

User's Manual



Imagine3D

**Ultrasonic Simulation Software
Version 2.5**



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Release Notes



Imagine3D



What's New in Version 2.5

Selection of objects

To move any object in *Imagine3D*, including probes, the object must first be selected. Objects can be selected using the mouse by moving the cursor over the object and double-clicking it. Objects that are selected are shown in bold lines and have black mouse handles. Ctrl-double-click allows you to select more than one object so that they can be moved at the same time. Pressing the tab key changes the selected object. No object can be moved or altered unless it is first selected.

Simple I2D View Editor

A [new Simple View Editor](#) provides the main elements of *Imagine3D* limited to a front top or side view. The four windows include A-scan, Raytracing, Modes and Probe views. The Target can only be edited in the front view.

Probe Reflections

The probe front surface and the sides of the wedge are now reflecting surfaces that allow you to fully simulate probe and water multiples. Internal reflections inside the wedge are also modeled.

Gain buttons

Two new [Gain buttons](#) on the View Toolbar allow you to easily increase or decrease the A-scan gain in 3dB steps.

Wedge Editor

The [Edit Probe X-Sec](#) button in the Probe document allows you to change the shape of the wedge using the cross-section editor. You may add and change certain line segments. Wedge length, acceptance angle and element size indicated in the Edit Probe dialog box are preserved.

Pulse Animation

Ray propagation can now be animated continuously. You may now specify time limits for the pulse animation loop.

Importing of solids using SAT files

Imagine3D now provides .SAT file support using Spatial Technologies Inc. ACIS[®] solid modeling engine. This is the same solid modeling engine used by AutoCAD, CadKey and other major CAD packages (Some CAD packages provide conversions from IGES and other formats to .SAT).

I3D Viewer files

Imagine3D can now create a viewer file (.i3d) that you can share with those who do not own *Imagine3D*. Look for free viewer software that will be available for download from our website www.utex.com. The viewer displays information about a simulation including the target, probe, A-scan and pulse animation. I3D viewer files can be placed into Microsoft Word documents to provide accurate simulation information for technique development and simulation reporting. I3D viewer files can also be opened as a full simulation by those who own *Imagine3D*.

Probe Coupling Depth

The depth that a probe wedge overlaps the target can now be set using the [Set Coupling Depth](#) button on the Probe Wedge tab or the Edit - Set Coupling Depth menu when editing a probe. This function simply makes sure that the wedge is in full contact with the surface of a curved target by allowing you to specify the target-wedge overlap in the simulation.



What's Changed in Version 2.5

Dragging

In the Simulation View, the probes, labels, lines and coordinates can be dragged once selected. To select any object, move the mouse cursor over that object and double-click. To select an additional object, move your mouse over the new object and hold the Ctrl key while you double-click that object. When any object is selected, black handles appear which can be used to manipulate that object. The Probe handles allow the rotation of the probe itself or rotation of the probe around the origin. The TAB key also allows users to individually select each of the objects in the view. For labels and lines, the outside black handles allow you to resize an object. The mouse cursor changes to indicate what will occur when the mouse button is depressed at the current location.

Grouping Objects

New [group and ungroup buttons](#) allow you to group the probes and labels together. The groups will move according to the movement behavior properties of the object the mouse is over. You may make groups of groups. The ungroup button ungroups and deselects all the objects in a group.

A-scan

You can now turn the wedge delay on or off. This sets the A-scan zero-point to either the surface of the probe or the surface of the wedge. Dragable cursors have been added. These correspond to the current propagation time (green line) or twice the propagation time (blue line). The cursors become active when animating a pulse or when you have asked rays to end at a particular time. Also, the B-scan gate can now be hidden.

Cross-Section Editor

The [cross-section editor](#) now uses a grid control to display and edit the points in the cross-section. You can edit the cross-section using the mouse on the display window or by typing directly into the grid to adjust the points. The editor no longer automatically zooms the view to fit the cross-section.

Target Document

The list box now contains all of the target parts and indicates which are currently selected. The Parts Toolbar and Edit Part toolbar allow easy access to commonly used functions. Target parts can now be selected, dragged, resized and rotated using mouse clicks.

Surface Following

A transducer's ability to "stick to" and align itself on curved surfaces when using a contact transducer has been enhanced. Contact transducers can now follow almost any surface without jumping or losing contact with the surface. Simulated inspections of curved surfaces, such as boilers or tubes, can be performed with little or no "lift-off" occurring. Surface following is not active when spinning or rotating a probe.

Label, Line and Title Editing

Labels and titles can now have properties such as position, size and content edited rather than replaced. A line's length, position and color can also be edited.

Installing



Imagine3D



Installation & Technical Support

Welcome to *Imagine3D* Ultrasonic Simulation Software

Imagine3D 2.5 offers a large range of simulation options. To help you learn most effectively, this documentation system offers on-line help topics, tutorial movies, sample simulations and a printed or PDF format manual.

Installation

Imagine3D now has an "Auto Run" feature on the CD that launches a user interface. All of the installation options are available through this interface. You can view the training movies and the manual without installing *Imagine3D*. The manual is provided in a PDF (Adobe Acrobat) format so that it can be easily viewed online or printed if necessary.

If you are installing for the first time, please insert the CD and choose the installation option from the interface that appears. *If you are upgrading* to Version 2.5, please install Version 2.5 without removing your previous version.

If you are installing *Imagine3D* Version 2.5 into a new folder location, proceed with the installation. Move your existing .ray files to the new Version 2.5 folder. Delete any remaining old *Imagine3D* Version folders using Windows Explorer.

If the *Imagine3D* CD does not launch automatically, browse the CD and run **Launch.exe**.

Support patch files will be available on our web site at www.utex.com

Free yearly upgrades and support are available to customers who have purchased I3DCoverage. For information about *Imagine3D* coverage, please contact us at the address noted below.

Your Hardlock Key

The Hardlock key is a small (1-3/4" x 2-1/4") hardware device that prevents *Imagine3D* from being copied and used illegally. This device, also known as a "Dongal", attaches directly to your computer's parallel port. The printer is then attached to the Hardlock key. The Hardlock key does not interfere with printer operations.

Minimum System Requirements:

Pentium90
32MB RAM
VGA Graphics 1024x768 resolution or higher
Parallel Port (for hardlock key)
Windows 95 v4.00.950b or later operating system

Recommended System Requirements:

200MHz Pentium II or faster
128MB RAM
VGA Graphics 1024x768 resolution or higher
Parallel Port (for hardlock key)
Windows 95, 98 or NT

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What Can I Do?



Imagine3D



Develop ultrasonic inspection techniques using real-world parts

Imagine3D was developed to solve a range of everyday problems encountered during ultrasonic inspections from simple welds to the most difficult composite airframes. *Imagine3D* allows you to develop an inspection technique with the benefit of understanding how potential problems such as shadowing and internal multiples might limit your real-world results.

The inspected parts and probes you will be simulating are your own. *Imagine3D* takes you through the same steps as you would experience in the real world, with the added benefit of being able to see where the sound is actually going inside the part. It is nice to be able to try various probe angles or focal lengths before ordering probes or fixturing.

Check our Website www.utex.com for additional help movies about technique development

Visualize sound paths in the inspected part

Simulated inspections can be rotated to any viewing angle thereby allowing you to clearly see whether your inspection technique is doing what you think it is doing.

Imagine3D shows you exactly where the ultrasound is going by using longitudinal, shear and mode-converted waves. Each new wave generation is displayed in a different color for clarity.

Sound can be displayed as rays, as wavefronts, as a beam profile and as a propagating wave.

[See demo movie – Rotating, spinning and tilting the inspection in 3D space](#)

[See demo movie – Switching between sound display modes](#)

Diagnose difficult problems by confirming the source of returning echoes

Imagine3D can accurately identify the origin of unexplained echoes by showing any number of mode-converted longitudinal or shear waves. A simple yet powerful color B-scan display shows you the times of signals arriving back at the transducer. The colors on the B-scan correspond to the colors of the rays in the simulation view. You can directly measure the arrival times of the echoes by moving the cursor between signals shown on the B-scan.

To see what the simulated ultrasonic signals look like, switch the B-scan display into RF mode. In this mode, it is also possible to see all of the collected A-scans that make up the B-scan.

These tools make it possible to solve the problem of echo overlap, where quite often it is just a matter of choosing a slightly different focal length or probe angle.

[See demo movie – Viewing A-scans and arrival times](#)

Model transducer sound fields for making transducer choices

Imagine3D will simulate the beam profiles of transducers that you already own, thereby allowing you to determine if any of them are able to do the job for a given inspection. If not, *Imagine3D* can help you determine the transducer you will need to order. This eliminates expensive errors such as ordering transducers with focal lengths or beam spreads that do not provide optimum sensitivity or coverage.

The probes can be anything that you might have on the shelf or that you can order from a catalog. The success of your inspection technique is aided by discovering how various angles, mode conversions and focal lengths affect the simulated A-scan signals.

A beam profile is primarily used to demonstrate the transducer's focus quality and the depth-of-field within the inspection part.

[See demo movie – Viewing the beam cross-section of a transducer](#)

[See demo movie – Using the text view](#)



Simulate a complete ultrasonic inspection

Imagine3D's features can completely simulate your inspection technique so that you can save time and make fewer errors.

Simulated B-scans can show you how flaws might be accidentally shadowed by part geometry or unwanted mode conversions. Simulated B-scans quickly show you which of the selected modes are returned as the probe moves across the surface of the inspected part.

After generating a B-scan, you can save it as a Winspect™ file. This allows you to use Winspect™ software for side-by-side comparison of the simulated B-scan with the real inspection B-scan. Winspect™ is data acquisition and imaging software for NDE. Visit our Web site www.utex.com for a complete product description.

Communicate your plans to customers and inspection team

Imagine3D offers printed reports with simulated A-scans, B-scans and raytracing to provide the tools that you can use to better communicate with your inspection team and customers. If fixturing is required, *Imagine3D* reports can list the probe angles, spacing and water-path dimensions needed for fabrication.

You can copy text and graphics to the clipboard for pasting into other applications such as Microsoft Word or Excel. A fully documented report can be created in a matter of minutes.

[See demo movie – Previewing how a report will print](#)

[See demo movie – Copying to the clipboard](#)

Train others in ultrasonic theory

Imagine3D makes it simple to demonstrate that by exceeding critical angles, longitudinal and shear waves cease to be generated. Students can be asked to demonstrate their understanding of applied ultrasonic theory by using *Imagine3D* to simulate refraction, reflection, attenuation and the near-field effect.

[See demo movie – Simulating critical angle](#)

Getting Started



Imagine3D



Getting Started -- Overview

Getting started with *Imagine3D* is actually quite easy. At any time, you can change the inspected part geometry, transducer characteristics or sound modes to be displayed in the simulation view. If you go down the wrong path, you never need to start over from the beginning, just change what needs to be changed. The following sequence will get you up and running quickly.

Here are the five basic steps needed to get you using *Imagine3D*:

Step One: Create a new default Simulation

Step Two: Edit your Target (define the part to be inspected)

Step Three: Edit your Probes (define the transducers)

Step Four: Edit your Modes (decide which modes to display)

Step Five: Start inspecting the target by moving the transducer around

[See Demo Movie: Creating a New Simulation](#)

Step One: Create a new default Simulation

Imagine3D stores all of the components needed for an ultrasonic simulation in a single document called a Simulation document (.ray extension). The fastest way to make a new simulation is to use the [New Simulation](#) button on the Main toolbar. On clicking this button, *Imagine3D* will display the **Choose the desired type of simulation** dialog box. Using this dialog box you can select from a few basic simulation set-ups. You will need to make a few choices here.

- Choose between Normal Beam – Pulse Echo, Angle Beam – Pulse Echo, Angle Beam-Pitch Catch.
- Select a Contact or Immersion simulation.
- If you chose a Contact simulation, you can select the wave mode type to be Shear or Longitudinal.
- Choose Full Editor.

On selecting OK, *Imagine3D* will create a simulation with the default target step block and your chosen probe(s). If you selected Blank, no default target will appear. The only thing in your new simulation will be a probe pointing down the Y-axis.

Step Two: Edit your Target (define the part to be inspected)

To edit the target use the [Edit Target context menu](#) (right click) or the **Edit – Target** menu item. The target document will appear. The target document (.trg extension) describes the shape of your inspection part and the materials of which it is constructed. The target could simply be a drawing of your inspection part, which may or may not contain simulated flaws. It could also be a drawing of just the flaw if all that you were interested in was how sound reflects from the flaw's surfaces.

A target is any assembly of parts. You can control the part's material, the way it combines with other parts as well as the part's shape. The Parts toolbar provides you with the option of several standard primitive parts. Add a primitive part into your target by clicking on the part type and dragging the mouse over the area of the target where you would like to add the new part.

Imagine3D provides these four options for creating and editing targets:

- Assemble targets from a range of primitive shapes.
- Import drawings as 3D solids from 3D SAT files or 3D DXF file surfaces that can be generated using AutoCAD.
- Import 2D DXF files and extrude or revolve them into 3D solids.
- Select parts from a library of stock objects and modify them.

Once your edits are complete, the edited target needs to be inserted into the Simulation document using the **Insert this target into** button. This will put the new target into the Simulation document and the Target document can now be closed without losing the new information.



Step Three: Edit your Probes (define the transducers)

The next thing that needs to be defined in the inspection is your probe. The Probe document (.prb extension) tells *Imagine3D* all of the details about the sound source being used. This document feeds information such as the transducer's focal length, diameter and frequency to the raytracing components of *Imagine3D*.

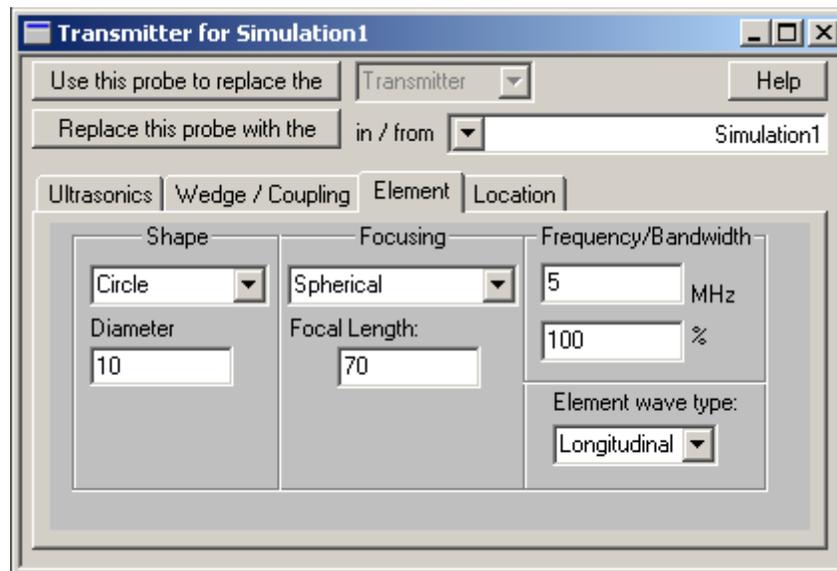
Imagine3D raytracing and beam modeling can simulate both contact and immersion transducers of any frequency. It also supports spherical, cylindrical and elliptical focusing. The transducer elements can be circular, elliptical, or rectangular.

You can also specify how the rays are to exit from the transducer surface. You do this by telling *Imagine3D* to place any number of rays on the X and Y-axes, on the transducer edge, evenly spaced or randomly on the transducer surface.

To open the Probe document, select **Edit – Probe** in the Simulation document main menu. The probe size, shape, frequency and other details can be defined in the Probe document tabs. To insert the edited probe into your simulation use the **Use this probe to replace the** button.

For Pitch Catch simulations the same probe document can be used to edit both the Transmitter and Receiver. In order for the information for both probes to be updated into the Simulation document, the values for each probe must be inserted (**Use this probe to replace the** button) with the appropriate transducer type selected (transmitter or receiver).

Once the probes have been edited and inserted into the Simulation document, the probe document can be closed without losing the changes made to the probes.



[See demo movie – Configuring an immersion transducer](#)

[See demo movie – Configuring a contact transducer](#)



Step Four: Edit your Modes (decide which modes to display)

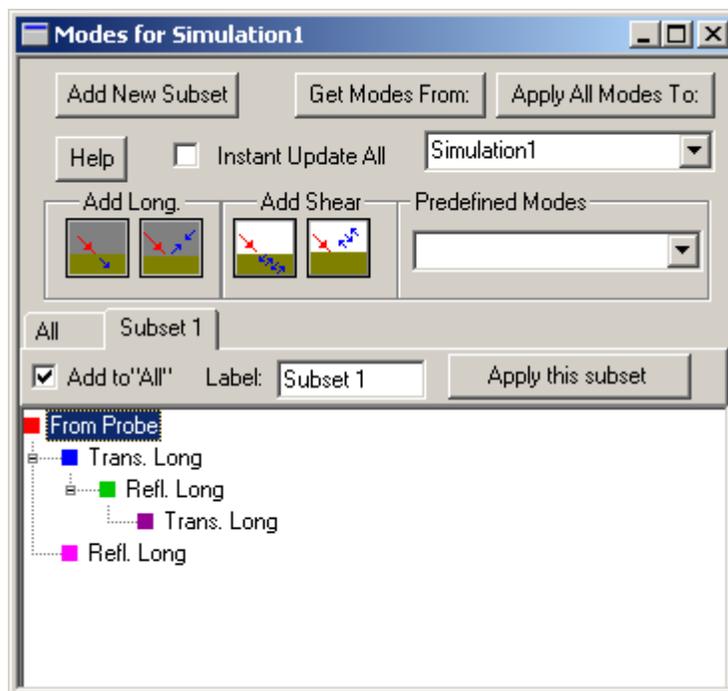
The next thing to be defined in your inspection is the desired modes. To edit the modes, select **Edit – Modes** on the Simulation document's main menu. The Modes document (extension .mds) tells *Imagine3D* which longitudinal and shear wave modes should be displayed. It also describes which transmitted and reflected wavefronts should be displayed.

The requested modes (longitudinal or shear) are represented graphically just like the branches on a tree. You have the option of starting a new branch at each interface where different materials come in contact.

By placing unique branches on separate tabs, it is possible to simulate just one branch of the sound path or any combination of branches. As an example, you can separate corner reflector signals from back-wall multiples that might be cluttering the A-scan.

The **Modes Document Context Menu** provides quick access to most of the Modes document options. Modes can be added to any branch using the modes buttons. To use the preset mode subsets in *Imagine3D*, just select one from the predefined modes pull-down list. Using the predefined modes will over-write the current subset and any other changes you have already made.

The **Apply All modes To:** button will insert the changes into the Simulation document. Once the changes have been inserted into your simulation, you can close the Modes document without losing your changes.



[See demo movie – Selecting which modes to show](#)

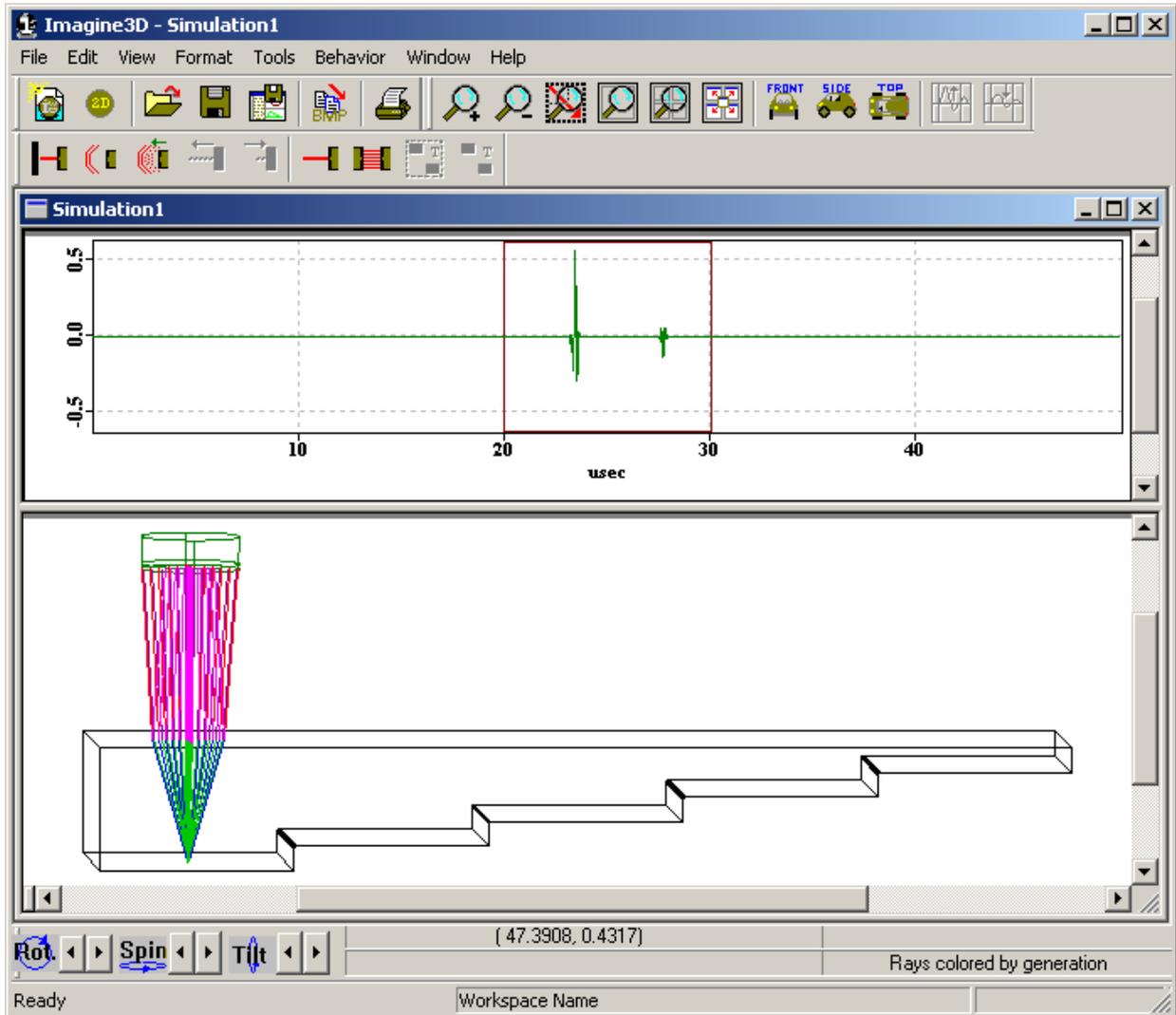


Step Five: Start inspecting the target by moving the transducer around

By this stage, you should be able to see your target in the Simulation view on your monitor. A probe should be floating in free space somewhere near the target. If this is not the case, click the **Fit To Window** toolbar button. *Imagine3D* will zoom out so that the transducer and target fill the window.

You must first select the transducer before you can move it. This is new since version 2.0. ([See – Move a probe](#)) Double-click on the transducer or press TAB until what you want to move is highlighted.

An easy way to move the transducer left or right and up or down is with the arrow keys. You can also rotate the probe by holding down the shift or ctrl keys while pressing the arrow keys.



[See demo movie – Using the text view](#)
[See demo movie – Viewing A-scans and arrival times](#)

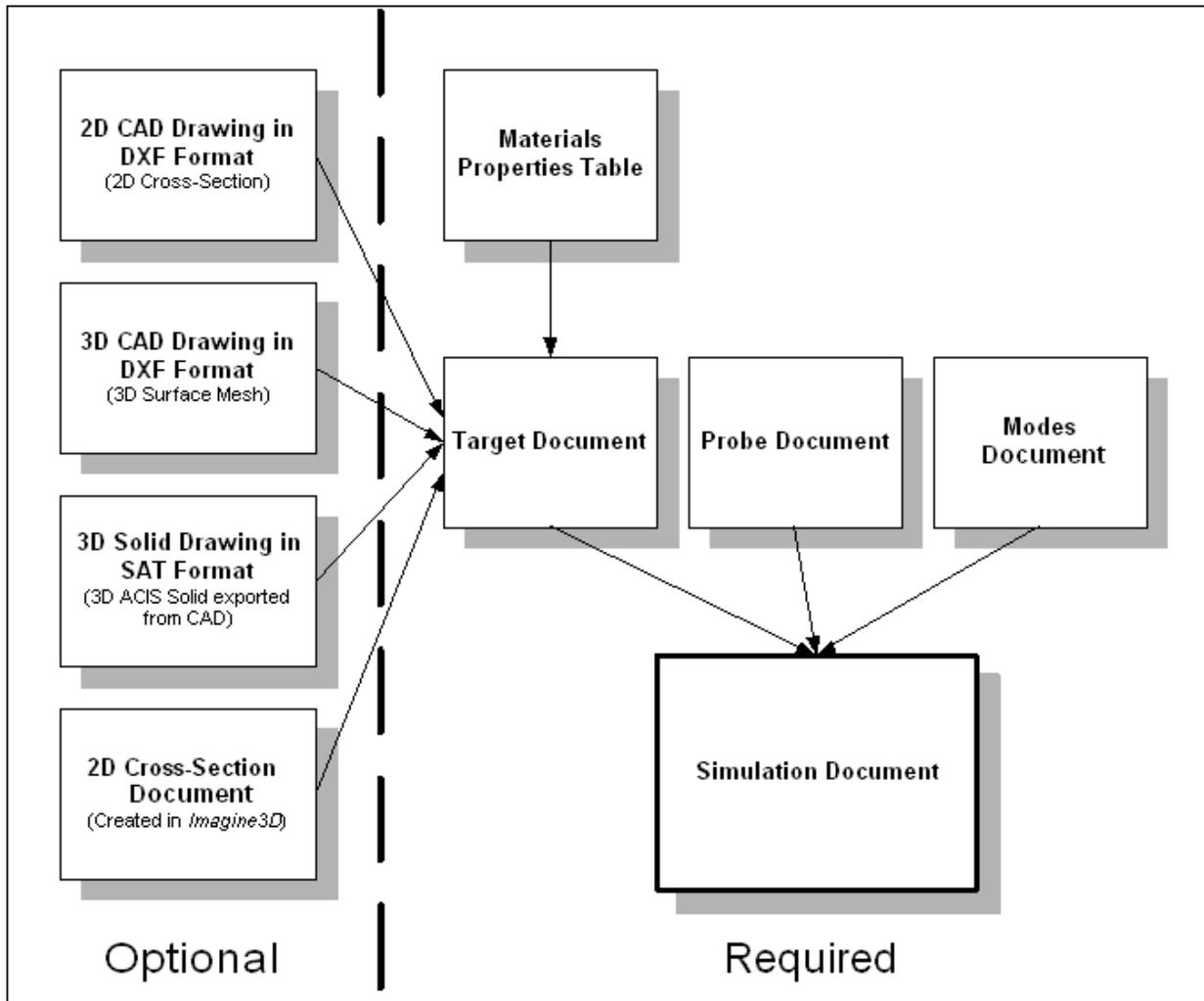
Main Components



Imagine3D



Overview of Different Imagine3D Document Types



Imagine3D's Terminology

Imagine3D uses certain terminology to describe files and operations it can perform. For example, "Documents" (Probe, Target, Modes, Simulation, etc.) are the sub-components of a simulation. These sub-components can exist as individual files outside of a simulation and are therefore referred to as "Documents". The Simulation Document is the main file structure for *Imagine3D*. It is referred to as a "Document: in the same way a file for a word processor is considered a "Document".



Simulation Documents - Define your inspection.

The Simulation document acts as a viewing window for your ultrasonic inspection. It is also responsible for storing all of the other elements that are required for the simulation such as probe, target, modes and the Material Properties documents.

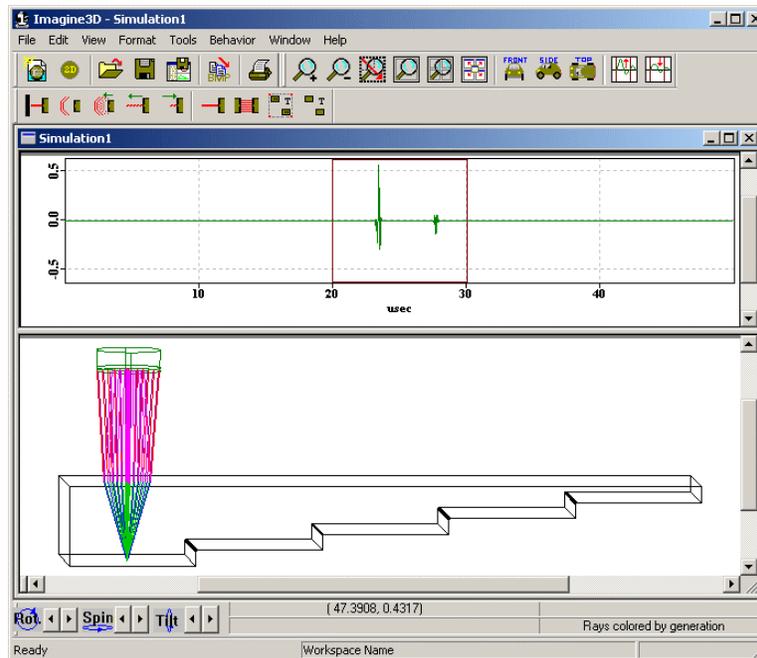
Simulation document views can have multiple panes that show raytracing, sound field modeling, A-scans and text descriptions of the simulation. Several different types of toolbars provide buttons for many frequently used functions such as saving, printing, zooming and changing the characteristics of the rays.

The various **status bars** provide important information such as the current workspace name, the coordinates of the cursor, the time that the rays end and whether a beam profile is currently being calculated.

The Simulation document can stand alone since everything is stored inside. If you wanted to share the basics of your work with co-workers, all that you would need to send them would be the Simulation document. You can also create a viewer file to share with others who don't own *Imagine3D*.

Simulation documents do not store how your screen was last configured nor do they store B-scans. Workspaces organize your screen layout. They also store additional windows such as B-scans. B-scan documents (extension .bsn) can be regenerated or saved separately.

Simulation documents are given the .ray filename extension.



See also:

- [Target Documents – Define your target's shape and material. – Page 23](#)
- [Probe Documents – Define your transmitter and receiver. – Page 24](#)
- [Modes Documents – Define the sound modes to be displayed. – Page 25](#)
- [Simple \(2D\) Editor – Probes, modes and raytracing view. – Page 26](#)
- [B-scan Documents – A plot of all arriving echoes over a scanned distance. – Page 28](#)
- [Material Properties Table – Edit material velocity, density and attenuation values. – Page 29](#)
- [How Do I Create New Documents? – Page 35](#)
- [How Do I Select Pulse Echo or Pitch Catch? – Page 38](#)
- [How Do I Select a Sound Display Mode? – Page 41](#)
- [How Do I Define a Ray's Color? – Page 42](#)
- [How Do I Move the Probe Around the Target? – Page 42](#)
- [How Do I Adjust the viewing angle? – Page 43](#)
- [How Do I Select the A-scan view? – Page 43](#)
- [How Do I Select the Text description view? – 44](#)
- [How Do I Produce a Printed Report? – Page 45](#)
- [See demo movie – Creating a new simulation](#)
- [See demo movie – Rotating spinning and tilting your viewpoint](#)
- [See demo movie – Reconfiguring toolbars](#)



Target Documents - Define your target's shape and material.

Target Documents help you to construct, import and insert real-world targets into the *Imagine3D* Simulation document.

