

Fluid Simulation Plugin User Manual

GNU GPL (General Public License)

Information for Blender Software

Some screenshots in this document have been acquired from the 3D application, Blender.

Blender can be acquired at:

<http://www.blender.org>

Blender is GNU GPL (General Public License) software.

Credits

I would like to express my sincerest gratitude for the following people for their help in testing the fluid simulation importer package, and for their feedback and support:

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Augusto Michelis (Prodigy)

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Richard Levy (RichLevy)

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David Egan (trueBlue)

Tomas Bujnak (tomasb)

Martin Kusnier (Martin)

Tom Grimes (TomG)

Vladimir Sisolak (Vladimir)

Paul Ashington (PaulA)

About the Fluid Simulation Plugin Package

The following folders are what you should have in your package:

- 1) User Manual – contains this document
- 2) Auto Setup for Fluids Importer – contains the setup.exe and Fluids_Importer_RSX_Setup.msi files
setup.exe will automatically install required system components for running the plugin.
- 3) Manual Setup for Fluids Importer – contains the FluidImporter.rsx plugin file.
Refer to this folder if you choose to configure your system manually by running vcsetup_x86.exe and running the .NET 2.0 or .NET 3.51 setup programs from Microsoft.
Manual setup is discussed in this document.
- 4) Blender Domain Importer – contains the Domain_export.py python script which will be installed in the blender .scripts directory. It is required for exporting the fluid Domain. The process is explained in this document. In addition, a copy of the GPL License is contained in the GPL License folder. The GPL License is required for the Domain_export.py script Only.
- 5) Sample Scenes and Objects - This directory contains the following:
 - a) TS_Collada_Exported folder – contains the brewscene.dae Collada file, exported from trueSpace. This is the file that is created when you export the trueSpace scene in Collada format.
This process is described in the Workflow tutorial in this document.
 - b) Blender Files – this folder contains the files brewscene.bin and brewscene.blend
brewscene.blend is the blender file that was created after importing the brewscene.dae file into blender. After import, it was saved to blender format.
brewscene.bin is the fluid Domain file created in blender as a result of selecting the fluid domain and exporting using the Export->Fluid Domain option in blender. Its use is described in the Workflow tutorial in this document.

About the Fluid Simulation Plugin Package, continued

The following folders are what you should have in your package:

5) Sample Scenes and Objects, continued

c) TS_RsScn_RsObj – this folder contains the following:

Brewscene.RsScn – this is an example scene for fluids import. There are two very important nodes in this scene (FluidInitOnLoadScript.RsObj, and Scene Fluid Controller.RsObj), described below.

When you create your own scenes from scratch, make sure these two nodes are included in your scene.

FluidInitOnLoadScript.RsObj – this node performs important scene initialization. This is required in every scene for fluid simulation, at the Scene level.

Scene Fluid Controller.RsObj – this is the Panel Interface for controlling Fluid Simulation. This is required in every scene for fluid simulation, at the Scene level.

6) Sample Mesh Data (Optional Download) – this folder contains the following:

fluidsurface_final_####.obj.gz files – these are sample data files generated from blender.

These can be used for becoming accustomed to the fluid sim import process, which is covered in this document.

fluidsurface_final_####.obj.gz.RsObj files – these are sample files which have already been converted using the fluid sim importer plugin.

These can be used for becoming accustomed to the playback process, which is covered in this document.

Creating a Scene From Scratch

If you want to create a scene from scratch, you need, at a minimum, the two RsObj objects in the TS_RsScn_RsObj folder:

FluidInitOnLoadScript.RsObj – this node performs important scene initialization. This is required in every scene for fluid simulation, at the Scene level.

Scene Fluid Controller.RsObj – this is the Panel Interface for controlling Fluid Simulation. This is required in every scene for fluid simulation, at the Scene level.

Load these two files into a blank scene.

Then, Save the Scene.

Finally. Reload the scene.

The scene is now ready to go.

Why do I need to reload the scene?

The FluidInitOnLoadScript.RsObj object performs important initialization steps on scene load.

Getting Started: Auto or Manual Setup

Prior to using the plugin, your system may need to be configured to support Microsoft .NET Framework 3.51.

Automatic setup:

The setup.exe executable resides in the folder: Auto Setup for Fluids Importer RSX.

If you choose this option, double click setup.exe.

This will autodetect the presence of .NET Framework 3.51, and install it, if it does not exist on your system.

In addition, setup.exe will create a directory (by default, C:\TS_FluidsImporter_RSX) and unpack the plugin file (FluidImporter.rsx) into that folder.

From there, you can install the plugin into trueSpace. The plugin installation procedure begins on the following page, in the section: Installing the Plugin.

Manual Setup:

You also have the option to manually check for the existence of .NET Framework 3.51, and install if necessary.

If you choose this option, go to your Control Panel, and select Add/Remove Programs.

If you have Microsoft .NET Framework 3.51 or higher installed, skip directly to the next section, Installing the Plugin, and follow the instructions.

If you do not have Microsoft .NET Framework 3.51 or higher installed, proceed to the last page of this document, entitled .NET Framework Setup.

Installing the Plugin

The plugin must be installed into truespace prior to using the interface.

To do so, locate the truespace icon which is 4th from the lower right, in the Default configuration:



Click and hold this icon, and move the mouse upwards to get the flyout window for this icon set.

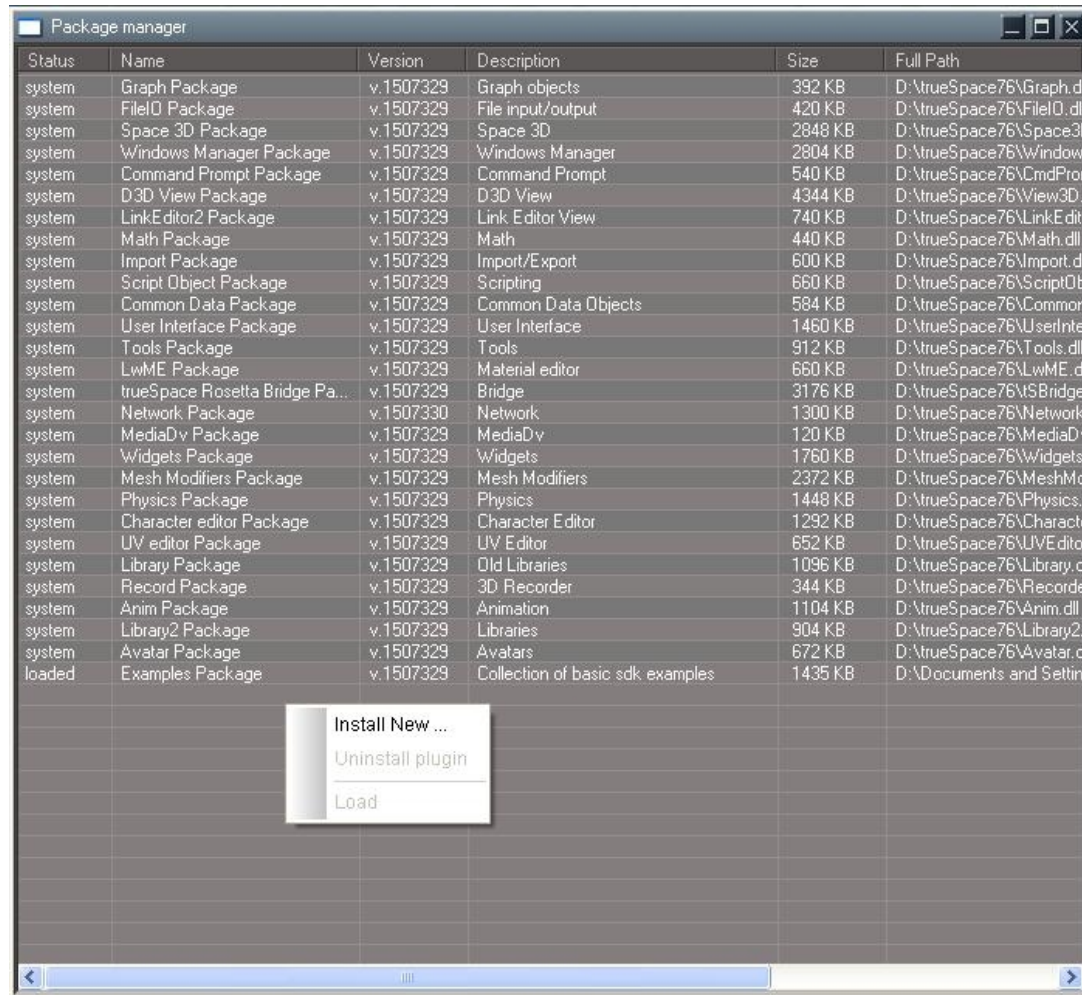
Select the Package Manager icon (it looks like a Power Outlet and a Power Plug)



Installing the Plugin, Continued

The package manager window appears.

Right click anywhere in the first empty row, and select: Install New



Installing the Plugin, Continued

The 'Install New Plugin' file dialog appears.

Navigate to the location where the plugin is located.

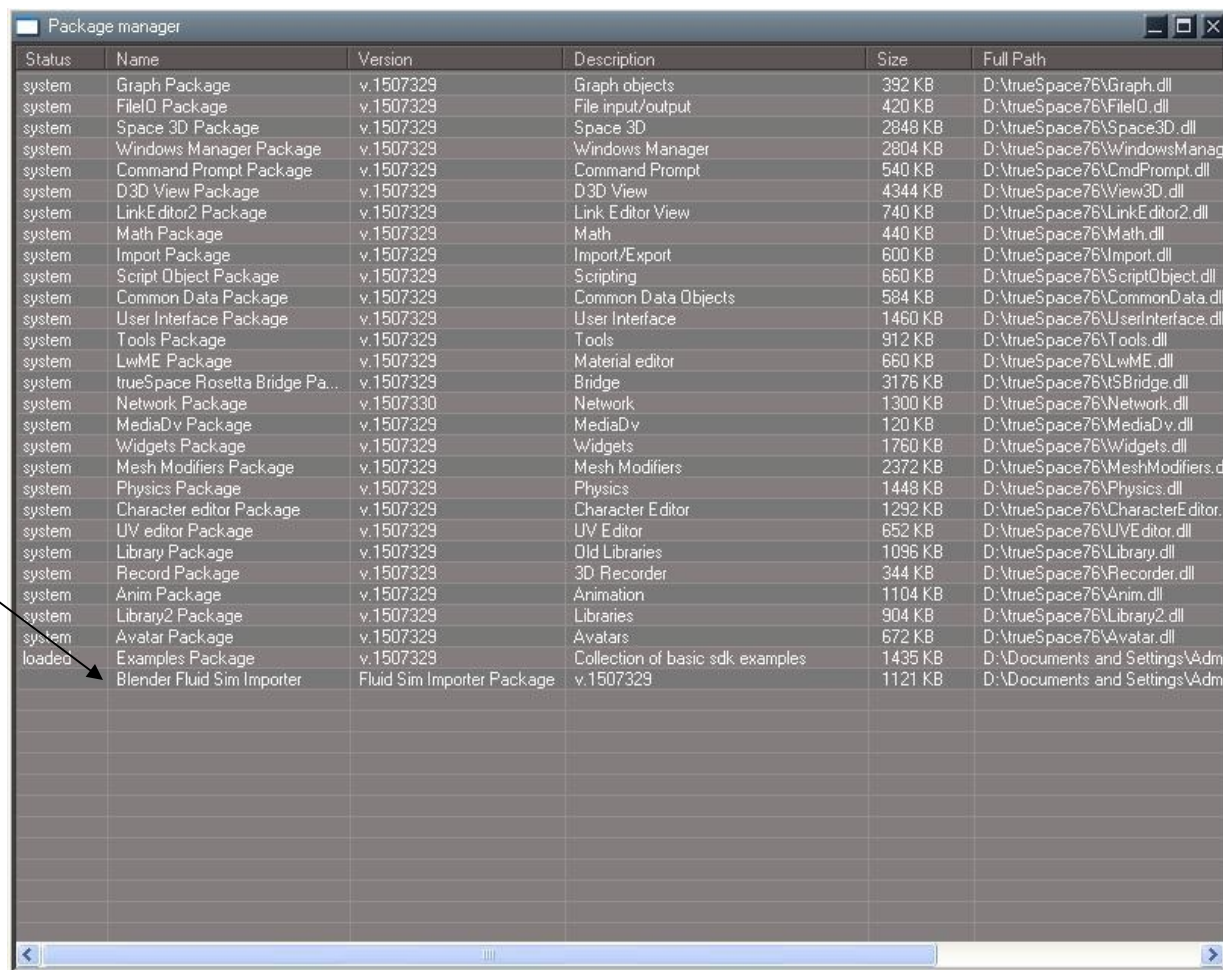
Select the filename, then select Open.

The plugin is now added to the Package manager.

If You Chose The Manual Install Option, and you do not see the plugin, you may need to run the Microsoft Visual C++ 2008 redistributable package (vcredist_x86.exe), then repeat the process. Go to the last page of this document, entitled .NET Framework Setup.

If You Chose The Manual Install Option, and you still cannot see the plugin installed, then you need to run the Microsoft .NET Framework Redistributable Package. Go to the last page of this document, entitled .NET Framework Setup.

Next step is to Load the plugin (shown on next slide)

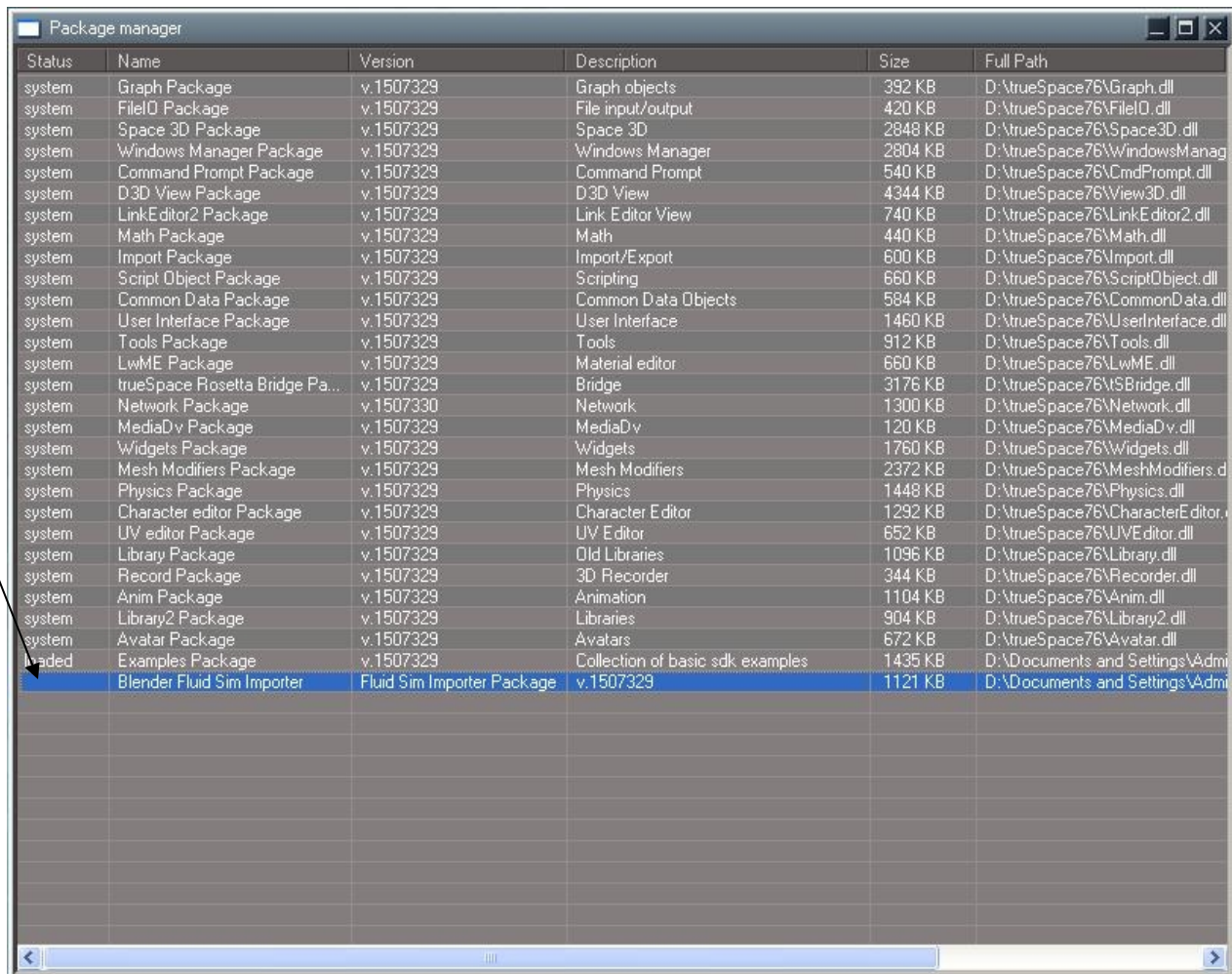


Status	Name	Version	Description	Size	Full Path
system	Graph Package	v.1507329	Graph objects	392 KB	D:\trueSpace76\Graph.dll
system	FileIO Package	v.1507329	File input/output	420 KB	D:\trueSpace76\FileIO.dll
system	Space 3D Package	v.1507329	Space 3D	2848 KB	D:\trueSpace76\Space3D.dll
system	Windows Manager Package	v.1507329	Windows Manager	2804 KB	D:\trueSpace76\WindowsManager.dll
system	Command Prompt Package	v.1507329	Command Prompt	540 KB	D:\trueSpace76\CmdPrompt.dll
system	D3D View Package	v.1507329	D3D View	4344 KB	D:\trueSpace76\View3D.dll
system	LinkEditor2 Package	v.1507329	Link Editor View	740 KB	D:\trueSpace76\LinkEditor2.dll
system	Math Package	v.1507329	Math	440 KB	D:\trueSpace76\Math.dll
system	Import Package	v.1507329	Import/Export	600 KB	D:\trueSpace76\Import.dll
system	Script Object Package	v.1507329	Scripting	660 KB	D:\trueSpace76\ScriptObject.dll
system	Common Data Package	v.1507329	Common Data Objects	584 KB	D:\trueSpace76\CommonData.dll
system	User Interface Package	v.1507329	User Interface	1460 KB	D:\trueSpace76\UserInterface.dll
system	Tools Package	v.1507329	Tools	912 KB	D:\trueSpace76\Tools.dll
system	LwME Package	v.1507329	Material editor	660 KB	D:\trueSpace76\LwME.dll
system	trueSpace Rosetta Bridge Pa...	v.1507329	Bridge	3176 KB	D:\trueSpace76\SBridge.dll
system	Network Package	v.1507330	Network	1300 KB	D:\trueSpace76\Network.dll
system	MediaDv Package	v.1507329	MediaDv	120 KB	D:\trueSpace76\MediaDv.dll
system	Widgets Package	v.1507329	Widgets	1760 KB	D:\trueSpace76\Widgets.dll
system	Mesh Modifiers Package	v.1507329	Mesh Modifiers	2372 KB	D:\trueSpace76\MeshModifiers.d
system	Physics Package	v.1507329	Physics	1448 KB	D:\trueSpace76\Physics.dll
system	Character editor Package	v.1507329	Character Editor	1292 KB	D:\trueSpace76\CharacterEditor.
system	UV editor Package	v.1507329	UV Editor	652 KB	D:\trueSpace76\UVEditor.dll
system	Library Package	v.1507329	Old Libraries	1096 KB	D:\trueSpace76\Library.dll
system	Record Package	v.1507329	3D Recorder	344 KB	D:\trueSpace76\Recorder.dll
system	Anim Package	v.1507329	Animation	1104 KB	D:\trueSpace76\Anim.dll
system	Library2 Package	v.1507329	Libraries	904 KB	D:\trueSpace76\Library2.dll
system	Avatar Package	v.1507329	Avatars	672 KB	D:\trueSpace76\Avatar.dll
loaded	Examples Package	v.1507329	Collection of basic sdk examples	1435 KB	D:\Documents and Settings\Admi
	Blender Fluid Sim Importer	Fluid Sim Importer Package v.1507329		1121 KB	D:\Documents and Settings\Admi

Installing the Plugin, Continued

Select the row where the fluid plugin has been installed.

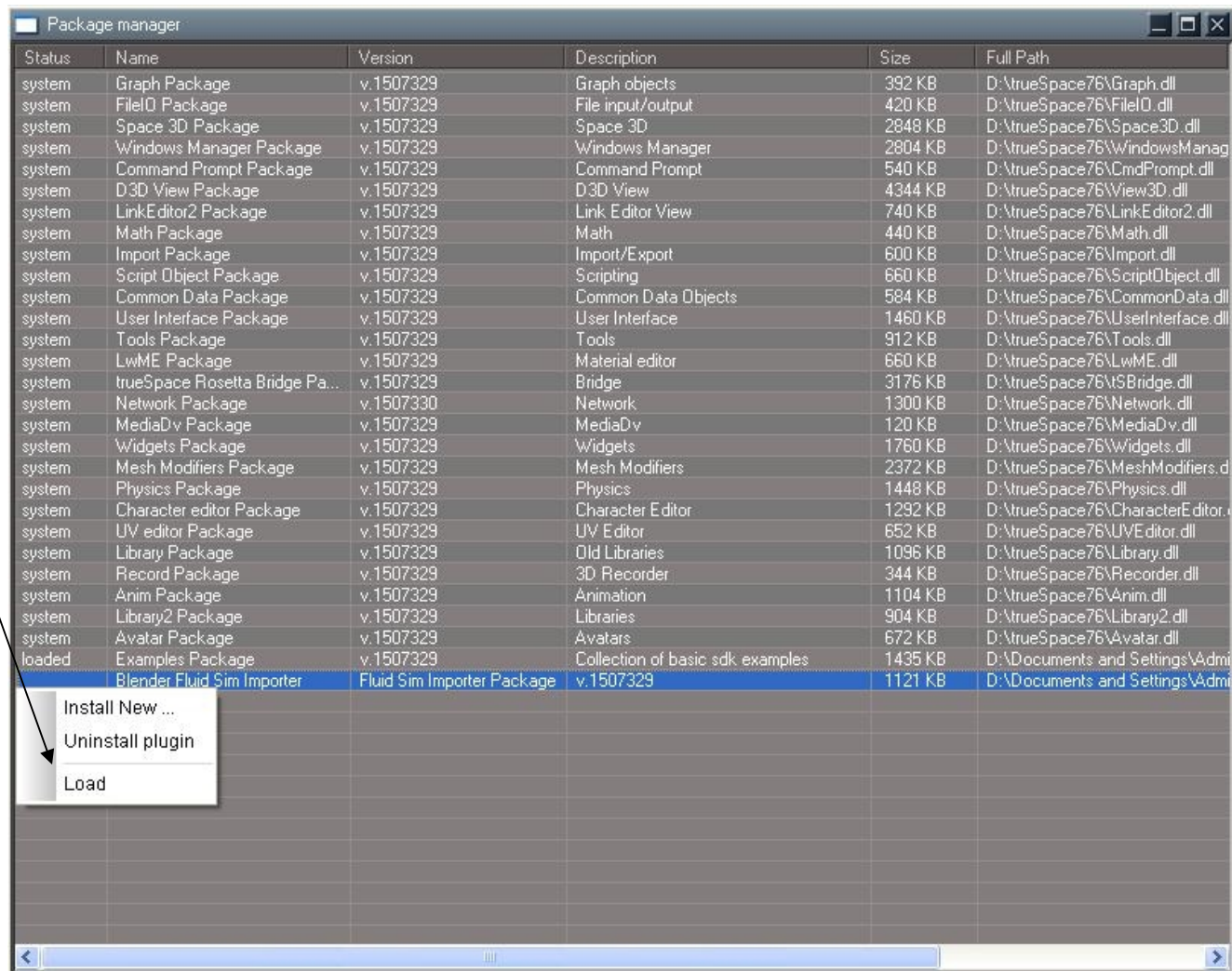
The row will be highlighted.



Installing the Plugin, Continued

Right Click anywhere in the selected row.

In the popup dialog that appears, select: Load



Installing the Plugin, Continued

The plugin is now loaded and ready for use.

Status	Name	Version	Description	Size	Full Path
system	Graph Package	v.1507329	Graph objects	392 KB	D:\trueSpace76\Graph.dll
system	FileIO Package	v.1507329	File input/output	420 KB	D:\trueSpace76\FileIO.dll
system	Space 3D Package	v.1507329	Space 3D	2040 KB	D:\trueSpace76\Space3D.dll
system	Windows Manager Package	v.1507329	Windows Manager	2804 KB	D:\trueSpace76\WindowsManager.dll
system	Command Prompt Package	v.1507329	Command Prompt	540 KB	D:\trueSpace76\CmdPrompt.dll
system	D3D View Package	v.1507329	D3D View	4344 KB	D:\trueSpace76\View3D.dll
system	LinkEditor2 Package	v.1507329	Link Editor View	740 KB	D:\trueSpace76\LinkEditor2.dll
system	Math Package	v.1507329	Math	440 KB	D:\trueSpace76\Math.dll
system	Import Package	v.1507329	Import/Export	600 KB	D:\trueSpace76\Import.dll
system	Script Object Package	v.1507329	Scripting	660 KB	D:\trueSpace76\ScriptObject.dll
system	Common Data Package	v.1507329	Common Data Objects	584 KB	D:\trueSpace76\CommonData.dll
system	User Interface Package	v.1507329	User Interface	1460 KB	D:\trueSpace76\UserInterface.dll
system	Tools Package	v.1507329	Tools	912 KB	D:\trueSpace76\Tools.dll
system	LwME Package	v.1507329	Material editor	660 KB	D:\trueSpace76\LwME.dll
system	trueSpace Rosetta Bridge Pa...	v.1507329	Bridge	3176 KB	D:\trueSpace76\TSBridge.dll
system	Network Package	v.1507330	Network	1300 KB	D:\trueSpace76\Network.dll
system	MediaDv Package	v.1507329	MediaDv	120 KB	D:\trueSpace76\MediaDv.dll
system	Widgets Package	v.1507329	Widgets	1760 KB	D:\trueSpace76\Widgets.dll
system	Mesh Modifiers Package	v.1507329	Mesh Modifiers	2372 KB	D:\trueSpace76\MeshModifiers.dll
system	Physics Package	v.1507329	Physics	1448 KB	D:\trueSpace76\Physics.dll
system	Character editor Package	v.1507329	Character Editor	1292 KB	D:\trueSpace76\CharacterEditor.dll
system	UV editor Package	v.1507329	UV Editor	652 KB	D:\trueSpace76\UVEditor.dll
system	Library Package	v.1507329	Old Libraries	1096 KB	D:\trueSpace76\Library.dll
system	Record Package	v.1507329	3D Recorder	344 KB	D:\trueSpace76\Recorder.dll
system	Anim Package	v.1507329	Animation	1104 KB	D:\trueSpace76\Anim.dll
system	Library2 Package	v.1507329	Libraries	904 KB	D:\trueSpace76\Library2.dll
system	Avatar Package	v.1507329	Avatars	672 KB	D:\trueSpace76\Avatar.dll
loaded	Examples Package	v.1507329	Collection of basic sdk examples	1435 KB	D:\Documents and Settings\Administrator\Desktop\trueSpace76\Examples
loaded	Blender Fluid Sim Importer	v.1507329	Fluid Sim Importer Package	1121 KB	D:\Documents and Settings\Administrator\Desktop\trueSpace76\BlenderFluidSimImporter

Testing the Plugin Installation

First off, Load the Truespace scene file: brewscene.RsScn.

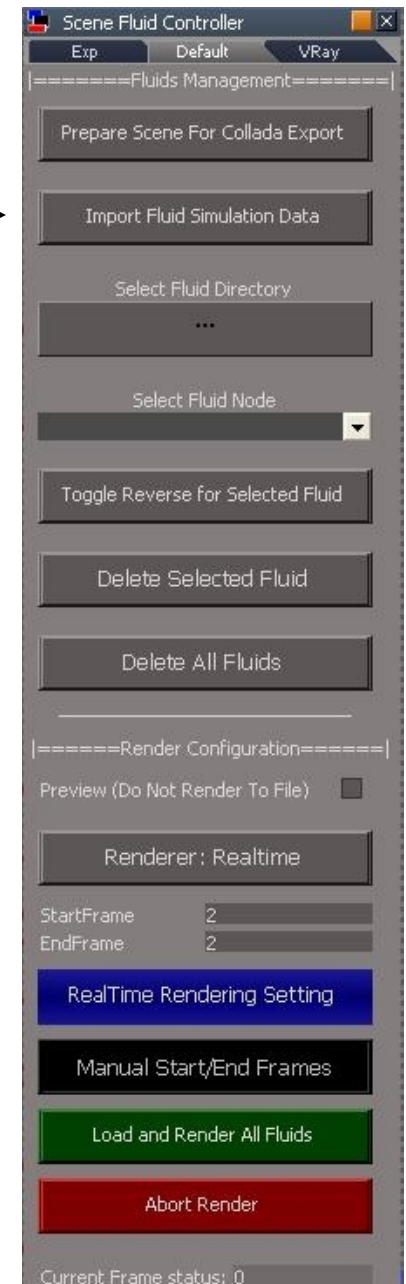
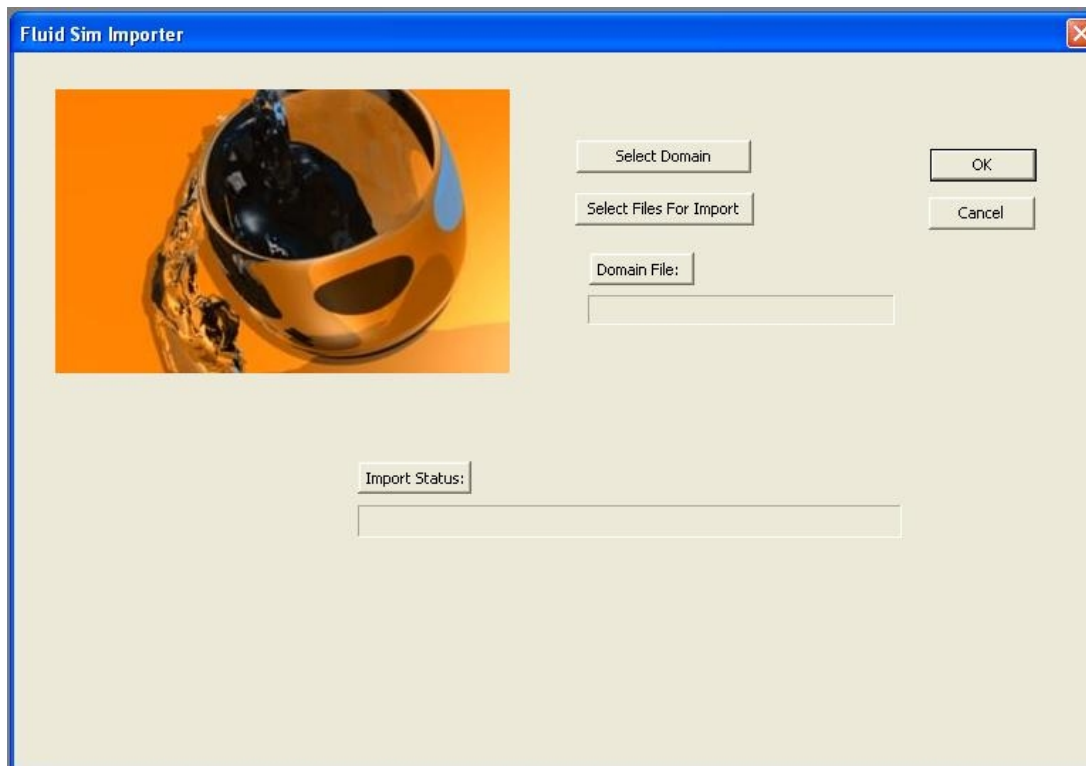
This scene contains two very important items:

- 1) Scene Fluid Controller node – this contains all the scripts required to use the fluid simulation plugin.
- 2) FluidInitOnLoadScript node – this jscript node runs automatically on scene load. It performs important scene initialization.

