

# X3D Graphics for Web Authors

## X3D-Edit Update

Federal Consortium for Virtual Worlds (FCVW)

May 2010

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Naval Postgraduate School

Monterey California USA



# Motivation

Teach X3D to anyone who can author HTML

Unlock all of the great work by Web3D partners

Learn by doing, help further X3D progress



# X3D Showcase DVD

## Contents

- Viewers
- Examples
- Content Creation Tools
- Case Studies
- Resources
- Join Web3D Consortium



## Features

The **Web3D Consortium** develops royalty-free open standards like Extensible 3D (X3D) Graphics. X3D is used for communicating 3D on the Web between applications, platforms and web services.

Web3D members are delighted to present our *X3D Showcase*, which is a DVD filled with introductory resources. X3D can help you accomplish your real-time 3D graphics challenges.

- **X3D Viewers** for X3D content can display scenes on every major platform, running in your web browser and on mobile devices.
- **Examples** show innovative X3D content from our member developers demonstrating the diverse use of X3D.
- **Content Creation Suite** tools help your initial ideas become interactive 3D content, ready for deployment on the Web.
- **X3D Case Studies** showcase how X3D is used by many different industries for many diverse uses (or try the **online version**).
- **X3D News and Events** provide X3D-related news stories, code samples, tutorials and X3D-based implementations for developers and the X3D user communities (or try the **online version**).
- **On-line X3D Podcasts (2008, 2007)** videos show and tell more about our innovative X3D content developers.
- **Web3D 2009 Symposium** is the 14th International Conference on 3D Web Technology. The **Call for Participation** lists topic areas of interest. It will be held 16-17 June 2009 at Fraunhofer Institute for Computer Graphics, Darmstadt, Germany.
- **X3D for Web Authors** is a textbook by Don Brutzman and Leonard Daly that provides complete detail how X3D works, helping you learn to build your own projects.

The Web3D Consortium thanks the many individuals listed in the **Showcase Credits** and **Contributor Credits**.





# X3D Showcase DVD

Production thanks!

- *Web3D*: Anita Havele
- *University of Sao Paolo*: Mario Nagamura, Marcia Kondo, Marcio Cabral, Olavo Belloc, Marcelo Zuffo
- *Naval Postgraduate School*: Byounghyun Yoo, Jeff Weekley, Don Brutzman

Sourceforge version control  
for easy updating

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# X3D Examples Archives

*X3D for Web Authors* 246 models

- Textbook on how to design and build X3D scenes

*Basic* 645 models

- Diverse scenes illustrating various X3D capabilities

*Conformance NIST* 732 models

- Strictly defined test examples for correct operation

*VRML 2.0 Sourcebook* 269 models

- Textbook on VRML97, examples converted to X3D

*Savage* 1177 models

- Open-source military models and tools





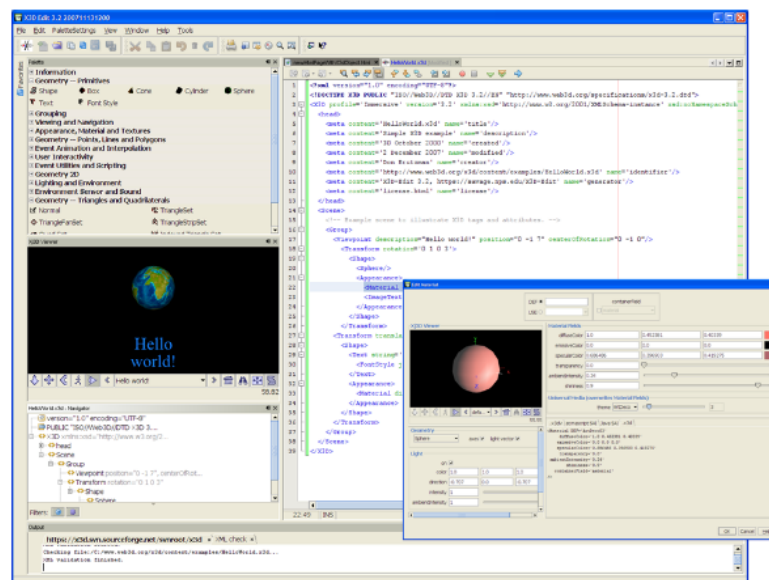
# X3D-Edit Authoring Tool for Extensible 3D (X3D) Graphics



**New**

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X3D-Edit is an Extensible 3D (X3D) Graphics authoring tool for simple error-free editing, authoring and validation of X3D scenes.



## Overview

The X3D-Edit 3.2 Authoring Tool for [Extensible 3D \(X3D\) Graphics](#) supports the creation, checking, display and publication of X3D scenes. It is written in open-source Java and XML using the [Netbeans 6.7](#) platform, making it suitable both as a standalone application and as a plugin module for the Netbeans integrated development environment (IDE).

X3D-Edit [features](#) include direct editing of X3D scenes using the XML (.x3d) encoding, embedded visualization of scenes using the [Xj3D](#) viewer, XML validation using X3D DTD grammars, X3D Schema grammars and [X3D Schematron rules](#), drag-and-drop palette for X3D nodes, popup panels for node editing, and extensive help resources. Further features include ClassicVRML and X3D compressed binary encoding support, encryption and digital-signature authentication using XML Security standards, and additional X3D scene authoring support.


X3D-Edit 3.2 is stable and available for public use. Current capabilities are summarized in the [X3D-Edit Update](#) presentation.



**Palette**

- Information
- Geometry -- Primitives
  - Shape
  - Box
  - Cone
  - Cylinder
  - Sphere
- Text
  - Font Style
- Grouping
- Viewing and Navigation
- Appearance, Material and Textures
- Geometry -- Points, Lines and Polygons
- Event Animation and Interpolation
- User Interactivity
- Event Utilities and Scripting
- Geometry 2D
- Lighting and Environment
- Environment Sensor and Sound
- Geometry -- Triangles and Quadrilaterals
- Normal
  - TriangleSet
- TriangleFanSet
  - TriangleStripSet

**X3D Viewer**



58.82

**HelloWorld.x3d - Navigator**

- version="1.0" encoding="UTF-8"
- PUBLIC "ISO//Web3D//DTD X3D 3.2..."
- X3D xmlns:xsd="http://www.w3.org/2001/XMLSchema-instance" xsd:noNamespaceSch...
- head
- Scene
  - Group
    - Viewpoint position="0 -1 7", centerOfRot...
    - Transform rotation="0 1 0 3"
    - Shape
      - Sphere

**Filters:** [ ] [ ]

**Output**

```
https://x3d.svn.sourceforge.net/svnroot/x3d x\ML check x\
Checking file: C:/www.web3d.org/x3d/content/examples/HelloWorld.x3d...
XML validation finished.
```

**newPageMhV3dObject.html** **HelloWorld.x3d**

```

1 <?xml version="1.0" encoding="UTF-8"?>
2 <!DOCTYPE X3D PUBLIC "ISO//Web3D//DTD X3D 3.2//EN" "http://www.web3d.org/specifications/x3d-3.2.dtd">
3 <X3D profile='Immersive' version='3.2' xmlns:xsd='http://www.w3.org/2001/XMLSchema-instance' xsd:noNamespaceSch
4
5 <head>
6   <meta content='HelloWorld.x3d' name='title'/>
7   <meta content='Simple X3D example' name='description'/>
8   <meta content='3D October 2000' name='created'/>
9   <meta content='2 December 2007' name='modified'/>
10  <meta content='Don Brutzman' name='creator'/>
11  <meta content='http://www.web3d.org/x3d/content/examples/HelloWorld.x3d' name='identifier'/>
12  <meta content='X3D-Edit 3.2, https://savage.nps.edu/X3D-Edit' name='generator'/>
13  <meta content='license.html' name='license'/>
14 </head>
15 <Scene>
16   <!-- Example scene to illustrate X3D tags and attributes. -->
17   <Group>
18     <Viewpoint description="Hello world!" position="0 -1 7" centerOfRotation="0 -1 0"/>
19     <Transform rotation="0 1 0 3">
20       <Shape>
21         <Sphere/>
22         <Appearance>
23           <Material>
24             <ImageTexture/>
25             </Appearance>
26           </Shape>
27         </Transform>
28       <Transform translation="0 0 0 0">
29         <Shape>
30           <Text string='Hello world!'>
31             <FontStyle/>
32           </Text>
33           <Appearance>
34             <Material defaultColor='red'>
35               </Appearance>
36             </Material>
37           </Shape>
38         </Transform>
39       </Group>
40     </Viewpoint>
41   </Group>
42 </Scene>
43 </X3D>

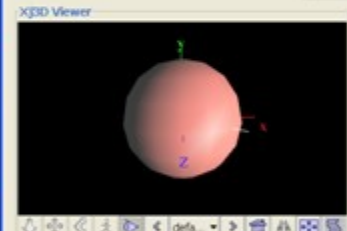
```

