

# X3D Graphics for Web Authors

## X3D-Edit Authoring Tool

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# X3D-Edit Motivation

Provide a simple, excellent authoring tool for X3D

Teach X3D to anyone who can author HTML

Unlock all of the great work by Web3D partners

Learn by doing, and help further X3D progress

# 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

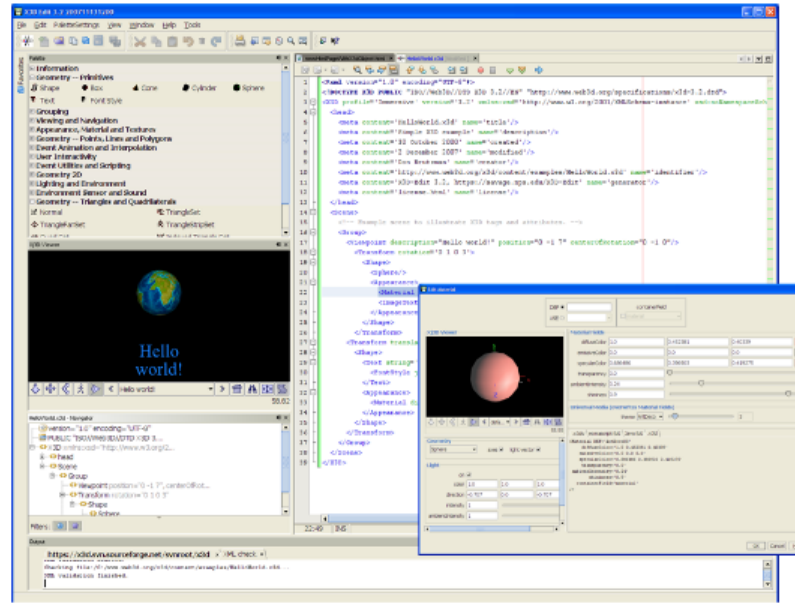


# X3D-Edit Authoring Tool for Extensible 3D (X3D) Graphics



[Overview](#) | [Acknowledgements](#) | [Book](#) | [Chat](#) | [Downloads](#) | [Features](#) | [Issue Tracking](#) | [Licenses](#) | [Mailing Lists](#) | [Plugins](#) | [Support](#) | [X3D Help](#) | [Contact](#)

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



**Overview** **Download:** <https://savage.nps.edu/X3D-Edit>

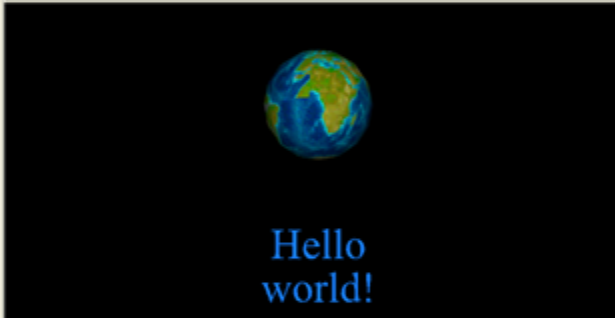
The X3D-Edit 3.2 Authoring Tool for [Extensible 3D \(X3D\) Graphics](#) supports the creation, checking, display and publication of X3D scenes. It is written in open-source Java and XML using the [Netbeans](#) platform, making it suitable both as a standalone application and as a plugin module for the 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 against X3D DTDs and Schemas, drag-and-drop palette for X3D nodes, popup panels for node editing, and extensive help resources. Planned features include ClassicVRML and X3D compressed binary encoding support, encryption and digital-signature authentication using XML Security standards, and additional X3D scene authoring support.

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



59.82

HelloWorld.x3d - Navigator

- version="1.0" encoding="UTF-8"
- PUBLIC "ISO//Web3D//DTD X3D 3...
- X3D xmlns:xsd="http://www.w3.org/2...
- 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'XML check x'
Checking file: C:/www.web3d.org/x3d/content/examples/HelloWorld.x3d...
XML validation finished.
```

newhtmlPageVlh\X3dObject.html HelloWorld.x3d Modified

```

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 <head>
5   <meta content='HelloWorld.x3d' name='title'/>
6   <meta content='Simple X3D example' name='description'/>
7   <meta content='3D October 2000' name='created'/>
8   <meta content='2 December 2007' name='modified'/>
9   <meta content='Don Brutzman' name='creator'/>
10  <meta content='http://www.web3d.org/x3d/content/examples/HelloWorld.x3d' name='identifier'/>
11  <meta content='X3D-Edit 3.2, https://savage.nps.edu/X3D-Edit' name='generator'/>
12  <meta content='license.html' name='license'/>
13 </head>
14 <Scene>
15   <!-- Example scene to illustrate X3D tags and attributes. -->
16 <Group>
17   <Viewpoint description="Hello world!" position="0 -1 7" centerOfRotation="0 -1 0"/>
18   <Transform rotation="0 1 0 3">
19     <Shape>
20       <Sphere/>
21     </Shape>
22     <Material>
23       <ImageTexture>
24         </ImageTexture>
25       </Material>
26     </Shape>
27   </Transform>
28 </Group>
29 <Transform translation="0 0 0 0">
30   <Text string='
31     Hello world!'
32     fontStyle='serif'
33   </Text>
34 </Transform>
35 </Scene>
36 </X3D>

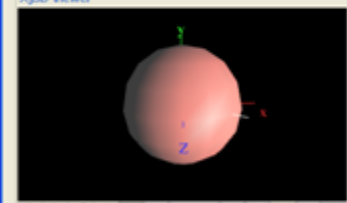
```

Edit Material

DEF # [ ] containerField

USE # [ ] material

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

```

.x3d | ecmscript SAJ | Java SAJ | x3d |
<Material 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"
/>

```

Geometry

Sphere axes  light vector

Light

on

color 1.0 1.0 1.0

direction -0.707 0.0 -0.707

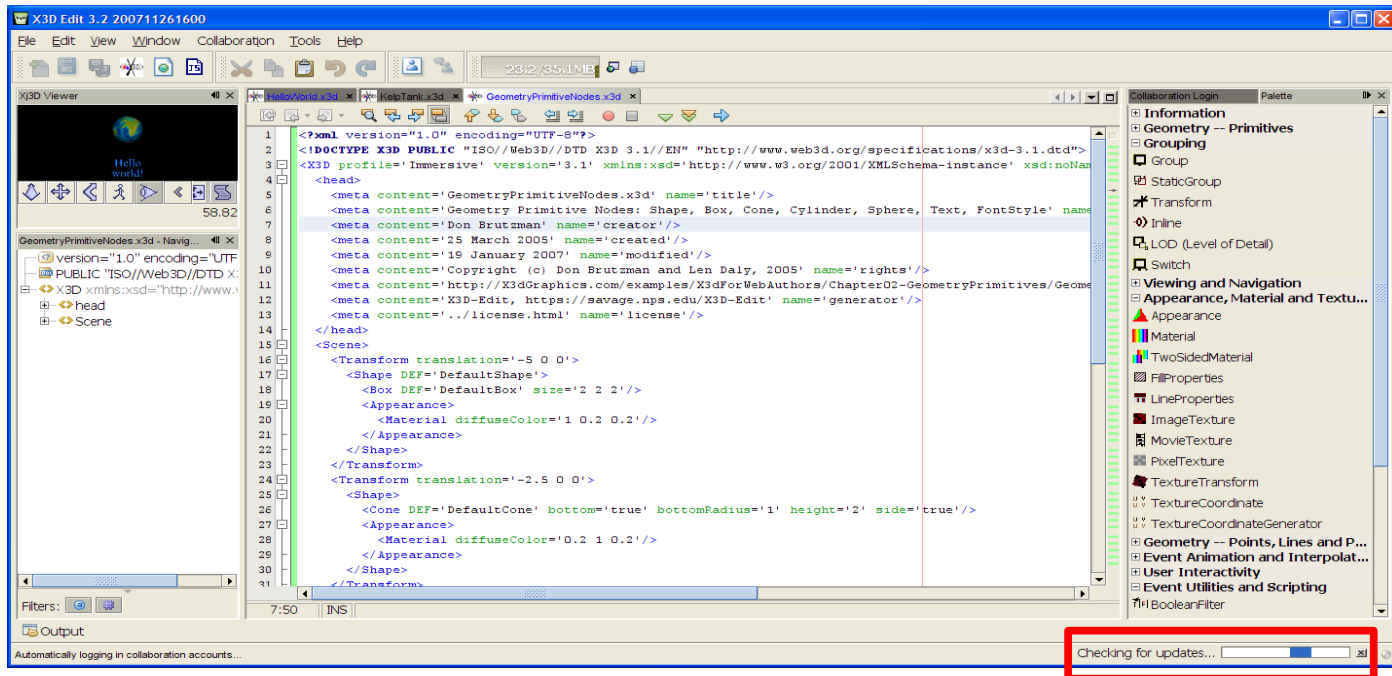
intensity 1

ambientIntensity 1

22:49 INS

# X3D-Edit updates

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



Plugin available: click



# 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**.

# Availability: 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*: Byoungyun Yoo, Jeff Weekley, Don Brutzman

Sourceforge version control  
for easy updating

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# X3D Examples Archives

*X3D for Web Authors* 244 models

- Textbook on how to design and build X3D scenes

*Basic* 653 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* 1181 models

- Open-source military models and tools



# 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:\



Contents Search

- Legal Notices
- IDE Basics
- X3D Extensible 3D Graphics
- X3D-Edit
  - X3D-Edit home
    - Installing Collaboration Chat module
    - Report a bug
  - X3D Examples Help
  - X3D Scene Authoring Hints
  - X3D Specifications
  - X3D Tooltips**
    - X3D Tooltips in Chinese
    - X3D Tooltips in English
    - X3D Tooltips in French
    - X3D Tooltips in German
    - X3D Tooltips in Italian
    - X3D Tooltips in Portuguese
    - X3D Tooltips in Spanish
  - Xj3D Navigation Hotkeys
- Collaboration
  - About Collaboration
  - Creating and Managing Collaboration Accounts
  - Logging Into the Collaboration Server
  - Working With Groups and Contacts
  - Starting a Conversation
  - Chat
  - 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](#)

[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



# Tool support for X3D components

navigation

- Main Page
- Web3D News
- Upcoming X3D events
- X3D Specifications
- Recent changes
- Random page
- Help
- Join the Consortium

search




toolbox

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

page discussion edit history delete move protect unwatch

## Tool 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 authoring tools](#) and [X3D conversion tools](#). 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 pages: [Plug-in and browser compliance](#), [Player support for X3D components](#), [X3D Resources: Authoring Software](#), [X3D Implementations](#), and [X3D Plugfest](#).

### 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

Types	Authoring tools					Conversion tools		
Tools	<a href="#">BS Editor</a>	<a href="#">SwirlX3D Editor</a>	<a href="#">X3D-Edit</a>	<a href="#">Flux Studio</a>	<a href="#">Vivaty Studio</a>	<a href="#">Okino Polytrans</a>	<a href="#">SwirlX3D Translator</a>	<a href="#">Xj3D Filter Chain</a>
Versions	<a href="#">v7.1</a>	<a href="#">v3.0.0</a>	<a href="#">v3.2</a>	<a href="#">v2.1</a>	<a href="#">v1.0 build 900</a>	<a href="#">v5.0</a>	<a href="#">v3.0.0</a>	<a href="#">v2.0</a>
Profiles	<a href="#">nearly Full Profile</a>	<a href="#">TBD</a>	<a href="#">nearly Full Profile</a>	<a href="#">Immersive Profile</a>	<a href="#">Immersive Profile</a>	<a href="#">Immersive Profile</a>	<a href="#">Immersive Profile</a>	<a href="#">nearly Full Profile</a>
X3D Conformance Certification	<a href="#">none</a>	<a href="#">none</a>	<a href="#">Interchange Profile</a>	<a href="#">Interchange Profile</a>	<a href="#">Interchange Profile</a>	<a href="#">none</a>	<a href="#">none</a>	<a href="#">Interchange Profile</a>

### File Encodings

<a href="#">XML (.x3d)</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>
<a href="#">ClassicVRML (.x3dv)</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>
<a href="#">Compressed Binary Encoding (.x3db)</a>	<a href="#">yes</a>	<a href="#">no</a>	<a href="#">yes</a>	<a href="#">no</a>	<a href="#">no</a>	<a href="#">no</a>	<a href="#">no</a>	<a href="#">yes</a>
<a href="#">VRML 97 (v2.0) (.wrl)</a>	<a href="#">?</a>	<a href="#">?</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">?</a>	<a href="#">yes</a>
<a href="#">VRML 1 (v1.0) (.wrl)</a>	<a href="#">?</a>	<a href="#">?</a>	<a href="#">no</a>	<a href="#">partial</a>	<a href="#">partial</a>	<a href="#">yes</a>	<a href="#">?</a>	<a href="#">no</a>

### X3D component list

<a href="#">CAD geometry</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">no</a>	<a href="#">no</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>
<a href="#">Core</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>
<a href="#">Cube map environmental texturing</a>	<a href="#">yes</a>	<a href="#">no</a>	<a href="#">partial</a>	<a href="#">partial</a>	<a href="#">partial</a>	<a href="#">no</a>	<a href="#">no</a>	<a href="#">no</a>
<a href="#">Distributed interactive simulation (DIS)</a>	<a href="#">no</a>	<a href="#">no</a>	<a href="#">yes</a>	<a href="#">no</a>	<a href="#">no</a>	<a href="#">no</a>	<a href="#">no</a>	<a href="#">yes</a>
<a href="#">Environmental effects</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>
<a href="#">Environmental sensor</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">yes</a>	<a href="#">no</a>	<a href="#">yes</a>	<a href="#">yes</a>

# Right-click to launch external players

The screenshot displays the X3D Editor 3.2 interface. The main window shows an XML file named `PixelTextureInterpolator.js` with the following content:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE X3D PUBLIC "ISO//Web3D//DTD X3D 3.1//EN" "http://www.web3d.org/ISO/IEC15944-1/2002-12-15/X3D-1.2.dtd">
<X3D profile='Immersive' version='3.1' xmlns:xsd='http://www.w3.org/2001/XMLSchema-instance'>
  <head>
    <meta content='PixelTextureInterpolatorPrototype.x3d' name='title' />
    <meta content='Using a CoordinateInterpolator to modify a PixelTexture' name='description' />
    <meta content='Don Brutzman' name='creator' />
    <meta content='14 April 2008' name='created' />
    <meta content='5 May 2008' name='modified' />
    <meta content='under development' name='warning' />
  </head>
  <scene>
    <!-- ... -->
  </scene>
</X3D>
```

