

# DDAV5 - USER GUIDE

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- DDA Basics and operation
- DDA 2d Geometry Builder
- Plane Weighting
- Import a Sketchup model into DDA

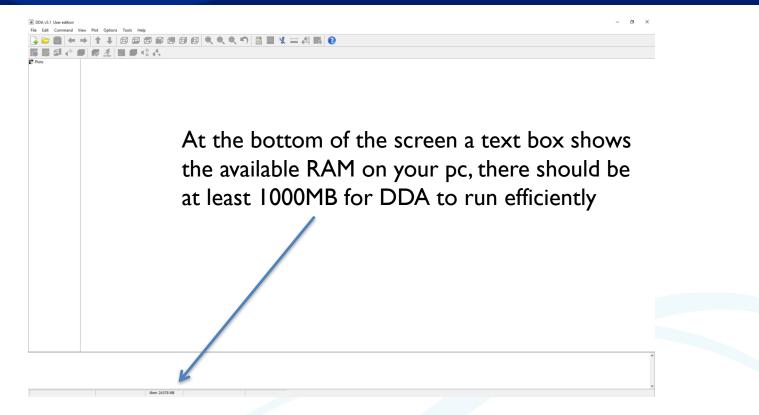
Page 3 Page 34 Page 43 Page 49



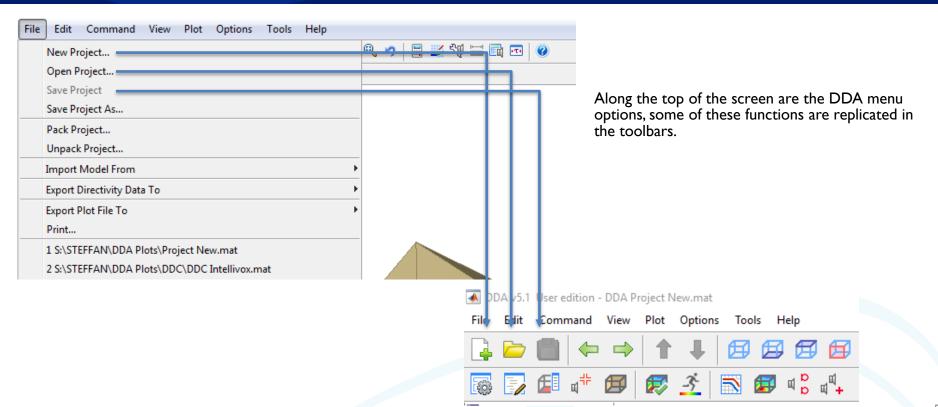
# When you open DDA for the first time you will see a screen like this.

DDA v5.1 User edition	– Ø ×	
File Edit Command View Plot Options Tools Help		
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	Unpack Project	
	Import Model From	
	Export Directivity Data To	
	Export Plot File To	-
	Print	
	1 S:\STEFFAN\DDA Plots\Project New.mat	
	2 S:\STEFFAN\DDA Plots\DDC\DDC Intellivox.mat	

When you make changes to your project such as trying out different speaker types, you can quickly 'Save Project As' change the file name and you can always go back to a previous version.

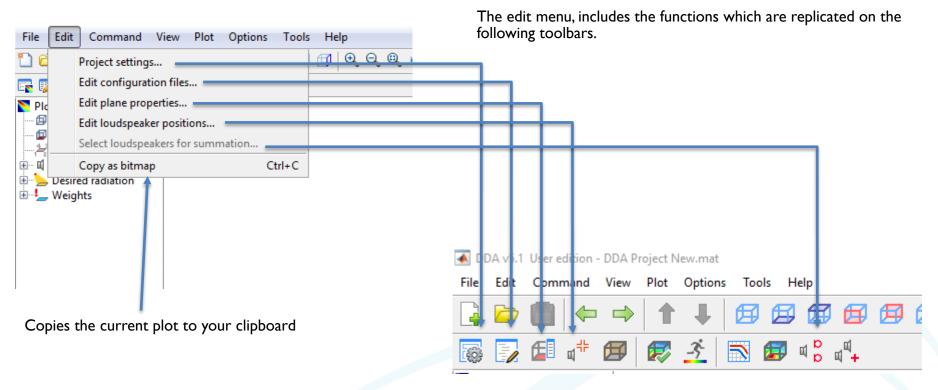
Pack project – this packs all of the project data you are using into a zip file to enable it to be sent to a client for example.

Unpack Project - unpacks the zip file and DDA will assign all of the project paths automatically to enable you to use the project straight away.



File Edit Command View Plot Options Tools New Project	Help 🧠 🤊 📄 🗾 👯 🔚 🖬 📼 🦉	Import a model from Catt Acoustic, Ease or Odeon Acoustic modelling software.
Open Project Save Project Save Project As		Once you have completed a Full run you can export the directivity files to be used in Catt Acoustic, Ease or Odeon Acoustic modelling software.
Pack Project Unpack Project		Export Jpeg Plot files to be used in a report etc.
Import Model From		Print Plot files.
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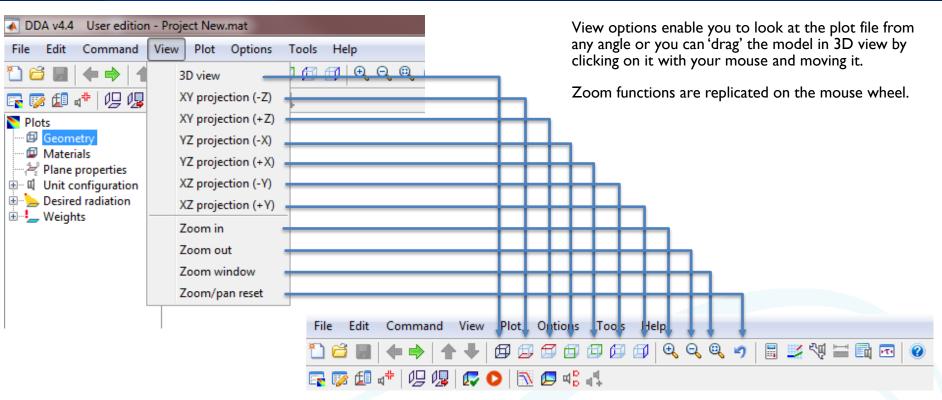




