# Quick-Start

July 2018

# 1. Introduction

The Ulysses Quick Start is intended to give you a brief survey of the most important Ulysses features, facilities and functions.

It is also an instruction manual how to create and edit architectural models and sound systems.

In addition, it contains advice on how to simulate and calculate acoustic and sound system properties.

It is recommended to load the Ulysses Quick Start to a file lister or word processor and print it.

The printout may then be used as a guide thru a quick start procedure to gain basic information on Ulysses modeling, editing and simulation.

In case you have any remarks, ideas or suggestions to improve this MicroTutorial please feel free to e-mail to our office:

**info@ifbsoft.de**

Subject: Ulysses Quick Start

You'll find databases and samples for download on our homepage:

**www.ifbsoft.de**


## 2. Installing Ulysses

Simply follow the instructions  from our web site:

**http://www.ifbsoft.de**


# 3. Start Ulysses Design Engine

The **Ulysses License Agreement** appears. After reading the License Agreement close the license window.

The User Registration box will pop up. It shows your **Computer ID** and asks for the entry of a **License Number**. Full licensing may be obtained by sending the Computer ID to IFBsoft. The assignment of a matching License Number for your PC or laptop is subject to charge.

After entering your License Number, company name, address etc. click OK. Ulysses will now run in fully **licensed mode**. The License Agreement Screen will show no longer when re-starting the program.

If you *don't* have a License Number you may use Ulysses in **Demo Mode** only by simply clicking OK.

In Demo Mode you may access all Ulysses 3-D drawing, editing, simulation and auralization features and save nearly all of your simulation results. However, you may not save your projects. Without entering a
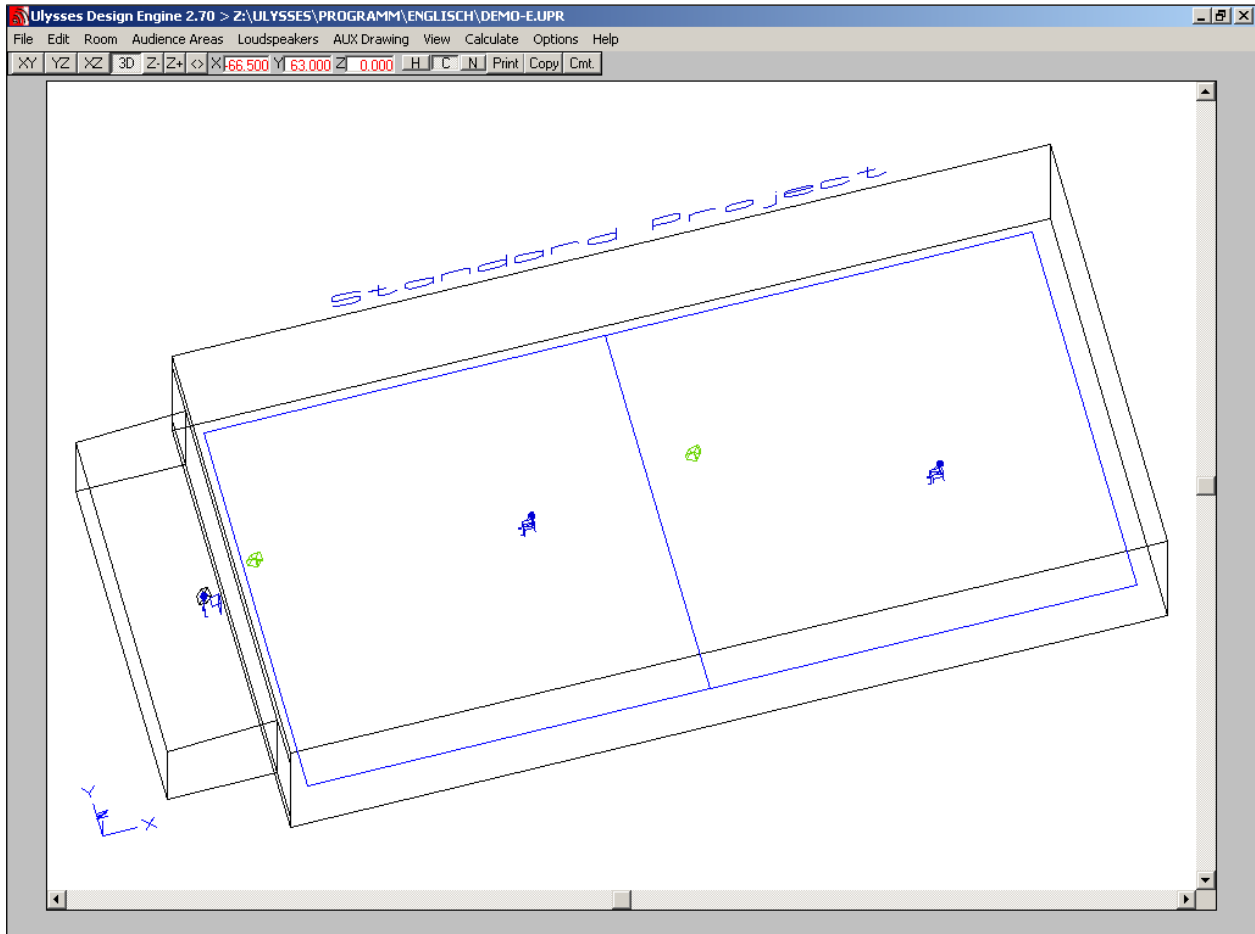
License Number the License Agreement Screen pops up every time you start the Ulysses Design Engine again.

# 4.     Loading a Demo Project

Load a demo project by clicking on **"Open"** in the **"File"** menu.
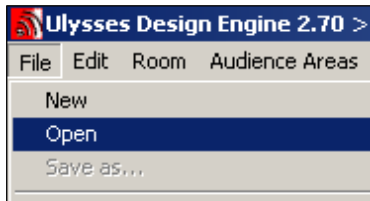


Load the *.**upr** file. A room model including speakers will appear.



Clicking on the  XY | YZ | XZ  or  3D  in the top menu bar (or strikingF1 - F4) toggles between model views.

| | |
|---|---|
| **Please note:** | In this tutorial, **»click«** always means **Left Mouse Click**, **Right Mouse Click** is indicated by **»RightClick«**. |

The [<>] or F7 centers the image on the screen, [Z-|Z+] or F6 / F7 zoom in and out

In the **»View«** menu, you may view or hide different **layers**. You may also toggle **»Room«** or **»Loudspeaker aim«** on or off in this menu.

Click on the [3D] (or strike F4) and use the **cursor keys** to **rotate** objects.

| | |
|---|---|
| **Please note:** | The top menu bar relates to your keyboard **function keys**, try F1 to F4 for changing views! |

Choose 3D mode and click on top bar [H] or F8 to hide the **wireframe lines**. Watch your model while rotating it via the cursor keys.

# 5.    Calculation and Simulation

Click on **»Calculate«** in the top menu bar and select **»RT60 Sabine«** (this calculates reverberation time using the Sabine equation).