A right-click context menu is open over the XML code. The menu items are:

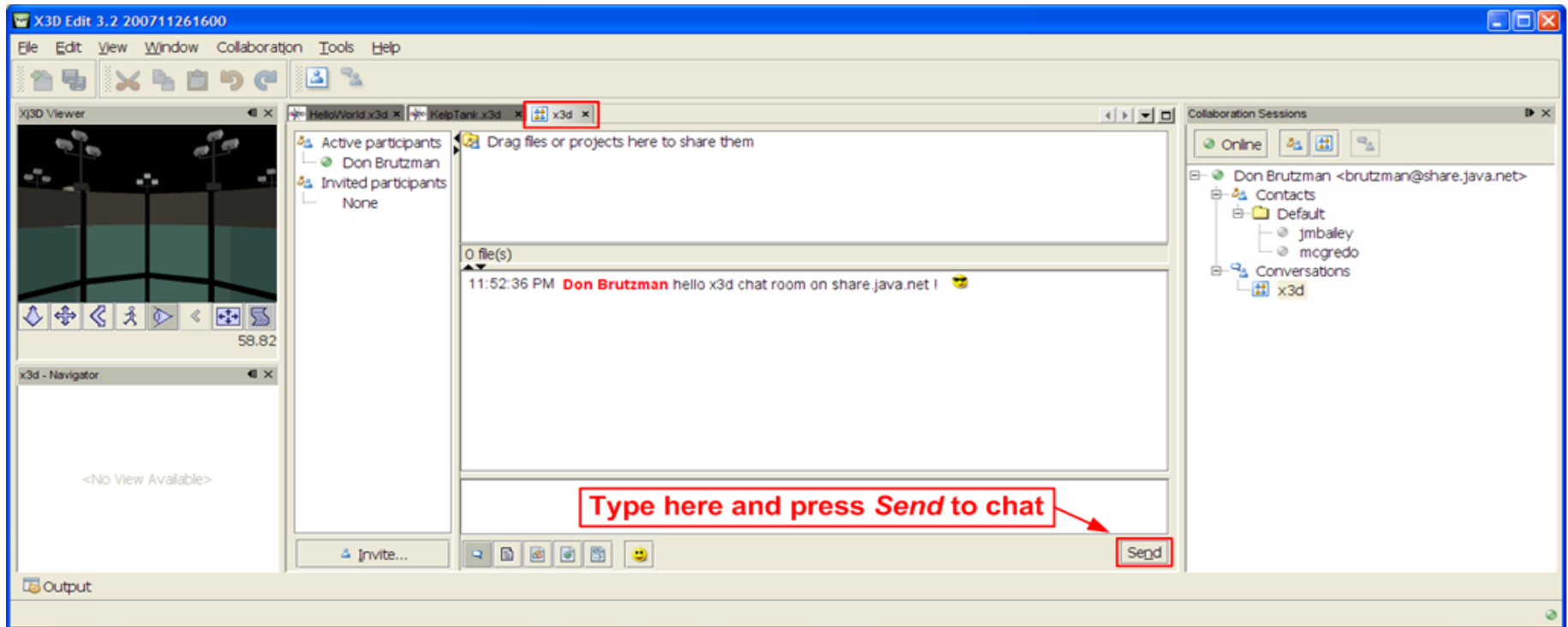
- Refresh Xj3D view
- Reload Xj3D component
- View scene externally in ..** (highlighted with a red box and arrow)
- Select element under cursor
- Edit element under cursor
- Delete element under cursor
- Rename element under cursor
- Split empty element under cursor
- Check source for ROUTE errors, etc.
- Format (Alt+Shift-F)
- View
- Check XML (Alt-F9)
- Validate XML (Alt+Shift-F9)
- XSL Transformation...
- Cut (Ctrl-X)
- Copy (Ctrl-C)
- Paste (Ctrl-V)
- Tools
- Select in

The **View scene externally in ..** option is expanded, showing a sub-menu with the following options:

- Web browser
- Contact viewer
- Flux viewer
- Instant Reality viewer
- Octaga viewer
- Xj3D viewer
- Other viewer (see Tools, Options, Miscellaneous, X3D-Edit)** (highlighted with a red box)

The interface also includes a Favorites pane on the left, an Xj3D Viewer window showing a 3D scene, and a Palette on the right with categories like X3D Metadata and Structures, Geometry: Primitives, Grouping, Viewing and Navigation, Appearance, Material and Textures, Geometry: Points, Lines and Surfaces, Event Animation and Interactivity, User Interactivity, Event Utilities and Scripting, Geometry: 2D, Lighting and Environment, Environment Sensor and Actuators, Geometry: Triangles and Surfaces, and Prototypes.

# 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

The screenshot displays the X3D Editor 3.2 interface. The 'File' menu is open, and the 'Subversion' option is highlighted. A sub-menu is visible, showing 'Commit...' as a selected option. The main editor window shows the XML code for a 'PixelTextureInterpolator' prototype, including fields for 'set', 'key', 'keyValue', 'value\_changed', and 'traceEnabled'. The 3D viewer shows a colorful cube. The 'Favorites' panel on the left lists various chapters, and the 'Navigator' panel at the bottom shows the current document structure.