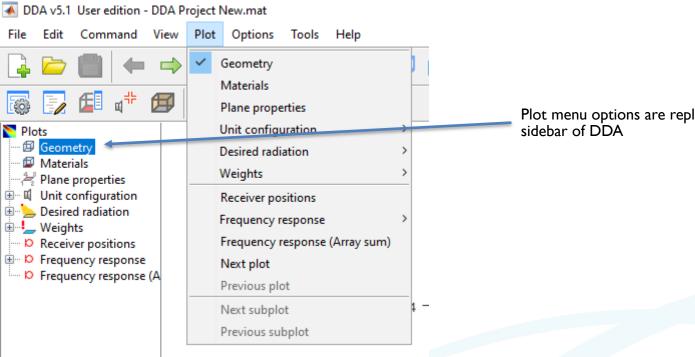
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The Command menu functions are assigned as follows



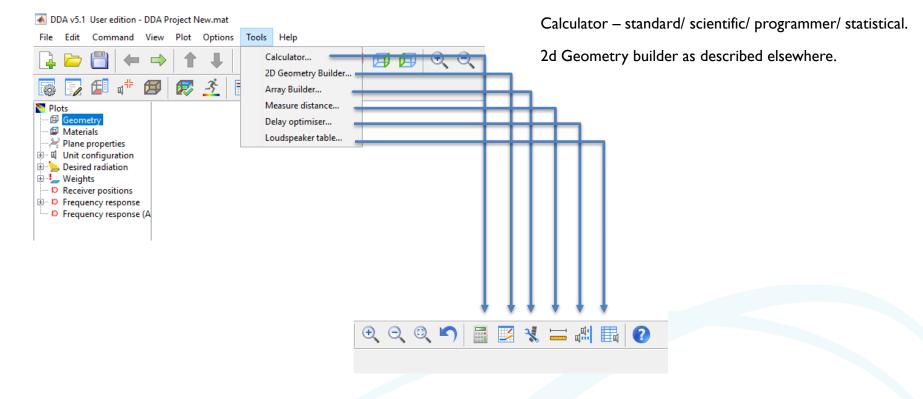






Plot menu options are replicated on the 'tree' in the







DDA v5.1 User edition			
File Edit Command V	View Plot Options Tools Help		
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## Project settings window will then open

Geo-file (Geometry Configuration File - GCF) this is the geometry or model the DDA project will be based upon - a standard 'shoe box' model is loaded by default.

Rec-file (Receiver Configuration File - RCF) this is the receivers or listeners file where the receiver positions can be placed within the model to indicate receiver response measurements.



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#### Each Group consists of a single speaker type

- New group
  - Duplicate Group
    - Import group (from another DDA project)
- delete Group

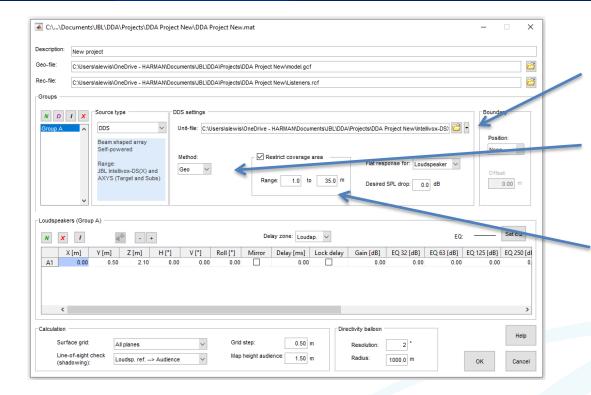
### Source Type

D

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ADC – For the passive 100v line V90 and H90
 DDC – Beam steering Intellivox using Digital
 Directivity Control technology (discontinued)
 DDS – Beam Shaping Intellivox using Digital
 Directivity Synthesis technology
 AXYS –Full range point source cabinets (discontinued)
 Point Source – Import any manufacturers'
 Common Loudspeaker Format (CLF) file





To Change the DDS Speaker type click on the folder here, this will then open the UCF (Unit Configuration File) folder and you can select the various DDS Intellivox.

There are two methods of steering a DDS device, either Geometry or Balloon Method. In almost all cases you will get a more accurate beam by using the Geo method where we define weighting and SPL values to a 3d model. 'Restrict coverage area' is defined where we would like the beam to start and end. For example a DSX380 would typically be used to cover a distance of around 35 metres so we would enter a start distance of I metre and an end distance of 35 metres. This would then be applied to the planes that we will weight within the model.



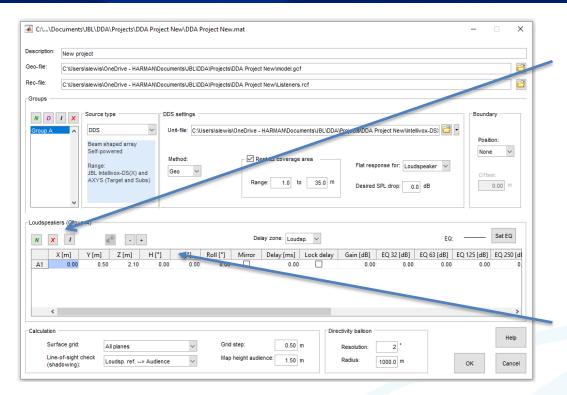
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Surface grid:     All planes     Grid step:     0.50 m     Resolution:     2       Line-of-sight check (shadowing):     Loudsp. ref> Audience     Map height audience:     1.50 m     Radius:     1000.0 m	ок	Car	ncel	

Flat response for Loudspeaker or Group, this adjusts the overall SPL for the group of speakers in relation to the desired SPL value. If we had three arrays covering an area and an 85dB requirement then by selecting 'loudspeaker' each individual loudspeaker would try to achieve 85dB which would mean the actual level would be higher or select group then the levels between the speakers would be automatically be adjusted to achieve 85dB.

As DDA works in direct SPL only, we sometimes need to include the reflections from the back of the array e.g. off a brick wall, these can be included here.

Desired SPL drop – a value can be entered to limit the SPL over an audience area so it drops with distance.





#### Loudspeaker Section

N - New Loudspeaker Position the loudspeaker within your model by entering the X,Y,Z co-ordinates

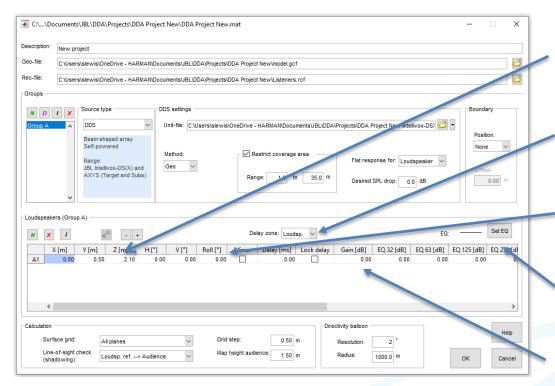
X - Delete Loudspeaker

Import Excel Sheet – data imported from columns (1,2,3,4,...) will correspond to the Loudspeaker table Parameters (X,Y,Z,H,...)
 Twenty one columns and 100 rows of data can be imported. Loudspeaker positions, aiming angles, delays, gain and equalisation values can all be imported or just the XYZ coordinates. Column 21 accepts text for loudspeaker labelling.

