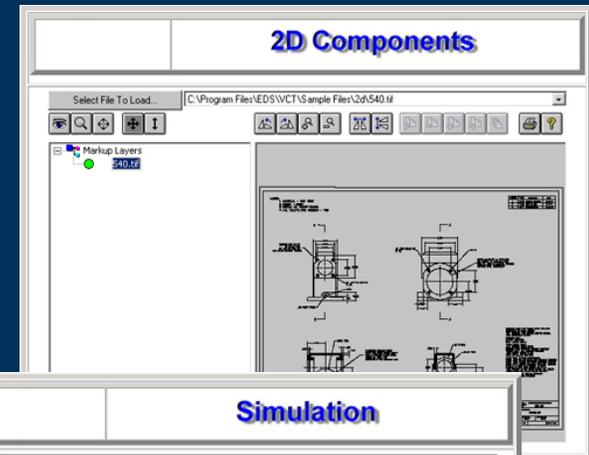
- ▶ Viewing, Interrogation, and Markup of nearly every popular 2D format as well as JT (3D), NX, Solid Edge and Parasolid XT data in a single environment
- ▶ Portable architecture – Java beans and ActiveX controls
- ▶ Rapid development of custom visualization solutions through the use of building blocks
- ▶ Seamless real-time internet & intranet collaboration
- ▶ Extending the value and reach of 2D and 3D intellectual property across the enterprise
- ▶ Broadening the scope of product data through the use of PLM XML





PLM Vis Product Line

- ▶ **PLM Vis Base**
 - ▶ 2D, viewing, navigation, image capture/export
 - ▶ 3D, simple viewing
- ▶ **PLM Vis Standard** (cf Teamcenter Visualization Standard)
 - ▶ 3D, viewing, part selection, rubberbanding
 - ▶ Save/load sessions, navigation
- ▶ **PLM Vis Pro** (cf Teamcenter Visualization Pro)
 - ▶ 3D, measure, markup, properties, appearance
 - ▶ Animation, cross-section, PMI, conferencing





PLM Vis supported file formats

http://www.ugs.com/products/open/vis/docsvis/fs_plm_file_formats_.pdf

3D formats supported

Extension	Description
jt	Common 3D format promoted by JT Open organization for enabling product visualization and information distribution and enhancing data sharing between PLM software applications. Includes data describing model's geometry, material, assembly, PMI (product manufacturing information), and other attributes.
vf	UGS Teamcenter Session file – state file that include session parameters as well as model
x_t, x_b, xmt_txt, xmt_bin	File formats used by Parasolid® – the geometric modeling kernel software that serves as popular CAD, CAM and CAE products.
prt	Model and drawing files created by NX and its predecessor Unigraphics® – UGS' integrat application.
prt	Model and drawing files created by Solid Edge® – UGS' value-based 3D CAD application Version 6).
vrml	Virtual Reality Markup Language
stl	Stereolithography format for rapid prototyping.

2D formats (cont'd.)

Extension	Description
dwf	AutoCAD Drawing Web Formats v5, v4, v3, v2
emf	Enhanced MetaFile
gbr, gbr	Gerber plot file formats RS274D and RS274X
hpg, hpgl, hp2, plt, prn	HP Graphics Language 1 and 2, HP Raster Transfer Language
igs, iges	Initial Graphics Exchange Specification
jpeg, jpe, jpg	Joint Photographic Experts Group (JPEG) is a common format for storing images.
mdl	Model file
md	MetaDataStamp
mds	MetaDataStamp
mi	HP CoCreate (not available on SGI or AIX platforms), ME10 and ME30
mlr, mil, mlr	MIL-R-28002 Type I Raster
mpc	Multi-page CALS file
ovl, v01, mrk	Markup layer
pct	Windows Paintbrush
pct	Macintosh Paint – PICT
png	Portable Network Graphics
ai, ps, eps	PostScript Levels 1, 2 and EPS
ras, sun	Bi-level Sun
rvf	Raster viewing format
dft	Solid Edge Drafting Format
tif	Tagged Image File Format
dc	TLC file format
fsx, ovx, fs, ov	TRIFF – Monochrome, single and multi-page tiled raster format
prt	NX (formerly Unigraphics) part file drawings
txt	ASCII text
zip	The files contained within the ZIP are displayed in a single multi-page 2D image window. You can navigate through the pages (files) using any of the available 2D multi-page navigation options.

2D formats

Extension	Description
906, 907	Calcomp plot file formats 906 and 907
pdf	Adobe Acrobat Document Format
bmp	MS Windows bitmap
bmp	OS/2 bitmap
c4	JEDMICS C4 tiled raster format
cgm	Binary Computer Graphics Metafile MIL-D-28003, ANSI X3.122
dgn	Microstation DGN file format (on Windows)
dxg	Autodesk Drawing Exchange Formats 2002, 2000, 14, 13, 12, 11, 10, 9
dwg	AutoCAD Drawing Versions 2002, 2000i, 2000



PLM Vis adds viewing to your applications

The screenshot displays the PLM Vis software interface, which is used for viewing 3D models and their associated BOM data. The interface is divided into several panels:

- Top Panel:** Displays the title "EWB: BOM Headers Overview" and a toolbar with various icons for file operations and navigation.
- Left Panel (Objects):** A hierarchical tree view showing the BOM structure. The root is "FORMULA 1 RACE CAR, 0001, formul...". Underneath, there are several sub-entries, including "L, 0010, ENGINE SUSPENSION", "L, 0020, FA 1 ENGINE", and "L, 0090, POTENGUSP". The "L, 0090, POTENGUSP" entry is highlighted with a yellow bar.
- Right Panel (Context):** Shows the current context information, including "Process using" (28.07.2000), "Context" (FORMULA 1 RACE CAR, 0001), and "M 00000548".
- Bottom Panel:** Contains a 3D model of a Formula 1 engine, showing the cylinders, pistons, and other components. A 2D cross-section view of the engine is overlaid on the 3D model, showing the internal components and a dimension of "pos = ~0.246in".