**Edit Material**

DEF: [ ] containerField: [ ]

USE: [ ]

**X3D Viewer**



55.55

**Material Fields**

diffuseColor	1.0	0.452381	0.40339
emissiveColor	0.0	0.0	0.0
specularColor	0.686486	0.396903	0.419275
transparency	0.0		
ambientIntensity	0.24		
shininess	0.9		

**Universal Media (overrides Material Fields)**

theme: ArtDeco [ ]

**Geometry**

Sphere [ ] axes [ ] light vector [ ]

**Light**

on [ ]

color: 1.0 1.0 1.0

direction: -0.707 0.0 -0.707

intensity: 1

ambientIntensity: 1

**Material DEF: 'ArtDeco03'**

```

DEF=ArtDeco03
diffuseColor=1.0 0.452381 0.40339
emissiveColor=0.0 0.0 0.0
specularColor=0.686486 0.396903 0.419275
transparency=0.0
ambientIntensity=0.24
shininess=0.9
containerField='material'

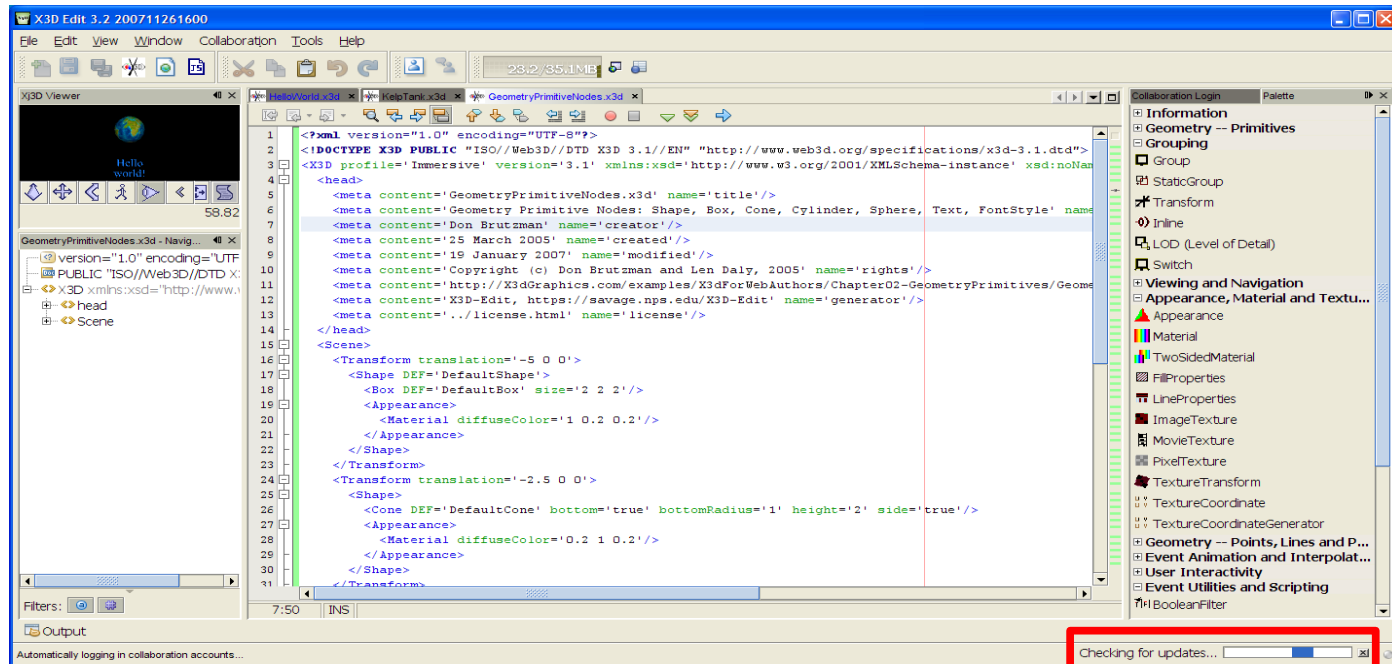
```

OK Cancel Help



# X3D-Edit updates

Icon in lower-left corner of screen indicates when updates are available for automatic installation



Plugin available: click



# X3D Examples download panel, X3D-Edit

**Download Example Archives**

☒ **X3D for Web Authors Examples**  
A wide variety of basic examples are provided that show how to design and build X3D scenes. These are explained in the book X3D for Web Authors.

☐ **Basic Examples**  
The Basic Examples archive provide provides numerous scenes illustrating a broad variety of X3D capabilities.

☐ **ConformanceNIST Test Suite Examples**  
The ConformanceNIST Test Suite Examples were authored by National Institute of Standards and Technology (NIST) to provide a complete test set for the Virtual Reality Modeling Language (VRML97). They were automatically converted into X3D and provide approximate coverage for the X3D Immersive Profile.

☐ **VRML 2.0 Sourcebook X3D Examples**  
The VRML 2.0 Sourcebook is an outstanding textbook covering the Virtual Reality Modeling Language (VRML) 97. These were the first examples converted into X3D.

☐ **Savage X3D Examples**  
NPS Scenario Authoring and Visualization for Advanced Graphical Environments (SAVAGE) library is an open-source set of X3D models and prototype tools used for defense simulation.

Local download directory: ... C:\

**Start downloads** **Cancel downloads**

**Close** **Help**



X3D Edit 3.2 Help

←→🖨️📄

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IDE Basics

X3D Extensible 3D Graphics

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- Working With Groups and Contacts
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Filesharing

## Using the IDE Help System

[See Also](#)

Click any entry in the Contents tab to view the topic in the right pane of the Help viewer.

## Searching the Online Help

To perform a full-text search of all IDE help topics, click the Search tab and type a keyword in the Find text box.

## Using the Index

Click any entry in the Index tab to view the topic. To search the index, enter a term in the search field and press Enter. Press Enter multiple times to cycle through all occurrences of the term in the index.

## Getting Help for IDE Dialogs and Windows

Press F1 in any part of the IDE to open a help topic that is specific to the task you are doing or where you are in the IDE.

## Tutorials and Additional Documentation

For general information about the IDE, see the Getting Started section of the online help. Tutorials and other documentation can be found in the Help menu.

**See Also**

[Help Viewer Shortcuts](#)

[Displaying Help in a Web Browser](#)

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[Legal Notices](#)

X3D-Edit Help



# Viewing alternatives for X3D

Default built-in viewer is open-source Xj3D

- High performance, implemented using Java OpenGL

Can launch current scene into web browser

- Displays using any of your installed plugins
- “Launch all viewers” simplifies comparison testing

Can also launch into standalone applications

- Configuration panel simplifies download, install



# Player support for X3D components

Player support for X3D components - Web3D.org - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.web3d.org/x3d/wiki/index.php/Player\_support\_for\_X3D\_components

Google

Brutzman my talk my preferences my watchlist my contributions log out

web3D  
CONSORTIUM

Public X3D Wiki  
Tutorials for X3D  
Nodes & Concepts

navigation

- Main Page
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- X3D Specifications
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search

Go Search

toolbox

- What links here
- Related changes
- Upload file
- Special pages
- Printable version
- Permanent link

page discussion edit history move unwatch

## Player support for X3D components

The [Extensible 3D \(X3D\) Graphics](#) standard has many capabilities. [X3D components](#) are modular collections of nodes that make it easier for software to gradually implement the full range of X3D capabilities. Authors can also indicate what components are needed in an X3D scene in order to ensure that proper support is provided at run time.

This table records support for the official X3D components by each of the various [X3D players](#). It is maintained by the [X3D Working Group](#) and member companies in the [Web3D Consortium](#).

The [X3D Resources](#) page provides lots of additional information about X3D. Please [Contact Web3D](#) if you want to learn more or report an update.