Right click on the top of any column to change all values within that column to the value of the selected cell.

E.g. change all Z height values from 2.1m to 2.3m.





The Z value is defined as the 'acoustic centre' of the array, this should be positioned approximately  $\leq Im$  above your audience height.

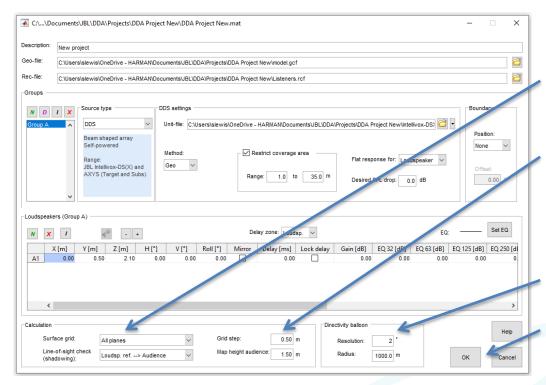
Delays can be set for each Loudspeaker, either as a group or for each loudspeaker within that group.

H – is the horizontal aiming angle of the array V – is the vertical aiming angle of the array Roll – adjust the roll around the acoustic centre of the array

Set EQ – equalisation values can be set here for individual or multiple loudspeakers. E.g. - This could be used to add a high pass filter

Gain – to reduce the gain of an individual loudspeaker you can enter a negative value. (do not enter positive values for DDS/DDC)





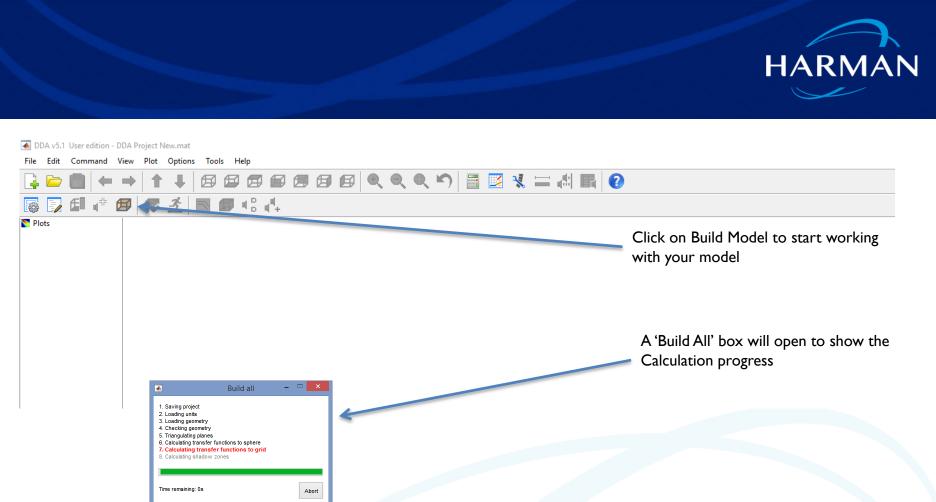
Surface grid - selects planes to be plotted on for visual reference Line of sight check – give you various options for displaying shadowing from structures such as

pillars within your model

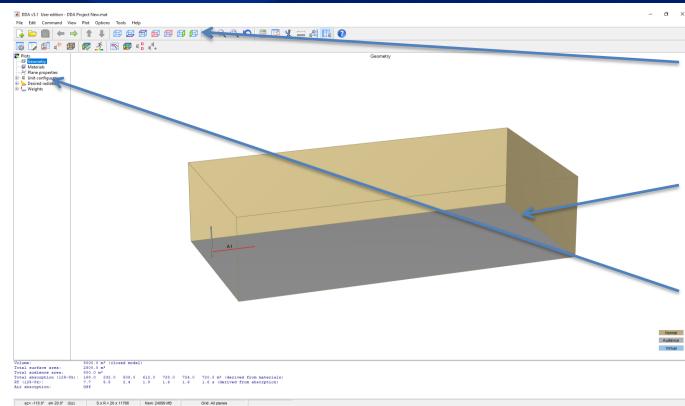
Grid step - changes the resolution of your model, for a small room such as a boardroom you may want to use a smaller grid step such as 0.25m, whereas a large train station you may want to use a larger grid step such as 3m to speed up calculation times.

Directivity balloon resolution can be adjusted here (for visual reference only)

Once your changes have been made to the project settings click on OK and then the model will need to be 'built'







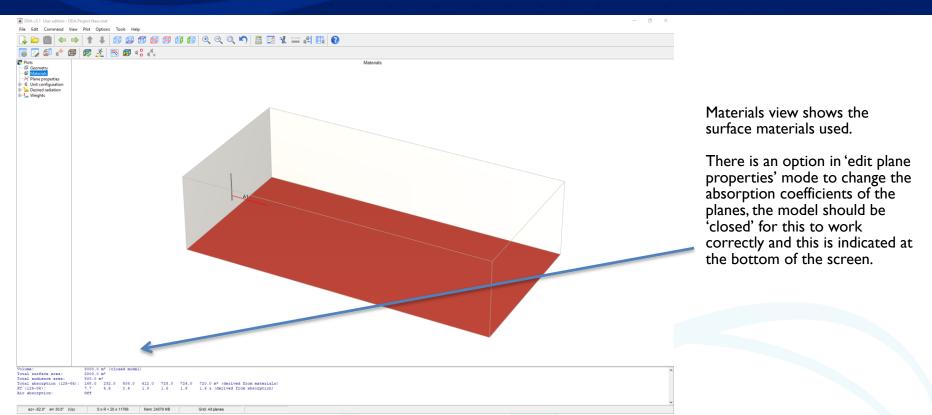
You can drag the model in 3d mode or look at the plan and section views by clicking on the toolbar.

Use the mouse wheel to zoom in and out, click on the mouse wheel to drag the model. The default box model is built with the walls and ceiling coloured brown and the audience plane shown in grey.