RT60 Sabine calculation results are now shown graphically (calculation shown is based on room geometry and absorption assigned to the different faces of the room).
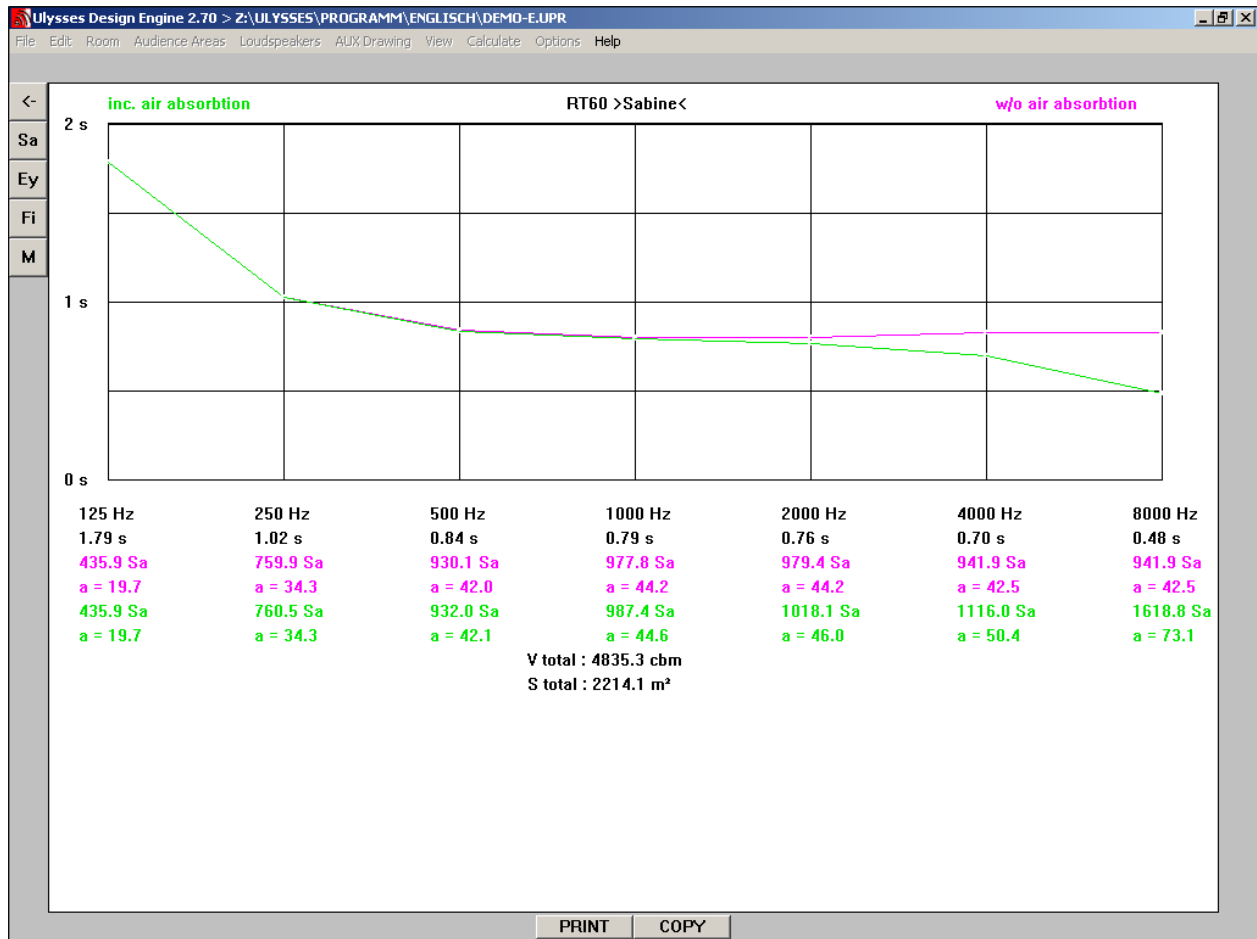
Use  above left on the screen or strike the ESC key to return to model view.

For sound field calculation select »Level« and **»Time«** in the **»Calculate«** menu.
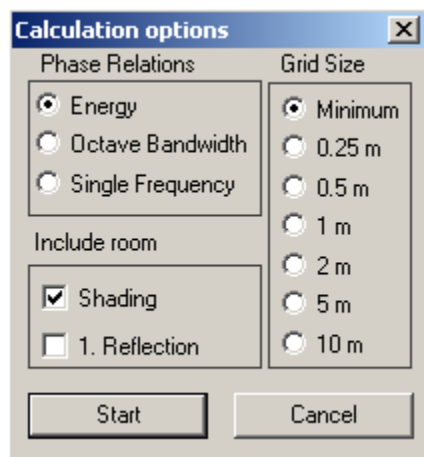


Select **»Energy«** from the **»Signal Coherence«** section (this calculates the energetic total of all sources, without interference effects). Do not select any of the **»Include Room«** options (i.e. no »checks«).

Choose **»Minimum«** in **»Grid Size«** for maximum resolution.



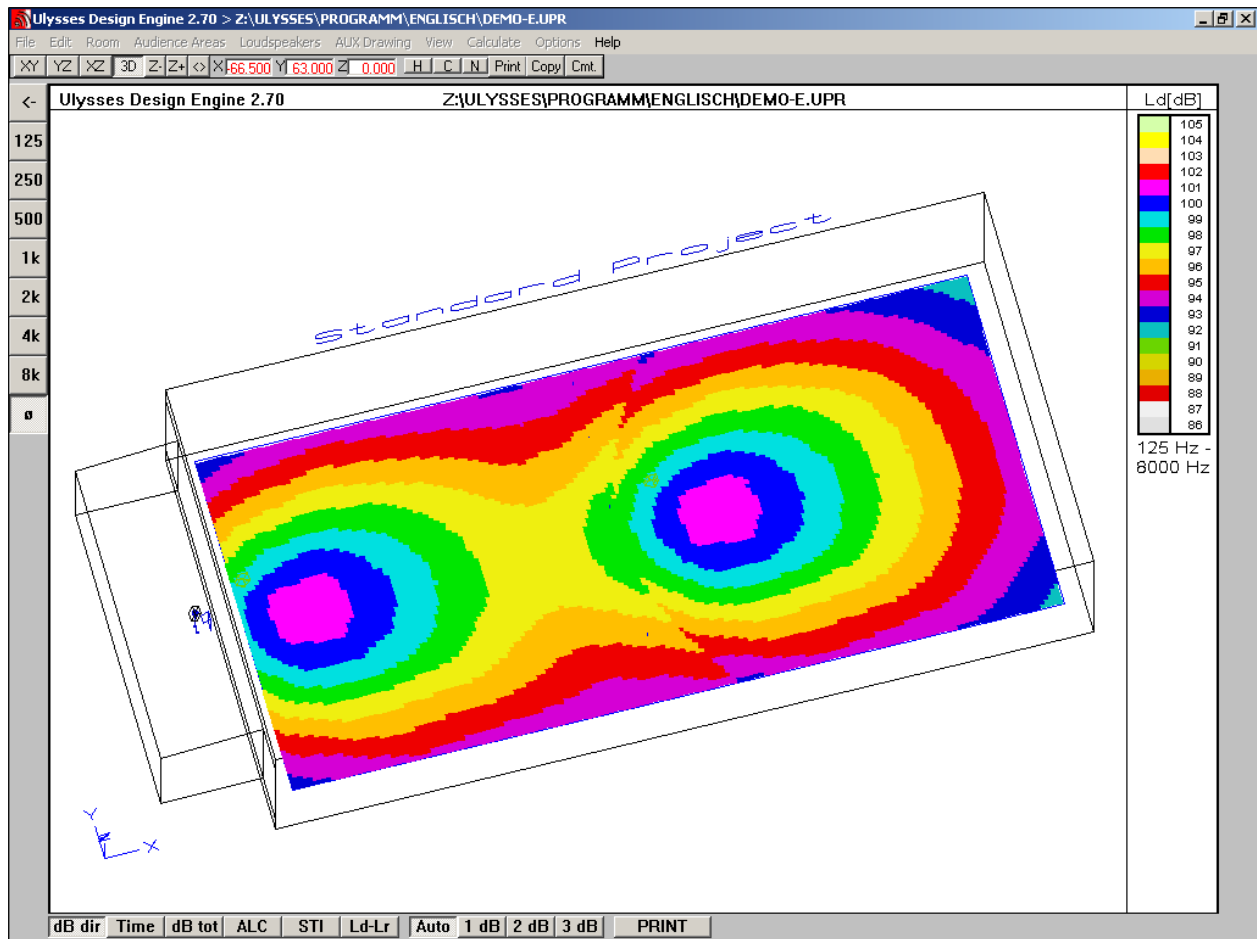After calculation click on the different **frequency band buttons** left of the screen.