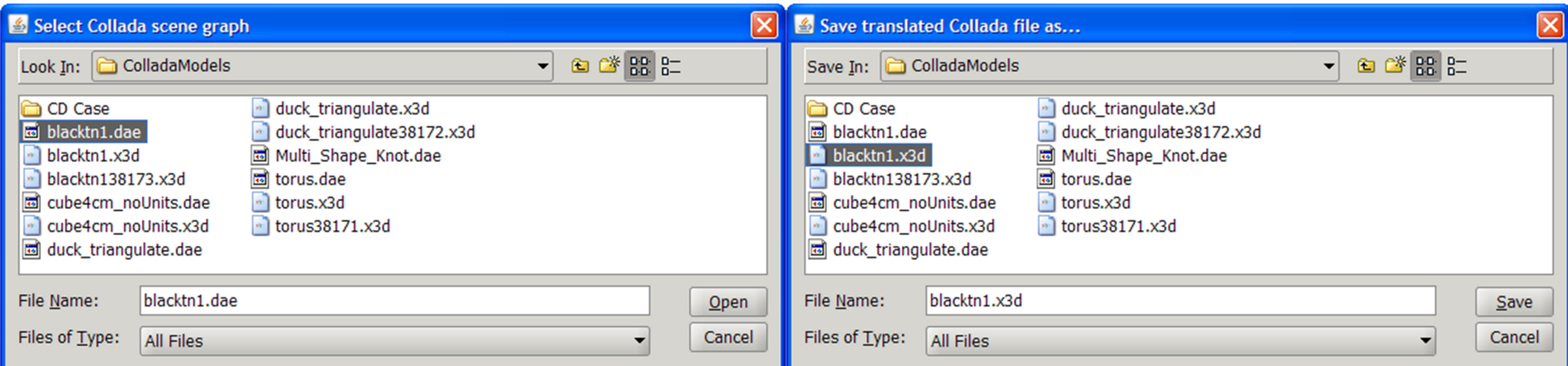
```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<!DOCTYPE X3D PUBLIC "-//Web3D//DTD X3D 3.1.dtd" "http://www.w3.org/2001/XMLSchema-instance" xsd:schemaLocation="http://www.w3.org/2001/XMLSchema-instance http://www.w3.org/2001/XMLSchema-instance" xsd:base="http://www.w3.org/2001/XMLSchema-instance" />
<X3D profile='Immersive' version='3.1' xmlns:xsd='http://www.w3.org/2001/XMLSchema-instance' />
  <head>
    <meta content='Title' name='title' />
    <meta content='a PixelTexture as an image morph' name='description' />
    <meta content='2D image PixelTexture morph' name='image' />
    <meta content='https://savage.nps.edu/Savage/Tools/TextureInterpolation/TextureInterpolation.html' name='url' />
    <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='license' />
    <meta content='../license.html' name='license' />
  </head>
  <Scene>
    <ProtoDeclare name='PixelTextureInterpolator'>
      <ProtoInterface>
        <field accessType='inputOnly' name='set' type='SFImage' />
        <field accessType='initializeOnly' name='key' type='MFFloat' />
        <field accessType='initializeOnly' name='keyValue' type='MFNode' />
        <field accessType='initializeOnly' name='value_changed' type='SFImage' />
        <field accessType='initializeOnly' name='traceEnabled' type='SFBool' />
      </ProtoInterface>
      <ProtoBody>
        <!-- First node determines node type of image -->
        <Script DEF='ImageInterpolatorScript' class='ImageInterpolatorScript' />
        <field accessType='inputOnly' name='set' type='SFImage' />
        <field accessType='initializeOnly' name='key' type='MFFloat' />
        <field accessType='initializeOnly' name='keyValue' type='MFNode' />
        <!-- initialization nodes (if any) go here -->
        </field>
        <field accessType='outputOnly' name='value_changed' type='SFImage' />
        <field accessType='initializeOnly' name='traceEnabled' type='SFBool' />
      </IS>
    </ProtoDeclare>
  </Scene>
</X3D>
```

# Collada .dae editing support

The screenshot displays the X3D-Edit 3.2 interface. On the left, a 3D viewport shows a white teddy bear model. A red arrow points from the 'Import as X3D' menu item to the 'Import Collada digital asset exchange (.dae) model...' option. Below the viewport is a hierarchical tree view of the scene's structure, including assets, materials, effects, and geometries. The main window shows the XML code for the scene, which is a Collada DAE file. The code defines a scene with a single geometry named 'sittin\_toy' and a mesh with vertices and triangles. The XML is as follows:

```
xml version="1.0" encoding="utf-8"?>
<COLLADA xmlns="http://www.collada.org/2005/11/COLLADASchema" version="1.4.1">
  <asset>
    <created>2008-01-14T16:34:46Z</created>
    <modified>2008-01-14T16:34:46Z</modified>
    <unit meter="0.01" name="centimeters" />
  </asset>
  <library_materials>
    <material id="PMat_sittin_toy">
      <instance_effect url="#Phong_sittin_toy"/>
    </material>
  </library_materials>
  <library_effects>
    <effect id="Phong_sittin_toy">
      <profile_COMMON>
        <technique sid="phong1">
          <phong>
            <emission><color>0 0 0 1.0</color></emission>
            <ambient><color>0 0 0 1.0</color></ambient>
            <diffuse><color>0.8667 0.8667 0.8667 1.0</color></diffuse>
            <specular><color>0 0 0 1.0</color></specular>
            <transparency><float>1.0</float></transparency>
          </phong>
        </technique>
      </profile_COMMON>
    </effect>
  </library_effects>
  <library_geometries>
    <geometry id="sittin_toy" name="sittin_toy">
      <mesh>
        <source id="sittin_toy-positions">
          <float_array id="sittin_toy-positions-array" count="42660">-6.183864 1.451195 17.567442 -7.186925 1.602639 18.239128 -8.380196 1.602639 18.176849 -9.307
        </float_array>
        <technique_common>
          <accessor source="sittin_toy-positions-array" count="14220" stride="3">
            <param name="X" type="float"></param>
            <param name="Y" type="float"></param>
            <param name="Z" type="float"></param>
          </accessor>
        </technique_common>
      </source>
      <vertices id="sittin_toy-vertices">
        <input semantic="POSITION" source="#sittin_toy-positions"/>
      </vertices>
      <triangles count="28416" material="Mat_sittin_toy">
        <input offset="0" semantic="VERTEX" source="#sittin_toy-vertices"/>
        <p>600 13600 13611 13611 13619 600 380 600 13619 13619 13624 380 382 106 13600 13600 600 382 45 382 600 600 380 45 197 601 13623 13623 13622 19
      </triangles>
    </mesh>
  </geometry>
</library_geometries>
<library_visual_scenes>
  <visual_scene id="DefaultScene">
    <node id="S_sittin_toy">
      <instance_geometry url="#sittin_toy">
        <bind_material>
          <instance_material target="#PMat_sittin_toy", sym...
        </bind_material>
      </instance_geometry>
    </node>
  </visual_scene>
</library_visual_scenes>
<scene id="DefaultScene">
  <instance_visual_scene url="#DefaultScene">
  </instance_visual_scene>
</scene>
</COLLADA>
```

# Collada .dae import to 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='Interchange' version='3.2'>
4 <head>
5 </head>
6 <Scene>
7     <Transform DEF='COLLADA_UNITS' scale='0.01 0.01 0.01'>
8         <Transform DEF='S_sittin_toy'>
9             <Shape>
10                <Appearance>
11                    <Material DEF='Phong_sittin_toy' diffuseColor='0.8667 0.8667 0.8667'></Material>
12                </Appearance>
13                <IndexedTriangleSet index='600 13600 13611 13611 13619 600 380 600 13619 13619 13624 380 382 106 13600 13600 600'
14                    <Coordinate DEF='sittin_toy-positions' point='-6.183864 1.451195 17.567442 ,-7.186925 1.602639 18.239128 ,-8.
15                </IndexedTriangleSet>
16            </Shape>
17        </Transform>
18    </Transform>
19 </Scene>
20 </X3D>
21
```

# Distributed Interactive Simulation (DIS) Protocol

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

OpenDIS: open source implementations

- Java, 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

- In progress
- Goal: aid development, testing of new protocols

# DIS Networking Test Panel

The screenshot displays the X3D-Edit 3.2 interface. On the left is the X3D Viewer showing a 3D scene with a yellow box and coordinate axes (X, Y, Z). The center pane shows the XML code for the scene, including metadata and an `EspduTransform` element. On the right is the DIS ESPDU Test Panel, which includes sliders for Translation (x, y, z) and Rotation (phi, theta, psi), along with DIS Settings (address, port, site ID, application ID, entity ID) and a Palette of objects.

```
<?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>
```

**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

The screenshot displays the X3D-Edit 3.2 software interface, which is used for configuring and recording network traffic in a 3D environment. The interface is divided into several main sections:

- X3D Viewer:** On the left, a 3D scene is shown with a yellow cube and a blue sphere. A coordinate system with red (X), green (Y), and blue (Z) axes is visible.
- Log Window:** A central window titled "DIS Player-Recorder Window" displays a list of entity states, such as "79 ENTITY\_STATE 14.211912687", "80 ENTITY\_STATE 14.237453643", and "112 ENTITY\_STATE 15.950148133".
- Configuration Panels:** On the right, several panels allow for detailed configuration:
  - PDU Header:** Fields for protocol version (6), exercise ID (0), PDU type (1), protocol family (1), time stamp (547), and pdu length (144).
  - Entity ID:** Fields for entity ID (2), sim site ID (0), and sim app ID (1).
  - Articulation Parameters:** A field for articulation number (0).
  - Entity Type:** A table for defining entity types based on kind, domain, country, category, subcategory, specific, and extra attributes.
  - Alternative Entity Type:** A similar table for alternative entity types.
  - Entity Linear Velocity:** Fields for linear velocity components (0.0, 0.0, 0.0).
  - Entity Location:** Fields for entity location coordinates (0.0, 0.0, -0.0).
  - Entity Orientation:** Fields for orientation angles: psi (-2.631084), theta (3.5735617), and phi (2.7488935).
  - Dead Reckoning Parameters:** Fields for algorithm (0) and other parameters (0 0 0 0 0 0 0 0 0 0 0 0).
  - Entity Marking:** Fields for character set (0), capabilities (0), entity appearance (0), force ID (0), and marshalled size (144).
- DIS ESPDU Test Panel:** On the far right, a panel for testing ESPDU parameters, including Translation (X, Y, Z scales from -100 to 100), Rotation (phi, theta, psi angles from 0 to 360 degrees), and DIS Settings (address: 239.1.2.3, port: 62040, site ID: 0, application ID: 1, entity ID: 2).
- Bottom Panel:** A control bar at the bottom contains playback controls (Begin, Reverse, Record, Pause, Stop, Play, FF, End, Load, Save) and a status indicator showing "31.24".

# X3D Earth, Geospatial Component

## Editing and authoring support provided

The screenshot displays the X3D-Edit 3.2 application window. The main editor shows an XML document with the following content:

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

A green box highlights the comment and the `<Inline>` node:

