

# Ecma TC43: Universal 3D

Ecma GA - June 29, 2004

Sanjay Deshmukh, Intel  
TC43 Chair

# Agenda

- **Problem Statement – Why Universal 3D Now?**
- **Challenges and Usage Models**
- **Historical Perspective**
- **Contributors**
- **TC43 Terms of Reference (ToR)**
- **Description & Progress Report on U3D**
- **Ecma International – Key to Success**
- **Demo**
- **Approval for Ecma TC43 & ToR?**



## Why Universal 3D (U3D) Now?

# Why U3D Now?

- **Companies are seeking better ways**
  - to communicate ideas, concepts, new products
  - improve product quality
  - reduce costs of production
  - improve time to market
  - support products throughout product life cycle
- **Interactive 3D is recognized as a powerful training and education tool**
- **Powerful servers, desktop and laptop computers that can run these applications are readily available today**
- **Bandwidth and streaming pipeline are available as well**

*...stars are aligned...*

# Why is this important?

- **Establish 3D as a common media for communication**
  - Pictures are the “lingua franca” for the worldwide economy
  - 3D is international business language
- **Interactive 3D is recognized as a powerful training and education tool**
  - U3D format (Universal 3D) as the “**JPEG for 3D**”
  - Brings the 3D domain to nontraditional users – low cost, lightweight, non-technical
- **Assist companies in capitalizing on significant IP and hardware assets and engineering investment**
  - **Repurpose CAD data for downstream applications**

# Challenges of Repurposing 3D CAD

What has held 3D back?

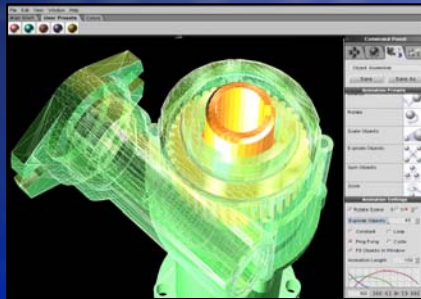
1. Bandwidth constraints
2. Requires certain skills to repurpose 3D content/assets
3. No easy repurpose path
4. Industry is fragmented



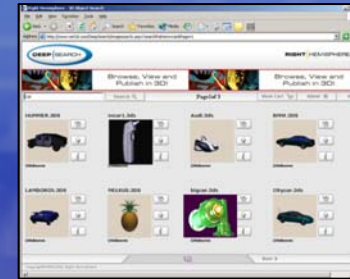
Training / Maintenance



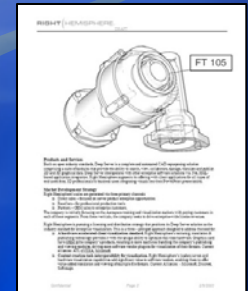
Sales & Marketing



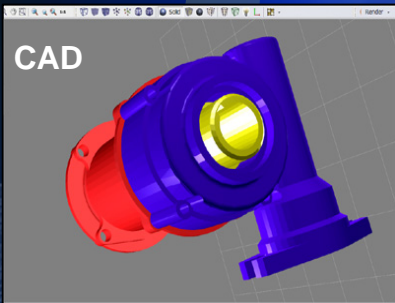
Visualization/  
Simulation



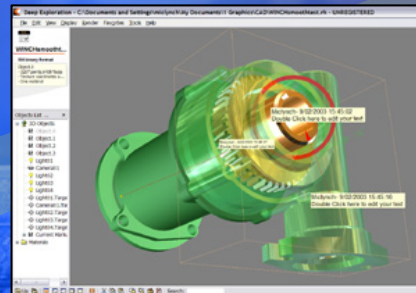
Data Management



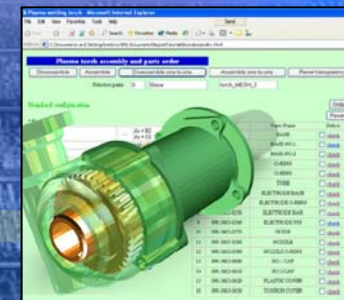
Documentation



Design / Manufacturing



Collaboration



Config / Bill of Materials

Repurpose



# U3D Target Environment

- **Task**
  - Communication
  - Visualization
  - Instruction
  - eDocumentation
- **Hardware Requirements**
  - PCs/Laptops/Servers/Handhelds
- **Software Requirements**
  - Internet browser/free plug in
- **Investment Required**
  - Viewing devices – low
  - Licenses – low, if any
  - Training – negligible
  - Installation – negligible
- **Benefits**
  - Ubiquitous communication and access to data
  - Reduced production errors
  - Improved time to market opportunities
  - Increased value of CAD
  - Lightweight and internet deliverable