Testing the Plugin Installation

To ensure the plugin has been installed correctly, click the Import Fluid Simulation Data button.

The Import Fluid Sim dialog will open. This confirms the plugin has been correctly installed.



Scene Fluid Controller: RealTime Renderer Panel View

Prepare Scene For Collada Export: Click this to select scene node for export to Collada. All object types selected for export in the Collada export panel will be exported.

Import Fluid Simulation Data: Fluid simulation data is converted to trueSpace RsObj format via the plugin. Click to import fluid simulation data. The plugin writes the output (RsObj files) to the same directory as the source files (*.bobj.gz)

Select Fluid Directory: After Importing, the fluid files are ready for use. Click to select a fluid directory.

Select Fluid Node: Once a fluid directory has been selected, the first fluid mesh is visible in the 3D space and Link Editor (LE). It is also added to the Combo Box for selection. Click the dropdown arrow and select the fluid node for editing.

Editing: Once a fluid node is selected in the Combo Box, editing can be performed:

Toggle Reverse for Selected Fluid: Select to play the fluid simulation in reverse.

Delete Selected Fluid: Select to remove the fluid which is currently selected in the Combo Box from the scene.

Delete All Fluids: Select to remove all fluids from the scene

Preview (Do Not Render To File): Select this checkbox to preview the scene animation without writing to image files.

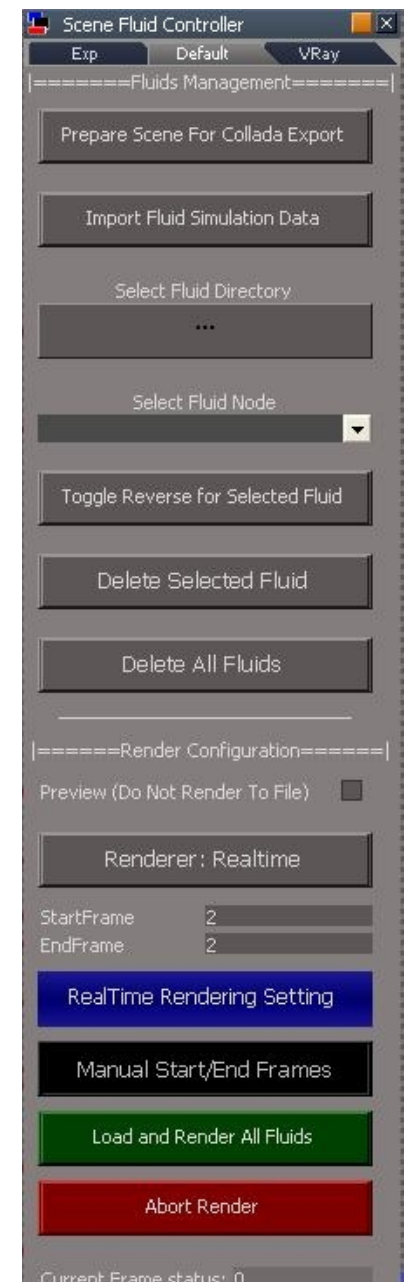
Renderer: Realtime / Renderer: VRay: Renderer: Realtime is the default setting for this toggle button. With this option selected, The RealTime Rendering Setting button is available for configuring the Real Time Renderer.

StartFrame / EndFrame: These parameters display the Start and End frames for the animation render. They can be set manually.

RealTime Rendering Setting: Select to configure RealTime Render settings, such as dimensions.

Manual Start/End Frames / Auto Start/End Frames:

When Manual Start/End Frames is selected, the values entered in the StartFrame and EndFrame textboxes will be used for the render.



Scene Fluid Controller: RealTime Renderer Panel View, continued

Manual Start/End Frames / Auto Start/End Frames:

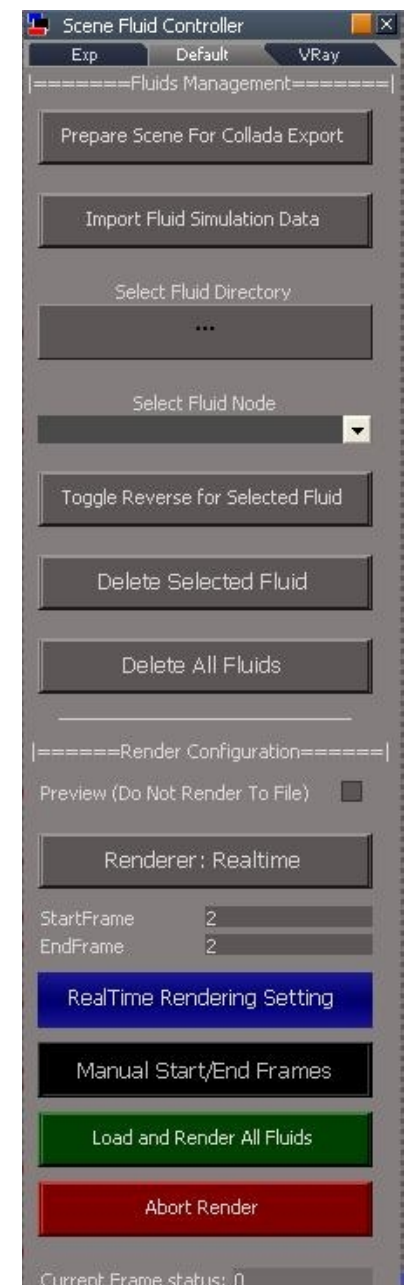
When Auto Start/End Frames is selected, trueSpace will calculate Start and End Frames for the render.

Technical Note: trueSpace analyzes the Animation Editor (AE) for the first and last keyframes in the scene and sets the Start and End frames in the StartFrame and EndFrame textboxes accordingly when the Load and Render All Fluids button is pressed.

Load and Render All Fluids: Renders the frames for the animation and writes each frame to a bitmap file if the Preview (Do Not Render To File) checkbox is Not Selected.

Abort Render: Aborts the animation render. After pressing this button, the EndFrame textbox displays the last frame which was rendered.

Current Frame status: Indicates the current scene frame which is being processed and rendered.



Scene Fluid Controller: VRay Renderer Panel View

Prepare Scene For Collada Export: Click this to select scene node for export to Collada. All object types selected for export in the Collada export panel will be exported.

Import Fluid Simulation Data: Fluid simulation data is converted to trueSpace RsObj format via the plugin. Click to import fluid simulation data. The plugin writes the output (RsObj files) to the same directory as the source files (*.bobj.gz)

Select Fluid Directory: After Importing, the fluid files are ready for use. Click to select a fluid directory.

Select Fluid Node: Once a fluid directory has been selected, the first fluid mesh is visible in the 3D space and Link Editor (LE). It is also added to the Combo Box for selection. Click the dropdown arrow and select the fluid node for editing.

Editing: Once a fluid node is selected in the Combo Box, editing can be performed:

Toggle Reverse for Selected Fluid: Select to play the fluid simulation in reverse.

Delete Selected Fluid: Select to remove the fluid which is currently selected in the Combo Box from the scene.

Delete All Fluids: Select to remove all fluids from the scene

Preview (Do Not Render To File): Select this checkbox to preview the scene animation without writing to image files.

Renderer: Realtime / Renderer: VRay: Renderer: VRay is the optional setting for this toggle button. With this option selected, The VRay Rendering options are available for configuring the VRay Renderer:

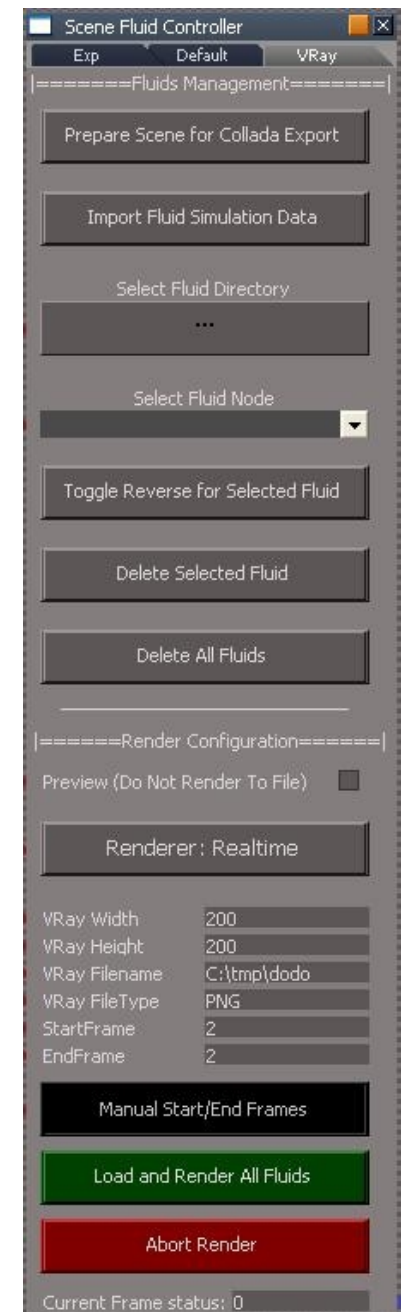
VRay Width: Set the image Width

VRay Height: Set the image Height

Vray Filename: Specify the base filename for rendering.

Example: C:\Renders\VRTest

VRay FileType: Specify the image file type (BMP, HDR, JPG, PNG, TGA)



Scene Fluid Controller: V-Ray Renderer Panel View, continued

StartFrame / EndFrame: These parameters display the Start and End frames for the animation render. They can be set manually.

Manual Start/End Frames / Auto Start/End Frames:

When Manual Start/End Frames is selected, the values entered in the StartFrame and EndFrame textboxes will be used for the render.

Manual Start/End Frames / Auto Start/End Frames:

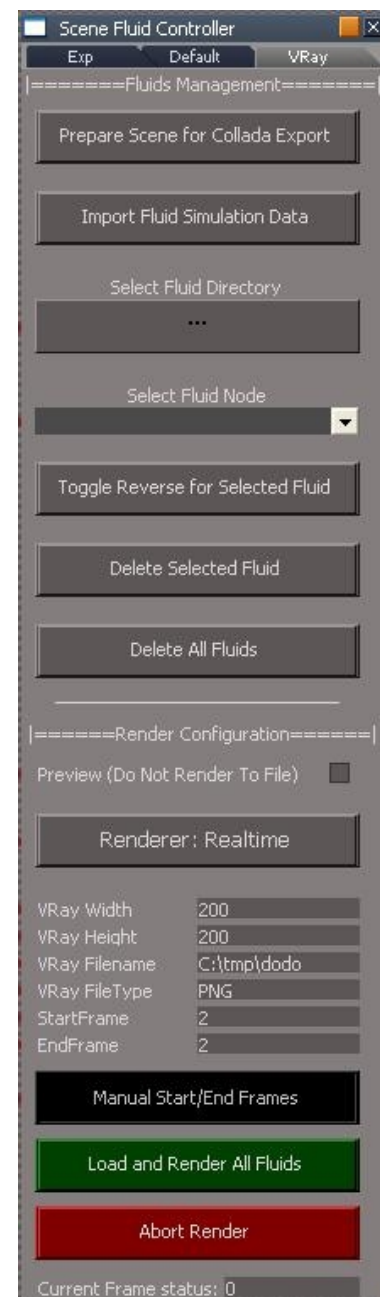
When Auto Start/End Frames is selected, trueSpace will calculate Start and End Frames for the render.

Technical Note: trueSpace analyzes the Animation Editor (AE) for the first and last keyframes in the scene and sets the Start and End frames in the StartFrame and EndFrame textboxes accordingly when the Load and Render All Fluids button is pressed.

Load and Render All Fluids: Renders the frames for the animation and writes each frame to a bitmap file if the Preview (Do Not Render To File) checkbox is Not Selected.

Abort Render: Aborts the animation render. After pressing this button, the EndFrame textbox displays the last frame which was rendered.

Current Frame status: Indicates the current scene frame which is being processed and rendered.



Import Fluid Sim Data: Detailed Description

Import Fluid Simulation Data

Clicking the Import Fluid Simulation Data button opens this dialog.

Select Domain:

Opens a file dialog for selecting the fluid domain.

Select the Blender fluid simulator domain file for the fluid simulation, then press Open in the dialog. The selected file will appear in the Domain File: text box.

Perform this step prior to selecting files for import, described next.

Select Files For Import:

Opens a file dialog for selecting fluid sim files to import. Select a single file in the desired directory, then press the Open button.

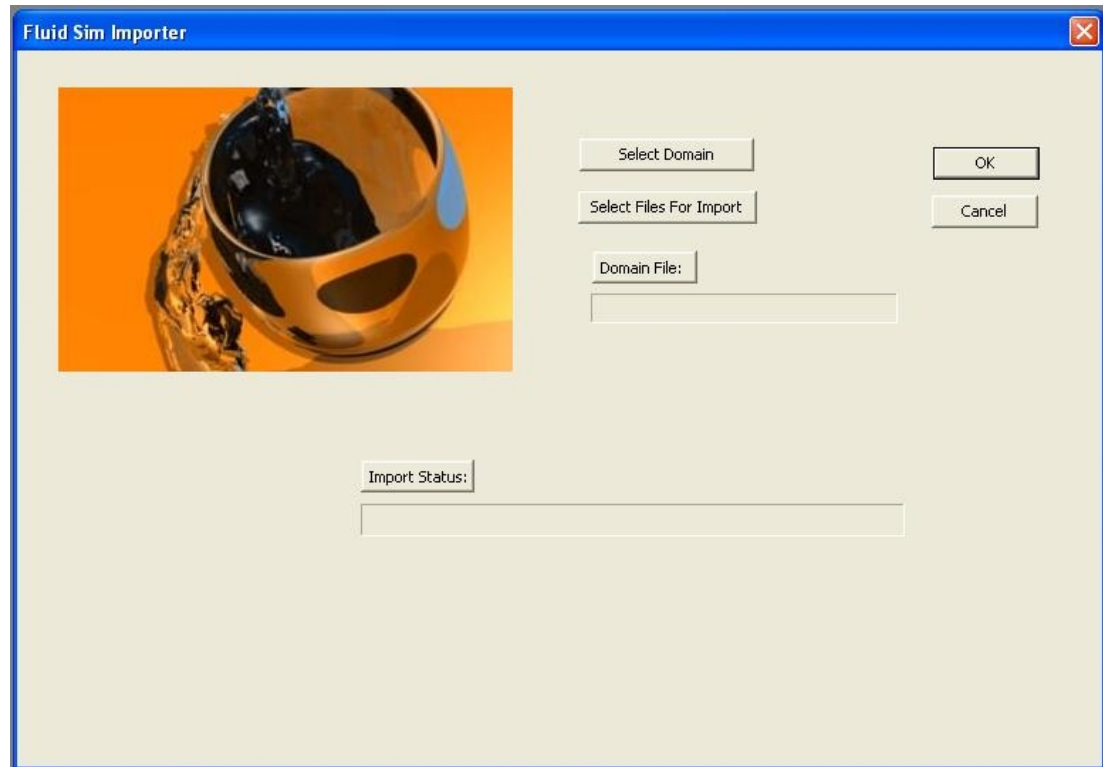
During the import process, the Import Status status bar will display the progress of the import process.

OK button:

Press the OK button to dismiss the window.

Cancel:

Press the Cancel button to abort the Import process and dismiss the window. Do Not press this button once import begins.



Installing Blender - Prerequisites

If you are installing blender for the first time, you need to install Python.

Python version 2.5.4 can be downloaded at this link:

<http://www.python.org/download/releases/2.5.4/>

Choose the python-2.5.4 msi file for your CPU.

Installing Blender

If you are installing blender for the first time, here is a very helpful tip which will make installing the Domain_exporter.py Python script much easier in the next few steps.

On this page of the installation process, the default Location for scripts and other user data is the Windows Application Directory. If you choose this option, you will want to put the Domain_export.py script in a directory similar to this:

C:\Documents and Settings\"user name"\Application Data\Blender Foundation\Blender\blender\scripts

Where 'user name' is the username you are currently logged in as on your computer.

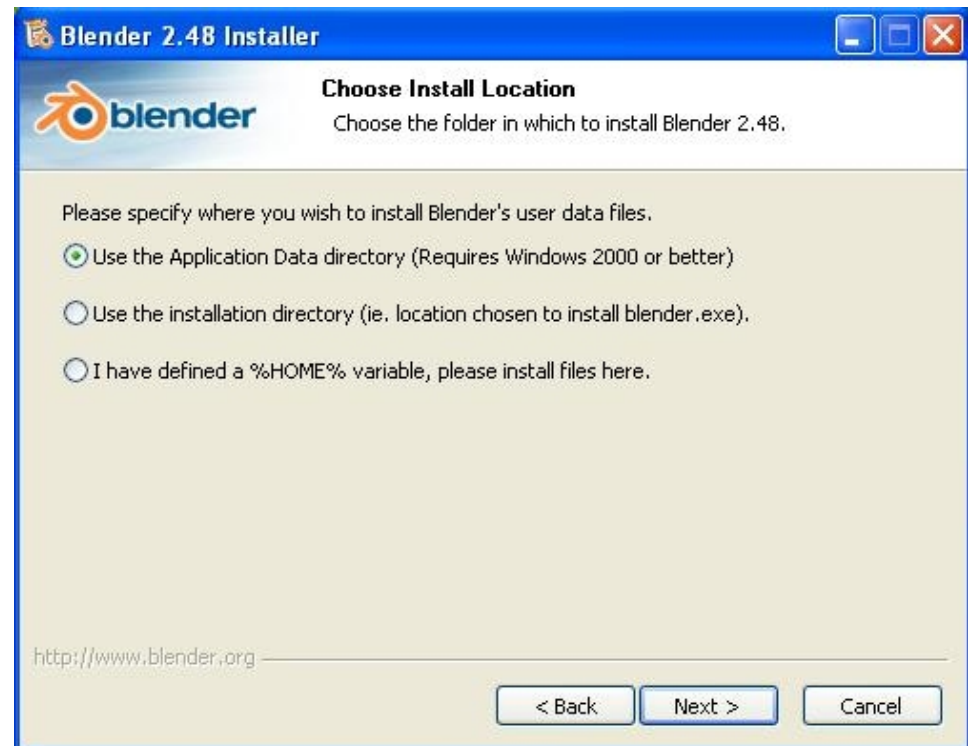
The simpler option is the second one.

If you install blender in the folder: C:\blender248a, for example, then the scripts directory will be here:

C:\blender248a\blender\scripts

Note the period before the word: blender.

It's recommended to select the second option, simply because it's easier to find that directory.



Configuring Blender

Using Windows Explorer, navigate to the directory where Blender is installed. Install the Domain_exporter.py script into the Blender\blender\scripts directory (note the period before the 2nd blender).

Note: As described on the previous page, if you chose the first option on install, the scripts directory will be here:

C:\Documents and Settings\”user name”\Application Data\Blender Foundation\Blender\blender\scripts

Note: You may need to perform the following steps to make the .blender directory visible.

Using a file dialog, select:

Tools->Folder Options->View

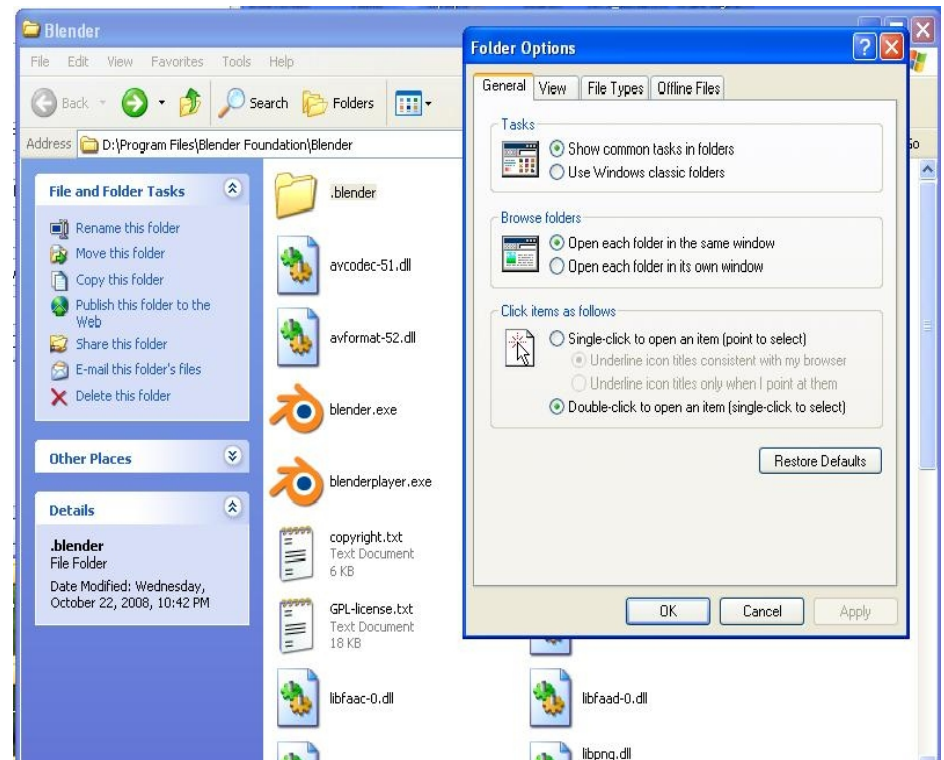
In the Folder Options dialog box, go to Hidden files and folders, and select:

Show hidden files and folders

The .blender folder should now be visible. Navigate to this folder, then into the scripts subfolder.

Install the Domain_exporter.py script in this folder.

Blender is now ready for use.



Configuring Blender: Why Do I Need the Domain_exporter.py script?

This script exports the Fluid Domain's transform information: translation and scale in x, y, and z. The raw fluid mesh data created by the fluid simulator does not contain this information. Therefore, when you import the fluid mesh data into trueSpace, you must load the domain data first (the file may be called domain.bin, for example; you specify the file name, but the suffix must be .bin). Once loaded, this transform data is applied to all the fluid sim meshes in the selected fluid directory during import.

If a domain file is not selected in this manner, the fluid meshes will still be imported, but the scale and translation of those meshes will be wrong.

Blender Version Optimized for Fluid Simulation

There is a version of Blender available which is optimized for fluid simulation. Some testers have reported significant speed increases. It can be found on Mike Pan's website:

Mike Pan's website

(includes excellent example of real world settings and an optimized blender build for fluid simulation):

<http://mikepan.homeip.net/blenderfluid>

A slight modification is required in order to import Collada 1.4 files from trueSpace:

In the Mike Pan version, Collada 1.4.0 import plugin is Version 0.3.159 which gives errors in some scenes. From the Standard Blender version, copy the Collada script in the scripts folder, and paste it into the scripts folder of the Mike Pan version.

Also, from the Standard Blender version, copy the folder: `.\blender\scripts\bpymodules\colladaImEx` And paste it into the Mike Pan version.

Navigating in Blender

Navigation in Blender is different than navigation in trueSpace.

Unless you can configure a trackball mouse to simulate a middle mouse button, you'll need a 3 button mouse.

Rotate the view: Hold down MMB (Middle Mouse Button) and drag the mouse.

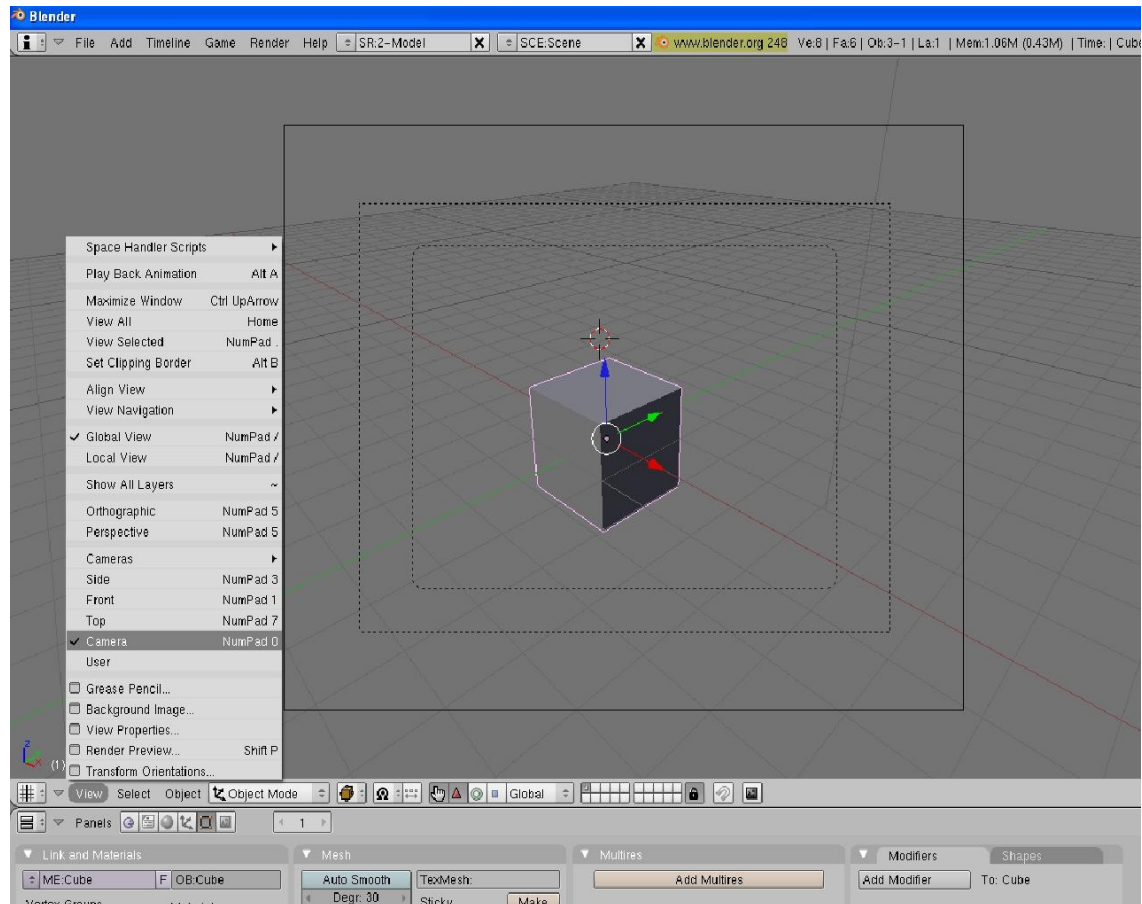
Zoom In/Out: Simultaneously Hold down Ctrl key and MMB, and drag the mouse.

Pan: Simultaneously Hold down Ctrl key and MMB, and drag the mouse.

Changing views to:

Side, Front, Top, and Camera:

Left Click the word: View and
select the desired View.



Selecting and Transforming Objects in Blender

Objects are selected in Blender by Right Clicking on them.

Objects can be transformed by first selecting the transform mode: Translate, Rotate, or Scale in the interface. Refer to the notes below the picture.

When Translation is selected, the red, green, and blue widgets have an arrowhead at the end.

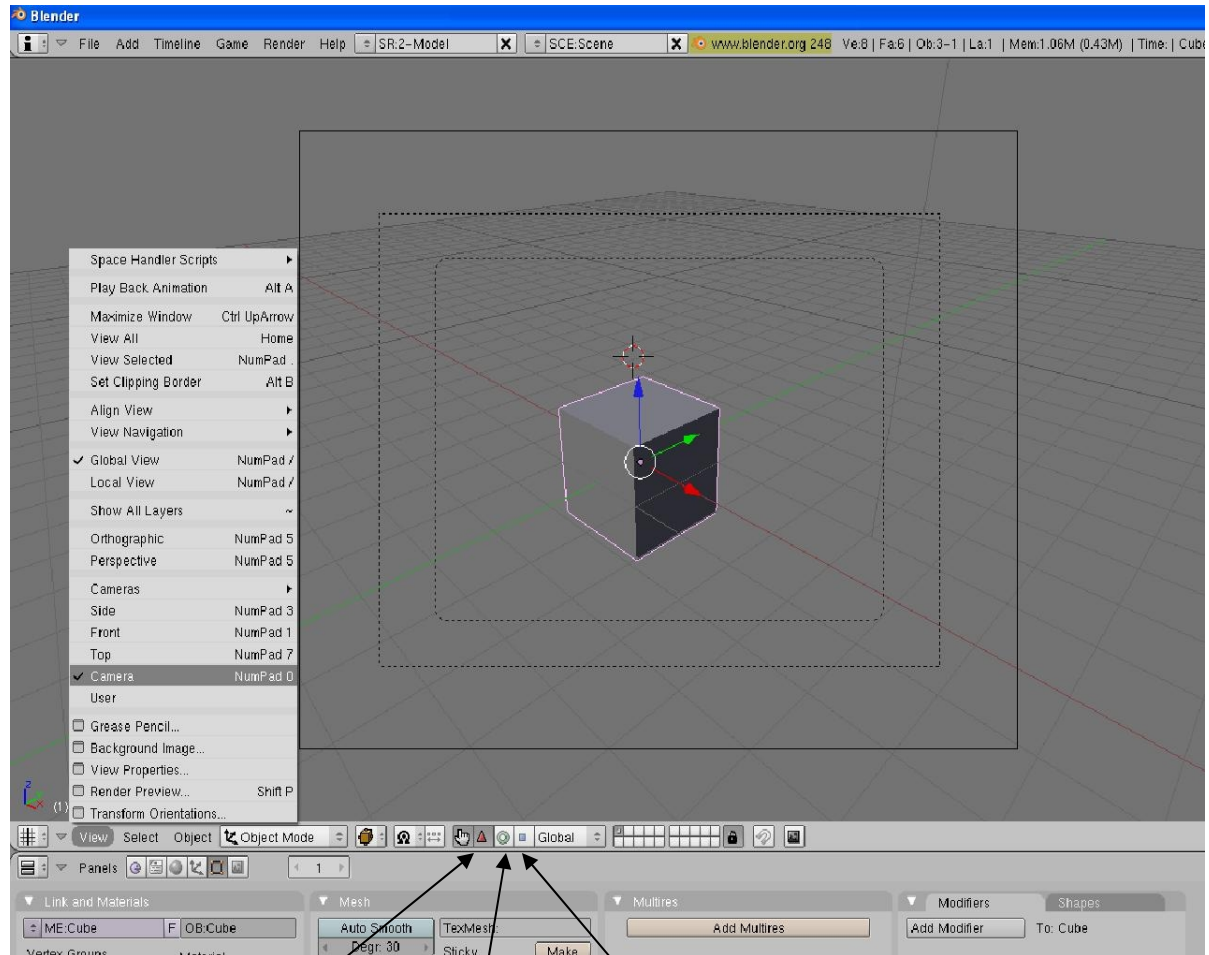
When Rotation is selected, the widgets change to circles.

When Scale is selected, the widgets have a cube at the end.

You can also translate a selected object by holding down the LMB, dragging, and releasing. After release, you can move the mouse and the object will follow. To exit this mode, click the LMB.

Scaling can also be achieved by pressing the 'S' key (the selected object will then be highlighted in white), then moving the mouse. To exit this mode, click the LMB.

The goal is to perform all modelling, scaling, rotation, and positioning in trueSpace, but tweaks may be required in blender as you perform test runs with the fluid sim and wish to make minor adjustments.