```
<!-- 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'/>
```

The interface also includes a file explorer on the left, a palette on the right, and a 3D viewer at the bottom left showing a globe. At the bottom, a Dilbert comic strip is visible.

# Humanoid Animation (H-Anim)

ISO standard for human skeletons, skin

- Supported in X3D-Edit, other tools

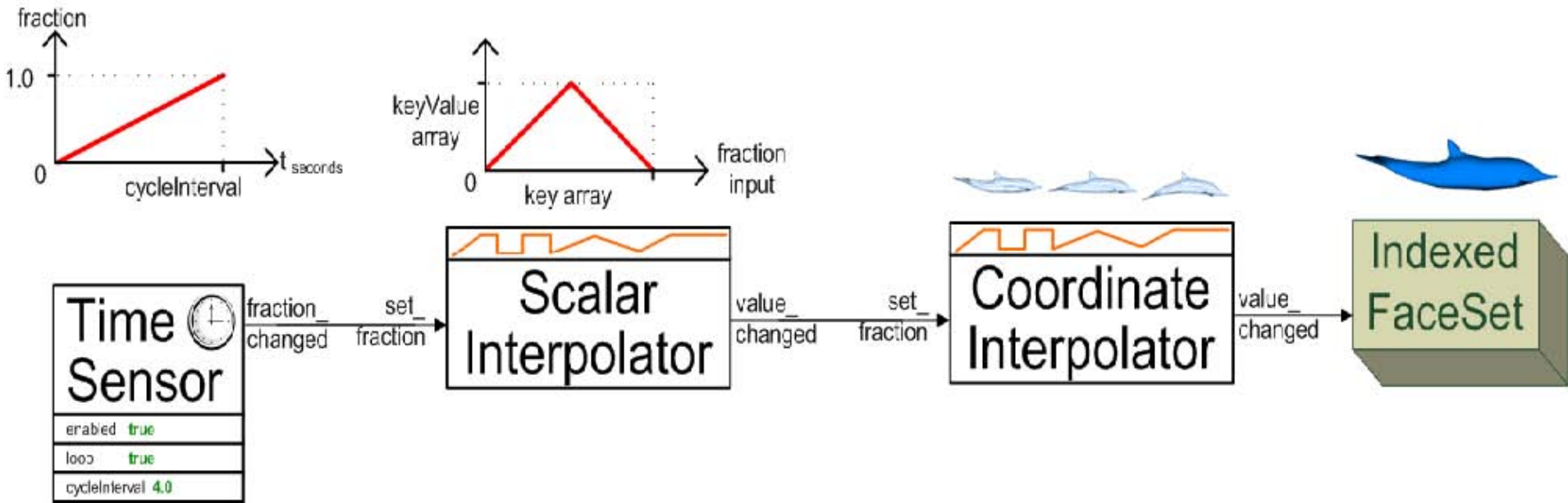
Examining support for non-humanoid skeletons

NPS working on composable, reusable behaviors

- From motion capture (Vicon Peak system)?
- From different motion formats?



# Tool and example support



**Edit CoordinateInterpolator**

containerField:  children

DEF  MorphInterpolator

USE

Coordinate lists

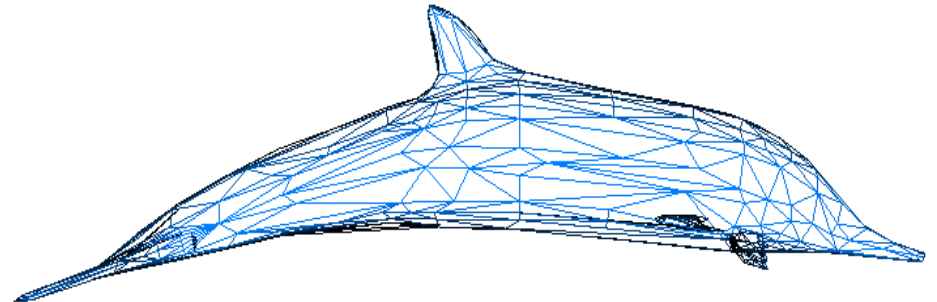
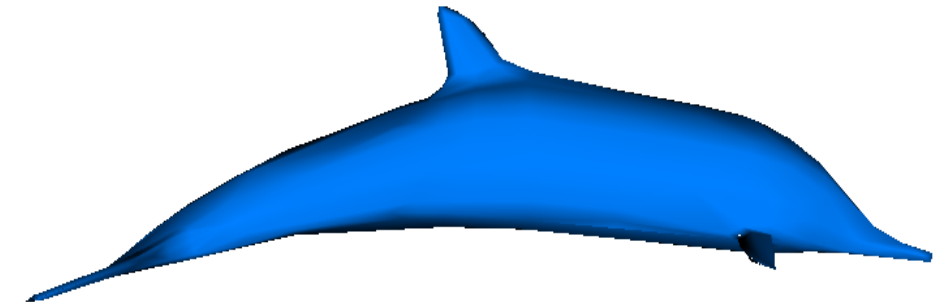
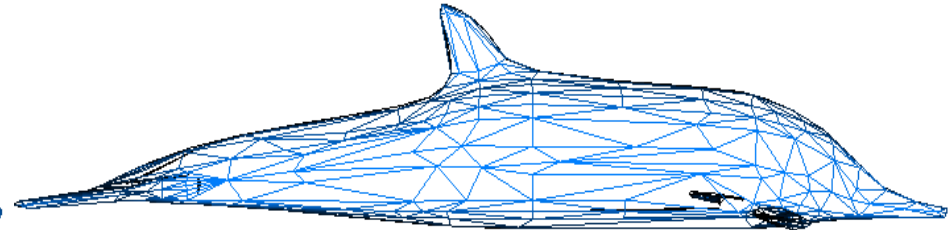
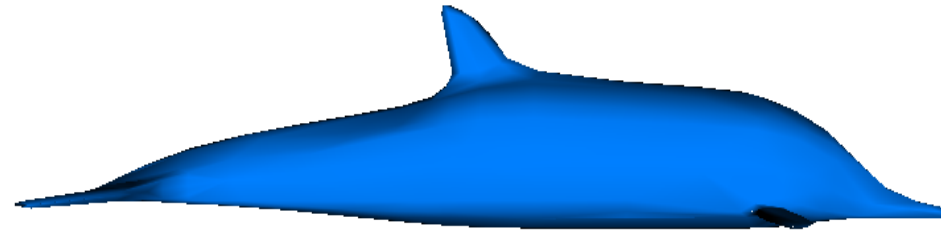
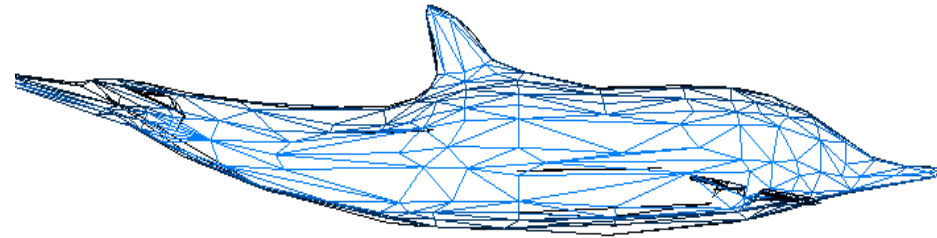
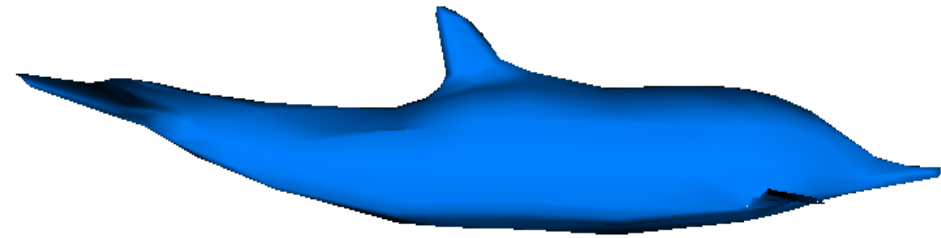
508 coordinate(s) (column triples)

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>



Bookmarks

- 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





# 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	Session	Description	.pdf
<a href="#">Examples</a>			
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	

# 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

Online learning resource: course video podcasts!

# Summary

X3D-Edit is useful for learning, producing, improving and extending X3D scenes

Many great resources are available for learning 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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# Open-source license for X3D-Edit software and X3D example scenes

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

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X3D Graphics for Web Authors

# X3D-Edit Authoring Tool

3 August 2012

Don Brutzman

Naval Postgraduate School (NPS)

*brutzman@nps.edu*



# X3D-Edit Motivation

Provide a simple, excellent authoring tool for X3D

Teach X3D to anyone who can author HTML

Unlock all of the great work by Web3D partners

Learn by doing, and help further X3D progress



# 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

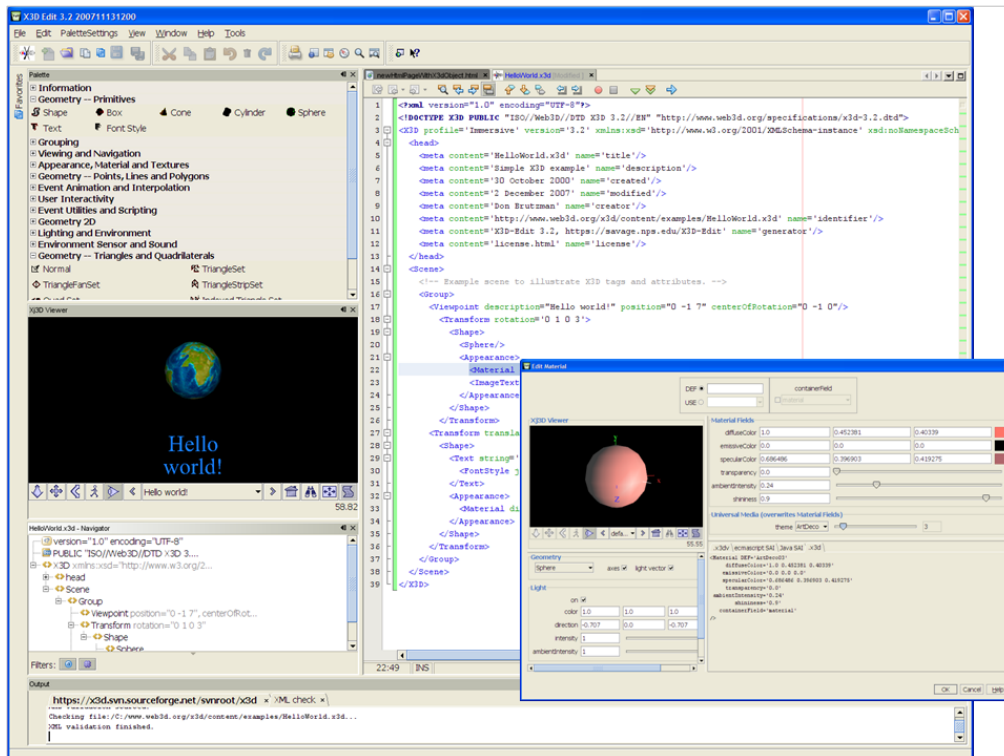
Explain broad principles and specific details of X3D for anyone learning how to build 3D models



Excerpted and adapted from Chapter 1, *X3D Graphics for Web Authors*  
<http://x3dGraphics.com>



X3D-Edit home page is online at <https://savage.nps.edu/X3D-Edit>

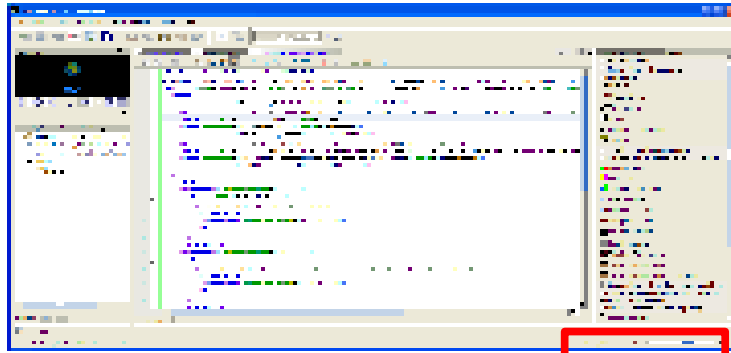


- As the name implies, X3D-Edit is primarily oriented towards editing X3D text. Additional features include:
- Pop-up editors for each node
  - Palette for dragging/dropping new nodes
  - Xj3D scene visualization
  - XML tree view
  - Automatic code completion and element matching
  - Validation and error checking
  - Help system including multilingual tooltips, X3D specifications, examples help and X3D Scene Authoring Hints
  - Automatic updates

<https://savage.nps.edu/X3D-Edit>

# X3D-Edit updates

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

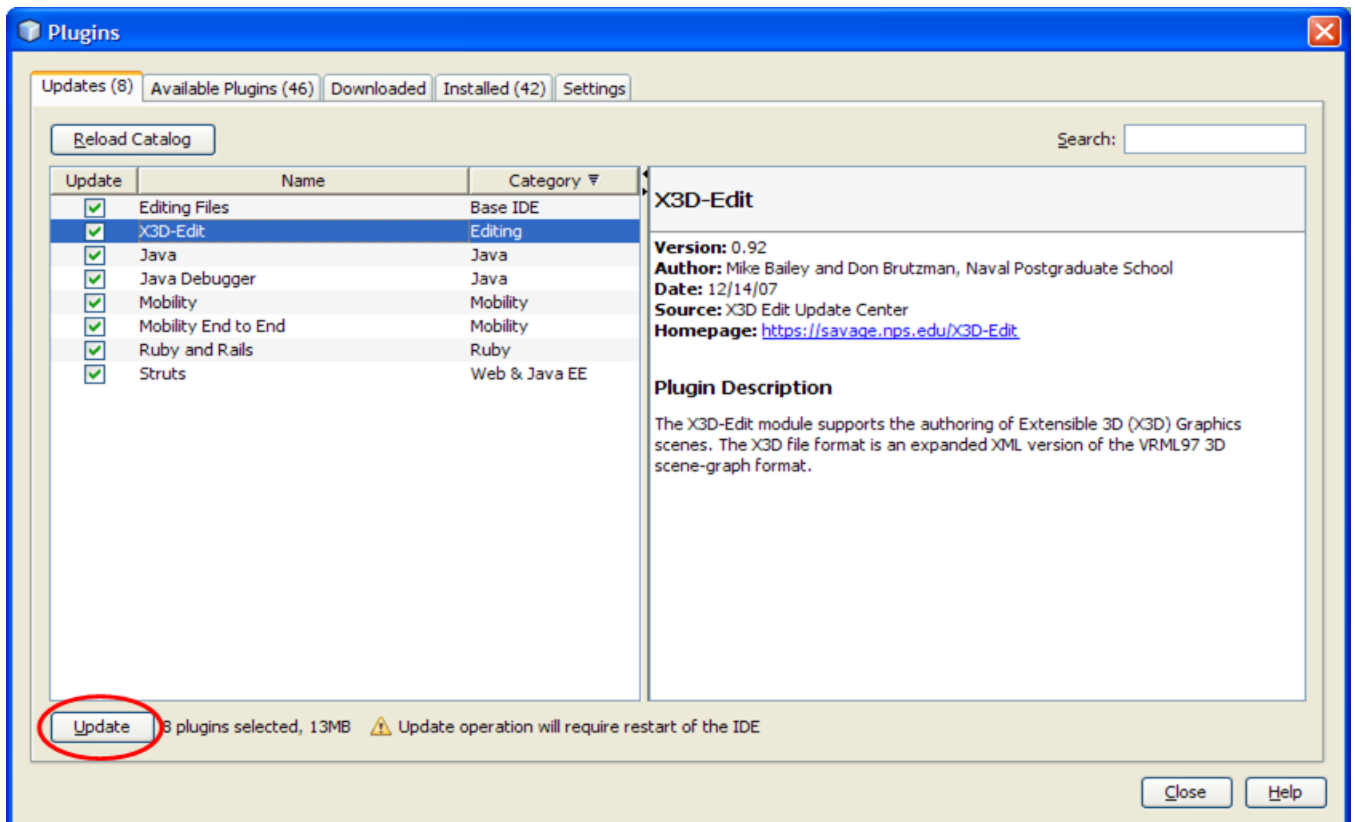


web|3D  
CONSORTIUM