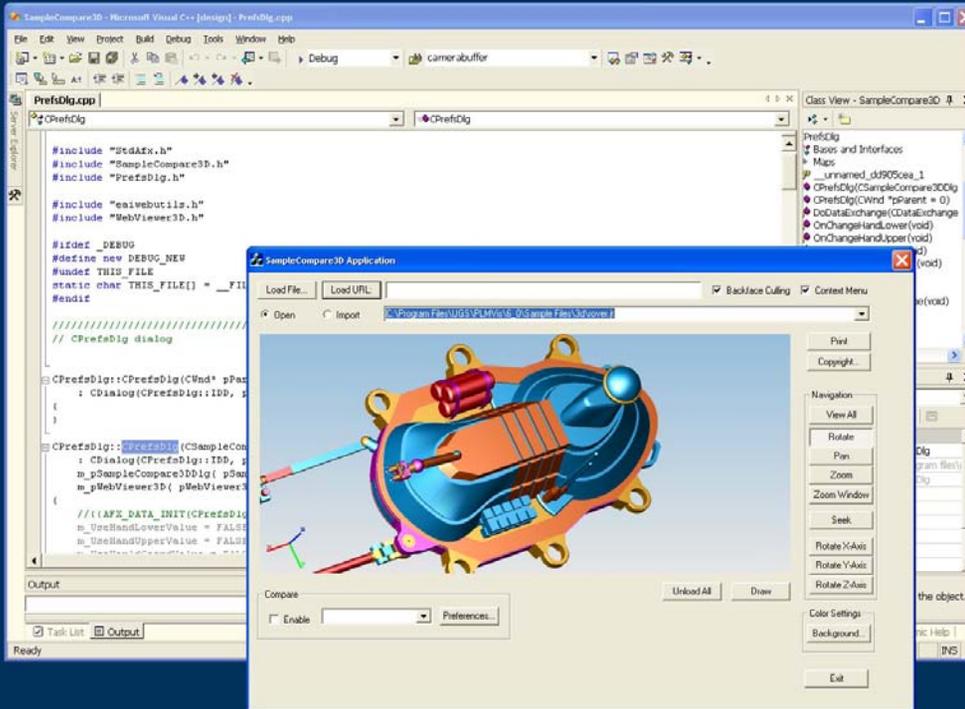
PLM Vis - Customer Benefits

- ✓ Application building is very easy
 - ✓ Drag and drop - e.g. Visual Studio, JBuilder,...
- ✓ Set of connecting building blocks that enable application development
- ✓ It is THE solution for developers when there is no off-the-shelf application that meets requirements
- ✓ Java Beans - Portable (Unix and Windows)
- ✓ ActiveX Controls - Windows optimized
- ✓ Extends the reach of JT and other 3D and 2D intellectual property in the enterprise

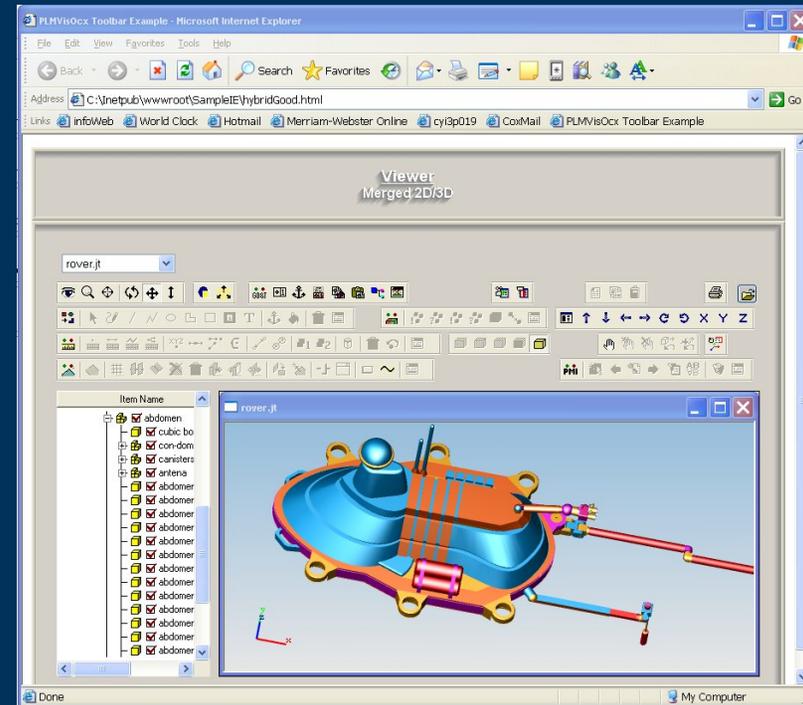


Building an application with PLM Vis

ActiveX and Java Standalone vs Embedded in Web Page



Visual Studio



Internet Explorer



PLM Vis is Highly Configurable

Action Interaction Reaction

3D Viewer Prototype

[\[Jump to the Examples\]](#)

Objective...deliver dynamic 3D content to the entire support team to enhance training and cut costs associated with maintenance and repair.

The solution leverages the same lightweight JT models that are presently being created

Users can access the JT models using a simple web interface and the proven EDS applications Vis View or Vis Mockup.

For specialized tasks, Vis View can be embedded electronic documentation to seamlessly augment current processes with intelligent 3D models.

This will create innovative and more cost effective methods of communication.

Selected Examples:

Note: Some examples will launch VisView while others will use the embedded viewer.

Data Access

[Rollover Navigator](#)

[Component Locator] Select from each pull-down menu and click "Build View"

Reference Geometry is Grey, the selected component is Yellow. Left-Click on any part for detailed information.