Related page: [Tool support for X3D components](#)

**Table key**

- yes** all nodes, all fields supported for all levels of this component (though some bugs may be present)
- partial** some nodes and fields supported
- level #** which component level number (1-4) is supported (found at end of each component specification)
- no** no support provided
- ?** unknown, need status report

Players, versions, and X3D Conformance Certification	<a href="#">BS Contact</a>	<a href="#">FreeWRL</a>	<a href="#">Heilan</a>	<a href="#">InstantReality</a>	<a href="#">Octaga Player</a>	<a href="#">OpenVRML</a>	<a href="#">SwirlX3D</a>	<a href="#">Vivaty</a>	<a href="#">Xj3D</a>
	<a href="#">v7.1</a>	<a href="#">v1.21.2</a>	<a href="#">v0.14</a>	<a href="#">beta 5</a>	<a href="#">v2.3.0.2</a>	<a href="#">v0.17.9</a>	<a href="#">v2.1.7</a>	<a href="#">v1.0 build 900</a>	<a href="#">1.0</a>
	<a href="#">Interchange Profile</a>	<a href="#">Interchange Profile</a>	none	none	none	none	none	<a href="#">Interchange Profile</a>	<a href="#">Interchange Profile</a>
<b>File Encodings</b>									
- <a href="#">XML</a> (.x3d)	yes	yes	yes	yes	yes	?	yes	yes	yes
- <a href="#">ClassicVRML</a> (.x3dv)	yes	yes	no	yes	yes	yes	yes	yes	yes
- <a href="#">Compressed Binary Encoding</a> (.x3db)	no	no	no	partial	no	no	no	no	yes
<b>X3D component list</b>									
<a href="#">CAD geometry</a>	yes	no	no	yes	yes	partial	yes	no	yes
<a href="#">Core</a>	yes	yes	partial (not Proto)	yes	yes	yes	yes	yes	yes
<a href="#">Cube map environmental texturing</a>	yes	partial	no	yes	yes	no	no	partial	no
<a href="#">Distributed interactive simulation (DIS)</a>	no	no	no	no	no	partial	no	no	yes

Downloads Master\_LeongTh... Done

Now: Overcast, 55° F Fri: 60° F Sat: 51° F

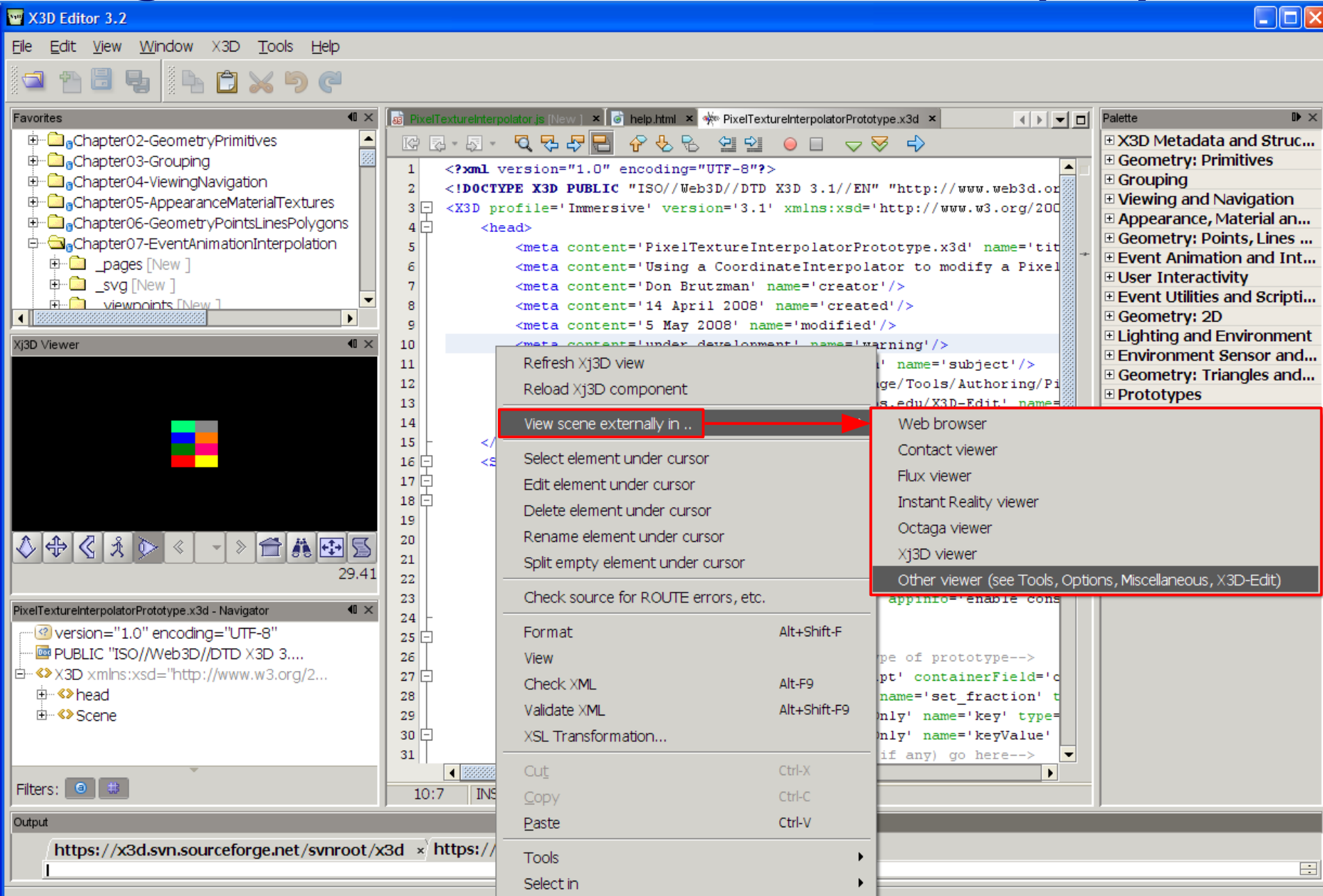


# Tool support for X3D components

The screenshot displays a Mozilla Firefox browser window at the URL http://www.web3d.org/x3d/wiki/index.php/Tool\_support\_for\_X3D\_components. The webpage header identifies it as the "web3D CONSORTIUM Public X3D Wiki". Navigation tabs include "page", "discussion", "edit", "history", "move", and "watch". The left sidebar contains a "navigation" menu with items such as "Main Page", "Web3D News", "Upcoming X3D events", "X3D Specifications", "Recent changes", "Random page", "Help", and "Join the Consortium". There is also a "search" box and a "toolbox" with links like "What links here", "Related changes", "Upload file", "Special pages", "Printable version", and "Permanent link". The main content area is titled "Tool support for X3D components" and explains that X3D components are modular collections of nodes. It mentions that authors can indicate needed components in an X3D scene. A paragraph states that the following table records support for official X3D components by various authoring and conversion tools, maintained by the X3D Working Group and member companies. Below this, a "Table key" defines symbols: green "yes" for full support, red "partial" for partial support, blue "level #" for component level number, red "no" for no support, and "?" for unknown status. The central feature is a large table titled "Tools, versions, and X3D Conformance Certification". This table has two main sections. The first section compares authoring tools (BS Editor, SwirlX3D Editor, Vivaty Studio, X3D-Edit) and conversion tools (Okino Polytrans, SwirlX3D Translator, Xj3D Filter Chain) across different levels of conformance (v7.1, v2.1.7, v1.0 build 900, v3.2, and Interchange Profile). The second section, titled "File Encodings", shows support for XML (.x3d), ClassicVRML (.x3dv), and Compressed Binary Encoding (.x3db) across the same tool categories. The bottom of the browser window shows the Windows taskbar with the word "Done" and system icons.