Translate

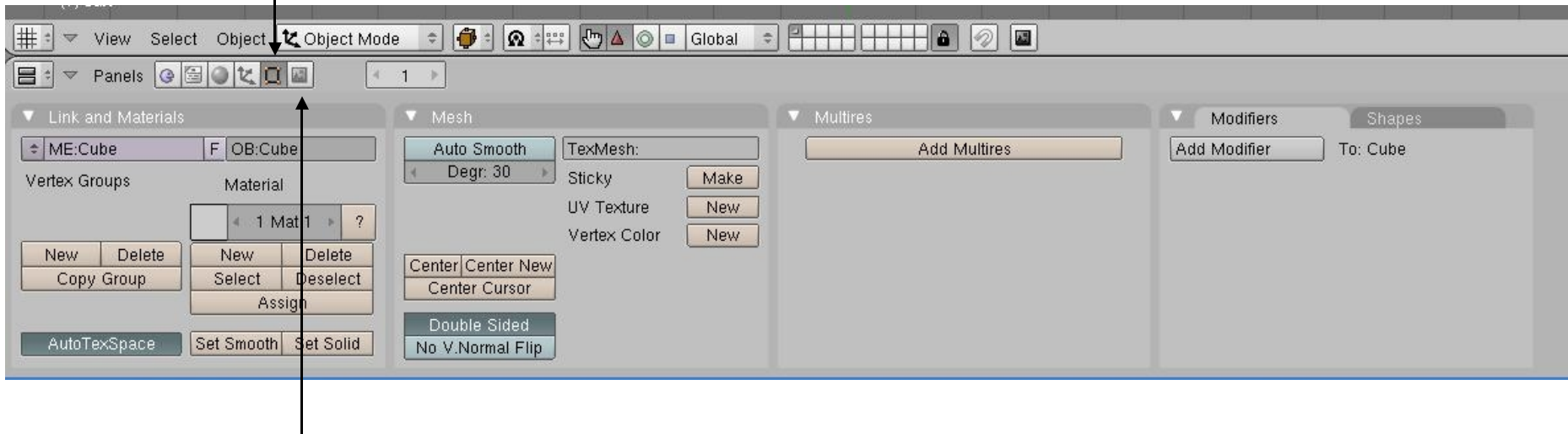
Rotate

Scale

Navigating to the Blender Scene Panel

This is the Editing Panel. Notice the icon which is highlighted, representing the current Panel in view. The icon is a black square with a hollow red circle at each corner. Click this icon to get back to this Panel. This can be your starting point in navigating the Blender interface. As the tooltip suggests when you hover over this icon, you can also press F9 to get back to this panel.

Editing Panel icon



This icon takes us to the Scene panel. As the tooltip suggests, we can also get to the Scene panel by clicking F10. We need to go to the Scene panel in order to set the number of frames for our simulation.

Click this icon to get to the Scene panel.

Navigating to the Blender Scene Panel



Editing Panel icon

This is the Scene panel. Here, we need to Set the number of frames for our simulation.

Beneath the ANIM button, we see Sta:1 and End: 250.

We can either click and drag the arrowheads on each of these to adjust them, or click them.

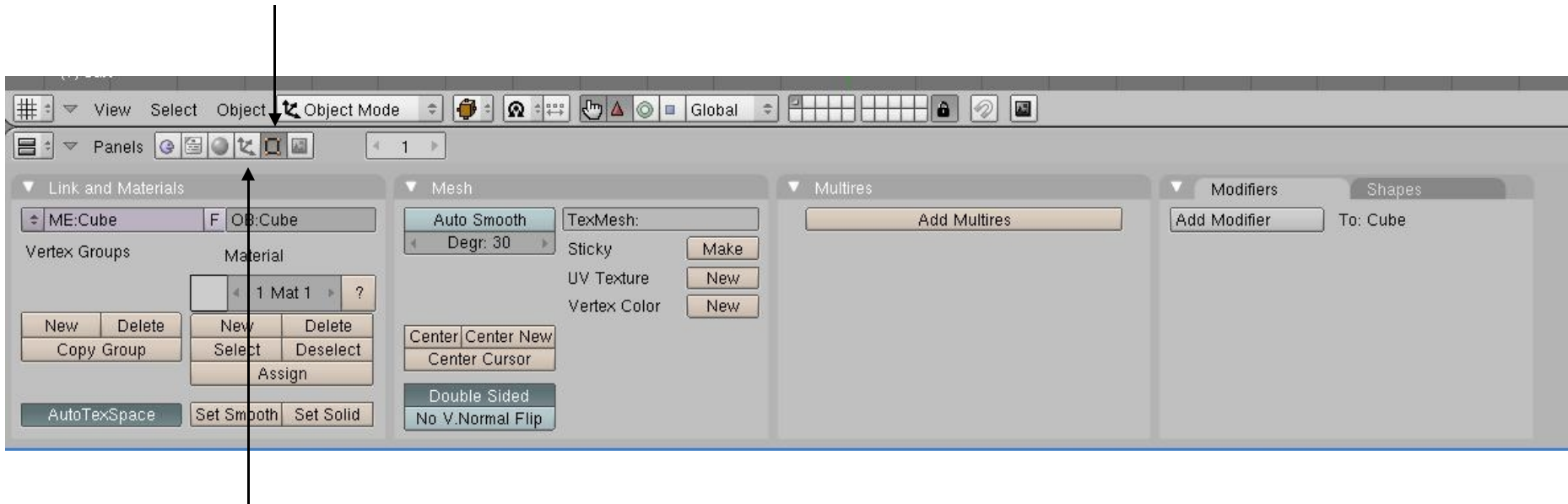
If we click on them, the number gets highlighted. Change the start and end entries to the desired value.

When done, either press F9 to return to the Editing panel, or, click the Editing panel icon.

Remember: our starting point in the blender interface is the Editing panel (we need a starting point to get familiar with the interface!)

Navigating to the Blender Fluid Sim Panel

This is the Editing Panel. Notice the icon which is highlighted, representing the current Panel in view. The icon is a black square with a hollow red circle at each corner. Click this icon to get back to this Panel. This can be your starting point in navigating the Blender interface. As the tooltip suggests when you hover over this icon, you can also press F9 to get back to this panel.



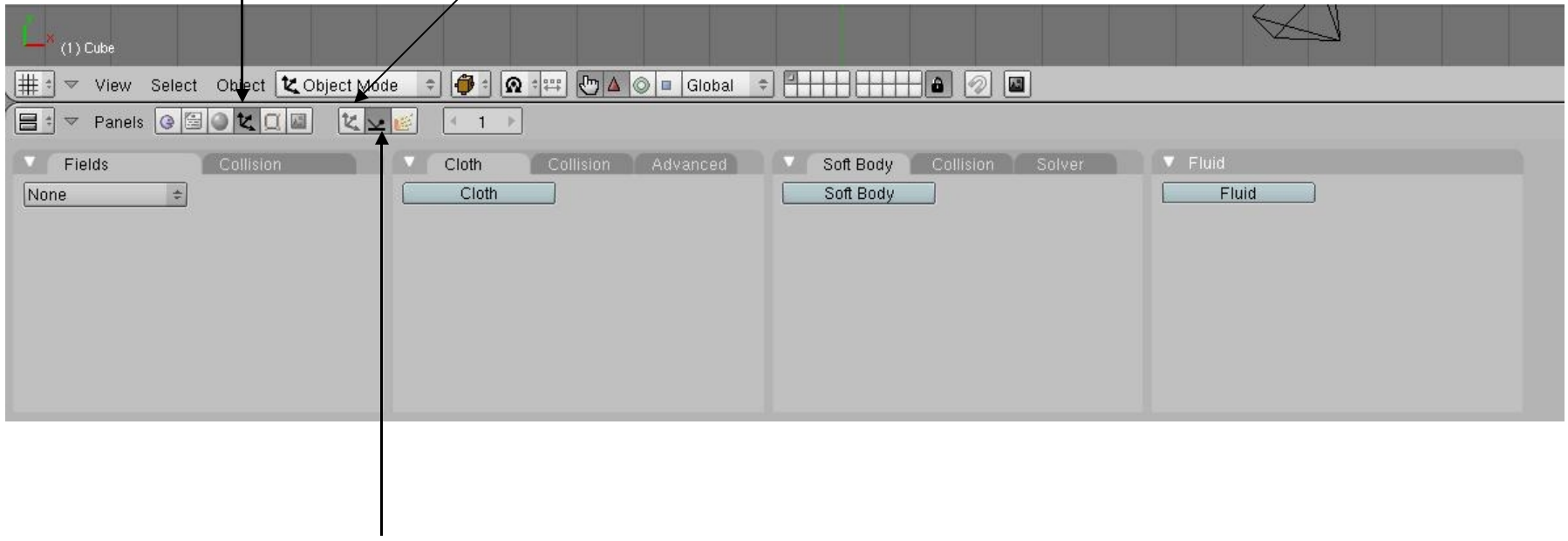
This icon takes us to the Object panel. As the tooltip suggests, we can also get to the Object panel by clicking F7.

Click this icon to get to the Object panel.

Navigating to the Blender Fluid Sim Panel

This is the Object Panel. We got here by either clicking this icon, or pressing F7

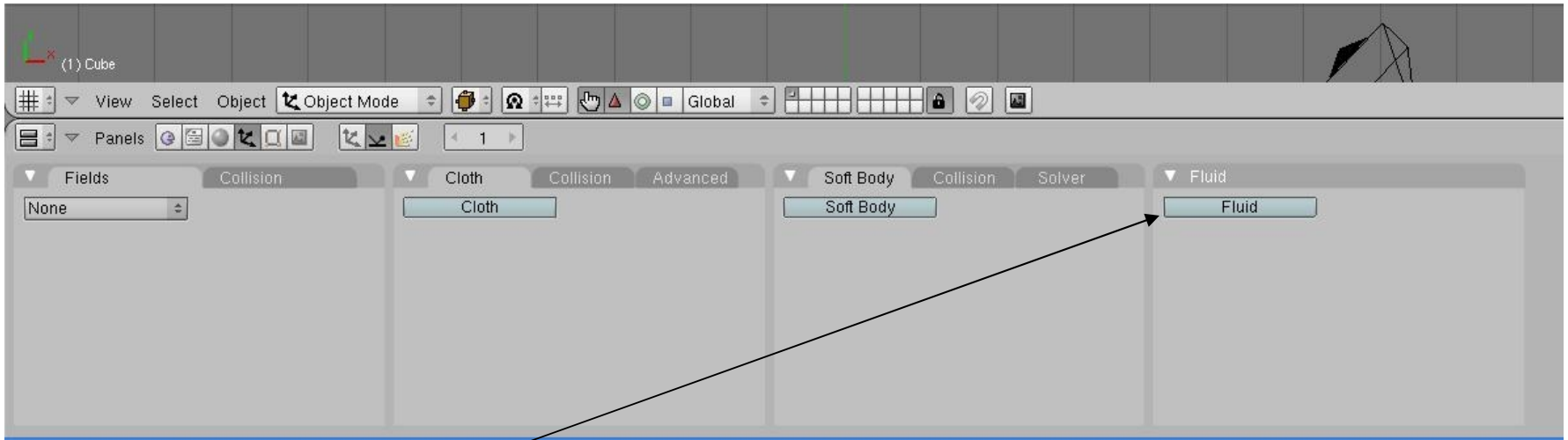
As a note, this icon is identical to the Object Panel icon. But, if you hover over it, the tooltip tells us it is for the Object Buttons. We are not concerned with this icon; you just need to know it's there, and what it's for, to avoid confusion.



Click this icon to navigate to the Physics buttons panel

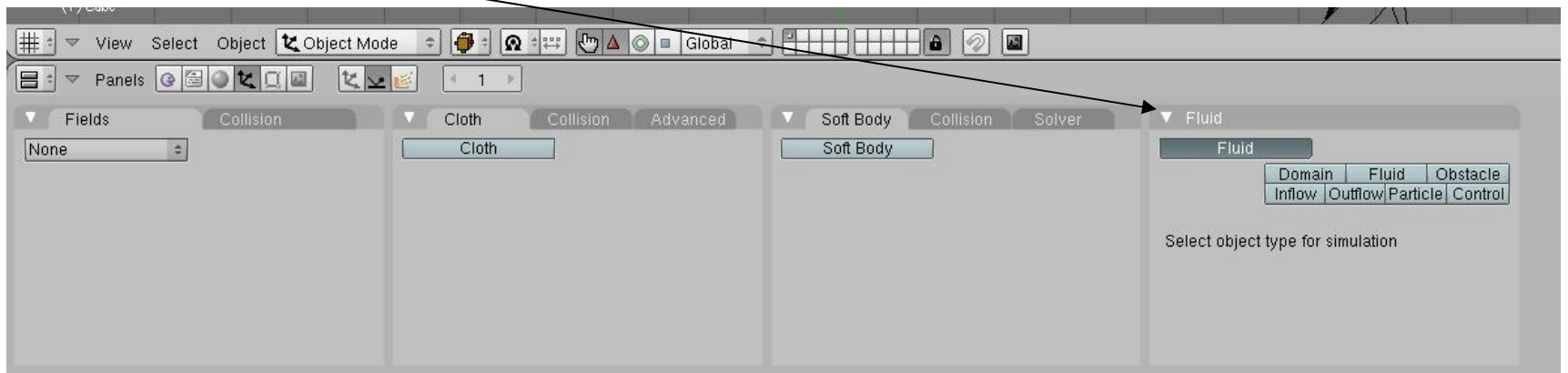
Navigating to the Blender Fluid Sim Panel

This is the Physics buttons Panel. We need to get to the Fluid panel.

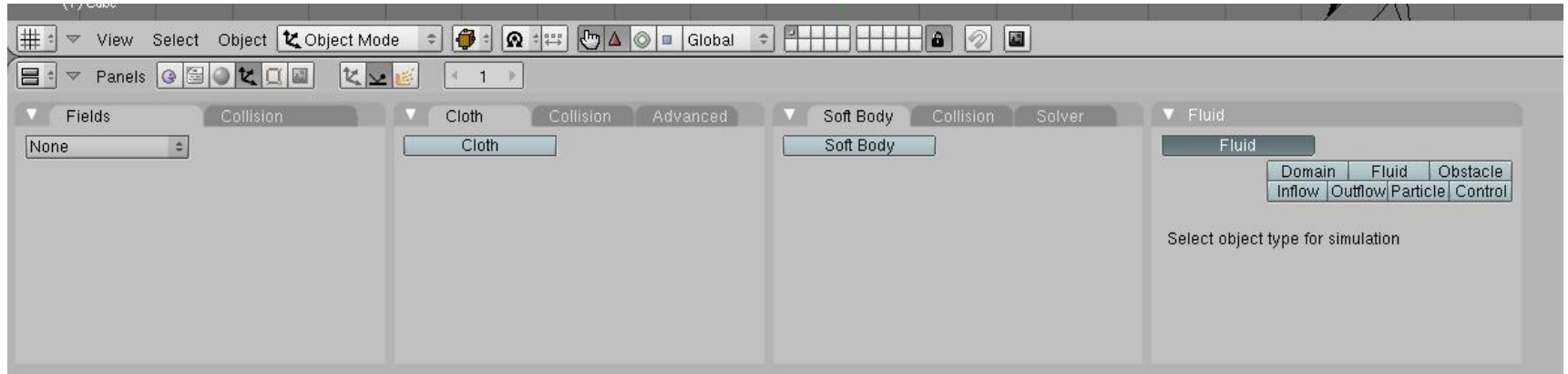


Click here to get to the Fluid panel.

This is the fluid panel.



Navigating to the Blender Fluid Sim Panel



Here we have several 'Property' items. The currently selected object is assigned the selected Property when clicked.

Blender Fluid Documentation Page: http://wiki.blender.org/index.php/Manual/Fluid_Simulation

Domain – All objects must be contained in the domain. This is always a Cube. Even if you select some other mesh, the bounding box of that mesh will be used as the domain. However, you can use Obstacles to alter the course and shaping of the fluid simulation. There can only be One fluid domain object in the scene.

Fluid – The object acts as a single drop of fluid.

Obstacle – The object blocks the flow of the fluid; the fluid is forced to find its way around the obstacle.

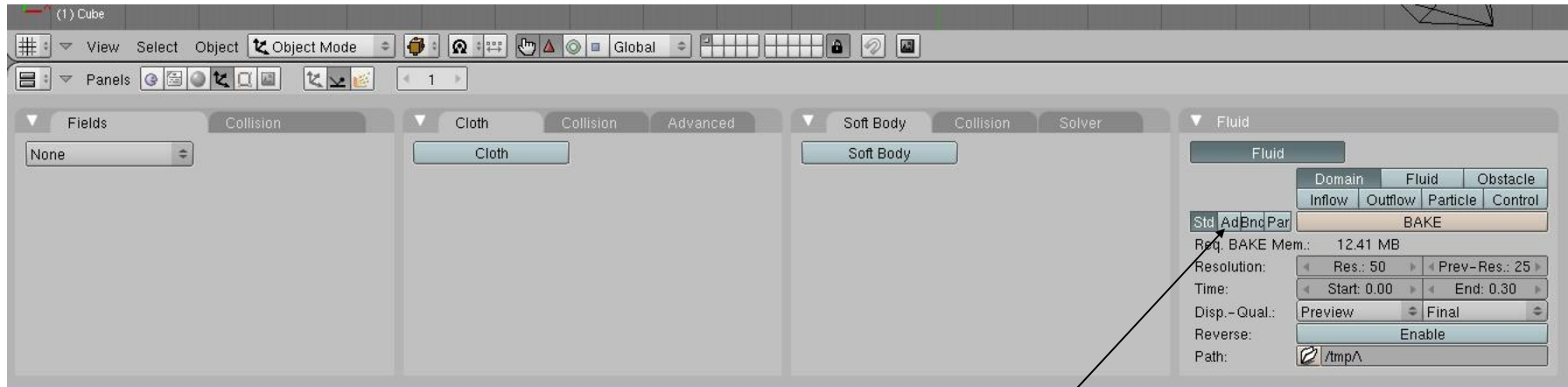
Inflow – the object acts as a Source of fluid; as an example, a water faucet. Fluid continuously flows from this object.

Outflow – the object acts as a Drain of fluid; as an example, the drain in a kitchen sink. Use this to prevent completely filling the domain with fluid.

Particle – Displays particles created during the simulation.

Control – Advanced Options.

The Blender Fluid Sim: Domain Panel



Click for Ad
(Advanced) settings

All fluid objects (Fluid, Obstacle, Inflow, Outflow, Particle, Control) must be with the boundaries of the Domain.
The Domain is a cubic shape (perfect cube, flattened or heightened cube).

Resolution: The most important aspect for fluid quality. Determines fluid quality, memory and disk usage, and computational time:
Res = 32 requires 4MB; 64 requires 30 MB; 128 requires > 230 MB.

Adjust as necessary. Note: Blender may freeze or crash if this value is set too high.

Set the resolution appropriate for the real-world physical size of the domain (set in the Ad [advanced] settings).

Prev-Res: Resolution of Preview meshes. Does not influence actual simulation.

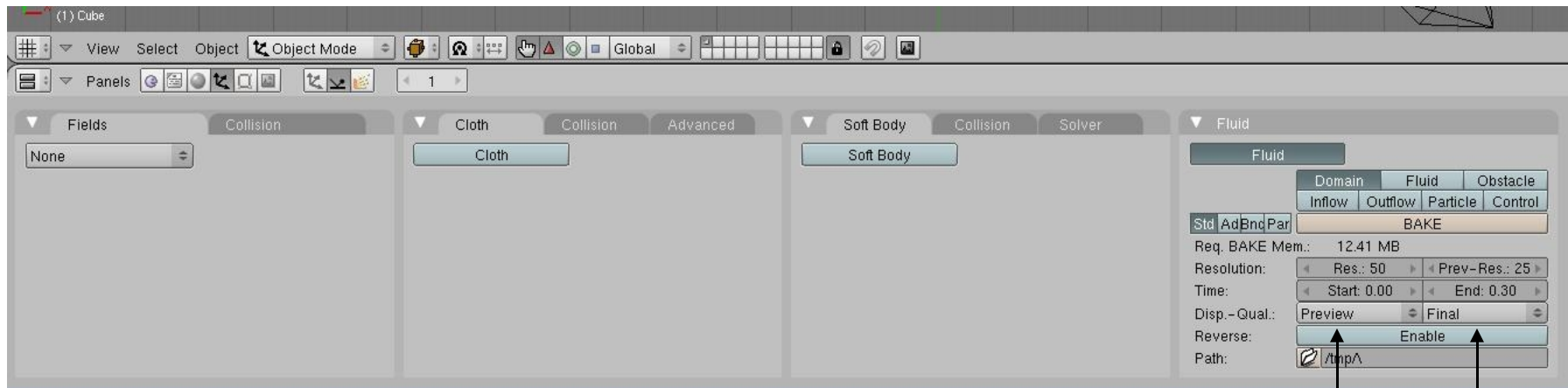
Time: Start: Simulation start time, in seconds. The simulation computation starts at a 'future' simulation time.

If you set this to 4 (seconds), the initial fluid appears to have been flowing for 4 seconds.

Time: End: Simulation end time, in seconds. Total number of animation frames is related to this item:

if start time = 0, end time = 4, and frame rate = 25 frames/sec, set end frame in ANIM panel to 100.

The Blender Fluid Sim: Domain Panel, cont.



Left pulldown Right pulldown

Disp.-Qual: First pulldown describes how baked simulation is displayed in the Blender GUI.
Second pulldown describes how baked simulation is rendered.
Options are: Original geometry, preview mesh, or final mesh

Note: After Baking a simulation, the domain is displayed as the preliminary mesh; not the original Domain geometry (the cube).
To see the original Domain (highly recommended when you need to make adjustments), select Geometry in the left pulldown menu.

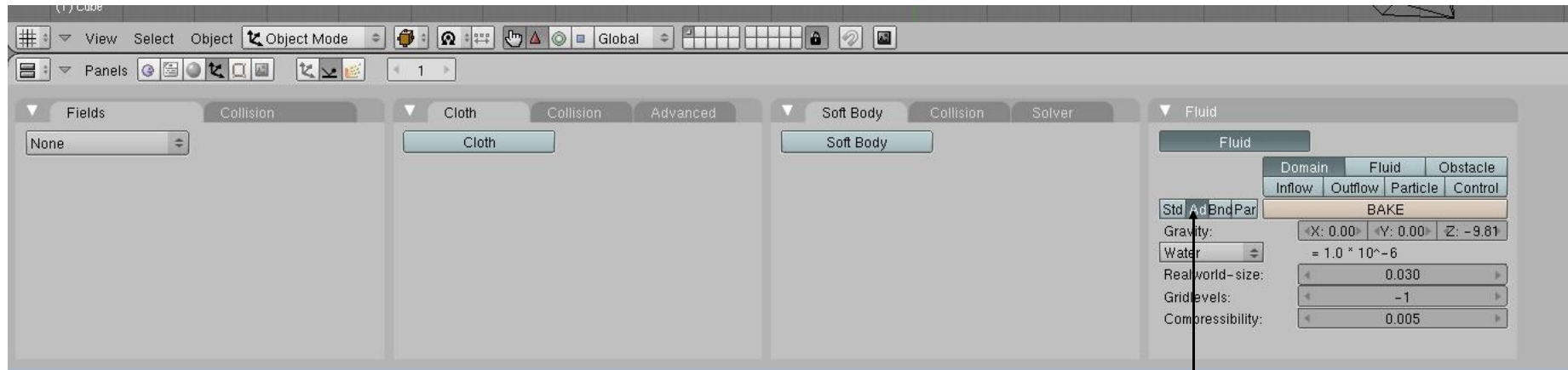
Reverse: Reverses order in which frames are simulated.

Path: Directory and file prefix to store baked surface meshes with.

Note: if you select a previously generated surface mesh, the prefix is automatically set, and the simulation can be performed several times with different settings, allowing quick changes between the different sets of surface data.

BAKE: Perform the actual fluid simulation. Blender GUI will freeze, only displaying the current frame being simulated.
Press ESC to abort the simulation.

The Blender Fluid Sim: Domain Panel, Advanced



Click to Access Advanced Panel

Advanced Panel

Gravity Vector: Specify direction of gravity in X, Y, and Z. Positive values cause gravity in the positive X, Y, and Z directions. Positive Z (+Z) is upwards; Negative Z (-Z) is downwards. Do not use Zero for all values. The fluid will not flow.

Viscosity (Water, Honey, Oil, Manual) pulldown menu: describes the thickness of the fluid.

Refer to this web page for info: http://wiki.blender.org/index.php/Manual/Fluid_Simulation

Real-world size: Size of the domain object in the real world in meters.

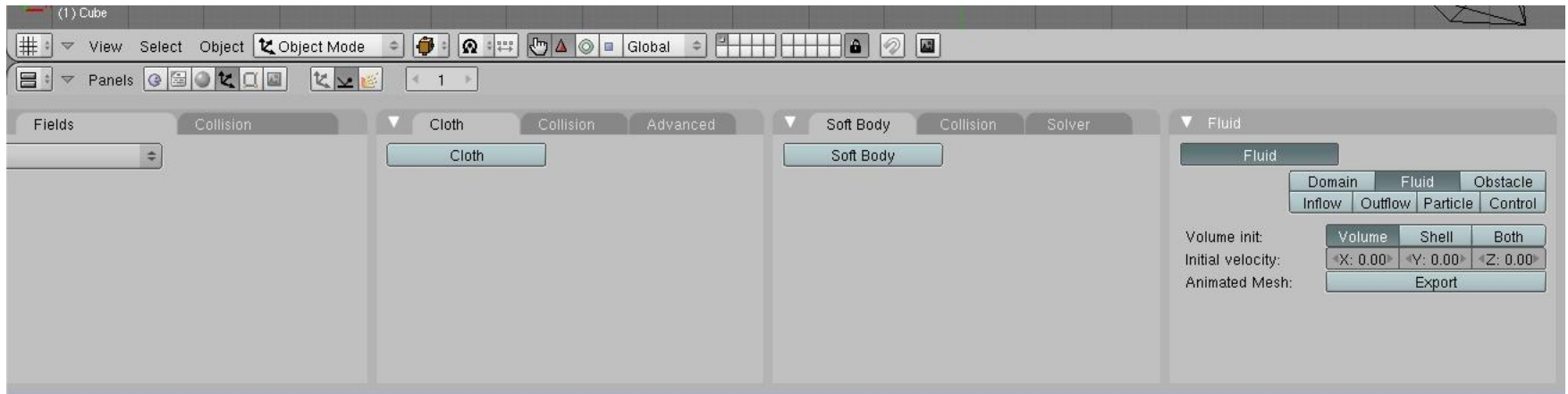
For a mug of coffee, use 0.1 meters (10 cm). For a swimming pool, use 10 m.

Gridlevel: number of adaptive grid levels to be used during the simulation.

Set to -1 for automatic selection.

Additional info: http://wiki.blender.org/index.php/Manual/Fluid_Simulation

The Blender Fluid Sim: Fluid Panel



Volume Init:

Volume : will initialize the inner volume of the object as fluid. This works for closed objects only.

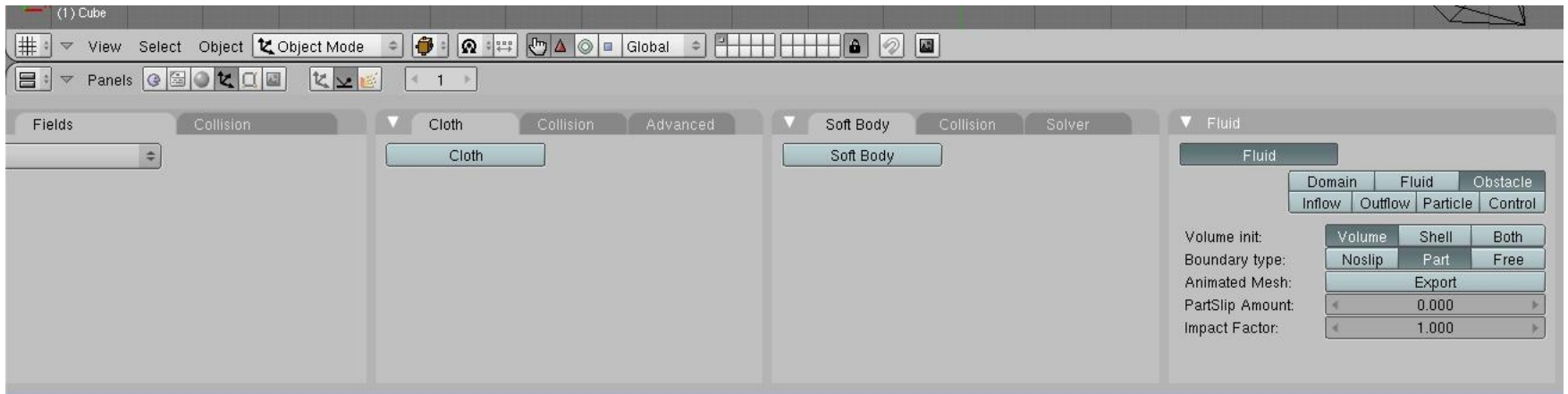
Shell: will initialize only a thin layer for all faces of the mesh. Works for closed and non closed meshes.

Both: Combines volume and shell. The mesh must be closed.

Initial velocity:

Initial Speed of the fluid, in meters per second.

The Blender Fluid Sim: Obstacle Panel



Obstacle:

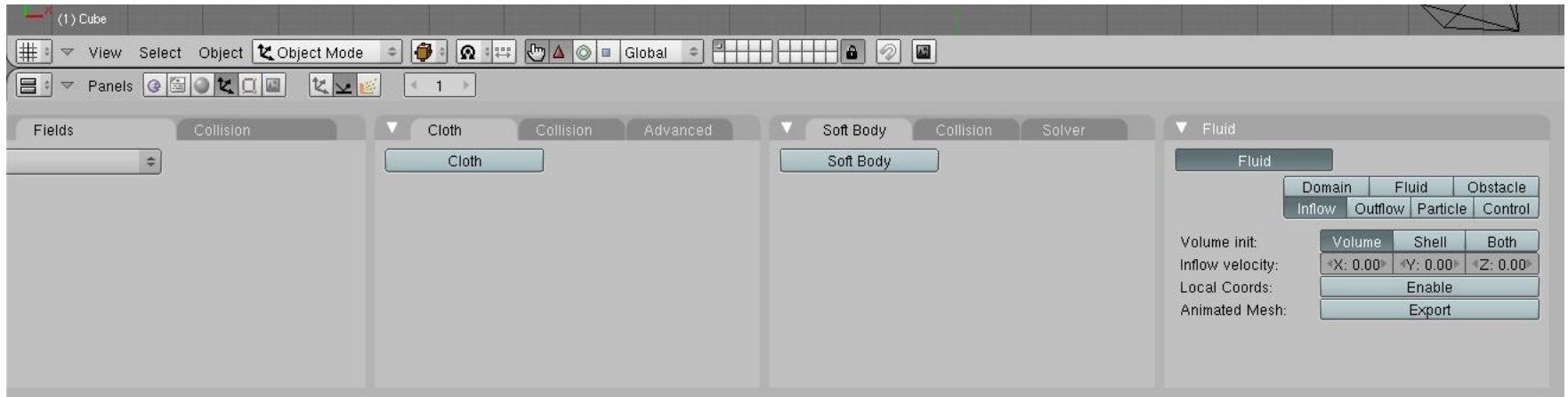
Selecting this panel after selecting an object sets the object as an obstacle in the simulation.

Volume init:

Settings are the same as for Fluid, described above.

Note: if you have an obstacle with 'holes' in it, for example, a metal grate, set this to Shell, to allow the fluid to fall through the holes.