Reference Parts | Target Component | Viewpoint | Build View

Available Documents for

1. Parts List
2. Assembly instruction
3. Replacement Ordering

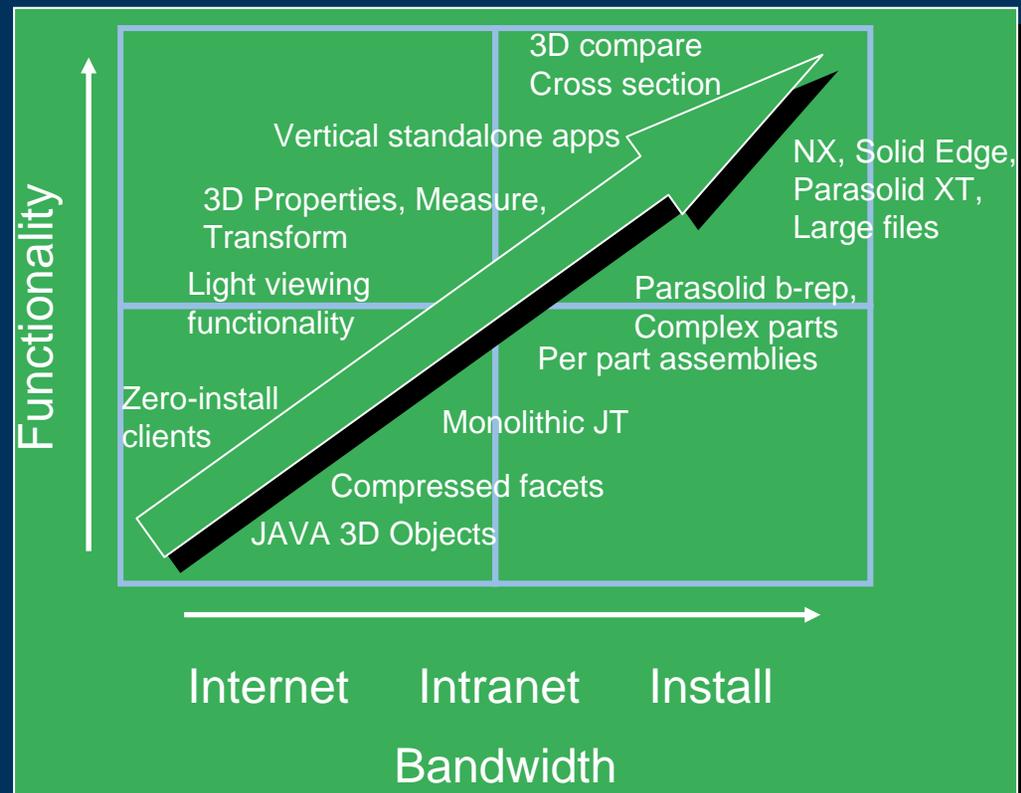
The Boeing Company - Microsoft Internet Explorer

Address: D:\EDS_INSTALLS\PLMVIS\4-Boeing_40_applet-Boeing_complex\calout_attrib_sample.HTM



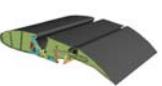
PLM Vis - Versatile Technology

- ▶ Reuse of intellectual property
- ▶ Create focused applications
 - ▶ Simpler user interface – easier to develop and use
- ▶ Scalable configuration
 - ▶ Range of functionality
- ▶ Internet
- ▶ Intranet





JT - Versatile Format

Model	Bodies	Faces	CAD File	JT File		
				Design Quality	View Query	View Only
	9	165	XT - 247 Kb	10,658 fct 302 kb	7,389 fct 112 kb	13,142 fct 39 kb
	56	1293	XT - 346 Kb	74,904 fct 1208 kb	36,363 fct 242 kb	56,669 fct 59 kb
	394	7596	NX – 48 Mb	313,160 fct 4427 kb	226,967 fct 1251 kb	553,740 fct 479 kb
	1,240	48962	NX - 35 Mb	1,371,113 fct 22521 kb	951,241 fct 1916 kb	1,543,195 fct 479 kb
	331	4390	NX - 20 Mb	184,024 fct 5672 kb	123,939 fct 2766 kb	109,094 fct 403 kb
	9	346	NX - 1.45Mb	10,447 fct 355 kb	10,429 fct 161 kb	9,500 fct 52 kb



PLM Vis and the JT Universe

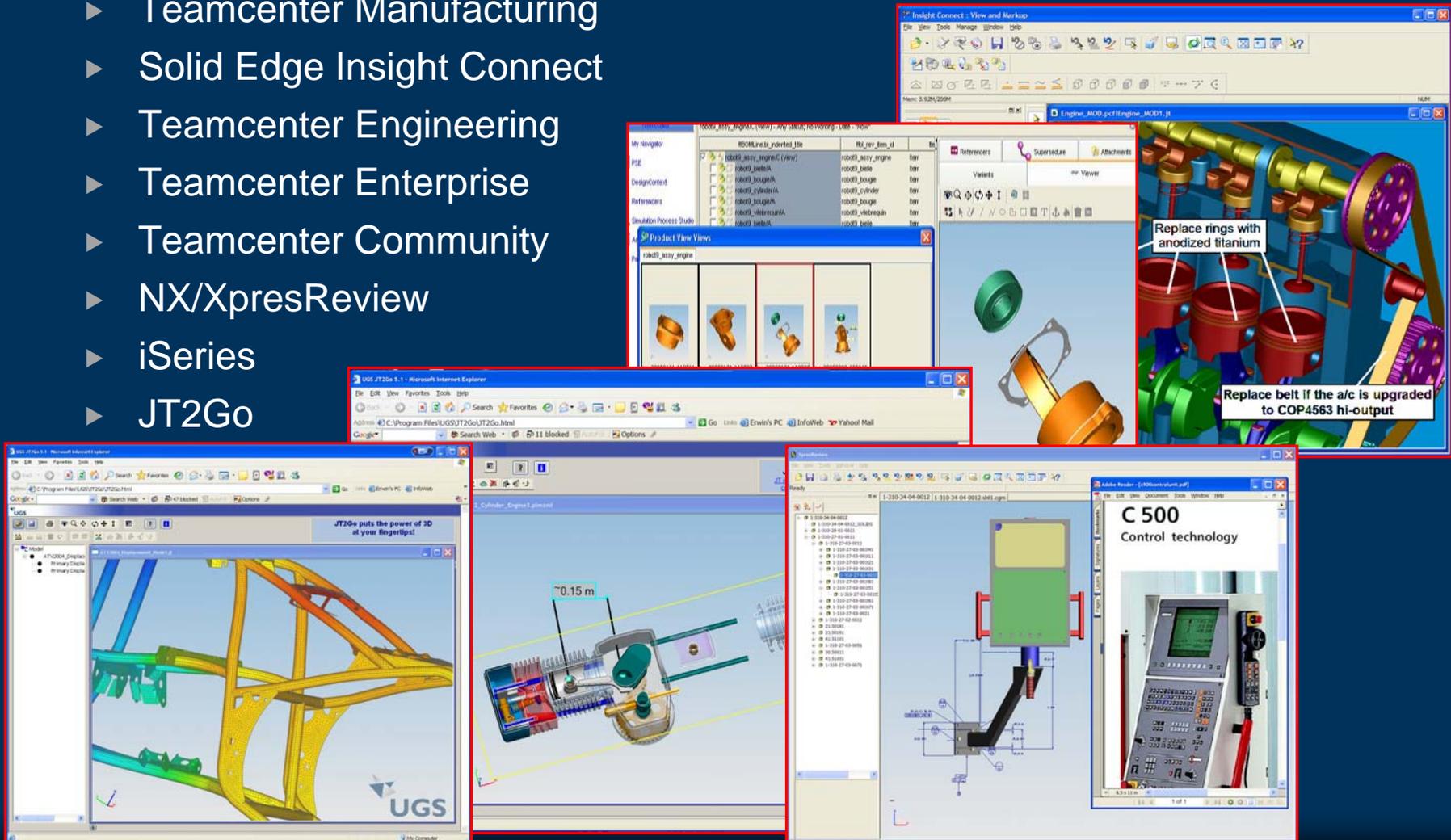
	<p>Teamcenter Visualization, Community, Enterprise, Engineering</p>	<p>PLM Vis</p>	<p>JT Open Toolkit</p>
What is it?	<p>Applications where JT visualization is pervasive</p>	<p>Component Technology</p>	<p>SDK + Business model</p>
What does it enable?	<p>Provides visualization, collaboration and management for JT formatted Data</p>	<p>Embed visualization of JT formatted data in your application</p>	<p>Enables read/write of JT data. Part of the PLM Open Platform.</p>
Availability	<p>End users</p>	<p>Level playing field</p>	<p>Level playing field</p>