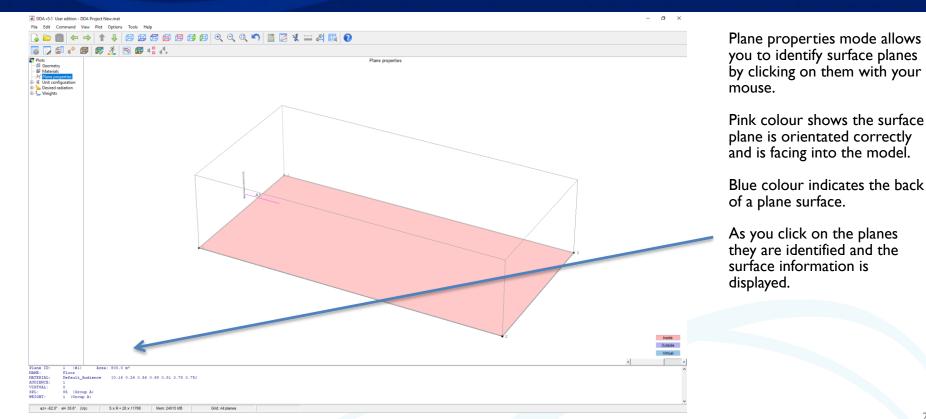
The tree on the left hand side shows –

- Geometry view, (as shown)
- Materials
- Plane properties
- Unit Configuration
- Desired Radiation
- Weights

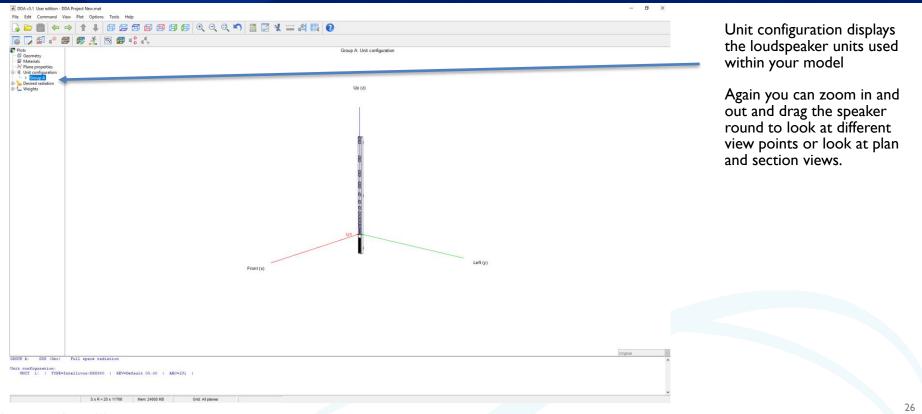






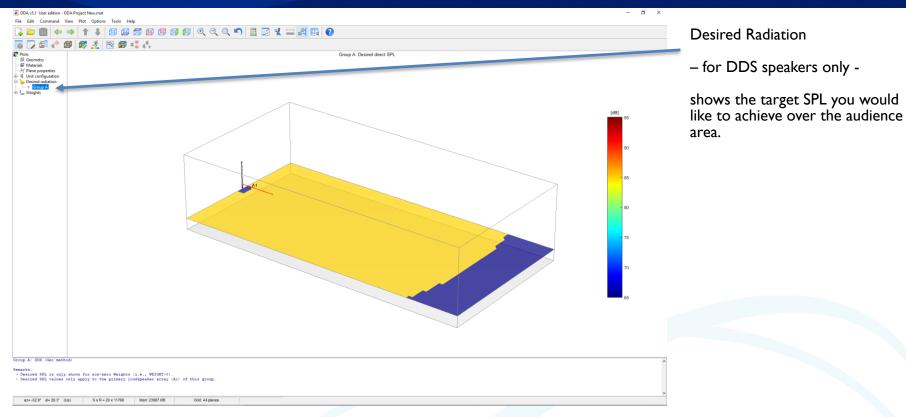




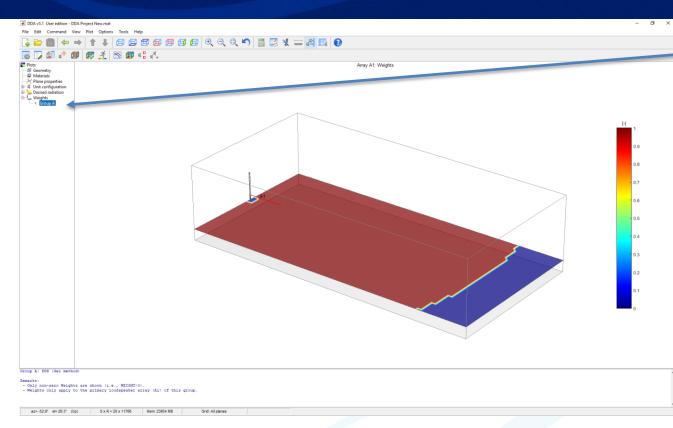


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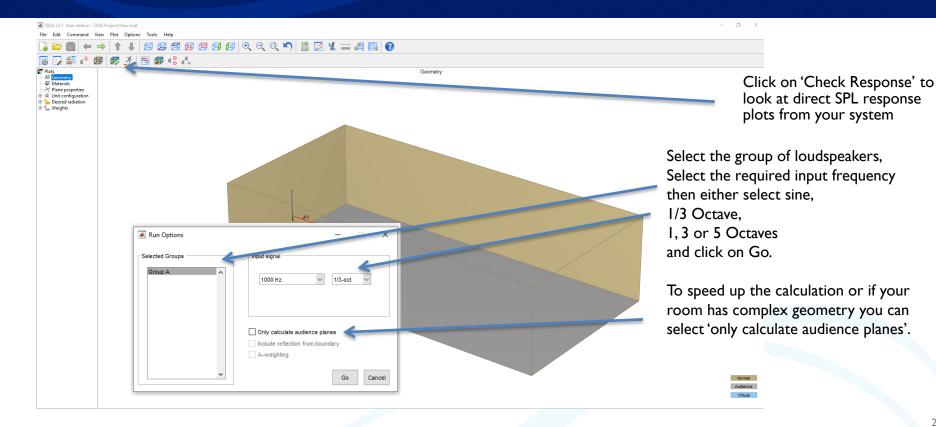