The Blender Fluid Sim: Inflow Panel



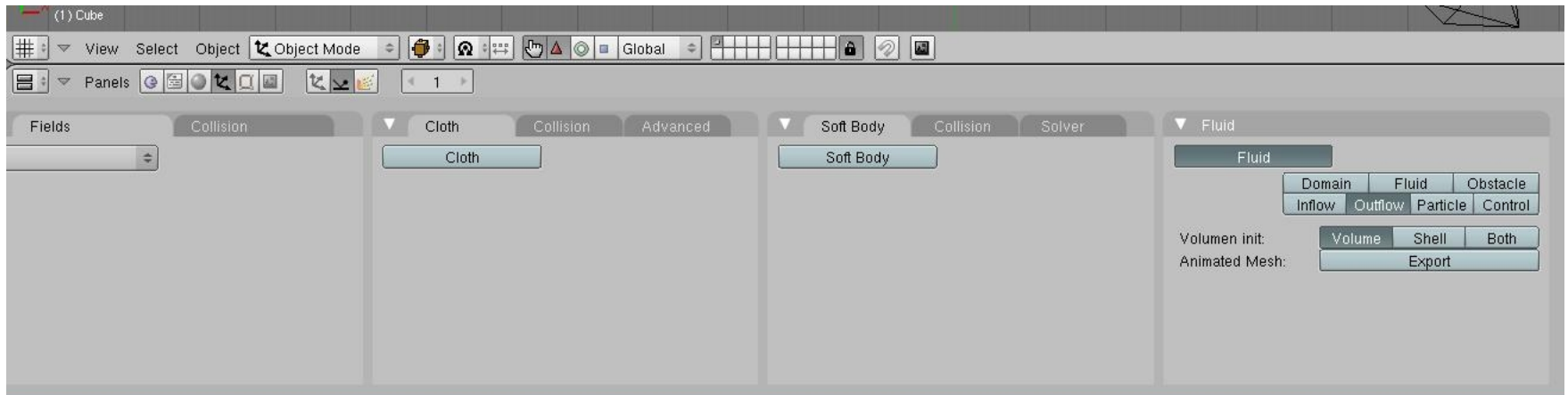
Inflow: This setting puts fluid into the simulation from the location of the selected mesh, like a water tap.

Volume Init: Settings are the same as fluid object, described above.

Inflow velocity: Speed of the fluid created.

Local Inflow Coords: use local coordinates for the inflow. This is useful if the inflo object is moving or rotating.
The inflow stream will follow/copy that motion.

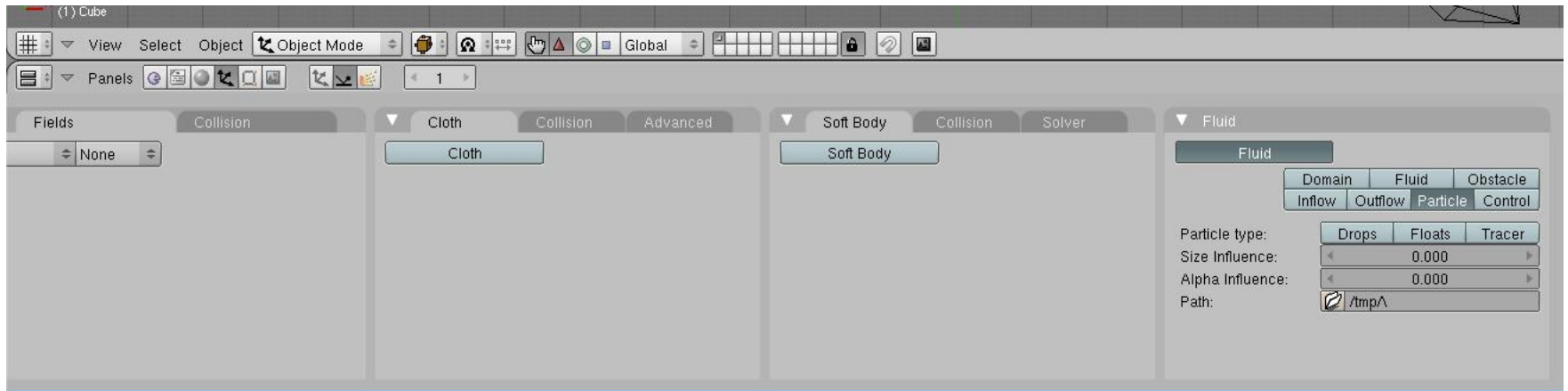
The Blender Fluid Sim: Outflow Panel



Outflow: Any fluid that enters the region of this object will be deleted, as in a sink's drain. This is useful in conjunction with an Inflow object to prevent completely filling the Domain.

Volume Init: Settings are the same as fluid object, described above.

The Blender Fluid Sim: Particle Panel



Particle: Used to display particles created during the simulation.

Drops: Useful for surface splashes; droplets are strewn about, like fresh water, with low Surface Tension.

Floats: Fluid surface tension is higher, fluid is heavier, like cold seawater and soup.

Tracer: Droplets follow the surface of the water where it existed.

Bake directory: The simulation run from which to load the particles. This should be the same as the fluid domain object.

The Blender Fluid Sim: A Real World Example

This link has a very good real world working example, along with a customized, optimized blender fluid for fluids:

<http://mikepan.homeip.net/blenderfluid>

Important Notes from this example:

- Fluid End Time value is set High: 5.00 (gets a nice, water type of flow)

- World size is set to 10 (cubic Meters)

- Resolution is turned up to 250

- Slip value (Part Slip) is set to 0.5

- Inflow amount is doubled

- The Domain cube is resized to it just barely encapsulates the fluid simulation boundary.

 - This reduces computing time, as well as memory usage.

Sample Workflow

This example will demonstrate a typical workflow for fluid simulation between truespace and blender.

The basic workflow is as follows:

Model all objects in trueSpace

From trueSpace Workspace side, export all objects in Collada format: Select all objects in the scene, then export.

Import all objects into blender. This should be a single Collada file

Setup and execute fluid simulation in blender

Play back animation in blender

Make adjustments to fluid simulation in blender, play back animation; Repeat as necessary

in trueSpace, load all fluids

in trueSpace, add textures

in truSpace, render animation to stills for video compilation

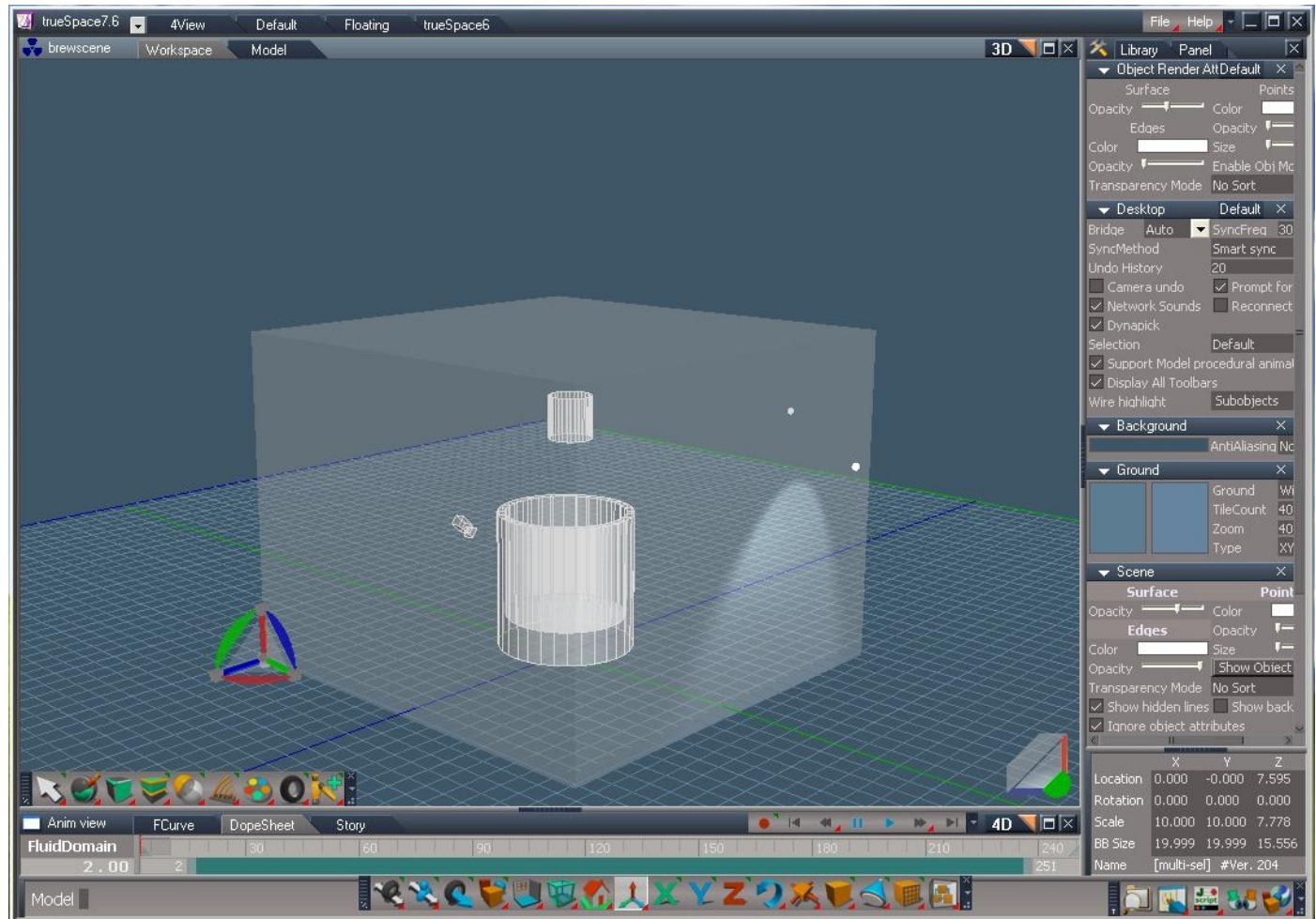
Sample Workflow

Scene File: brewscene.RsScn

In this picture, we see a simple model.

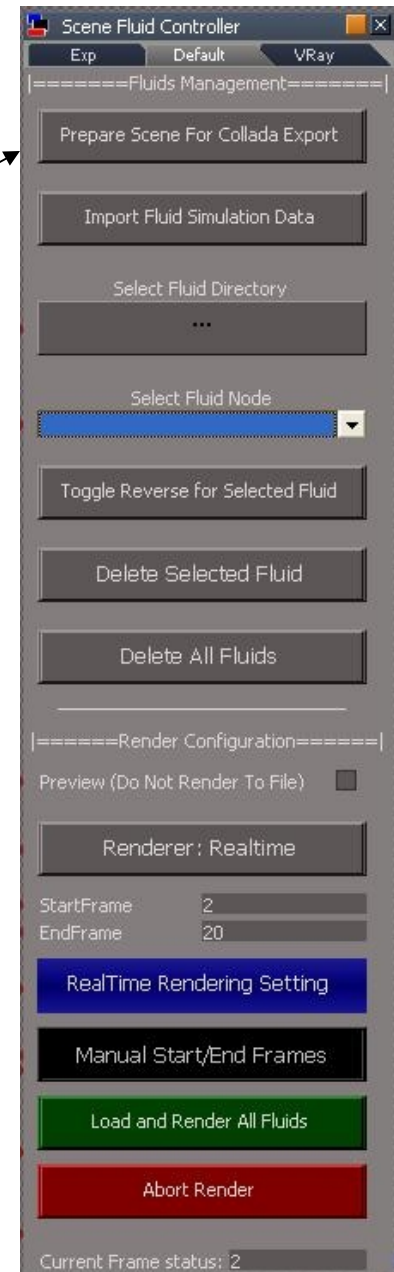
It's a simple mug, created by boolean subtracting one cylinder from another.

In addition, there is a tap (a cylinder, the fluid source), and the fluid Domain (the large cube surrounding the tap and mug). The mug will serve as an obstacle.



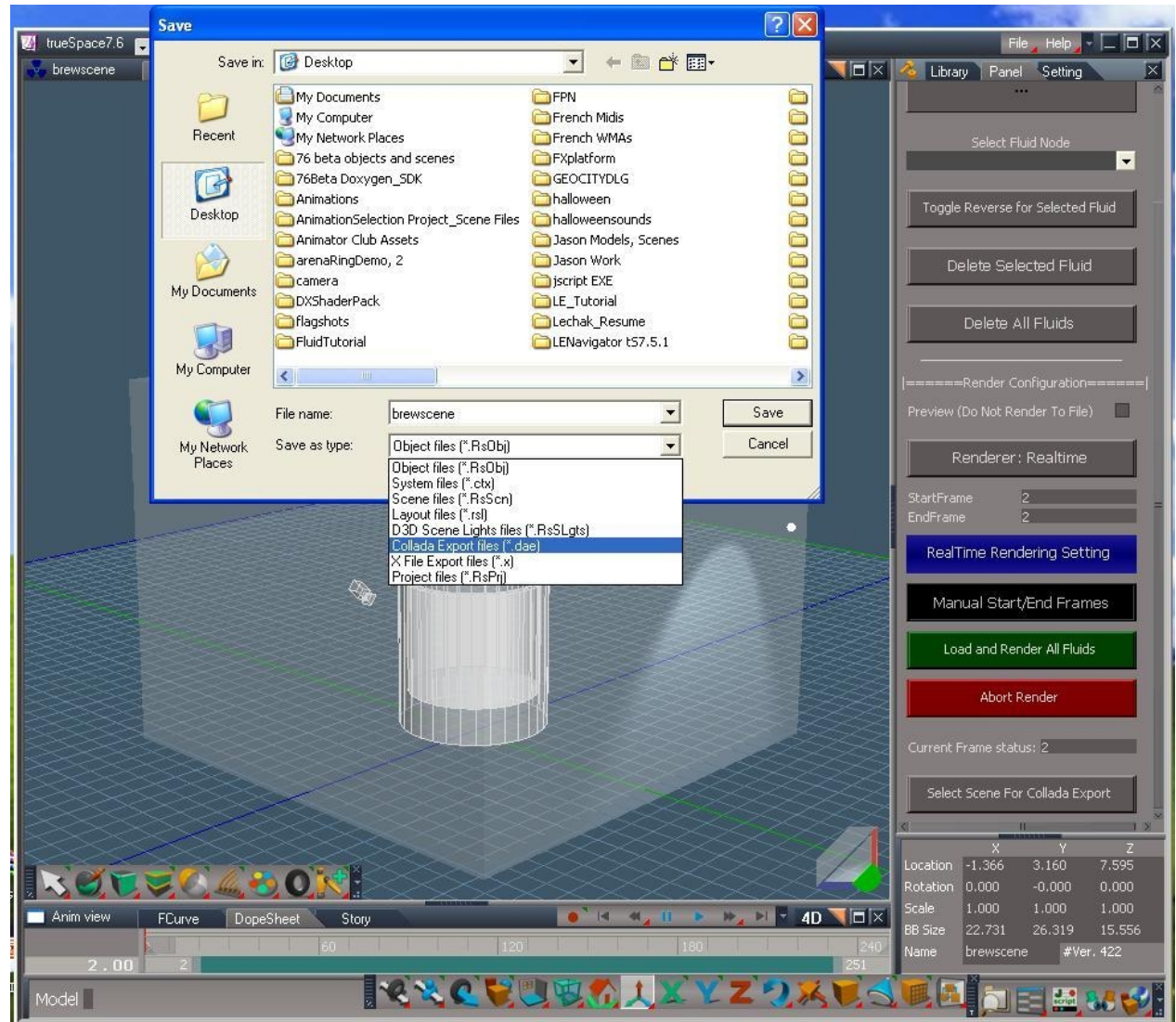
Sample Workflow

Now we want to export the scene in Collada format.
In the Scene Fluid Controller panel in trueSpace,
select the button, 'Select Scene For Collada Export'
In the trueSpace Workspace File menu, select the
Collada Export files(*.dae) option, then press Save.
(make sure you know which directory it's in)



Sample Workflow

In the trueSpace Workspace File menu, select the Collada Export files(*.dae) option, then press Save. (make sure you know which directory it's in)

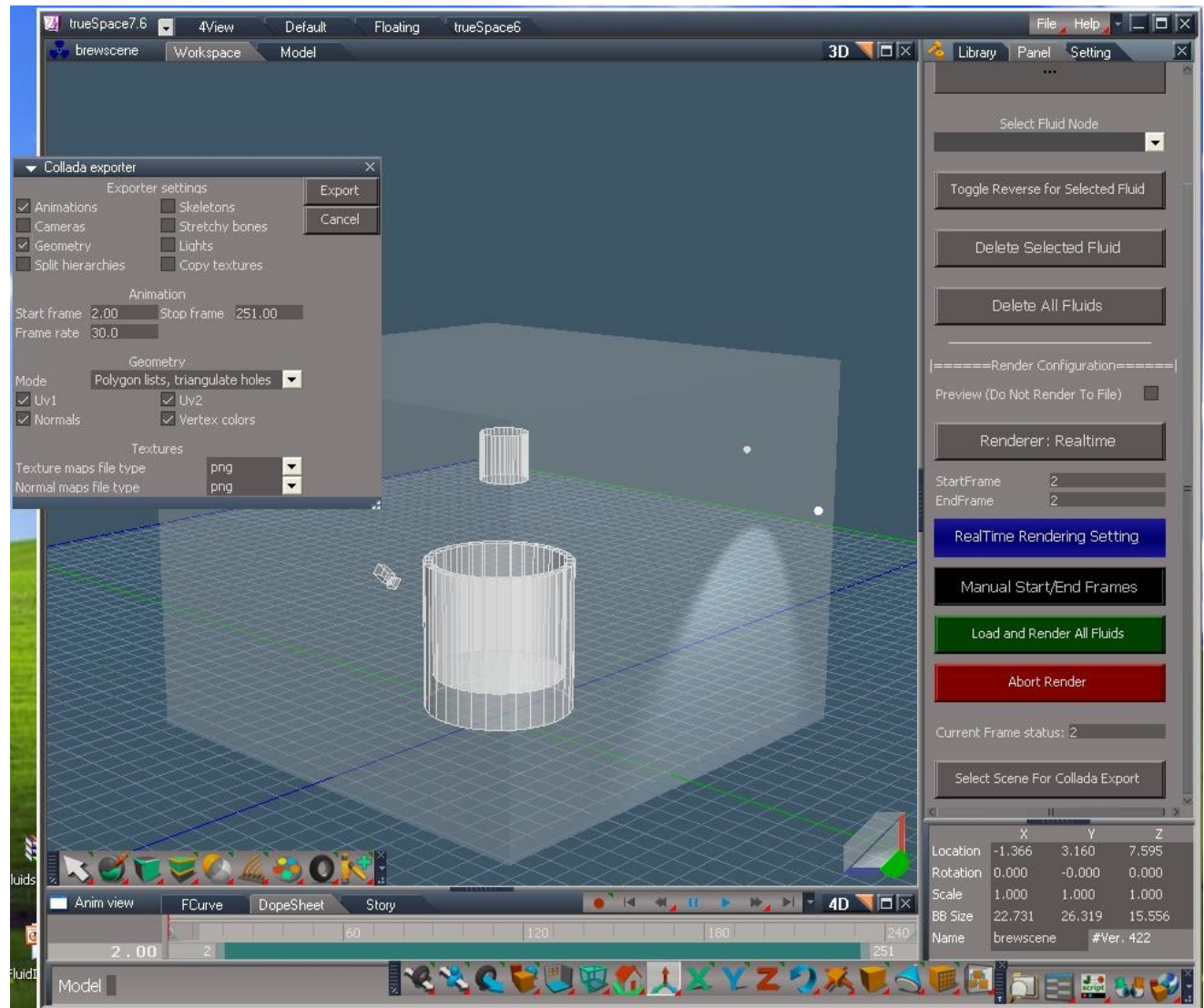


Sample Workflow

Notice that now we have the Collada exporter window. Leave all settings at their defaults and select: Export

Note: You can turn off Cameras, Skeletons, etc. if you wish.

The scene is now exported in Collada format.



Sample Workflow

Now back to blender.

We need to delete the default cube in blender, since we don't need it.

The cube should already be selected.

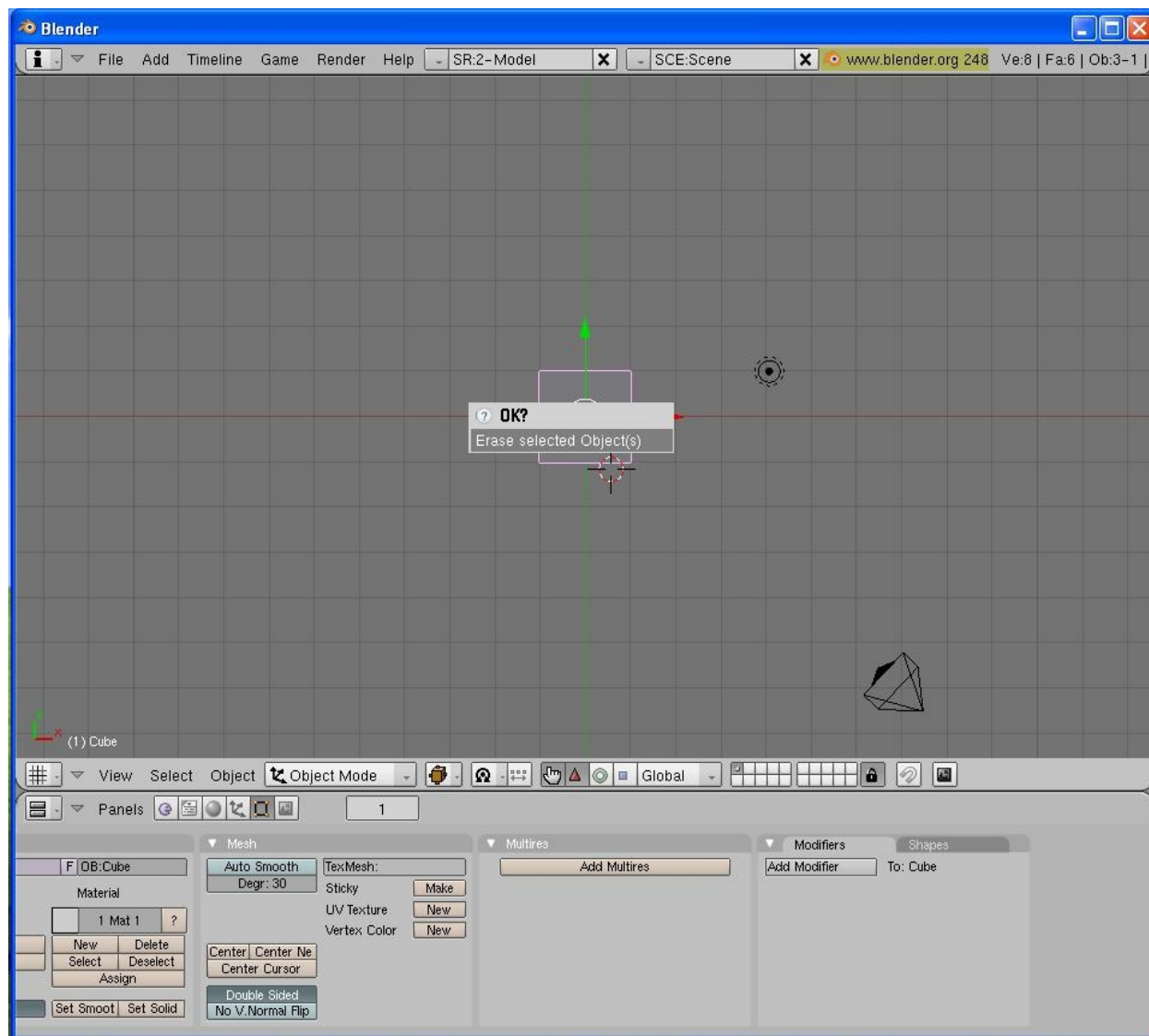
So just press the DEL key on the keyboard.

When prompted, select the option:

Erase selected Object(s)

And press the Enter key.

The cube will disappear from the scene.



Sample Workflow

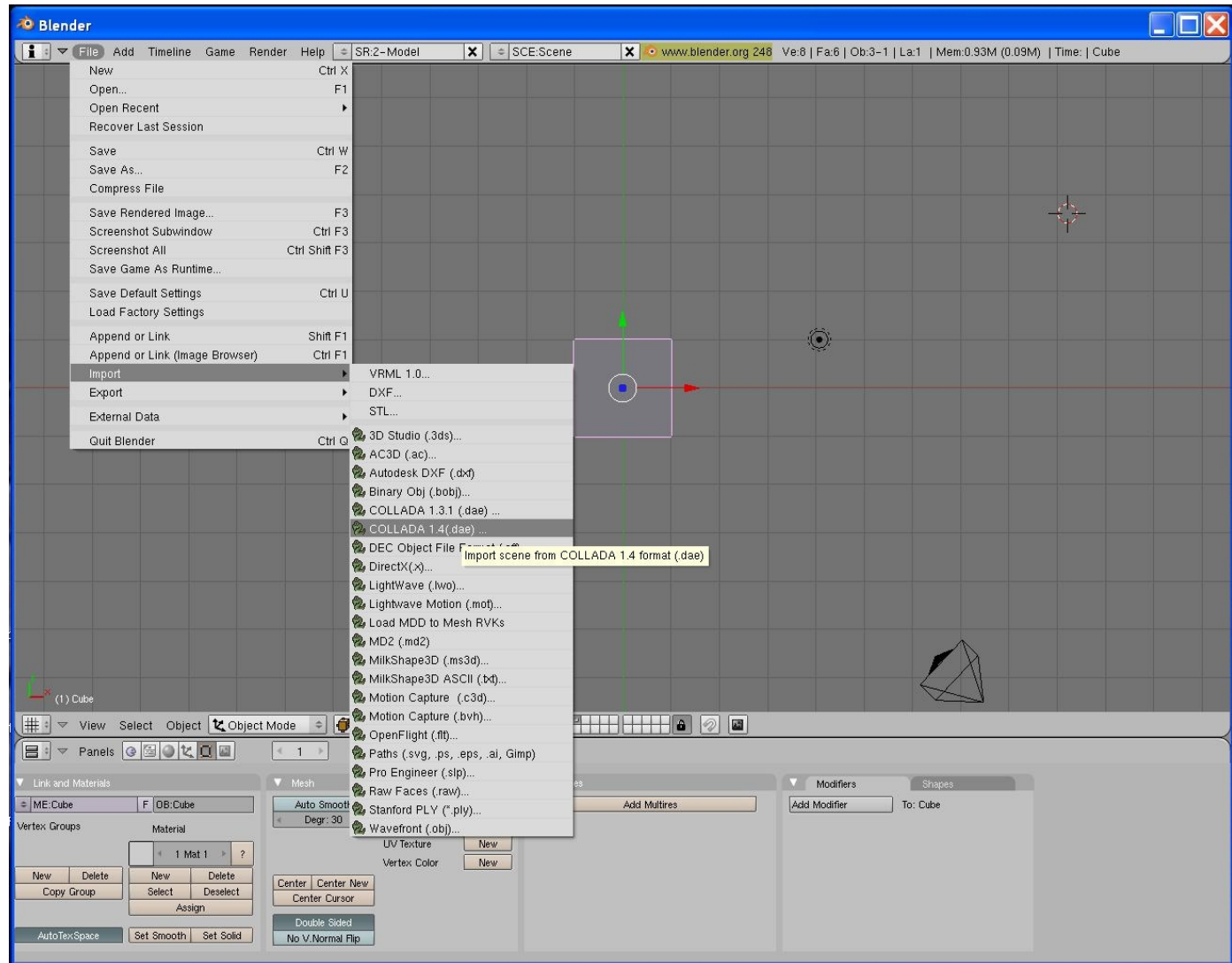
Now let's import this scene file into Blender.

Start Blender.

Now, import the file:

From the File Menu, select:

Import->COLLADA 1.4(dae)



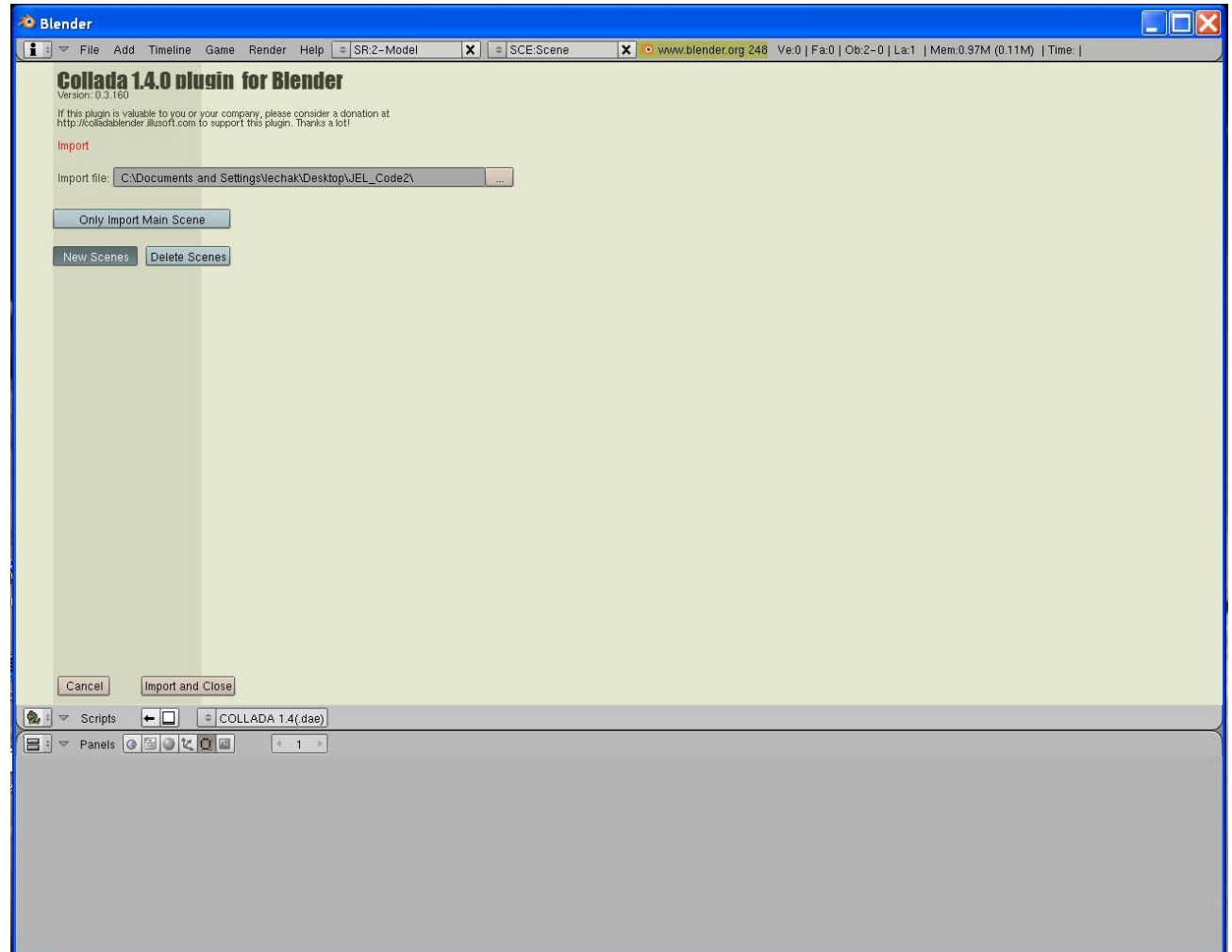
Sample Workflow

This is the next screen you will see in Blender.

Navigate to the directory where you exported your scene.

In this example, that directory is C:\FluidTutorial.