PLM Vis complements the Teamcenter Visualization products



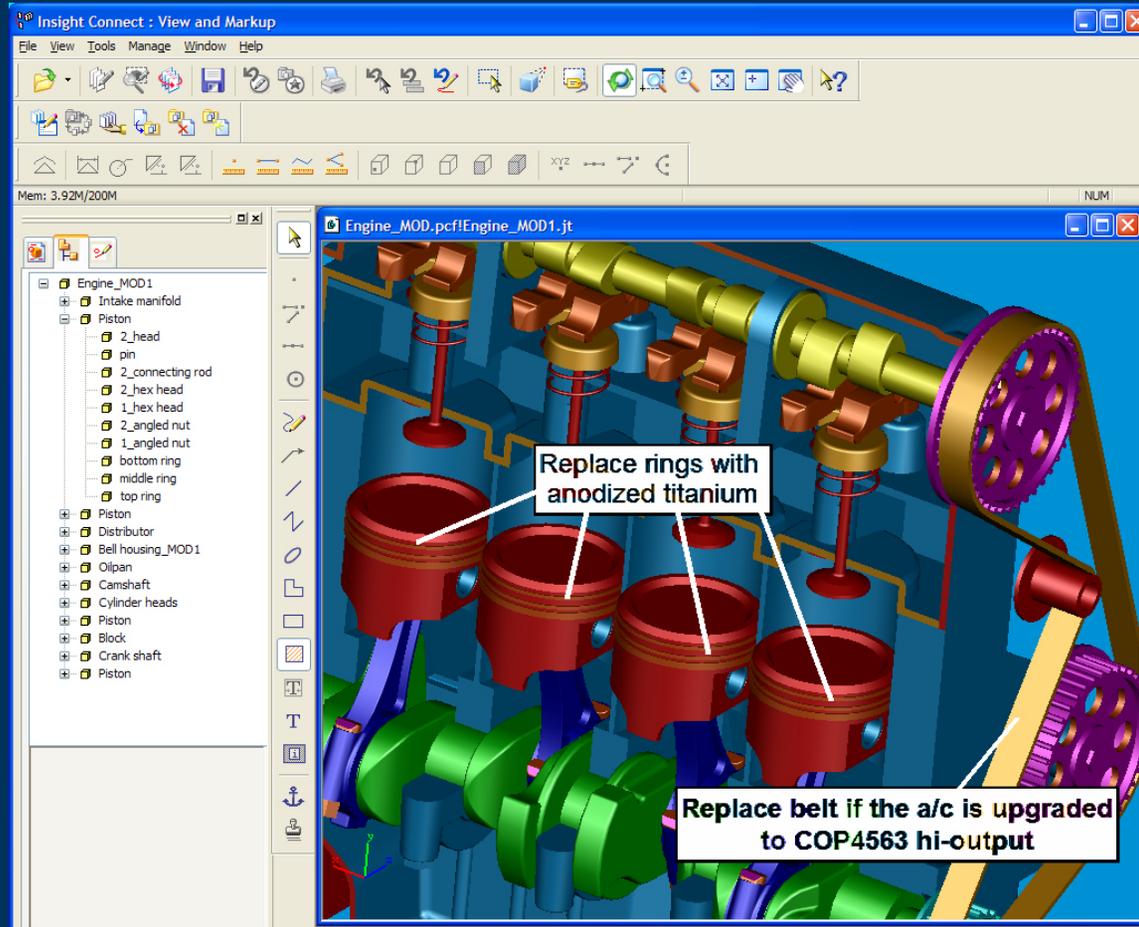
UGS' common visualization component technology

- ▶ Teamcenter Visualization enabled through PLM Vis:
 - ▶ Teamcenter Manufacturing
 - ▶ Solid Edge Insight Connect
 - ▶ Teamcenter Engineering
 - ▶ Teamcenter Enterprise
 - ▶ Teamcenter Community
 - ▶ NX/XpresReview
 - ▶ iSeries
 - ▶ JT2Go



Solid Edge – Insight – View and Markup

- ▶ View/Markup PDM integration
- ▶ Supports measure and native Solid Edge, NX viewing
- ▶ Solid Edge development customized with their own functions
- ▶ PLM Vis accelerated the development of Insight Connect





JT Open Showcase - Internet Example

- ▶ www.jtopen.com
- ▶ PLM Vis provides the gallery
- ▶ Leverages lightness of JT
- ▶ 10 days to implement
- ▶ 35MByte CAD data displayed in 470KByte of JT

JT Open
PLM Open
Home

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An open platform for visualization, collaboration and data sharing across the product lifecycle

Program
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Membership
Technology
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Program

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Members

Members' Products

Membership

Technology

What is JT?