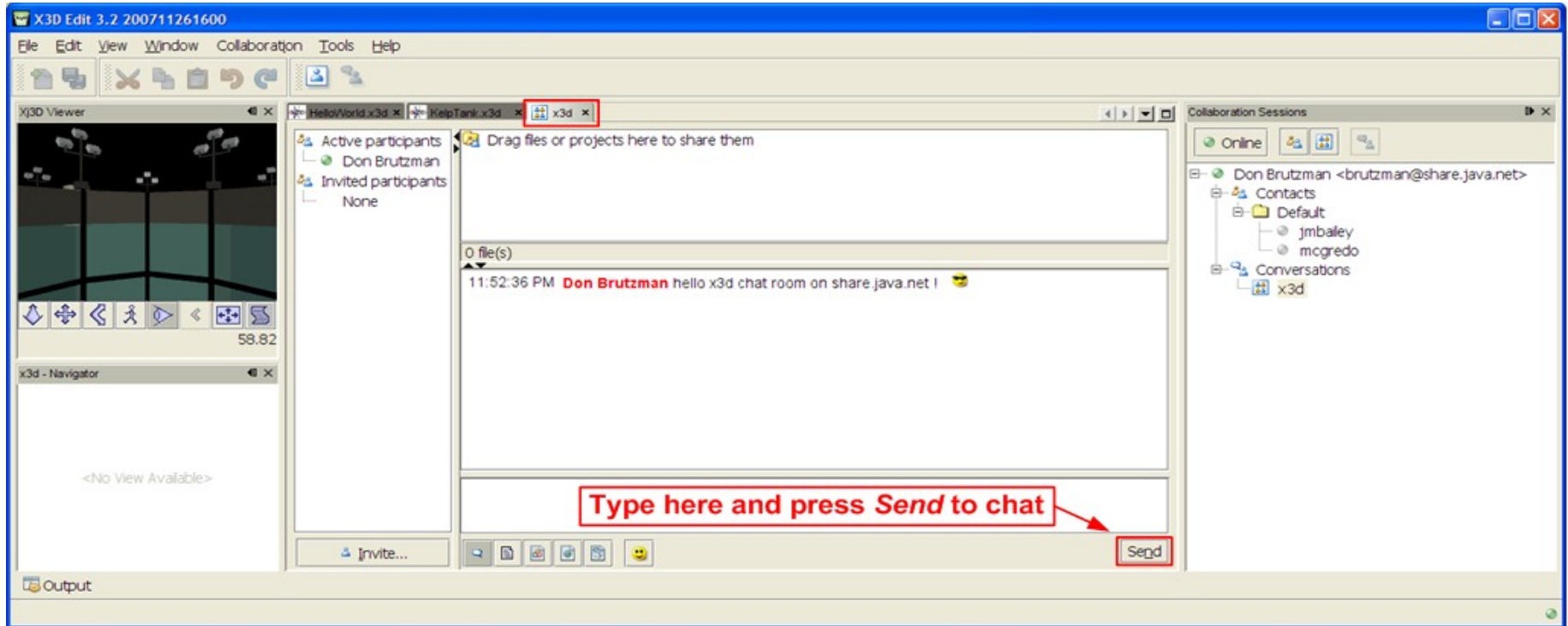


# Right-click to launch external players





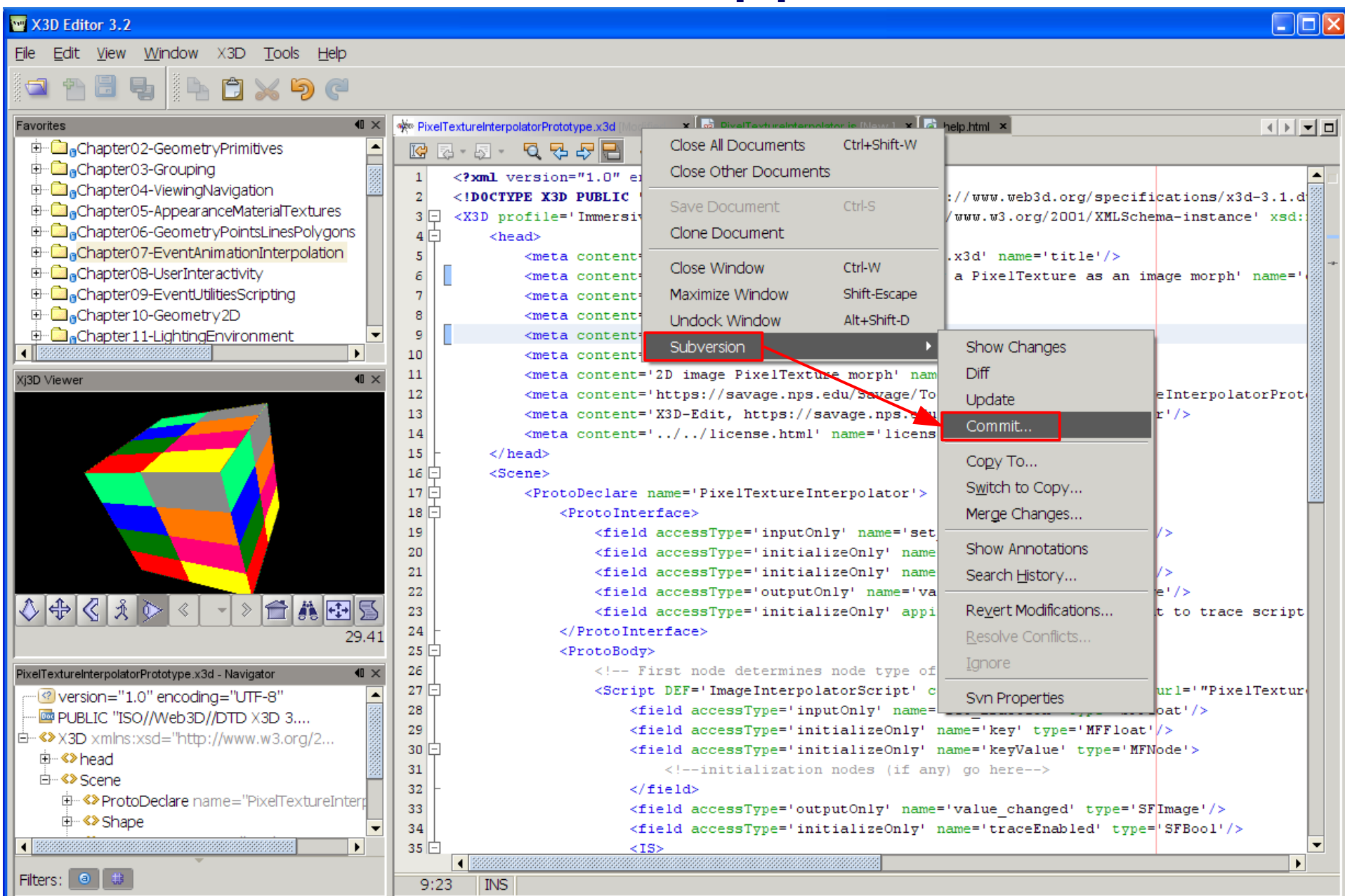
# X3D-Edit collaboration chat



XMPP JID for the chat channel is <xmpp://x3d@muc.share.java.net>  
Subscription directions are provided on the installation page