Click on the following **buttons** on the bottom button bar to display results:

| | |
|---|---|
| **dB dir** | **Direct Sound Preasure Level (w/ or w/o Early Reflections)** |
| **Time** | **Time of First Arrival** |
| **dB tot** | **Total Sound Preasure Level** |
| **ALC** | **Articulation Loss of Consonants (%AL$_{Cons}$)** |
| **STI** | **Speech Transmission Index** |
| **Ld-Lr** | **Difference between Direct- and Reverberant Sound** |

The **resolution** of the calculation shown may be selected by clicking on **Auto 1 dB 2 dB 3 dB** at the right end of the bottom button bar.

Clicking on the istening area shows the **numerical values** of the corresponding simulation parameters.

Clicking on CLEAR below right removes the numerical values from the screen.

Clicking on PRINT (bottom button bar) prints the screen display.

Calculate again, but check the **»1st reflection«** box in the **»Include Room«** options (this includes first reflections within 35 ms after first arrival of sound in the direct sound pressure level calculation).

**RightClick** on listening area to start **speedy auralization processing** using the included *.wav file (auralization is based on direct sound and first reflections adding a statistical reverberation tail for your model room). When choosing this function for the first time you have to select the wave file for processing.

You may also use other *.wav files for auralization (mono, 16 bit, 44.1 kHz format).
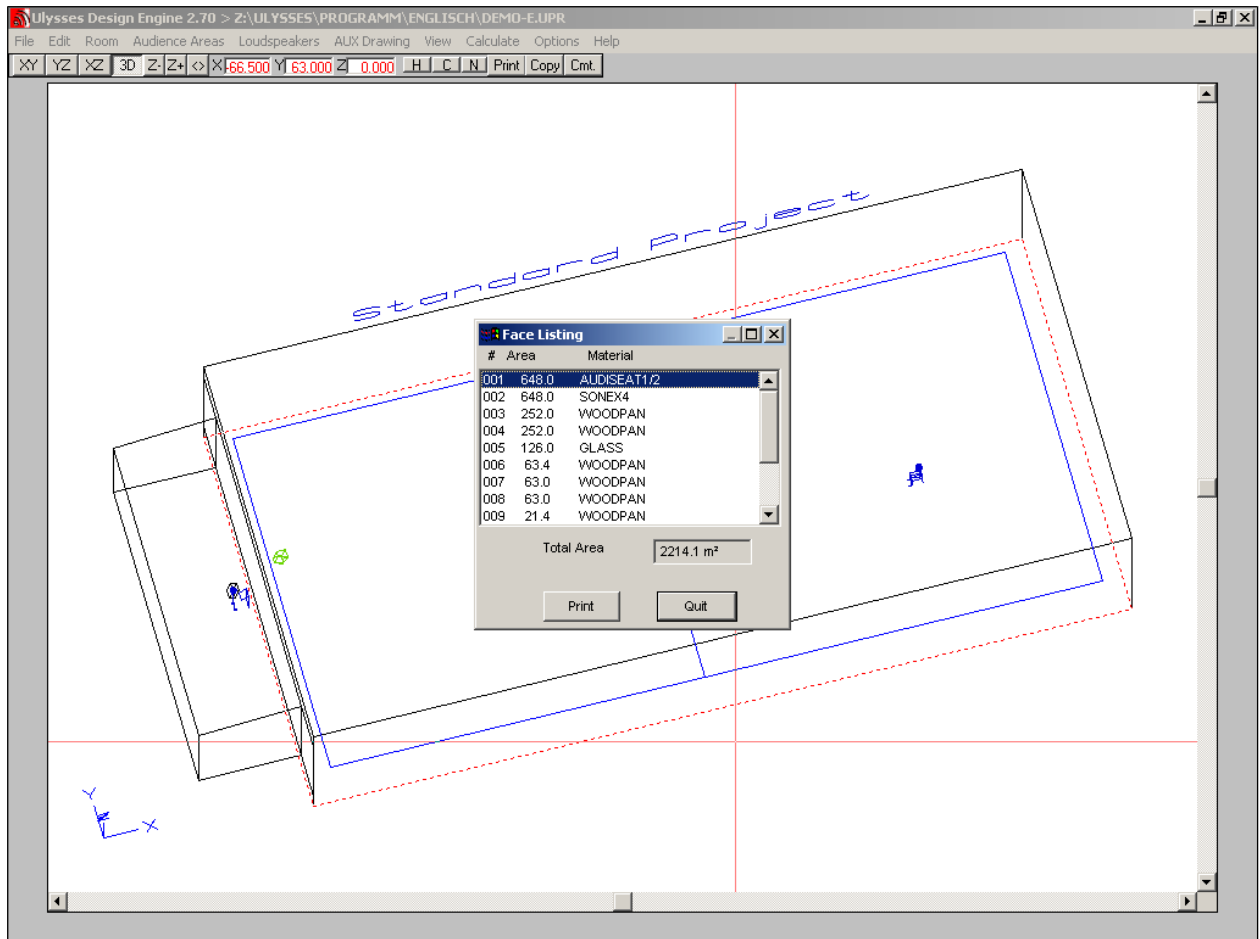
> For **auralization** a **dry sound** without strong reflections or reverberation is highly recommended.