JT Open Toolkit

Documentation

JT Showcase

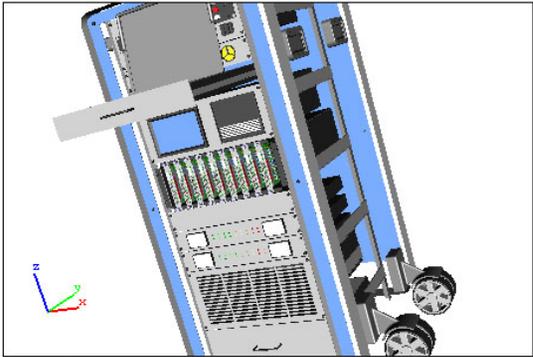
Members' Area

Technology: JT Showcase

Technology

JT Showcase

To view the JT showcase, click on the thumbnail images on the right.



Viewer Controls

- Rotate - drag(left mouse button)
- Spin about Z axis - drag(left mouse button near edge of viewer)
- Zoom - <shift>drag(left mouse button)
- Pan - <ctrl>drag(left mouse button)

Menu Controls

- Viewer Menu - right mouse over viewer background
- Model Menu - right mouse over model

Click on the thumbnail images to view the JT showcase.

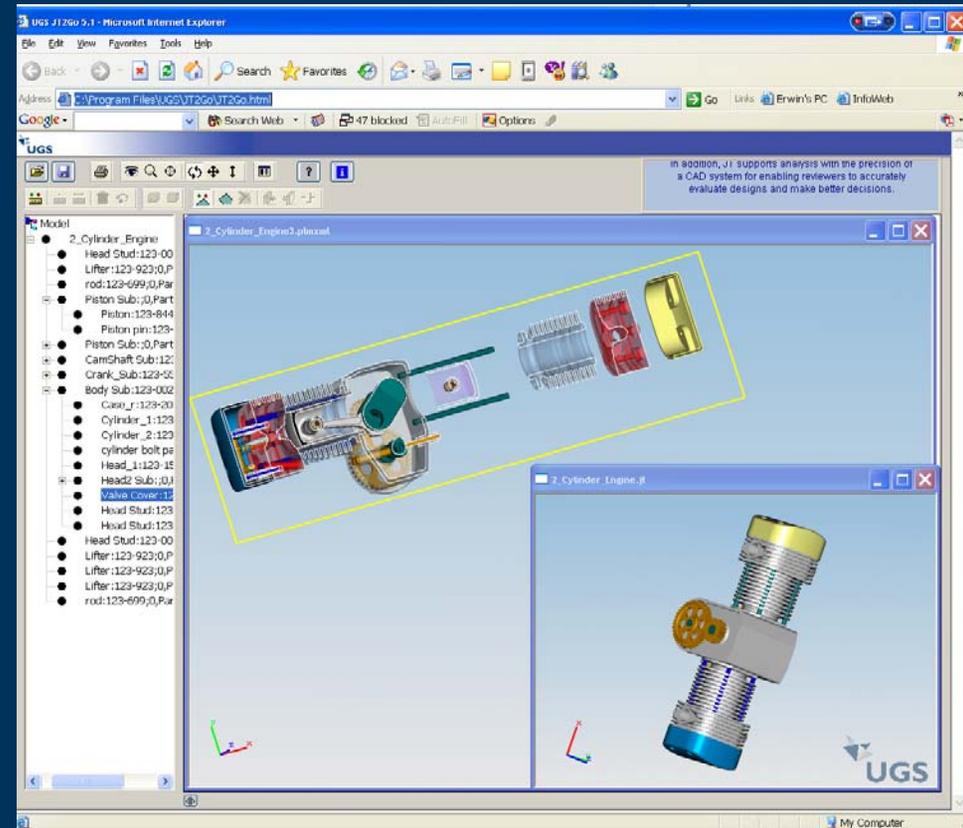
-  55 K B
13,142 Δs
9 Part
-  61 K B
56,669 Δs
56 Part
-  69 K B
12,089 Δs
1 Part
-  73 K B
10,534 Δs
12 Part
-  86 K B
20,559 Δs
16 Part
-  76 K B
9,500 Δs
9 Part
-  600 K B
553,740 Δs
394 Part
-  159 K B
77,564 Δs
159 Part
-  562 K B
1,643,195 Δs
1,240 Part
-  407 K B
199,094 Δs
331 Part
-  369 K B
185,939 Δs
40 Part
-  127 K B
16,883 Δs
6 Part

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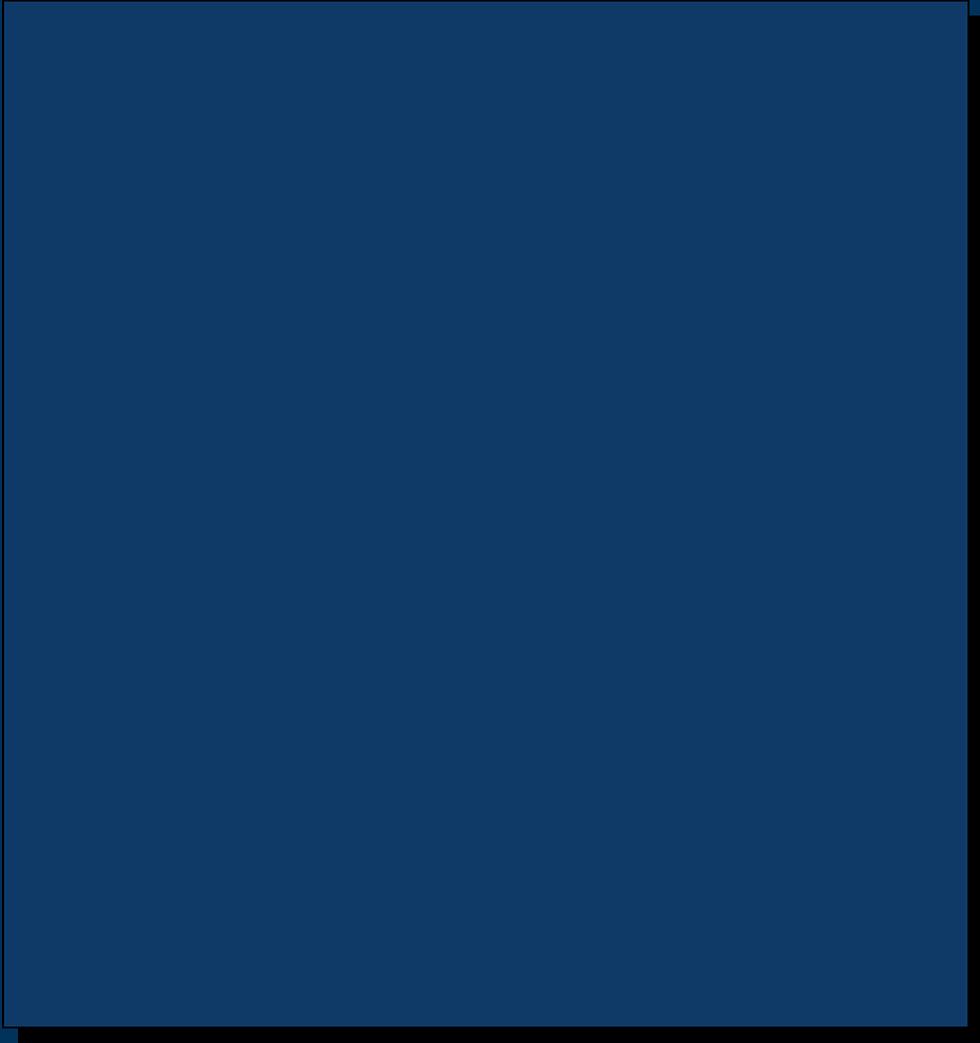
JT2Go – JT viewing for everyone