Navigate by clicking the button to the right of the words: 'Import File'

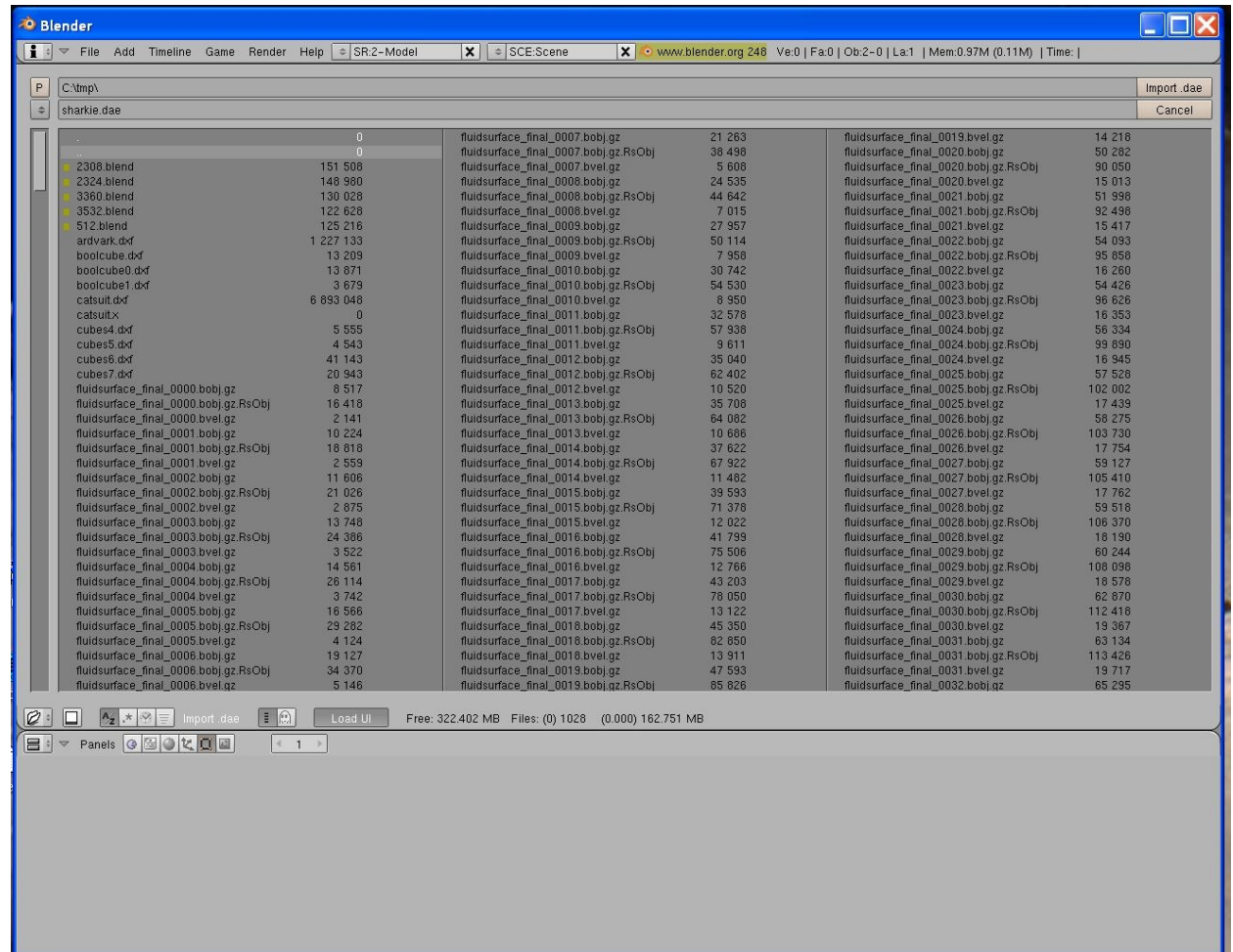


Sample Workflow

This is the next screen you will see in Blender 2.48a.

We see that we are in the wrong directory; to navigate to the directory where you exported your objects, click the .. (which is highlighted)

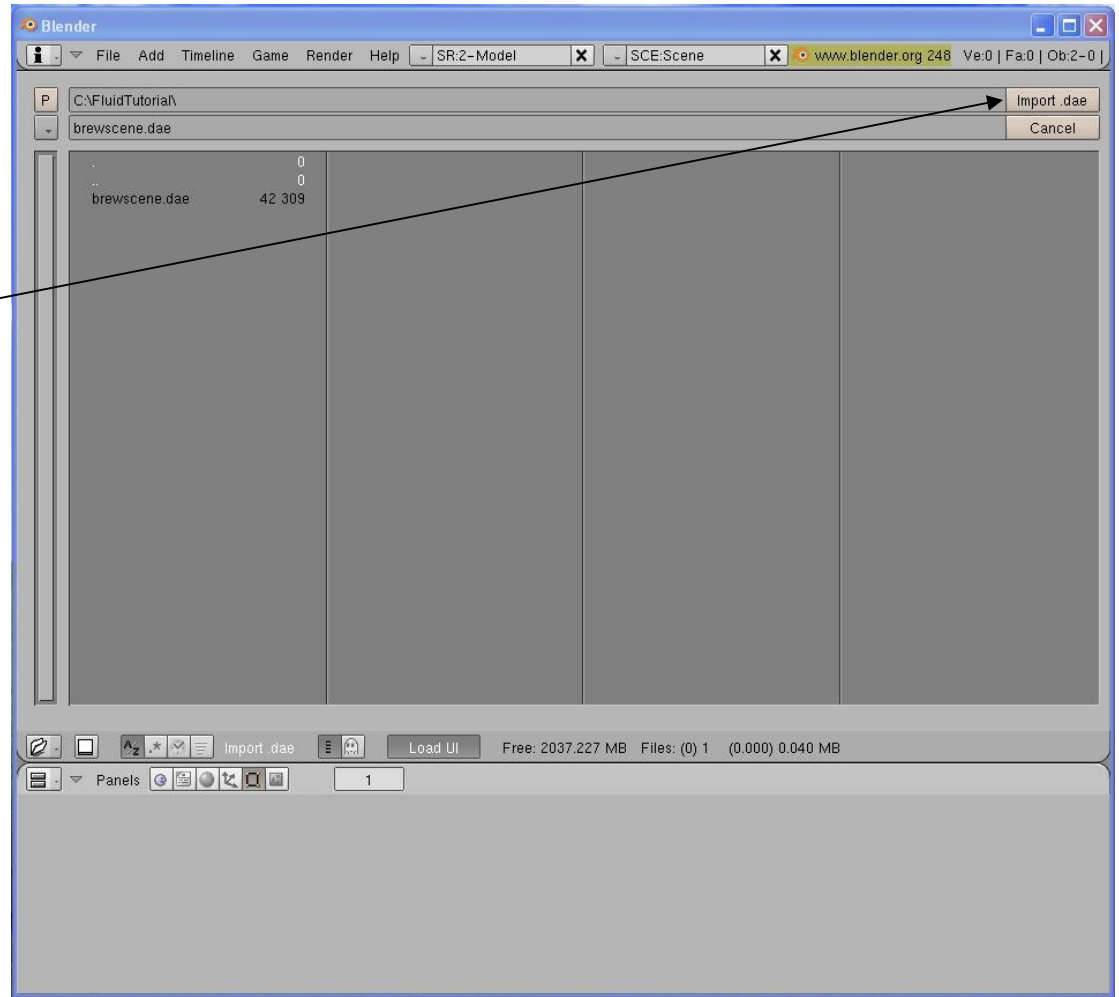
Note: Notice how the vertical scroll bar is on the LEFT of the panel; not The right, as are standard Windows applications.



Sample Workflow

This is the correct directory: C:\FluidTutorial.
Select the scene file; in this case, brewscene.dae.
You will see the file name appear in the textbox
beneath the directory path.

No select: Import.dae



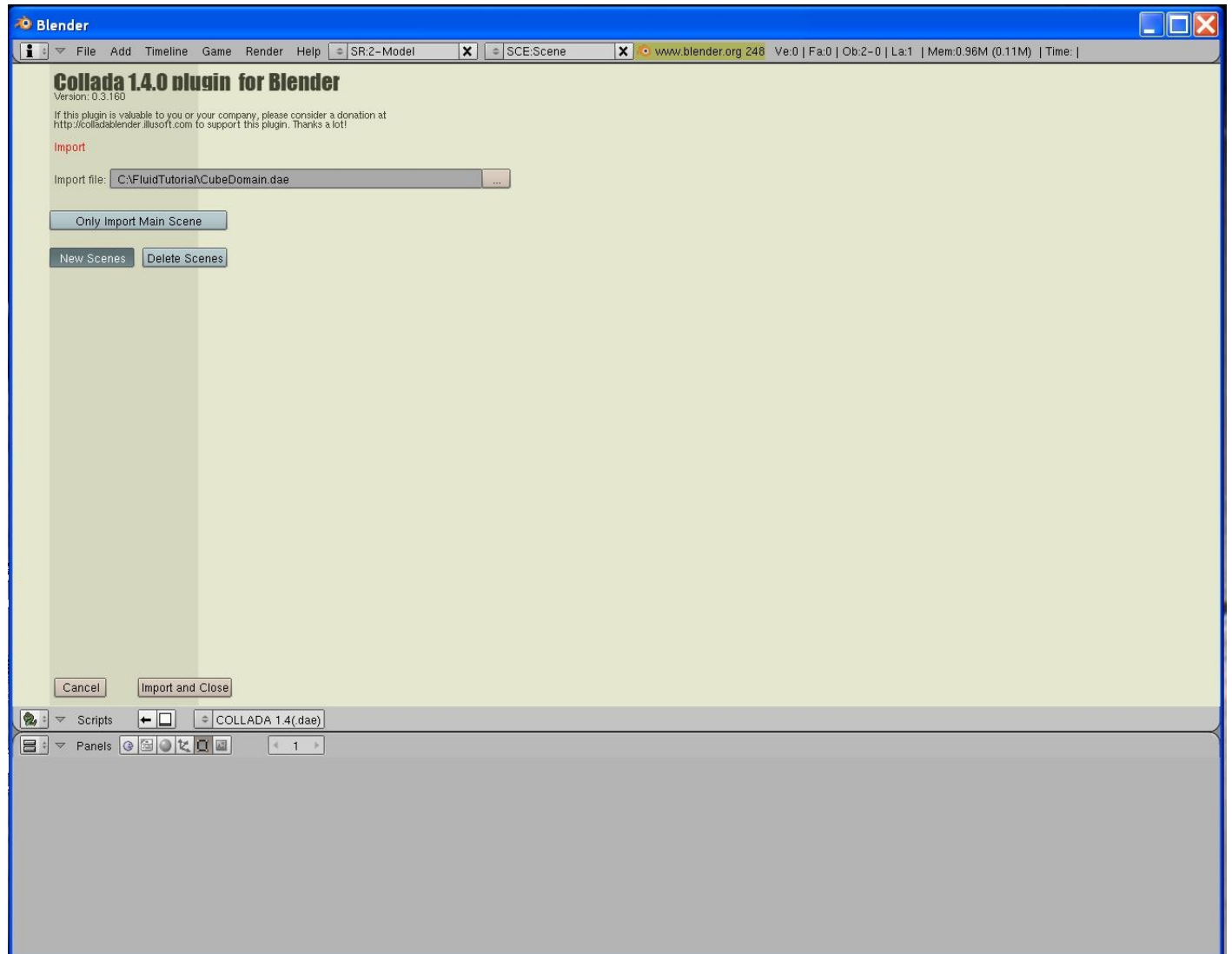
Sample Workflow

Now we are back at this page.

Select: Import and Close

You should see:

Import Successful



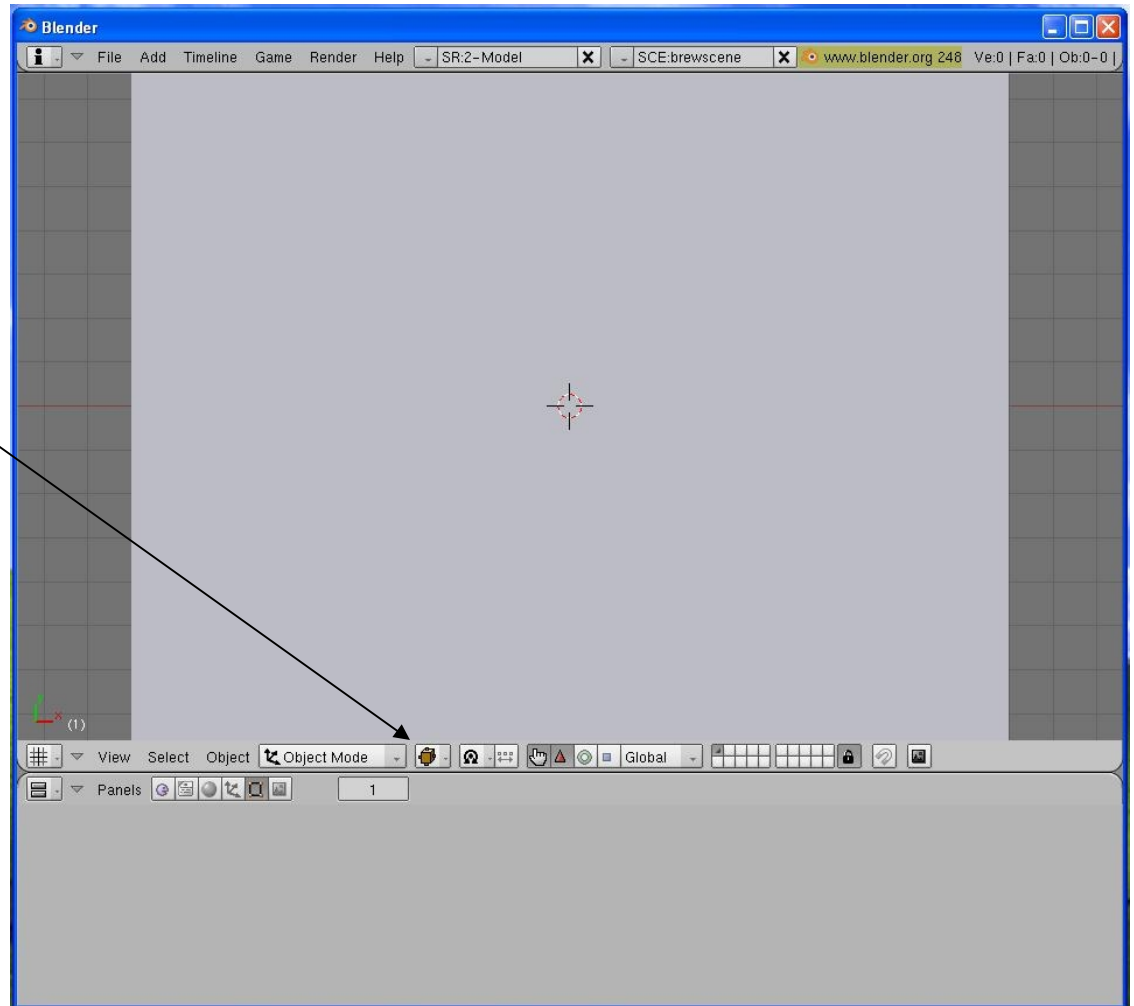
Sample Workflow

Yes this looks Odd.

Yes we can fix it.

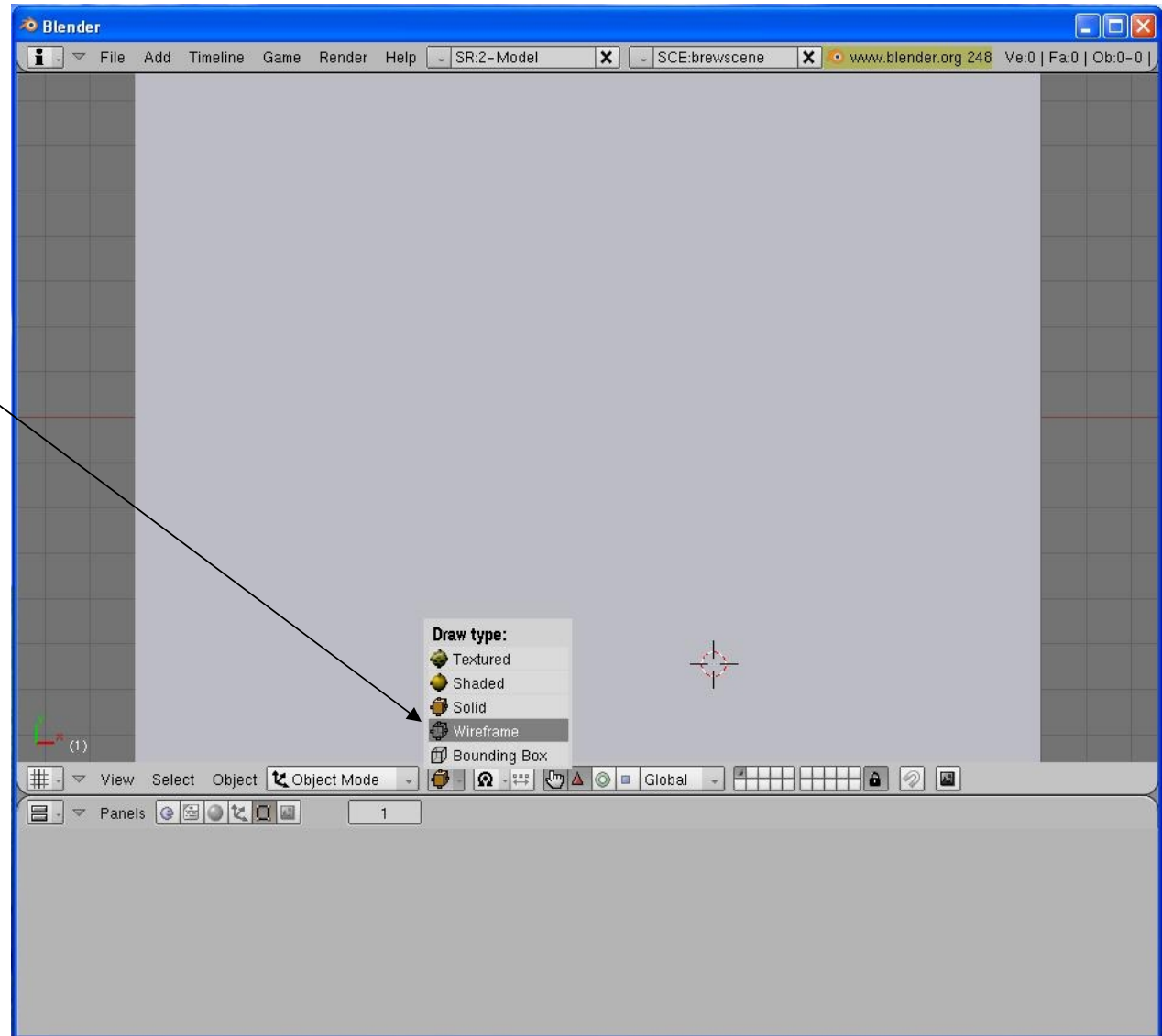
Currently Blender is showing a Solid view of the scene.

Click and drag this button
(scroll to next page to see what you
Need to have selected)



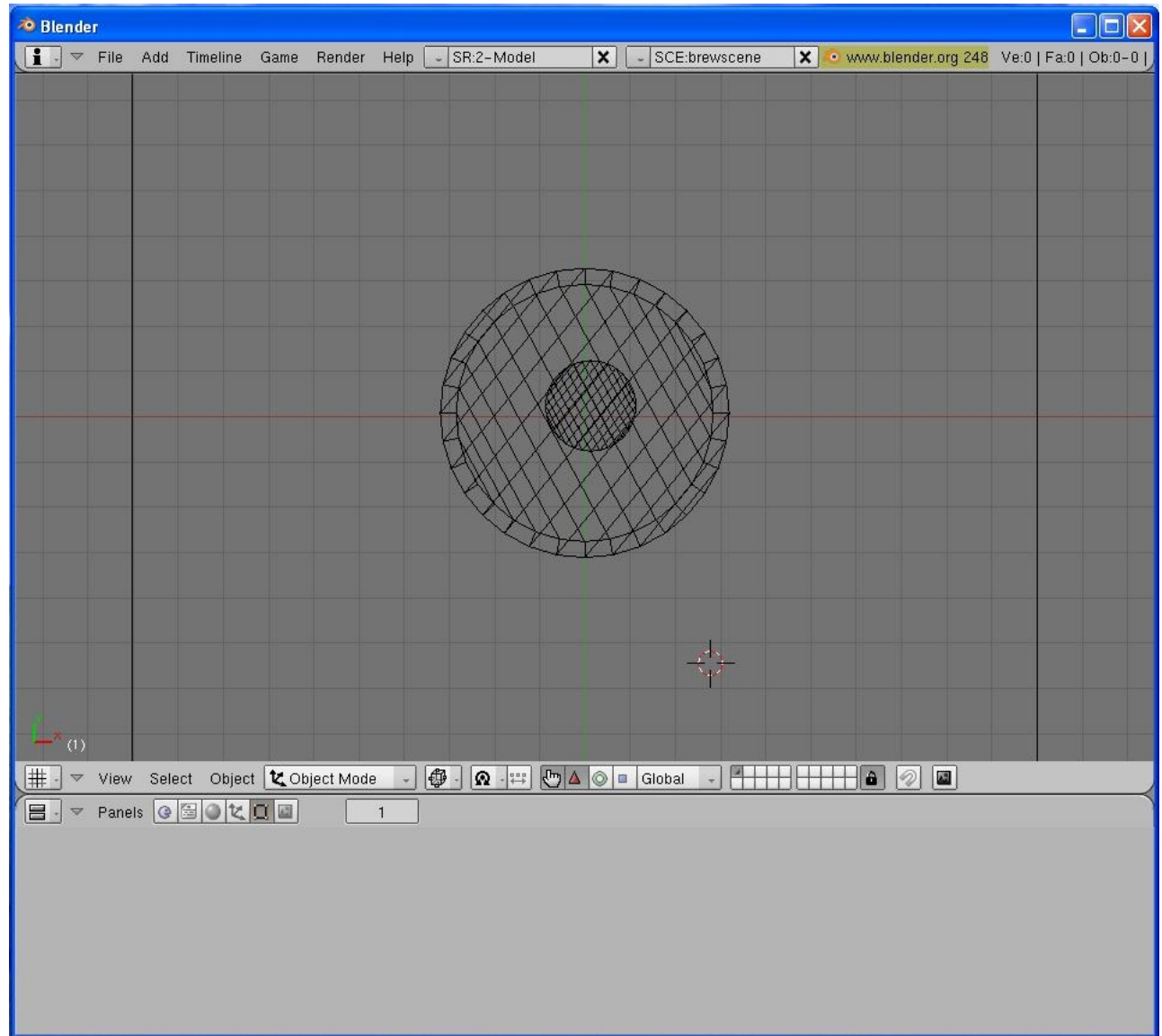
Sample Workflow

This is what you want
(scroll to next page to see the result)



Sample Workflow

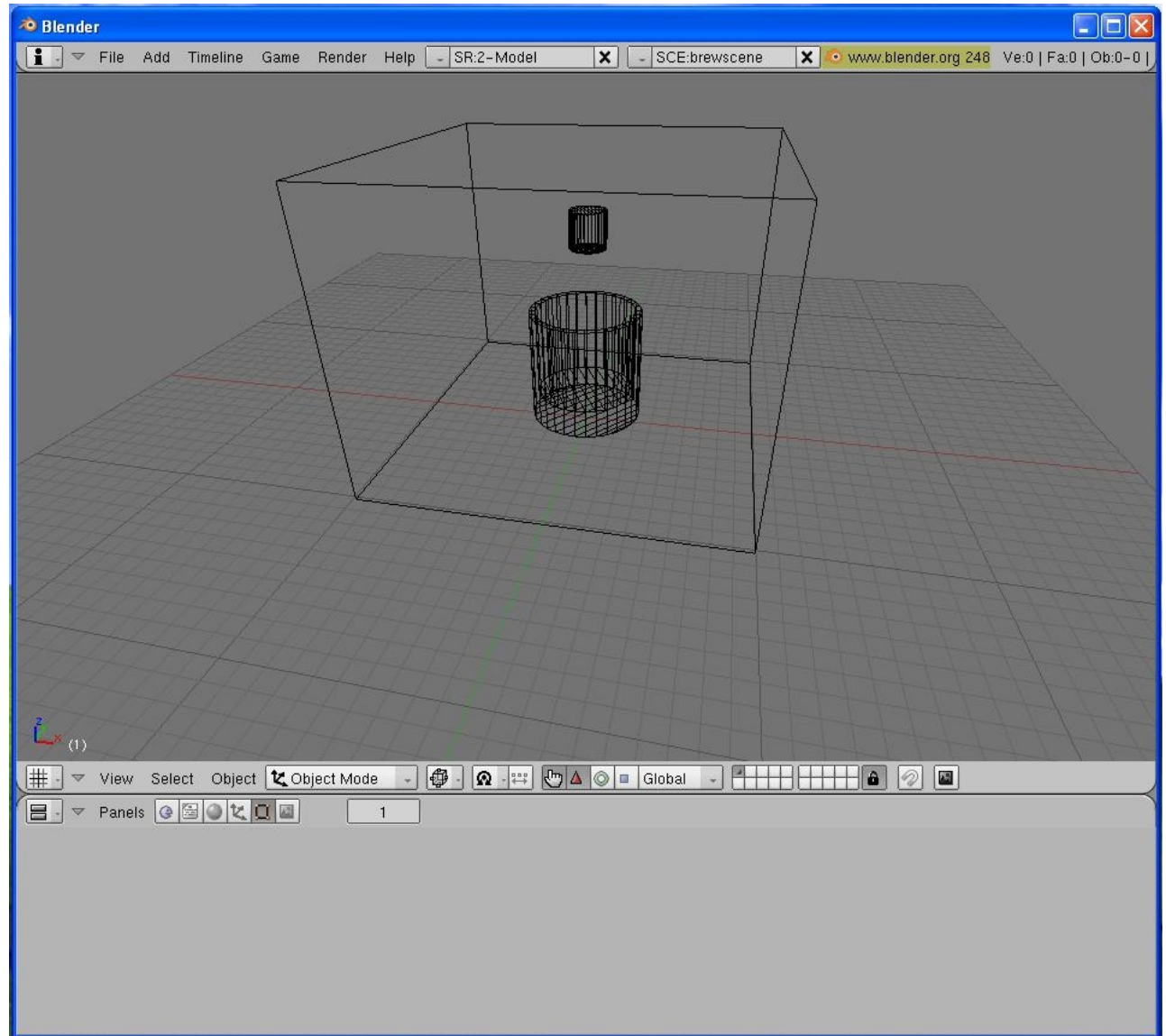
The scene is now in wireframe mode. Use the Middle Mouse button to rotate the view, to a perspective Viewpoint so we can see all the objects in the scene.



Sample Workflow

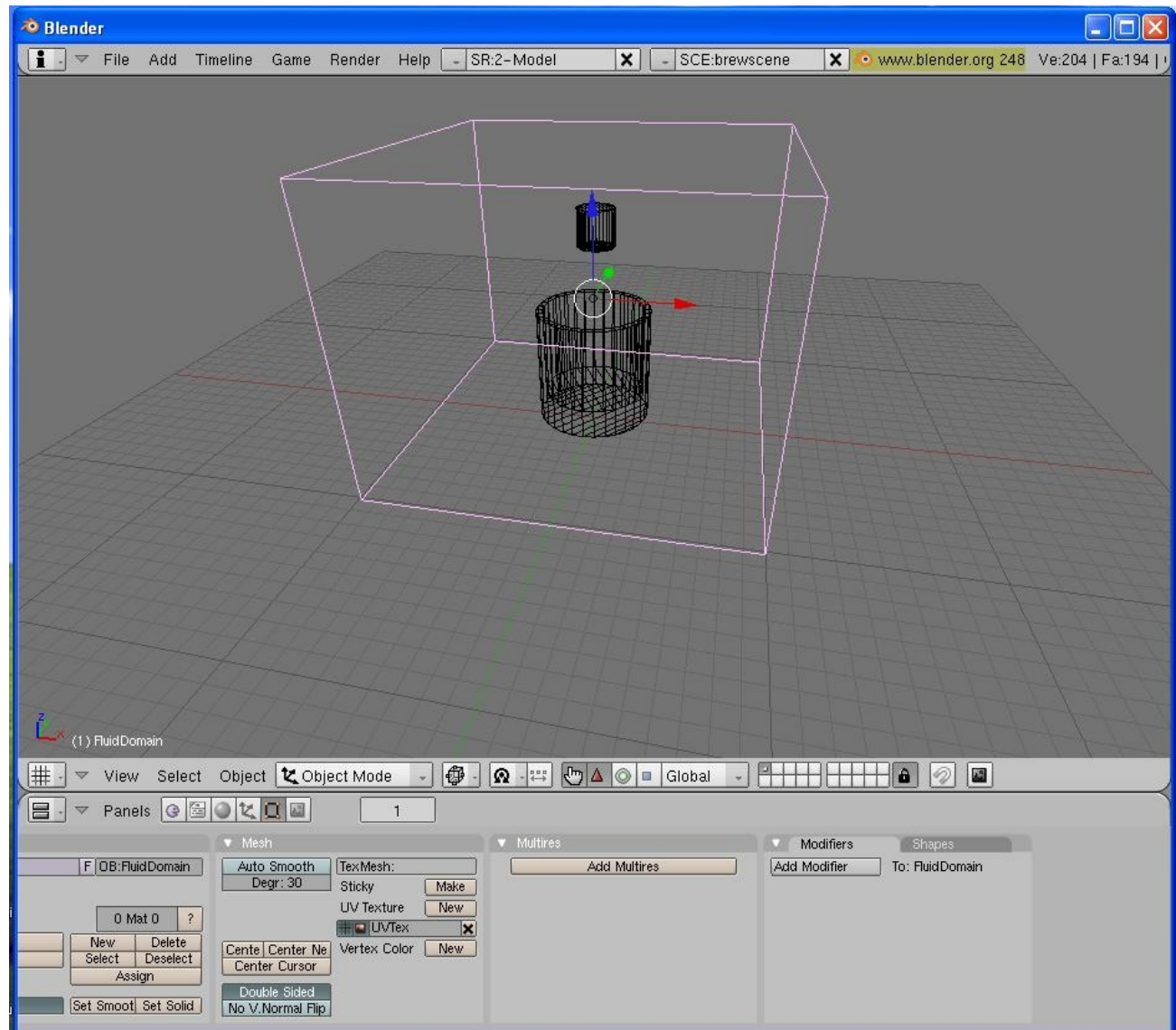
This is a pretty good perspective
Viewpoint.

Now let's setup our fluid simulation.



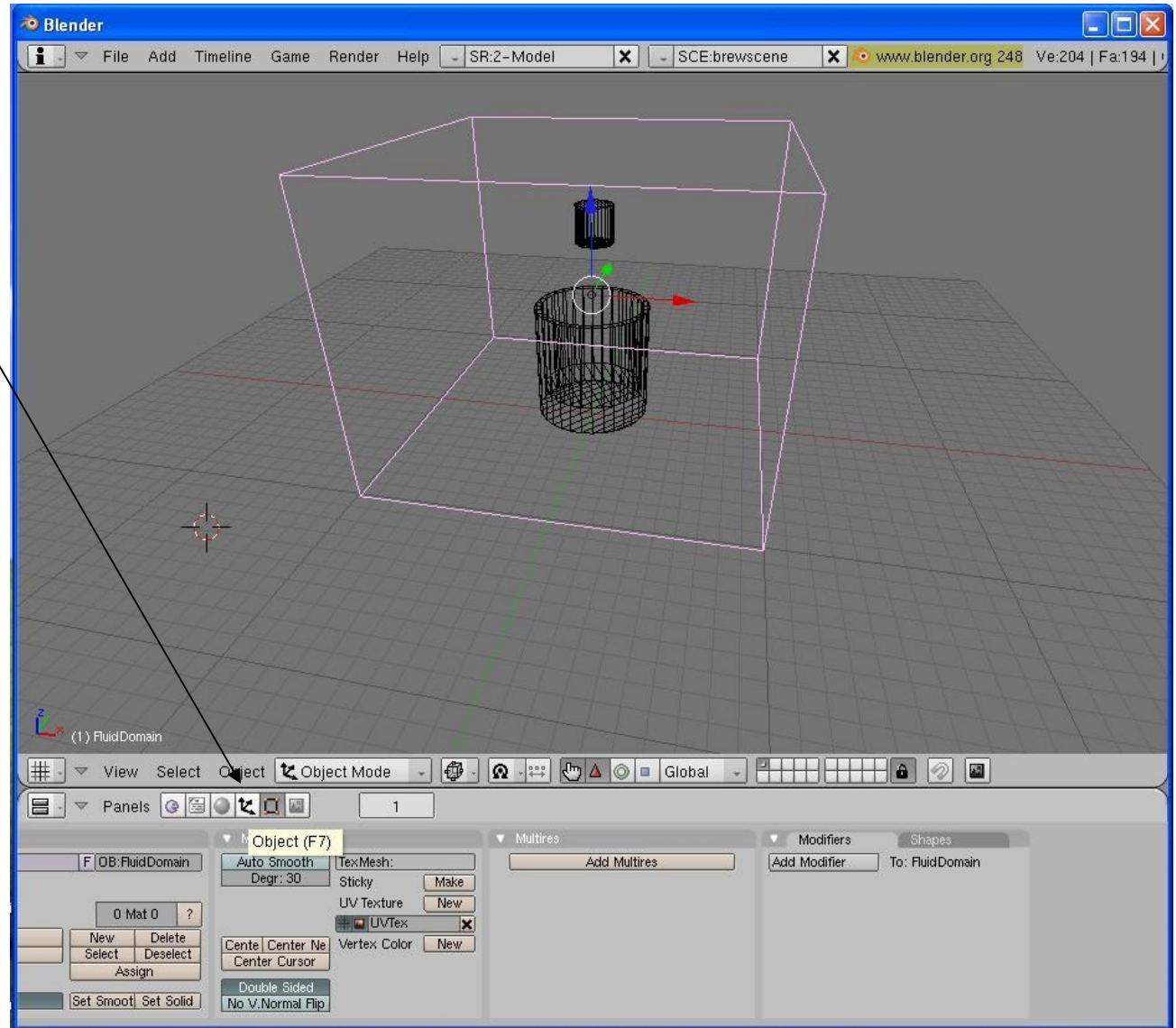
Sample Workflow

Right click the cube. This will be our domain.