Weights - for DDS speakers only -

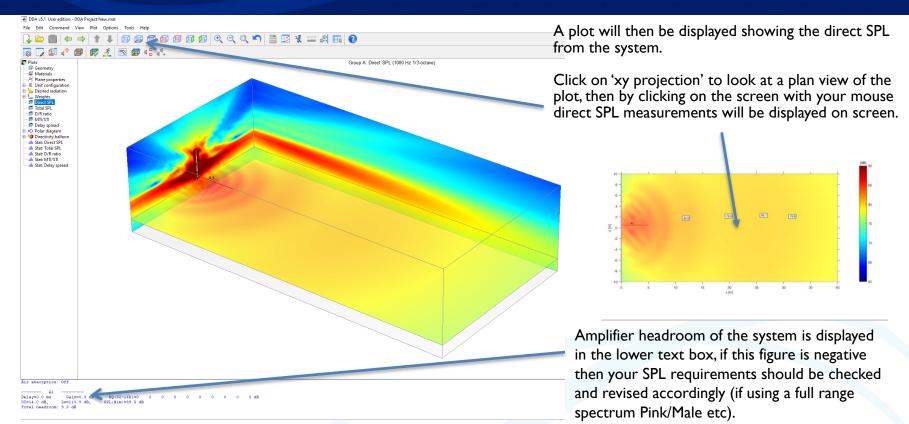
This shows the weighting or importance factor of achieving your target SPL over the audience area. In the default model the audience plane is weighted with a target of I. As this is the highest 'weight' within this model and no other planes are weighted this will give an optimum coverage over the audience area.

If for example we had an end wall reflection we could weight the end wall plane with a weight of 2 and as this is a higher number than the floor it would be seen as more important to avoid the end wall than cover the end of the audience plane so the DDS algorithm would steer the beam down to avoid the end wall.

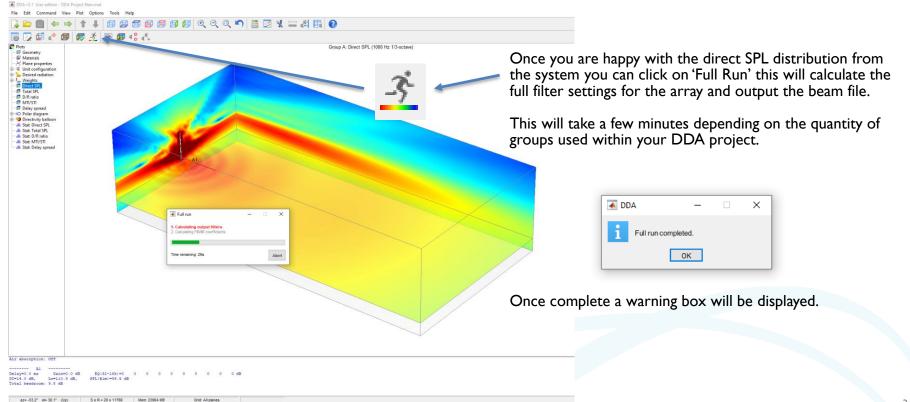




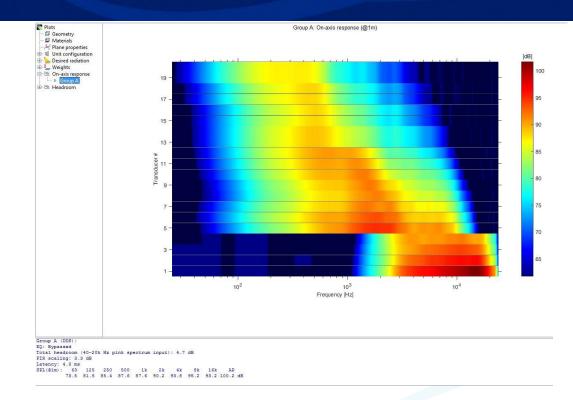








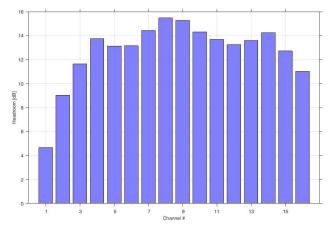




Once the full run is complete it displays the frequency range that each transducer is reproducing.

There is also a graph to indicate amplifier headroom.

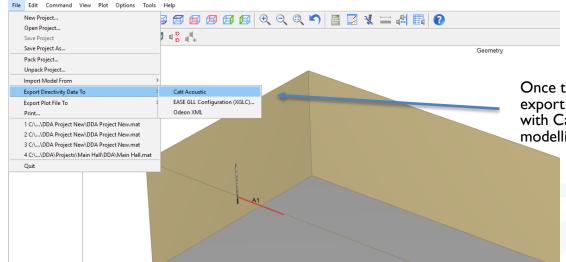
Group A: Headroom for pink spectrum input at desired output SPL





Name	Date modified	Туре	Size
Project New.stk	10/11/2016 16:41	STK File	1 KB
Project New.dda	10/11/2016 16:41	DDA File	17 KB

DDA v5.1 User edition - DDA Project New.mat

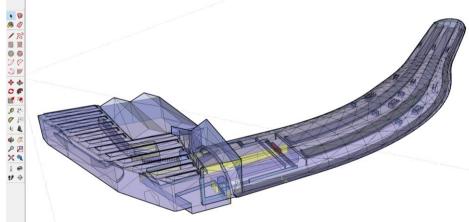


If you look where your project is saved there will be a new folder called \**Your Project Name*\*\_WinControl. This contains your DDS beam file.

The folder contains the two files needed to upload the beam settings to your DDS steered Intellivox via the WinControl Software package.

Once the full run has been completed you can also export the directivity files out from DDA to be used with Catt Acoustic, Odeon or EASE Acoustic modelling Software.

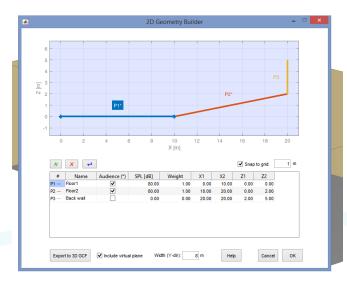




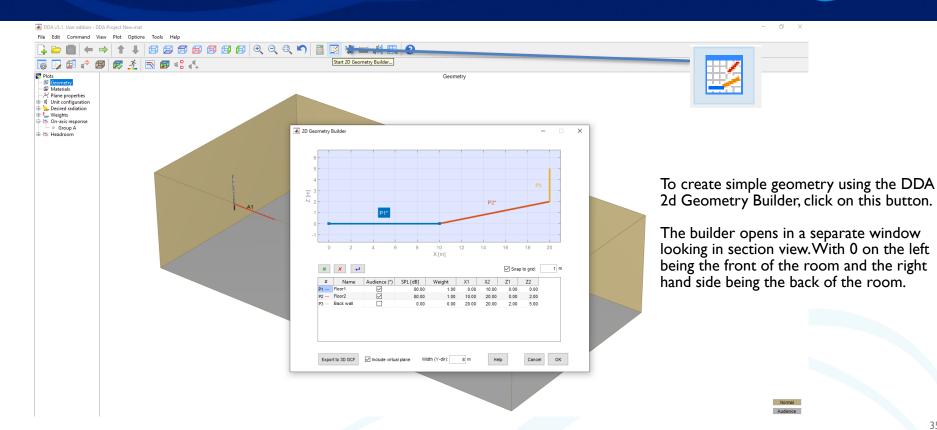
To import geometry into DDA you can export the geometry from SketchUp modelling software using the JBL plugin.