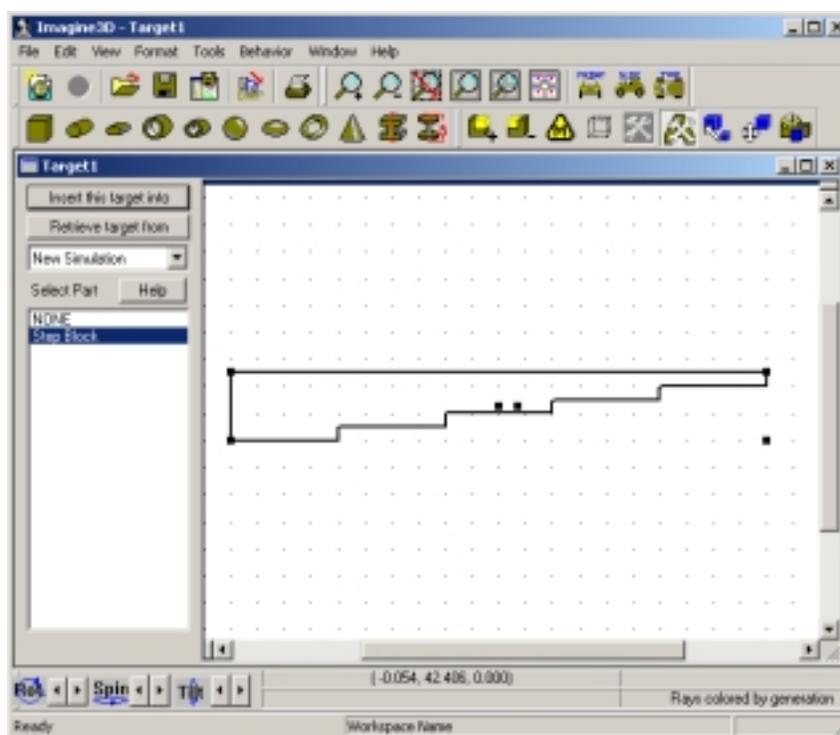
Only one target can be stored inside a Simulation document at a time. You can create targets by combining many parts together. If your inspection target is made up of several parts, just import or create them one by one to form a single target document that is a composite of the various parts.

There is no limit to the complexity of a target. However, keep in mind that the more interfaces and surfaces there are, the longer it will take *Imagine3D* to calculate the surface of the target. This delay happens only when the target is being constructed. Once a simulation is opened, the complexity of your target will have less of an impact on system performance.

The [Material Properties Table](#) is contained in the Target document so that Material Properties for each target component can be specified.

Target documents can also be saved as a stand-alone file. This allows you to reuse the target on another project or share it with someone else.

Target documents are given the .trg file extension.



See also:

- [Simulation Documents – Define your inspection. – Page 22](#)
- [Probe Documents – Define your transmitter and receiver. – Page 24](#)
- [Modes Documents – Define the sound modes to be displayed. – Page 25](#)
- [Simple \(2D\) Editor – Probes, modes and raytracing view. – Page 26](#)
- [B-scan Documents – A plot of all arriving echoes over a scanned distance. – Page 28](#)
- [Material Properties Table – Edit material velocity, density and attenuation values. – Page 29](#)
- [Cross-Section Editor – Defines 2D profiles that can be extruded or revolved into 3D solids. – Page 30](#)
- [How Do I Create New Documents? – Page 35](#)
- [How Do I Create targets using only *Imagine3D*? – Page 35](#)
- [How Do I Create targets from imported CAD drawings? – Page 36](#)
- [How Do I Adjust the viewing angle? – Page 43](#)
- [See demo movie – Assembling targets from primitive shapes](#)
- [See demo movie – Creating Targets from DXF or SAT files](#)
- [See demo movie – Creating targets using the cross-section editor](#)



Probe Documents – Define your transmitter and receiver.

Probe documents help you specify the characteristics of ultrasonic transducers so that they can be inserted into a Simulation document. Both transmitters and receivers are specified using the same document.

You are required to provide the transducer type, center frequency, bandwidth, focal length, element size and element shape. For raytracing purposes, you need to specify the sound wave type, the number of rays and their pattern on the surface of the transducer. You can specify that an immersion transducer should be locked to the surface of the inspected part at a given distance and incident angle. As you move the probe over the surface of the target, *Imagine3D* will automatically maintain the offset and angle that you specified.

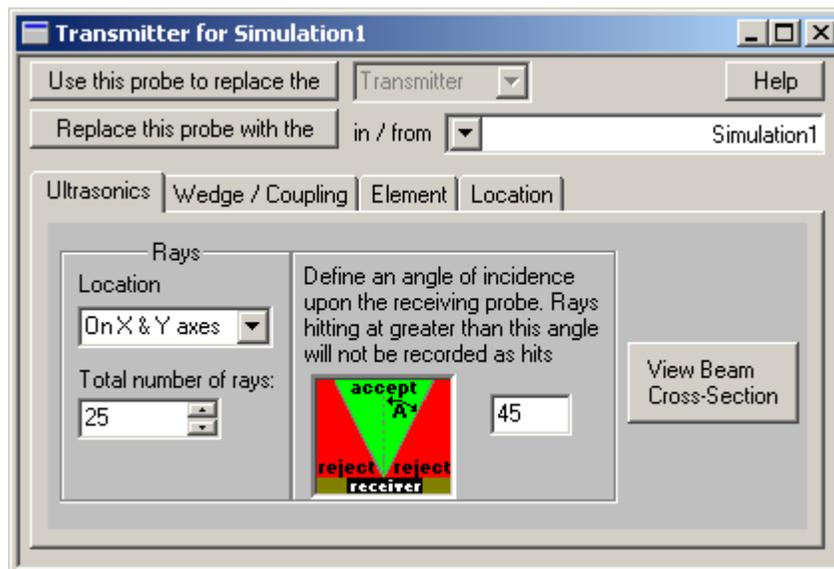
For contact transducers, you are required to also specify the wedge material, wedge size, inspection angle and target material. *Imagine3D* will calculate the transducer's incident angle so that the desired inspection angle in the target is achieved.

In Version 2.5 you can now edit the shape of the wedge and display the transducer's sound field in water.

The RF Beam Cross-section can be calculated for the probe. You can also open and save RF Beam Cross-Sections (extension .sdt) for different probes and compare them with real data collected by using Winspect™ data acquisition software.

Probe documents can be saved as a stand-alone file. This allows you to reuse the transducer on another project or share it with someone else.

Probe documents are given the .prb file extension.



See also:

[Simulation Documents – Define your inspection. – Page 22](#)

[Target Documents – Define your target's shape and material. – Page 23](#)

[Modes Documents – Define the sound modes to be displayed. – Page 25](#)

[How Do I Create New Documents? – Page 35](#)

[How Do I Configure an Immersion Transducer? – Page 39](#)

[How Do I Configure a Contact Transducer? – Page 39](#)

[See demo movie – Switching to pitch-catch operation](#)

[See demo movie – Configuring an immersion transducer](#)

[See demo movie – Configuring a contact transducer](#)

[See demo movie – Viewing the beam cross-section of a transducer](#)

[See demo movie – Grouping and ungrouping objects](#)



Modes Documents - Define the sound modes to be displayed.

The Modes document helps you to select which longitudinal and shear wave modes should be displayed during the simulation. It also describes which transmitted and reflected wavefronts should be displayed.

Once configured, the Modes document is inserted into the Simulation document.

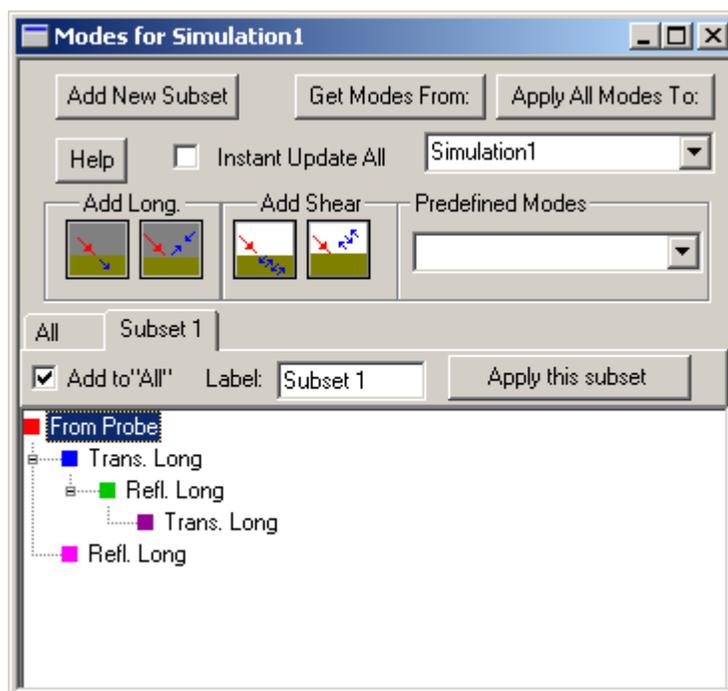
In the Modes document, the requested modes (longitudinal or shear) along the entire sound path are represented graphically, just like the branches on a tree. You have the option of starting a new branch at each interface, where different materials come in contact. By placing unique branches on separate tabs, it is now possible to simulate just one branch of the sound path or any combination of branches. As an example, you can separate corner reflector signals from back-wall multiples that might be cluttering the A-scan.

Modes are easily added by using the modes buttons or right clicking on a mode branch. Each branch, or portion of a branch, can be given a unique color or line thickness. This makes it easier to spot a particular mode conversion. The [Modes document context menu](#) provides quick access to most modes document options.

Predefined modes allow the selection of a standard set of modes. Corner and direct reflection tools mirror the modes back to the transducer once you have defined the forward path.

Mode Properties can be saved as a stand-alone file. This allows you to reuse the Modes document on another project or share it with someone else.

Mode documents are given the .mds file extension.



See also:

[Simulation Documents – Define your inspection. – Page 22](#)

[Target Documents – Define your target's shape and material. – Page 23](#)

[Probe Documents – Define your transmitter and receiver. – Page 24](#)

[How Do I Create New Documents? – Page 35](#)

[How Do I Enable Desired Long and Shear Modes? – Page 40](#)

[How Do I Select a Sound Display Mode? – Page 41](#)

[How Do I Define a Ray's Color? – Page 42](#)

[See demo movie – Organizing groups of modes on subset tabs](#)

[See demo movie – Simulating critical angles](#)

[See demo movie – Advanced features of the modes document](#)

[See demo movie – Selecting which modes to show](#)



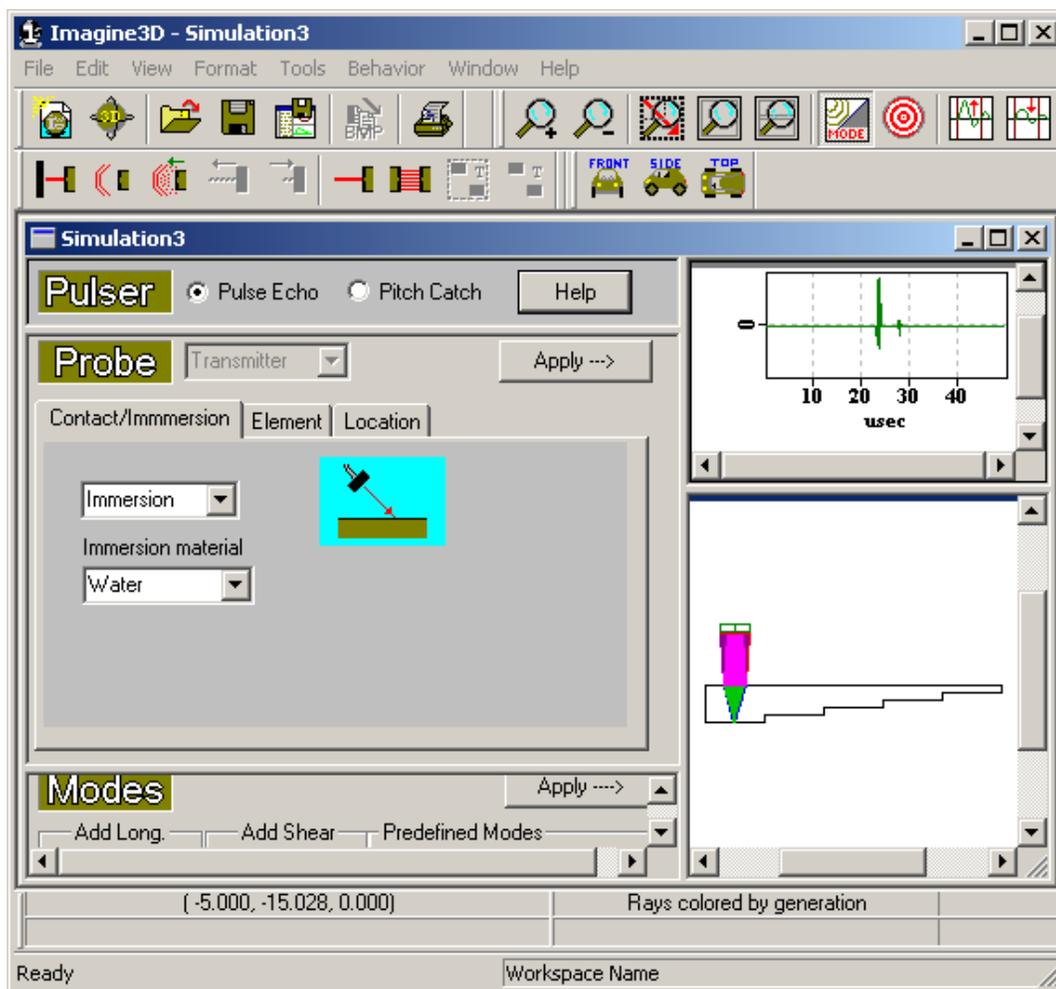
Simple (2D) Editor– Probes, Modes and Raytracing View

The Simple View Editor provides the main elements of *Imagine 3D* limited to a simpler x-y plane case. The simple editor reduces some of the flexibility of the main *Imagine3D* editor in return for a simplified interface. This gives clarity for novice users.

The Simulation document retains changes made in either mode. Settings for the Simulation document are not lost when you switch between editors – the inspection remains the same. The difference between two identical Simulation documents, one in Full Edit mode and the other in Simple Edit mode is what you are allowed to change while using each editor.

To use the 2D editor, you can create a new default simulation and choose the Simple Editor or you can switch from a 3D simulation to the simple editor using the **Switch 2D /3D** button on the Main toolbar. The simple editor has 4 windows, A-Scan view, Raytracing view, edit Modes and edit Probe contained in the one window. The Modes and Probe windows can be hidden using the hide and show buttons on the View toolbar.

Essential tools are available in the Simple editor while more advanced functionality is hidden. For example, in the simple editor different mode subsets are not shown. Only the first subset of modes available in the full editor is used in the simplified interface.



See Also:

[Simulation Documents – Define your inspection. – Page 22](#)

[Target Documents – Define your target's shape and material. – Page 23](#)

[Probe Documents – Define your transmitter and receiver. – Page 24](#)

[Modes Documents – Define the sound modes to be displayed. – Page 25](#)

[Simple \(2D\) Editor – Target View. – Page 27](#)

[Material Properties Table – Edit material velocity, density and attenuation values. – Page 29](#)

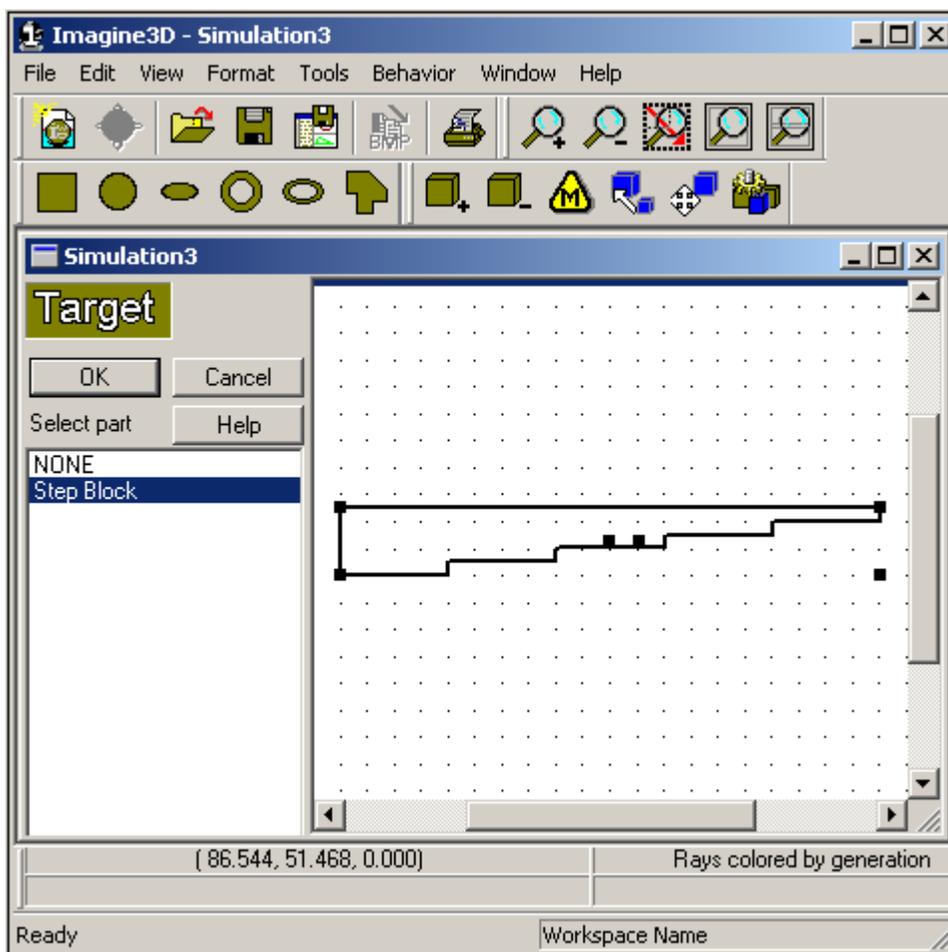


Simple (2D) Editor – Target View

The Edit Target button on the View toolbar takes you to the second screen, The Simple Editor - Target View. This can be used to edit the target in the x-y plane only.

There is an option in the Tools menu to set the depth of the target. This will affect the depth of all the parts in the target. A limited Parts toolbar is available for dragging primitive shapes into the target. The Edit Parts toolbar provides tools for defining the parts in two dimensions.

When editing the target is complete, the OK and Cancel buttons return you to the main simple editing view. The OK button saves any changes made to the target. The Cancel button discards your changes.



See Also:

[Simulation Documents – Define your inspection. – Page 22](#)

[Target Documents – Define your target's shape and material. – Page 23](#)

[Probe Documents – Define your transmitter and receiver. – Page 24](#)

[Modes Documents – Define the sound modes to be displayed. – Page 25](#)

[Simple \(2D\) Editor – Probes, modes and raytracing view. – Page 26](#)

[Material Properties Table – Edit material velocity, density and attenuation values. – Page 29](#)

[Cross-Section Editor – Defines 2D profiles that can be extruded or revolved into 3D solids. – Page 30](#)



B-scan Documents - A plot of all arriving echoes over a scanned distance.

B-scans plot scan distance on the target versus all echo arrival times. B-scan documents are created when you select the **Tools-Generate B-scan** menu item, fill in the requested values and press OK.

B-scan documents only need to be generated as needed. They are only one of several different types of simulation outputs available from *Imagine3D*. B-scans are not stored in the Simulation document.

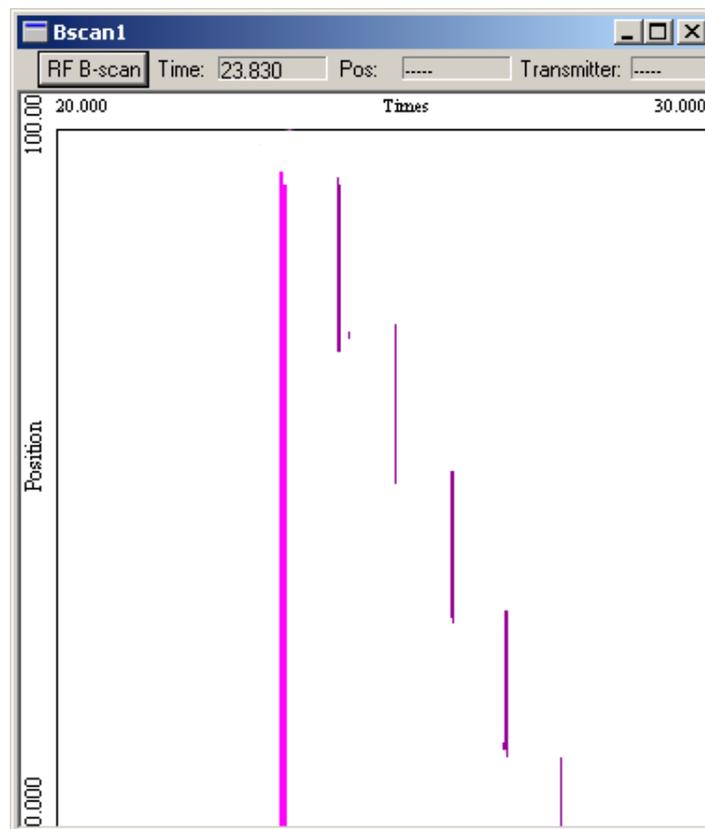
B-scans can be presented in two different ways: color or RF.

The color B-scan display shows you the times of the various signals arriving back at the transducer. The colors on the B-scan correspond to the colors of the rays in the simulation. This allows you to sort out different mode-converted signals that might be overlapping each other. By moving the cursor over the surface of the color B-scan, you can directly measure the arrival times of the echoes using your mouse.

To see what the simulated ultrasonic signals really look like, just switch the B-scan display into RF mode. In this mode, it is possible to see all of the collected A-scans that make up the **RF B-scan**. You can also save RF B-scans (.sdt extension) and compare them with real collected data by using Winspect™ data acquisition software.

So that *Imagine3D* can perform the simulated B-scan, you are asked for the scan distance, number of points, time range and scan direction values. The B-scan always starts at the current probe position. By pressing the **Show Probe Path** button, *Imagine3D* will draw a green line showing you where the probe will be moved during the B-scan.

B-scan documents are given the .bsn file extension.



See also:

[Simulation Documents – Define your inspection. – Page 22](#)

[Target Documents – Define your target's shape and material. – Page 23](#)

[Probe Documents – Define your transmitter and receiver. – Page 24](#)

[Modes Documents – Define the sound modes to be displayed. – Page 25](#)



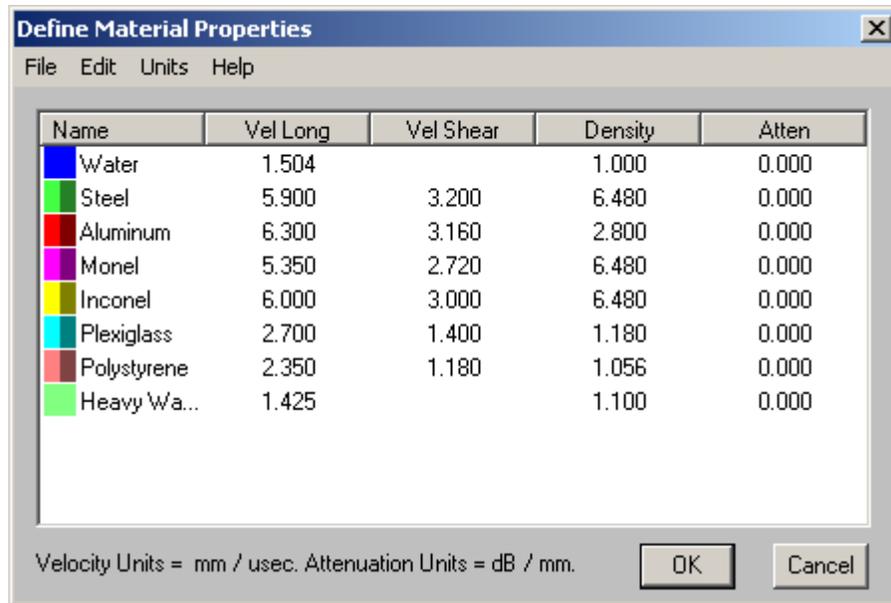
Material Properties Table - Edit material velocity, density and attenuation values.

The Material Properties document stores the acoustic velocity, density and attenuation values for many common materials. You can add your own materials to the table, if desired. These are the materials from which you may construct inspection targets.

You can also pick the colors you want displayed, anytime that a long or shear wave propagates through a given material when the show Rays by Medium display type is selected.

Material Properties documents can be saved as a stand-alone file. This allows you to reuse the materials table on another project or share it with someone else.

Material Properties documents are given the .med file extension. The extension is short for "media".



See also:

[Simulation Documents – Define your inspection. – Page 22](#)

[Target Documents – Define your target's shape and material. – Page 23](#)

[Probe Documents – Define your transmitter and receiver. – Page 24](#)

[Modes Documents – Define the sound modes to be displayed. – Page 25](#)

[Simple \(2D\) Editor – Probes, modes and raytracing view. – Page 26](#)

[How Do I Define a Ray's Color? – Page 42](#)

[See demo movie – Working with the materials table](#)

[See demo movie – Changing a target's material](#)



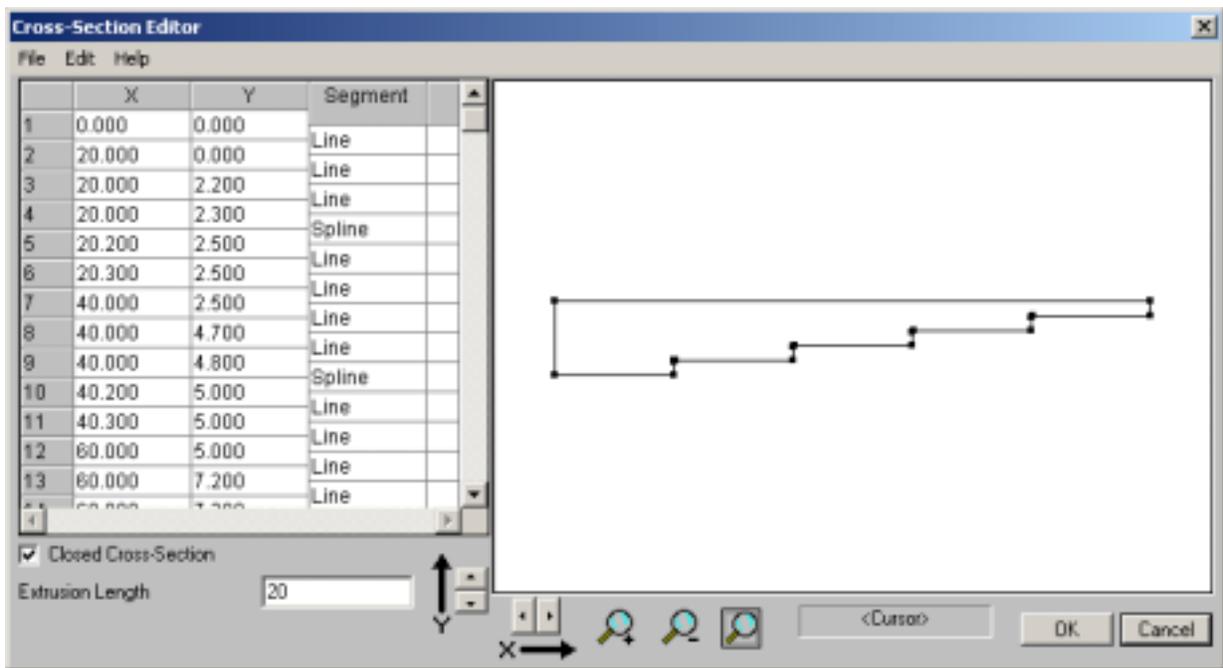
Cross-Section Editor – Defines 2D profiles that can be extruded or revolved into 3D solids.

One of your options when creating a target in *Imagine3D* is to draw a cross-sectional view of your part and then extrude it into a 3D length of your choice. You also have the option of revolving it into a solid, through a number of degrees. Once the cross-section has been drawn, *Imagine3D* gives you the option of saving your work to a file. You can then reuse the cross-section elsewhere. Cross-sections are particularly useful for objects such as train rails and turbine disks.

The Cross-Section Editor is used temporarily whenever you import or edit a 2D .dxf file. It represents the stage just before it is extruded or revolved into a solid. The Cross-Section Editor can be used to make small changes in the profiles.

You can also use the Cross-Section Editor to [Create a Revolved or Extruded Cross-Section Part using a text file](#).

Cross-section documents are given the .xsn file extension.



See also:

- [Simulation Documents – Define your inspection. – Page 22](#)
- [Target Documents – Define your target's shape and material. – Page 23](#)
- [Probe Documents – Define your transmitter and receiver. – Page 24](#)
- [Modes Documents – Define the sound modes to be displayed. – Page 25](#)
- [Simple \(2D\) Editor – Probes, modes and raytracing view. – Page 26](#)
- [How Do I Create targets using only *Imagine3D*? – Page 35](#)
- [How Do I Create targets from imported CAD drawings? – Page 36](#)
- [See demo movie – Assembling targets from primitive shapes](#)
- [See demo movie – Creating targets from .dxf and .sat files](#)
- [See demo movie – Creating targets using the cross section editor](#)



Workspace Folders -- save everything so that you can continue your work later.

Workspace folders are created when you ask *Imagine3D* to save your work to a workspace. The information that *Imagine3D* saves in the new folder includes your current screen configuration and any documents that are open at the time of saving. You do not need to use workspaces at all if you do not care about saving the other open documents.

The first time that a new workspace is saved, a new Workspace folder and Workspace file is created—both share the same root name. All target, probe and mode documents that were open at the time of saving are also saved in this new folder. RF B-scans and RF Beam Cross-Sections are not saved in workspaces. By recalling a workspace, *Imagine3D* re-opens the document files and reconfigures the screen, as it was when you last saved the workspace.

You can share workspaces with someone else, however, it is important that you provide them with all of the files that are in the workspace directory. There will always be a minimum of two files: a Workspace file and a Simulation document.

Workspace files are given the .prj file extension. This stands for Project.

How Do I ?



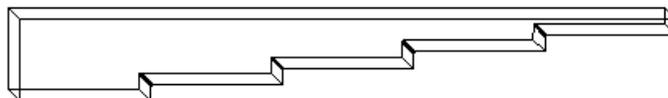
Imagine3D



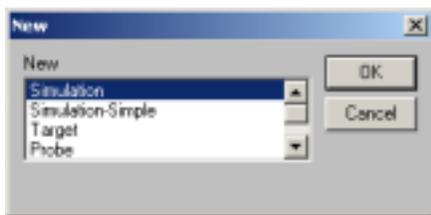
Create New Documents (Simulation, Target, Probes, Modes)

There are two main methods used to create new documents. The first is to create a default Simulation document and then edit each of the individual parts (Target, Modes etc.) of that document. The second is to create each specific document type individually and then insert each into the Main simulation document.

The **New Simulation** button creates a default Simulation document that contains default Target, Probe and Modes. The default target is a calibration step block.



The **File – New** menu item provides a selection of document types to create.



Target, Probe, Modes, Simulation and Simple Simulation documents can all be created individually.

A new **Target document** is created completely empty.

A new **Probe document** contains default values for the probe, which need to be edited.

A new **Modes document** contains a single mode from the probe.

A new Simulation document contains the default documents for each case above, a default probe, no target and only the first mode from the Probe.

The new **Simulation-Simple document** is a Simulation document that starts in the Simple Editor and contains a step block target, an immersion probe with the modes setup for normal beam inspection.