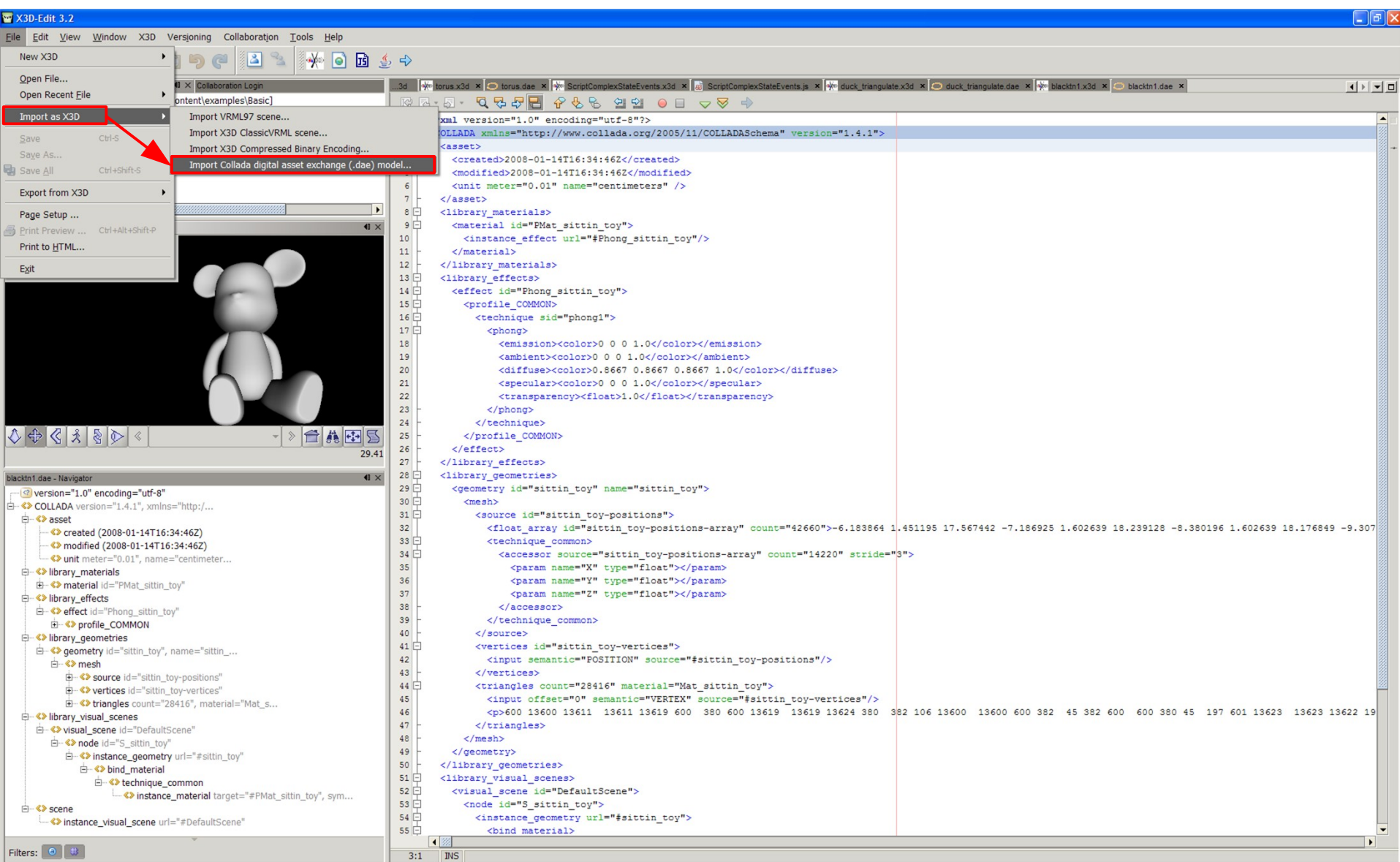


# Version control support included



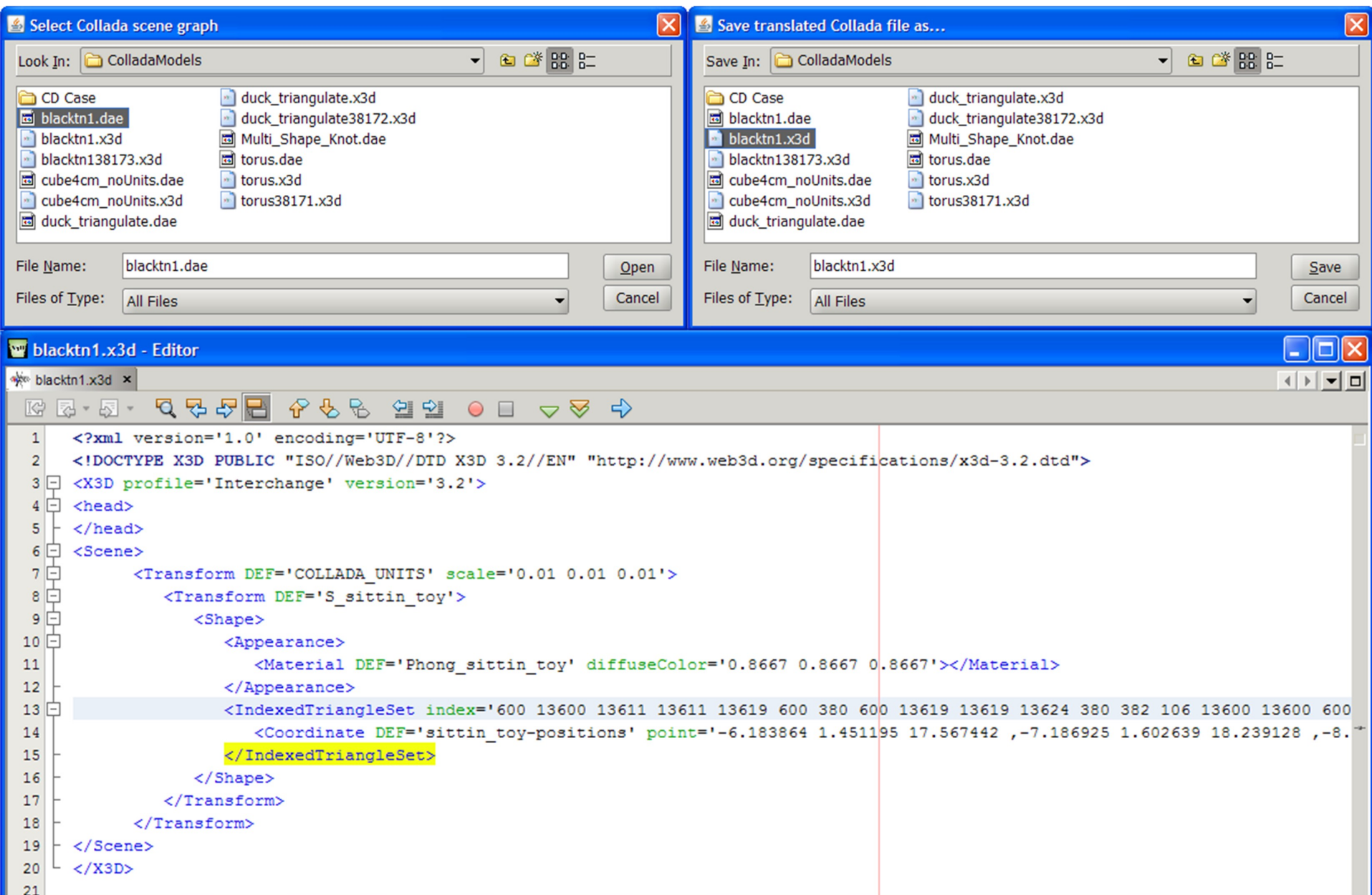


# Collada .dae editing support





# Collada .dae import to X3D





# Distributed Interactive Simulation (DIS) Protocol

Long-running IEEE protocol used in military modeling + simulation applications

OpenDIS: open source implementations

- Java, C++, C#, Objective C
- Also DIS-XML that runs under XMPP jabber chat
- Available at Sourceforge  
<http://sourceforge.net/projects/open-dis>

Integrate network test environment into X3D-Edit

- Multiple panels completed for record/playback/test
- Goal: aid development, testing of new protocols



# DIS Networking Test Panel

The screenshot displays the X3D-Edit 3.2 application interface. On the left, a 3D viewer shows a yellow box in a coordinate system with red, green, and blue axes. The central pane contains XML code for a Distributed Interactive Simulation (DIS) scene. The right pane features the 'DIS ESPDU Test Panel' with controls for translation and rotation, and a 'Palette' of simulation entities.