Plugin available: click



It is also possible to manually trigger an X3D-Edit update, if one is available.  
From top menu, select *Tools > Plugins > Updates* and then click the Update button.





# 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 products.

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



# Availability: 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*: Byoungyun Yoo, Jeff Weekley, Don Brutzman

Sourceforge version control  
for easy updating

web|3D  
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 products.

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



# X3D Examples Archives

*X3D for Web Authors* 244 models

- Textbook on how to design and build X3D scenes

*Basic* 653 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* 1181 models

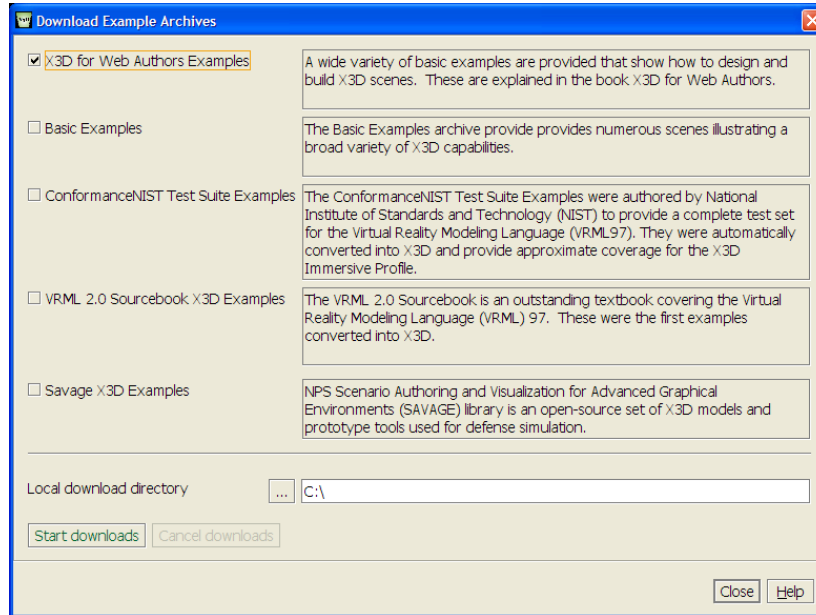
- Open-source military models and tools



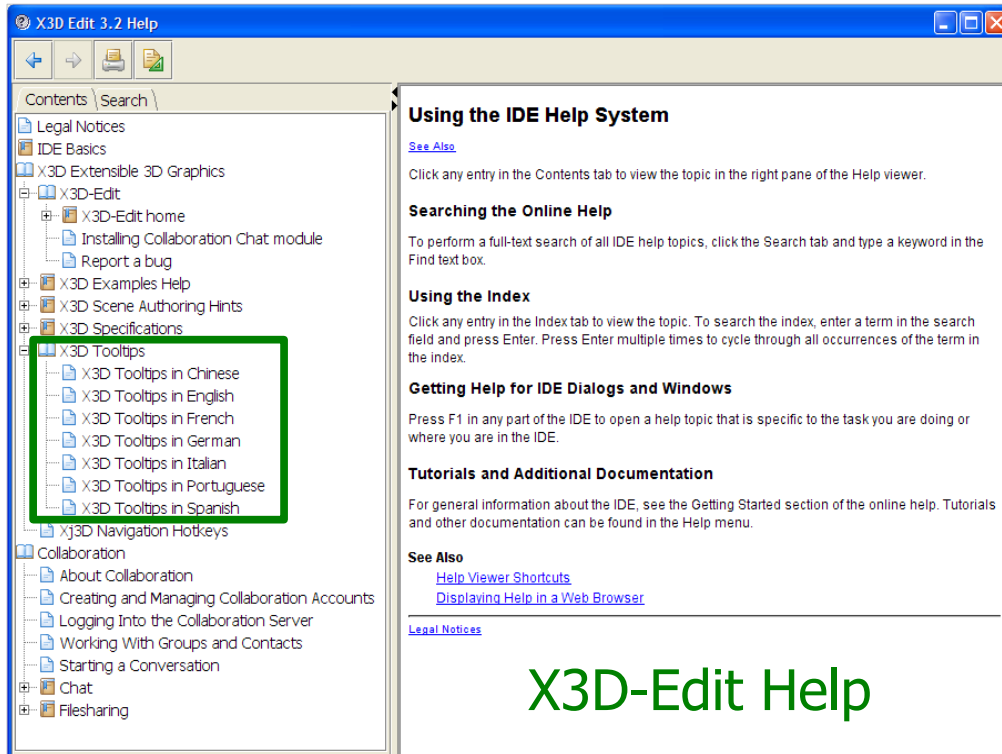
3000+ models available



## X3D Examples download panel, X3D-Edit



X3D-Edit includes this download panel. Select the top-level *Examples* menu, then *Download X3D Example Archives*.



F1 or the Help menu launches the JavaHelp system.

## 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



<http://www.xj3d.org>

<http://www.web3d.org/x3d/content/examples/help.html#Applications>

# Player support for X3D components

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Public X3D Wiki  
Tutorials for X3D  
Nodes & Concepts

navigation

- Main Page
- Web3D News
- Upcoming X3D events
- X3D Specifications
- Recent changes
- Random page
- Help
- Join the Consortium

search

Go Search

toolbox

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

page | discussion | edit | history | delete | move | protect | 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 pages: Plug-in and browser compliance, Tool support for X3D components, X3D Resources: Applications, X3D Implementations, and X3D Plugfest.

**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	BS Contact Family	FreeWRL, FreeX3D	H3DViewer	InstantPlayer	OctagaVS Player	OpenVRML	SwirlX3D	view3dscene	Xj3D
<b>Versions</b>	v8.0	v1.22.8	v2.1	2.1	v4.0	v0.17.9	v2.1.7	v3.11.0	1.0
<b>Status</b>	Active	Active	Active	Active	Active	Active	Active	Active	Active
<b>X3D Conformance Certification</b>	Interchange Profile	Interchange Profile	none	none	none	none	none	none	Interchange Profile
<b>File Encodings</b>									
XML (x3d)	yes	yes	yes	yes	yes	?	yes	yes	yes
ClassicVRML (x3dv)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Compressed Binary Encoding (x3db)	yes	no	no	partial	no	no	no	no	yes
VRML 97 (v2.0) (.wrl)	yes	yes	yes	yes	yes	yes	?	yes	yes
VRML 1 (v1.0) (.wrl)	no	yes	no	?	?	?	?	yes	?
<b>X3D component list</b>									
CAD geometry	yes	no	no	yes	yes	partial	yes	partial	yes
Core	yes	yes	yes	yes	yes	yes	yes	yes	yes

Accessed 13 December 2008

[http://www.web3d.org/x3d/wiki/index.php/Player\\_support\\_for\\_X3D\\_components](http://www.web3d.org/x3d/wiki/index.php/Player_support_for_X3D_components)

# Tool support for X3D components

page | discussion | edit | history | delete | move | protect | unwatch

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- Main Page
