INCITS: Standards Facilitate 3D Publishing

Background

In 1997, INCITS (the InterNational Committee for Information Technology Standards), the International Organization for Standardization (ISO), and the International Electrotechnical Commission (IEC) jointly published INCITS/ISO/IEC 14772-1, *Information Technology - Computer Graphics and Image Processing - Virtual Reality Modeling Language (VRML)*. At the time VRML was the leading international standard used to integrate three-dimensional (3D) capabilities in graphics and multimedia.

Problem

The VRML standard provided a file format and set of application programmer interfaces suitable to describe 3D objects and behaviors. But with dramatic improvements in the capabilities of graphics hardware, emergence of new internet technologies, and evolving and disparate 3D application needs, the VRML standard would need to be dramatically updated if it were to stay relevant and useable within the application domain. A solution was needed that rivaled the technical and market success of VRML.

Approach

As interest in 3D capabilities quickly gained momentum, the Web3D Consortium (Web3D) was founded in 1997 to create and promote open standards for real-time 3D communication. Working in collaboration, INCITS, ISO, IEC, and Web3D utilized their membership rosters of technical experts and industry stakeholders, including representatives from broad-based industry, academia, government, and the military, to embark on developing an international standard using VRML as a foundation to build upon.

Led by ISO/IEC JTC 1 SC24, *Computer graphics, Image Processing and Environmental Data Representation*, and supported by INCITS technical committee H3-Computer Graphics & Image Processing serving as the U.S. Technical Advisory Group (TAG) to ISO/IEC JTC 1 SC24, the goal of the new standard, nicknamed X3D (Extensible 3D), was to include a rich set of features to support applications such as engineering and scientific visualization, multimedia presentations, entertainment and educational titles, web pages, and shared virtual worlds. The X3D feature set included 3D graphics, 2D graphics, 2D/3D compositing, animation, spatialized audio and video, user interaction, navigation, cameras, user-defined objects, scripting, networking, and physical simulation.

Outcome

In the mid-2000s, ISO/IEC JTC 1 SC24 published the first X3D international standard designed for sharing interactive 3D graphics on the internet, between applications, and across distributed networks and web services. The most recent edition of X3D, ISO/IEC 19775-1:2013, *Information technology - Computer graphics, image processing and environmental data representation - Extensible 3D (X3D)*, is available in XML, compressed binary, and classic

VRML formats.

X3D has evolved to have broad application in science and engineering, modelling and simulation, computer aided design (CAD), healthcare, mixed augmented and virtual reality, geospatial presentations, and education and training. And X3D is open, royalty free, extensible, interoperable, and runs on all platforms including desktops, tablets, and phones. As X3D evolving technologies continue to find broad application, several working groups are looking to expand X3D domain specific capabilities including CAD, geospatial, humanoid animation, medical X3D, and mixed augmented reality (MAR).