**XML Code (X3D):**

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE X3D PUBLIC "ISO//Web3D//DTD X3D 3.2//EN" "http://www.web3d.org/specifications/x3d-3.2.dtd">
<X3D profile='Immersive' version='3.2' xmlns:xsd='http://www.w3.org/2001/XMLSchema-instance' xsd:noNamespaceSchemaLocation='http://www.w3.org/2001/XMLSchema-instance'>
  <head>
    <component level='1' name='DIS'/>
    <meta content='BoxTestEspduTransform.x3d' name='title'/>
    <meta content='Don Brutzman, Don McGregor' name='creator'/>
    <meta content='1 January 2007' name='created'/>
    <meta content='13 November 2008' name='modified'/>
    <meta content='Leonard Daly and Don Brutzman' name='creator'/>
    <meta content='A simple EspduTransform test to move a Box.' name='description'/>
    <meta content='http://www.web3d.org/x3d/content/examples/Basic/DistributedInteractiveSimulation/BoxTestEspduTransform.x3d' name='generator'/>
    <meta content='../..//license.html' name='license'/>
  </head>
  <Scene>
    <Viewpoint description='EspduTransform moves Box' position='0 0 25'/>
    <Background skyColor='0.5 0.6 0.8'/>
    <EspduTransform address='239.1.2.3' applicationID='1' entityID='2' marking='TestBox' networkMode='networkReader' port='62040' siteID='0'>
      <Shape>
        <Box size='2 4 6'/>
        <Appearance>
          <Material diffuseColor='0.748014 0.62085 0' shininess='0.93' specularColor='0.860606 0.860606 0.860599'/>
        </Appearance>
      </Shape>
    </EspduTransform>
    <Transform scale='5 5 5'>
      <Inline url='../..//course/CoordinateAxes.x3d'>
        "http://www.web3d.org/x3d/content/examples/Basic/course/CoordinateAxes.x3d"
      </Inline>
    </Transform>
  </Scene>
</X3D>
```

**DIS ESPDU Test Panel Settings:**

- Translation: x, y, z sliders (0, 1.00 scale)
- Rotation: phi, theta, psi sliders (0, 180°, 360° scale)
- DIS Settings: address (239.1.2.3), port (62040), site ID (0), application ID (1), entity ID (2)

**Palette:**

- X3D Metadata and Structure
- Geometry: Primitives
- Grouping
- Viewing and Navigation
- Appearance, Material and Textures
- Geometry: Points, Lines and Polygons
- Event Animation and Interpolation
- User Interactivity
- Event Utilities and Scripting
- Geometry: 2D
- Lighting and Environment
- Environment Sensor and Sound
- Geometry: Triangles and Quadrilaterals
- Prototypes
- Computer Aided Design (CAD)
- Distributed Interactive Simulation (DIS)
  - DISEntityManager
  - DISEntityTypeMapping
  - EspduTransform
  - ReceiverPdu
  - SignalPdu
  - TransmitterPdu
- Geospatial
- Humanoid Animation

Distributed Interactive Simulation (DIS)  
Entity State Protocol Data Unit (ESPDU)  
Test Panel

Translation along x-axis by -20m, to left  
Rotation about y-axis by +20° counter-clockwise



# DIS Networking Player-Recorder Panel

X3D-Edit 3.2

File Edit View Window X3D Versioning Tools Help

X3D Viewer

DIS Player-Recorder Window

TestSchematronDiagnostics.x3d

BoxTestEspduTransform.x3d

79 ENTITY\_STATE 14.211912687  
80 ENTITY\_STATE 14.237453643  
81 ENTITY\_STATE 14.254803613  
82 ENTITY\_STATE 14.286980328  
83 ENTITY\_STATE 14.325127914  
84 ENTITY\_STATE 14.88727003  
85 ENTITY\_STATE 14.90586988  
86 ENTITY\_STATE 14.91336357  
87 ENTITY\_STATE 14.931027826  
88 ENTITY\_STATE 14.949399714  
89 ENTITY\_STATE 14.966543792  
90 ENTITY\_STATE 15.225262428  
91 ENTITY\_STATE 15.250172019  
92 ENTITY\_STATE 15.267734586  
93 ENTITY\_STATE 15.2851449  
94 ENTITY\_STATE 15.293875059  
95 ENTITY\_STATE 15.311404941  
96 ENTITY\_STATE 15.329561997  
97 ENTITY\_STATE 15.37510773  
98 ENTITY\_STATE 15.412108522  
99 ENTITY\_STATE 15.436978163  
100 ENTITY\_STATE 15.463135957  
101 ENTITY\_STATE 15.52497119  
102 ENTITY\_STATE 15.564852795  
103 ENTITY\_STATE 15.590005992  
104 ENTITY\_STATE 15.60751129  
105 ENTITY\_STATE 15.632799979  
106 ENTITY\_STATE 15.640490342  
107 ENTITY\_STATE 15.675847349  
108 ENTITY\_STATE 15.693986526  
109 ENTITY\_STATE 15.824318174  
110 ENTITY\_STATE 15.856962826  
111 ENTITY\_STATE 15.881707032  
112 ENTITY\_STATE 15.950148133  
113 ENTITY\_STATE 16.000276571  
114 ENTITY\_STATE 16.775290155  
115 ENTITY\_STATE 16.793808151  
116 ENTITY\_STATE 16.802593067  
117 ENTITY\_STATE 16.822360663  
118 ENTITY\_STATE 16.840936767  
119 ENTITY\_STATE 16.859243563  
120 ENTITY\_STATE 16.876472568  
121 ENTITY\_STATE 16.893585637  
122 ENTITY\_STATE 16.911356611  
123 ENTITY\_STATE 16.929247991

address 239.1.2.3 port 62040

DIS ESPDU Test Panel

Translation

scale 1.00

x -100 -50 0 50 100

y -100 -50 0 50 100

z -100 -50 0 50 100

Rotation

phi 0 180° 360°

theta 0 180° 360°

psi 0 180° 360°

DIS Settings

address 239.1.2.3 site ID 0

port 62040 application ID 1

entity ID 2

PDU Header

prot version 6 exercise ID 0 PDU type 1 prot family 1

time stamp 547

pdu length 144 padding 0

Entity ID

ent id 2 sim site id 0 sim app id 1

Articulation Parameters

number 0

EntityType

kind	domain	country	category	subcategory	specific	extra
0	0	0	0	0	0	0

Alternative Entity Type

kind	domain	country	category	subcategory	specific	extra
0	0	0	0	0	0	0

Entity Linear Velocity

0.0 0.0 0.0

Entity Location

0.0 0.0 -0.0

Entity Orientation

psi	theta	phi
-2.631084	3.5735617	2.7488935

Dead Reckoning Parameters

algorithm 0 other 0 0 0 0 0 0 0 0 0 0 0 0 0 0

ang vel 0.0 0.0 0.0 lin acc 0.0 0.0 0.0

Entity Marking

char set 0 string(hex) 00 00 00 00 00 00 00 00 00 00

capabilities 0

entity appearance 0

force id 0

marshalled size 144

31.24

Beginning Reverse Record Pause Stop Play FF End Load Save



# X3D Earth, Geospatial Component

## Editing and authoring support provided

X3D-Edit 3.2

File Edit View Window X3D Versioning Collaboration Tools Help

Favorites: HelloEarth.x3d, HelloEarth.x3dv, HelloEarth.x3db, HelloEarthCanonical.xml, HelloEarthOpenStreetMap.html, HelloEarthOpenStreetMap.wrl, HelloEarthOpenStreetMap.x3d, HelloEarthOpenStreetMap.x3dv, HelloEarthOpenStreetMap.x3db, HelloEarthOpenStreetMapCanonical.xml, KmlPrototypes.html, KmlPrototypes.wrl, KmlPrototypes.x3d, KmlPrototypes.x3dv

Collaboration Login

version="1.0" encoding="UTF-8"  
PUBLIC "ISO//Web3D//DTD X3D 3.1...  
X3D xmlns:xsd="http://www.w3.org/2001/...  
head  
Scene  
Inline url="http://x3d-earth.nps.edu/...

Filters: [X3D] [Scene]

X3D Viewer

25:12 INS

DilbertViewer Window

IT'S OUR VICE PRESIDENT OF ENGINEERING.

HELLO. I AM ASOK THE INTERN. MAY I TELL YOU ABOUT AN IDEA I HAVE?

VICE PRESIDENTS CAN'T HEAR US, ASOK. TO THEM, OUR VOICES SOUND LIKE THE FAINT BUZZING OF FLIES.

IF YOU WANT TO GIVE HIM YOUR IDEA, YOU HAVE TO DO IT INDIRECTLY.

TELL SOMEONE WHO KNOWS SOMEONE, WHO KNOWS SOMEONE ELSE, WHO KNOWS THE VICE PRESIDENT.

OR DO WHAT I DO AND CHANNEL YOUR IRRATIONAL IMPULSIONS INTO BEING USEFUL INSTEAD OF UNQUENCHABLE THIRST FOR COFFEE.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE X3D PUBLIC "ISO//Web3D//DTD X3D 3.1//EN" "http://www.web3d.org/specifications/x3d-3.1.dtd">
<X3D profile='Immersive' version='3.1' xmlns:xsd='http://www.w3.org/2001/XMLSchema-instance' xsd:noNamespaceSchemaLocation='http://www.w3.org/2001/XMLSchema-instance'>
  <head>
    <meta content='HelloEarthOpenStreetMap.x3d' name='title'/>
    <meta content='Simplest example to load X3D Earth into an X3D scene.' name='description'/>
    <meta content='Byoungyun Yoo, Don Brutzman' name='creator'/>
    <meta content='24 November 2008' name='created'/>
    <meta content='25 November 2008' name='modified'/>
    <meta content='http://OpenStreetMap.org' name='reference'/>
    <meta content='http://www.web3d.org/x3d-earth' name='reference'/>
    <meta content='http://x3d-earth.nps.edu' name='reference'/>
    <meta content='OpenStreetMapToX3D.php' name='reference'/>
    <meta content='OpenStreetMapExample0.x3d' name='reference'/>
    <meta content='OpenStreetMapExample00.x3d' name='reference'/>
    <meta content='OpenStreetMapExample01.x3d' name='reference'/>
    <meta content='OpenStreetMapExample02.x3d' name='reference'/>
    <meta content='OpenStreetMapExample03.x3d' name='reference'/>
    <meta content='http://www.web3d.org/x3d/content/examples/Basic/GeoSpatial/HelloEarthOpenStreetMap.x3d' name='identifier'/>
    <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit' name='generator'/>
    <meta content='../license.html' name='license'/>
  </head>
  <Scene>
    <!-- a simple Inline node is all that is needed for any scene to use X3D Earth assets -->
    <Inline url='http://x3d-earth.nps.edu/osmdemo.x3d'/>
    <!-- TODO: consider exchanging further configuration information with server via IMPORT/EXPORT -->
    <!-- TODO: also consider passed parameters to server in the url, similar to HTML forms -->
  </Scene>
</X3D>
```