- Web3D News
- Upcoming X3D events
- X3D Specifications
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- Help
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**Tool support for X3D components**

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This table records support for the official X3D components by each of the various X3D authoring tools and X3D conversion tools. It is maintained by the X3D Working Group and member companies in the Web3D Consortium.

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Related pages: Plug-in and browser compliance, Player support for X3D components, X3D Resources: Authoring Software, X3D Implementations, and X3D Plugfest.

**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

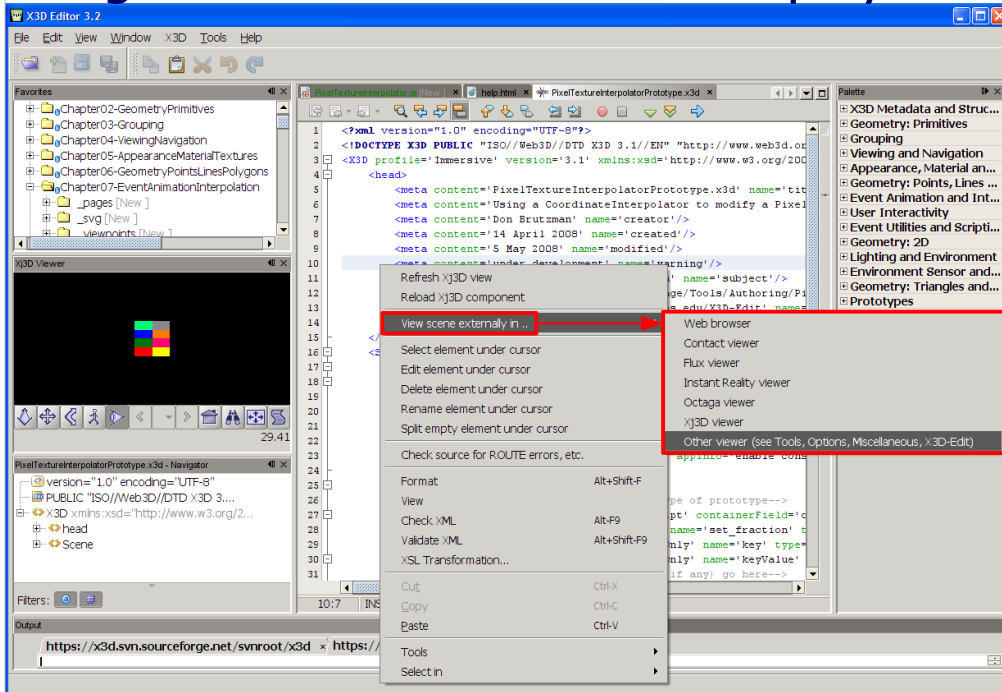
Types	Authoring tools					Conversion tools			
	BS Editor	SwirX3D Editor	X3D-Edit	Flux Studio	Vivaty Studio	Okino Polytrans	SwirX3D Translator	X3D Filter Chain	
<b>Tools</b>									
<b>Versions</b>	v7.1	v3.0.0	v3.2	v2.1	v1.0 build 900	v5.0	v3.0.0	v2.0	
<b>Profiles</b>	nearly Full Profile	TBD	nearly Full Profile	Immersive Profile	Immersive Profile	Immersive Profile	Immersive Profile	nearly Full Profile	
X3D Conformance Certification	none	none	Interchange Profile	Interchange Profile	Interchange Profile	none	none	Interchange Profile	
<b>File Encodings</b>									
XML (X3D)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Class:VRML (x3dv)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Compressed Binary Encoding (x3db)	yes	no	yes	no	no	no	no	no	yes
VRML 97 (v2.0) (wrl)	?	?	yes	yes	yes	yes	?	?	yes
VRML 1 (v1.0) (wrl)	?	?	no	partial	partial	yes	?	no	
<b>X3D component list</b>									
CAD geometry	yes	yes	yes	no	no	yes	yes	yes	yes
Core	yes	yes	yes	yes	yes	yes	yes	yes	yes
Cube map environmental texturing	yes	no	partial	partial	partial	no	no	no	no
Distributed interactive simulation (DIS)	no	no	yes	no	no	no	no	no	yes
Environmental effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
Environmental sensor	yes	yes	yes	yes	yes	no	yes	yes	yes

Accessed 13 December 2008

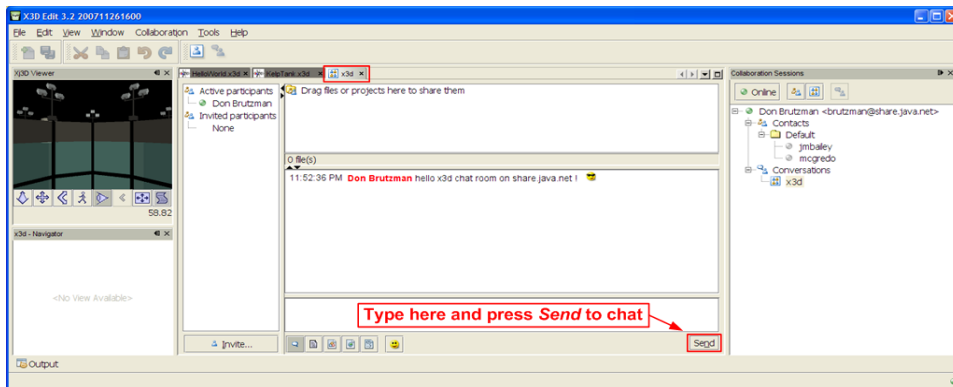
[http://www.web3d.org/x3d/wiki/index.php/Tool\\_support\\_for\\_X3D\\_components](http://www.web3d.org/x3d/wiki/index.php/Tool_support_for_X3D_components)



# 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

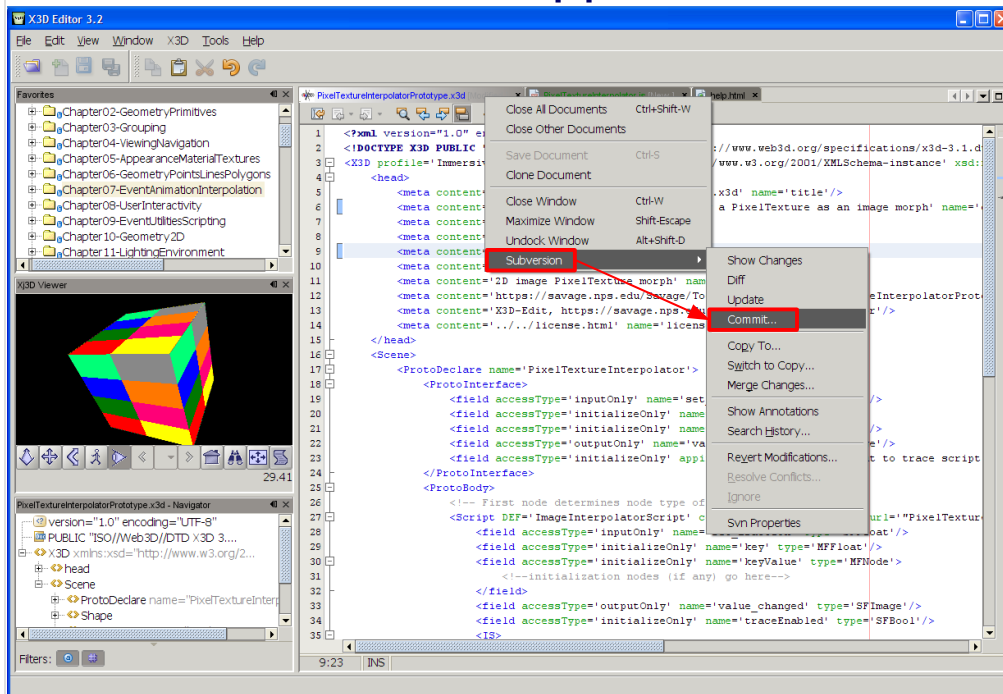
web|3D  
CONSORTIUM



X3D-Edit collaboration chat installation page available at

- <https://savage.nps.edu/X3D-Edit/XmppChatCollaborationModule.html>

# Version control support included

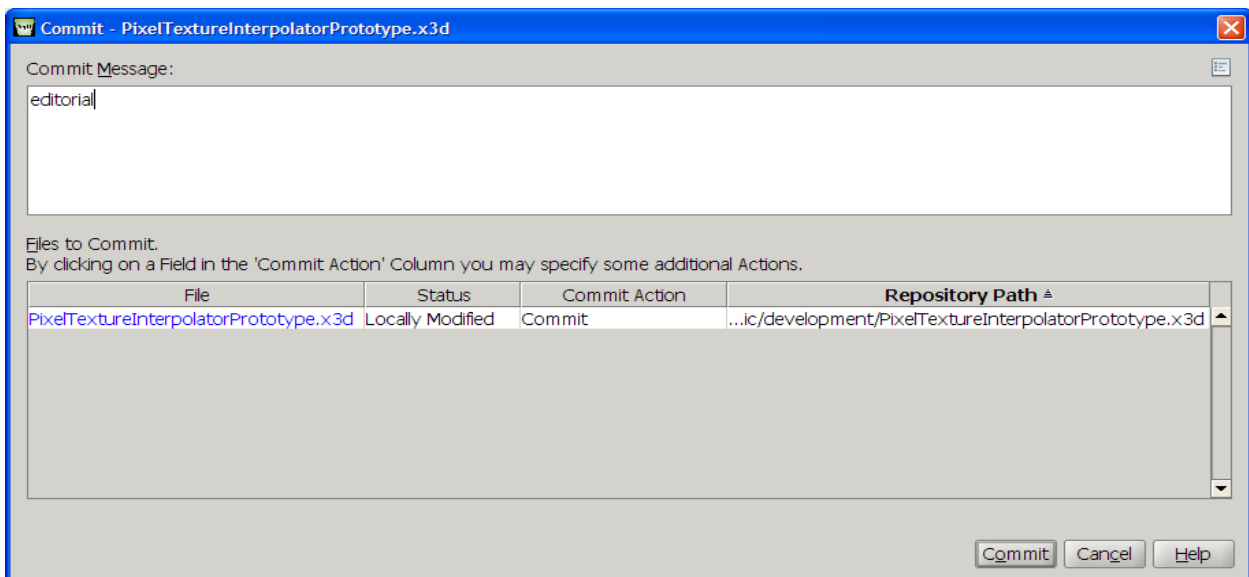


Version control allows multiple authors to share updates and work together.  
Prerequisite: you must have the Collabnet subversion client installed.

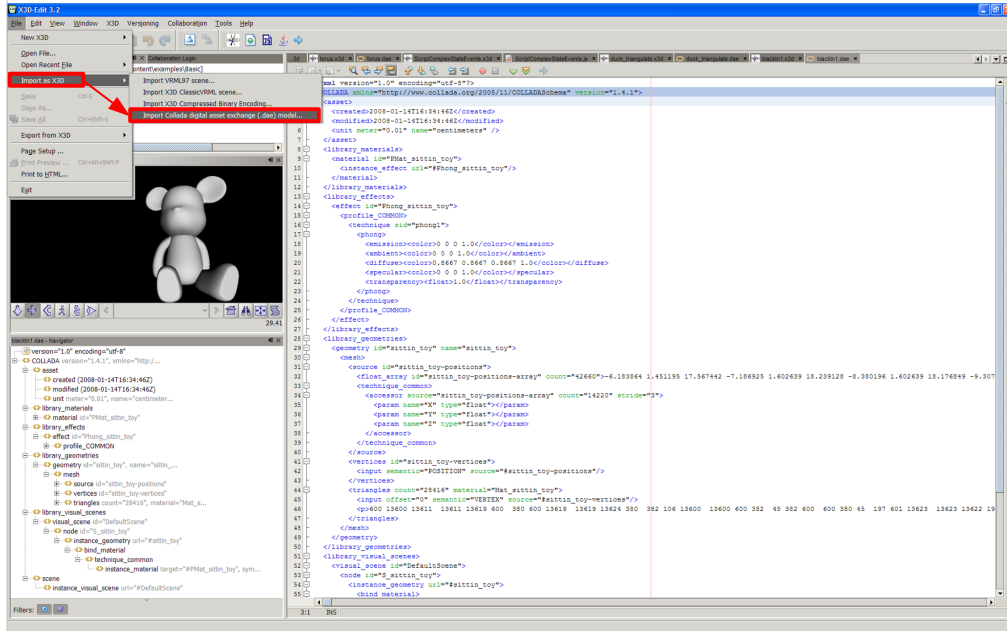
If the file being edited is under version control, the Netbeans platform detects that and offers Subversion or CVS version control (as appropriate) without further setup.

Developers can work with X3D-Edit directly to update, diff (difference compare) and commit any file changes. X3D-Edit 3.2 subversion master source is at

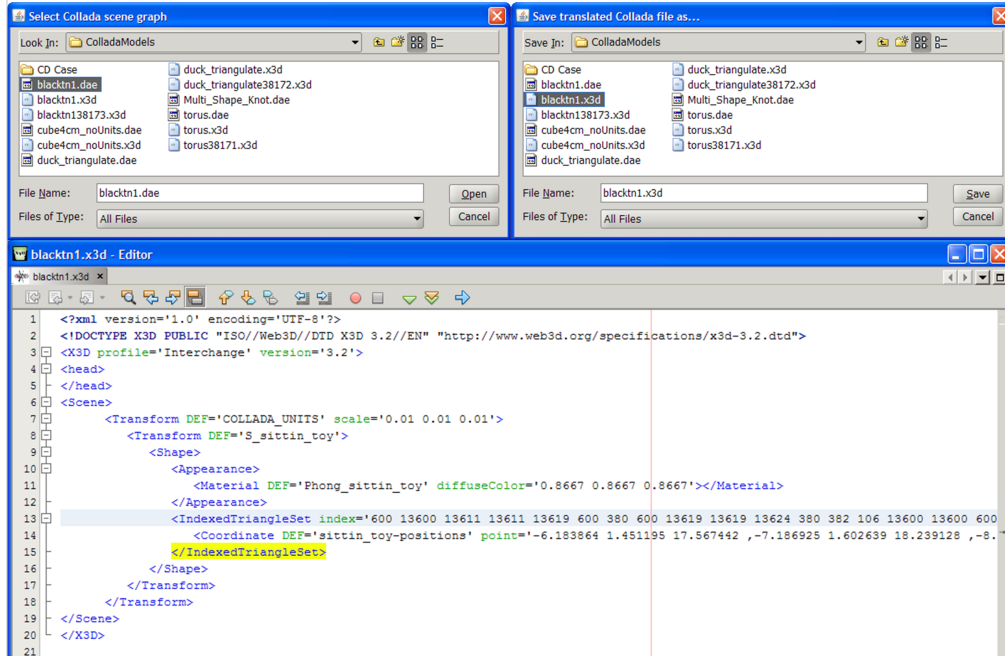
<http://x3d.svn.sourceforge.net/viewvc/x3d/www.web3d.org/x3d/tools/X3dEdit3.2>