- ▶ No Charge, JT viewer
- ▶ Built with PLM Vis, same core as Teamcenter Visualization
- ▶ Natural upgrade path to Teamcenter Visualization
- ▶ Reads PLM XML CGM, TIFF
- ▶ Trial Measure and Cross Section
- ▶ View Microsoft Office JT documents
- ▶ JT Open Edition
 - ▶ Available to full JT Open members
 - ▶ Markup and Measure included
 - ▶ Publish Microsoft Office JT Documents





PLM Vis in MS Apps



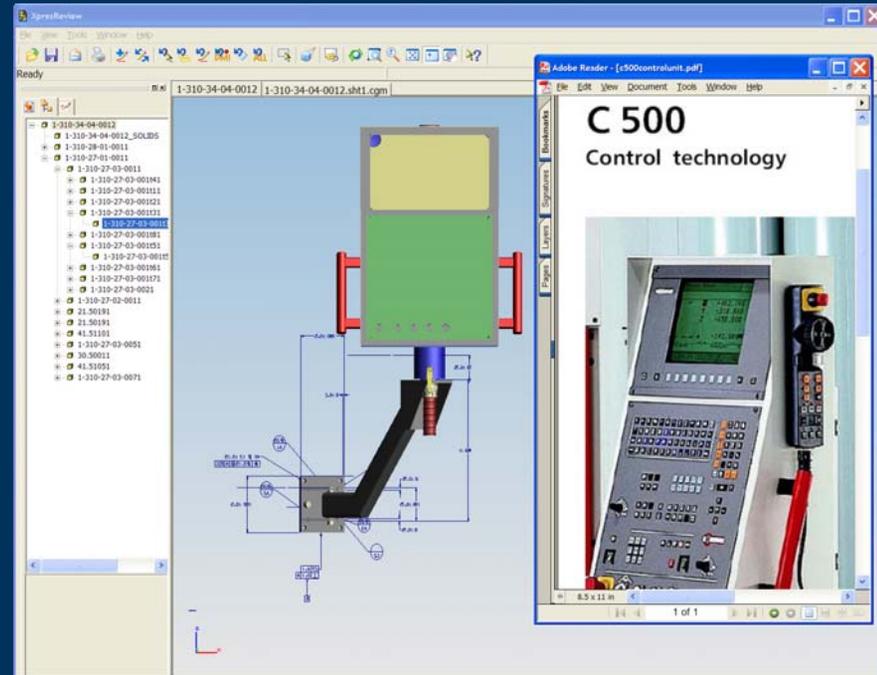
Display

Capabilities

- ▶ Electronic design/review solution
 - ▶ Both Publisher and Viewer
 - ▶ Packages data for collaboration
- ▶ Free download for viewing
- ▶ Markup/Measure/PMI/Section
- ▶ Publish models and drawings from NX
- ▶ Solid Edge supplier viewer
- ▶ Any data can be added to the packages

Why is this important

- ▶ Collaboration beyond the enterprise that is cost free down the supply chain
- ▶ Rich bi-directional information exchange without an NX license
- ▶ XpresReview publisher shows NX user exactly what supplier will see
- ▶ Complete package that includes any supporting documentation in a single email attachment