X3D Metadata and Structure

- X3D
- Scene
- MetadataFloat
- MetadataInteger
- MetadataString
- MetadataSet
- WorldInfo
- Geometry: Primitives
- Grouping
- Viewing and Navigation
- Appearance, Material and Textures
- Geometry: Points, Lines and Polygons
- Event Animation and Interpolation
- User Interactivity
- Event Utilities and Scripting
- Geometry: 2D
- Lighting and Environment
- Environment Sensor and Sound
- Geometry: Triangles and Quadrilaterals
- Prototypes
- Computer Aided Design (CAD)
- Distributed Interactive Simulation (DIS)
- Geospatial
- GeoCoordinate
- GeoElevationGrid
- GeoLocation
- GeoMetadata
- GeoOrigin
- GeoPositionInterpolator
- GeoProximitySensor
- GeoTouchSensor
- GeoTransform
- GeoViewpoint
- Shape
- ROUTE
- Humanoid Animation

GeoCoordinate

GeoElevationGrid

GeoLocation

GeoMetadata

GeoOrigin

GeoPositionInterpolator

GeoProximitySensor

GeoTouchSensor

GeoTransform

GeoViewpoint

Shape

ROUTE

Humanoid Animation

<!-- a simple Inline node is all that is needed for any scene to use X3D Earth assets, for example: -->

<Inline url='http://x3d-earth.nps.edu/osmdemo.x3d'/>

25:12 INS

DilbertViewer Window

IT'S OUR VICE PRESIDENT OF ENGINEERING.

HELLO. I AM ASOK THE INTERN. MAY I TELL YOU ABOUT AN IDEA I HAVE?

VICE PRESIDENTS CAN'T HEAR US, ASOK. TO THEM, OUR VOICES SOUND LIKE THE FAINT BUZZING OF FLIES.

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OR DO WHAT I DO AND CHANNEL YOUR IRRATIONAL IMPULSIONS INTO BEING USEFUL INSTEAD OF UNQUENCHABLE THIRST FOR COFFEE.

Previous Next Dilbert strip from Sun Dec 28 00:00:00 PST 2008

10.86



# Humanoid Animation (H-Anim)

ISO standard for human skeletons, skin

- Supported in X3D-Edit, other tools

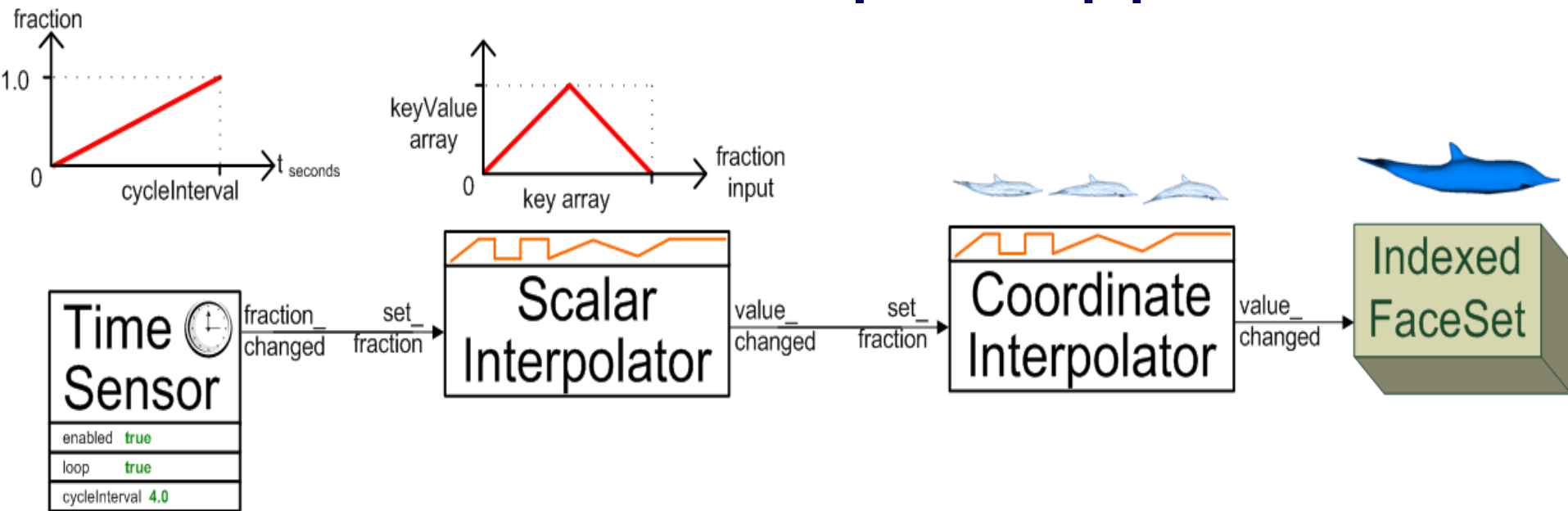
Examining support for non-humanoid skeletons

NPS working on composable, reusable behaviors

- From motion capture (Vicon Peak system)?
- From different motion formats?
- More work needed, H-Anim group seems stalled...



# Tool and example support



**Edit CoordinateInterpolator**

containerField: ☐ children

DEF: ☒ MorphInterpolator

USE: ☐

Coordinate lists

508 coordinate(s) (column triples)

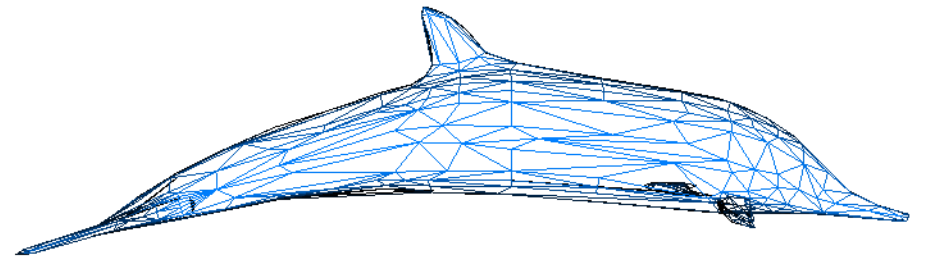
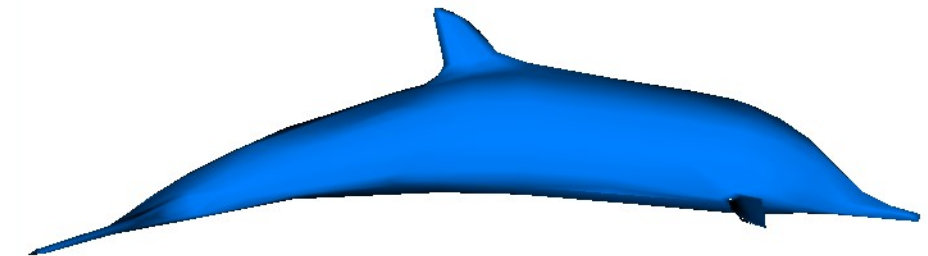
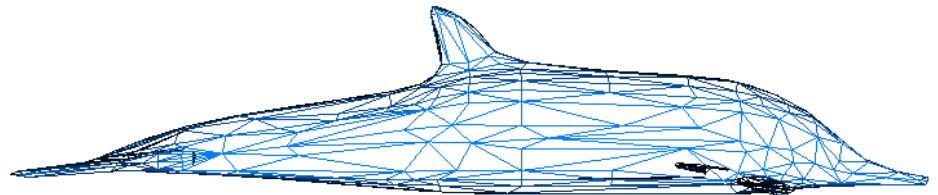
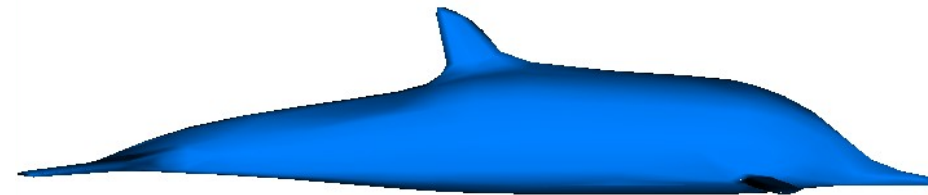
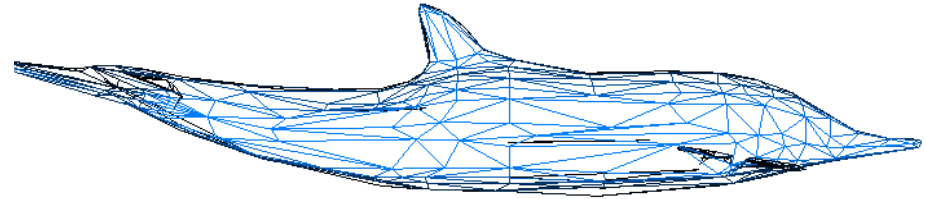
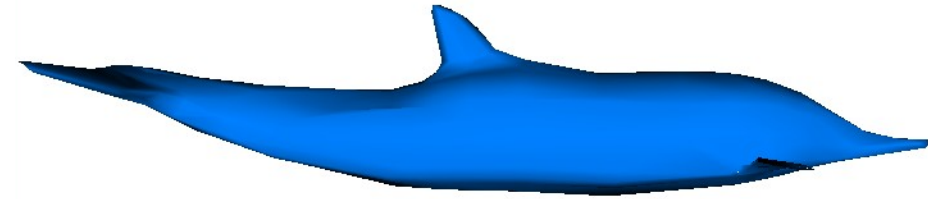
key		0			1			2			3			4			5		
0	0.406	1.049	7.905	0.595	2.957	-10.3...	0.592	2.263	-10.7...	1.246	2.823	5.21	1.352	0.918	5.384	1.336	3.003	-1.028	1.311
0.5	0.406	0.431	7.729	0.595	1.561	-10.4...	0.592	0.769	-10.4...	1.246	2.58	5.322	1.352	0.67	5.216	1.336	3.003	-1.028	1.311
1	0.406	-0.354	7.585	0.595	0.257	-10.3...	0.592	-0.511	-10.1...	1.246	2.012	5.391	1.352	0.121	5.105	1.336	3.003	-1.028	1.311

