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What's Happening in Collaborative Engineering?

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Agenda

The emerging importance of Collaborative Engineering

What are the Tools

How does a company begin to adapt this technology

What are the risks and cautions

What's next

The Emerging Importance of Collaborative Engineering

Concurrent vs Collaborative Engineering

Designs getting more complex

Product life getting shorter

Time-to-market driving factor

Other benefits

Engineering and the Web

- Enables data to be kept current
- Workers can retrieve information as needed
- Reduces costs associated with making and distributing physical documents
- Provides common tool for retrieving data from a variety of computer types
- Data can be distributed seamlessly on a web-like network

Source: "Computer Aided Design report" April 1997



Some Collaborative Engineering References (Books)

Crabb, Dr. Howard C, "The Virtual Engineer", 1998, SME

Machover, Carl, "The CAD/CAM Handbook", 1996, McGraw-Hill

Mills, Anthony, "Collaborative Engineering and the Internet", 1998,
SME

Thomas, Brian J., "The Internet For Scientists and Engineers", 1997,
SPIE



Some Collaborative Engineering References (Articles)

•Editor, " Collaboration, Internet Style" ,IEEE Internet Computing, Mar-Apr1999

•Port/Kaiser, " Collaborative Technologies for Evolving Software Systems,
IEEE Internet Computing, Nov-Dec 1998

•Laiserin, J, " CAD and IP:Architects Using the Internet" Computer-Aided
Engineering, Apr 1998

•Mollen, R " Innovation in CAD/CAM Collaboration" Intergrated Design and
Manufacturing, Sept 1997

•Potter, C " Engineering on the Internet" . Computer Graphics World. Aug 1996

•Vacca, J " 3D Worlds on the Web", Computer Graphics World, May 1996







The Internet.....

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A giant, worldwide "network of networks" that allows computer users everywhere to share information with each other over high-speed telephone lines.

Began in the 1960's when the US government developed ARPANET

■




What is Virtual Reality?

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A new interactive technology that creates a completely (*hopefully*) convincing illusion that one is immersed in a world that exists only inside a computer

■



What is Multimedia?

Whatever you want it to be..but it usually involves an intelligent way of combining computer graphics, animation, sound, scanned images, and video so that the user can interact and get needed information most effectively

Intranet, LAN and WAN

- An Intranet is simply a small scale version of the Internet inside your company
- LAN...local area network..covers a single building
- WAN...wide area network..covers an area larger than a single building



Video Conferencing



A new tool for Collaborative Engineering




Using Videoconferencing and the Internet/Intranet



Desktop vs purpose-built video conferencing facilities

Internet vs Intranet

Hardware/software/system requirements



Representative Technologies/Suppliers

Hardware

..displays(HMD stereo, conventional), input devices (gloves, 3- and 6D, trackers), computing resources, videoconferencing,, rapid prototyping, and others

Software

..collaborative engineering, VR operating systems and tool kits, others

Systems

..turnkey, constructive, others

Services

..VR labs, consultancies, design services, publications, others

Representative Industry Players-Workstations

Apple

DEC

Evans and Sutherland

Hewlett Packard

IBM

Silicon Graphics

Sun



Representative Industry Players- CAD/CAM Software

Altium

Ashlar

Cadkey

Dassault

ESRI

IBM

Matra Datavision

MICROCADAM

SDRC

Autodesk

Bentley

Computervision

EDS Unigraphics

HP

Intergraph

MCSI

MSC

Visio



Representative Industry Players- Collaborative Engineering

CoCreate(HP)

C-TAD

Future Labs

MatraDatavision

SGI

Sun Microsystems

Evolv

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Cimlinc

Division

Insoft

SDRC

Spectrographics

CSWL, Inc


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Interactive Data Access







Representative Industry Players-Commercial and Public Domain VIZ Software



Visual Numerics
Advanced Visualizer(Wavefront Technologies)
AVS(AVS, Inc)
IDL(Research Systems, Inc)
IRIS Explorer(SGI)



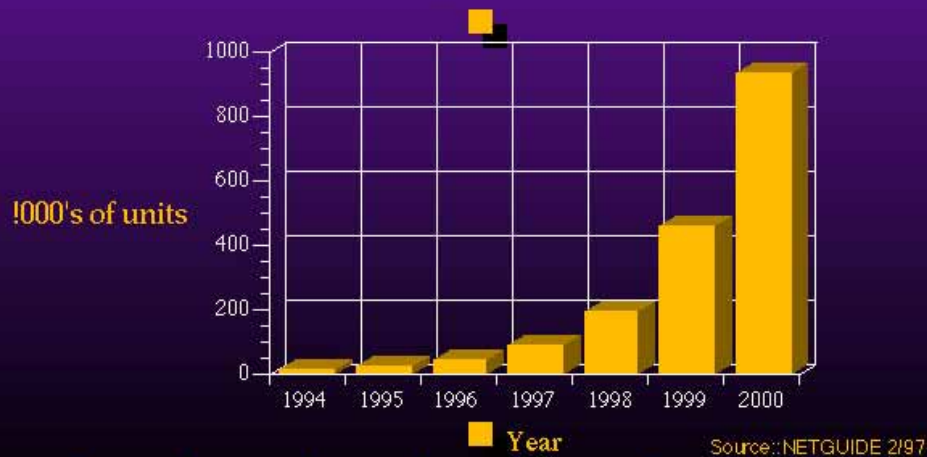
Representative Industry Players-Videoconferencing



Intel ProShare
PictureTel Live 200
CorelVIDEO/CorelCAM
MultiLink System 80
SGI Inperson
IVC LANscape
Target Technologies C-Phone