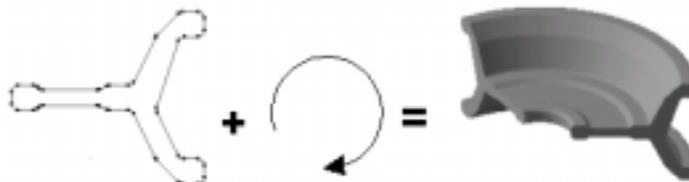
Create targets using only Imagine3D

If you do not have CAD drawings, your target can be constructed entirely within *Imagine3D*.

You can assemble targets from a range of primitive shapes such as blocks, rods, tubes, spheres, cones and cross-sections. These shapes can be embedded, attached or removed from each other to form a combined solid geometry.



You can also draw cross-section details using the built-in cross-section editor that allows you to specify line, arc, or spline segments. These cross-sections can then be extruded or revolved into 3D solids.



See also:

[How Do I Create a Revolved or Extruded Cross-Section Part using a text file of points? – Page 37](#)
[See demo movie – Creating targets using the cross-section editor](#)



Create targets from imported CAD drawings

Imagine3D can import CAD drawings in .sat and .dxf file formats. Files can be imported by using the [File – Import DXF or SAT](#) menu item or by selecting the .SAT or .DXF checkboxes in the [Define Part Type](#) dialog box when a new part is added.

If you have 3D CAD drawings, your drawing is imported as 3D solids from either .dxf or .sat files. 3D shapes contained in .dxf files must be drawn as 3D faces or 3D volumes enclosed by a mesh. 3D solids contained in .sat files are already fully constructed and are usually imported without any problems.

If you have 2D cross-section drawings, your .dxf files are imported and extruded or revolved into 3D solids. Cross-sections in .dxf files must be drawn as a closed polyline. See [Setup a DXF file for Import into Imagine3D \(below\)](#).

In all cases, the .dxf file should contain only one object at a time.

.dxf files are generated by popular packages such as AutoCAD and TurboCad as well as by many vector-based drawing packages such as Corel Draw and Micrografix. Most CAD packages have some form of .dxf exporting capability.

.sat files are generated by AutoCAD and TurboCad or any other vendor that has licensed the ACIS® solid modeling engine from Spatial Technologies.

[See demo movie – Creating targets from .dxf and .sat files](#)

Setup a DXF file for Import into Imagine3D

There are a few simple rules that must be followed when importing .dxf files:

1) Importing 2D .dxf drawings

Imagine3D will import any closed 2D-polyline shape and extrude it or revolve it into a solid.

Rules:

- Only one object should be in the .dxf drawing at a time.
- There should be no dimensions, dimension lines or annotations in the drawing.
- The object needs to be drawn with a polyline that has been closed.
- Export the DXF in AutoCAD version 12 or 13 format. Newer DXF versions contain lots of extras that get in the way.

Open polylines and more than one object in the drawing will return an "unknown file format" error. The part will not be imported.

Use the PEDIT command in AutoCAD to confirm that the polyline is closed. If it is not closed, PEDIT can be used to close it.

Here is a simple hint for creating .dxf files from AutoCAD drawings that contain many objects. Erase all of the objects in the drawing except for the one that you wish to export to .DXF. Export the object. Select the Undo function until the original drawing is restored. Repeat the above procedure for each object that you would like to export.

Import each exported .dxf file one by one into *Imagine3D* and assign it the correct Material Properties.

2) Importing 3D .DXF drawings

Imagine3D will import any number of fully enclosed 3D objects.

Any object drawn with 3D surfaces that completely encloses a volume will correctly import into *Imagine3D*.



Create a Revolved or Extruded Cross-Section Part using a text file of points.

It is possible to define a cross-section profile using a .txt file. The [File-Open](#) menu item allows you to read in both .txt and .xsn (*Imagine3D* Cross-section document) files. The editor can import a list of the points from a .txt file. The [Cross-Section Editor](#) uses lines to connect each point. The profile can be edited to use arcs or splines after import.

Four Steps to making a Cross-Section Profile in *Imagine3D*

- Step One: Create and save your text file.
- Step Two: Add a new part – choose revolved or extruded.
- Step Three: Open text file in the Cross-Section Editor.
- Step Four: Define other part parameters.

Step One: Create and save your text file.

Using any program that will create a .txt file, enter a list of points. The format is one point per line. The x and y values must be separated by a space or tab.

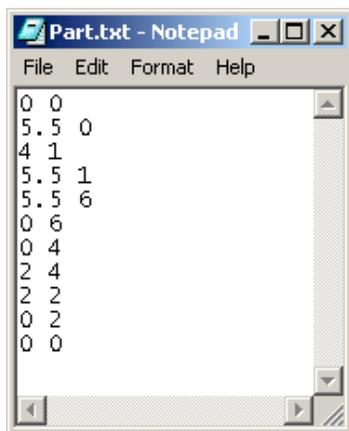
Text File Format

```

First Point X Value<space or tab>First Point Y Value
Second Point X Value<space or tab>Second Point Y Value
Next Point X Value<space or tab>Next Point Y Value
And so on . . .

```

For example:



Step Two: Add a new part – choose revolved or extruded.

In the Target Document select the [Add New Part](#) button. The part material and part combination method needs to be selected in the Define Part Type dialog box. Select either "Revolved Cross-section" or "Extruded Cross-section" as the part's shape.

Step Three: Open the text file in the Cross-Section Editor

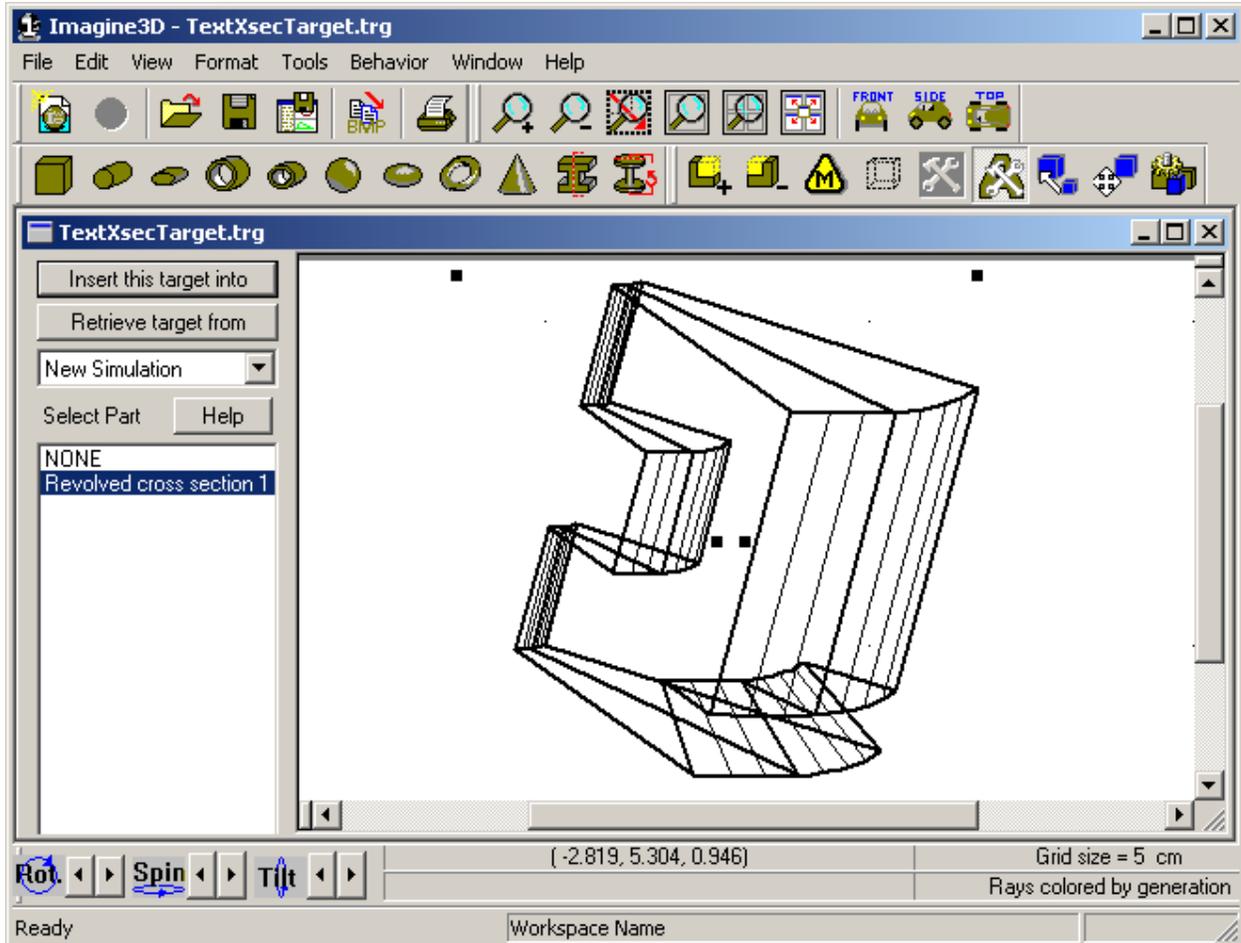
The [Cross-Section Editor](#) will appear. Select the File – Open menu item. Select "Text Cross-Section (*.txt)" as the File type. Choose to open your text file of points. The new points of the profile will appear in the Editor.



Step Four: Define other part parameters

The extrusion length or the revolution angle as well as the part's position in the **Define Part Position** dialog box need to be specified before you can view the final product.

This is the completed revolved cross-section in the target editor.



Select Pulse Echo or Pitch Catch

Imagine3D supports both Pulse Echo and Pitch Catch ultrasonic methods. The default mode is Pulse Echo.

Pitch Catch (often called Dual Mode) simply means that you are using two transducers, one for transmitting and one for receiving. Methods that use a Pitch Catch arrangement are TTU (Through Transmission Ultrasonics), dual-element transducers and Tandem transducers (same-side inspections using two transducers).

To change from Pulse Echo to Pitch Catch, click the right mouse button in any 3D pane and select PE/PC.

If you have selected Pitch Catch and can see only one transducer on the screen, click the **Fit All Views** toolbar button. The receiver should now be visible as well. Move the receiver closer to the target and click **Fit All Views**, again. This will restore the display so that you can more easily configure the inspection. Whenever you lose sight of either transducer, click the **Fit All Views** button.

[See demo movie – Switching to Pitch Catch operation](#)



Configure an immersion transducer

Each time a [new Simulation document](#) is opened *Imagine3D* inserts a default transducer. This transducer is a 5 MHz, 10mm diameter, 70mm spherically focused immersion transducer. You can modify this default by simply entering the values that correspond to your own transducer's specifications.

To modify the default transducer in any Simulation document, click the right mouse button in the 3D View and select Edit Transmitter ([Simulation Document 3D Context Menu](#)). If you are in Pitch Catch mode and wish to modify the receiver, click the right mouse button in the 3D View and select Edit Receiver ([Simulation Document 3D Context Menu](#)).

For immersion transducers, you may choose to explicitly specify the Incident Angle and Distance to Interface. This "lock to Interface" feature simulates the action of a squirter or contour-following scanner. When moved using the mouse or the cursor keys, the transducer will stay aligned to the surface at a fixed distance, fixed angle or both. *Imagine3D* will resist any attempt to change the angle of the transducer or to vary the offset from the part surface.

See also:

[Probe Documents -- define your transmitter and receiver – Page 24](#)

[Reference – Probe Document - Immersion tab – Page 79](#)

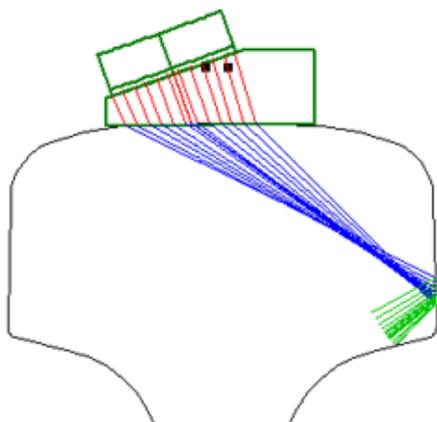
[See demo movie – Configuring an immersion transducer](#)

Configure a contact transducer

For contact transducers, you are required to specify the wedge material, wedge size, inspection angle and target material. *Imagine3D* will calculate and set the transducer's incident angle so that the desired inspection angle in the target is achieved.

To modify the default transducer in any Simulation document, click the right mouse button in the 3D View and select Edit Transmitter ([Simulation Document 3D Context Menu](#)). If you are in Pitch Catch mode and wish to modify the receiver, click the right mouse button in the 3D View and select Edit Receiver ([Simulation Document 3D Context Menu](#)).

The transducer, when moved using the mouse or the cursor keys, will stay in contact with the surface of the part. *Imagine3D* will resist any attempt that you might make to change the angle of the transducer or to remove it from the surface of the part.



See Also:

[What's New in Version 2.5 - Wedge Editor – Page 3](#)

[Reference – Probe Document - Wedge tab – Page 79](#)

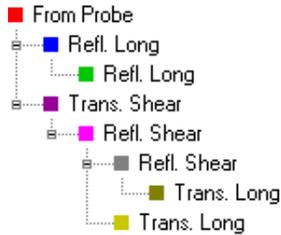
[See demo movie – Configuring a contact transducer](#)



Enable desired longitudinal and shear modes

Each time a [new Simulation document](#) is opened, *Imagine3D* inserts a default [Modes Document](#). You can modify this default Modes document by adding or removing the longitudinal and shear wave modes that you want to see.

Right clicking over the Modes Tree in the Modes Document allows access to the [Modes Document Context Menu](#). This menu allows you to add and remove branches in the modes document. The [Modes Document context menu](#) also allows you to define the color and thickness of the selected modes. These are the colors *Imagine3D* uses when the Show Rays by Generation option is selected in the Simulation document.

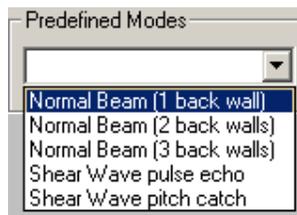


There are several features that speed up Modes selection.

1. For [Pulse Echo](#) simulations, a fast way of getting modes to show up on the A-scan is to use the [Mirror Back to Transmitter–Direct reflection](#) and [Mirror Back to Transmitter–Corner reflection](#) menu items on the [Modes Document Context Menu](#). These functions automatically add the required branches into your modes document to return the sound to the transmitter.

First add the forward modes that will reach the portion of the target you would like to inspect. If you expect to receive sound from a direct reflection (e.g. a back wall echo in a normal beam inspection), select [Mirror Back to Transmitter–Direct reflection](#). If you expect to receive the sound from a corner reflection (e.g. a crack root with an angle beam inspection), select [Mirror Back to Transmitter–Corner reflection](#).

2. You can also select from a list of [Predefined Modes](#) that automatically configure *Imagine3D* for some of the most popular inspection configurations. This is a fast way of configuring *Imagine3D* to display corner reflectors and multiple back walls.



See also:

[Modes Documents -- define the sound modes that should be displayed – Page 25](#)

[Modes Document Reference – Page 65](#)

[Modes Document Context Menu – Page 70](#)

[See demo movie – Selecting which modes to show](#)



Select a sound display mode (rays, wavefronts, beam or pulse)

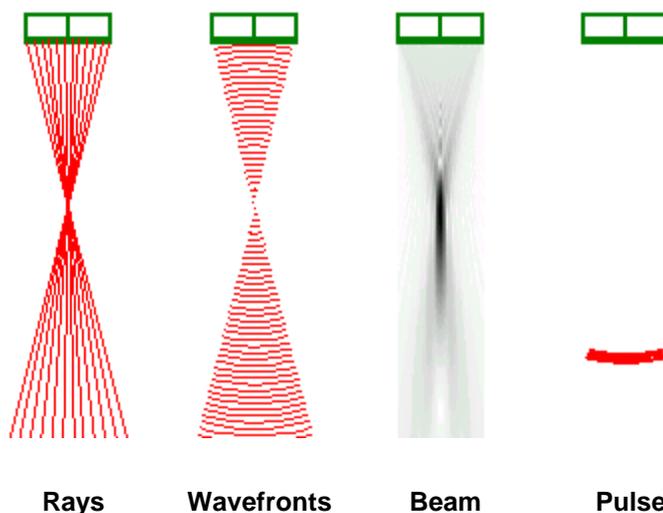
Imagine3D can display sound fields in several different ways.

Rays are the default presentation because they are intuitive and robust. Rays simply represent the sound field as a series of straight lines that leave the probe face, then transmit or reflect at the interface between dissimilar materials.

Selecting **Wavefronts** shows the sound field as a series of short curved (or straight) lines that follow one another in the direction of the sound propagation. The spacing between the waves increases or decreases in relation to the velocity of the sound in each medium. This presentation can be quite informative. However, if the sound scatters off corners, it may appear cluttered as the wavefront begins to spread. To reduce this clutter, restrict the number of generations presented when using the wavefront display.

The **Beam Profile** shows the sound field as a rendered, grayscale image showing the transducer focus, side lobes and near-field interference patterns. Ultrasonic beams are calculated using a summation of Gaussian solutions to the parabolic wave equation.

The **Pulse** display shows a single wavefront at any selected time. A series of pulses can be animated to show a moving wavefront through the target (select Tools>Show Pulse Animation). The width of the wavefront, as plotted, represents the actual physical pulse-width in the medium. Therefore, faster velocity materials will exhibit a wider pulse-width



Imagine3D allows the display mode to be defined in a number of ways. The most direct is to select the display mode using the **Format – Sound Display Mode** menu item. Alternately, the display mode can be defined in the **Sound Display Properties** dialog box (**Format – Sound Display Properties** menu item).

[See demo movie - Switching between sound display modes](#)



Define a ray's color (used to highlight the mode type, medium type or generation)

To change how colors are used when displaying rays, select **Format – Ray Color** in the **Simulation document**. Your choices are:

Selection	What the Ray Colors Indicate
By Generation	The rays change color whenever an interface between two materials is encountered.
By Medium	The rays are assigned colors based on the target material.
By Mode	Longitudinal waves are shown in one color and shear waves are shown in another.
By Medium and Mode	Longitudinal waves and shear waves are shown as color pairs which are different for each target material.

You can set how the sound fields change color based on whether a mode conversion occurs, a new medium is entered or a new wave is generated. The default color-coded display setting is by generation because it guarantees a new color each time the sound leaves an interface.

The colors used when the rays are displayed by Generation are set in the **Modes document**. The colors used when the rays are displayed by Medium or by Mode can be set in the **Material Properties Table**.

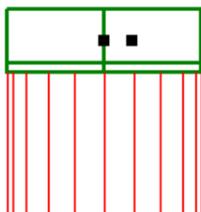
See Also:

Modes Documents– Define the sound modes to be displayed – Page 25

Material Properties Table – Edit material velocity, density and attenuation values. – Page 29

Move the probe around the target

To move the probe, you must first select the probe by double-clicking on it or by pressing TAB until the probe is selected. Selected objects are drawn in bold lines and show black dragging handles.



Imagine3D uses three different cursor types to indicate what motion will occur when you hold the left mouse button down to drag the selected object.

Move Cursor	Spin Cursor	Rotate Cursor



To move the probe with the mouse, place the cursor over the probe. When the cursor changes into the Move Cursor, press and hold the Left mouse button to drag the probe around your simulation.

When you place the cursor over the right drag handle, the Spin Cursor will appear. Holding the left-mouse button while the Spin Cursor is showing will turn the probe around itself, the probe direction will change but not its position.

When you place the cursor over the left drag handle, the Rotate Cursor will appear. Holding the left-mouse button while the Rotate Cursor is showing will rotate the probe about the probe's movement origin. As the probe is dragged, it will change both in direction and position.

The movement origin for any draggable object can be set using the [Set Draggable Object Properties](#) dialog box (Behavior - Object Movement Behavior menu item).

An easy way to move the probe left or right and up or down is with the arrow keys. You can spin the probe by holding down the Shift key while pressing the arrow keys. To rotate the probe hold the Ctrl key while you press the arrow keys.

See also:

[Simulation Documents – Define your inspection – Page 22](#)

Adjust the viewing angle

You can tilt, rotate and spin any Simulation view so that it can be seen from a different viewing angle. You do this by clicking on the arrow buttons in the [View Controlbar](#) at the bottom of the main *Imagine3D* window.

Pressing the T, R or S keys will also tilt, rotate and spin the view. Holding down the Alt key at the same time reverses the direction of motion.

See also:

[Simulation Documents – Define your inspection – Page 22](#)
[Reference – Simulation Document - Rotation Step Size – Page 123](#)

Select the A-scan view

The A-scan view shows a simulated RF or rectified signal as you might expect to see on the screen of a flaw detector. The A-scan is constructed from the sum of the amplitudes of the received rays convolved with the probe's response. All phase and amplitude information is maintained based on the transmission and reflection coefficients at each interface.

How to select the A-scan view

1. It is often easiest to split the Simulation view into more than one pane. By dragging a splitter control (outer ends of the scroll bars) into the simulation, you will split the views. This will allow you to see a 3D view and the A-scan view at the same time.
2. It is a good idea to select one of the least used 3D panes to display the A-scan. Sometimes this might be the top view or the side view of the inspected part.
3. To display the A-scan view, first click inside the desired pane, then click the right mouse button and select View Type – A-scan.

See Also:

[A-scan Context Menu – Page 138](#)
[See demo movie - Viewing A-scans and arrival times](#)



Select the Text description view

To select the Text description view:

1. It is often easiest to first split the Simulation view into more than one pane. By dragging a splitter control (outer ends of the scroll bars) into the simulation, you will split the views. This will allow you to see the 3D view and the Text view side by side.
2. It is a good idea to select one of the least used 3D panes for display of the Text view. Sometimes this might be the top view or the side view of the part.
3. To show the Text view, first click inside the desired pane, then click the right mouse button and select **View Type – Text**.

The Text view uses three sections to describe the inspection:

1. Center Ray Statistics (only the physically possible rays)

Each time the ray encounters an interface, a line of text is added to the listing in the Center Ray Statistics section. This text describes the current material, mode of propagation, transit time, distance traveled, angle, ray starting point and ray direction.

The following is a sample of the text:

```

Transmitter's Center Ray Statistics (only the physical rays):
Material      Mode      Times              Length      Angle (at end)
0      Water  Long.  0.000 to 10.190   15.326      8.000
1      Steel  Long.  10.190 to 12.719  14.920      33.090
2      Steel  Long.  12.719 to 15.248  14.920      33.090
      Impl. (Start,End)  Starting point      Direction
0      1.000, 1.000 ( 2.725, 27.677, 10.000) ( 0.139, -0.990, 0.000)
1      0.075, 0.075 ( 4.858, 12.500, 10.000) ( 0.546, -0.838, 0.000)
2      0.043, 0.043 ( 13.004, 0.000, 10.000) ( 0.546, 0.838, 0.000)

```

2. A-scan Arrivals (only the rays reaching the receiver)

Whenever a ray finally hits the surface of the receiver two lines of text are added to the listing in the A-scan Arrivals section.

The following is a sample of the text:

```

A-Scan Arrivals (rays hitting receiver):
In Generation 4, 18 of 25 rays hit the receiver
Arrival Times: avg: 20.593 std dev: 0.152 first:20.175 last:20.734

```

3. Modes (requested by user)

This section contains a description based on the current Modes document.

The following is a sample:

```

Modes (requested by user)
0 is from the transmitter in Water
  1 is a transmitted longitudinal wave from 0 in Steel
    2 is a reflected longitudinal wave from 1 in Steel
      3 is a transmitted longitudinal wave from 2 in Water
        4 is a reflected longitudinal wave from 0 in Water
          5 is a transmitted shear wave from 0 in Steel

```

See also:

[Simulation Documents – Define your inspection – Page 22](#)

[See demo movie - Using the text view](#)

[See demo movie - Copying to the clipboard](#)



Produce a printed report

Imagine3D provides a powerful print preview feature that displays exactly how the printout will appear.

There are three types of annotation text that may be added to printed reports:

You can add a 3D-text label that tilts and rotates relative to viewing angle changes. This text is ideal for labeling planes such as the front view because the text will appear to be lying flat on the front view surface when viewed from a different angle.

You can also add a 3D-text title that does not tilt or rotate relative to viewing angle changes. This text is ideal for object identification purposes because it always faces you regardless of the viewing angle.

A printer comment can be added so that the text entered will appear on printed reports just below the header information. This text is ideal for adding administrative information such as "prepared by" or other project information.

See also:

[Simulation Documents – Define your inspection – Page 22](#)

[See demo movie - Using the text view](#)

[See demo movie - Copying to the clipboard](#)

[See demo movie - Previewing a printed report](#)

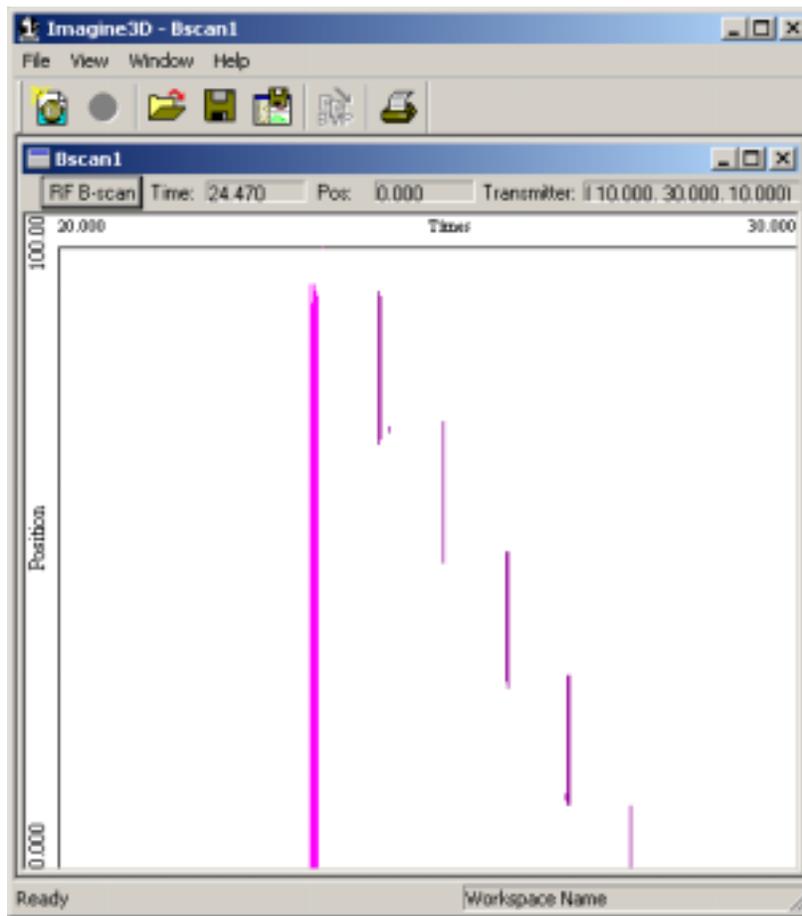
Reference



Imagine3D



B-scan Documents



See also:

[B-scan Documents – A plot of all arriving echoes over a scanned distance. – Page 28](#)

FILE MENU-B-scan Document

New	Ctrl+N
Open...	Ctrl+O
Close	
Save	Ctrl+S
Save As...	
Open RF B-scan	
Workspaces ▶	
Print...	Ctrl+P
Print Preview	
Print Setup...	
Recent File	
Recent Workspace	
Exit	



New

Opens a new Ray, Probes, Modes or Target document.

Open

Opens or finds a document. This will open any *Imagine3D* related file.

Close

Closes the currently selected document.

Save

Re-saves a previously opened document to the same filename without prompting, otherwise, *Imagine3D* saves a newly created document by first asking for a filename and path.

Save As

Saves the currently active document by first asking for a new filename and path.

Open RF B-scan

Allows you to open any saved RF scan files (.sdt).

Workspaces

Open Workspace - opens or finds a Workspace.

Close Workspace - closes the current workspace so it cannot be accidentally overwritten.

Save Workspace As - creates a new workspace folder by first asking for a project name and then saves any open documents including the screen configuration into that folder.

Print Preview

Displays an *Imagine3D* report on your screen as it will be printed on your printer.

Print Setup

Allows you to select the printer, paper size and orientation.

Recent File

Provides a list of the most recently opened Documents, which will be re-opened if selected.

Recent Workspace

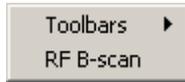
Provides a list of the most recently opened Workspaces which will be re-opened if selected.

Exit

Exits *Imagine3D*.



VIEW MENU – B-scan Document



Toolbars

Allows the user to show and hide each of the toolbars for the B-scan Document.

File Toolbar

Displays a toolbar with buttons that manage opening, saving, copying, printing.

Status Bar

Displays a status bar at the bottom of the screen that shows: Help messages, current Workspace name and beam calculation status.

RF B-scan

Displays the [RF B-scan](#) for this document.

WINDOW MENU – B-scan Document



New Window

Opens an additional child window allowing more viewing panes for a given Simulation document.

Cascade / Tile

Arranges all of the open documents so that they overlap (cascade) or so they resize to fill the main *Imagine3D* window (Tile).

Arrange Icons

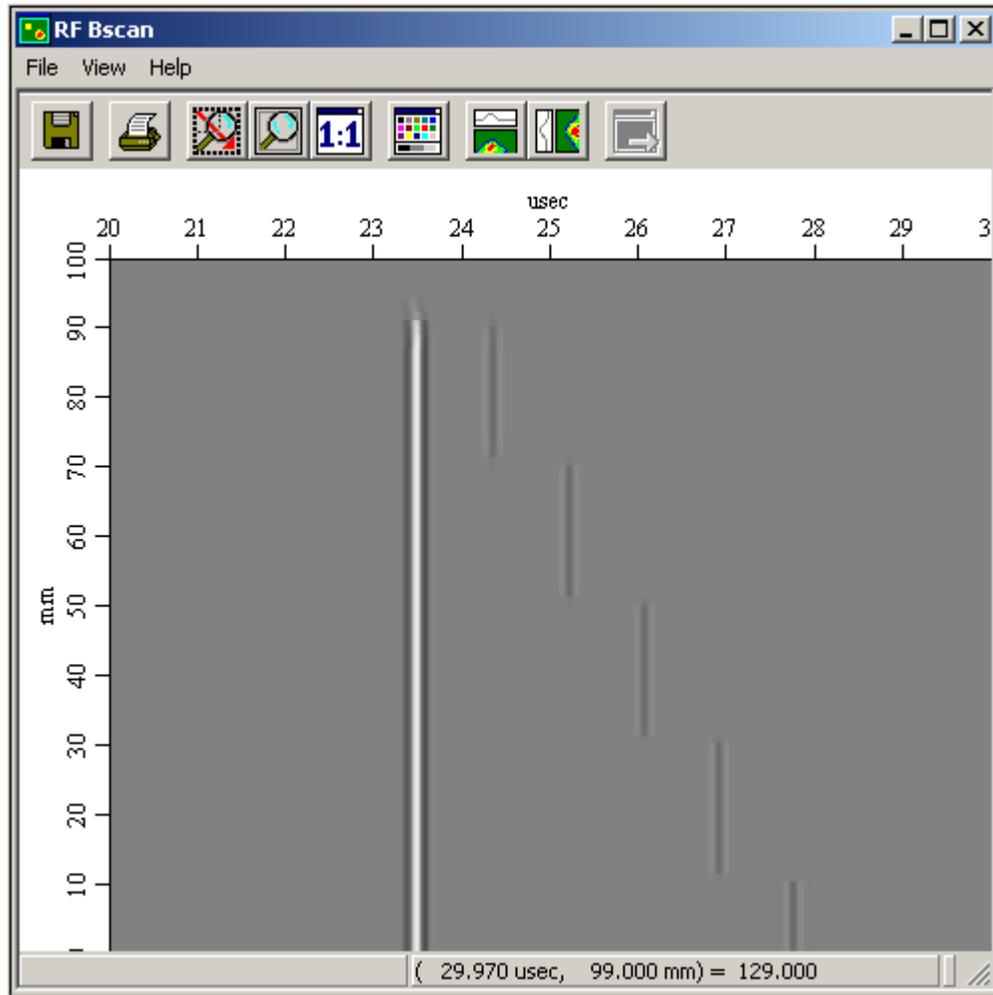
All documents that have been minimized to icons are arranged side by side along the bottom of the main *Imagine3D* window.