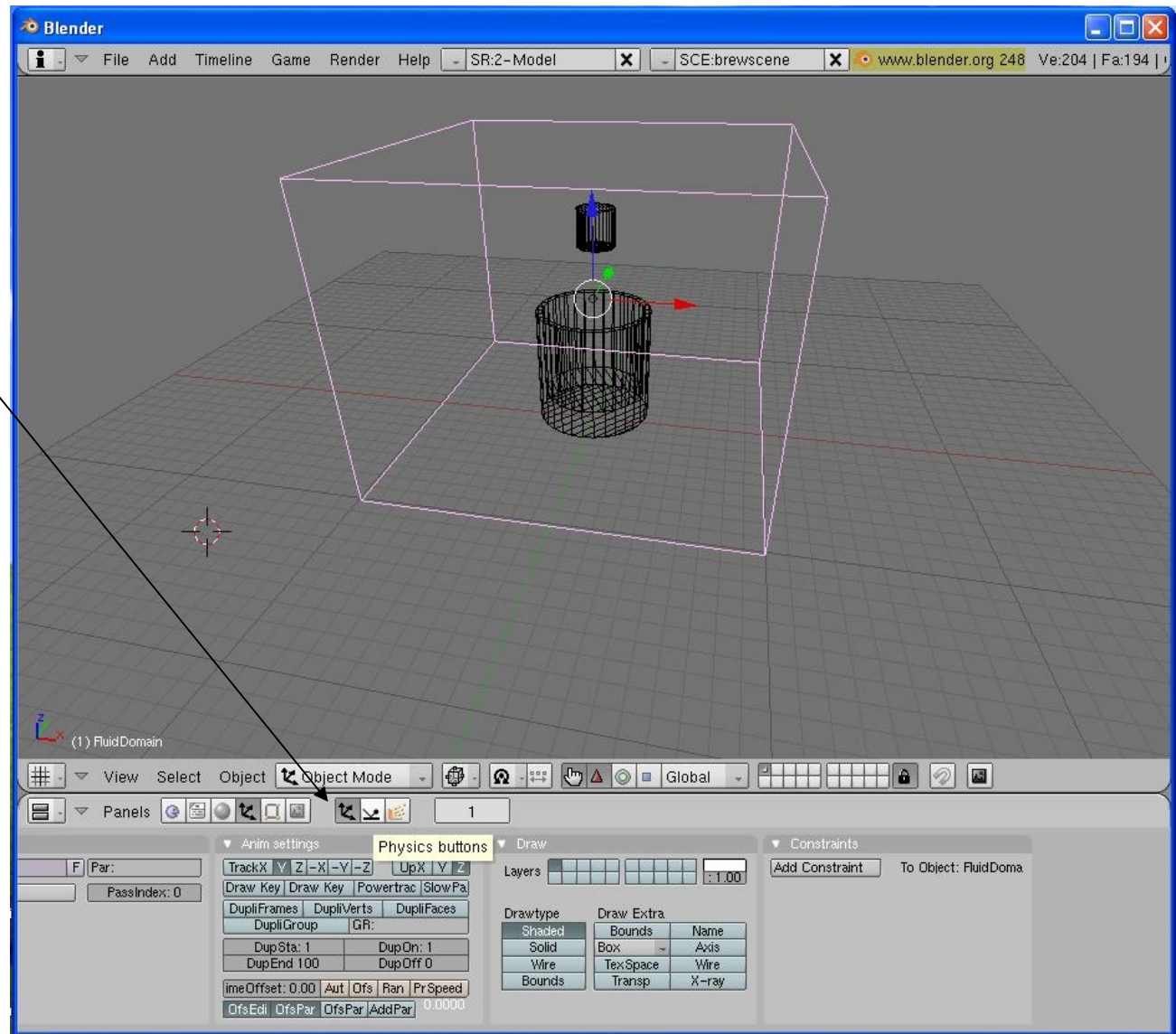
Sample Workflow

Select the Object icon, or press F7 to get to the Object panel.



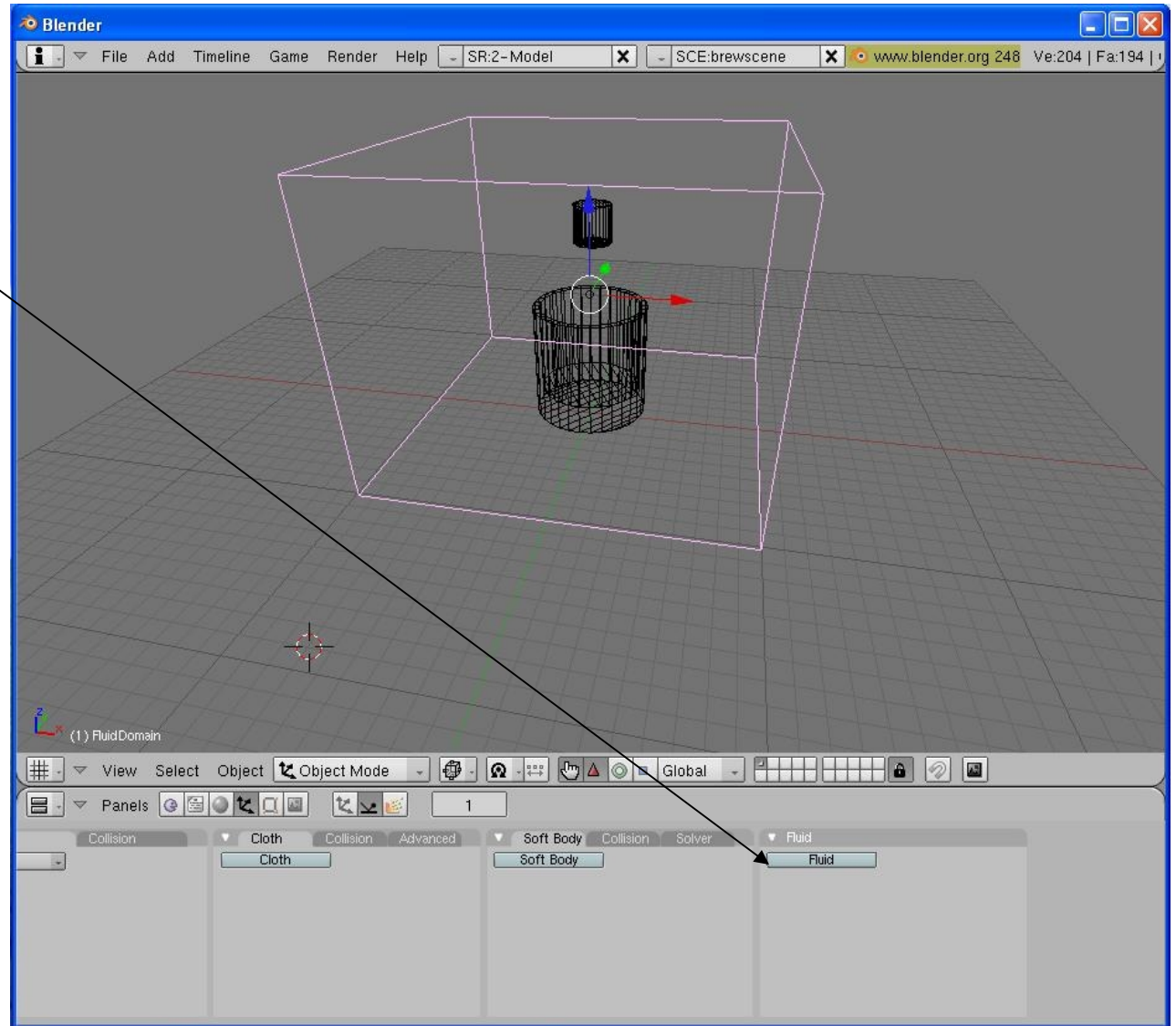
Sample Workflow

Select this icon to get to the Physics buttons.



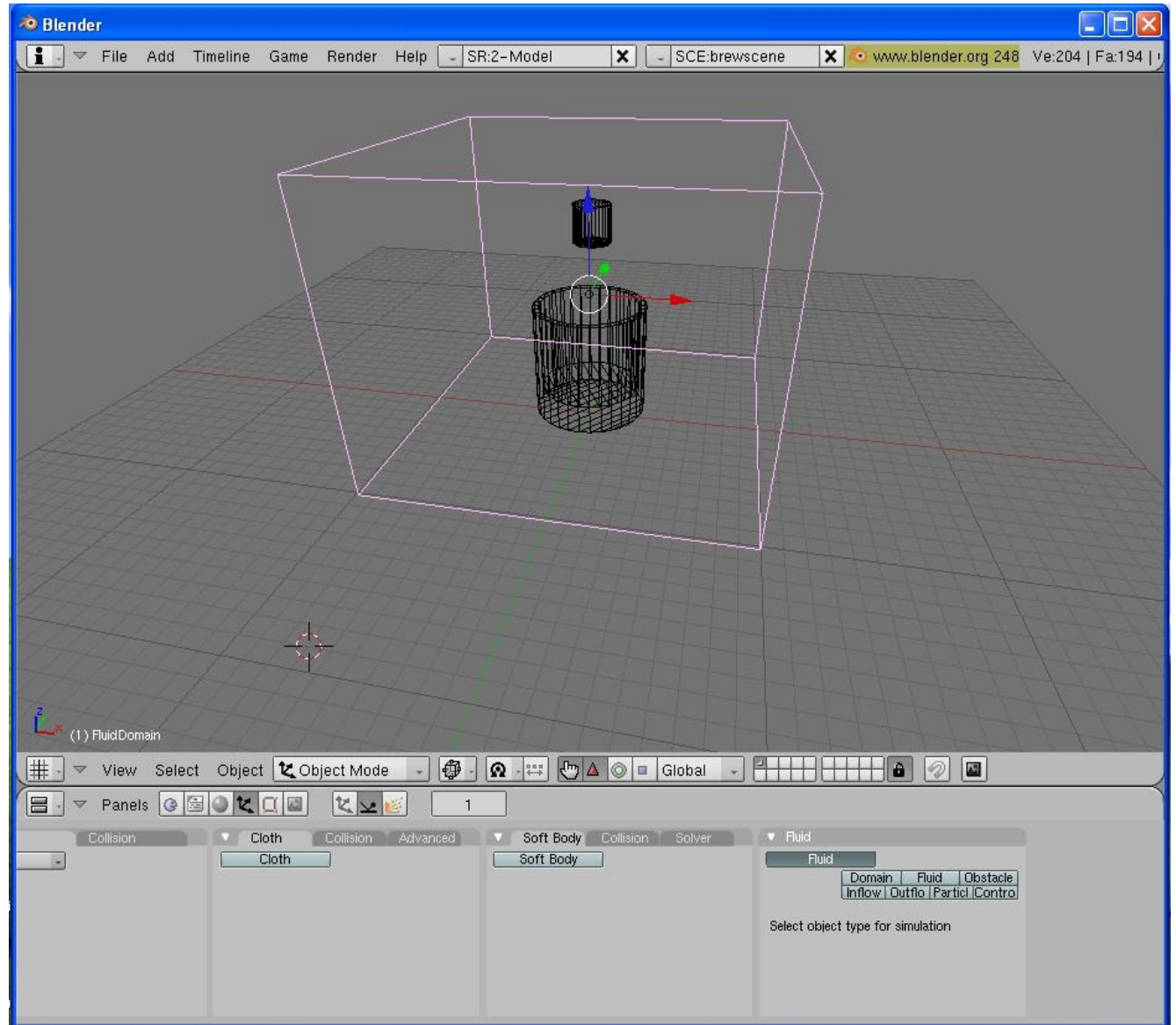
Sample Workflow

Select this icon to get to the
Fluid buttons



Sample Workflow

The cube (our Fluid Domain) is selected; so select the Domain button.



Sample Workflow

Set the path to:

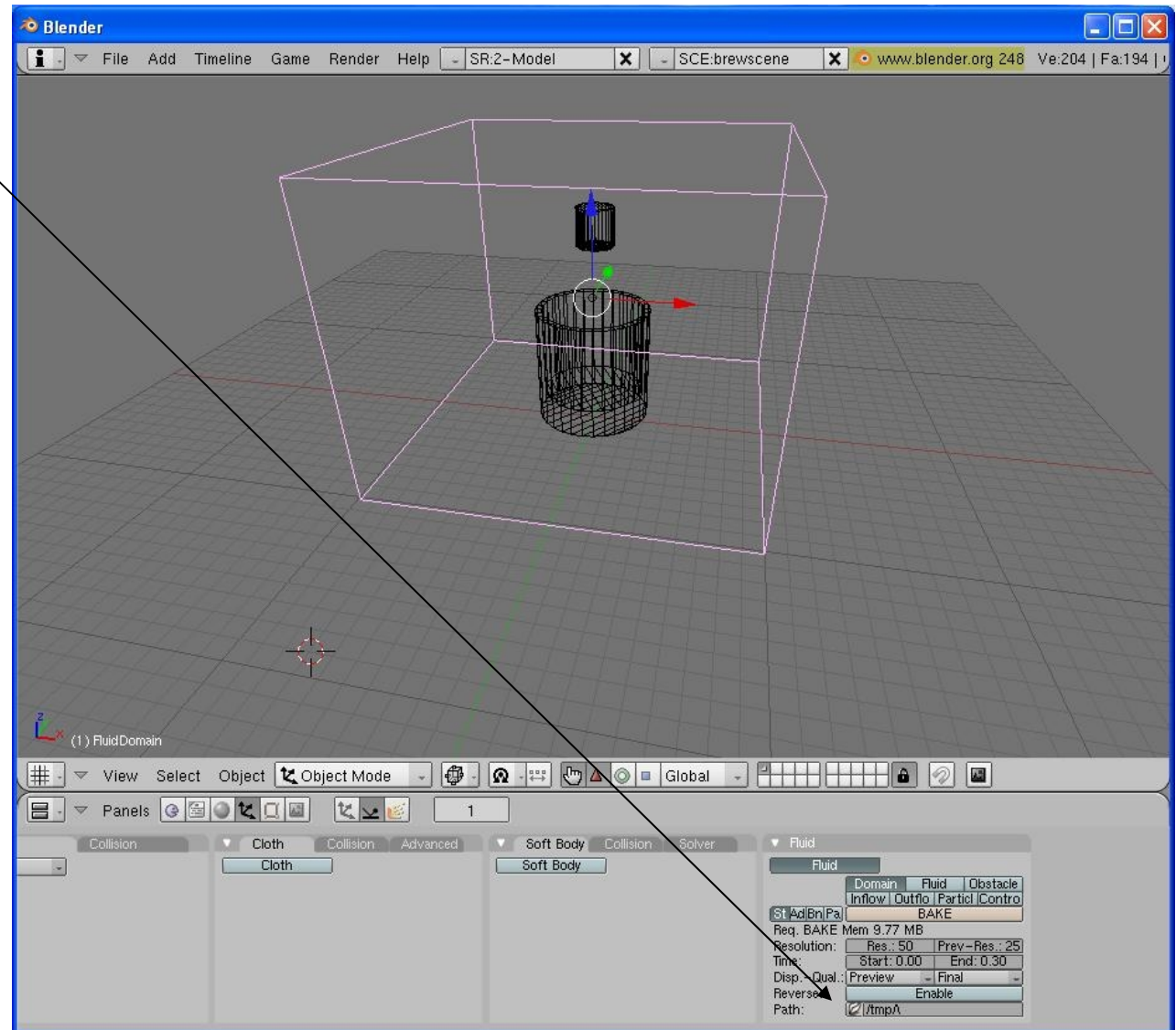
C:\FluidTutorial\

Note: the trailing backslash is required. Otherwise your fluid sim filenames will be called:

FluidTutorialfluidsurfacefinal...

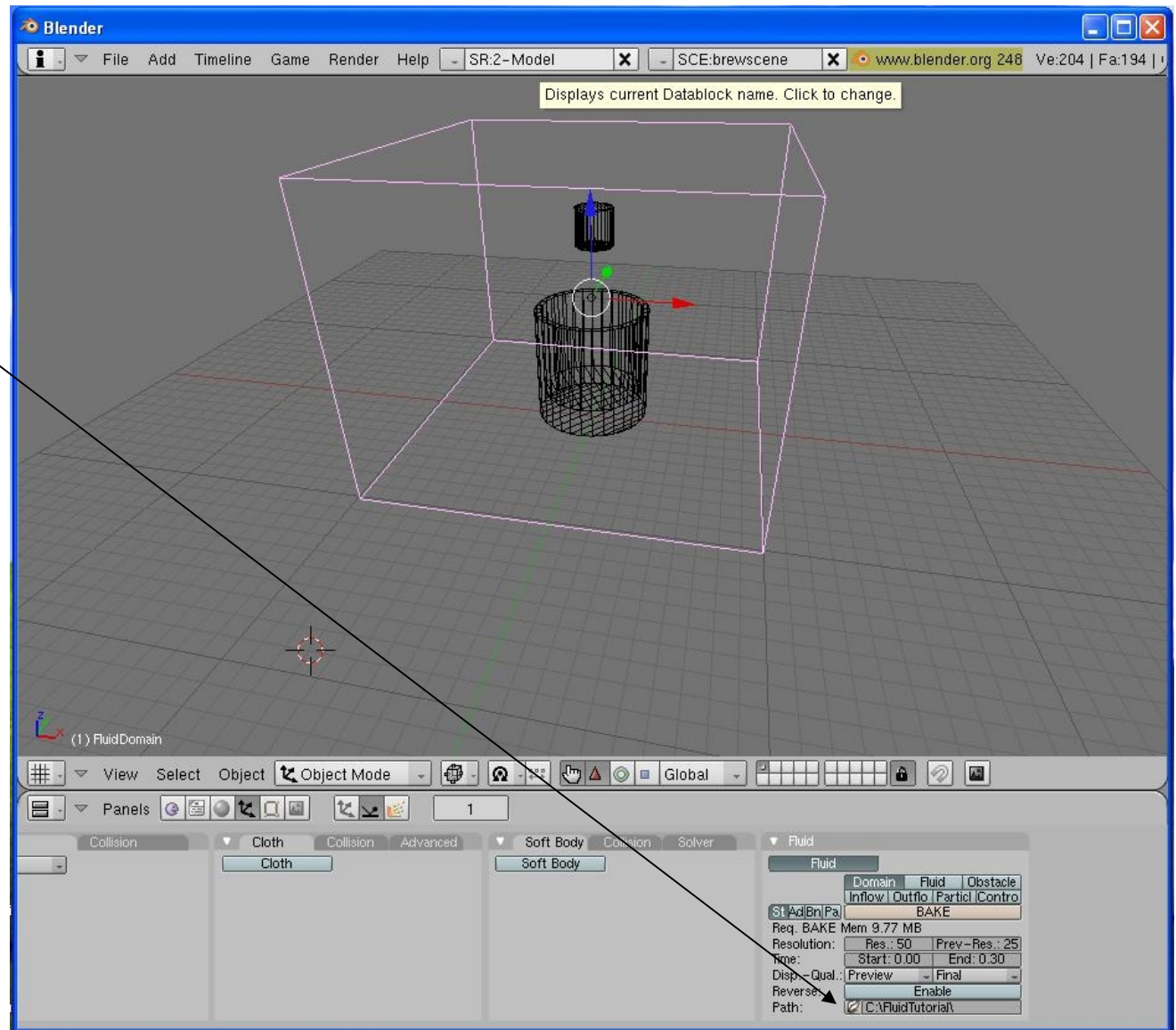
and truespace Import will not work.

Also: if this directory does not yet exist, blender will create it, even though you may see an error msg from blender indicating the directory could not be created.



Sample Workflow

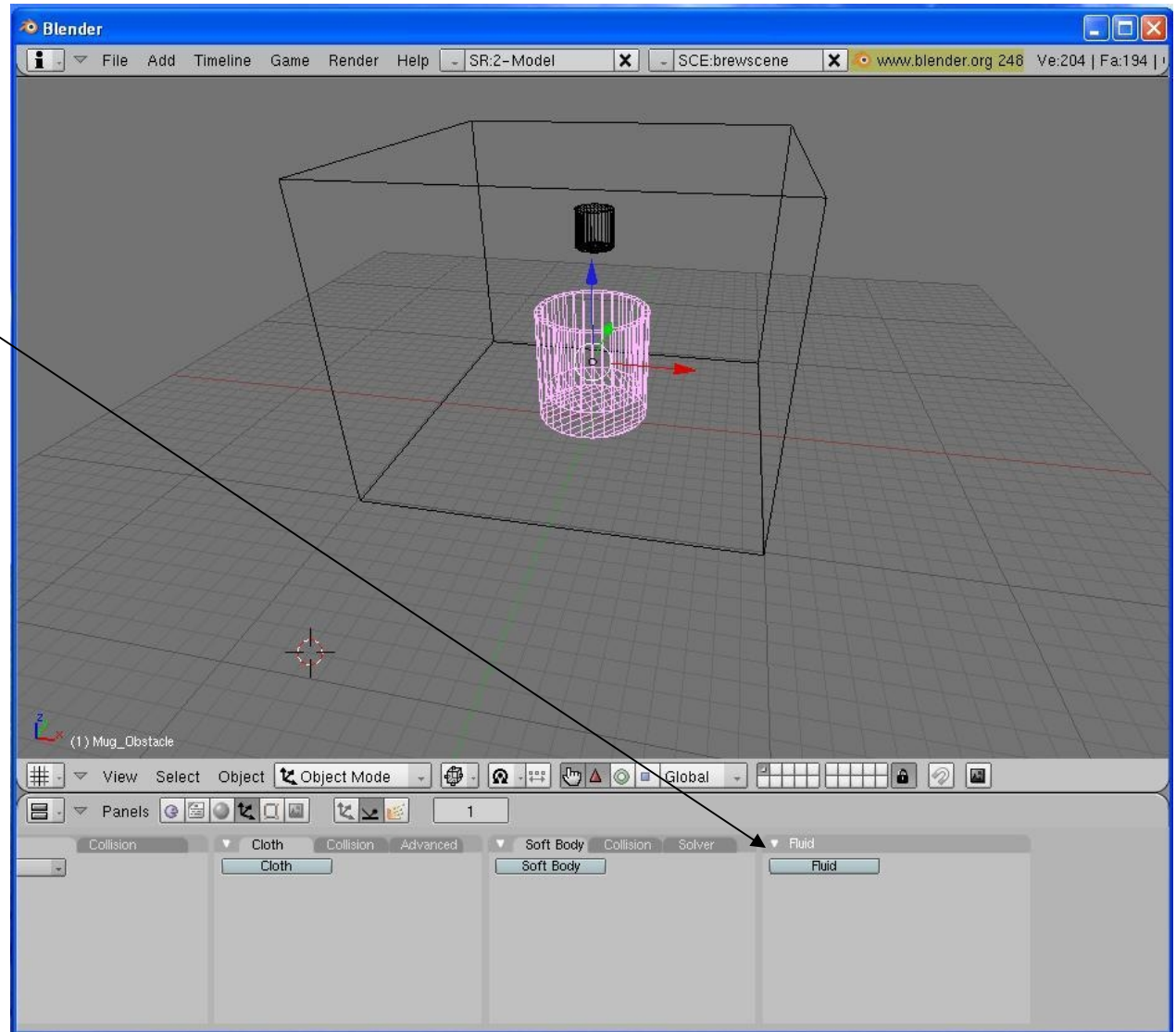
The path is now set to:
C:\FluidTutorial



Sample Workflow

Right click the mug to select it
(the Obstacle)

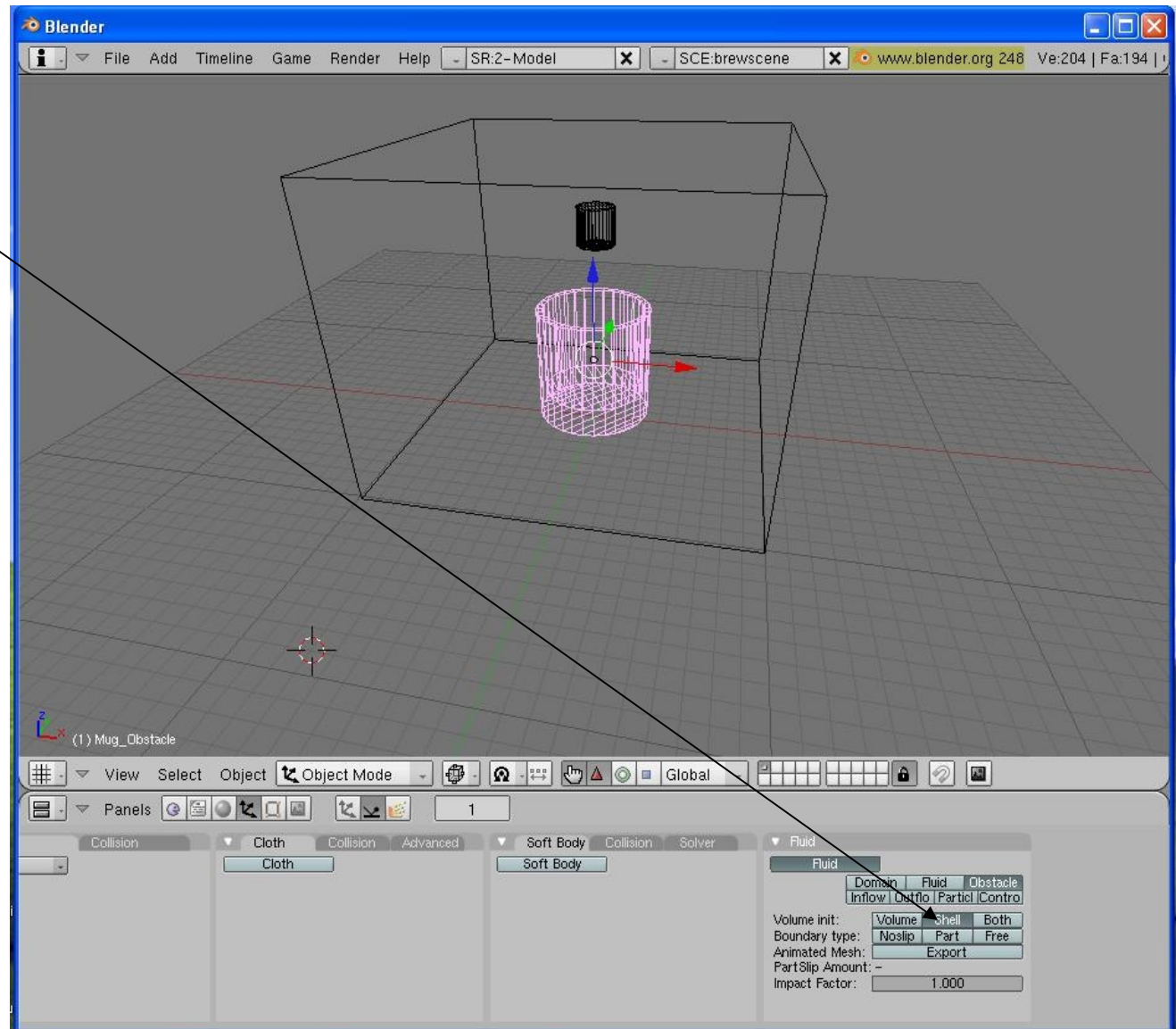
Now select Fluid again,
Then select Obstacle



Sample Workflow

Also, select Shell in the Obstacle Window.

This will allow the fluid to Fall Into the mug.



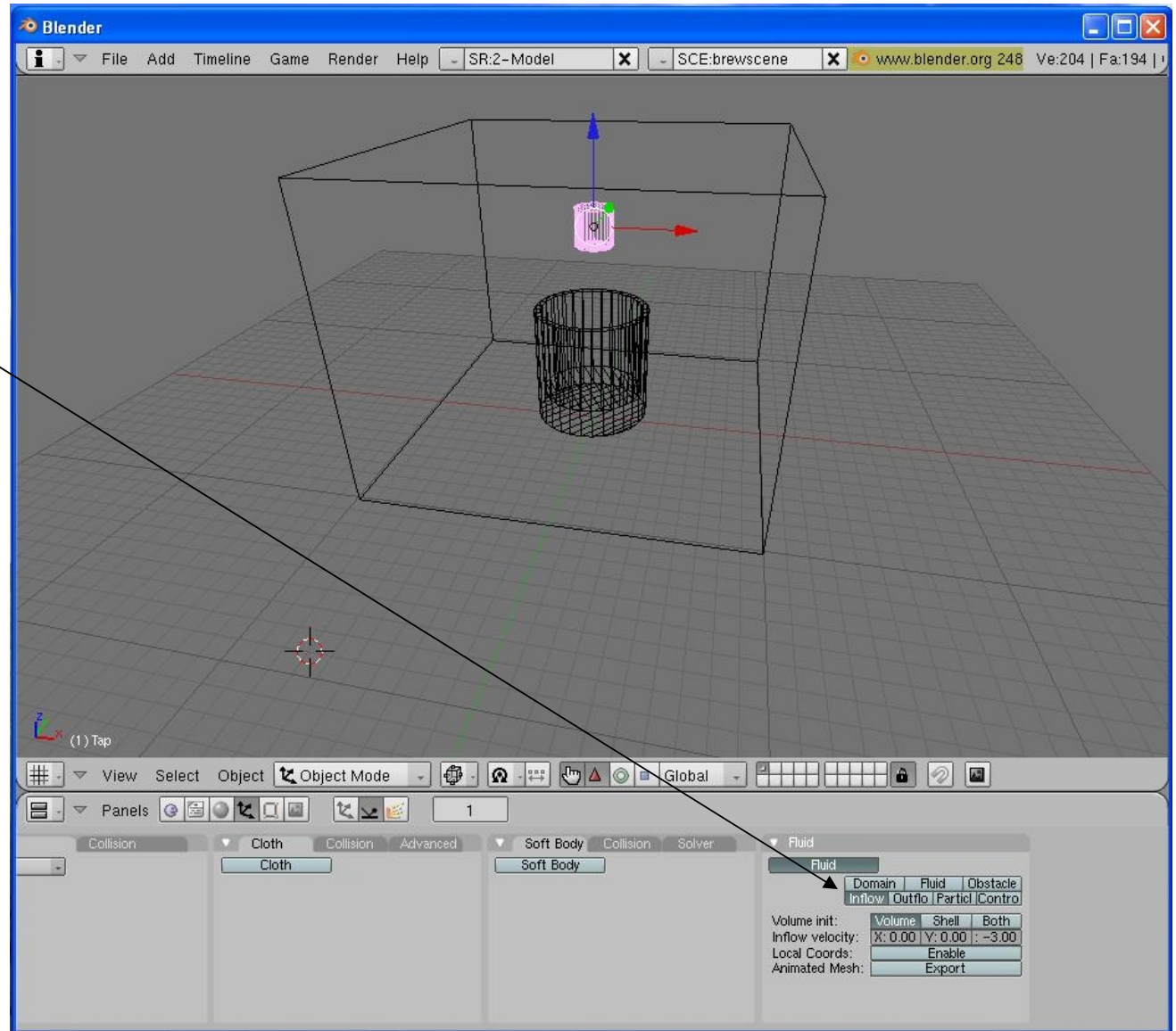
Sample Workflow

Next, select the spout by right clicking it (ok, it's just a cylinder in free space :D)

Select Fluid, then select Inflow in the opened panel.