Import geometry directly from Odeon/CATT Acoustic by exporting the geometry to a .CAD file or a .XFC export from EASE

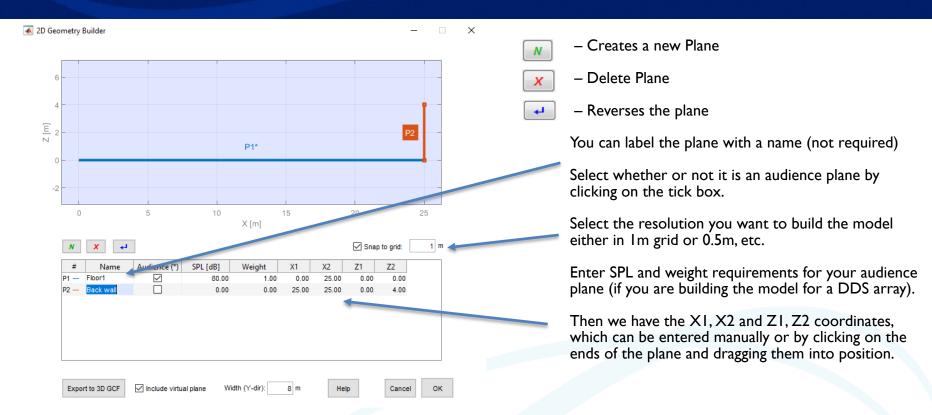
#### Or create simple geometry using the DDA 2d Geometry Builder.



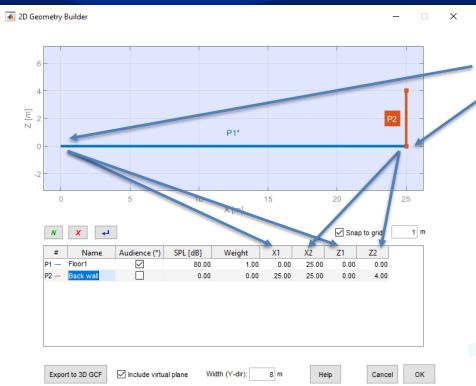












X is the horizontal plane and Z is the vertical plane.

Position XI / ZI

Position X2 / Z2

Plane I has its first location at XI, ZI

XI = 0 and ZI = 0 this is the start of the plane

X2 = 25 and Z2 = 0 This is the second location 25m away

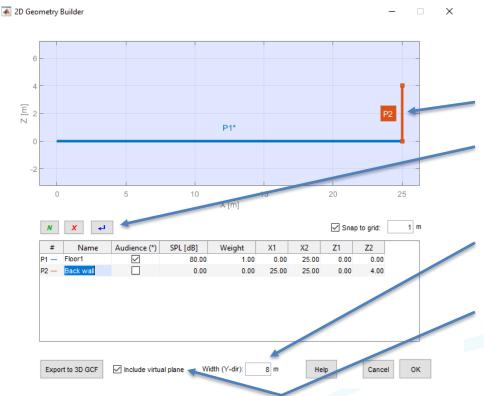
These locations are then joined to create a plane.

To build plane 2 – the back wall

XI = 25 and ZI = 0

$$X2 = 25$$
 and  $Z2 = 4$ 





If you click on a plane and select it, such as plane 2 in this model, we can then click on the ends of that plane and drag them to our desired positions.

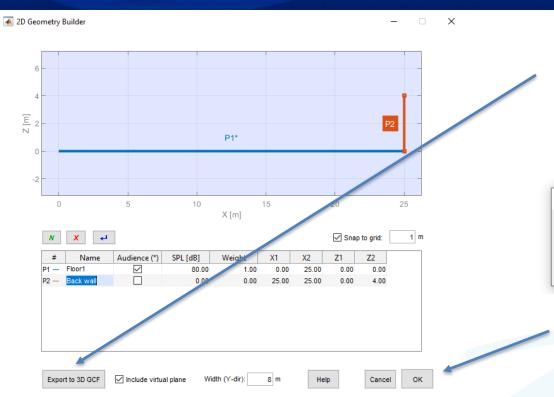
The plane numbers should always be 'inside' our model to ensure the plane is orientated correctly (facing into the model).

If your plane is facing the wrong way you can select the plane then click on 'reverse plane' to orientate it correctly.

Once you are happy with the location of your planes you can then define the width of your model by entering a value here in metres.

A virtual plane can be added down the centre of the model if the tick box is selected, this will map the audio dispersion coming from the array.





Once you are happy with the model you can click on 'export to 3D GCF' which will prompt you to save the geometry to your project folder.

A warning box will open after the geometry is saved giving you the option to use the geometry in your project

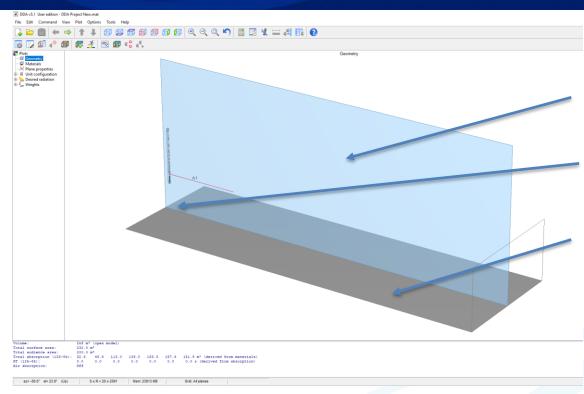
承 Ch	ange Geo-file —		×
?	Do you want to use this new Geo-file in your project? Press "Yes" to automatically change path in Project Setting Yes No	js	

Finally Click on Ok to temporarily close the 2D Geometry Builder.