Open document list

Allows you to locate and make active any open documents that might be hidden by other windows.



RF B-scan Window



Shows data in RF format.

See also:

[B-scan Documents – A plot of all arriving echoes over a scanned distance. – Page 28](#)

File menu – RF B-scan



Save

Saves the scan to an .sdt file type so that it can be reloaded later or viewed using Winspect™.



Save As ...

Saves an .sdt file with a chosen name.

Export Bitmap

To Clipboard - Places the color plot image bitmap on the clipboard.

To File - Writes the color plot image bitmap to a file.

Print Displayed Image

Prints the color plot using the chosen Print Options.

Print Options

Selects whether Print Header, Axis Summary Information, Scale, Horizontal and Vertical Cross-sections will be printed.

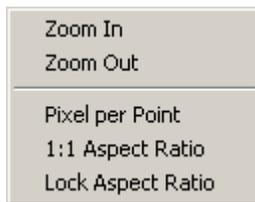
Edit Comment

Allows you to add a comment that will be saved with the image and will appear on printouts.

Display Header

Displays information about this image.

View menu – RF B-scan



Zoom In

Drag mouse over color plot to select the region to be enlarged.

Zoom Out

Fits the whole scan to the view window.

Pixel per Point

Displays the image using one screen pixel for each data point.

1:1 Aspect Ratio

Makes the horizontal and vertical axes the same scale.

Lock Aspect Ratio

Maintain the current ratio of the scales for the horizontal and vertical axes while zooming or sizing.



RF B-scan Toolbar Buttons



Saves the scan to an .sdt file type.



Prints the color plot using the chosen Print Options.



Drag mouse over color plot to select the region to be viewed.



Fits the whole scan to the view window.



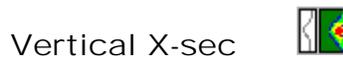
Makes the horizontal and vertical axes the same scale.



Displays a color selection editor that allows you to assign colors to amplitudes.



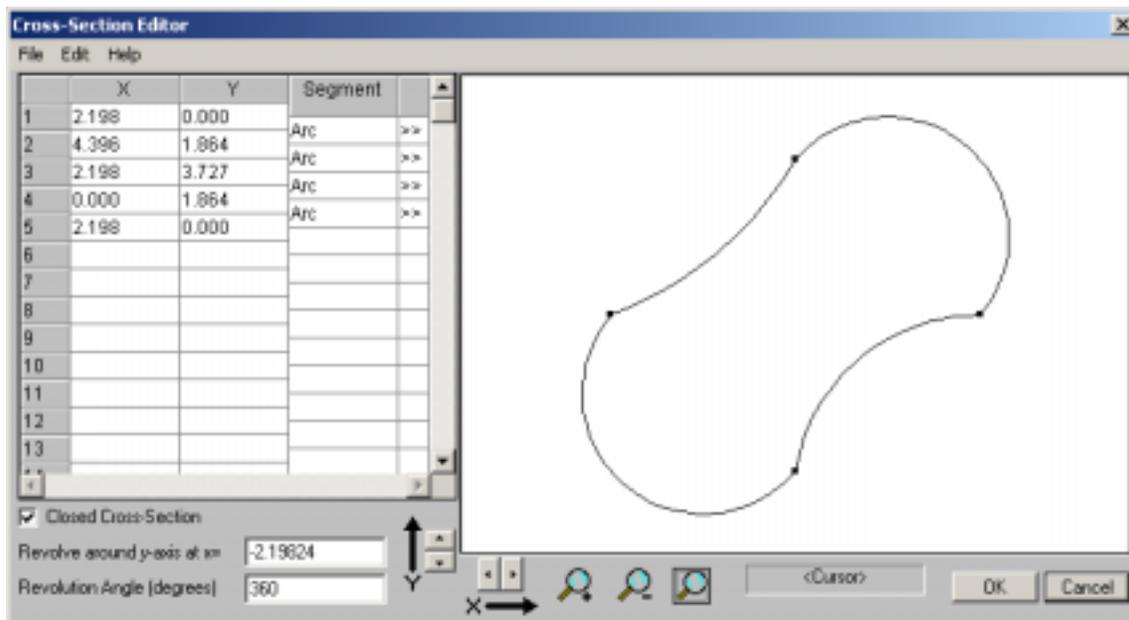
Displays a horizontal cross-section above the color plot. Click on a location in the color plot to display the amplitude cross-section at this point.



Displays a vertical cross-section to the left of the color plot. Click on a location in the color plot to display the amplitude cross-section at this point.



Cross-Section Editor



See also:

[Target Documents – Define your target's shape and material – Page 23](#)

File Menu – Cross-Section Editor

Open

Opens a cross-section editor file (.xsn) or text file (.txt) from disk.

Save

Saves a previously saved cross-section editor file (.xsn) to disk using its original filename.

Save As

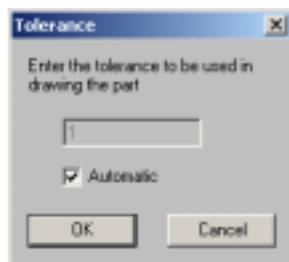
Saves a cross-section editor file (.xsn) to disk using a filename you have chosen.

Edit Menu – Cross-Section Editor

Undo

Reverses the last action performed.

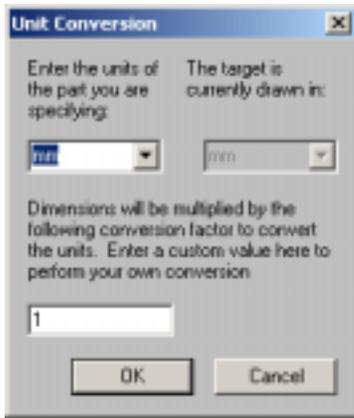
Tolerance



Defines the accuracy to which vertices will be placed.



Units



Use this tool when importing 2D .dxf files that have been drawn in different units than your current target. For example, a 2D .dxf file that was drawn in inches could be converted into mm using this tool.

Define Co-ords

Uses the [Define translation and rotation](#) dialog box to define the coordinates of the part.

Segment table

This is a list of all of the vertices and the segments that connect them together.

You can change and insert coordinates and connecting line types.

Entire drawing segments can be selected, inserted or deleted. Click on the left-margin (Vertex pair number) to select a segment. Each segment is represented by a "vertex pair". Example: the first vertex pair is shown highlighted (row 1).

	X	Y	Segment
1	0.000	0.000	Line
2	20.000	0.000	Line
3	20.000	2.200	Line
4	20.000	2.300	Spline
5	20.200	2.500	Line
6	20.300	2.500	Line
7	40.000	2.500	Line
8	40.000	4.700	Line
9	40.000	4.800	Line
10	40.200	5.000	Spline
11	40.300	5.000	Line
12	60.000	5.000	Line
13	60.000	7.200	Line

The vertex pair values: X, Y and [Segment type](#) can be changed.

Pressing **Enter** updates the properties of the vertex referenced in the Vertex field. You can create almost any shape merely by repeatedly changing the X,Y coordinates and pressing enter.

Pressing **Insert** creates a new vertex between the previous and currently selected rows. This new vertex can then be dragged (on the cross-section drawing view) to a new location.

Pressing **Delete** removes the currently selected vertex from the cross-section drawing area.

See also:

- [Vertex Pairs – Page 57](#)
- [Segment Type – Page 57](#)
- [Define Arc – Page 58](#)



Vertex Pairs

Vertex pairs (X, Y) can be added one by one to the cross-section drawing area by entering the coordinates of the vertex. Use Tab to move between the columns.

	X	Y
1	2.198	0.000

See also:

[Segment Type – Page 57](#)

[Define Arc– Page 58](#)

Segment Type

You can connect vertices with straight lines, splines and arc segment types.

Example:

	X	Y	Segment
1	0.000	0.000	Line
2	20.000	0.000	Line
3	20.000	2.200	Arc
4	20.000	2.300	Spline
5	20.200	2.500	Line
6	20.300	2.500	Line
7	40.000	2.500	Line
8	40.000	4.700	Line
9	40.000	4.800	Line
10	40.200	5.000	Spline
11	40.300	5.000	Line
12	60.000	5.000	Line
13	60.000	7.200	Line

When an arc has been selected as the segment type, you can set various attributes of the segment using the [Define Arc](#) Button . Choose the arc's radius, center and the direction of travel.

	X	Y	Segment
1	2.198	0.000	Arc
2	4.396	1.864	Arc
3	2.198	3.727	Arc
4	0.000	1.864	Arc
5	2.198	0.000	Arc
6			
7			
8			
9			
10			
11			
12			
13			

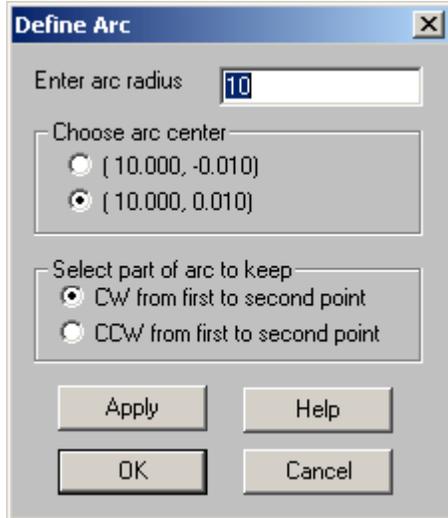
See also:

[Vertex Pairs – Page 57](#)

[Define Arc– Page 58](#)



Define Arc



Arc Radius

Enter the radius of the segment.

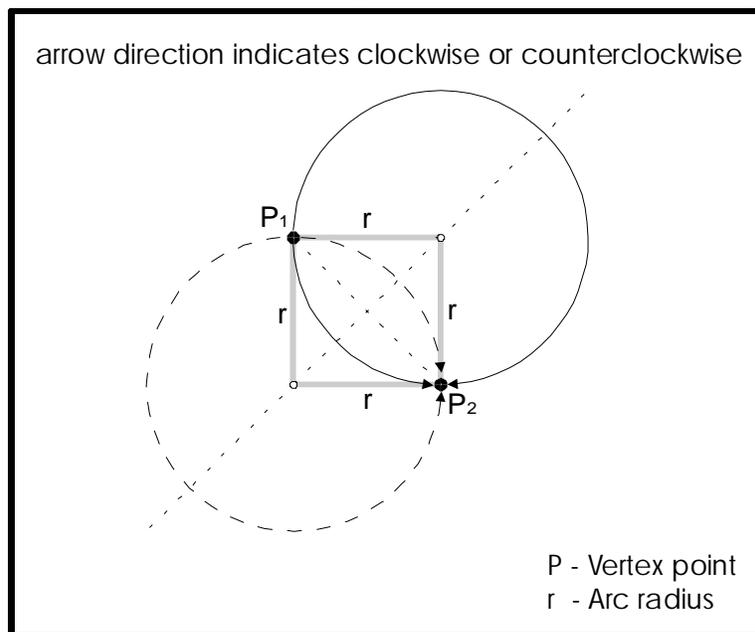
Arc Center

Choose to have the arc center below (Option 1 with a negative Y value), or above the vertices (Option 2 with a positive value). The X value of the center is half of the distance between the two vertices.

Select part of arc to keep

Depending on the arc center, selecting the clockwise or counter-clockwise direction will have different effects.

Selection of what part of an arc to keep



See also:

[Vertex Pairs – Page 57](#)

[Segment Type – Page 56](#)



Zoom In



Makes the cross-section in the view window appear 20% larger.

Zoom Out



Makes the cross-section in the view window appear 20% smaller.

Fit to Window



Automatically scales the cross-section to fit in the drawing window.

Closed Cross-Section

With **Closed Cross-Section** checked, a line is used to connect the first point in the cross-section to the last point, thereby creating a closed polyline. Shapes can only be extruded or revolved once they have been closed.

Extrusion Length

This field only appears for Extruded Cross-Sections. Enter the extrusion length in this field. This is the length the 2D profile will be extended along the z-axis to make the part 3D.

Revolve around y-axis at x=

Only appears for Revolved Cross-Sections. Enter the x value to be revolved about in this field. The Cross-Section is revolved around a vertical axis at this x value.

Revolution Angle

Only appears for Revolved Cross-Sections. Enter the angle of revolution desired in this field.

Move Viewpoint

Press the arrow buttons to change the viewpoint in the X or Y directions.

Cursor Location Readout

Shows the current position of the cursor.



Material Properties Document

Name	Vel Long	Vel Shear	Density	Atten
Water	1.504		1.000	0.000
Steel	5.900	3.200	6.480	0.000
Aluminum	6.300	3.160	2.800	0.000
Monel	5.350	2.720	6.480	0.000
Inconel	6.000	3.000	6.480	0.000
Plexiglass	2.700	1.400	1.180	0.000
Polystyrene	2.350	1.180	1.056	0.000
Heavy Wa...	1.425		1.100	0.000

Velocity Units = mm / usec. Attenuation Units = dB / mm.

This is a list of materials from which you may construct targets. You may add your own new materials or edit the existing materials. The main table has a context menu that can be reached by right clicking on a material in the table.

See also:

[Material Properties Table – Edit material velocity, density and attenuation values. – Page 29](#)
[Materials Table Context Menu– Page 62](#)

File menu

Allows you to save and recall Material Properties tables from disk.

Open Table

Recalls a Material Properties table from disk.

Save Table

Saves a previously opened Material Properties table to disk using its original name.

Save Table As

Saves a new Material Properties table to disk with a name you have chosen.

Open Default Table

Recalls the default Material Properties table from disk. This table will be used in any new Simulation or Target document.

Save As Default Table

Saves the currently open Material Properties table as the default table.



Edit menu

Allows for the creation or editing of materials in a materials properties table.

Add New Material

Adds a new or modified material to the Material Properties Table.

Edit Material

Provides a dialog box where all of the material's properties can be set. This dialog box can be reached by a right click on the materials table or from the Edit Menu.

Delete Material

Removes a selected material from the open Material Properties table.

Set Default Material

Sets the default materials used when creating new targets and wedges as well as the default immersion liquid for new Simulations.

Units menu

Sets the length and time units for the velocity and attenuation ratios.

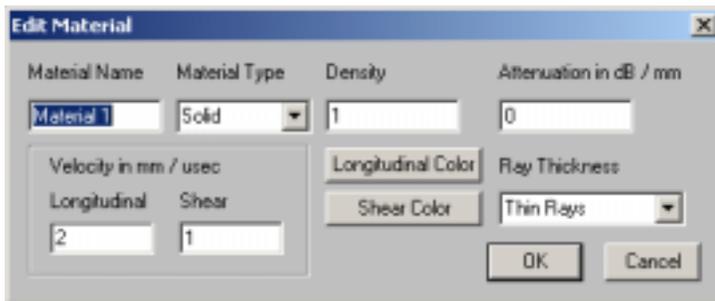
RIGHT CLICK CONTEXT MENU – Materials Table



This context menu was designed for easy access to commonly used menu functions. Many of these options are also available from the main menu bar.

Add

Adds a new or modified material to the Material Properties Table.



Material Name

Assign a name to your new material or edit an existing name.

Material Type

Specify whether the material is a solid, liquid or gas so that *Imagine3D* can determine whether to support certain wave propagation.

Density

Input the density of the material in relation to water. Water's density is 1.0.



Attenuation Units

Informs you of the units currently being used for attenuation values since the table values depend on the distance units selected.

Velocity Units

Defines the units for sound velocity as distance (mm, cm, m, inch, or feet) per unit time (μ s, ms, sec). The velocity values in the table are adjusted making this feature a useful velocity converter.

Longitudinal/Shear Color

The colors for longitudinal and shear waves may be set for each material. It is advisable to select colors that are similar, such as light and dark green so that materials can be identified regardless of wave type.

Thick/Thin Rays

Allows you to place emphasis on a particular material by making only the rays in that material thicker than the other rays.

(Active only in Format – Ray Color – By Medium and Mode)

Edit

Provides a dialog box where all of the material's properties can be set. This dialog box can be reached by a right click on the materials table or from the Edit Menu.

Delete

Removes a selected material from the Material Properties table.

Set as Default Material

Depending on the material's properties, this sets the current material as the default material used when creating new targets, wedges or immersion liquids for new Simulations.

Ray Thickness

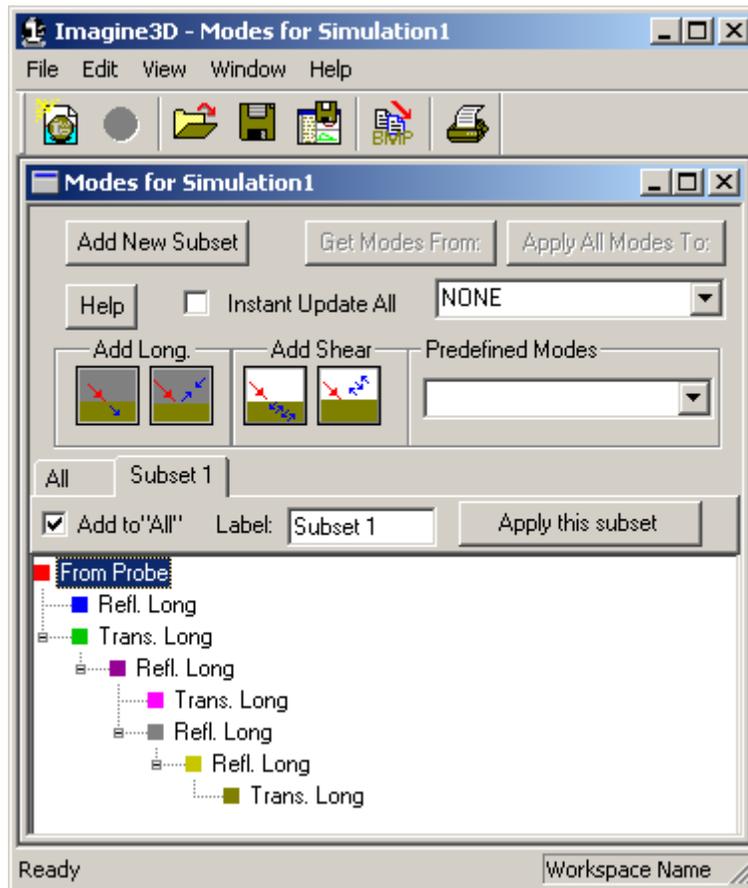
Allows you to place emphasis on a particular material by making only the rays in that material thicker than the other rays. The choices are Thick, Thin and Hide.

Ray Color

The colors for longitudinal and shear waves may be set for each material. It is advisable to select colors that are similar, such as light and dark green so that materials can be identified regardless of propagation type.



Modes Document



See also:

[Modes Documents– Define the sound modes to be displayed. – Page 25](#)

[Modes Document Context Menu – Page 70](#)

FILE MENU – Modes Document

New	Ctrl+N
Open...	Ctrl+O
Close	
Save	Ctrl+S
Save As...	
Workspaces	▶
Print...	Ctrl+P
Print Preview	
Print Setup...	
Recent File	
Recent Workspace	
Exit	



New

Opens a new Ray, Probes, Modes or Target document.

Open

Opens or finds a document. This will open any *Imagine3D* related file.

Close

Closes the currently selected document.

Save

Re-saves a previously opened document to the same filename without prompting, otherwise, *Imagine3D* saves a newly created document by first asking for a filename and path.

Save As . . .

Saves the currently active document by first asking for a new filename and path.

Workspaces

Open Workspace

Opens or finds a Workspace.

Close Workspace

Closes the current workspace so it cannot be accidentally overwritten.

Save Workspace As

Creates a new workspace folder by first asking for a project name and then saves any open documents including the screen configuration into that folder.

Print

Prints an *Imagine3D* report consisting of the Simulation view (current configuration), date and filename.

Print Preview

Displays an *Imagine3D* report on your screen as it will be printed on your printer.

Print Setup

Allows you to select the printer, paper size and orientation.

Recent File

Provides a list of the most recently opened Documents, which will be re-opened if selected.

Recent Workspace

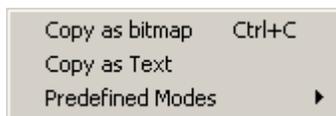
Provides a list of the most recently opened Workspaces, which will be re-opened if selected.

Exit

Exits *Imagine3D*.



EDIT MENU – Modes Document



Copy as Bitmap

Places a bitmap graphic of the active document on the clipboard so that it can be pasted as a picture into other applications such as Microsoft Word.

Copy as Text

Places the text description of the active document on the clipboard so that it can be pasted as unformatted text into reports or e-mail messages.

Predefined Modes

Using predefined modes is a quick way of building useful simulations by simply placing standard mode configurations on individual subset tabs.

Standard Configurations

- Normal Beam (1 back wall)
- Normal Beam (2 back walls)
- Normal Beam (3 back walls)
- Shear Wave pulse echo
- Shear Wave pitch catch

VIEW MENU – Modes Document



Toolbars

Allows the user to show and hide each of the toolbars for the Modes Document.

File Toolbar

Displays a toolbar with buttons that manage opening, saving, copying, printing.

Status Bar

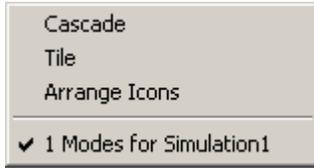
Displays a status bar at the bottom of the screen that shows: Help messages, current Workspace name and beam calculation status.

Zoom Full

Resizes the Modes document so that all the modes are shown.



WINDOW MENU – Modes Document



Cascade / Tile

Arranges all of the open documents so that they overlap (Cascade) or so they resize to fill the main *Imagine3D* window (Tile).

Arrange Icons

All documents that have been minimized to icons are arranged side by side along the bottom of the main *Imagine3D* window.

Open document list

Allows you to locate and make active any open documents that might be hidden by other windows.

FILE TOOLBAR– Modes Document



Allows you to create, open and save *Imagine3D* files and workspaces.

New Simulation



Opens the [Choose the desired type of simulation dialog box](#). This dialog box presents you with a number of predefined simulation examples. Use the File menu instead of this button if you wish to open a new blank Simulation, Probe, Mode or Target document.

2D/3D



This toggle feature is unavailable when in the Modes Document.

Open



Opens any *Imagine3D* file from disk.

Save



Re-saves any *Imagine3D* file type without prompting, unless the file has not been saved before, in which case you are prompted for a filename and path.

Save Workspace



Saves the current workspace without prompting unless the simulation has not been saved before, in which case you are prompted for a workspace name and path.

Copy as Bitmap



Places a copy of the Simulation view on the clipboard so that it can be pasted into another program such as Microsoft Word.



Print



Prints an *Imagine3D* simulation report as it appears when using Print Preview.

Other Actions on the Modes Document

Add New Subset

Adds a new subset tab so that you can group related modes together for increased clarity.

[See demo movie – Organizing groups of modes on subset tabs](#)

Get Modes From:

Extracts the modes from any currently open Simulation document so that they may be edited or inserted into a different Simulation document. This is good for copying.

Apply All Modes To:

Inserts the complete modified modes document into any currently open Simulation document or into a newly created Simulation document selected from list.

Instant Update All

Any newly inserted sound mode is instantly applied to the Simulation document. This will show your changes in the Simulation document as you make them. This can be slow for complex simulations.

Add Long



Adds or removes a transmitted or reflected longitudinal mode to the tree just below the currently highlighted mode.

Add Shear



Adds or removes a transmitted or reflected shear mode to the tree just below the currently highlighted mode.

All TAB

Shows the entire tree, which is constructed by combining all of the underlying subsets together.

Subset TAB

Individual branches of an entire tree can be placed on subset tabs to help keep them separate and manageable. These branches can be individually turned on or off using **Add to All** so that the returning echoes can be isolated.

It is possible to give each tab its own Label, for example "Back-wall Echoes". Just click the mouse on the tab text and type the new name. If you press **Apply this subset**, only that particular subset will be applied to the simulation.

Add to All

When checked, the current subset Modes are added to the All Modes subset.

Label

Each subset tab can be labeled.

Apply this Subset

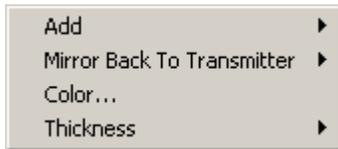
Applies the current subset of modes to the selected Simulation document.



Modes Tree Diagram

This diagram shows a graphical representation of the modes to be raytraced in the simulation document. Individual branches may be collapsed by clicking on the box containing the minus (-) sign at the top of each branch. You may right-click (**Modes Document Context Menu**) on a particular Mode to change its properties or add or remove branches from that mode. The right click (**Modes Document Context Menu**) is not available for the **All Tab**. All editing should be done in the **Subset Tabs**.

RIGHT CLICK CONTEXT MENU – Modes Document



Right clicking on a mode within the mode tree window accesses this menu.

Add

Allows the user to add or remove modes below the currently selected branch in the modes tree. The mode can be any of the following four types: **Transmitted Long**, **Reflected Long**, **Transmitted Shear** and **Reflected Shear**.

Mirror back to transmitter

Imagine3D will automatically return sound to the transmitter by adding the modes necessary to mirror the sound.

Direct Reflection

Direct Reflection is used for normal back-wall reflections because the sound is returned directly to the transmitter.

Corner Reflection

Corner Reflection is used for angle beam inspections because the sound is first sent around an additional corner as you might experience when looking for surface-breaking cracks.

Color

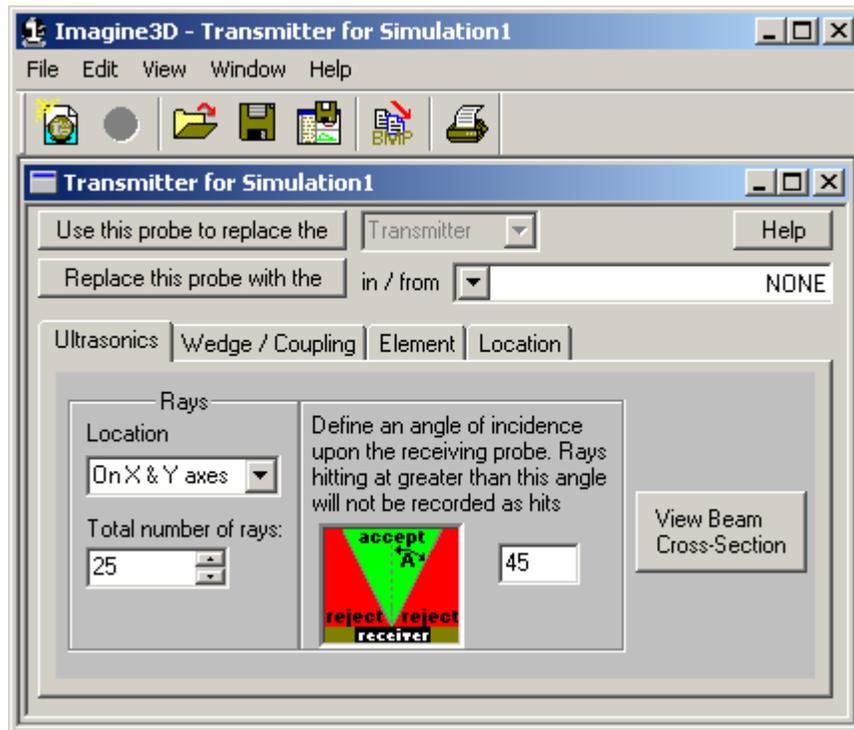
Sets the color used for each generation when rays are shown according to **Generation for display** in the **Modes Tree Diagram**.

Thickness

Allows you to set the thickness of the ray used when rays are shown according to **Generation**. The options are **Thick**, **Thin** and **Hide**.



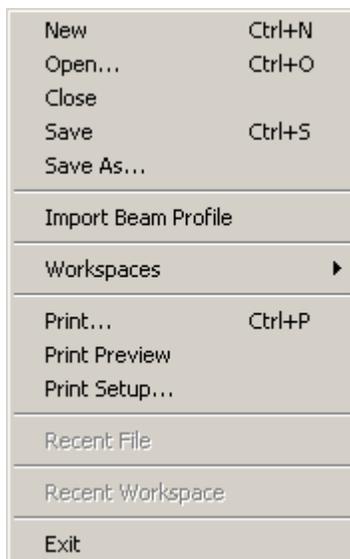
Probe Document



See also:

[Probe Documents – Define your transmitter and receiver – Page 24](#)

FILE MENU – Probe Document





New

Opens a new Ray, Probes, Modes or Target document.

Open

Opens or finds a document. This will open any *Imagine3D* related file.

Close

Closes the currently selected document.

Save

Re-saves a previously opened document to the same filename without prompting, otherwise, *Imagine3D* saves a newly created document by first asking for a filename and path.

Save As . . .

Saves the currently active document by first asking for a new filename and path.

Import Beam Profile

Allows you to import an .sdt file into the [RF Beam Cross-Section](#) window.

Workspaces

Open Workspace

Opens or finds a Workspace.

Close Workspace

Closes the current workspace so it cannot be accidentally overwritten.

Save Workspace As

Creates a new workspace folder by first asking for a project name and then saves any open documents including the screen configuration into that folder.

Print

Prints an *Imagine3D* report consisting of the Simulation view (current configuration), date and filename.

Print Preview

Displays an *Imagine3D* report on your screen, as it will be printed on your printer.

Print Setup

Allows you to select the printer, paper size and orientation.

Recent File

Provides a list of the most recently opened Documents, which will be re-opened if selected.

Recent Workspace

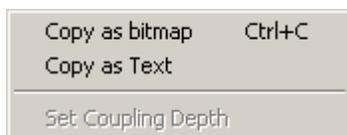
Provides a list of the most recently opened Workspaces, which will be re-opened if selected.

Exit

Exits *Imagine3D*.



EDIT MENU – Probe Document



Copy as Bitmap

Places a bitmap graphic of the active document on the clipboard so that it can be pasted as a picture into other applications such as Microsoft Word.

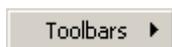
Copy as Text

Places the text description of the active document on the clipboard so that it can be pasted as unformatted text into reports or e-mail messages.

Set Coupling Depth

Ensures that the wedge is in full contact with the target by overlapping it a small amount. Leave this on automatic unless you are experiencing difficulties.

VIEW MENU – Probe Document



Toolbars

Allows you to select which toolbars are visible.

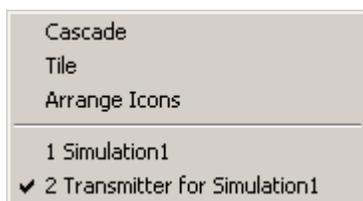
File Toolbar

Displays a toolbar with buttons that manage opening, saving, copying, printing.

Status Bar

Displays a status bar at the bottom of the screen that shows: Help messages, current Workspace name and beam calculation status.

WINDOW MENU – Probe Document



Cascade

Arranges all of the open documents so that they overlap.

Tile

Arranges all the open documents to fill the main *Imagine3D* window.

Arrange Icons

All documents that have been minimized to icons are arranged side by side along the bottom of the main *Imagine3D* window.

Open document list

Allows you to locate and make active, any open documents that might be hidden by other windows.



FILE TOOLBAR– Probe Document



Allows you to create, open and save *Imagine3D* files and workspaces.