Set the Initial Velocity to:

Z: -3.0

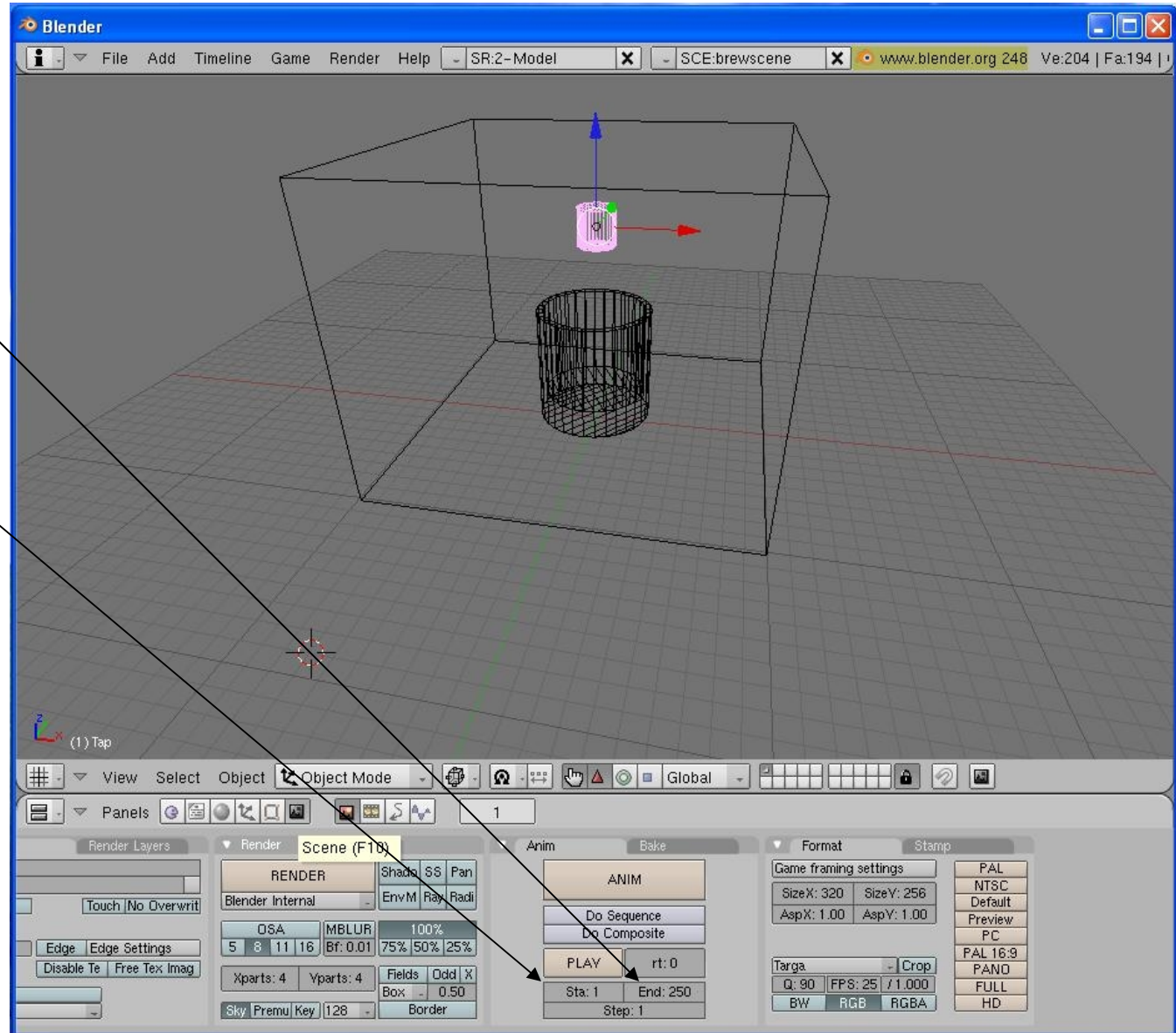


Sample Workflow

Let's switch back to the Scene Panel, to make sure we have the desired Start and End frames.

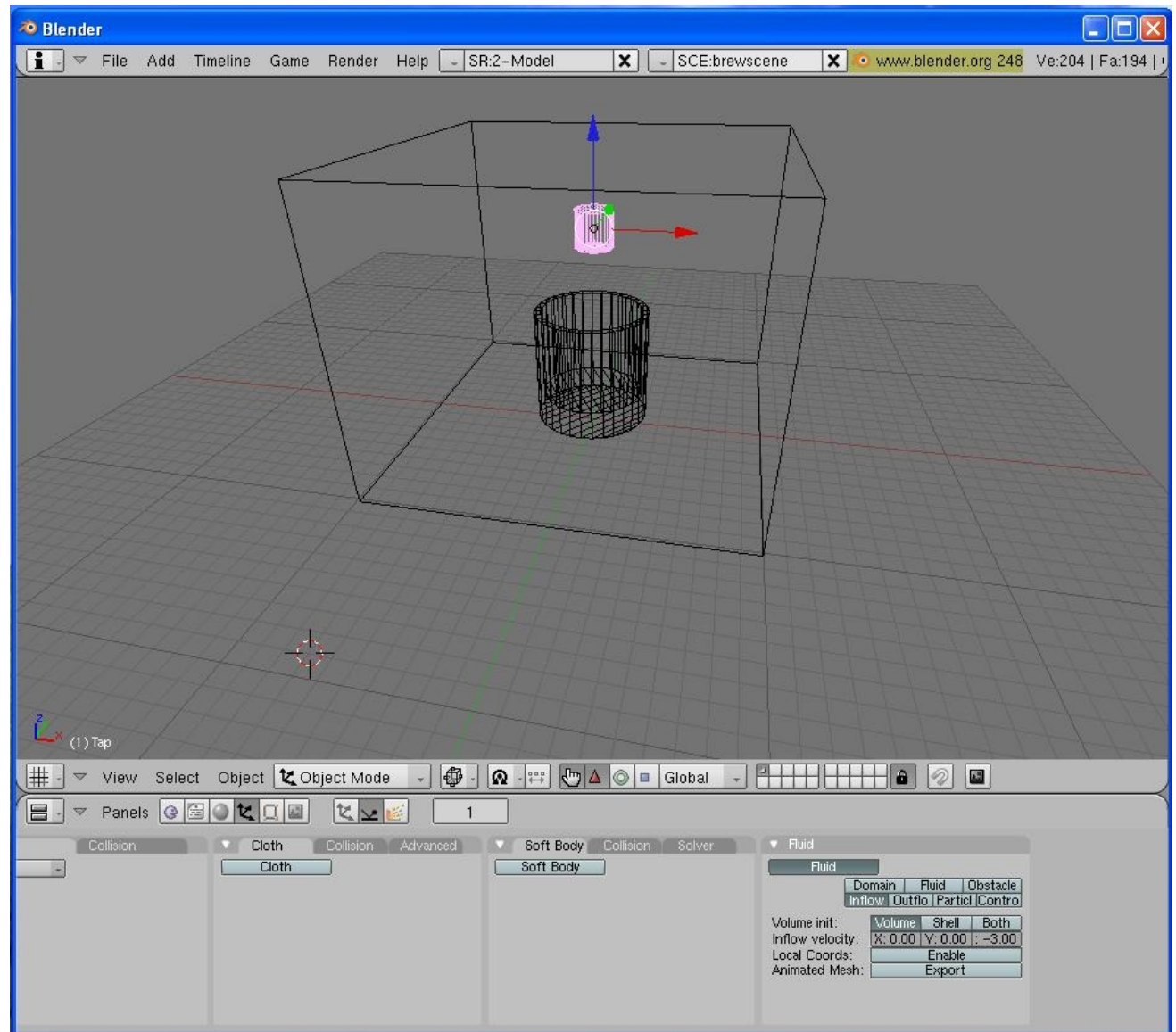
Change the End frame value if you wish; 25 may be a good value. You will end up with 25 files instead of 250

Then press F7 to return to the Object panel.



Sample Workflow

Back in the Object panel,
Select the Domain (the cube)
By right clicking on it.



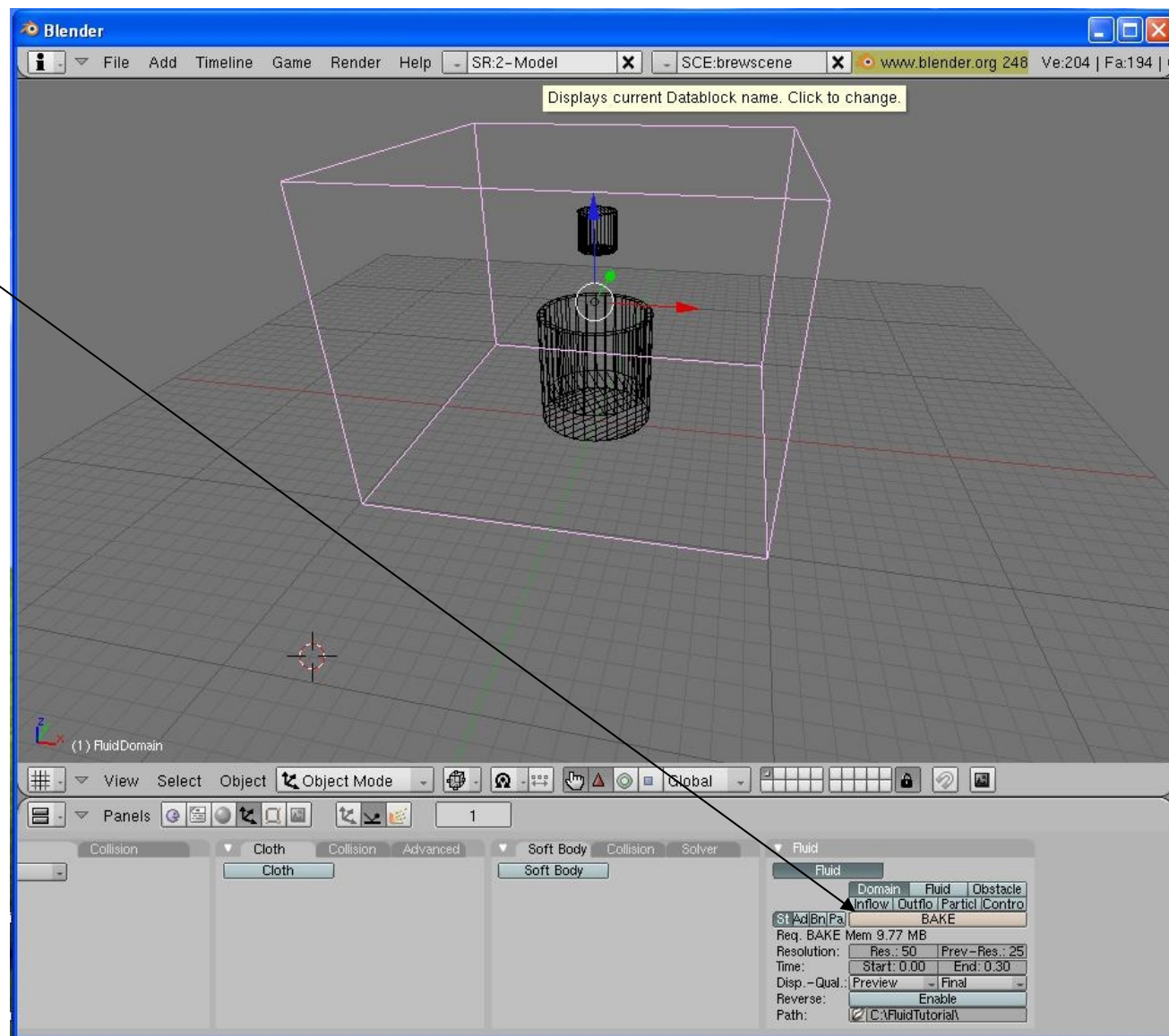
Sample Workflow

Click Bake.

The Fluid Sim Bake process
Will begin.

It may take awhile.

When it's done, you can play
back the animation for review by
pressing Alt-A.



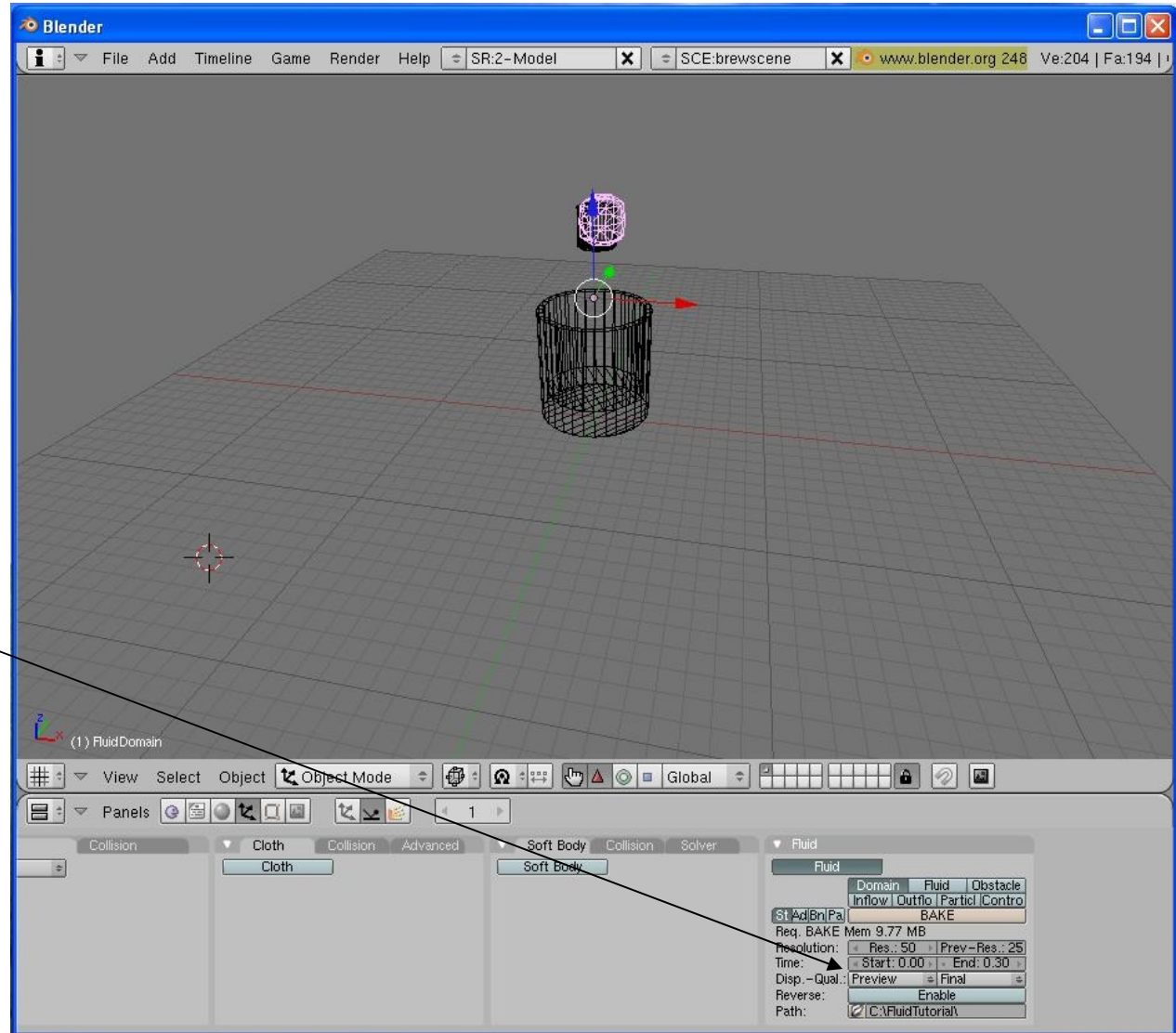
Sample Workflow

This is how the scene looks
After the simulation Bake
Has completed.

Where did the Domain object go?
It's there. It's actually still
Highlighted. The Domain has
Assumed the appearance of the
Fluid mesh.

If you look closely, you'll see here
That the display quality is set to
Preview:

To see the Domain's geometry
Again, change the left hand side
Disp-Qual back to Geometry



Sample Workflow

To see the Domain's geometry
Again, change the left hand side
Disp-Qual back to Geometry;

This is the result.

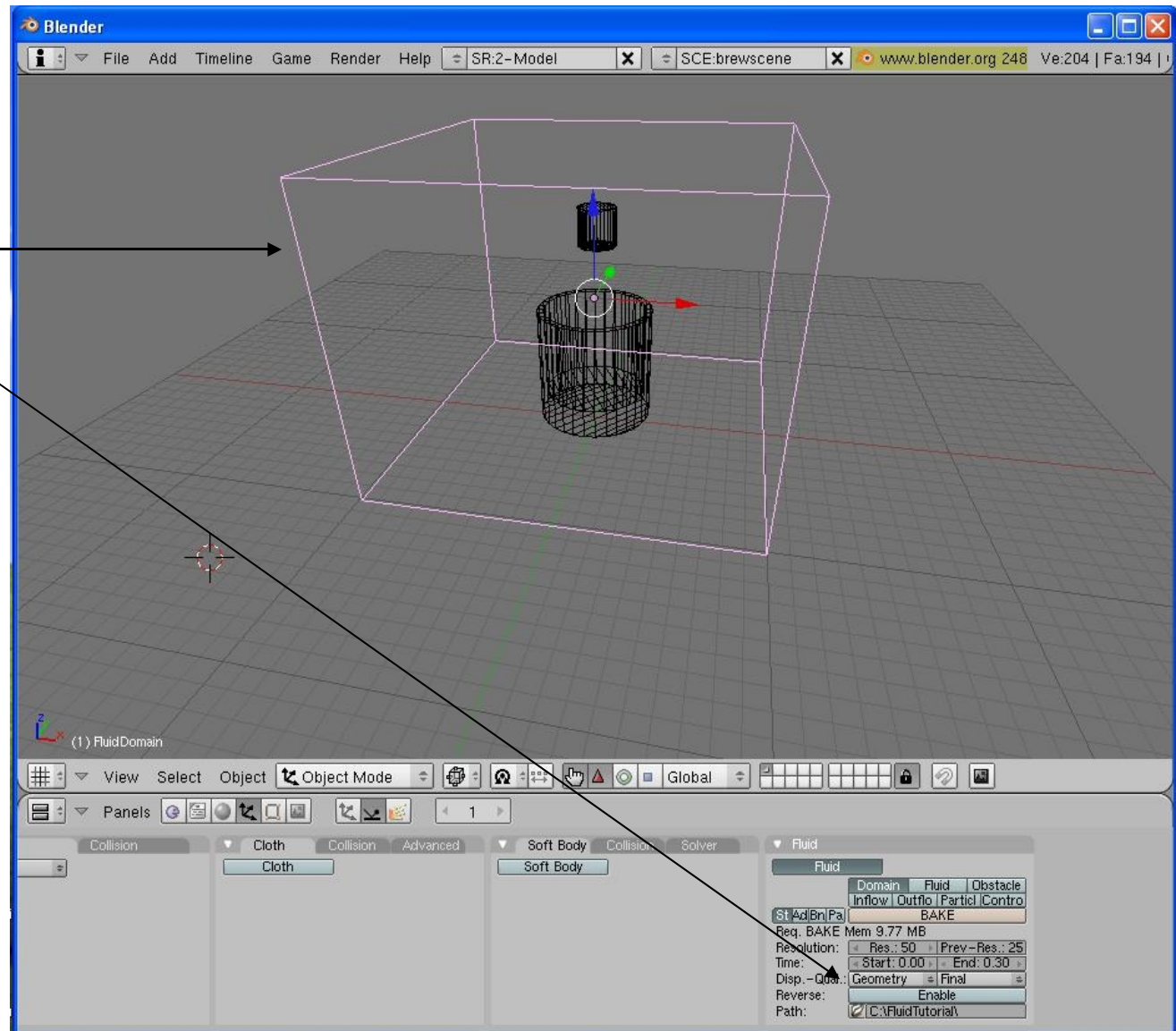
Note:

If you want to make adjustments

To resolution, End time, etc.

Make Sure You set the
Left Hand Side Disp-Qual
Back to PREVIEW.

Otherwise it will look like
Nothing is happening!

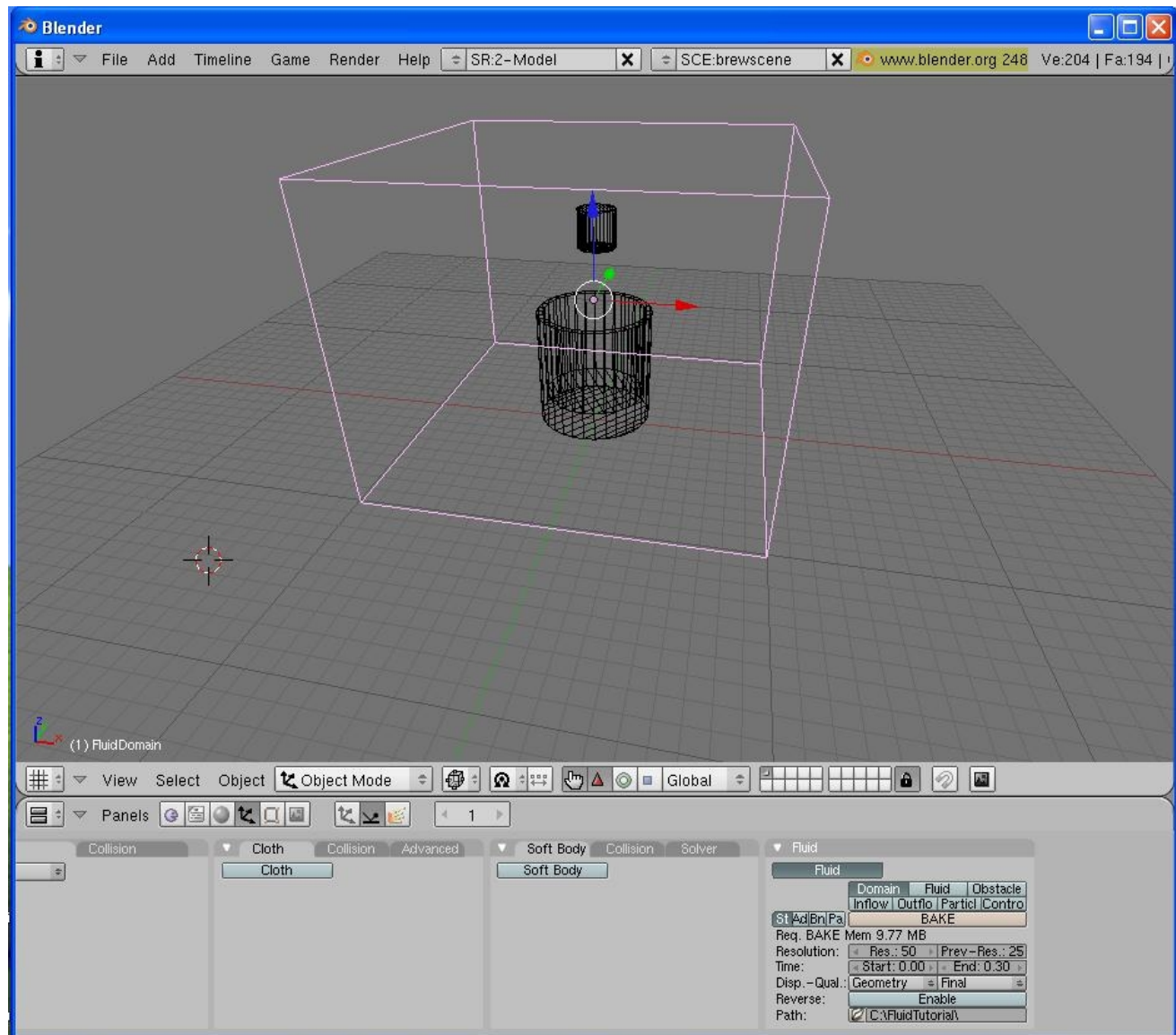


Sample Workflow

Before we head back over to trueSpace, we need to export the Domain properties.

These will be applied in trueSpace, so the fluids will have the correct scale and translation.

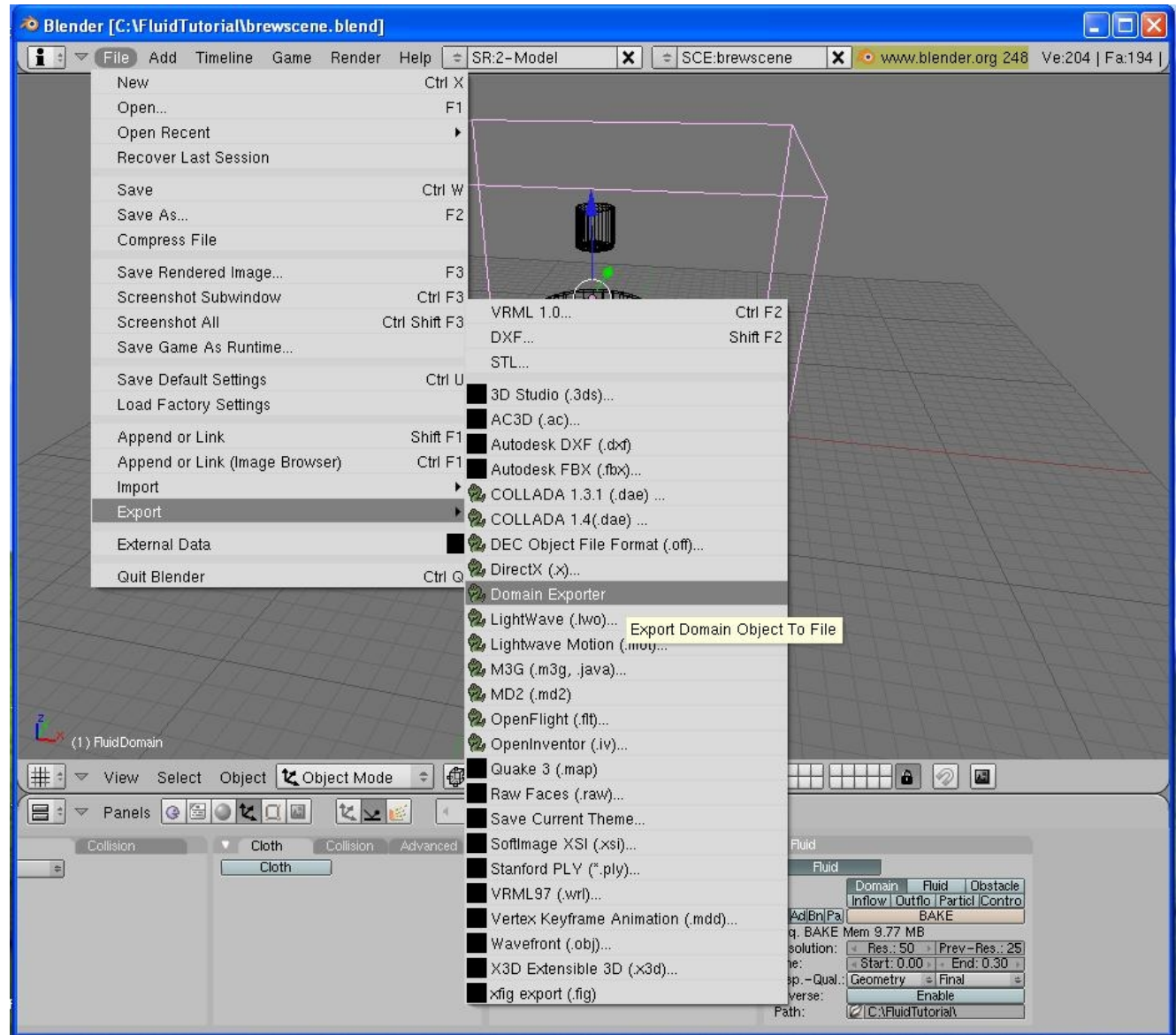
So. In Blender, right click the Domain to select it. It is colored pink when selected.



Sample Workflow

Select File->Export

Then select Domain Exporter
As shown



Sample Workflow

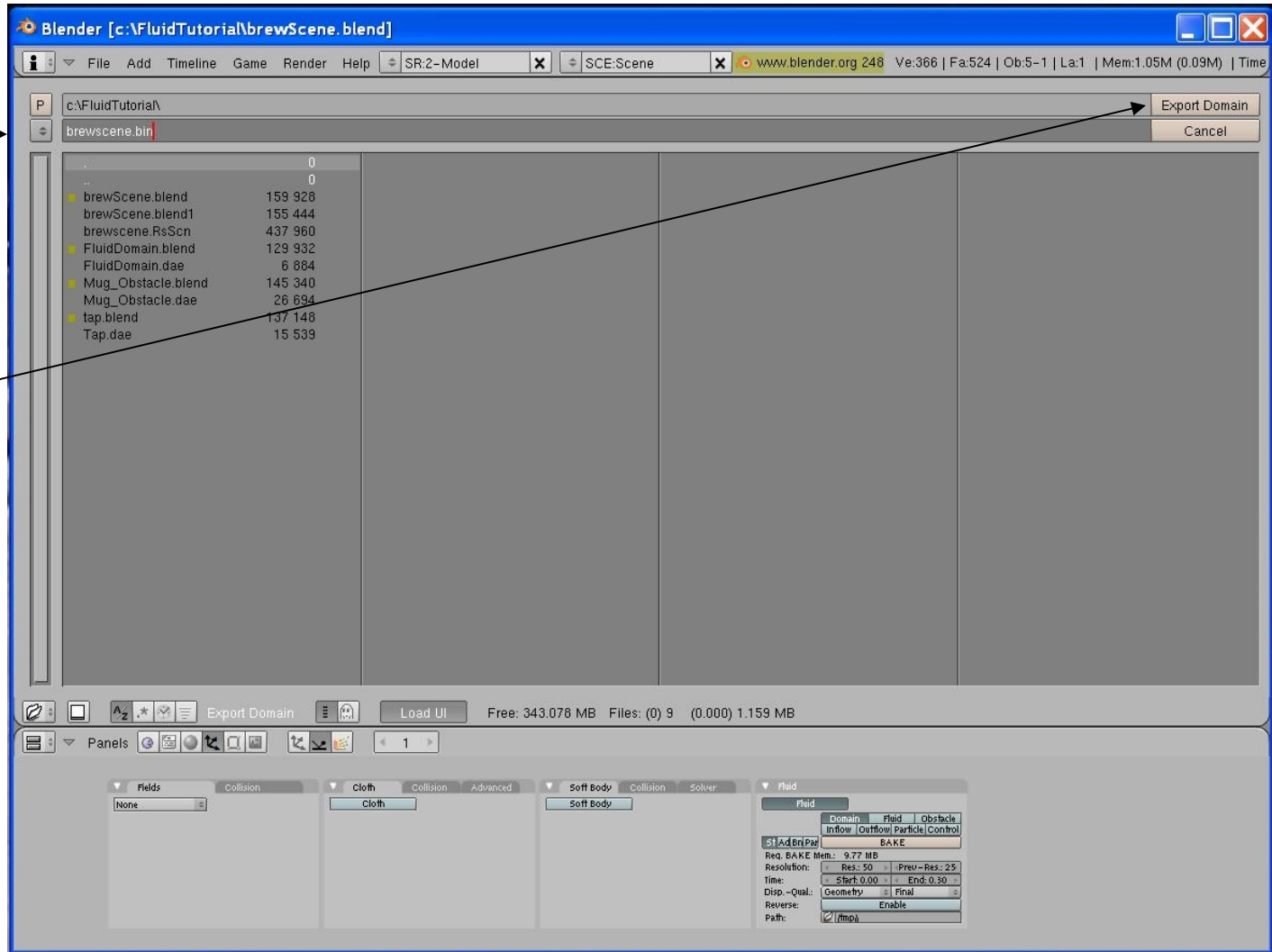
Type a name into the textbox
As shown; it Must have the
Extension: .bin

Note the directory in which
it will be written.