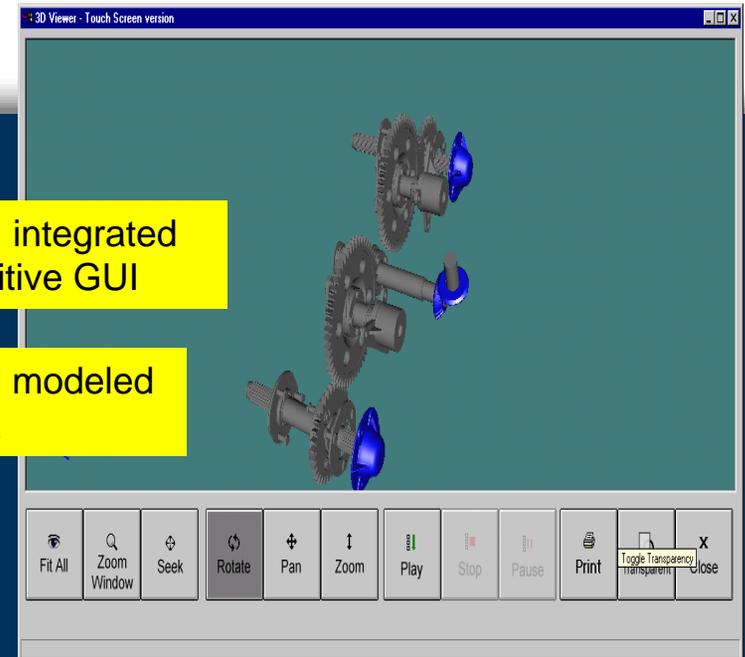
Client Successes



Shop floor

dirty environment, integrated with a touch-sensitive GUI

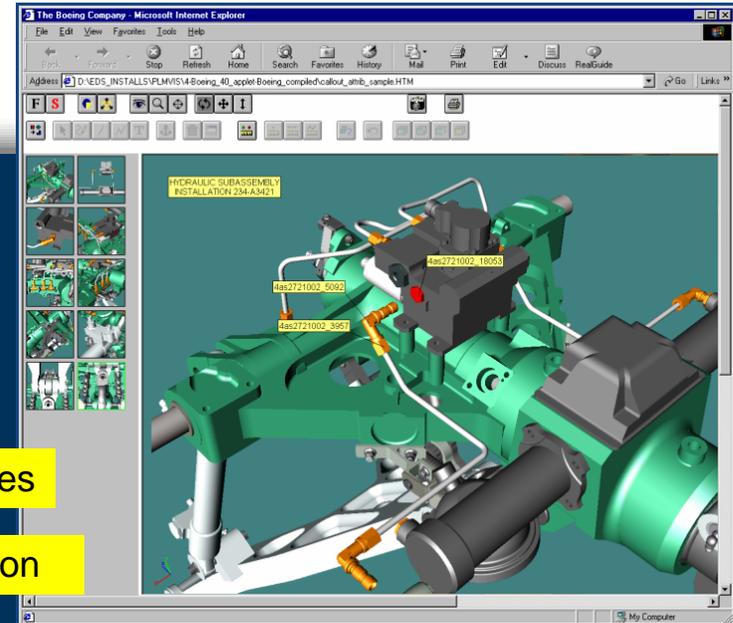
Simple UI modeled on a VCR



- ▶ In-house development
- ▶ Shop floor application
- ▶ Dirty environment, no mouse, no keyboard
- ▶ Use TC Vis, Engineering and Pro-E in harmony. “Open by design” at work.
- ▶ Example of PLM Vis and TC Vis complementing each other
- ▶ Simple user interface, modelled on the VCR
- ▶ Application walks animations, demonstrating “how to”



Maintenance



- ▶ In-house development
- ▶ Shop floor application
- ▶ UG NX user
- ▶ IE Explorer leveraged to facilitate data accessibility/distribution
- ▶ Electronic manual is always current.
- ▶ Thumbnail images provide visual indexing
- ▶ Targeted user interface. Easy to learn.
- ▶ Cost effective desktop solution
- ▶ Application walks animations, demonstrating “how to”

Vis Publish palettes

IE extension

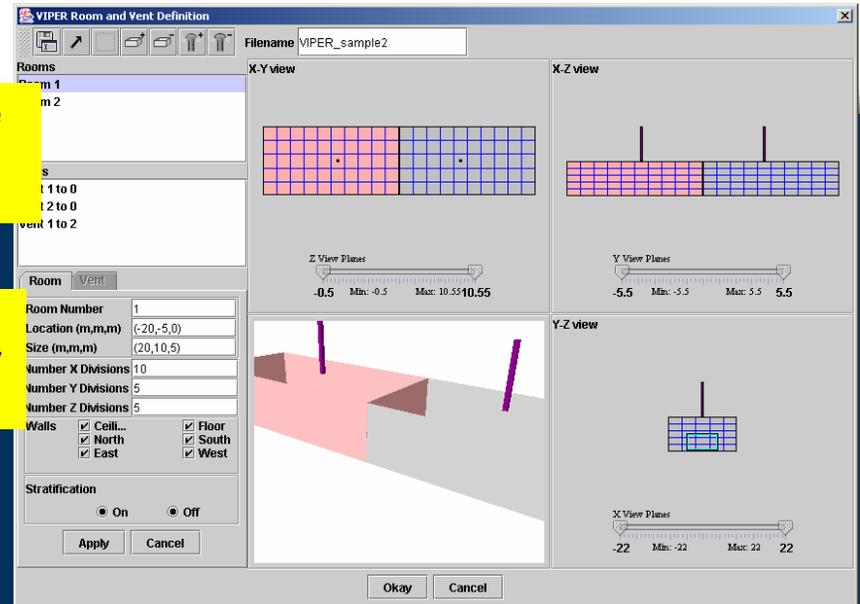


Simulation

Application focuses on core competency. Models designed in CAD program

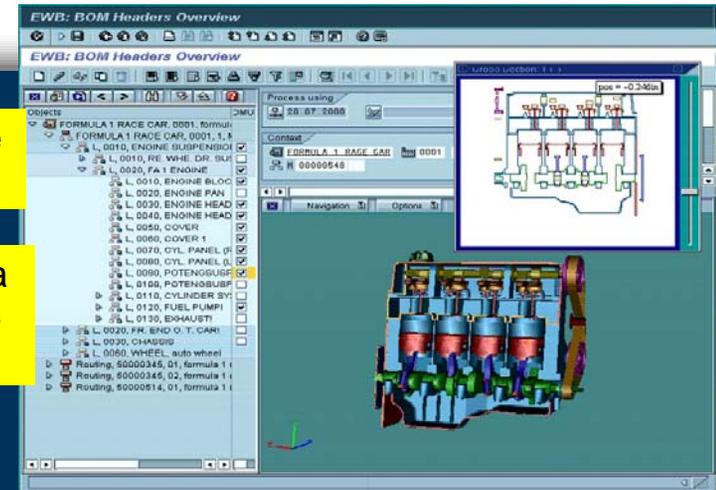
MultiCAD support for models from a variety of sources

- ▶ In-house development
- ▶ Parasolid/PLM Vis combination
- ▶ Highly specialized defense application
- ▶ No commercial equivalent available
- ▶ Supports Java and ActiveX
- ▶ Able to read a variety of formats including JT, UG NX and Parasolid XT



Customer focus on core competency of PDM

Adds viewing of a variety of formats to application



- ▶ PLM Vis frees customer to concentrate on core competency
- ▶ Customer retains total control over the look and feel of the application
- ▶ Added new formats without having to write a single line of code to interpret the data.
- ▶ Displays every popular 2D format as well as the 3D formats JT, UG NX, and Parasolid XT