New Simulation

Opens the **Choose the desired type of simulation** dialog box. This dialog box presents you with a number of predefined simulation examples. Use the File menu instead of this button if you wish to open a new blank Simulation, Probe, Mode, or Target document.

2D/3D

This toggle feature is unavailable when in the Probe Document.

Open

Opens any *Imagine3D* file from disk.

Save

Re-saves any *Imagine3D* file type without prompting, unless the file has not been saved before, in which case you are prompted for a filename and path.

Save Workspace

Saves the current workspace without prompting unless the simulation has not been saved before, in which case you are prompted for a workspace name and path.

Copy as Bitmap

Places a copy of the Simulation view on the clipboard so that it can be pasted into another program such as Microsoft Word.

Print

Prints an *Imagine3D* simulation report as it appears when using Print Preview.

Other Actions on the Modes Document

Use this Probe to replace the Transmitter or Receiver

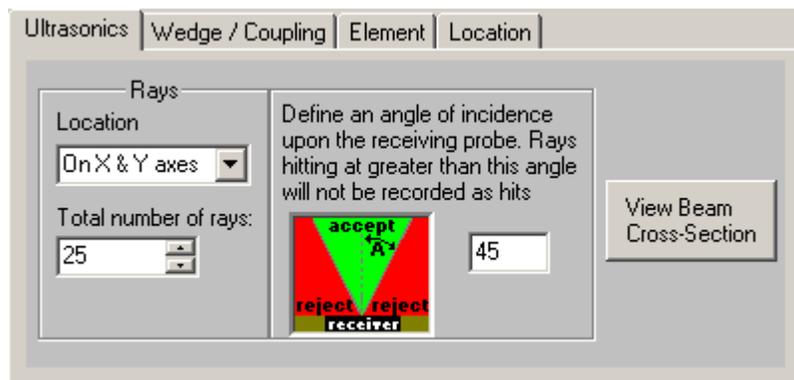
Uses the current Probe Document settings to replace either the Transmitter or Receiver in the selected Simulation document. You can also send the settings to a file (.prb) using the "in/from" settings.

Replace this Probe with the

Replaces current Probe document settings with the settings retrieved from the selected Simulation document. You can also retrieve a probe document from a file (.prb) using the "in/from" settings.



ULTRASONICS TAB - Probe Document



Location

Selects the location on the surface of the transducer where the rays should originate:

- On edges** – rays originate from around the outside edge of the transducer.
- Evenly spaced** – rays originate evenly spaced over the transducer's entire surface.
- On X axis** – rays originate as a line of rays only along the X axis of the transducer.
- On Y axis** – rays originate as a line of rays only along the Y axis of the transducer.
- On X & Y axes** – rays originate in a cross pattern along the X and Y axes.

Total number of rays

Sets the total number of rays leaving the surface of the transducer.

Define Angle of Incidence

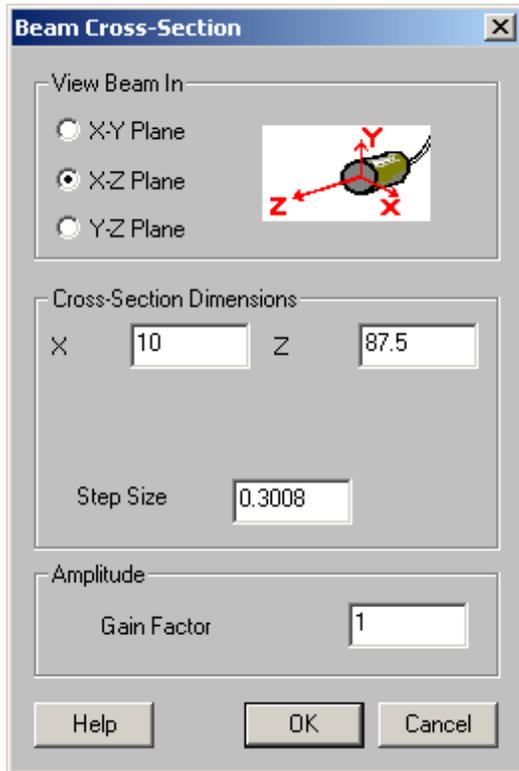
Limits the reception angle of the transducer so that it rejects any rays hitting the surface at an angle greater than specified.

View Beam Cross-Section

Generates a simulated [beam cross-section window](#) that resembles the output that you might expect from a transducer characterization system. The first step to produce a beam cross-section is the [setup](#).



Beam Cross-Section - Setup



Once completed, a [beam cross-section window](#) is generated.

View Beam in

Choose a viewing plane in which to have the cross-section generated.

Cross-Section Dimensions

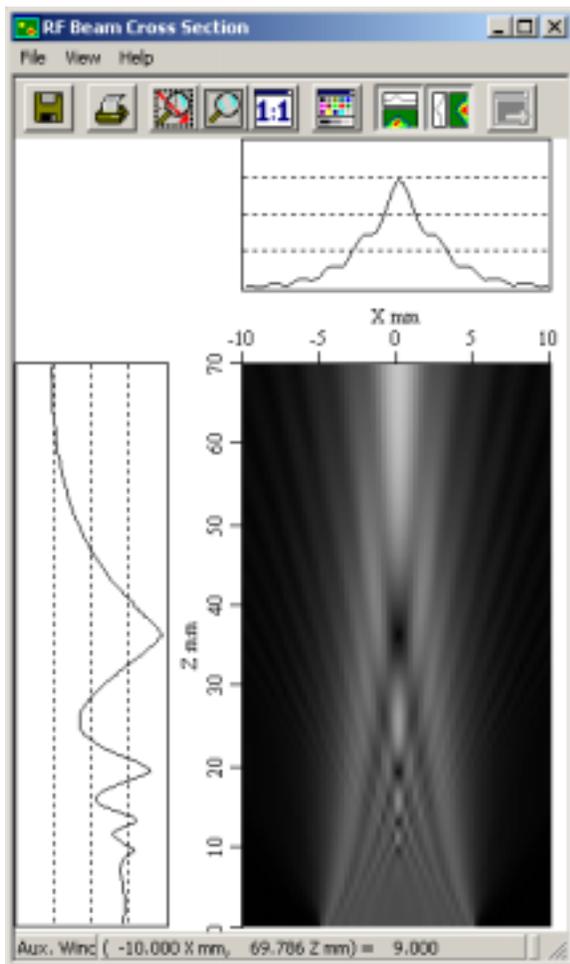
Choose the size of the cross-section. X will default to the diameter of the probe. Z will default to one and a quarter of the probe's focal length. Step size determines the resolution of the cross-section. The smaller the step size, the higher the resolution will be.

Amplitude

Sets the gain of the scans for the beam cross-section. The higher the gain is set, the brighter the scan will appear.



RF Beam Cross-Section – Window



This is a beam cross-section in water.

File Menu

Save

Saves the scan to an .sdt file type.

Save As ...

Saves an .sdt file with a chosen name.

Export Bitmap

To Clipboard

Places the color plot image bitmap on the clipboard.

To File

Writes the color plot image bitmap to a file.

Print Displayed Image

Prints the color plot and the chosen Print Options.



Print Options

Select from Print Header, Axis Summary Information, Scale, Horizontal and Vertical Cross-sections as options for printing.

Edit Comment

Edits a comment field to be saved with the given file.

Display Header

Displays information about this file.

View Menu

Zoom In

Drag the mouse over color plot to select the region to be viewed.

Zoom Out

Fits the whole scan to the view window.

Pixel per Point

Sets the horizontal and vertical scales to match the pixel size.

1:1 Aspect Ratio

Makes the horizontal and vertical scales the same.

Lock Aspect Ratio

Maintains the ratio of the scales on the horizontal and vertical axes while zooming or sizing.

Save



Saves the scan to an .sdt file type.

Print



Prints the color plot and the chosen Print Options.

Zoom Rect



Allows you to drag a rectangle over a region to be magnified (drag with the left mouse button).

Fit to Window



Automatically scales to fit the contents of the selected pane.

1:1 Aspect Ratio



Makes the horizontal and vertical scales the same.

Color Palette



Displays a color selection editor that maps amplitude to selected colors.

Horizontal Cross-section



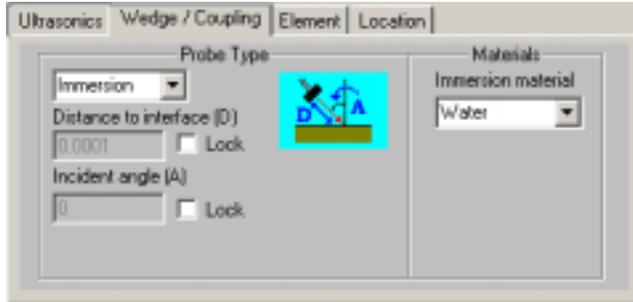
Displays a horizontal cross-section above the color plot. Click on a location in the color plot to display the cross-section of this point.



Vertical Cross-section

Displays a vertical cross-section to the left of the color plot. Click on a location in the color plot to display the cross-section of this point.

WEDGE / COUPLING TAB – Immersion - Probe Document



Probe Type

Two types of transducers can be simulated: [immersion](#) or contact using a [wedge](#).

Probe Distance to Interface (D)

Immersion transducers can have their relative distance to the parts' surface set and locked.

[Contact transducers](#) use this distance to generate the size of the wedge.

Incident angle (A)

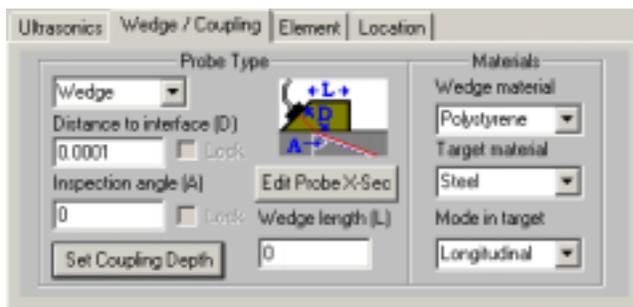
Immersion transducers can have their relative angle to the parts' surface assigned and locked.

Immersion Material

The liquid that surrounds the transducers and target needs to be specified for immersion inspections.

Note that the liquid does not need to be water but can be any liquid such as alcohol or oil.

WEDGE / COUPLING TAB – Wedge - Probe Document



Inspection angle (A)

Contact transducers use this angle to calculate the angle of the wedge based on the target and wedge materials.



Set Coupling Depth



Ensures that the wedge is in full contact with the target by overlapping it a small amount. Leave this on automatic unless you are experiencing difficulties.

Wedge Length (L)

Allows you to lengthen the wedge when steep inspection angles are being used that cause the rays to hit the end of wedge before they can enter the target. If a zero is entered, *Imagine3D* will calculate a reasonable value to use.

Edit Probe X-sec

Allows you to use the [cross-section editor](#) to design a custom wedge shape. Not all line segments will be able to be changed since some are determined by other settings on this tab. This feature is useful to eliminate internal wedge reflections.

Wedge Material

Allows you to specify the wedge material. This material and the target material are important since they will be used for calculating wedge angles.

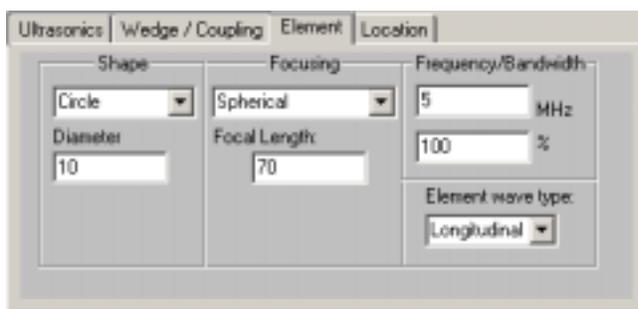
Target Material

Allows you to enter the target material. This material and the wedge material are important since they will be used for calculating wedge angles.

Mode in target

Specifies the primary type of sound waves that you want produced in the target, either longitudinal or transverse (shear). Make sure the modes document is requesting that this type of mode is displayed inside the target.

ELEMENT TAB - Probe Document



Element Shape

Selects the shape of the transducer element from the list below:

Circle – most transducers have circular elements and are flat or spherically focused.

Ellipse – elliptical element shapes may often indicate an elliptical focus as well.

Rectangle – these transducers are usually flat or cylindrically focused.

Element Diameter

Enter the diameter of the transducer's crystal.



Element Focusing

Selects the style of focus from the list below:

Unfocused – Flat – the transducer emits parallel rays.

Spherical – the transducer focuses down to a round spot.

Cylindrical – the transducer is a line focus transducer and focuses on one axis only with parallel rays on the other.

Elliptical – the transducer has two different focal lengths, one for the X axis and one for the Y axis.

Unfocused – Diffracted – the transducer's far field is approximated back to a point source that shows beam spread for the current element frequency and diameter.

Element Focal Length

Enter the probe manufacturer's specified focal length (rather than the calculated focal length, based on the curvature of the element).

Focal lengths (X, Y)

Assigns the transducer's focal lengths in each axis. This is only available when an elliptical transducer is selected.

Cutoff Rays at (dB)

Limits the beam spread of a diffracted probe to rays with amplitudes above this cutoff. This is only available when an unfocused – diffracted transducer is selected.

Element Frequency and Bandwidth

Enter the center frequency of the transducer and it's bandwidth (damping). Frequency will affect beam spread while frequency and bandwidth will affect pulse length and resolution.

Element wave type

Enter the primary type of sound waves produced by the transducer element, either longitudinal or transverse (shear).

LOCATION TAB - Probe Document

Probe Center

Indicates the position of the center of the transducer in 3D space.

Probe Beam Direction

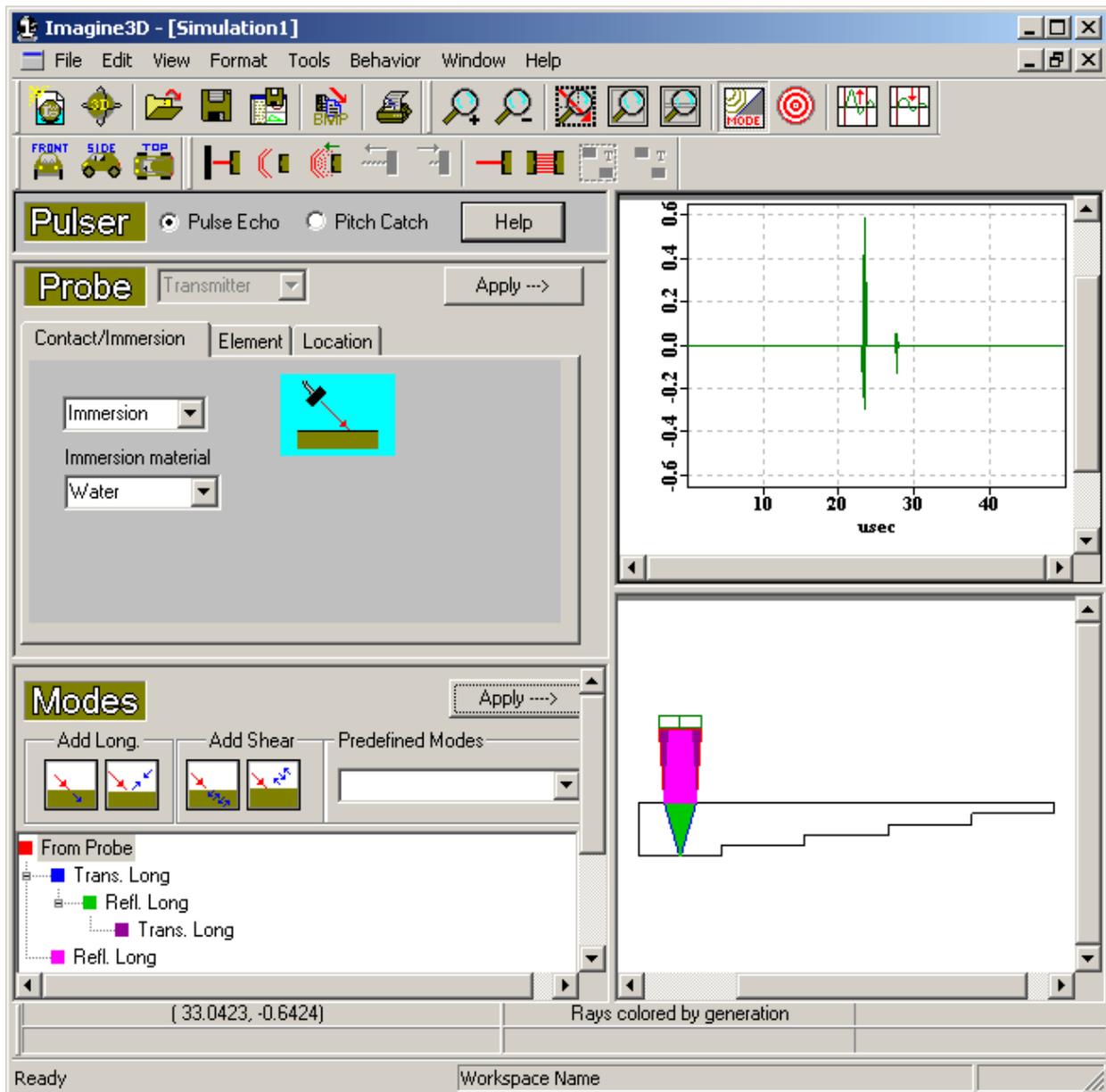
Indicates the direction that the transducer is pointing in 3D space.

Place the probe at the following

Leave this unchecked unless you want to place the transducer at an absolute position. If it is left checked by accident, the transducer would be moved to this location whenever any change is made to the probe.



Simple Editor

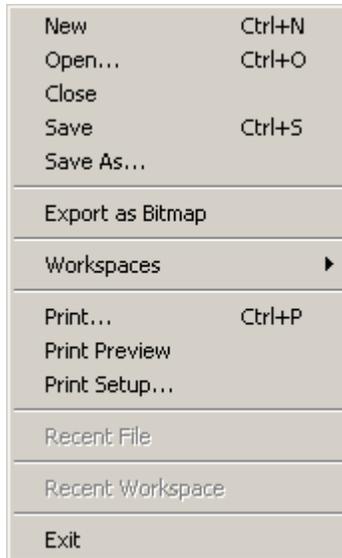


See Also:

- [Simple \(2D\) Editor – Probes, modes and raytracing view – Page 26](#)
- [Simple \(2D\) Editor – Target view – Page 27](#)
- [Simple \(2D\) Editor – Simulation view - Context Sensitive Menu – Page 102](#)
- [Simple \(2D\) Editor – A-scan view – Context Sensitive Menu – Page 103](#)
- [Simple \(2D\) Editor – Probe - Context Sensitive Menu – Page 103](#)
- [Simple \(2D\) Editor – Modes Tree Diagram - Context Sensitive Menu – Page 104](#)



FILE MENU – Simple Editor Raytracing View



New

Opens a new Ray, Probes, Modes or Target document.

Open

Opens or finds a document. This will open any *Imagine3D* related file.

Close

Closes the currently selected document.

Save

Re-saves a previously opened document to the same filename without prompting, otherwise, *Imagine3D* saves a newly created document by first asking for a filename and path.

Save As . . .

Saves the currently active document by first asking for a new filename and path.

Export as Bitmap

Saves the current window contents to a bitmap graphics file (.bmp)

Workspaces

Open Workspace

Opens or finds a Workspace.

Close Workspace

Closes the current workspace so it cannot be accidentally overwritten.

Save Workspace As

Creates a new workspace folder by first asking for a project name and then saves any open documents including the screen configuration into that folder.

Print

Prints an *Imagine3D* report consisting of the Simulation view (current configuration), date and filename.



Print Preview

Displays an *Imagine3D* report on your screen as it will be printed on your printer.

Print Setup

Allows you to select the printer, paper size and orientation.

Recent File

Provides a list of the most recently opened Documents, which will be re-opened if selected.

Recent Workspace

Provides a list of the most recently opened Workspaces, which will be re-opened if selected.

Exit

Exits *Imagine3D*.

EDIT MENU – Simple Editor Raytracing View

Undo	Ctrl+Z
Redo	Ctrl+Y
Copy as Bitmap	Ctrl+C
Copy as Text	Ctrl+T
Material Properties	
Delete All Labels	
Printer Comment	

Undo

Reverses the last action performed.

Redo

Reverses the last undo.

Copy as Bitmap

Places a bitmap graphic of the active document on the clipboard so that it can be pasted as a picture into other applications such as Microsoft Word.

Copy as Text

Places the text description of the active document on the clipboard so that it can be pasted as unformatted text into reports or e-mail messages.

Material Properties

Opens the [Material Properties table](#) so you can edit the Material Properties of the inspected part.

Delete All Labels

Deletes all text labels.



Printer Comment

Text entered here will appear on printed reports just below the header information.



VIEW MENU – Simple Editor Raytracing View



Update

Synchronizes all of the windows so that they all reflect the most recent changes in any other window.

Show Probe and Modes

Shows or hides the Probe and Modes windows.

Toolbars

Allows you to select which toolbars are visible.

File Toolbar

Displays a toolbar with buttons that manage opening, saving, copying, printing.

View Controlbar

Displays cursor position coordinates, current Ray Color settings and the current Ray Ends time setting.

Status Bar

Displays a status bar at the bottom of the screen that shows: Help messages, current Workspace name and beam calculation status.

View Toolbar

Displays a toolbar with buttons that provide various zooming options. This toolbar also contains the Show Probe and Modes, Show Target and the A-scan gain controls.



Probe Toolbar

Displays a toolbar with buttons that control the characteristics of the rays and how the probes are to move.

Main Views Toolbar

Displays a toolbar with buttons that allow you to view the simulation from the Top, Front and Side.

Zoom

Zoom In

Makes the image approximately 20% larger.

Zoom Out

Makes the image approximately 20% smaller.

Zoom Rect

Allows you to specify the magnified region by dragging a rectangle.

Fit to Window

Automatically scales to fit the target and transducer in the window.

Live Zoom

Allows live zooming (range and gain) by dragging the mouse on the A-scan view. To use, hold the left button down and drag left or right to zoom in and out.

Scaling and Grid

These features help you to more accurately place and measure objects.

1:1 Display

Scales the window so that the target appears actual size on your computer screen.

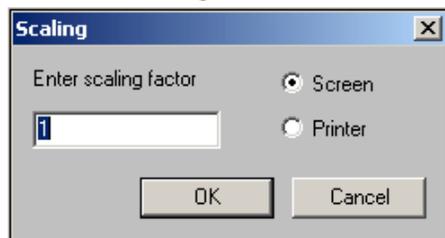
1:1 Printing

Scales the window so that the target prints actual size on your selected printer.

To use 1:1 printing follow these steps.

1. Choose **File – Printer Setup** and configure your printer.
2. Select **View – Scaling and Grid - 1:1 Printing**.
3. Scroll your views to frame the area you want to print. Do not zoom or size the window. Zooming and sizing will break the 1:1 scaling.
4. Select **File-Print**.

Custom Scaling



Allows the target to appear on screen or print on your printer any scaling factor.

Screen – the target on your monitor will be scaled accordingly.

Printer – the target on your printer will be scaled accordingly.



Show Grid

Enables a vertical and horizontal grid on the selected 3D view.

Grid Size

Sets the grid line density.

Show Coordinates

Shows or hides the orientation of the x, y, z axes by placing a red, three-headed arrow at the origin 0,0,0 in each view.

Increase A-scan Gain

Increases the gain of the A-scan by 3dB.

Decrease A-scan Gain

Decreases the gain of the A-scan by 3dB.

FORMAT MENU – Simple Editor Raytracing View



Units

Allows the user to set the units.

Sound Display Mode

Rays

Displays the sound field as a series of straight lines traveling away from the transducer.

Pulse

Displays a single wavefront at any selected propagation time.

Wavefronts

Displays the sound field as a series of short curved (or straight) lines that follow one another in the direction of sound propagation.

Beam

Displays the full sound field energy as a rendered grayscale.

Color Rays by:

Generation – the rays change color when an interface is encountered.

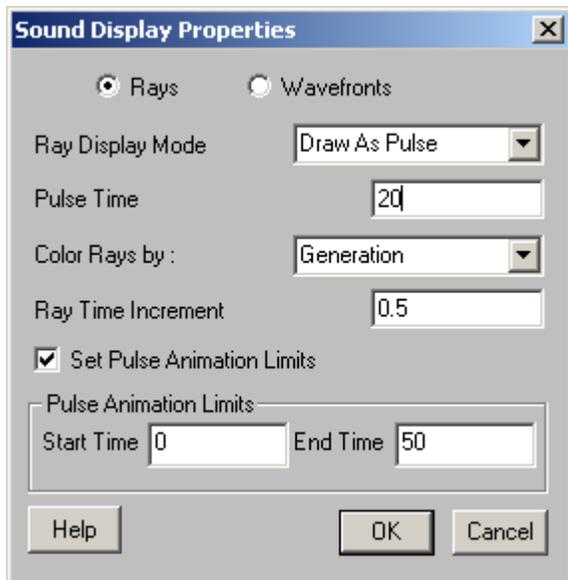
Medium – the rays change color when a new material is encountered.

Mode – longitudinal waves are shown in one color and shear waves are shown in another.

Medium and Mode – the rays are shown in different colors for each mode type in each material.



Sound Display Properties



Ray or Wavefront

Select the type of sound display desired.

Ray Display Mode

Show for all time - rays extend out in time showing all modes in the Modes document.

End at time - rays are set to end at the time shown under Time to end Rays at.

Draw as pulse - rays simulate a single propagating wavefront.

Pulse Time

Defines the desired time at which to plot the pulse. This is only displayed when mode is Draw As Pulse.

Time To End Rays At

Defines the end time for plotting the rays. This is only displayed when mode is End At Time.

Time to end wavefronts at

Defines the end time for plotting wavefronts. This is only displayed when wavefronts are selected.

Color Rays by:

Generation – the rays change color when an interface is encountered.

Medium – the rays change color when a new material is encountered.

Mode – longitudinal waves are shown in one color and shear waves are shown in another.

Medium and Mode – the rays change color when a new material or mode conversion.

See also:

[How Do I – Define a ray's color? – Page 42](#)

Ray Time Increment

The time increment for Time to end Rays at is set here.

Set Pulse Animation Limits

Only displayed when mode is Draw As Pulse. Turns pulse animation limits on and off.



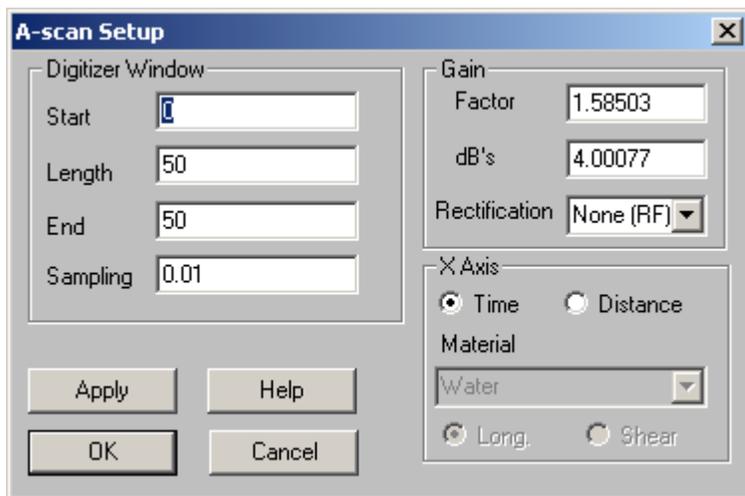
Pulse Animation Limits

When Draw As Pulse is selected, you may set the start and end times of the animation loop.

Start Time - time to start plotting the pulse for animation loop.

End Time - time to stop plotting the pulse for animation loop.

Set A-scan Time Window



Digitizer Window

Start Time – sets the start time of the A-scan window.

Length – sets the width of the A-scan window.

End Time – sets the end time of the A-scan window.

Time Increment – sets the sampling rate as if it were a digitizer.

Gain

Factor – sets gain by a multiplication factor, Example: X2, X100.

dB's – sets gain in dB, Example: 6dB, 50dB.

Rectification – displays data in rectified Video mode.

X Axis

Time – the X-axis is calibrated in microseconds.

Distance – the X-axis is calibrated in the selected units for any given material.

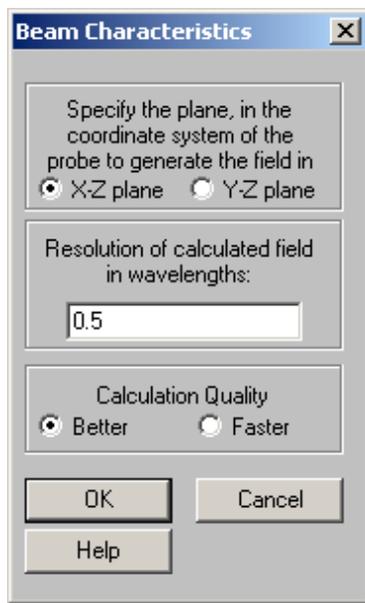
Material – selects the material for distance conversion of the X-axis.

Long – uses the longitudinal velocity of the material for distance conversion.

Shear – uses the shear velocity of the material for distance conversion.



Define Beam Profile (Format Menu)

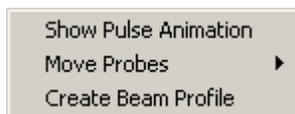


Specify the plane – determines the 2D plane on which the beam profile will be calculated and displayed.

Resolution of the calculated field – specify in wavelengths how resolved the beam profile should be calculated. Increasing the resolution by two increases the calculation time by four.

Calculation quality – selecting better uses a higher quality beam model that shows diffraction better than selecting faster.

TOOLS MENU - Simple Editor Raytracing View



Show Pulse Animation

Runs a pulse animation showing sound propagation moving forward in time.

Move Probes

All of the Move Probe functions below are affected by the increment values specified on the Set Draggable Object Properties Dialog box ([Behavior-Object Movement Behavior](#)).

Move Up – or press Up arrow.

Move Down – or press Down arrow.

Move Right – or press Right arrow.

Move Left – or press Left arrow.

Rotate CW – or press Ctrl +Right arrow.

Rotate CCW – or press Ctrl +Left arrow.

Spin CW – or press Shift +Right arrow.

Spin CCW – or press Shift +Left arrow.

You can also move a probe by dragging it with the mouse.



Create Beam Profile

Starts the beam calculation and displays a grayscale beam profile after the calculation has completed. Calculation progress is shown in the status bar.

BEHAVIOR MENU – Simple Editor Raytracing View

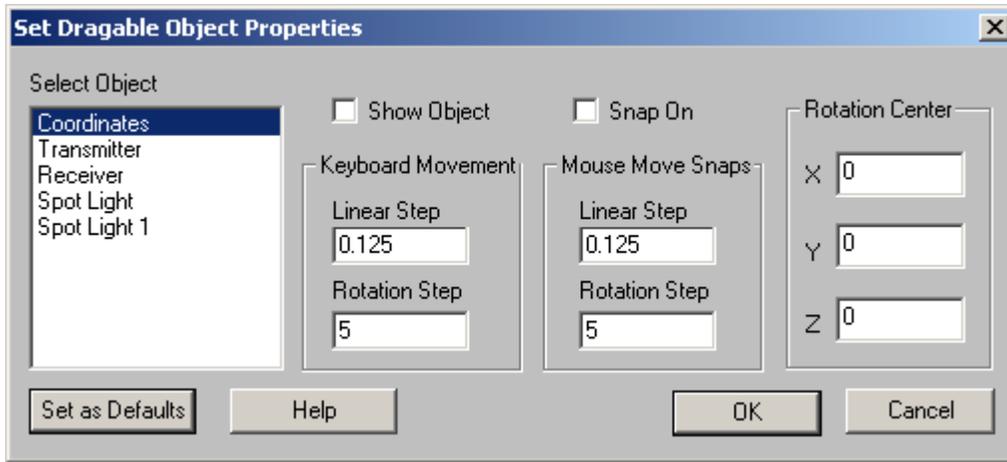


PE/PC

Allows the user to change to a Pulse Echo (PE) or Pitch Catch (PC) inspection.