Then select:

Export Domain

The Domain data is now
Saved.



Sample Workflow

Now we're back to trueSpace. We need to import the fluid simulation. This will convert the data files from the blender format to the trueSpace RsObj format.

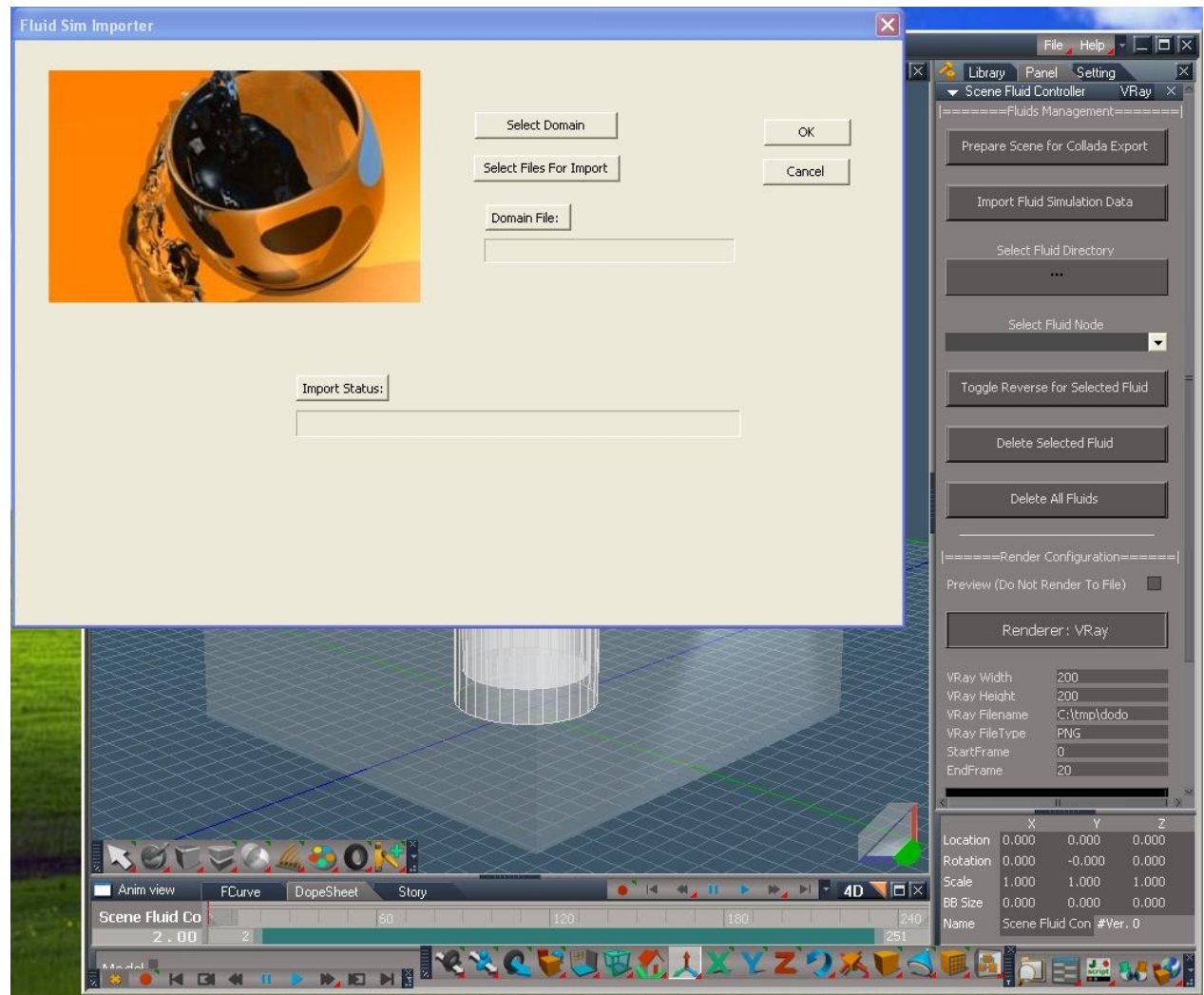
So, in the Scene Fluid Controller panel, click the button labeled, 'Import Fluid Simulation Data'.

A dialog opens. The first thing we want to do is select our Domain file.

In the dialog, select the 'Select Domain' button.

In the dialog that opens, navigate to the FluidsTutorial directory, select the file: brewscene.bin, then press OK.

The Domain File name will appear in the dialog beneath: Domain File:



Sample Workflow

Next, we want to import the fluid simulation files in the FluidTutorial directory.

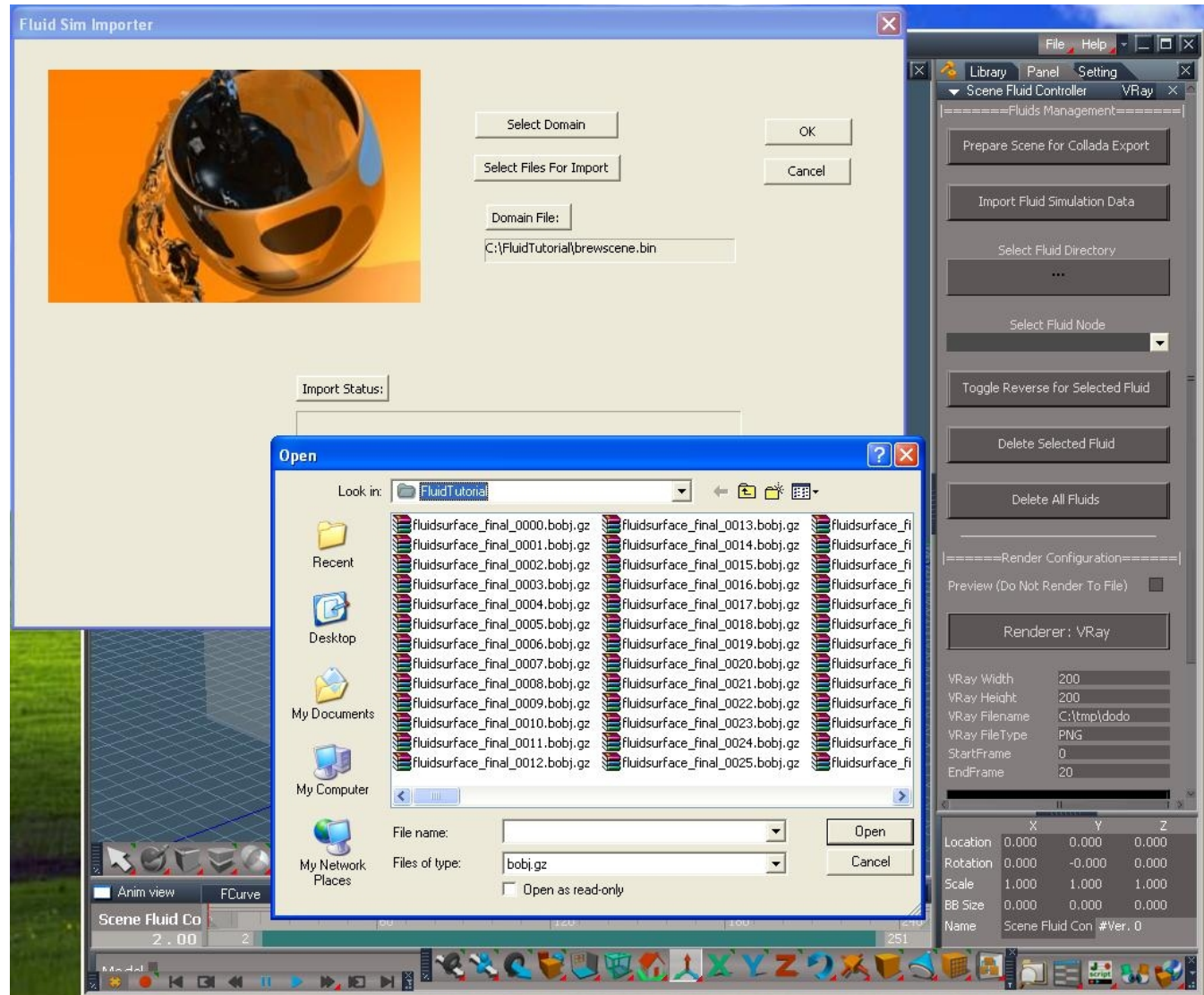
So, in the Scene Fluid Controller panel, click the button labeled, 'Select Files for Import'.

A dialog opens.

Navigate to the FluidTutorial directory, select any file, then select Open.

The Import Status bar will indicate the progress as the files are converted.

When done, press OK to close the dialog.



Sample Workflow

Our files are now converted.

Now, we want to add them to our scene.

In the Scene Fluid Controller panel, Press the 'Select Fluid Directory' button.

Then navigate to the C:\FluidTutorial Directory, select any file, then press Open.

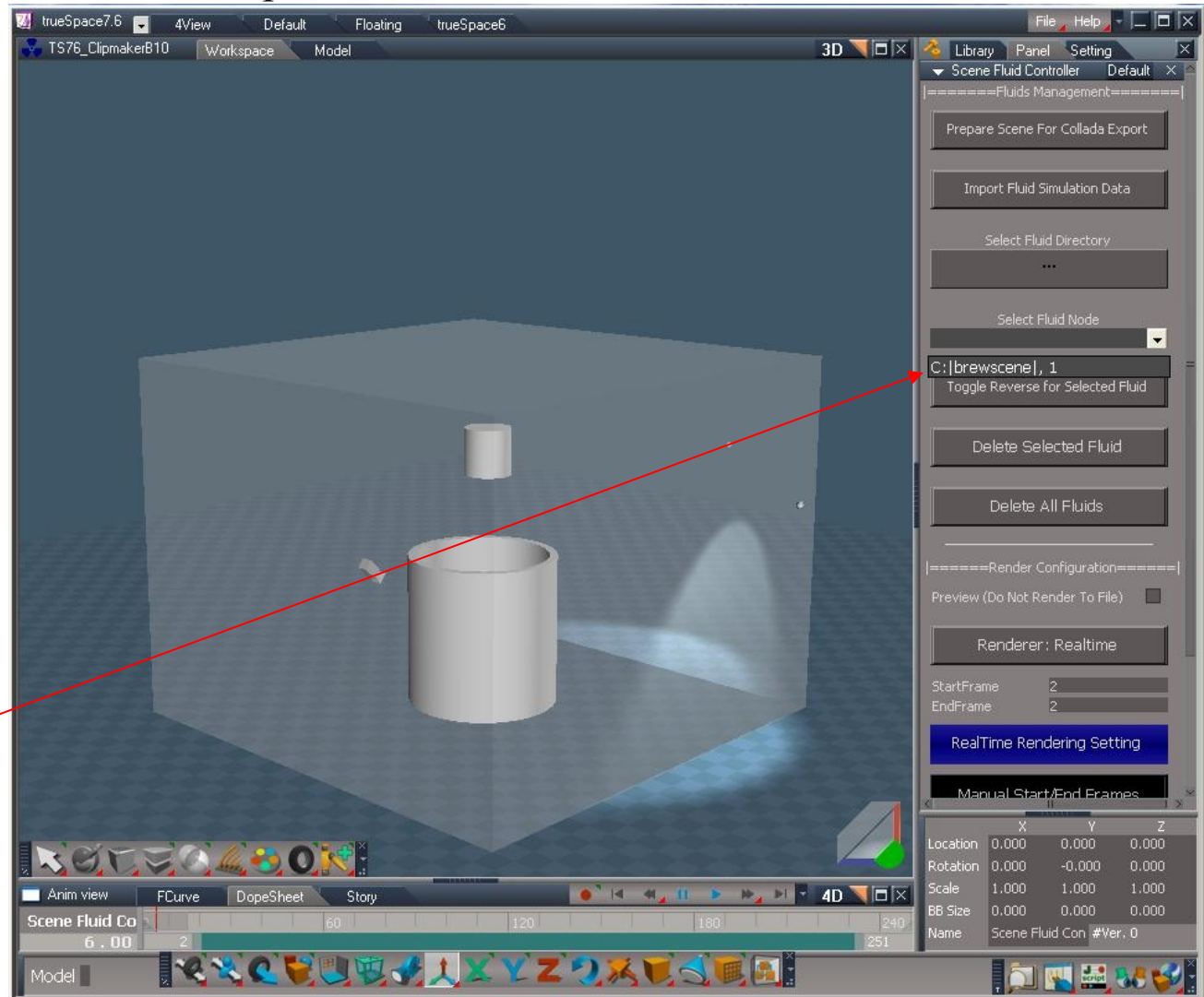
The first fluid object in the simulation will be loaded into the workspace so you can see it, position it, and texture it.

Select the dropdown arrow for the 'Select Fluid Node' combo box.

You will see the directory you selected has been added.

You can select this entry if you wish to delete it from the scene, or reverse the animation frame playback.

The backslash in the path structure has been replaced with an upright pipe: '|' because backslashes in node names cause trueSpace to bounce us to the System level in the scene graph.

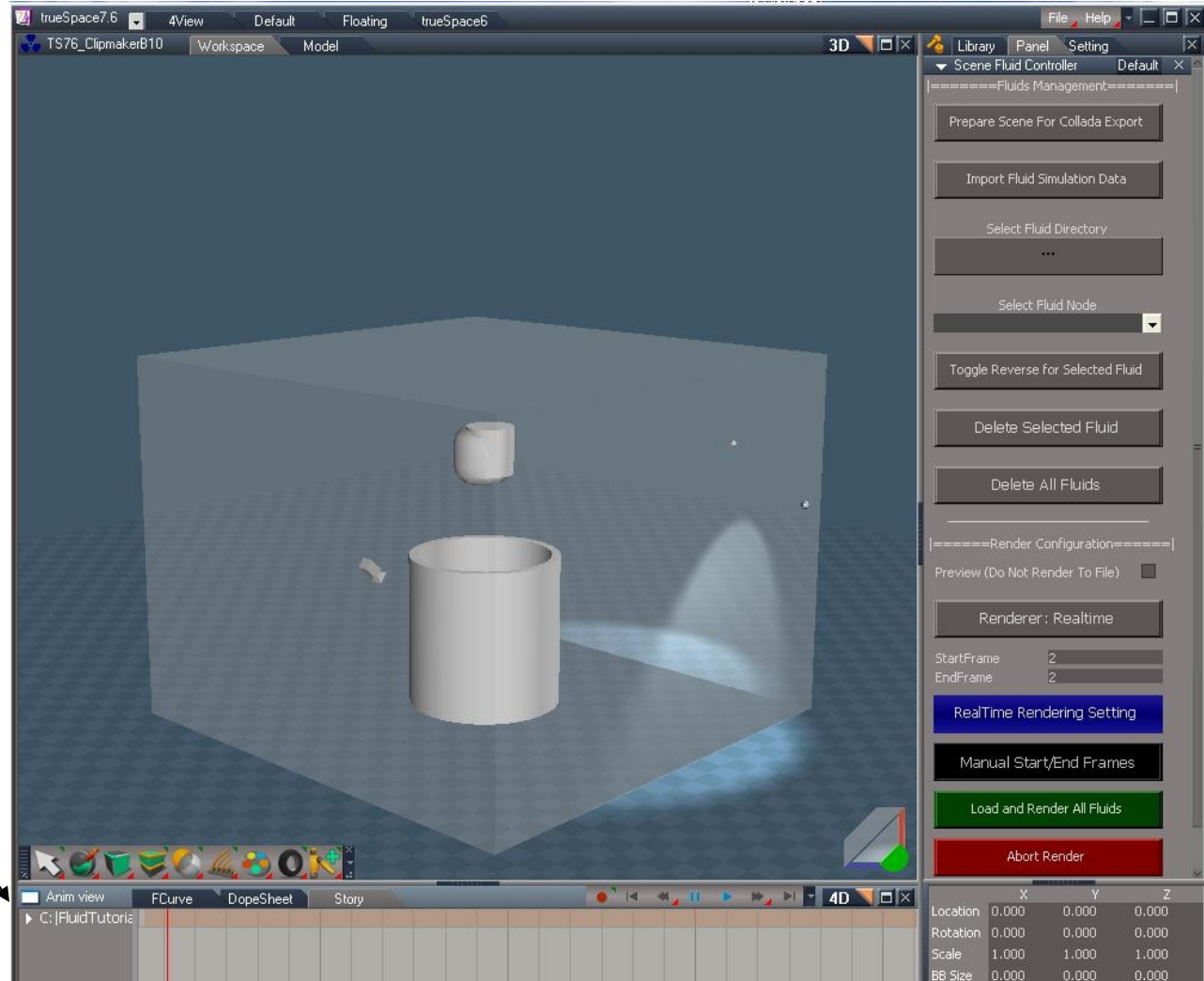


Sample Workflow

Textures can be added to the fluid node in the same manner as any other trueSpace object. You can drag and drop textures from a library, for example.

If we want, we can select our fluid node from the combo box and enable the 'Toggle Reverse for Selected Fluid' if we wish; for now, we won't do that.

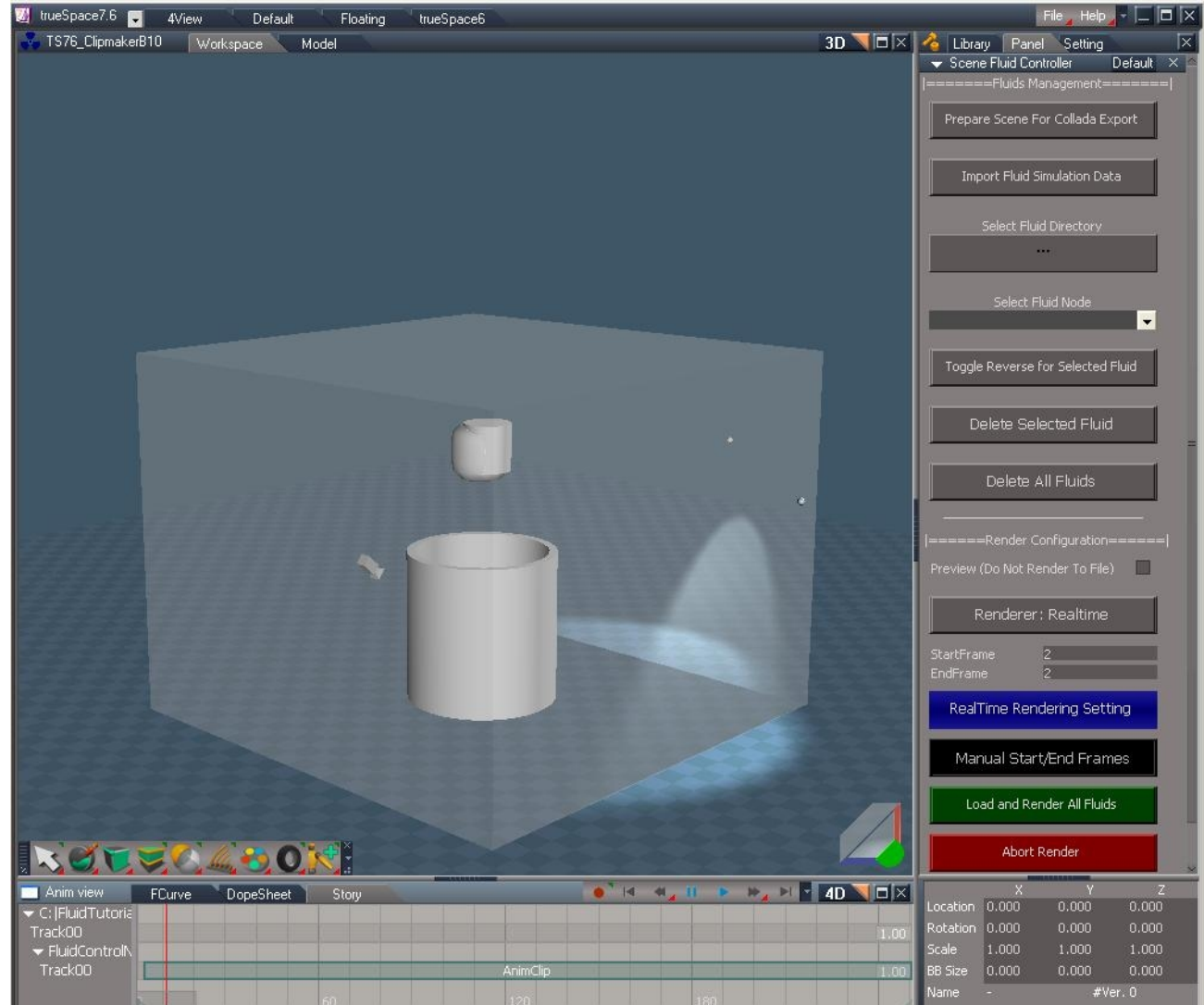
If we switch the Animation Editor view to the Story tab, we see that our fluid node has an Animation Track.



Sample Workflow

Here I've drilled down in the Animation Editor to show the actual AnimClip which we can manipulate. The clip length is automatically set to the number of fluid simulation files generated by Blender.

We can adjust the time at which this particular fluid appears in the scene by sliding its track along the timeline. In this image the fluid will appear, starting at frame 2.



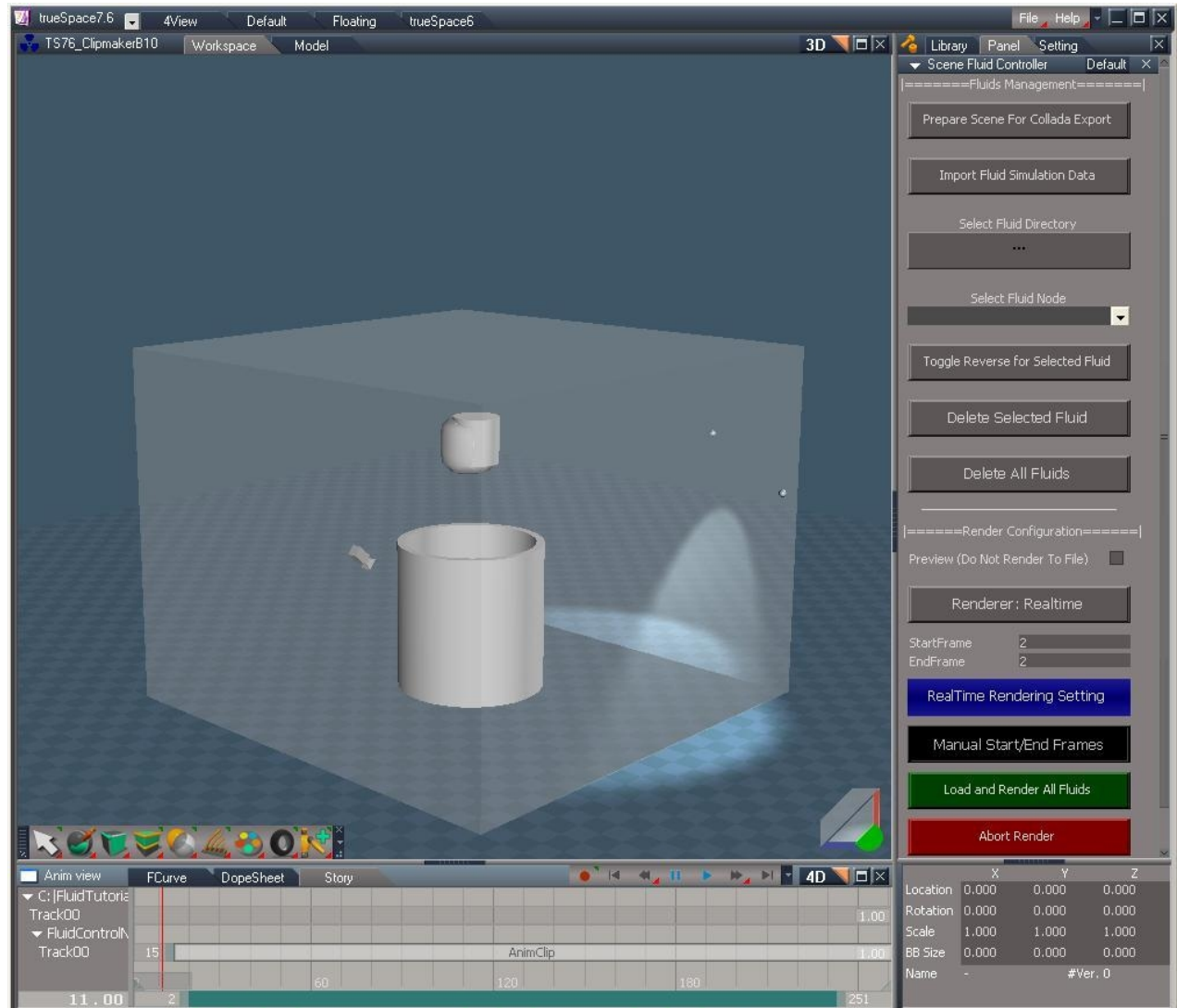
Sample Workflow

In this situation, the AnimClip for The Fluid has been adjusted on the timeline so the fluid will not be visible in the scene until Frame 15.

Set the checkbox for
'Preview (Do Not Render To File)
To watch the animation in real time,
without rendering the frames to
bitmap files.

Press the black button to toggle
Manual or Automatic StartFrame
And EndFrame for animation
playback. If Manual is selected, you
can specify the start and end frames
of the animation playback. If
Automatic is selected, trueSpace
automatically calculates the start
and end frames for you.

For this tutorial, make sure you see:
Auto Start/End Frames
on the black button.



Sample Workflow

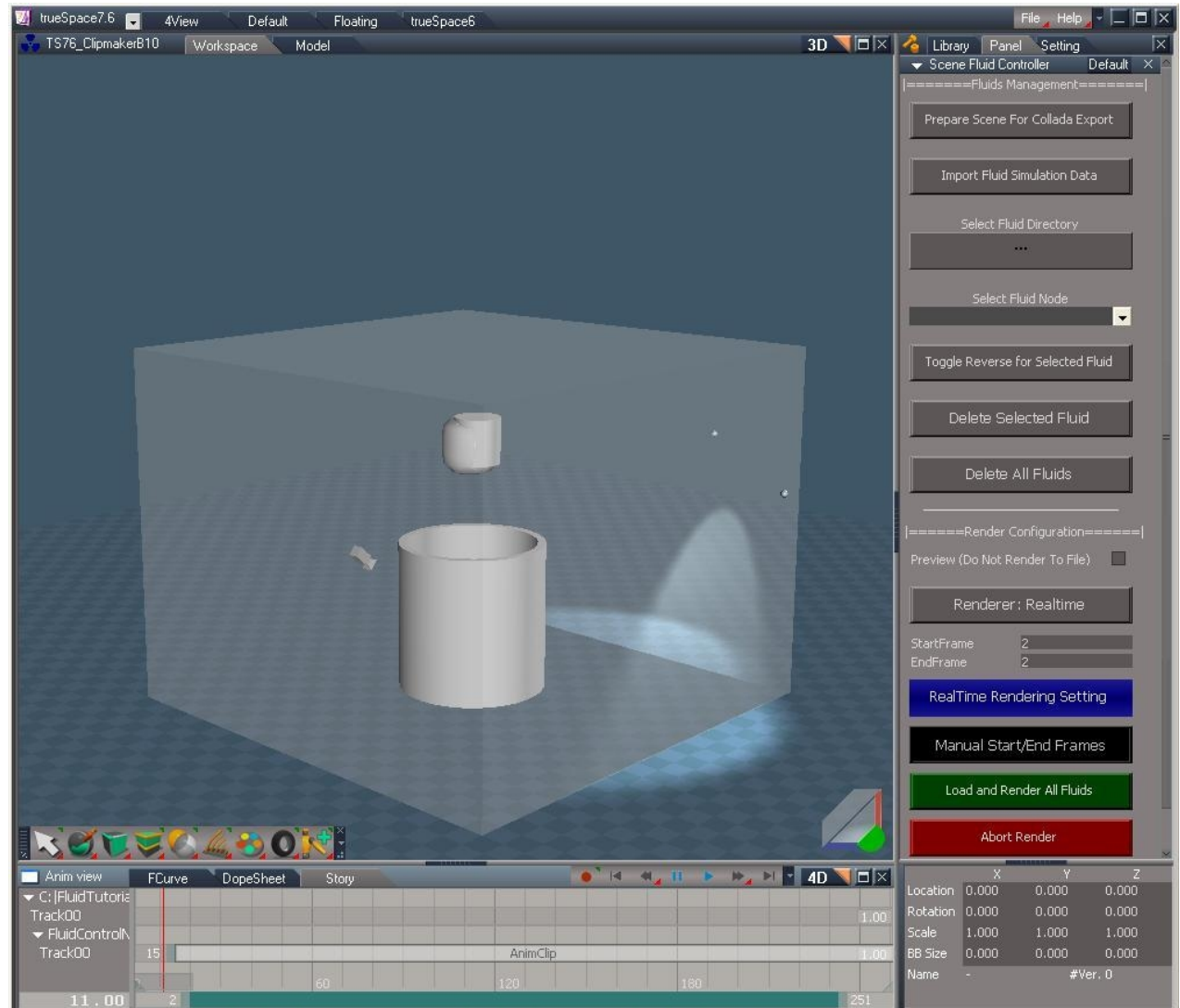
Press the 'Load and Render All Fluids' button to begin the rendering process. If Preview is selected, no files are created; the data is only loaded into the Workspace.

During the playback, it is normal to see the Workspace go blank. Each fluid file in the simulation is being loaded and displayed in sequence.

Press the Abort Render button to stop the playback. The EndFrame will be set to the next animation frame after the currently rendering frame.

When you are content with the scene, Deselect the checkbox:

Preview (Do Not Render To File) to render the scene to bitmap files. Then, you can load the bitmap files into a video editor and compile them into a video file.



Reference Web Links

Blender Fluid Simulation Wiki Page:

http://wiki.blender.org/index.php/Manual/Fluid_Simulation

Mike Pan's website

(includes excellent example of real world settings and an optimized blender build for fluid simulation:

<http://mikepan.homeip.net/blenderfluid>

Animated Guide to Fluid Simulation

(includes short videos demonstrating how changes to parameters affect quality of realism)

<http://www.pkblender.it/FluidSim/domain.htm>

.NET Framework Setup

Acquiring and Installing the Microsoft Visual C++ 2008 Redistributable Package (x86):

Either click, or Copy and paste this link to your browser address bar.

<http://www.microsoft.com/downloads/details.aspx?familyid=9B2DA534-3E03-4391-8A4D-074B9F2BC1BF&displaylang=en>

Click download. Then run the executable.

When done, return to the Installing the Plugin section of this document.

Acquiring and Installing the Microsoft .NET Framework Version 3.51 Redistributable Package (x86):

Copy and paste this link to your browser address bar.

<http://msdn.microsoft.com/en-us/netframework/aa569263.aspx>

Click the button: 'Install it now' and follow the instructions.

When done, return to the Installing the Plugin section of this document.