	\slewis\Documents\JBL\DDA\Projects\DDA Project New.mat	×	When we then view the project settings window we can see the Geo-file has changed to the file used in the 2D
	New project		Geo Builder and we can use it straight away by clicking or
Geo-file:	C:\Users\slewis\Documents\UBL\DDA\Projects\ModelFrom2D.gcf	õ	Ok and then build all.
Rec-file:	C:\Users\slewis\Documents\UBL\DDA\Projects\Listeners.rcf	õ	Ok and then build all.
Groups			
N D	Source type DDS settings	Boundary	Geometry
Group A	DDS V Unit-file: C:\Users\slewis\Documents\JBL\DDA\Projects\Intellivox-DSX380.ucf		
	Beam shaped array Self-powered	Position: None V	
	Range: Flat response for: Loudspeaker	None	
	JBL Intellivox-DS(X) and Geo V	Offset:	
	AXYS (Target and Subs) Range: 1.0 to 35.0 m Desired SPL drop: 0.0 dB	0.00 m	
	✓		
Loudspeake	rs (Group A)		
		Se EQ	M
A1 X	[[m]         V [m]         Z [m]         H [*]         V [*]         Roll [*]         Mirror         Delay [ms]         Lock delay         Gain [dB]         EQ.32 [dB]         EQ.36 [dB]         EU           0.00         0.50         2.10         0.00	Q 125 [dB] F Q 250 [dl 0.00 0.	
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Calculation	Directivity balloon	Help	tornal Autoror
Surfa	ace grid: All planes V Grid step: 0.50 m Resolution: 2 °		Vitar
	of-sight check Loudsp. ref> Audience V Map height audience: 1.50 m Radius: 1000.0 m	OK Cancel	
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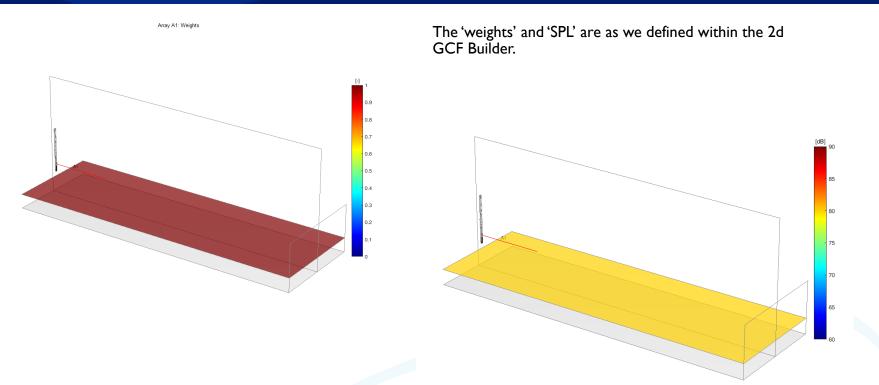
The built geometry will then be displayed

The blue plane through the centre is the 'virtual plane' this has no effect on the dispersion from the array and is there as a visual guide only.

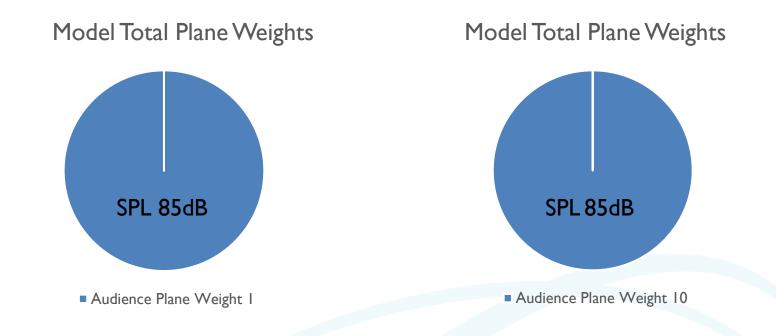
The Intellivox is positioned at the X,Y,Z (0m,0m,2.2m) position as defined within Group AI in the project settings window.