Object Movement Behavior

Allows you to set the move increments for both the keyboard and mouse for all of the different draggable objects found in *Imagine3D*.



Select Object

Deselecting "Show Object" hides the selected objects.

Keyboard Movement

When "Snap On" is selected, the object will "Snap" to a grid of this spacing when moved with the cursor keys.

Mouse Move Snaps

When "Snap On" is selected, the object will "Snap" to a grid of this spacing when moved with the mouse.

Rotation Center

The selected object will rotate around this 3D coordinate.



WINDOW MENU – Simple Editor Raytracing View



New Window

Opens an additional child window allowing more viewing panes for a given Simulation document. This option is unavailable in the simple editor.

Cascade

Arranges all of the open documents so that they overlap.

Tile

Arranges all the open documents to fill the main *Imagine3D* window.

Arrange Icons

All documents that have been minimized to icons are arranged side by side along the bottom of the main *Imagine3D* window.

Split

Allows you to adjust the size of the split panes in the simple editor raytracing view. This feature is disabled for the simple editor target view.

Open document list

Allows you to locate and make active any open documents that might be hidden by other windows.

FILE TOOLBAR– Simple Editor Raytracing View



Allows you to create, open and save *Imagine3D* files and workspaces. Also allows you to switch between the standard (3D) and simple (2D) editor.

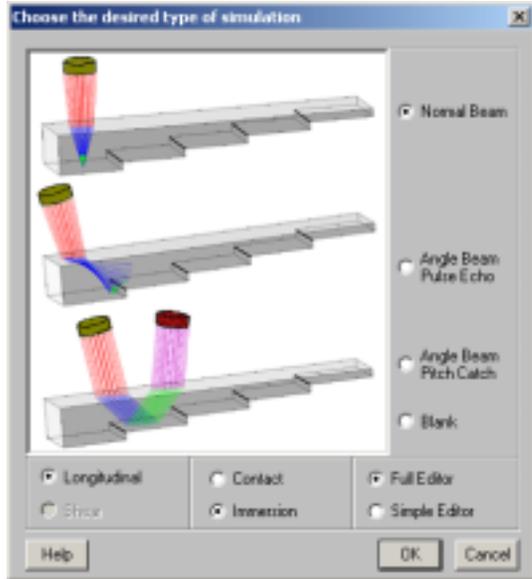
New Simulation



Opens the [Choose the desired type of simulation](#) dialog box. This dialog box presents you with a number of predefined simulation examples. Use the File menu instead of this button if you wish to open a new blank Simulation, Probe, Mode or Target document.



Choose the desired type of simulation (default)



Normal Beam

Generates a simulation with a step block target and a transmitter pointing straight down on the target.

Angle Beam Pulse Echo

Generates a simulation with a step block and a transmitter pointing at an angle to the target's surface.

Angle Beam Pitch Catch

Generates a simulation with a step block, a transmitter and a receiver pointing at an angle to the target's surface.

Blank

Generates a simulation with a transmitter pointing down the Y-axis but no target.

Longitudinal

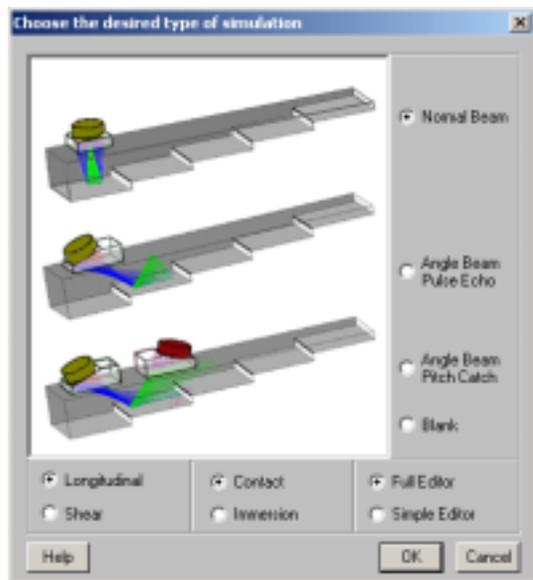
Positions the probes so that longitudinal waves are used for the inspection.

Shear

Positions the probes so that shear waves are used for the inspection.



Contact



Immersion

Selects an immersion probe. This is the default screen. See [Choose the desired type of simulation](#) (default).

Full Editor

Selects the standard 3D editor.

Simple Editor

Selects the simpler 2D editor.

2D/3D



Toggles *Imagine3D* between the standard 3D editor and the simpler 2D editor.

Open



Opens any *Imagine3D* file from disk.

Save



Re-saves any *Imagine3D* file type without prompting, unless the file has not been saved before, in which case you are prompted for a filename and path.

Save Workspace



Saves the current workspace without prompting unless the simulation has not been saved before, in which case you are prompted for a workspace name and path.

Copy as Bitmap



Places a copy of the Simple Editor view on the clipboard so that it can be pasted into another program such as Microsoft Word.

Print



Prints an *Imagine3D* simulation report as it appears when using Print Preview.



VIEW TOOLBAR – Simple Editor Raytracing View



3D and A-scan views can be zoomed, scaled and modified to suit the user's viewpoint.

Zoom In



Makes the objects in a 3D view appear 20% larger or expands the time in an A-scan view.

Zoom Out



Makes the objects in a 3D view appear 20% smaller or expands the time axis in an A-scan view.

Zoom Rect



Allows you to drag a rectangle over a region to be magnified (drag with the left mouse button).

Fit to Window



Automatically scales to fit the contents of the selected pane.

Fit All Views



Automatically fits the contents of all panes by zooming in or out.

Show Probe and Modes



Shows or hides the Probe and Modes windows.

Edit Target



Switches you to the [Simple Editor Target View](#).

Increase Gain



Increases the gain of the A-scan by 3dB.

Decrease Gain



Decreases the gain of the A-scan by 3dB.



PROBE TOOLBAR – Simple Editor Raytracing View



Various simulation operations can be selected.

End Rays at a Given Time



Stops the ray propagation at a time chosen by the user using Advance or Retreat Rays toolbar buttons.

Start Rays as Pulse



Shows only the propagating wavefronts at a time chosen using the Advance or Retreat Rays toolbar buttons.

Show Pulse Propagation



Shows propagating wavefronts using continuous animation.

Advance Rays



Increases the amount of time that rays are allowed to propagate.

Retreat Rays



Reduces the amount of time that rays are allowed to propagate.

Only Plot Main Ray



Shows only one ray emitted from the center of the probe.

Only Plot Received Rays



Shows only those rays that make it back to the receiver; all other rays are hidden.

Group



All selected items will be grouped together so that they act as one entity when re-selected.

Ungroup



All selected groups of items will be restored to individual items.



MAIN VIEWS TOOLBAR – Simple Editor Raytracing View



Front View



Rotates the user's perspective to provide a front view of the target -- (X, Y plane).

Side View



Rotates the user's perspective to provide a right-side view of the target -- (Z, Y plane).

Top View



Rotates the user's perspective to provide a top view of the target -- (X, Z plane).

CONTACT/IMMERSION TAB – Immersion – Probe Window Simple Editor Raytracing View



Probe Type

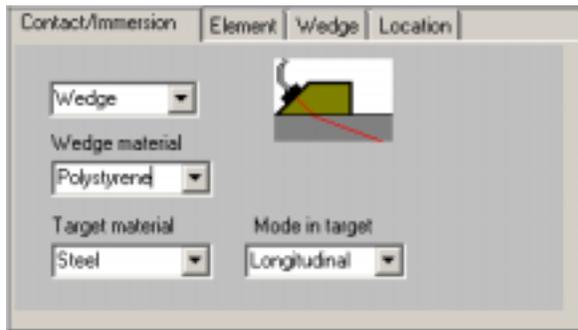
Two types of transducers can be simulated: [immersion](#) or contact using a [wedge](#).

Immersion Material

The liquid that surrounds the transducers and target needs to be specified for immersion inspections.



CONTACT/IMMERSION TAB – Contact – Probe Window Simple Editor Raytracing View



Wedge Material

Allows you to specify the wedge material. This material and the target material are important since they will be used for calculating wedge angles.

Target Material

Allows you to enter the target material. This material and the wedge material are important since they will be used for calculating wedge angles.

Mode in target

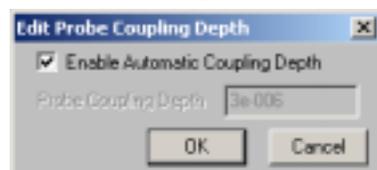
Specifies the primary type of sound waves that you want produced in the target, either longitudinal or transverse (shear).

Make sure the modes document is requesting that this type of mode is displayed inside the target.

WEDGE TAB –Probe Window Simple Editor Raytracing View



Set Coupling Depth



Ensures that the wedge is in full contact with the target by overlapping it a small amount. Leave this selected unless you are experiencing difficulties.

Distance to Interface (D)

Contact transducers use this distance to generate the size of the wedge.



Inspection angle (A)

Contact transducers use this angle to calculate the angle of the wedge based on the target and wedge materials.

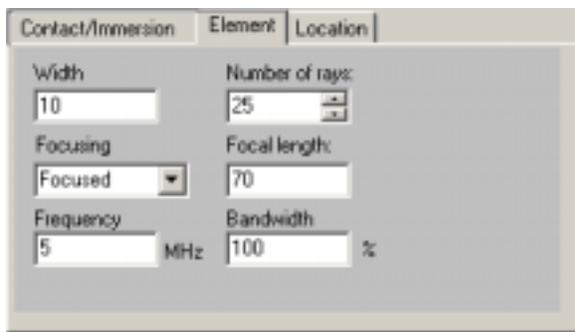
Edit Probe X-sec

Allows you to use the [cross-section editor](#) to design a custom wedge shape. Not all line segments will be able to be changed since some are determined by other settings on this tab. This feature is useful to eliminate internal wedge reflections.

Wedge Length (L)

Allows you to lengthen the wedge when steep inspection angles are being used that cause the rays to hit the end of wedge before they can enter the target. If a zero is entered, *Imagine3D* will calculate a reasonable value to use.

ELEMENT TAB –Probe Window Simple Editor Raytracing View



Width

Sets the diameter of the transducer's crystal.

Focusing

Selects the style of focus from the list below:

Straight Rays – the transducer emits parallel rays.

Focused – the transducer focuses down to a round spot.

Diffacted – the transducer's far-field is approximated back to a point source that shows beam spread for the current element frequency and diameter.

Frequency

Sets the center frequency of the transducer. Frequency will affect beam spread and resolution.

Number of Rays

Sets the total number of rays leaving the surface of the transducer.

Focal Length

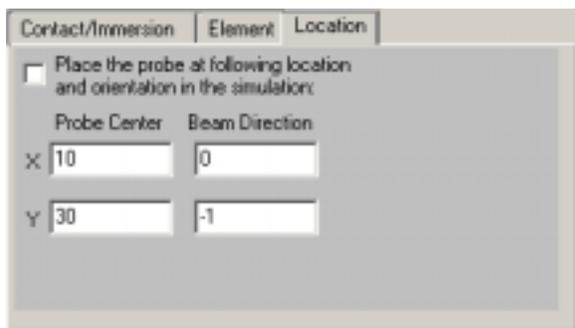
Sets the probe manufacturer's specified focal length (rather than the calculated focal length, based on the curvature of the element).

Bandwidth

Sets the bandwidth (damping). Bandwidth will affect pulse length and resolution.



LOCATION TAB –Probe Window Simple Editor Raytracing View



Probe Center

Indicates the position of the center of the transducer in 3D space.

Probe Beam Direction

Indicates the direction that the transducer is pointing in 3D space.

Place the probe at the following

Leave this unchecked unless you want to place the transducer at an absolute position. If it is left checked by accident, the transducer would be moved to this location whenever any change is made to the probe.



Adds or removes a transmitted or reflected longitudinal mode to the tree just below the currently highlighted mode.

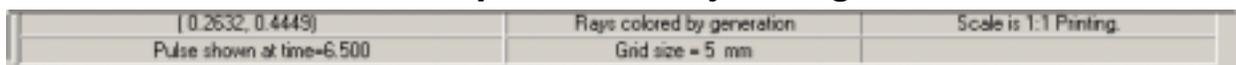


Adds or removes a transmitted or reflected shear mode to the tree just below the currently highlighted mode.

Modes Tree Diagram

This diagram shows a graphical representation of the modes to be raytraced in the simulation document. Individual branches may be collapsed by clicking on the box containing the minus (-) sign at the top of each branch. You may right-click ([Modes Document Context Menu](#)) on a particular Mode to change its properties or add or remove branches from that mode.

VIEW CONTROL BAR- Simple Editor Raytracing View



X Y Z Cursor Position Readout

If the cursor is in a Simulation view:

Moving the cursor displays the absolute x, y and z position of the cursor. Dragging a rectangle displays the relative distance of the dragged rectangle in x, y and z., the diagonal distance and it's angle.

If the cursor is in an A-scan view:

Moving the cursor displays the absolute A-scan time and absolute amplitude of the cursor position. Dragging a rectangle displays the relative arrival time and amplitude of the dragged rectangle.



Grid Size

Displays the current grid sizing in selected units.

Scale

Displays the current simulation scale.

Ray's End Time

Displays the maximum distance that the rays or pulse are allowed to propagate based on the value assigned to the "End Rays at a Given Time" toolbar button.

Ray Color Mode

Displays the method for determining Ray Color.

IMAGINE3D STATUS BAR – Simple Editor Raytracing View



Displays whether *Imagine3D* is Ready or Busy, the task currently being performed and help text when the cursor moves over a button.

Workspace Name Area

Displays the name of the current workspace.

Beam calculation Area

Displays current status of beam calculations.

RIGHT CLICK CONTEXT MENU – Simple Editor Raytracing View



This context menu was designed for easy access to commonly used menu functions. Many of these options are also available from the main menu bar.

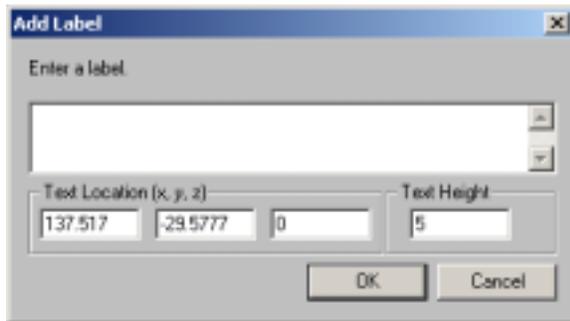
Set Immersion Material

Allows the user to set the immersion material for the current simulation.



Add Label

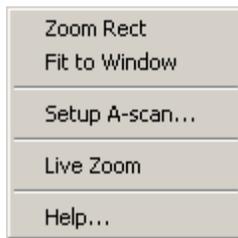
Allows the user to add text that appears to lie flat on the plane on which it was placed regardless of your viewing angle.



Properties (of labels)

Allows you to change the size, orientation and color of selected labels.

RIGHT CLICK CONTEXT MENU – Simple Editor A-scan View



This context menu was designed for easy access to commonly used menu functions. Many of these options are also available from the main menu bar.

RIGHT CLICK CONTEXT MENU – Probe Simple Editor Raytracing View



This context menu was designed for easy access to commonly used menu functions. Many of these options are also available from the main menu bar.

Flip Probe

Re-orientes the probe 180 degrees.

Set Probe Direction Up

Faces the probe up within the view.



Set Probe Direction Down

Faces the probe down within the view.

Set Probe Direction Right

Faces the probe right within the view.

Set Probe Direction Left

Faces the probe left within the view.

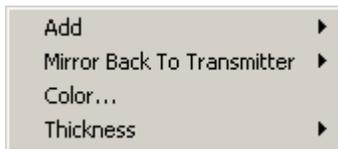
Pulser Window

Shows the simulation type. Allows selection of Pulse Echo or Pitch Catch.

Apply

Applies the edited document (Probe or Modes) to the simulation.

RIGHT CLICK CONTEXT MENU – Modes Window Simple Editor Raytracing View



Right clicking on a mode within the mode tree window accesses this menu.

Add

Allows the user to add or remove modes below the currently selected branch in the modes tree. The mode can be any of the following four types: Transmitted Long, Reflected Long, Transmitted Shear and Reflected Shear.

Mirror back to transmitter

Imagine3D will automatically return sound to the transmitter by adding the modes necessary to mirror the sound.

Direct Reflection

Direct Reflection is used for normal back-wall reflections because the sound is returned directly to the transmitter.

Corner Reflection

Corner Reflection is used for angle beam inspections because the sound is first sent around an additional corner as you might experience when looking for surface-breaking cracks.

Color

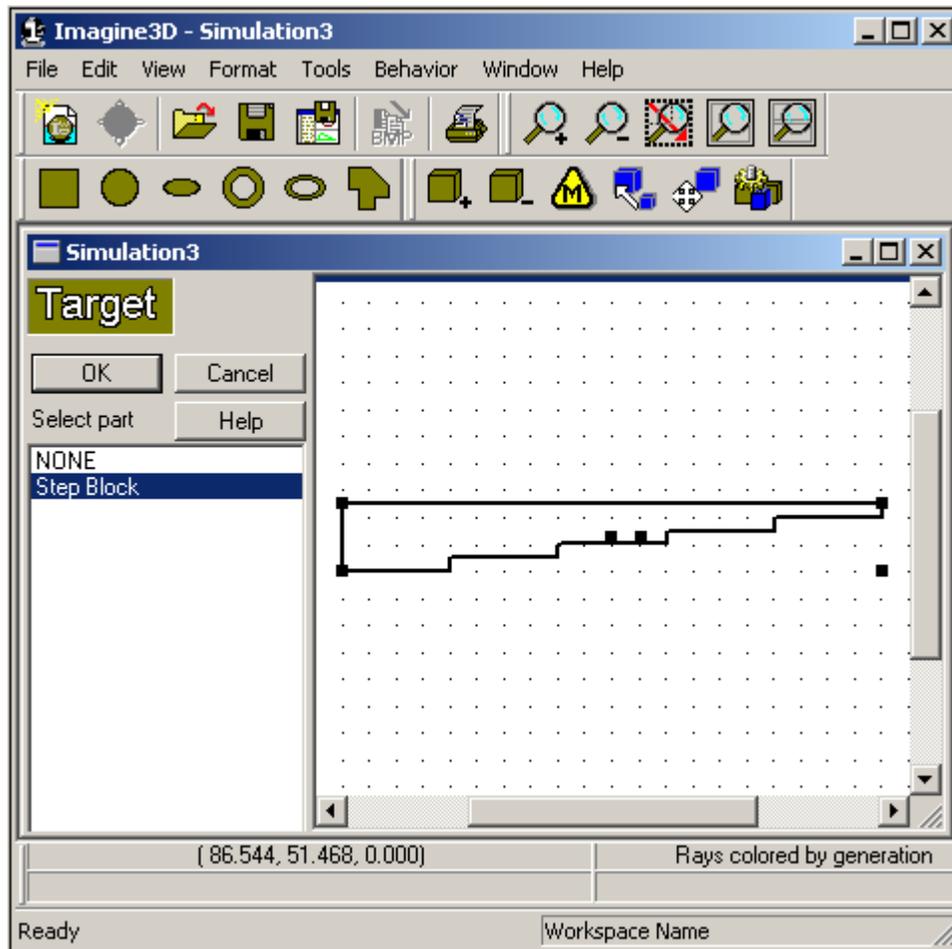
Sets the color used for each generation when rays are shown according to Generation for display in the Modes Tree Diagram.

Thickness

Allows you to set the thickness of the ray used when rays are shown according to Generation. The options are Thick, Thin and Hide.



Simple Editor – Target View



See Also:

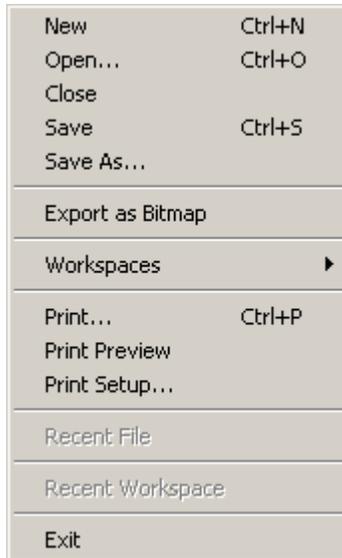
[Simple \(2D\) Editor – Probes, modes and raytracing view – Page 26](#)

[Simple \(2D\) Editor – Target view – Page 27](#)

[Simple \(2D\) Editor – Target view - Context Sensitive Menu – Page 115](#)



FILE MENU – Simple Editor – Target View



New

Opens a new Ray, Probes, Modes or Target document.

Open

Opens or finds a document. This will open any *Imagine3D* related file.

Close

Closes the currently selected document.

Save

Re-saves previously opened documents to the same filename without prompting, otherwise, *Imagine3D* saves a newly created document by first asking for a filename and path.

Save As . . .

Saves the currently active document by first asking for a new filename and path.

Export as Bitmap

Saves the current window contents to a bitmap graphics file (.bmp)

Workspaces

Open Workspace

Opens or finds a Workspace.

Close Workspace

Closes the current workspace so it cannot be accidentally overwritten.

Save Workspace As

Creates a new workspace folder by first asking for a project name and then saves any open documents including the screen configuration into that folder.

Print

Prints an *Imagine3D* report consisting of the Simulation view (current configuration), date and filename.



Print Preview

Displays an *Imagine3D* report on your screen, as it will be printed on your printer.

Print Setup

Allows you to select the printer, paper size and orientation.

Recent File

Provides a list of the most recently opened Documents, which will be re-opened if selected.

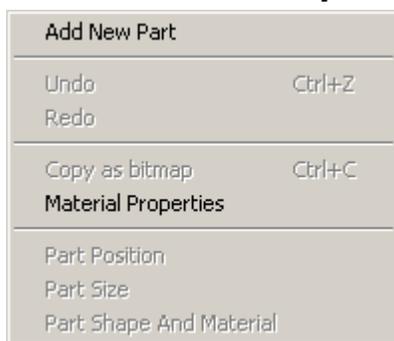
Recent Workspace

Provides a list of the most recently opened Workspaces, which will be re-opened if selected.

Exit

Exits *Imagine3D*.

EDIT MENU – Simple Editor – Target View



Add New Part

Creates a new part to add into the target by working through a series of dialog boxes.

The [Define Part Type](#) dialog box (Edit-Part Shape and Material) appears first. If the new part type is one of the regular primitive parts the [Define Part Dimension](#) dialog box appears next.

If the new part type will be an Extruded Cross-Section or a Revolved Cross-Section the [Cross-Section Editor](#) allows you to define the parts profile.

In each case, the [Define Part Position](#) dialog box appears last to allow you to specify the new part's location.

Undo

Reverses the last action performed.

Redo

Reverses the last undo.

Delete Part

Deletes the selected part from the target.

Copy as Bitmap

Places a bitmap graphic of the active document on the clipboard so that it can be pasted into other applications such as Microsoft Word.

Material Properties

Opens the [Material Properties Table](#) so you can edit the Material Properties of the inspected part.



Part Position

Edits the selected parts position using the [Define Part Position](#) dialog box.

Part Size

Edits the selected parts size using the [Define Part Dimensions](#) dialog box. If the selected part is a Extruded Cross-Section or a Revolved Cross-Section, the [Cross-Section Editor](#) is used to edit the part's dimensions.

Part Shape and Material

Edits the selected parts name, type, material and combination method using the [Define Part Type](#) dialog box.

VIEW MENU – Simple Editor – Target View



Update

Synchronizes all of the windows so that they all reflect the most recent changes in any other window.

Toolbars

Allows you to select which toolbars are visible.

File Toolbar

Displays a toolbar with buttons that manage opening, saving, copying, printing.

Status Bar

Displays a status bar at the bottom of the screen that shows: Help messages, current Workspace name and beam calculation status.

View Controlbar

Displays Rotate controls, cursor position coordinates, current Ray Color settings and the current Ray Ends time setting.

View Toolbar

Displays a toolbar with buttons that provide various zooming options and a button that splits the screen into four panes containing front, top, side and 3D views. This toolbar also contains the direct view controls.

Parts Toolbar

Provides quick access to a library of stock parts that can be easily dragged into a target.

Edit Parts Toolbar

Provides tools for adding new parts and changing how they are combined with other parts.

Zoom

Zoom In

Makes the image approximately 20% larger.



Zoom Out

Makes the image approximately 20% smaller.

Zoom Rect

Allows you to specify the magnified region by dragging a rectangle.

Fit to Window

Automatically scales to fit the target and transducer in the window.

Show Coordinates

Shows or hides the target orientation of the x, y, z axis by placing a red, three-headed arrow at the origin 0,0,0 in each view.

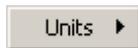
Show All Parts

Displays the wireframe for all parts. Shows all parts completely regardless of part combination type.

Grid Type

Enables a vertical and horizontal grid on the selected 3D view. Sets the grid line spacing.

FORMAT MENU – Simple Editor – Target View



Units

Allows the user to set the units for the Target. This does not perform a conversion from the old unit type into the newly selected units. The number of the units in any part remains the same. For example, a 5mm square block will become a 5-inch square block when you change the units from mm to inches.

TOOLS MENU - Simple Editor – Target View



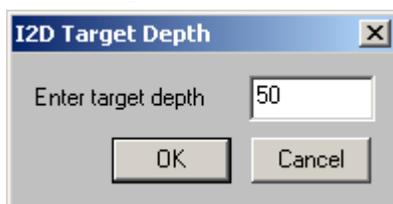
Add Part

Allows you to drag a selected primitive part type into a selected view.

Primitive Parts: Block, Rod, Elliptical Rod, Tube, Elliptical Tube, Cross-Section.

For descriptions of how each part type is added see [Parts Toolbar](#).

Set Target Depth



Sets the desired default depth to use when adding new parts. Recreates all the parts in the target with the specified depth.

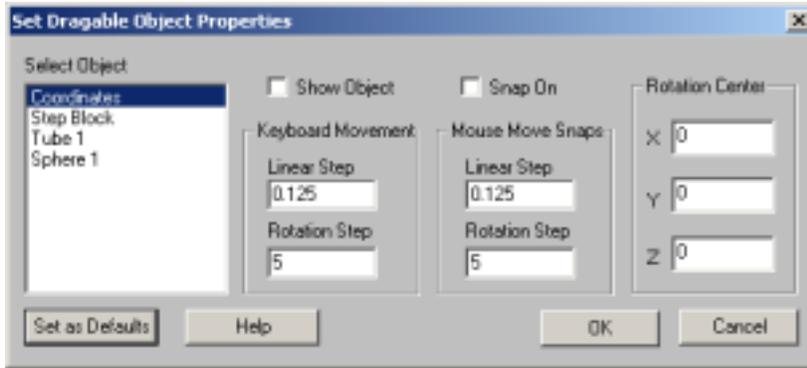


BEHAVIOR MENU – Simple Editor – Target View

Object Movement Behavior

Object Movement Behavior

Allows you to set the move increments for both the keyboard and mouse for all of the different objects found in *Imagine3D*.



Select Object

Deselecting "Show Object" hide the selected objects.

Keyboard Movement

When "Snap On" is selected, the object will "Snap" to a grid of this spacing when moved with the cursor keys.

Mouse Move Snaps

When "Snap On" is selected, the object will "Snap" to a grid of this spacing when moved with the mouse.

Rotation Center

The selected object will rotate around this 3D coordinate.

WINDOW MENU – Simple Editor – Target View



New Window

Opens an additional child window allowing more viewing panes for a given target document. This option is unavailable in the simple editor.

Cascade

Arranges all of the open documents so that they overlap.

Tile

Arranges all the open documents to fill the main *Imagine3D* window.



Arrange Icons

All documents that have been minimized to icons are arranged side by side along the bottom of the main *Imagine3D* window.

Split

Splits a Simulation view into two or four viewing panes. This option is unavailable in the simple editor.

Open document list

Allows you to locate and make active, any open documents that might be hidden by other windows.

FILE TOOLBAR– Simple Editor – Target View



Allows you to create, open and save *Imagine3D* files and workspaces.

2D/3D



This toggle feature is unavailable when in the Simple Editor Target View.

VIEW TOOLBAR – Simple Editor – Target View



The target views can be zoomed, scaled and modified to suit the user's viewpoint.

Zoom In



Makes the objects in a 3D view appear 20% larger.

Zoom Out



Makes the objects in a 3D view appear 20% smaller.

Zoom Rect



Allows you to drag a rectangle over a region to be magnified (drag with the left mouse button).

Fit to Window



Automatically scales to fit the contents of the selected pane.

Fit All Views



Automatically fits the contents of all panes by zooming in or out.



PARTS TOOLBAR – Simple Editor – Target View



Allows you to drag a selected primitive part type into the target.

Add a Block



Allows you to drag a block of any size into a selected view. The default depth of the block is set in Tools - Set Target Depth.

Add a Rod



Allows you to drag a rod of any diameter into a selected view. The default depth of the rod is set in Tools - Set Target Depth.

Add an Elliptical Rod



Allows you to drag an elliptical rod of any diameter into a selected view. Default depth of the elliptical rod is set in Tools - Set Target Depth.

Add a Tube



Allows you to drag a tube of any outer diameter into a selected view. The default depth of the tube is set in Tools - Set Target Depth.

Add an Elliptical Tube



Allows you to drag an elliptical tube of any x and y outer dimension into a selected view. The default depth of the elliptical tube is set in Tools - Set Target Depth.

Add an Extrusion



Allows you to drag a four-sided cross-section into a selected view. The default depth of the extrusion is set in Tools - Set Target Depth. Use Edit Part Size to move vertices or add more line segments to the cross-section.

EDIT PARTS TOOLBAR – Simple Editor – Target View



Tools for defining part properties.

Add New Part



Creates a new part to add into the target by working through a series of dialog boxes.

The [Define Part Type](#) dialog box (Edit-Part Shape and Material) appears first. If the new part type is one of the regular primitive parts, the [Define Part Dimension](#) dialog box appears next.

If the new part type will be an Extruded Cross-Section or a Revolved Cross-Section, the [Cross-Section Editor](#) allows you to define the parts profile. In a .dxf or .sat file import, the file itself defines the part dimensions.

In each case, the [Define Part Position](#) dialog box appears last to allow you to specify the new part's location.



Delete Part



Deletes the currently selected part.

Materials Table

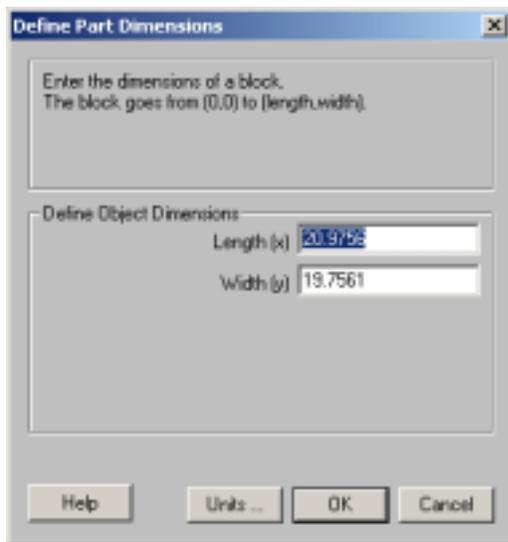


Opens the [Material Properties Table](#) so that you can edit or add materials.