# 6.    Taking a closer look at the model

Select the 3D view by pressing 3D. Click on the **»Room«** menu and select **»Face list«**.
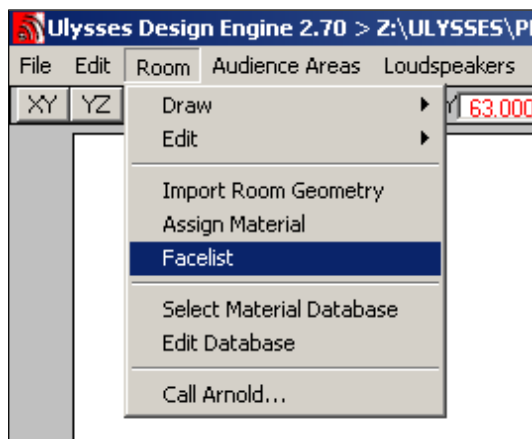


 A window shows **all faces** of your model room sorted by size.

It also shows the **materials** assigned to each face.

A face highlighted blue in the list is shown by a **broken red outline** in your wireframe model. Step thru Face List via the cursor keys or by clicking on the faces of interest.

The face list is created and updated automatically while drawing or editing a model.

Click on the »Magnifying« button ▢ of the face list for more **details** on faces and materials assigned. There are two options in the **magnified face list** to change assigned materials.

The button [ Change Face Material ] only changes the material assigned to the face currently highlighted blue in the list. After clicking on the button you must load an **absorber database**.
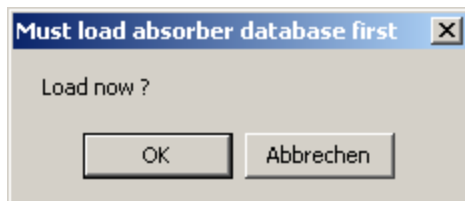


Clicking [ OK ] opens a box for selecting an **absorber database** (*.uab).

Choosing **abscom1.uab** and clicking [ OK ] lists the materials of the selected absorber database.

Select a **new material** from the list and click [ OK ]. The previous material will immediately be replaced by your new choice.

The button [ Replace Material ] works in similar fashion, however, it replaces the material on **all** faces that had been assigned the same original material, i.e. you may assign a new materuial to all faces originally intended for woodpaneling in a single step.

Material assignment to different faces may also be accomplished by selecting **»Assign material«** from the **»Room«** menu.
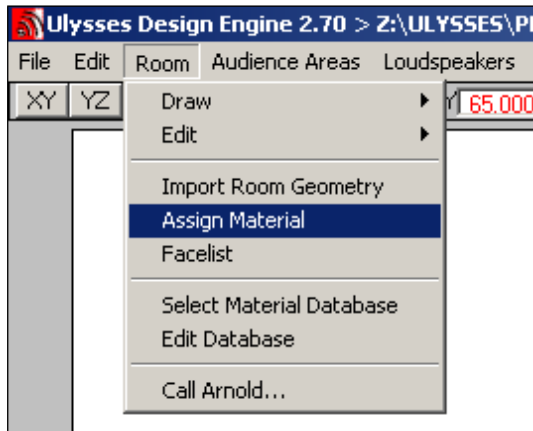


This opens the absorber database for material selection.
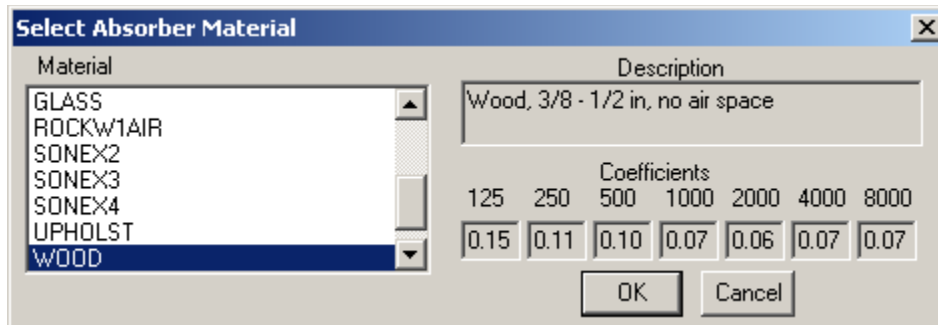


Select a material from list and click [ OK ]. The selected material will be shown bottom left on your screen. Ulysses now requires a face selection.



Assign WOODSelect Face
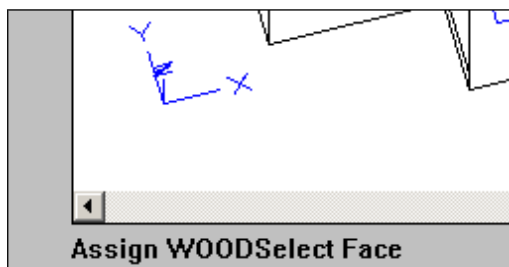
**Please note:** Ulysses input requirements (if there are any) are always shown bottom left on your screen.

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For easy operation make sure you are in 3D mode. The red **cross-hairs cursor** may now be moved to any face of the model.

Click on a face. The **outline** of the selected face turns **red**. However, while selecting faces in 3D mode there is always the possibility that two or more faces are selected. This happens because the screen is only two-dimensional and several faces may be within cursor position.

After the appropriate face has been selected (= red outline) RightClick or strike the Retun or Space keys to assign the chosen material. You may now select other faces and repeat assigment.

To stop assignment click **STOP** bottom center of the screen or strike the ESC key .

Select the 3D view. Select **»Listing...«** from the **»Loudspeakers«** menu in the top menu bar.
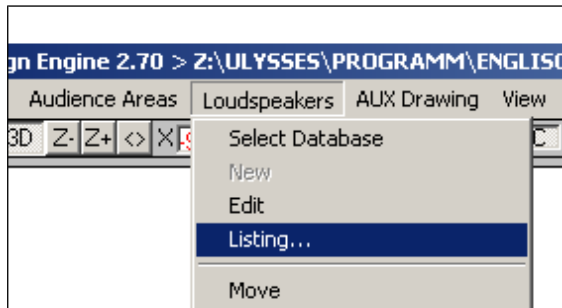


A window shows **all loudspeakers** in your model and their placement (x,y,z).
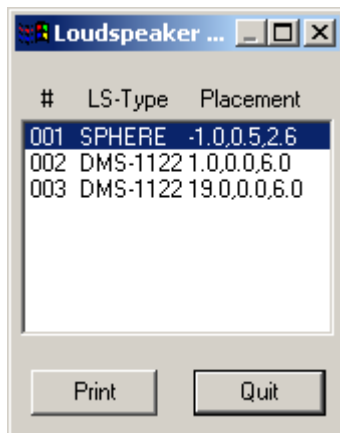


A speaker **highlighted blue** on the list is shown **red** in your model. Step thru loudspeakers via the cursor keys or by clicking on a loudspeaker of interest.

The speaker list will automatically be created and updated while installing or editing  loudspeakers in your model.