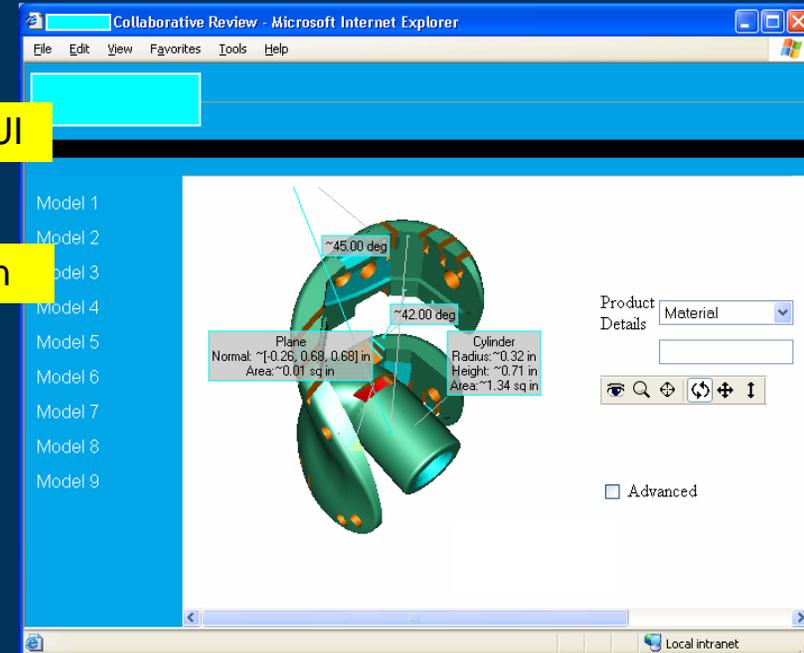


Medical specialist collaboration

- ▶ Collaborative Application
- ▶ Production of orthopaedic implants
- ▶ Author with UG NX
- ▶ Often collaborate with surgeons to verify the fidelity of an implant
- ▶ Surgeons can log in over the Internet and use an ordinary IE explorer that automatically downloads PLM Vis and provides a customized view of the data
- ▶ PLM Vis' view markup capabilities provide surgeons the means collaborate and critique the implant design

Targeted UI

IE extension

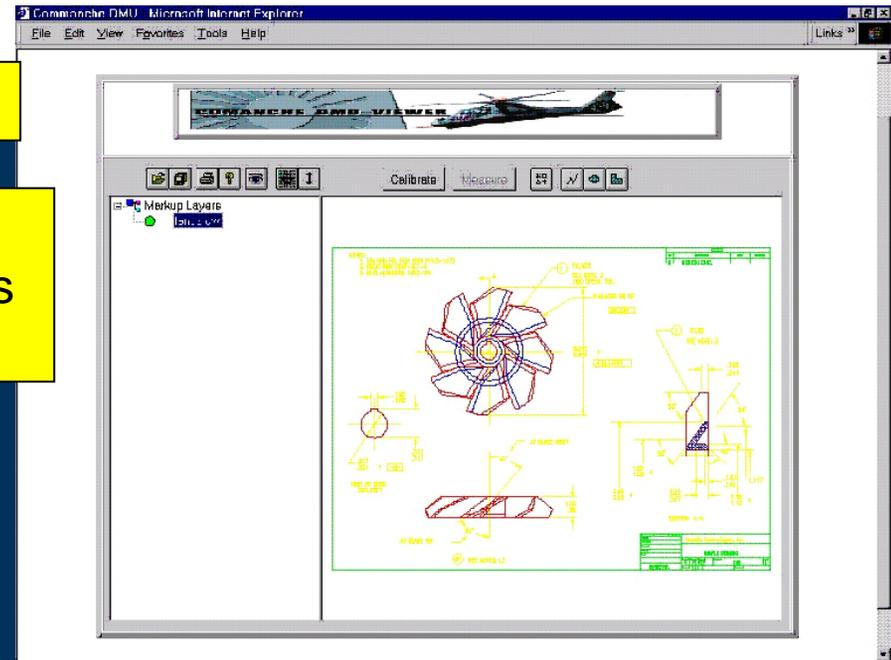




2D Design

Targeted UI

2D compare rapidly shows the differences between drawings

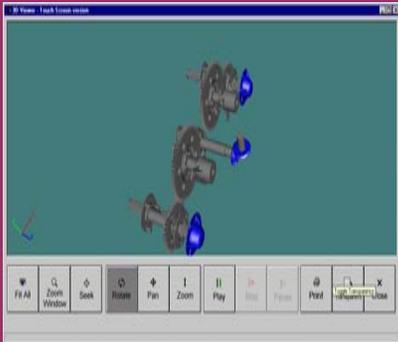


- ▶ PLM Vis supports all the popular 2D data formats
- ▶ Another example of extending Internet Explorer
- ▶ Cost effective desktop solution
- ▶ Targeted user interface. Easy to learn

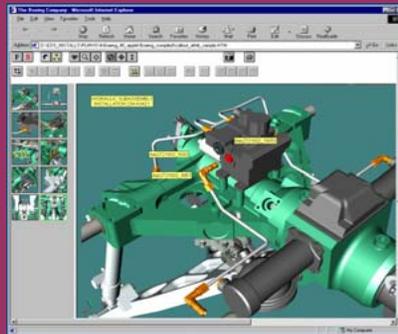


PLM Vis increases productivity

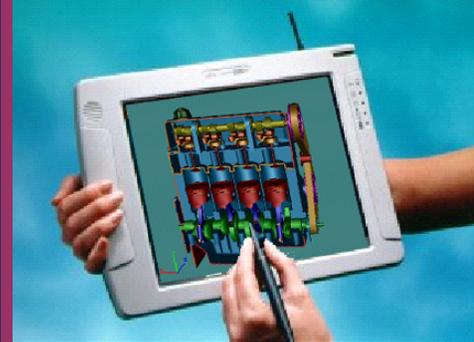
...shop floor



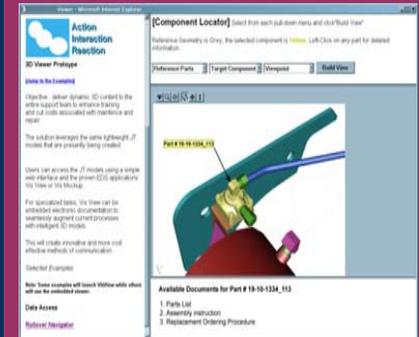
...maintenance



...field activity



...IExplorer



PLM Vis

- Components that add visualization
- Extend in-house applications, IExplorer
- Portable – ActiveX Controls as well as JavaBeans
- High level abstraction – develop in days not months
- View markup, navigation, simulation, sectioning...
- Supports view/publish paradigm
- Rapid deployment means fast payback