Define Part Dimensions



If the selected part is one of the standard primitive shapes such as a block, this button opens a dialog box that allows you to change the size of the standard dimensions of the part. The dimensions that can be specified for different part types vary. Specific instructions will appear on the Define Part Dimensions dialog box according to the part type.



If the selected part is a Cross-Section, the Define Part Dimensions button will take you to the [Cross-Section Editor](#) where you can edit the profile of the part.

Dimension Definition

Describes the part type and required dimensions.

Define Object Dimensions

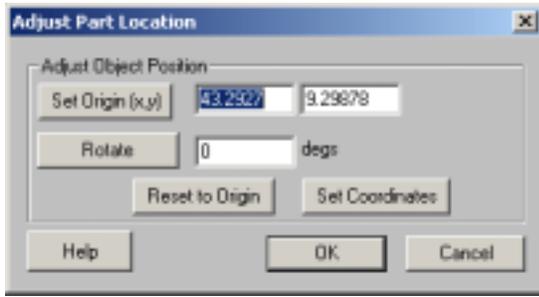
Specifies each dimension.

Units

Specifies target units. See [Simple Editor Target View - Format-Units](#) menu item.



Define Part Position



Opens a dialog box that allows the part to be moved relative to the drawing's origin (hence relative to other parts as well), rotated relative to the axes of the target drawing or rotated relative to the axes of the selected part.

Set Origin (x,y)

Sets the origin of the selected part to the x and y values you choose. The selected part is displayed in its new position after this button is pressed.

Rotate

Rotates the selected part relative to its own coordinate system. Note that this rotation is relative to the current orientation of the part. The selected part is displayed in its new position after this button is pressed.

Reset to Origin

Moves the selected parts origin to the Target View base coordinates.

Set Coordinates

Explicitly defines the parts coordinates using the [Define translation and rotation](#) dialog box.

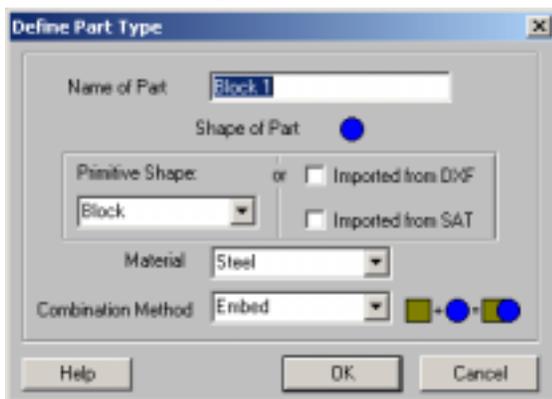
OK - Define Part Position Dialog box

Confirms any changes already made using the Set Origin, Rotate About, Reset to Origin and Set Coordinates buttons as well as performing the move currently showing if the Set Origin and Rotate About buttons have not been used.

Cancel - Define Part Position Dialog box

This returns the part to the position it was in before the Adjust Part Location dialog box was opened.

Define Part Type



Allows you to change the selected part's material, shape and how it is combined with other parts.



Name of Part

Specifies the name of the part. This is the name used in the Target View Parts list box.

Shape of Part

Specifies the type of the part. Parts can be selected from the primitive shapes available in *Imagine3D* or imported from a .dxf or a .sat file.

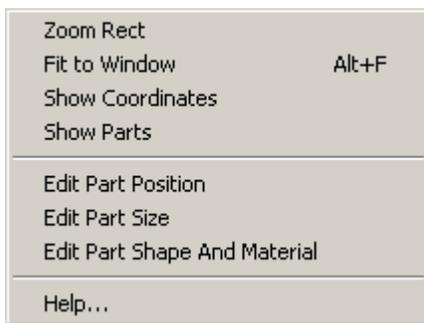
Material

Specifies the material for the part.

Combination Method

Specifies the way the part will combine with the other parts in the target.

RIGHT CLICK CONTEXT MENU – Simple Editor – Target View



This context menu was designed for easy access to commonly used menu functions. Many of these options are also available from the main menu bar.

OK

Inserts the modified target into your Simulation and returns you to the Simple Editor Raytracing view.

Cancel

Discards any changes made to the target and returns you to the Simple Editor Raytracing view.

Drawing Area

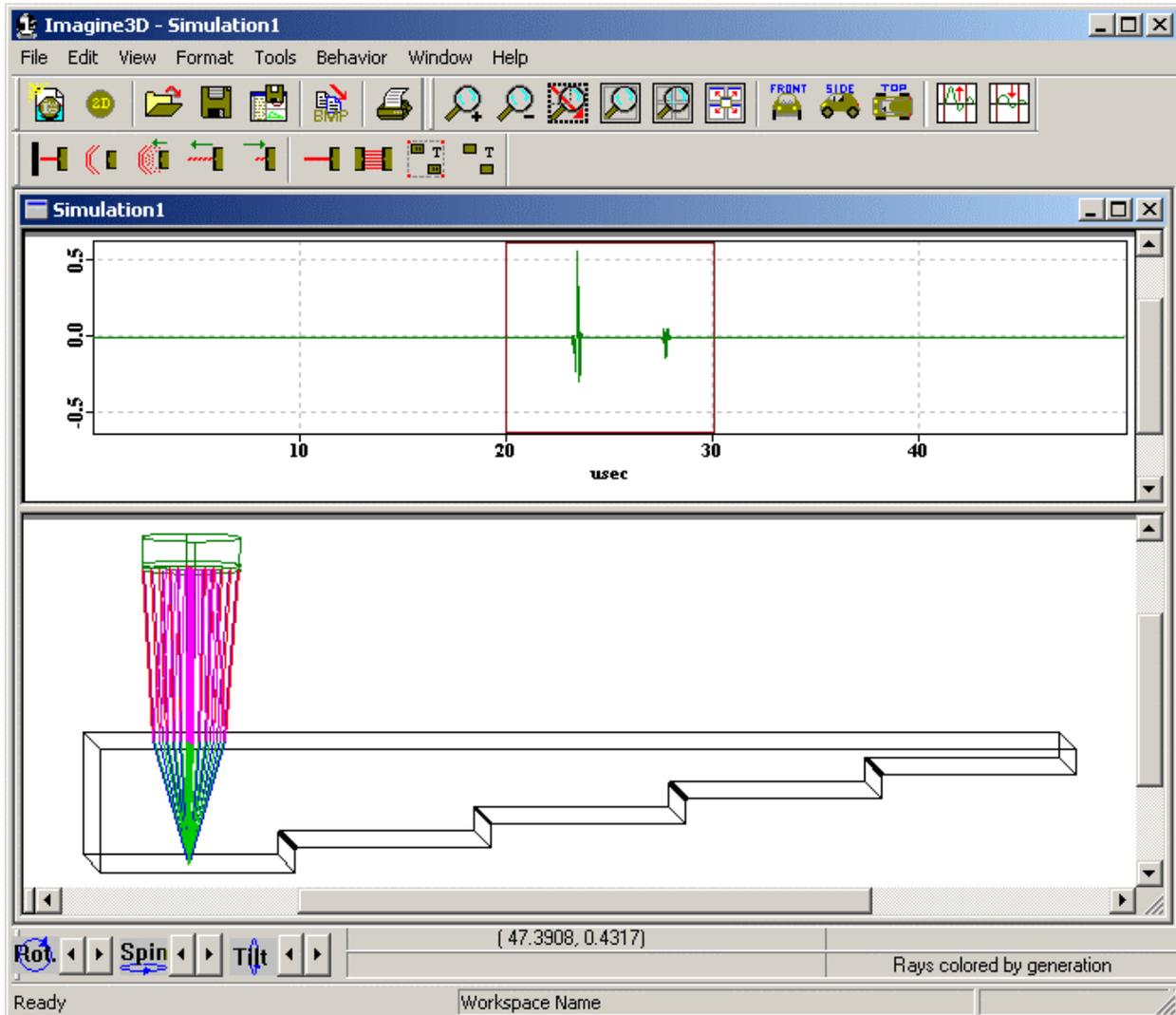
Shows the entire target as it is currently constructed from individual parts. Related dialog boxes can be reached by right clicking in the drawing area.

Select Parts

Shows a list of all the parts in the target. A single left click on a name selects or deselects that part. More than one part can be selected at a time. This is useful to move multiple parts at the same time.



Simulation Document



See also:

[Simulation Documents – Define your inspection – Page 22](#)

[Simulation view - Context Sensitive Menu – Page 137](#)

[Text view - Context Sensitive Menu – Page 137](#)

[A-scan view – Context Sensitive Menu – Page 138](#)

[Probe - Context Sensitive Menu – Page 138](#)



FILE MENU – Simulation Document



New

Opens a new Ray, Probes, Modes or Target document.

Open

Opens or finds a document. This will open any *Imagine3D* related file.

Close

Closes the currently selected document.

Save

Re-saves a previously opened document to the same filename without prompting, otherwise, *Imagine3D* saves a newly created document by first asking for a filename and path.

Save As . . .

Saves the currently active document by first asking for a new filename and path.

Export

as Bitmap

Saves the current window contents to a bitmap graphics file (.bmp).

as I3D viewer file

Saves the current simulation to a compatible file format with animations (.i3d).

Import

Imports external Target (.trg), Probe (.prb) or Modes (.mds) document files.



Workspaces

Open Workspace

Opens or finds a Workspace.

Close Workspace

Closes the current workspace so it cannot be accidentally overwritten.

Save Workspace As

Creates a new workspace folder by first asking for a project name and then saves any open documents including the screen configuration into that folder.

Print

Prints an *Imagine3D* report consisting of the Simulation view (current configuration), date and filename.

Print Preview

Displays an *Imagine3D* report on your screen as it will be printed on your printer.

Print Setup

Allows you to select the printer, paper size and orientation.

Recent File

Provides a list of the most recently opened Documents, which will be re-opened if selected.

Recent Workspace

Provides a list of the most recently opened Workspaces, which will be re-opened if selected.

Exit

Exits *Imagine3D*.

EDIT MENU – Simulation Document



Undo

Reverses the last Probe move performed.



Redo

Reverses the last undo.

Copy as Bitmap

Places a bitmap graphic of the active document on the clipboard so that it can be pasted as a picture into other applications such as Microsoft Word.

Copy as Text

Places the text description of the active document on the clipboard so that it can be pasted as unformatted text into reports or e-mail messages.

Target

Opens the target documents so you can modify your [Target](#) properties.

Transmitter

Opens the probe document so you can modify your [Transmitter](#) properties.

Receiver

Opens the probe document so you can modify your [Receiver](#) properties.

Modes

Opens the Modes document so you can modify the [Modes](#) Properties.

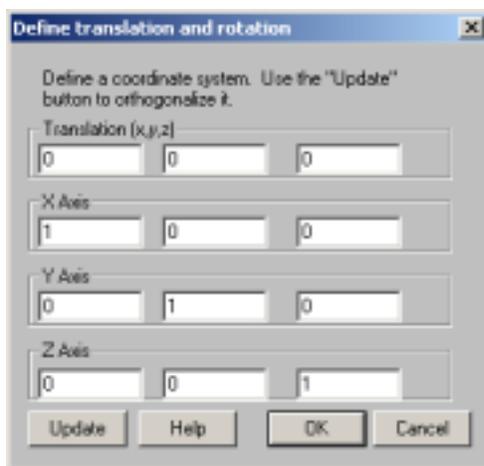
Material Properties

Opens the [Material Properties table](#) so you can edit the Material Properties of the inspected part.

Set Immersion Material

Allows the user to set the immersion material for the current simulation.

User Coordinates



Translation allows you to relocate the origin of the coordinate system.

X, Y and Z each contain three vector values that allow you to point each axis in a new direction. All coordinate displays will be calculated relative to the new origin and axis orientations.

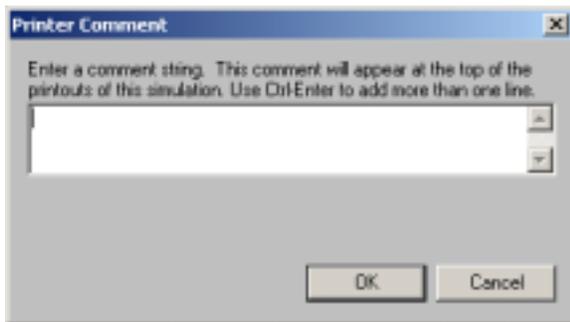
Delete All Labels

Deletes all 3D and 2D text labels.



Printer Comment

Text entered here will appear on printed reports just below the header information.



VIEW MENU – Simulation Document



Update

Synchronizes all of the windows so that they all reflect the most recent changes in any other window.

Save Layout

Allows you to save specific views of your inspection so that you can return to them quickly later on.

Load Layout

Restores a previously saved screen layout.

Toolbars

Allows you to select which toolbars are visible.

File Toolbar

Displays a toolbar with buttons that manage opening, saving, copying and printing.

Status Bar

Displays a status bar at the bottom of the screen that shows: Help messages, current Workspace name and beam calculation status.



View Controlbar

Displays Rotate controls, cursor position coordinates, current Ray Color settings and the current Ray Ends time setting.

View Toolbar

Displays a toolbar with buttons that provide various zooming options and a button that splits the screen into four panes containing front, top, side and 3D views. This toolbar also contains the direct view controls and the A-scan gain controls.

Probe Toolbar

Displays a toolbar with buttons that control the characteristics of the rays and how the probes are to move.

View Type

Each pane of a simulation document can show content according to the view type you assign.

3D

Changes the currently selected view pane to show a three dimensional view of the inspection.

A-scan

Changes the currently selected view pane to show an A-scan display.

Text

Changes the currently selected view pane to show a text description of the simulation.

Viewpoint

Selecting these can set the user's viewpoint:

Top view of the target (X,Z plane).

Front view of the target (X,Y plane).

Side view of the target (Z,Y plane).

Rotate

The user's viewpoint is rotated in these directions:

Rotate

CW  or press R.

CCW  or press ALT+R.

Tilt

Up  or press T.

Down  or press ALT+T.

Spin

Left  or press S.

Right  or press ALT+S.



Rotation Step Size

Each click or key press will alter the viewing angle by this step size (5 degrees by default)

Zoom

Zoom In

Makes the image approximately 20% larger.

Zoom Out

Makes the image approximately 20% smaller.

Zoom Rect

Allows you to specify the magnified region by dragging a rectangle.

Fit to Window

Automatically scales to fit the target and transducer in the window.

Live Zoom

Allows live zooming (range and gain) by dragging the mouse on the A-scan view. To use, hold the left button down and drag left or right to zoom in and out.

Scaling and Grid

These features help you to more accurately place and measure objects.

1:1 Display

Scales the window so that the target appears actual size on your computer screen.

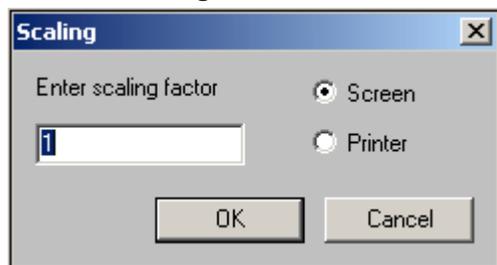
1:1 Printing

Scales the window so that the target prints actual size on your selected printer.

To use 1:1 printing follow these steps.

1. Choose **File – Printer Setup** and configure your printer.
2. Select **View – Scaling and Grid - 1:1 Printing**.
3. Scroll your views to frame the area you want to print. Do not zoom or size the window. Zooming and sizing will break the 1:1 scaling.
4. Select **File-Print**.

Custom Scaling



Allows the target to appear on screen or print on your printer any scaling factor.

Screen – the target on your monitor will be scaled accordingly.

Printer – the target on your printer will be scaled accordingly.

Show Grid

Enables a vertical and horizontal grid on the selected 3D view.



Grid Size

Sets the grid line density.

Show Coordinates

Shows or hides the orientation of the x, y, z axes by placing a red, three-headed arrow at the origin 0,0,0 in each view.

Render

Rendering shows the target as a more realistic gray solid for easier visualization.

Render Mode

With depth test

The rays are allowed to be in behind target wireframe lines rather than always on top.

Surface and Wireframe

The target is rendered with solid surfaces and the wireframe is left visible for reference.

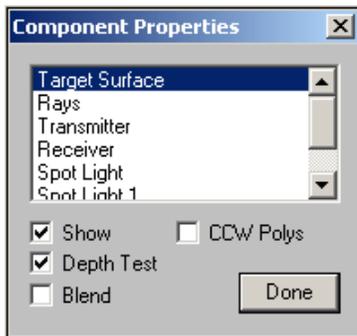
Solid Surface

The target is rendered with solid surfaces so that it looks like it does in reality.

Transparent Surface

The target is rendered with see-through surfaces showing the inside geometry.

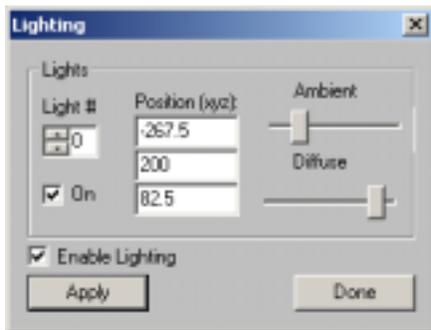
Custom



You can choose which drawing objects are shaded, visible or see-through.

Render Lighting

You may change the number of light sources, their placement and intensity.



In general the default lighting is effective. *Imagine3D* uses OpenGL for rendering. If you want to change the lighting refer to an OpenGL manual for information on lighting.



Increase A-scan Gain

Increases the gain of the A-scan by 3dB.

Decrease A-scan Gain

Decreases the gain of the A-scan by 3dB.

FORMAT MENU – Simulation Document



Units

Allows the user to set the units for use in the Simulation view.

Sound Display Mode

Rays

Displays the sound field as a series of straight lines traveling away from the transducer.

Pulse

Displays a single wavefront at any selected propagation time.

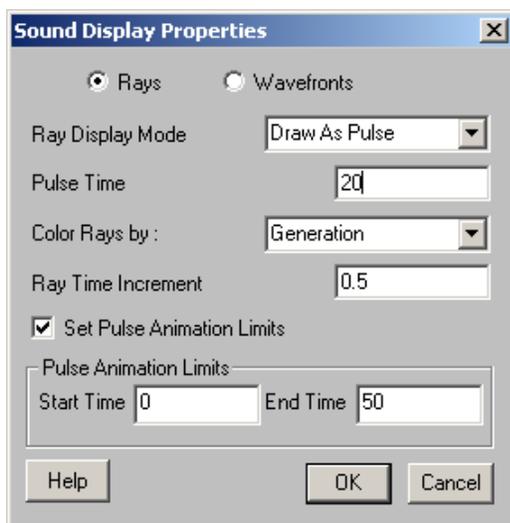
Wavefronts

Displays the sound field as a series of short curved (or straight) lines that follow one another in the direction of sound propagation.

Beam

Displays the full sound field energy as a rendered grayscale.

Sound Display Properties





Ray or Wavefront

Select the type of sound display desired.

Ray Display Mode

Show for all time - Rays extend out in time showing all modes in the Modes document.

End at time - Rays are set to end at the time shown under Time to end Rays at.

Draw as pulse - Rays simulate a single propagating wavefront.

Pulse Time

Defines the desired time the plot the pulse. This is only displayed when mode is Draw As Pulse.

Time To End Rays At

Defines the end time for plotting the rays. This is only displayed when mode is End At Time.

Time to end wavefronts at

Defines the end time for plotting wavefronts. This is only displayed when wavefronts are selected.

Color Rays by:

Generation – the rays change color when an interface is encountered.

Medium – the rays change color when a new material is encountered.

Mode – longitudinal waves are shown in one color and shear waves are shown in another.

Medium and Mode – the rays change color when a new material or mode conversion.

See also:

[How Do I – Define a ray's color? - Page 42](#)

Ray Time Increment

The time increment, for Time to end Rays at is set here.

Set Pulse Animation Limits

Only displayed when mode is Draw As Pulse. Turns pulse animation limits on and off.

Pulse Animation Limits

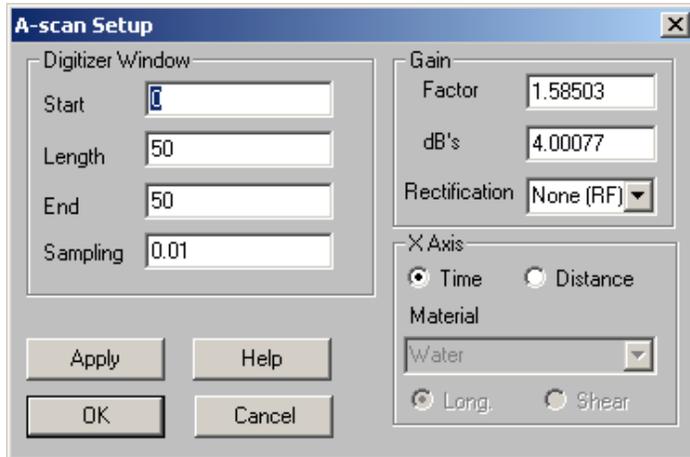
When draw as a pulse is selected, you may set the start and end times of the animation loop.

Start Time - Time to start plotting the pulse for animation loop.

End Time - Time to stop plotting the pulse for animation loop.



Set A-scan Time Window



Digitizer Window

Start Time – sets the start time of the A-scan window.

Length – sets the width of the A-scan window.

End Time – sets the end time of the A-scan window.

Time Increment – sets the sampling rate as if it were a digitizer.

Gain

Factor – sets gain by a multiplication factor, Example: X2, X100.

dB's – sets gain in dB, Example: 6dB, 50dB.

Rectification – displays data in rectified Video mode.

X Axis

Time – the X-axis is calibrated in microseconds.

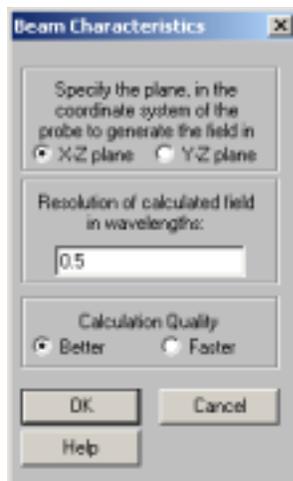
Distance – the X-axis is calibrated in the selected units for any given material.

Material – selects the material for distance conversion of the X-axis.

Long – uses the longitudinal velocity of the material for distance conversion.

Shear – uses the shear velocity of the material for distance conversion.

Define Beam Profile



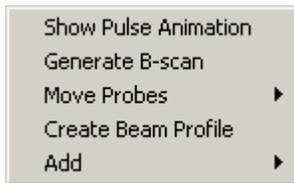


Specify the plane – determines the 2D plane on which the beam profile will be calculated and displayed.

Resolution of the calculated field – specify in wavelengths how resolved the beam profile should be calculated. Increasing the resolution by two increases the calculation time by four.

Calculation quality – selecting better uses a higher quality beam model that shows diffraction better than selecting faster.

TOOLS MENU - Simulation Document



Show Pulse Animation

Runs a pulse animation showing sound propagation moving forward in time.

Generate B-scan

Creates a new document containing a B-scan plot of all arriving echoes as the probe is moved over the surface of the part. You must enter the scan properties.



Motion

Selects if the scan will be circular or linear.

Translation Direction

Establishes the direction (x,y,z) that the scan will take.

Scan Distance

Sets the length of the scan in selected units.

Rotation Center

Establishes the center point (x,y,z) the scan will move around.

Scan Angle

Sets the angle (degs) through which the scan will move.

Number of Points

A larger number of scan points over a distance increases the resolution of the scan.



Show Probe Path

Produces a line on the simulation windows showing the probe path.

Times

Select start and end times for the scan.

Move Probes

All of the Move Probe functions, below, are affected by the increment values specified on the Set Draggable Object Properties Dialog box ([Behavior-Object Movement Behavior](#)).

Move Up – or press Up arrow.

Move Down – or press Down arrow.

Move Right – or press Right arrow.

Move Left – or press Left arrow.

Rotate CW – or press Ctrl +Right arrow.

Rotate CCW – or press Ctrl +Left arrow.

Spin CW – or press Shift +Right arrow.

Spin CCW – or press Shift +Left arrow.

You can also move a probe by dragging it with the mouse.

Create Beam Profile

Starts the beam calculation and displays a grayscale beam profile after the calculation has completed. Calculation progress is shown in the status bar.

Add

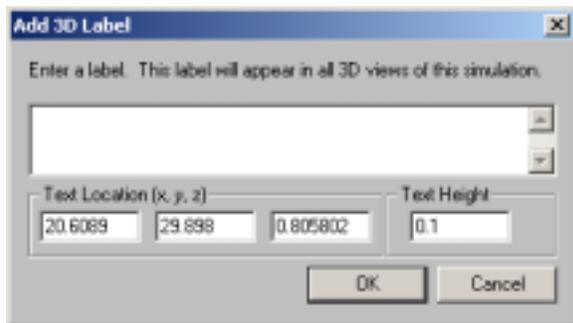
Descriptive lines, labels and titles can be added to the 3D view.

Add Line

Allows the user to add a line that appears to lay flat on the plane on which it was placed regardless of your viewing angle. This is useful for placing index marks on reference blocks or for pointing to details using labels. The color of the line can be specified using **Properties** on the Context Sensitive Menu.

Add Label

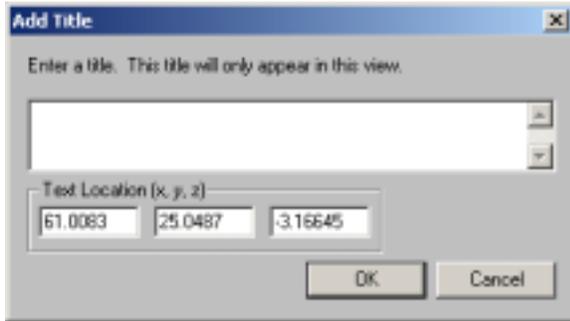
Allows the user to add text that appears to lie flat on the plane on which it was placed regardless of your viewing angle.





Add Title

Allows you to add text that always faces you regardless of your viewing angle.



BEHAVIOR MENU – Simulation Document

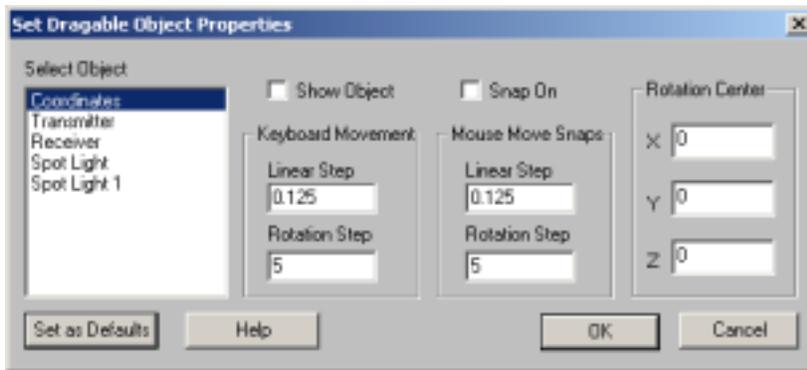


PE/PC

Allows the user to choose between a Pulse Echo (PE), Pitch Catch (PC) or No Probe inspection.

Object Movement Behavior

Allows you to set the move increments for both the keyboard and mouse for all of the different draggable objects found in *Imagine3D*.



Select Object

Deselecting "Show Object" hides the selected objects.

Keyboard Movement

When "Snap On" is selected, the object will "Snap" to a grid of this spacing when moved with the cursor keys.

Mouse Move Snaps

When "Snap On" is selected, the object will "Snap" to a grid of this spacing when moved with the mouse.

Rotation Center

The selected object will rotate around this 3D coordinate.



WINDOW MENU – Simulation Document



New Window

Opens an additional child window allowing more viewing panes for a given Simulation document.

Cascade

Arranges all of the open documents so that they overlap.

Tile

Arranges all the open documents to fill the main *Imagine3D* window.

Arrange Icons

All documents that have been minimized to icons are arranged side by side along the bottom of the Main *Imagine3D* window.

Split

Splits a Simulation view into two or four viewing panes.

Open document list

Allows you to locate and make active any open documents that might be hidden by other windows.

FILE TOOLBAR– Simulation Document



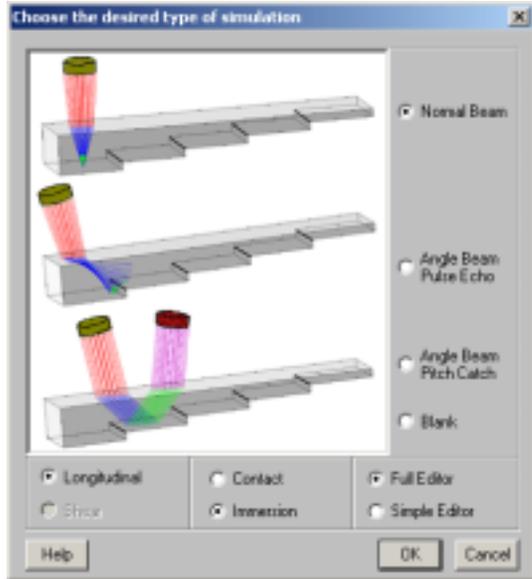
Allows you to create, open and save *Imagine3D* files and workspaces. Also allows you to switch between the standard (3D) and simple (2D) editor.

New Simulation

Opens the [Choose the desired type of simulation](#) dialog box. This dialog box presents you with a number of predefined simulation examples. Use the File menu instead of this button if you wish to open a new blank Simulation, Probe, Mode, or Target document.



Choose the desired type of simulation (default)



Normal Beam

Generates a simulation with a step block target and a transmitter pointing straight down on the target.

Angle Beam Pulse Echo

Generates a simulation with a step block and a transmitter pointing at an angle to the target's surface.

Angle Beam Pitch Catch

Generates a simulation with a step block, a transmitter and a receiver pointing at an angle to the target's surface.

Blank

Generates a simulation with a transmitter pointing down the Y-axis but no target.

Longitudinal

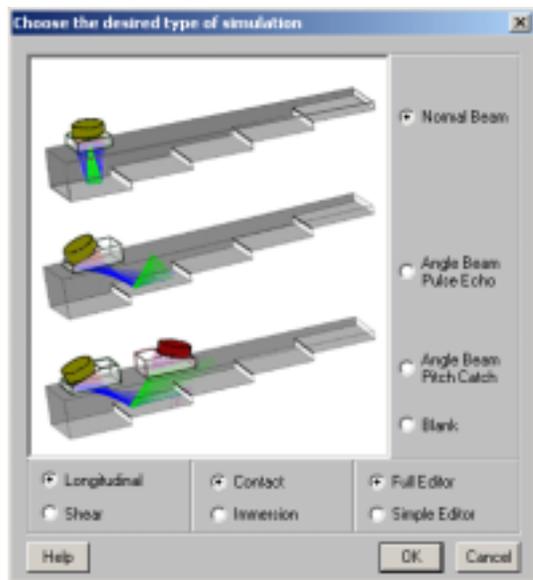
Positions the probes so that longitudinal waves are used for the inspection.

Shear

Positions the probes so that shear waves are used for the inspection.



Contact



Immersion

Selects an immersion probe. This is the default screen. See [Choose the desired type of simulation](#) (default).

Full Editor

Selects the standard 3D editor.

Simple Editor

Selects the simpler 2D editor.

2D/3D



Toggles *Imagine3D* between the standard 3D editor and the simpler 2D editor.

Open



Opens any *Imagine3D* file from disk.

Save



Re-saves any *Imagine3D* file type without prompting, unless the file has not been saved before, in which case you are prompted for a filename and path.

Save Workspace



Saves the current workspace without prompting unless the simulation has not been saved before, in which case you are prompted for a workspace name and path.