Click on ▣ of the loudspeaker list for more **details** on installed speakers.
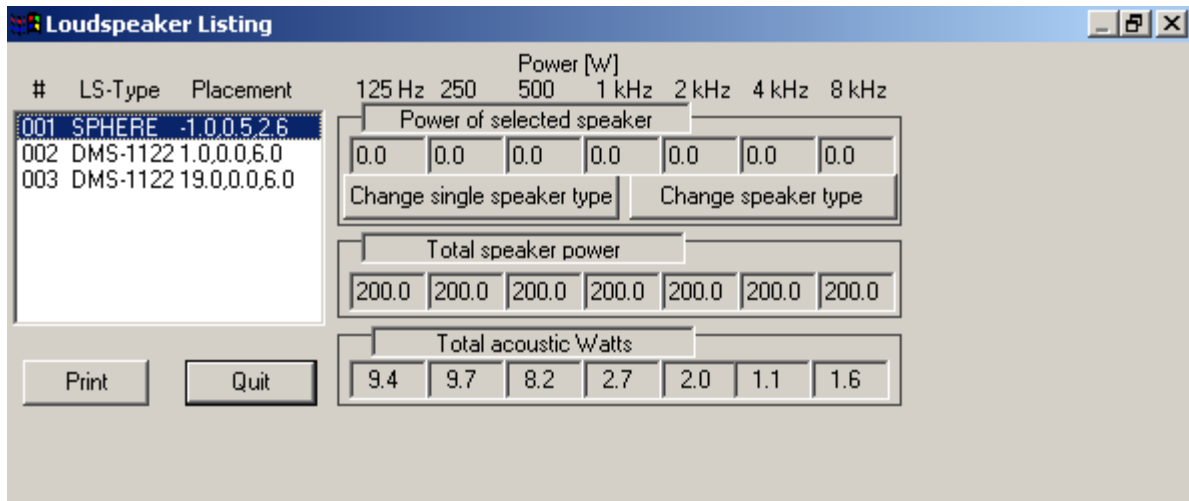
In the **magnified box** there are two options in the magnified loudspeaker list to change loudspeakers.

The button  replaces only the **loudspeaker higlighted blue** in the list.

The button  replaces **all loudspeakers** of the highlighted type in the entire model at once.

Before changing loudspeakers you must load a Ulysses Speaker Database (file *.usb) by clicking on **»Select Data Base«** in the **»Loudspeakers«** menu. A sample speaker database comes with the software package (speaker.usb).
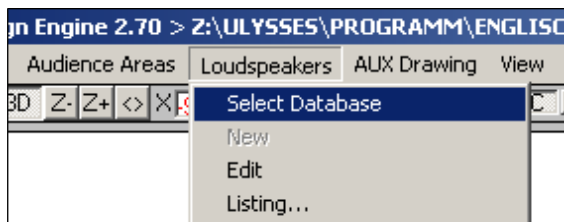


Without loading a speaker database you will be asked to do so when clicking on one of the Change Speaker buttons. In this case return to the main menu by closing the loudspeaker list.

All other **editing functions** of the loudspeaker menu work in **similar** fashion. After clicking on an editing function you must always select the objects (in this case loudspeakers) to be edited.

This also applies to **all** other editing and drawing functions in Ulysses!

Let's try an example: **Switching Off** Loudspeakers For easy operation make sure you are in 3D mode. Click on the **»Loudspeakers«** menu and select **»Switch Off«**.
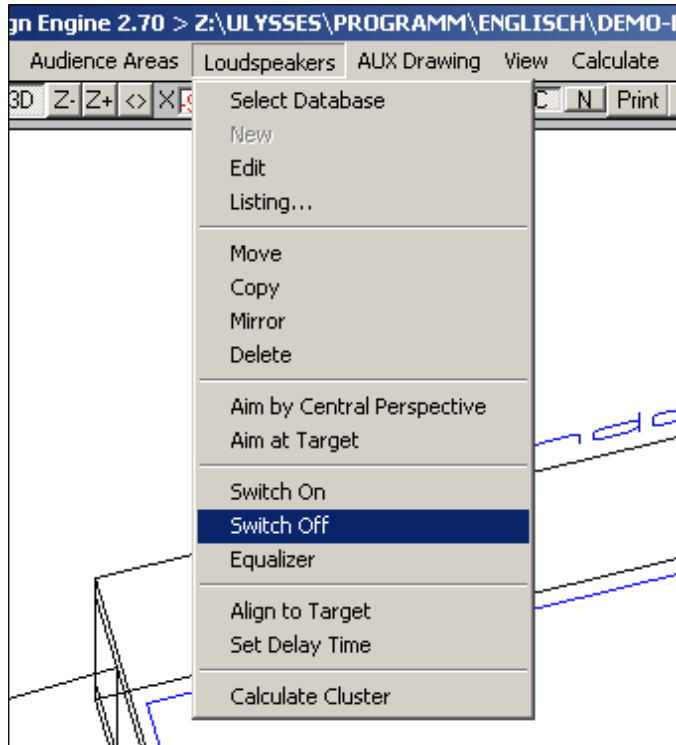
The red cross-hairs cursor now turns into a **square cursor** for loudspeaker selection. Place this square cursor on the loudspeaker to be edited and click. The selected speaker is now shown **red**. Select other speakers simply by repeating above procedure.

After finishing loudspeaker **selection** OK or strike the Return or Space keys to excecute the command (in this example switching off the selected loudspeakers). Speakers that have been switched **off** are now shown **black** while speakers that are still **on** are shown **green**.

For selecting several loudspeakers in a single step click on an area without speakers. Next, move the mouse to open a **dynamic rectangular window** for selection. All objects (in this case loudspeakers) within the cursor window are marked by a click. RightClick or strike the Return or Space keys to execute the desired edit command.

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There are two kinds of windows available depending on **mouse direction**:

- The first is **red** and generated by moving the mouse to the **left**. It selects all objects **completely surrounded** by the window frame.

- The second window is a **broken black-and-green** generated by moving the mouse to the **right**. It selects all objects **completely surrounded and/or merely touched** by the window frame.

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Try other editing functions in the same way!

# 7.    **Editing / Remarks**

Ulysses includes many powerful graphic editing functions. Since it is CAD based editing routines are not object oriented. They always follow the same six steps:

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**1.** Select the **desired action** from the appropriate menu

**2.** Select **object(s)** for action

**3. Terminate** object selection

**4.** Determine **base point** for action

**5.** Determine **offset point** for action

**6. Terminate** action

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**Please note:** Ulysses **input requirements** are always shown bottom left on your screen.

RightClick to repeat the last action.

In the **»Edit«** menu, 8 undo steps are available **(»Undo«** command)
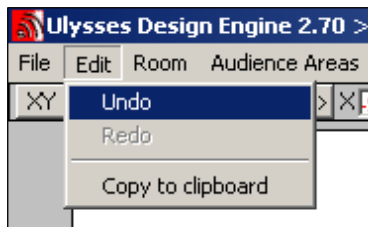


In the following **example** the room shape is edited:

For easy operation make sure you are in 3D mode. Select **»Edit«** and **»Move Nodes«** in the **»Room«** menu.

All **nodes** of the model room are now highlighted **green**. The red cross-hairs cursor now turns into a **square selector cursor**.

Place the cursor on the node to be edited and click. Selected nodes are now shown **red** and related objects are shown with a **broken red outline**.