Desktop Videoconferencing Systems (Shipments)



Representative Industry Players-Rapid Prototyping

Stereo Lithography

Laminated Object

Selective Laser Sintering

Fused Deposition Modeling

Solid Ground Curing

3D Systems

Helisys

Sparx

DTM

Stratasys

Sanders

Cubital

Source: "The CAD/CAM Handbook"

Representative Industry Players-HMD (Head-Mounted Displays) and other displays

General Reality Company

Dimension Technologies

Forte Technologies

n-Vision

RPI Advanced Technology

Liquid Image

Victormaxx Technologies

Artificial Realities

Kaiser Electro-optics

Fake Space Labs

Kopin

Leep Systems

Reflection Technologies

Stereographics Corporation

Virtual I/O

Virtual Research

Panoram Technologies

Representative Industry Players-Position Input Devices and Trackers

Ascension Technology Corp.

Exos

Logitech

Polhemus, Inc.

Spaceball Technologies

Virtual Technologies

Elographics

ISCAN

Pixsys


SimGraphics

SenAble Devices


Paradigm Shift R&D



Representative Industry Players-Sound Input Devices



Focal Point 3-D Audio
Media Vision
Spatial Sound
Virtual Audio Systems



Representative Industry Players-Systems



Abrams Gentile Entertainment	Superscape
Digital Image Design	Dimensions International
Division Ltd.	Landmark Entertainment
Mandala VR Systems	Visions of Reality
Green Mountain Optics	RPI Advanced Technology
Virtual S Limited	W. Industries Ltd.
Alternate Realities	Straylight
MultiGen	VREAM





Some Vendors offering Collaborative CAD/CAM/PDM products

Bentley Systems

CoCreate Software Inc.

IBM/Dassault Systems

Integrated Data For Management (IDFM, Inc.)

Parametric Technology Corporation

Spectragraphics

Universal Technical Systems



What are the Risks and Cautions

Security

Pilot Program

Generating Confidence

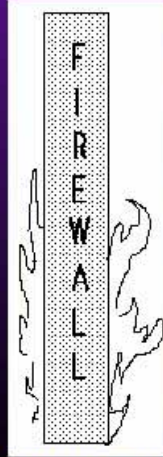


Firewall

INTRANET

Productivity Enhancement

- Internal e-mail
- Collaborative processing
- Order processing
- Access Enterprise memory
- Personal Pages
- Dept. Pages
- Group Communications
- Enterprise Communications
- Product & Co. info



INTERNET

Productivity Enhancement

- External e-mail
- Product Company Info
- Place Orders
- Research

EXTENDED INTERNET

Productivity & Business Enhancements

- Order Tracking
- Order fulfillment
- Customer Support
- Transactions

BUSINESS ENHANCEMENT

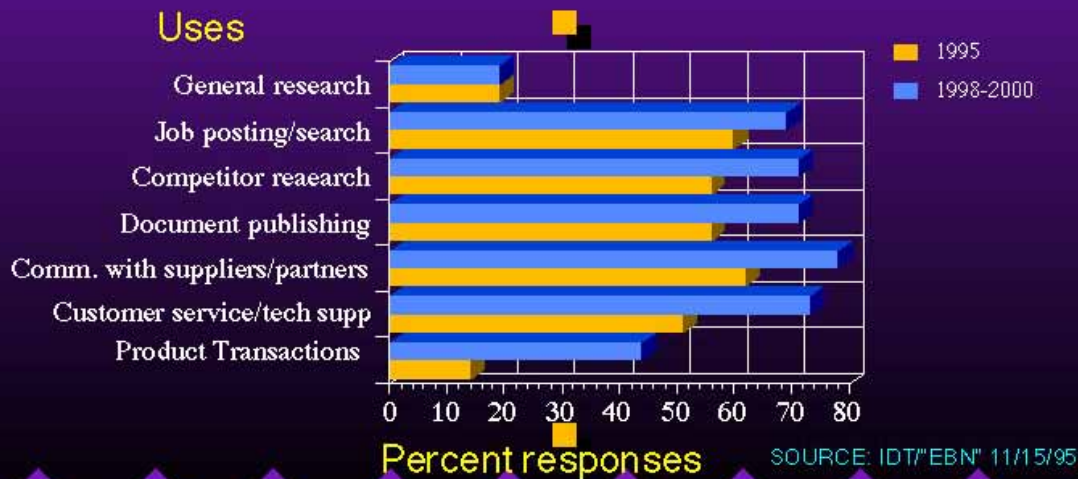
- External Presence
- Outbound Marketing
- Catalogs, Product Info
- Order Placement

Source: Zona, Inc., special advertising section "Building an Intranet Inside your Company" (Datamation?)

What's Next

We are entering era when users are reluctant to purchase a workstation without multimedia capability...just as now, almost everyone buys color

Current and Future Internet Uses



What Can We Expect in the Near Future?

- Wider use of Multimedia
- Improved Virtual Reality
- Easier-to-use tool kits
- More application-specific software
- Specialized processing cards
- Improved video output
- Expanded KBE capability
- Increased ease of handling large and diverse data sets
- More visualization and CAD conferencing on the 'Net
- Hardware price-performance continues to improve

What Can We Expect in the Near Future?(Cont.)

- AVS application modules w/additional sense feedback
- Growing technical applications
- HDTV-like display resolution
- Improve/eliminate bulky HMD technology
- Low cost motion simulation
- Physically-based modeling

What Can We Expect in the Near Future?(cont.)

Improved low-cost, real-time photorealistic capability

Nintendo/Sega-like processors

Significant price reductions

Tactile I/O devices

Utilize eye-trackers

VR workbench

World-building services