Copy as Bitmap



Places a copy of the Simulation view on the clipboard so that it can be pasted into another program such as Microsoft Word.

Print



Prints an *Imagine3D* simulation report as it appears when using Print Preview.



VIEW TOOLBAR – Simulation Document



3D, A-scan and Text views can be zoomed, scaled and modified to suit the user's viewpoint.

Zoom In 

Makes the objects in a 3D view appear 20% larger or expands the time in an A-scan view.

Zoom Out 

Makes the objects in a 3D view appear 20% smaller or expands the time axis in an A-scan view.

Zoom Rect 

Allows you to drag a rectangle over a region to be magnified (drag with the left mouse button).

Fit to Window 

Automatically scales to fit the contents of the selected pane.

Fit All Views 

Automatically fits the contents of all panes by zooming in or out.

Standard Layout 

Provides a single button that automatically splits the Simulation view into 4 panes for front, side, top and 3D views.

Front View 

Rotates the user's perspective to provide a front view of the target -- (X, Y plane).

Side View 

Rotates the user's perspective to provide a right-side view of the target -- (Z, Y plane).

Top View 

Rotates the user's perspective to provide a top view of the target -- (X, Z plane).

Increase Gain 

Increases the gain of the A-scan by 3dB.

Decrease Gain 

Decreases the gain of the A-scan by 3dB.



PROBE TOOLBAR – Simulation Document



Various simulation operations can be selected.

End Rays at a Given Time



Stops the ray propagation at a time chosen by the user using Advance or Retreat Rays toolbar buttons.

Start Rays as Pulse



Shows only the propagating wavefronts at a time chosen using the Advance or Retreat Rays toolbar buttons.

Show Pulse Propagation



Shows propagating wavefronts using continuous animation.

Advance Rays



Increases the amount of time that rays are allowed to propagate.

Retreat Rays



Reduces the amount of time that rays are allowed to propagate.

Only Plot Main Ray



Shows only one ray emitted from the center of the probe.

Only Plot Received Rays



Shows only those rays that make it back to the receiver; all other rays are hidden.

Group



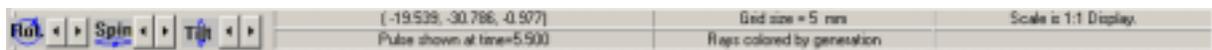
All selected items will be grouped together so that they act as one entity when re-selected.

Ungroup



All selected groups of items will be restored to individual items.

VIEW CONTROL BAR-Simulation Document



Rotate Buttons

Each click of the arrow button will rotate the view about an axis perpendicular to the screen by the selected rotation step size (default is 5 degrees).

Rotate CW – click the  button or press R.

Rotate CCW – click the  button or press ALT +R.



Spin Buttons

Each click of the arrow button will spin the view about a vertical axis on the screen by the selected rotation step size (default is 5 degrees).

Spin Backward – click the  button or press S.

Spin Forward – click the  button or press ALT +S.

Tilt Buttons

Each click of the arrow button will tilt the view about a horizontal axis on the screen by the selected rotation step size (default is 5 degrees).

Tilt Upward – click the  button or press T.

Tilt Downward – click the  button or press ALT +T.

X Y Z Cursor Position Readout

If the cursor is in a 3D view:

Moving the cursor displays the absolute x, y and z position of the cursor. Dragging a rectangle displays the relative distance of the dragged rectangle in x, y and z., the diagonal distance and it's angle.

If the cursor is in an A-scan view:

Moving the cursor displays the absolute A-scan time and absolute amplitude of the cursor position. Dragging a rectangle displays the relative arrival time and amplitude of the dragged rectangle.

Grid Size

Displays the current grid sizing in selected units.

Scale

Displays the current simulation scale.

Ray's End Time

Displays the maximum distance that the rays or pulse are allowed to propagate based on the value assigned to the End Rays at a Given Time toolbar button.

Ray Color Mode

Displays the method for determining Ray Color.

IMAGINE3D STATUS BAR – Simulation Document



Displays whether *Imagine3D* is Ready or Busy, the task currently being performed and help text when the cursor moves over a button.

Workspace Name Area

Displays the name of the current workspace.

Beam calculation Area

Displays current status of beam calculations.



RIGHT CLICK CONTEXT MENU – 3D View



This context menu was designed for easy access to commonly used menu functions. Many of these options are also available from the main menu bar.

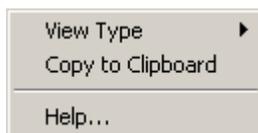
Delete Title

Allows you to delete the selected title.

Properties (of lines, labels and titles)

Allows you to change the size, orientation and color of selected titles, labels and lines.

RIGHT CLICK CONTEXT MENU – Text View



This context menu was designed for easy access to commonly used menu functions. Many of these options are also available from the main menu bar.

Copy to Clipboard

Copies the text window to the Windows Clipboard for pasting into external documents (Microsoft Word, etc.).



RIGHT CLICK CONTEXT MENU – A-scan View



This context menu was designed for easy access to commonly used menu functions. Many of these options are also available from the main menu bar.

B-scan Gate

Allows the B-scan gate to be shown or hidden.

Live Zoom

Allows live zooming (range and gain) by dragging the mouse on the A-scan view. To use hold the left button down and drag left or right to zoom in and out.

RIGHT CLICK CONTEXT MENU – Probe in 3D View



This context menu was designed for easy access to commonly used menu functions. Many of these options are also available from the main menu bar.

Flip Probe

Re-orientes the probe 180 degrees.

Set Probe Direction Up

Faces the probe up within the view.

Set Probe Direction Down

Faces the probe down within the view.

Set Probe Direction Right

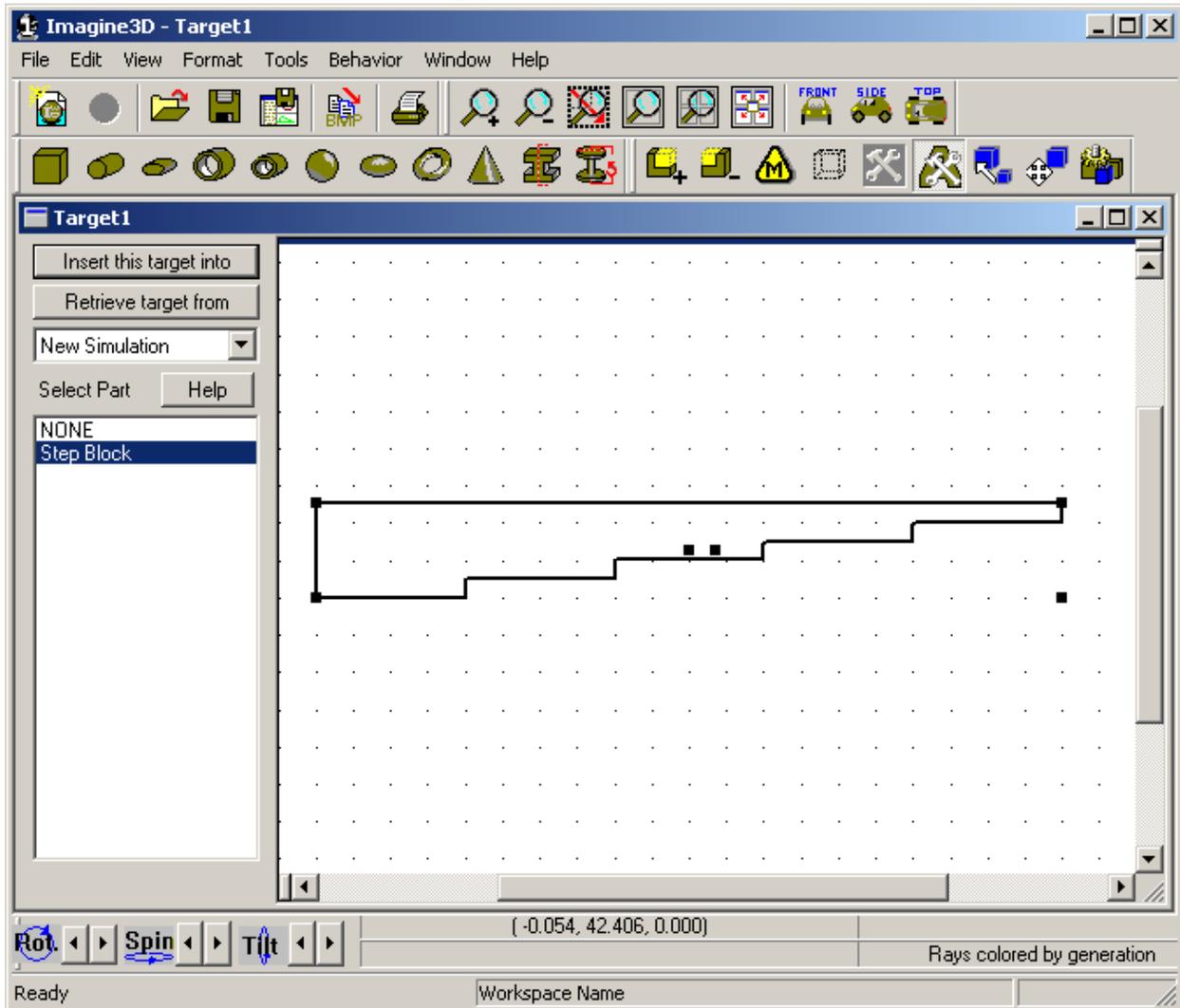
Faces the probe right within the view.

Set Probe Direction Left

Faces the probe left within the view.



Target Document



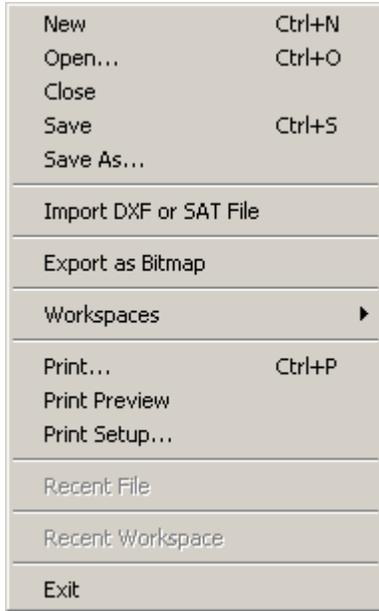
See also:

[Target Documents – Define your target's shape and material – Page 23](#)

[Target Context Sensitive Menu – Page 155](#)



FILE MENU – Target Document



New

Opens a new Ray, Probes, Modes or Target document.

Open

Opens or finds a document. This will open any *Imagine3D* related file.

Close

Closes the currently selected document.

Save

Re-saves previously opened documents to the same filename without prompting, otherwise, *Imagine3D* saves a newly created document by first asking for a filename and path.

Save As . . .

Saves the currently active document by first asking for a new filename and path.

Import DXF or SAT File



Part files created in different CAD programs can now be imported into *Imagine3D* targets. SAT and DXF file types are supported. The imported parts can be moved and raytraced in the same way as *Imagine3D* primitive parts.



If the imported file is a 2D .dxf file the **DXF Cross-Section** dialog box will allow you to specify how to change the 2D profile into a 3D solid part. In each case the **Define Part Position** dialog box appears last to allow you to specify the new part's location.

Import File Type

Selects the type of file to be imported; either .dxf or .sat.

Name of part

Specifies the name of the part. This is the name used in the Target View Parts list.

Material

Specifies the material for the part.

Combination Method

Specifies the way the part will combine with the other parts in the target.

DXF Cross-Section dialog box



Defines the manner in which a 2D .dxf file gets imported and converted into a 3D solid part.

Do you want to extrude or revolve it?

Selects the type of file to be imported; either DXF or SAT.

Please specify an extrusion length.

Specifies the length to which the part will be extruded.

Export as Bitmap

Saves the current window contents to a bitmap graphics file (.bmp).

Workspaces

Open Workspace

Opens or finds a Workspace.

Close Workspace

Closes the current workspace so it cannot be accidentally overwritten.

Save Workspace As

Creates a new workspace folder by first asking for a project name and then saves any open documents including the screen configuration into that folder.



Print

Prints an *Imagine3D* report consisting of the Target view (current configuration), date and filename.

Print Preview

Displays an *Imagine3D* report on your screen as it will be printed on your printer.

Print Setup

Allows you to select the printer, paper size and orientation.

Recent File

Provides a list of the most recently opened Documents, which will be re-opened if selected.

Recent Workspace

Provides a list of the most recently opened Workspaces, which will be re-opened if selected.

Exit

Exits *Imagine3D*.

EDIT MENU – Target Document



Undo

Reverses the last part movement performed.

Redo

Reverses the last undo.

Add New Part

Creates a new part to add into the target by working through a series of dialog boxes.

The [Define Part Type](#) dialog box (Edit-Part Shape and Material) appears first. If the new part type is one of the regular primitive parts the [Define Part Dimension](#) dialog box appears next.

If the new part type will be an Extruded Cross-Section or a Revolved Cross-Section, the [Cross-Section Editor](#) allows you to define the parts profile.

For .dxf and .sat file imports, the part dimensions are defined by the file itself.

In each case, the [Define Part Position](#) dialog box appears last to allow you to specify the new part's location.

Delete Part

Deletes the selected part from the target.



Copy as Bitmap

Places a bitmap graphic of the active document on the clipboard so that it can be pasted into other applications such as Microsoft Word.

Material Properties

Opens the [Material Properties Table](#) so you can edit the Material Properties of the inspected part.

Part Position

Edits the selected parts position using the [Define Part Position](#) dialog box.

Part Size

Edits the selected parts size using the [Define Part Dimensions](#) dialog box. If the selected part is a Extruded Cross-Section or a Revolved Cross-Section, the [Cross-Section Editor](#) is used to edit the part's dimensions.

Part Shape and Material

Edits the selected parts name, type, material and combination method using the [Define Part Type](#) dialog box.

VIEW MENU – Target Document



Update

Synchronizes all of the windows so that they all reflect the most recent changes in any other window.

Toolbars

Allows you to select which toolbars are visible.

File Toolbar

Displays a toolbar with buttons that manage opening, saving, copying and printing.

Status Bar

Displays a status bar at the bottom of the screen that shows: Help messages, current Workspace name and beam calculation status.

View Controlbar

Displays Rotate controls, cursor position coordinates, current Ray Color settings and the current Ray Ends time setting.

View Toolbar

Displays a toolbar with buttons that provide various zooming options and a button that splits the screen into four panes containing front, top, side and 3D views. This toolbar also contains the direct view controls.



Parts Toolbar

Provides quick access to a library of stock parts that can be easily dragged into a target.

Edit Parts Toolbar

Provides tools for adding new parts and changing how they are combined with other parts.

Viewpoint

Selecting these can set the user's viewpoint:

Top view of the target (X,Z plane).

Front view of the target (X,Y plane).

Side view of the target (Z, Y plane).

Rotate

The user's viewpoint is rotated in these directions:

Rotate

CW  or press R.

CCW  or press ALT+R.

Tilt

Up  or press T.

Down  or press ALT+T.

Spin

Left  or press S.

Right  or press ALT+S.

Rotation Step Size

Each click or key press will alter the viewing angle by this step size (5 degrees by default).

Zoom

Zoom In

Makes the image approximately 20% larger.

Zoom Out

Makes the image approximately 20% smaller.

Zoom Rect

Allows you to specify the magnified region by dragging a rectangle.

Fit to Window

Automatically scales to fit the target and transducer in the window.

Show Coordinates

Shows or hides the target orientation of the x, y, z axis by placing a red, three-headed arrow at the origin 0,0,0 in each view.



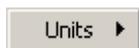
Show All Parts

Displays the wireframe for all parts. Shows all parts completely regardless of part combination type.

Grid Type

Enables a vertical and horizontal grid on the selected 3D view. Sets the grid line spacing.

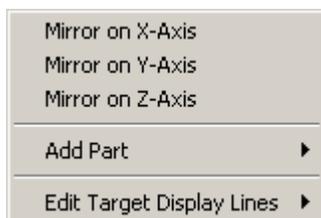
FORMAT MENU – Target Document



Units

Allows the user to set the units for the Target. This does not perform a conversion from the old unit type into the newly selected units. The number of the units in any part remains the same. For example, a 5mm square block will become a 5-inch square block when you change the units from mm to inches.

TOOLS MENU - Target Document



Mirror on X-Axis

Flips the target so that the new position is the mirror image on the X-Axis.

Mirror on Y-Axis

Flips the target so that the new position is the mirror image on the Y-Axis.

Mirror on Z-Axis

Flips the target so that the new position is the mirror image on the Z-Axis.

Add Part

Allows you to drag a selected primitive part type into a selected view.

Primitive Parts: Block, Rod, Elliptical Rod, Tube, Elliptical Tube, Sphere, Spheroid, Toroid, Cone, Extruded Cross-Section, Revolved Cross-Section.

For descriptions of how each part type is added see [Parts Toolbar](#).

Edit Target Display Lines

The surface of a target may be made visible by wrapping it in a mesh (default presentation) or by highlighting certain features with cross-section lines.

Add Horizontal Cross-Section

Allows you to select a Horizontal Cross-Section by clicking with the Horz. Cross-Section cursor.

Add Vertical Cross-Section

Allows you to select a Vertical Cross-Section by clicking with the Vert. Cross-Section cursor.

Add Cross-Section

Allows you to select a Cross-Section by clicking and dragging with the Cross-Section cursor.



Edit Cross-Section

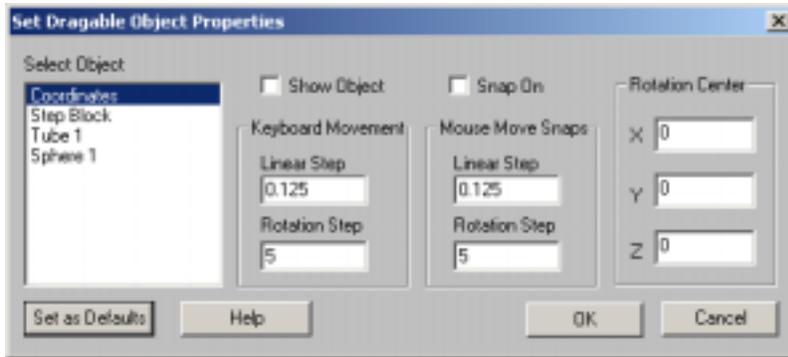
Allows you to hide or show the target cross-sections or target mesh using the [Edit Display Lines dialog box](#).

BEHAVIOR MENU – Target Document



Object Movement Behavior

Allows you to set the move increments for both the keyboard and mouse for all of the different draggable objects found in *Imagine3D*.



Select Object

Deselecting "Show Object" hides the selected objects.

Keyboard Movement

When "Snap On" is selected, the object will "Snap" to a grid of this spacing when moved with the cursor keys.

Mouse Move Snaps

When "Snap On" is selected, the object will "Snap" to a grid of this spacing when moved with the mouse.

Rotation Center

The selected object will rotate around this 3D coordinate.

WINDOW MENU – Target Document



New Window

Opens an additional child window allowing more viewing panes for a given Target document.

Cascade

Arranges all of the open documents so that they overlap.

Tile



Arranges all the open documents to fill the main *Imagine3D* window.

Arrange Icons

All documents that have been minimized to icons are arranged side by side along the bottom of the main *Imagine3D* window.

Split

Splits a Target view into two or four viewing panes.

Open document list

Allows you to locate and make active any open documents that might be hidden by other windows.

FILE TOOLBAR– Target Document



Allows you to create, open and save *Imagine3D* files and workspaces.

New Simulation



Opens the **Choose the desired type of simulation** dialog box. This dialog box presents you with a number of predefined simulation examples. Use the File menu instead of this button, if you wish to open a new blank Simulation, Probe, Mode or Target document.

2D/3D



This toggle feature is unavailable when in the Target Document.

Open



Opens any *Imagine3D* file from disk.

Save



Re-saves any *Imagine3D* file type without prompting, unless the file has not been saved before, in which case you are prompted for a filename and path.

Save Workspace



Saves the current workspace without prompting unless the simulation has not been saved before, in which case you are prompted for a workspace name and path.

Copy as Bitmap



Places a copy of the Simulation view on the clipboard so that it can be pasted into another program such as Microsoft Word.

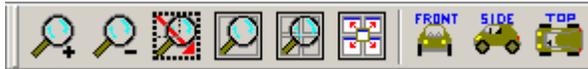
Print



Prints an *Imagine3D* target report as it appears when using Print Preview.



VIEW TOOLBAR – Target Document



The target views can be zoomed, scaled and modified to suit the user's viewpoint.

Zoom In 

Makes the objects in a 3D view appear 20% larger.

Zoom Out 

Makes the objects in a 3D view appear 20% smaller.

Zoom Rect 

Allows you to drag a rectangle over a region to be magnified (drag with the left mouse button).

Fit to Window 

Automatically scales to fit the contents of the selected pane.

Fit All Views 

Automatically fits the contents of all panes by zooming in or out.

Standard Layout 

Provides a single button that automatically splits the Target view into 4 panes for front, side, top and 3D views.

Front View 

Rotates the user's perspective to provide a front view of the target -- (X, Y plane).

Side View 

Rotates the user's perspective to provide a right-side view of the target -- (Z, Y plane).

Top View 

Rotates the user's perspective to provide a top view of the target -- (X, Z plane).



PARTS TOOLBAR – Target Document



Allows you to drag a selected primitive part type into a selected view.

Add a Block



Allows you to drag a block of any size into a selected view. The default depth of the block will be 50 units into the view.

Add a Rod



Allows you to drag a rod of any diameter into a selected view. The default depth of the rod will be 50 units into the view.

Add an Elliptical Rod



Allows you to drag an elliptical rod of any diameter into a selected view. Default depth of the elliptical rod will be 50 units into the view.

Add a Tube



Allows you to drag a tube of any outer diameter into a selected view. The default depth of the tube will be 50 units into the view.

Add an Elliptical Tube



Allows you to drag an elliptical tube of any x and y outer dimension into a selected view. The default depth of the elliptical tube will be 50 units into the view.

Add a Sphere



Allows you to drag a sphere of any diameter into a selected view. The default depth of the sphere will be the diameter of the sphere.

Add a Spheroid



Allows you to drag a spheroid of any x and y outer dimension into a selected view. The default depth of the spheroid will be 50 units into the view.

Add a Toroid



Allows you to drag a toroid of any major diameter into a selected view. The default minor diameter will be one fourth of the major diameter.

Add a Cone



Allows you to drag the base diameter and height of a cone into selected view.

Add an Extrusion



Allows you to drag a four-sided cross-section into a selected view. The default depth of the extrusion will be 50 units into the view. Use "edit part size" to move vertices or add more line segments to the cross-section.



Add a Revolved Cross-Section



Allows you to drag a four-sided cross-section into a selected view, which is then revolved into a ring. Use "edit part size" to move vertices or to add more line segments to the cross-section.

EDIT PARTS TOOLBAR – Target Document



Tools for defining part properties.

Add New Part



Creates a new part to add into the target by working through a series of dialog boxes.

The **Define Part Type** dialog box (Edit-Part Shape and Material) appears first. If the new part type is one of the regular primitive parts, the **Define Part Dimension** dialog box appears next.

If the new part type will be an Extruded Cross-Section or a Revolved Cross-Section, the **Cross-Section Editor** allows you to define the parts profile.

In a .dxf or .sat file import, the file itself defines the part dimensions.

In each case, the **Define Part Position** dialog box appears last to allow you to specify the new part's location.

Delete Part



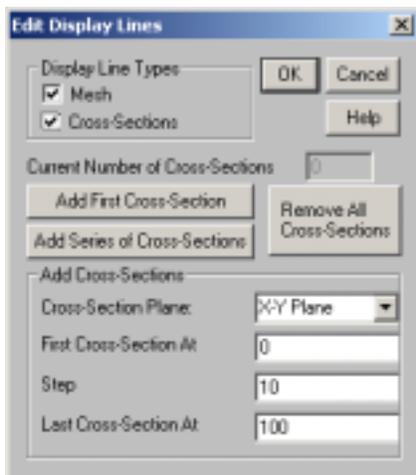
Deletes the currently selected part.

Materials Table



Opens the **Material Properties Table** so that you can edit or add materials.

Edit Display Lines



By default, *Imagine3D* shows the target as a mesh surrounding the surface of the part. For complex parts, this representation can become complicated. To create a simpler representation of the target, *Imagine3D* allows you to define a series of cross-sections of your specifications. These allow you to show your target more clearly.

**Display Line Types**

Show the mesh or cross-sections.

Current Number of Cross-Sections

Shows the total number of Cross-Sections defined.

Add First Cross-Section

Adds the cross-section specified in the **Add Cross-Sections** region at the first value along the axis perpendicular to the plane specified.

Add Series of Cross-Sections

Adds a series of cross-section according to the plane, first value, last value and step size as specified in the **Add Cross-sections** region.

Remove All Cross-Sections

Removes all Cross-Sections.

Cross-Section Plane

Select plane to use to add series of Cross-Sections.

First Cross-Section At

Specifies the distance along the axis perpendicular to the selected plane (e.g. the Z-axis is used when X-Y plane is selected) at which the cross-section will be drawn.

Step

Distance to allow between subsequent Cross-Sections.

Last Cross-Section At

Specifies the distance along the axis perpendicular to the selected plane (e.g. the Z-axis is used when X-Y plane is selected) at which the cross-section will be drawn.

Combine Parts

Forces all of the individual components of a target to be combined to form a unified target by using each component's combine settings such as remove, embed or attach. This option is only available when **Auto-Combine** is off.

Auto-Combine

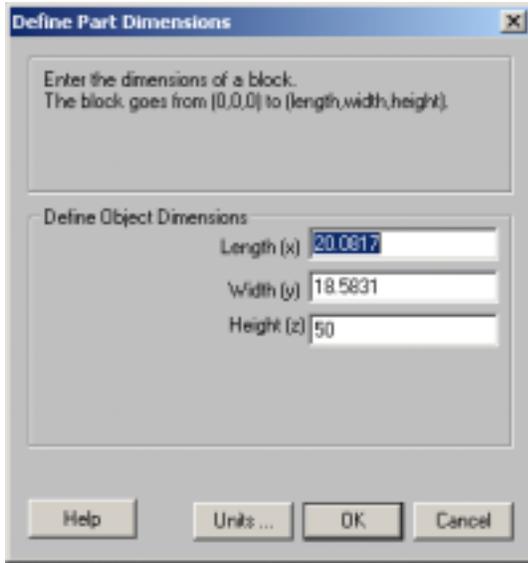
When **Auto-Combine** is active, *Imagine3D* will combine the target parts each time a part is changed or moved. For complex parts, this combination can be time consuming. To reduce your waiting time, turn off **Auto-Combine**. Once you are done changing the target, use **Combine Parts**.



Define Part Dimensions



If the selected part is one of the standard primitive shapes such as a block, this button opens a dialog box that allows you to change the size of the standard dimensions of the part. The dimensions that can be specified for different part types vary. Specific instructions will appear on the Define Part Dimensions dialog box according to the part type.



If the selected part is either an Extruded Cross-Section or a Revolved Cross-Section the Define Part Dimensions button will take you to the [Cross-Section Editor](#) where you can edit the profile of the part.

Dimension Definition

Describes the part type and required dimensions.

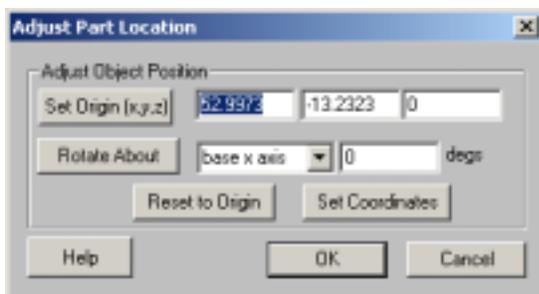
Define Object Dimensions

Specify each dimension.

Units

Specify target units. See [Target Document - Format-Units](#) menu item.

Define Part Position



Opens a dialog box that allows the part to be moved relative to the drawing's origin (hence relative to other parts as well), rotated relative to the axes of the target drawing or rotated relative to the axes of the selected part.

Set Origin (x,y,z)

Sets the origin of the selected part to the specified x, y and z values. The selected part is displayed in its new position after this button is pressed.



Rotate About

Rotates the selected part about an axis of the target drawing (base) coordinate system or relative to its own (part) coordinate system. Performs the rotation about the chosen axis by the specified angle in degrees. Note that this rotation is relative to the current orientation of the part. The selected part is displayed in its new position after this button is pressed.

Reset to Origin

Moves the selected parts origin to the Target View base coordinates.

Set Coordinates

Explicitly defines the parts coordinates using the [Define translation and rotation](#) dialog boxes.

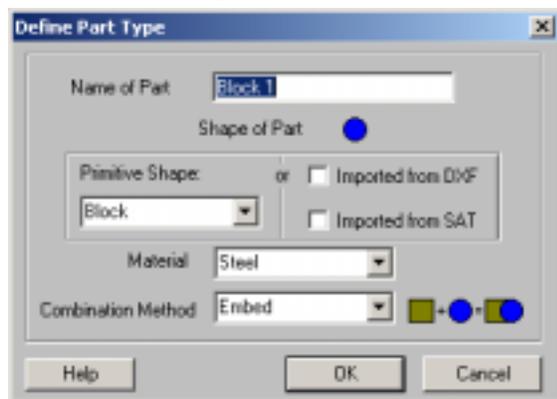
OK – Adjust Part Location

Confirms any changes already made using the **Set Origin**, **Rotate About**, **Reset to Origin** and **Set Coordinates** buttons as well as performing the move currently showing if the **Set Origin** and **Rotate About** buttons have not been used.

Cancel – Adjust Part Location

This returns the part to the position it was in before the **Adjust Part Location** dialog box was opened.

Define Part Type



Allows you to change the selected part's material, shape and how it is combined with other parts.

Name of Part

Specifies the name of the part. This is the name used in the Target View Parts list box.

Shape of Part

Specifies the type of the part. Parts can be selected from the primitive shapes available in *Imagine3D* or imported from a .dxf or a .sat file.

Material

Specifies the material for the part.

Combination Method

Specifies the way the part will combine with the other parts in the target.

Insert this target into

Inserts the modified target into any currently open Simulation document, into a newly created Simulation document, or to a file.



Retrieve target from

Extracts the target from any currently open Simulation, or from a file, so that it may be edited or inserted into a different Simulation document. This is good for copying.

Drawing Area

Shows the entire target as it is currently constructed from individual parts. Note that the zoom, split windows and standard layout toolbar buttons may be used on this window. Related dialog boxes can be reached by right clicking in the drawing area.

Select Parts

Shows a list of all the parts in the target. A single left click over the part name selects or deselects that part. More than one part can be selected at a time. This is useful to move multiple parts at the same time.

VIEW CONTROL BAR-Target Document



Rotate Buttons

Each click of the arrow button will rotate the view about an axis perpendicular to the screen by the selected rotation step size (default is 5 degrees).

Rotate CW – click the button or press R.

Rotate CCW – click the button or press ALT +R.

Spin Buttons

Each click of the arrow button will spin the view about a vertical axis on the screen by the selected rotation step size (default is 5 degrees).

Spin Backward – click the button or press S.

Spin Forward – click the button or press ALT +S.

Tilt Buttons

Each click of the arrow button will tilt the view about a horizontal axis on the screen by the selected rotation step size (default is 5 degrees).

Tilt Upward – click the button or press T.

Tilt Downward – click the button or press ALT +T.

X Y Z Cursor Position Readout

Moving the cursor displays the absolute x, y and z position of the cursor. Dragging a rectangle displays the relative distance of the dragged rectangle in x, y and z, the diagonal distance and it's angle.

Grid Size Readout

Displays the current grid sizing in selected units.



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