The input requirement now reads:



Select the **4 nodes** of the rear wall of the room. You may select other nodes by repeating above procedure. The selection of Nodes is terminated by RightClick or striking the Return or Space keys.
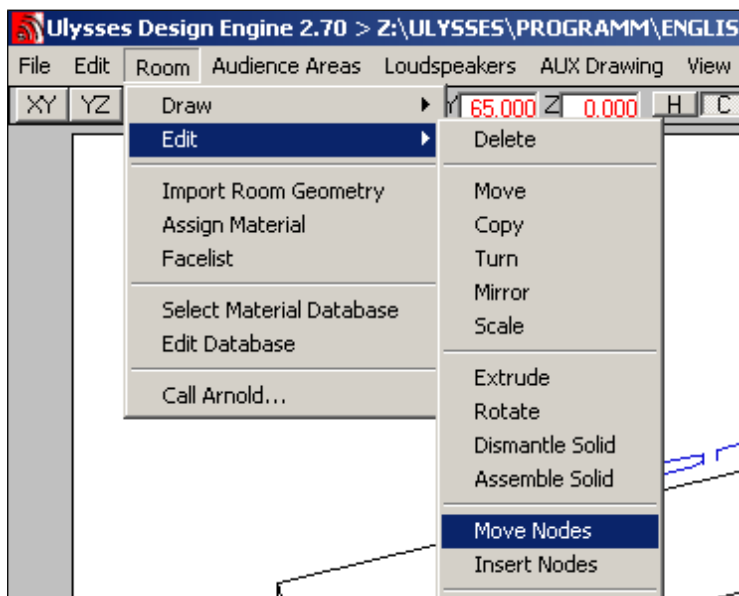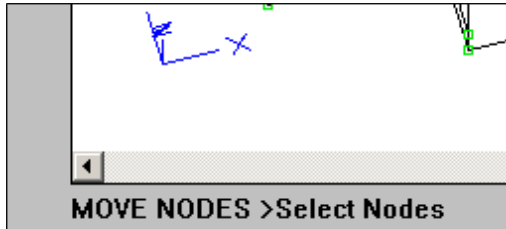
The Input Requirement now reads: **Move Nodes >Basepoint:**

Select the xy view by striking F1 or clicking on the ☐XY in the top button bar. (You may of course switch to the xz or yz views. However, best start with xy.)

Zoom out one step by pressing F5 or or clicking on ☐Z+ of top button bar.

Make sure **Coordinate Snap** and **Node Snap** are switched on. (This is not mandatory for any action but it makes things easier for this example. You will soon find out by practising)

**Coordinate Snap** toggles ON/OFF by striking F9, clicking on ☐C. **Node Snap** toggles ON/OFF by striking F11 or clicking on ☐N in the top button bar.

Now set the **base point** by clicking on one of the selected nodes.

The Input Requirement reads: **Move Nodes> Offset Point**

Move the **mouse** to the desired new location (in our example towards the stage = direction –x) to shorten the room model. Watch how the faces and nodes are tied to your mouse action.

Click on the desired **offset point** position. This excecutes the command (in our example it moves the selected nodes thus creating a new shape of the model room). The model should now be modified in length.

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*Coordinate input may also be accomplished **numerically**:*

**Absolute**     Strike the **A key**, and a box for numerical input of x, y, and z opens.

**Relative**     Strike the **R key**, and a box for numerical input of relative x, y, and z opens (relative to last coodinate input).

**Polar**         Strike the **P key**, and a box for numerical input of relative distance D and angle° opens (relative to last coordinate).

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You may use any means of coordinate input, i.e. graphic input by mouse or numerical input in any order. Set the basepoint by using your mouse, for instance, and determine the offset point by polar coordinate input relative to your selected basepoint.

Try to explore more of the **powerful editing functions** by using the steps above. Just follow the instructions in the Input Requirement line bottom left on your screen. In case you get lost, just hit the ESC key and start over again.

Here's a little teaser: try to cut the ceiling of the building into two equal parts via the Room/Edit/Split Face command. Then form a v-shaped roof by rising the new nodes of the cut ceiling using the Room/Edit/Move Nodes command.

# 8.      Drawing

The most crucial problem of all CAD tools is to integrate your model into the CAD program. We will now create a simple "shoebox room" model with a v-shaped roof.

First, select **»New«** from the **»File«** menu to open a new file for our model.
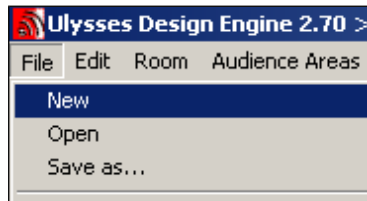
For drawing the floor make sure you are in the ⊠XY mode. Make sure that Coordinate Snap is switched on. (F9 or ⌷C⌷ toggles Coordinate Snap).

Click on the **»Options«** menu and select **feet** or **meters**.
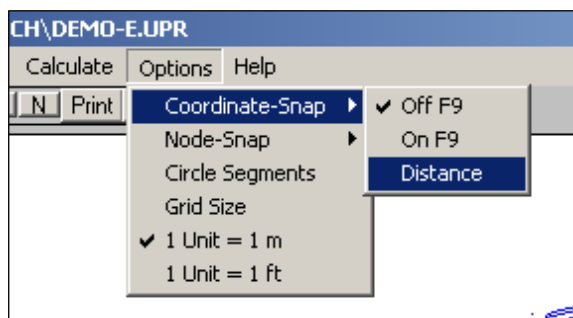
In the **»Options«** menu also click on **»Coordinate-Snap«** and **»Distance«.** Set **distance** to **5** in the input box. This will cause the cursor to snap at every 5 m or 5 ft. increment.

Open the **»Room«** menu and select **»Draw«** and **»Rectangle«**.
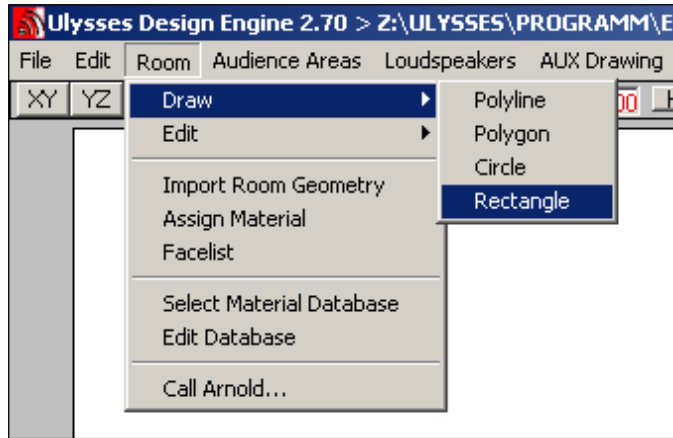
The **red cross-hairs cursor** will appear. The actual cursor location is shown on top of the screen including the x, y, and z coordinates.
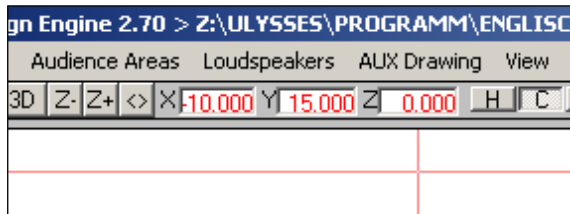


Because we want to draw the floor, **z** should read **zero**! If the z coordinate does not read zero, change to the yz view. Move the cross-hairs cursor untill  z = 0 and change to xy view by striking F1.