*Bringing 3D  
to the  
Mainstream*



3D Industry Forum  
Bringing 3D to the  
Mainstream



# So...what's needed?

- **Industry Collaboration**
  - 3D Industry Forum (3DIF)
- **Single visualization format global standard**
  - Universal 3D
- **Enabling Technologies**
  - Run Time Libraries (RTL)
  - Sample Implementation (in 3DIF)
  - Extensibility
- **Strategy for Adoption**
  - Marketing efforts through 3DIF
  - Committed implementations by users & ISVs
  - ISO Standardization

# 3D History Roadmap

- **1998 – Project team assembled to develop 3D viewing capability**
- **2001 – Announcement with Macromedia – Director product supports 3D**
  - target usage models – gaming, consumer retail, online shopping
- **2002 – Intel research confirms need for access to CAD data for mainstream usage**
- **2002 – Forms working group under Web 3D Consortium and develops format specification**
- **2003 – 3D Industry Forum Established**
- **2004 – Formal announcement of 3DIF and Ecma International relationship**
- **2004 - Today – Approval of TC43 by Ecma GA?**


# Contributing Companies

- Establish a common extensible open format for downstream 3D CAD repurposing and visualization

- Universal 3D (U3D) Open File format specification
- Run-Time Libraries

- Consists of major players in 3D ecosystem
- We welcome others interested in 3D to join TC43!





Ecma TC43  
Universal 3D  
ToR,  
Description &  
Progress Report

# Terms of Reference (ToR) for TC 43

- **Scope: To facilitate the reuse of 3D CAD data by developing global 3D standards intended for downstream 3D visualization applications.**

## Programme of Work:

1. To standardize a Universal 3D extensible file format and infrastructure focused on the repurposing of 3D CAD data for non-engineering and non-design applications, e.g. training and visualization applications. Notable U3D features include binary encoding, domain-specific compression, continuous level of detail, progressive data representation, animation support, and extensibility to address evolving market needs.
2. To develop a usage and implementation strategy guide for users of U3D to be published as an Ecma Technical Report (TR).

# Terms of Reference (ToR) for TC 43

3. To contribute the Ecma U3D standards to ISO/IEC JTC 1 for approval and adoption by ISO and IEC.
4. To establish and maintain liaison with other standards organizations in order to present Ecma U3D proposals to them and to make comments on their proposals.
5. Upon completion of items 1 - 3, to investigate the future direction of 3D standards, and to evaluate and consider proposals for complementary or additional technology, e.g. support for advanced physics based lighting and rendering applications.
6. To assume responsibility for the maintenance of Ecma Standards prepared by TC43.

# U3D Description & Benefits

- **Execution architecture that facilitates optimal run-time modification of geometry**
  - **Increased performance due to reduced need for data computation**
- **Continuous-level-of-detail**
  - **Enables applications to increase or decrease model complexity based on needed quality or performance**
- **Domain-specific compression**
  - **Allows for reduced file sizes**
- **Progressive data streaming & playback**
  - **Handles real-world usage scenarios for improved end-user experience**
- **Key-frame and bones-based animation**
  - **Facilitates animation for applications that repurpose CAD data**
- **Extensibility of U3D format and run-time**
  - **Allows for ecosystem development and market needs to be quickly addressed**

# U3D Progress Report

- **3DIF Universal 3D Specification**
  - Part I: Architecture – **complete**
  - Part II: File Format Specification – **nearly complete w/o extensibility**
  - Part III: Reference Software – **in progress**
  - Part IV: Conformance - **minimal**
- **TC43 U3D Specification (in Progress)**
  - Convert documents to Ecma U3D Specification style & structure – **combined above parts to single Ecma U3D spec**
  - Bit Encoding Algorithm (adaptive arithmetic compression)
    - **drafted & proposed for inclusion in Ecma U3D spec**
  - Extensibility – **work in progress**
  - SW Implementation – **moved to 3DIF**

- **Planned completion of Ecma U3D File Format Spec in Sept '04 & GA approval in Dec '04**



# Ecma International

- **Ecma track record and experience**
  - Successful submittal of ISO approved initiatives & standards
  - ISO standard addresses end user requirement
  - FAST Track program
  - International presence
- **Ecma relationship**
  - Provide 3DIF with guidance and direction for ISO/IEC standardization
  - Submission of U3D standards for adoption by ISO/IEC JTC 1

## *Ecma GA - Call to Action*

- 1. Approval of TC43*
- 2. Approval of TC43 Terms of Reference (ToR)*

# Questions?

- **For more information contact**
  - **Sanjay Deshmukh, Intel & Ecma TC43 Chair**
    - Email: [sanjay.deshmukh@intel.com](mailto:sanjay.deshmukh@intel.com)
    - Phone: (503) 721-8255
  - **Richard Benoit, Intel & 3DIF Chair**
    - Email: [richard.d.benoit@intel.com](mailto:richard.d.benoit@intel.com)
    - Phone: (503) 704-5391
- **Websites to visit**
  - [www.ecma-international.org](http://www.ecma-international.org)
  - [www.3dif.org](http://www.3dif.org)