# 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++
- 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

- In progress
- Goal: aid development, testing of new protocols



# DIS Networking Test Panel

The screenshot displays the X3D-Edit 3.2 interface. On the left, a 3D scene shows a yellow rectangular prism on a coordinate system with X, Y, and Z axes. The central pane contains XML code for a scene, including metadata, a scene description, and a transform for a box. On the right, the 'DIS ESPDU Test Panel' is visible, featuring sliders for translation (x, y, z) and rotation (phi, theta, psi) around the axes. The 'DIS Settings' panel shows address, port, and application ID fields. A 'Scene' tree on the bottom left shows the hierarchy of objects in the scene.

**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

The screenshot displays the X3D Editor 3.2 interface with the DIS Networking Player-Recorder Panel. The main window is divided into several sections:

- 3D Viewer:** A 3D coordinate system with X, Y, and Z axes. A yellow rectangular object is positioned in the center.
- Entity List:** A list of entity states, including:
  - 79 ENTITY\_STATE 14.211912687
  - 80 ENTITY\_STATE 14.237453643
  - 81 ENTITY\_STATE 14.256903813
  - 82 ENTITY\_STATE 14.286980228
  - 83 ENTITY\_STATE 14.323127914
  - 84 ENTITY\_STATE 14.368727063
  - 85 ENTITY\_STATE 14.405869688
  - 86 ENTITY\_STATE 14.91336357
  - 87 ENTITY\_STATE 14.931027826
  - 88 ENTITY\_STATE 14.949399714
  - 89 ENTITY\_STATE 14.966453792
  - 90 ENTITY\_STATE 15.225262428
  - 91 ENTITY\_STATE 15.259172019
  - 92 ENTITY\_STATE 15.267794386
  - 93 ENTITY\_STATE 15.2851449
  - 94 ENTITY\_STATE 15.293875059
  - 95 ENTITY\_STATE 15.311404941
  - 96 ENTITY\_STATE 15.320561897
  - 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 15.580003992
  - 104 ENTITY\_STATE 15.60751129
  - 105 ENTITY\_STATE 15.632799979
  - 106 ENTITY\_STATE 15.640490342
  - 107 ENTITY\_STATE 15.670304749
  - 108 ENTITY\_STATE 15.693986526
  - 109 ENTITY\_STATE 15.824318174
  - 110 ENTITY\_STATE 15.850963826
  - 111 ENTITY\_STATE 15.881707032
  - 112 ENTITY\_STATE 15.950148133
  - 113 ENTITY\_STATE 16.000276571
  - 114 ENTITY\_STATE 16.75206155
  - 115 ENTITY\_STATE 16.763808151
  - 116 ENTITY\_STATE 16.802593067
  - 117 ENTITY\_STATE 16.822369663
  - 118 ENTITY\_STATE 16.840930767
  - 119 ENTITY\_STATE 16.859243563
  - 120 ENTITY\_STATE 16.876472568
  - 121 ENTITY\_STATE 16.893586507
  - 122 ENTITY\_STATE 16.913356611
  - 123 ENTITY\_STATE 16.929247991
- PDU Header:** Fields for protocol version, exercise ID, PDU type, and protocol family.
- Entity ID:** Fields for entity ID, simulation site ID, and simulation application ID.
- Articulation Parameters:** A field for articulation number.
- Entity Type:** A table with columns for kind, domain, country, category, subcategory, specific, and extra.
- Alternative Entity Type:** A table with columns for kind, domain, country, category, subcategory, specific, and extra.
- Entity Linear Velocity:** Fields for linear velocity components.
- Entity Location:** Fields for entity location components.