3 keyed coordinate list(s) (rows)



# Creating a morphable dolphin

Chris Lang, Monterey High School





# X3D for Web Authors

Textbook, slidesets, examples, videos

<http://x3dGraphics.com>



# Availability of book resources

Book available in hard copy or electronic copy

X3D-Edit authoring tool is free for any use

X3D Examples are free for any use

X3D for Web Authors slides and course videos  
are free for any use

All free assets included on X3D Showcase DVD





## Bookmarks

Options

- Front Cover
- X3D: Extensible 3D Graphics for Web Authors
- Copyright Page
- Dedication Page
- Contents
- [-] Preface
- Contributor List
- About the Authors
- [-] Chapter 1: Technical Overview
- [-] Chapter 2: Geometry Nodes, Part 1: Primitives
- [-] Chapter 3: Grouping Nodes
- [-] Chapter 4: Viewing and Navigation
- [-] Chapter 5: Appearance, Material, and Textures
- [-] Chapter 6: Geometry Nodes, Part 2: Points, Lines, and Polygons
- [-] Chapter 7: Event Animation and Interpolation
- [-] Chapter 8: User Interactivity Nodes
- [-] Chapter 9: Event Utilities and Scripting
- [-] Chapter 10: Geometry Nodes, Part 3: Geometry2D Nodes





# Teaching Goals

This work presents Extensible 3D (X3D) Graphics, the open, royalty-free, international standard for 3D graphics on the Web

Book and slideset goals include

- Show Web authors experienced with HTML and XML how to build and connect X3D models
- Teach students principles of Web-capable 3D graphics
- Serve as a ready-reference book for X3D experts

Explain broad principles and specific details of X3D for anyone learning how to build 3D models



# CGEMS

## Computer Graphics Educational Material Source

- SIGGRAPH Education Committee
- Archives for teaching and learning 3D
- <http://cgems.inesc.pt>



## Jury award, best submission 2008

- Book, course notes, X3D-Edit tool, examples

New learning resource: course video podcasts!





## Course Videos: X3D for Web Authors



These video lessons support the textbook [X3D: Extensible 3D Graphics for Web Authors](#), which shows how to build and animate models using X3D.

Primary supporting materials for the book and these video lessons include the [X3D-Edit authoring tool](#), [example scenes](#), and [chapter slidesets](#). Supplementary learning materials include [X3D Resources](#), [X3D Tooltips](#), and [X3D Scene Authoring Hints](#).

These videos were produced as part of two [Naval Postgraduate School \(NPS\) MOVES Institute](#) courses: *Introduction to X3D Graphics* (MV3204) and *Advanced X3D Graphics* (MV4205). The course presenter is book coauthor [Don Brutzman](#).

Chapter <a href="#">Examples</a>	Session	Description	.pdf
0	<a href="#">Getting Started</a>	Goals and motivation, installing <a href="#">X3D-Edit authoring tool</a> and <a href="#">example scenes</a> , course introduction	<a href="#">slides</a>
1	<a href="#">Technical Overview 1A</a>	Introduction, historical background, <a href="#">Web3D Consortium</a> , importance of standardization, <a href="#">X3D Specifications</a> and <a href="#">International Organization of Standards (ISO)</a> , intellectual property rights (IPR) and open-source software, interoperability considerations	<a href="#">slides</a>
	<a href="#">Technical Overview 1B</a>	Browsers and players, models versus programming, scene graphs, behaviors and events, profiles and components, document metadata, fields	
	<a href="#">Technical Overview 1C</a>	Importance of consistency, strong data typing, accessType, XML design patterns for X3D, compressed binary encoding, standards liaison organizations	
	<a href="#">Technical Overview 1D</a>	<a href="#">X3D-Edit authoring tool</a> development, functional testing, bug tracking, version control, <a href="#">Netbeans</a> , help system	
2	<a href="#">Geometry Primitives 2A</a>	Shape and geometry nodes, common geometry fields	<a href="#">slides</a>
	<a href="#">Geometry Primitives 2B</a>	Box and Cylinder nodes, <a href="#">X3D Tooltips</a>	
	<a href="#">Geometry Primitives 2C</a>	<a href="#">HelloWorld</a> example, Cone Cylinder and Sphere nodes	
	<a href="#">Geometry Primitives 2D</a>	Text node for flat 2D strings, launching an X3D scene into one or more external players, multiple-field MFString arrays, handling special characters using <a href="#">XML character entities</a>	
	<a href="#">Geometry Primitives 2E</a>	FontStyle node, open-source licenses	
3	<a href="#">Grouping 3A</a>	Grouping node concepts, XML encoding	<a href="#">slides</a>
	<a href="#">Grouping 3B</a>	Inline node, url field	
	<a href="#">Grouping 3C</a>	X3D resources and additional references, Inline node, url fields, level of detail (LOD) node	
	<a href="#">Grouping 3D</a>	Switch node, review grouping node concepts, 3D grid resources	
4	<a href="#">Viewing Navigation 4A</a>	Viewing, navigation, bindable nodes and binding operations example	<a href="#">slides</a>
	<a href="#">Viewing Navigation 4B</a>	Viewpoint node, viewing and navigation	
	<a href="#">Viewing Navigation 4C</a>	NavigationInfo and Anchor nodes, uniform resource locator (url)	
5	<a href="#">Appearance 5A</a>	Material and TwoSidedMaterial nodes, <a href="#">Universal Media materials library</a>	<a href="#">slides</a>
	<a href="#">Appearance 5B</a>	Textures and ImageTexture node, texture coordinates, image copying and flipping to produce a continuously repeating texture, file formats	
	<a href="#">Appearance 5C</a>	MovieTexture and PixelTexture nodes, LineProperties and FillProperties nodes	
	<a href="#">Appearance 5D</a>	PixelTexture node, SFImage data type, PixelTexture image-import tool	
	<a href="#">Appearance 5E</a>	More on PixelTexture node. MovieTexture node	



# Summary

X3D-Edit provides many great resources for learning, authoring and using X3D

These community capabilities are good for business, educators, individuals

We welcome your active participation in Web3D Consortium



# Contact

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<http://www.web3d.org/x3d/content/examples/license.html>

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