The Input Requirement reads: **RECTANGLE > 1.Point :**

The **first rectangle node** is determined by the cursor position (try to set the first point at **x = 0**, **y = 0**) and a click.

After determining the first rectangle point, the Input Requirement reads: **RECTANGLE > 2.Point :**

Move the **mouse** and watch the rectangle emerging. The **second rectangle node** is determined by cursor position (try to set the second point at **x = 30**, **y = 10**) and a click.
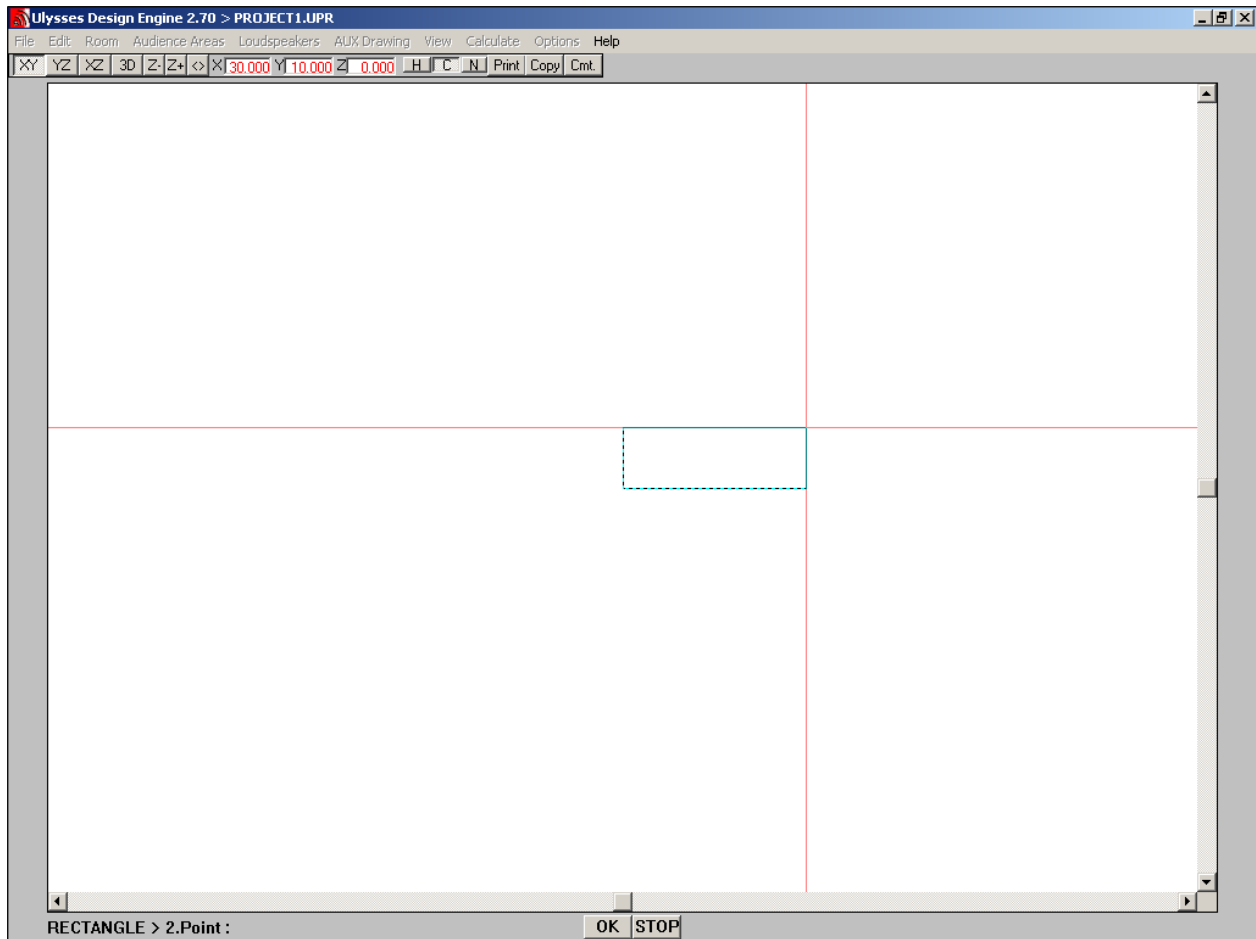
The second rectangle point has now been determined and the rectangle has been drawn. The Input Requirement line disppears.

Take a look at the floor you've drawn from the other views (yz, xz, 3D). You may also check out the **face list**, it should contain the floor only and an absorption of 100% should be assigned to it already.

**Please note: 100%** absorption is the Ulysses **default** for all newly created faces.

Because of the powerful drawing features of Ulysses it is highly recommended to create an entirely closed coarse model room first that is **entirely closed** (by using the extrude and rotate functions) and do the final shaping by using the Ulysses editing tools.

To create a shoebox from our floor in the xy plane we can now use the **»Extrude«** editing function to pull the floor to a certain height in direction z. Since this immediately creates a closed space you don't have to fiddle around with further drawing and connecting all faces to each other.

Switch to yz view to look at a section of the floor. Click on **»Room« / »Edit« / »Extrude«**
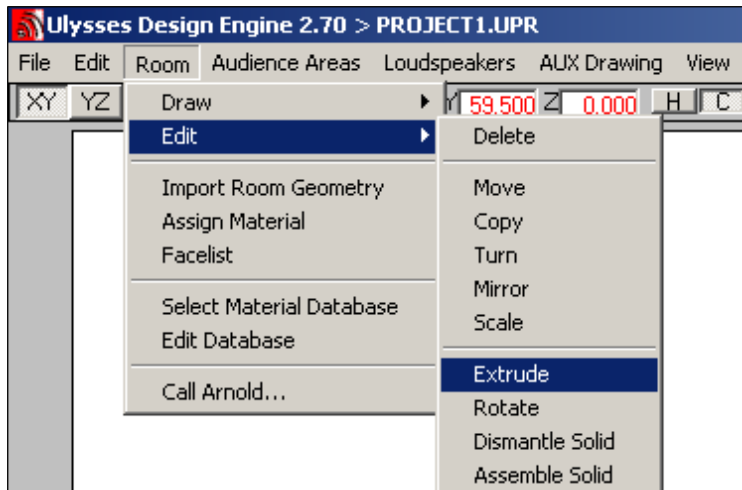
The Input Requirement now reads: **Extrude >Select Objects**

To select a **face** click on it (you may select objects in any view mode, even in 3D). Please refer to previous chapters for additional information on selection. The selected object is shown in a broken **red outline**.

The selection of objects is terminated by **OK** or RightClick or striking the Return or Space keys.

The Input Requirement now reads: **Extrude >Base point**

Set the **base point** by moving the cross-hairs cursor to one end of the floor section and click.

The Input Requirement now reads: **Extrude >Offset point**

Move the cross-hairs cursor vertically to the plane in direction +z to extrude plane to desired height (try to move cursor until z coordinate reads 5) then click.

There are two steps for doing **split face** and **move nodes**:

First step is to split the selected face, second is to move the selected nodes. The editing function "**split face**" has to be used first.