- Entity Orientation:** Fields for orientation parameters (psi, theta, phi).
- Dead Reckoning Parameters:** Fields for algorithm, angular velocity, and linear acceleration.
- Entity Marking:** Fields for character set and marking data.
- DIS Settings:** Fields for address, port, site ID, application ID, and entity ID.



# X3D Earth, Geospatial Component

## Editing and authoring support provided

The screenshot displays the X3D-Edit 3.7 application interface. On the left, a 3D viewer shows a globe. The central pane is a code editor containing X3D XML code. A green box highlights a specific XML node: `<!-- 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/'/>`. The right pane shows a 'X3D Metadata and Structure' tree. At the bottom, a comic strip strip from Sun Dec 28 00:00:00 PST 2008 is visible.

# Humanoid Animation (H-Anim)

ISO standard for human skeletons, skin

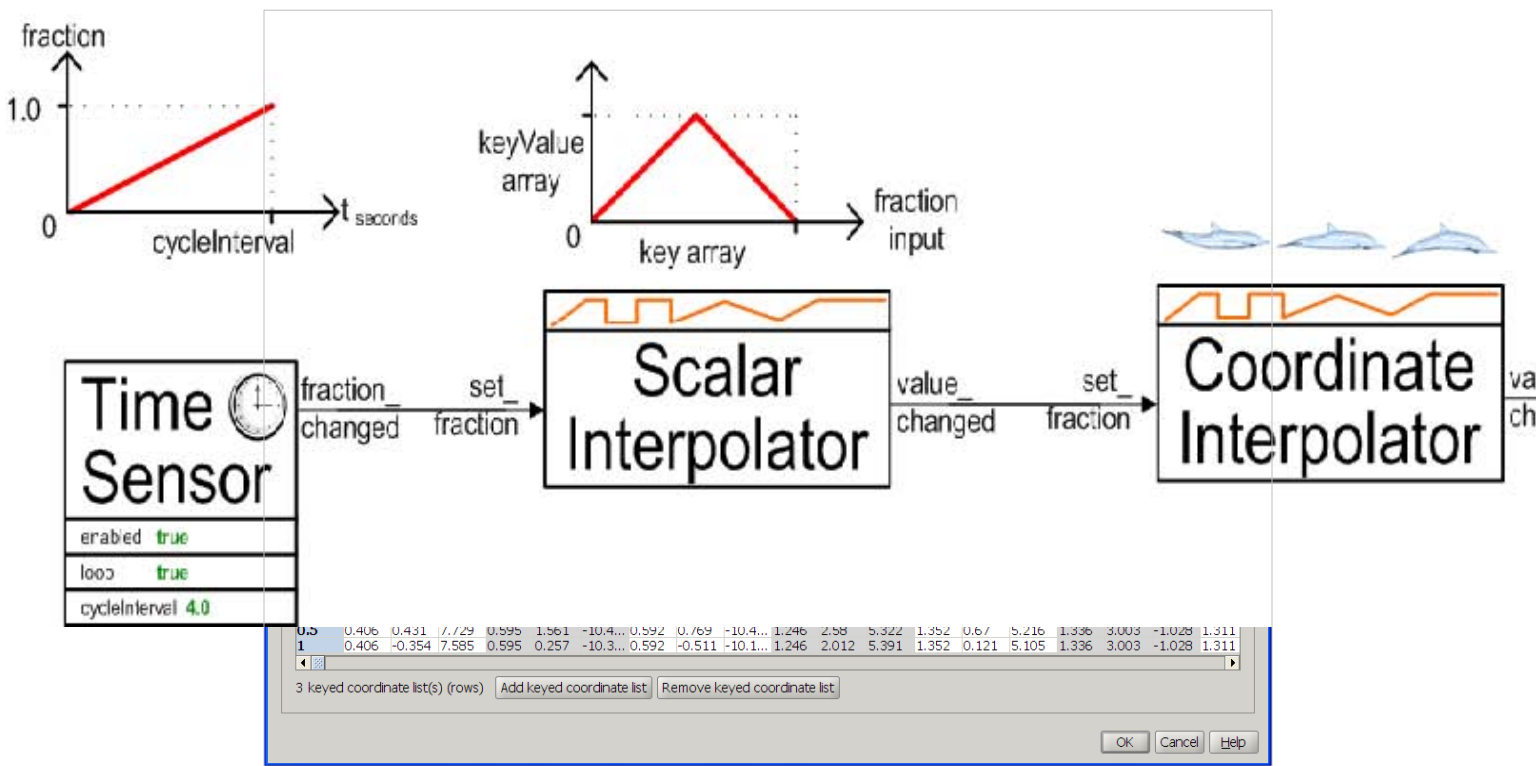
- Supported in X3D-Edit, other tools

Examining support for non-humanoid skeletons

NPS working on composable, reusable behaviors

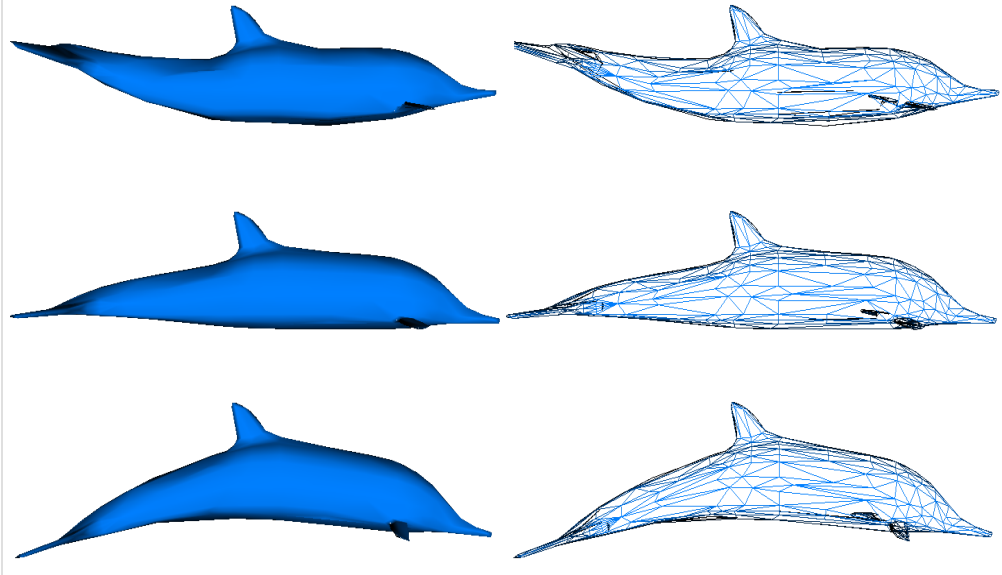
- From motion capture (Vicon Peak system)?
- From different motion formats?





## Creating a morphable dolphin

Chris Lang, Monterey High School



<https://savage.nps.edu/Savage/Biologics/Dolphin/DolphinPose02.x3d>

<https://savage.nps.edu/Savage/Biologics/Dolphin/DolphinPose01.x3d>

<https://savage.nps.edu/Savage/Biologics/Dolphin/DolphinPose03.x3d>

X3jD viewer wireframe mode is toggled with key Alt-w

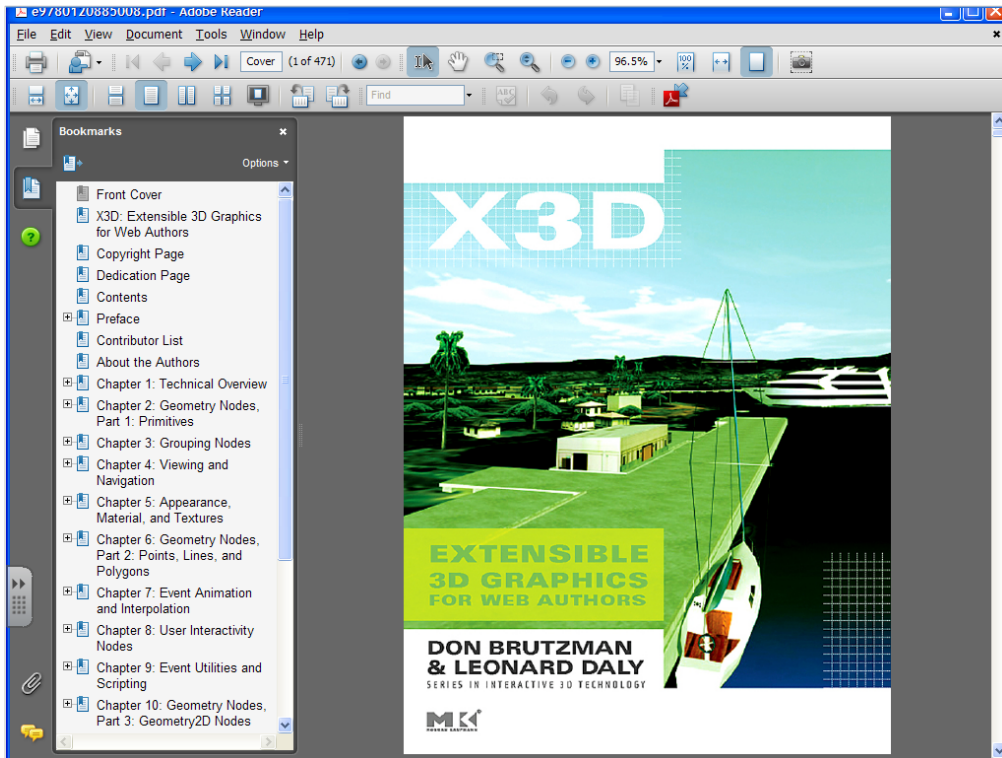
[back to Table of Contents](#)

# X3D for Web Authors

Textbook, slidesets, examples, videos

<http://x3dGraphics.com>







## 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	

# 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

### Online learning resource: course video podcasts!





## Summary

X3D-Edit is useful for learning, producing, improving and extending X3D scenes

Many great resources are available for learning and using X3D

These community capabilities are good for business, educators, individuals

We welcome your active participation in Web3D Consortium



# Contact

**Don Brutzman**

*brutzman@nps.edu*

*<http://web.nps.navy.mil/~brutzman>*

Code USW/Br, Naval Postgraduate School

Monterey California 93943-5000 USA

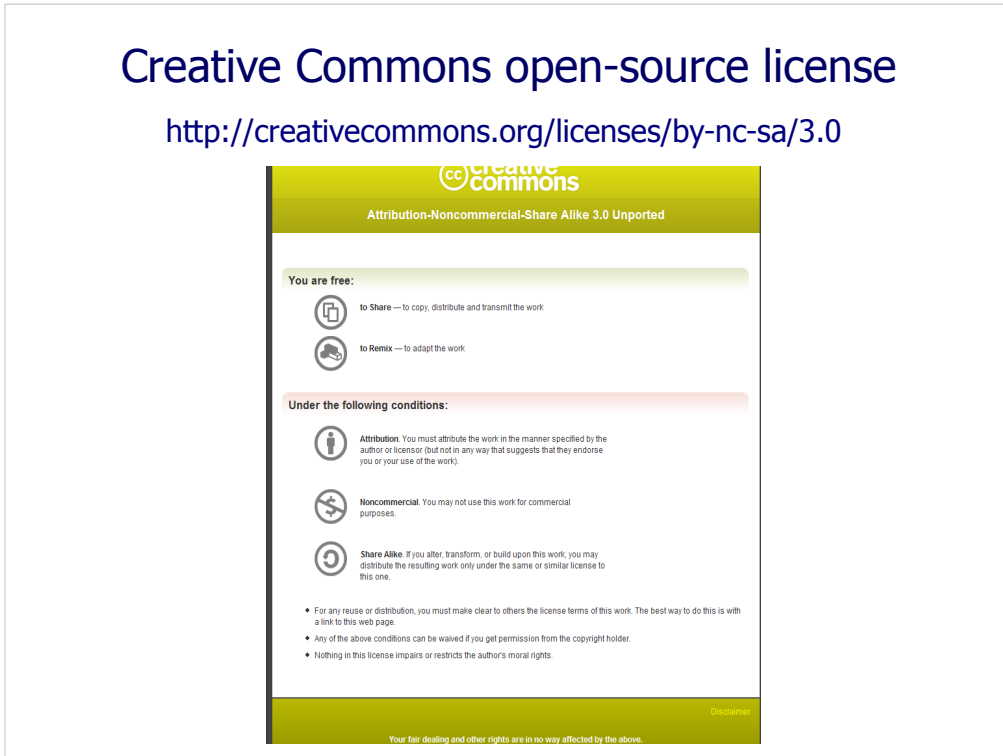
1.831.656.2149 voice

1.831.656.7599 fax



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# Open-source license for X3D-Edit software and X3D example scenes

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

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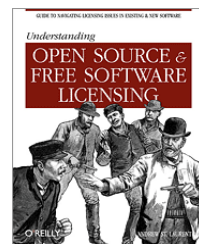
License available at

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

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

Good references on open source:

Andrew M. St. Laurent, *Understanding Open Source and Free Software Licensing*, O'Reilly Publishing, Sebastopol California, August 2004. <http://oreilly.com/catalog/9780596005818/index.html>



Herz, J. C., Mark Lucas, John Scott, *Open Technology Development: Roadmap Plan*, Deputy Under Secretary of Defense for Advanced Systems and Concepts, Washington DC, April 2006. <http://handle.dtic.mil/100.2/ADA450769>