So you have to determine the face you want to split first, this works best in the 3-D view (F4) I think.

The Input Request line will change to: **SPLIT FACE > Select Face**

If the face you want to split is **hi-lighted red**, then you have to tell Ulysses that this is your choice by hitting the Return key or right click. If the hi-lighted face is the wrong one you can walk thru the different faces by left mouse clicks.To Split the face of the roof you have to turn to the **top view** (xy, F1).

The Input Request line will change to: **SPLIT FACE >Intersection line, 1 st point**

Then place the cross-hair **outside** the face you want to split, click left.

The Input Request line will change to: **Intersection line, 2 nd point**

Then move the cross-hair over to the **opposite side outside** the face you want to split, click left. So you have drawn a line intersecting at **2 points** with the face you wanted to split. Now you should have **2 additional nodes**. Check by using "View Nodes".

Now use move Nodes, Input Request reads: **MOVE NODES >Select Nodes**

Turn to 3D View (F4) and **select nodes** by clicking left on all the nodes you want to move. Then you have to tell Ulysses that these are all the nodes you want to move by hitting the Return key or right click.

Now turn to a side view (yz or xz, F2 or F3) and chose a "**base point**" (watch Input Reqirement Line) for moving by a **left click** to some arbitrary point or to one of the the nodes itself. Now the input requirement should have changed again to "**offset-Point**" and you should be able to move the nodes. With the mouse and left click for the final position of the nodes.

Switch to the 3D view and **survey your model**, check the face list and the RT60 Calculation (it should give you a read-out of the volume and surface of the model – and no error messages – and an RT60 figure for all surfaces covered with 100% absorption).

# 9.    Determinining Absorption

Once a room has been drawn you may determine any amount of **absorption** for and assign various **absorbing materials** to the different faces in order to calculate RT60s, sound fields or ray-tracing.

For assigning and changing absorption materials please refer to previous passages.

# 10.    Creating Audience Areas

By audience areas you define the planes in which you want to do you sound field calculations like direct sound, Alcons etc.

Audience areas may be drawn like surfaces by choosing the »Drawing« and »Editing« functions in the »Audience Area« menu. Normally an audience does not float around within the space of a room, but is seated in certain areas of that room.

Switch on the 3D view first. Select **»Build Ontop Room Faces«** in the »Audience Area« menu. An input box opens asking for the input of **ear height** above the room surface. For a seated listener this would be approximately 1.2 meters or 4 feet.

After numerical input click on ⌗OK⌗ button.

The Input Requirement reads:   **AUDIENCS AREA ONTOP ROOM FACES > Select Faces**

For face selection the red **cross-hairs cursor** appears. This is described earlier in this tutorial. Selected faces are shown with a **broken red outline**. After positive selection the audience area should appear in **solid blue** upon desired faces.

# 11.    Installing Speakers

For sound field calculations you must have a source feeding sound energy to the room.

This will take to a file selection box. Select the **speaker.usb** on your demo and click on the Open button. The box will disappear and the red cross-hairs cursor is back on again.

Now loudspeakers may be selected from the Ulysses Speaker Base (*.usb, speaker.usb in our case).

Select **»New«** in the the the **»Loudspeakers«** menu.

The Input Requirement reads:  **ADD NEW LOUDSPEAKER > Place at :**

Now you have to determine the **position** of the new speaker. This may be accomplished numerically by striking the A key (or graphically, refer to the section below). Now you can enter the x, y, and z coordinates of the new speaker.

Click **OK** after entry, and the Edit Loudspeaker box pops up.
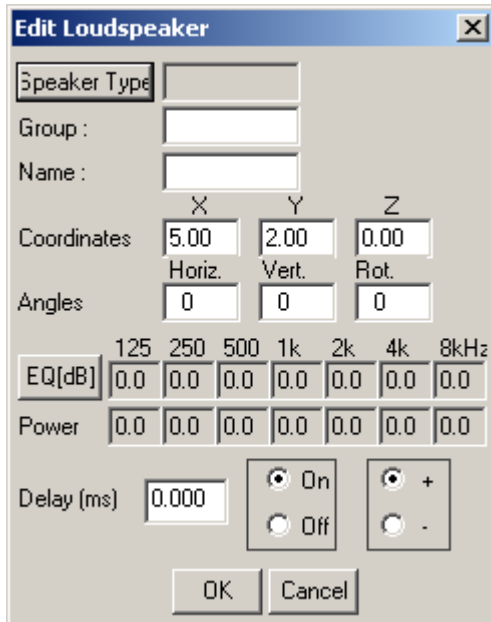


By clicking on the Speaker Type button you may select a speaker from the **Ulysses Speaker Base** you have chosen.

After speaker selection click **OK** .

In the **Edit Box** you may set the x, y, and z coordinates, aiming, powering, equalizing, polarity and ON/OFF status.

Click **OK** after input of the desired values.

The new loudspeaker should now be shown **green** in your model.

It is recommended to always check speaker aim. Select the »View« menu and verify. The **speaker axis** (i.e. the highest SPL or directivity) is now shown in **magenta**. If the file contains a **physical model** of the speaker cabinet it is shown. Otherwise a standard sample cabinet is shown.

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Please note the **Ulysses Aiming Definitions**:

- **0, 0, 0 degree** means the speaker »looks« along the x-axis and is not rotated.

- **Positive Horizontal Angle** means counter-clockwise in xy-plane.

- **Positive Vertical Angle** means counter-clockwise in xz-plane (so negative angles will aim or tilt the speaker towards the floor if mounted above the floor).

- **Positive Rotation Angle** means counter-clockwise rotation around the main axis while looking through the speaker from the back.

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Please note the Ulysses Aiming Definitions: 0, 0, 0 degree means the speaker »looks« along the x-axis and is not rotated. Positive Horizontal Angle means counter-clockwise in xy-plane.

Positive Vertical Angle means counter-clockwise in xz-plane (so **negative angles** will aim or tilt the speaker towards the floor if mounted above the floor).

Positive Rotation Angle means counter-clockwise rotation around the main axis while looking through the speaker from the back.

# 12.    Graphical Speaker Placement

Select **»New«** in the the **»Loudspeakers«** menu. The Input Requirement reads: **ADD NEW LOUDSPEAKER > Place at :**

Now you must determine the **position** of the new speaker. Select the xz or yz view and move the **cross-hairs cursor** until the desired speaker height is achieved. Next, switch to the xy view by striking F1.

The Input Requirement still reads: **ADD NEW LOUDSPEAKER > Place at :**

Move the cursor in the xy view to the desired location and click. Now the Edit Loudspeaker box pops up which already contains the graphically determined x, y, and z coordinates of the speaker.

If you want to maintain these values click OK . Otherwise edit the values in the box and then click OK .

The speaker is now shown in your room model. You may now install more speakers, different types of speakers, equalize them etc.

You may also **copy or mirror** one or more of the speaker(s) already installed to a second or third location or successively create a pattern for an overhead distributed system.

After that you may start all kinds of simulation or auralization processes in Ulysses. Have fun!

# 13.    Help

For further information please refer to the Ulysses context-sensitive online help which is accessible while running the Ulysses Design Engine under some Microsoft OS-Systems.