The grey area indicates the audience plane

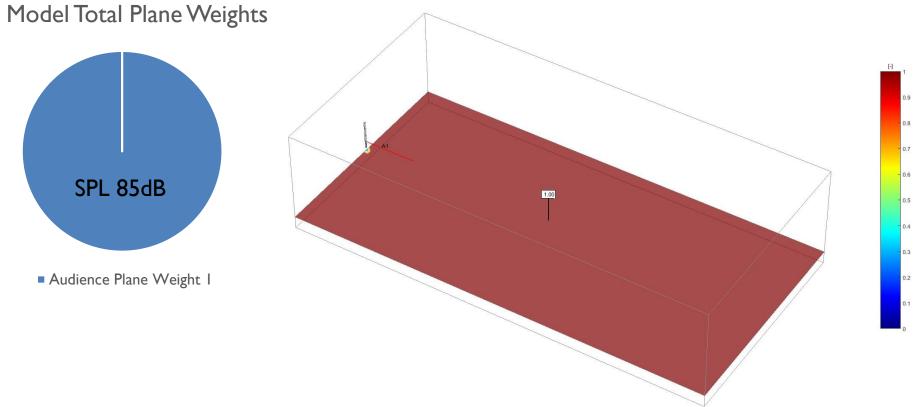




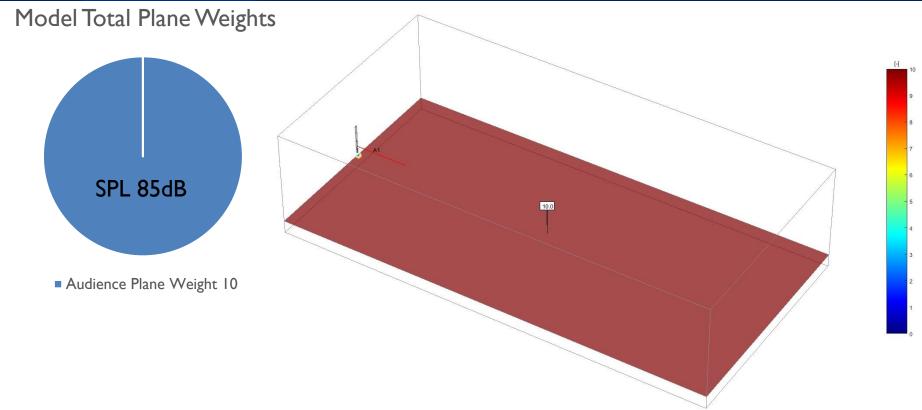






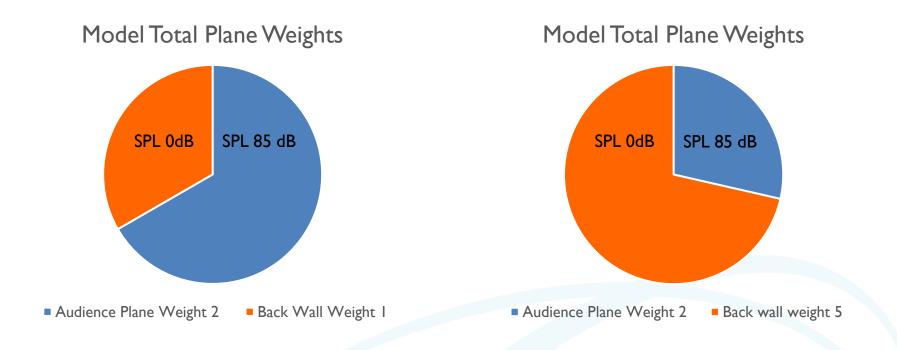






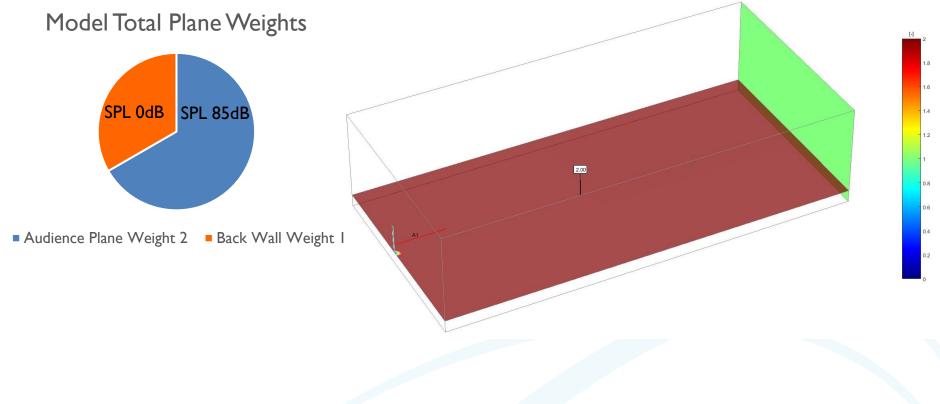
HARMAN International. Copyright 2021



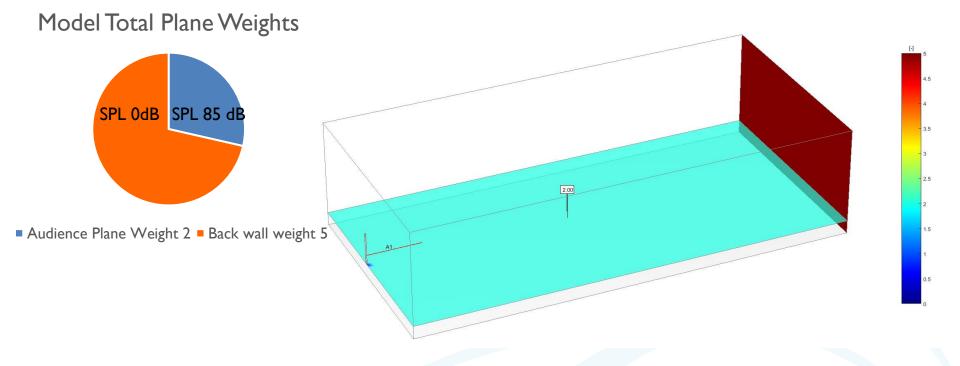


### HARMAN International. Copyright 2021



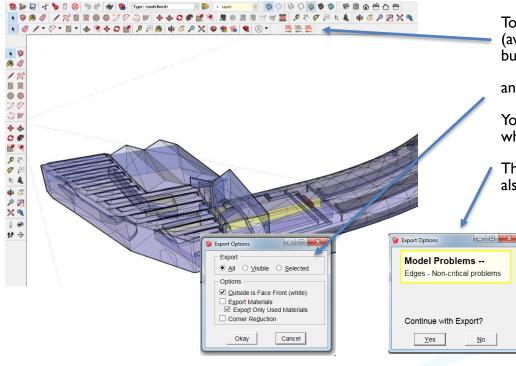






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To import a model from SketchUp, install the plugin for SketchUp (available on the JBL Pro website). When you have completed building your model within SketchUp click on the export button

and a window will open with a few options

You may get a warning your model may have some problems which may need to be resolved

Then name the file and choose where it should be saved. It should also include the '.gcf' file extension.

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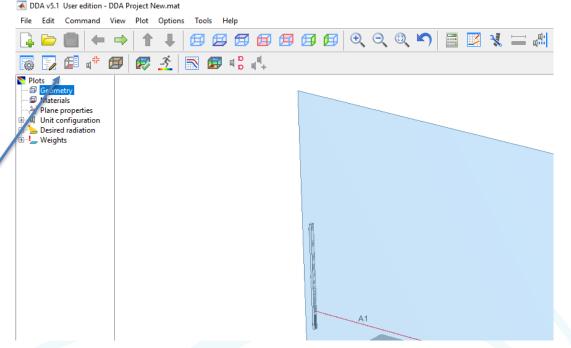
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<b>v x</b> A1 <b>c</b>	ers (Group /	الاً ۲ [m]	Z [m]				Mirror	Delay [ms]	Lock dela			EQ 63 [dB]	EQ 125 [d	B] EQ	250 [dl 0. >
X X A1 Culation	ers (Group /	역 <sup>49</sup> Y [m] 0.50	Z [m]			0.00	Mirror	Delay [ms]	Lock dela	0.00		EQ 63 [dB]	EQ 125 [d	B] EQ	250 [dl

Open 'Project Settings' window and click on the Geo-File folder and browse to where the file is located.

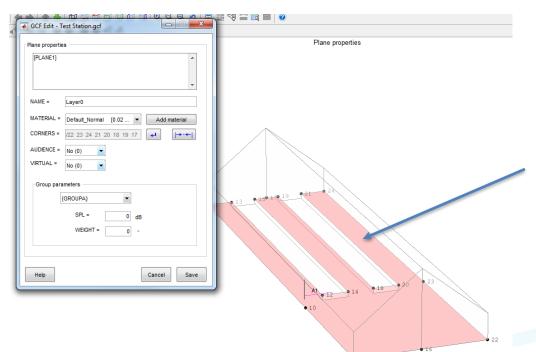
Then click on Ok and 'Build Geometry'



Warning	👅 DE
	File
No audience plane set in: Test Station.gcf.	ļ
Only geometry will be built. Use "Edit plane properties" command to edit model.	-
СК	Pic
A warning will then be displayed saying 'no audience plane set'	
Click on 'Edit Configuration files' and a window will open.	







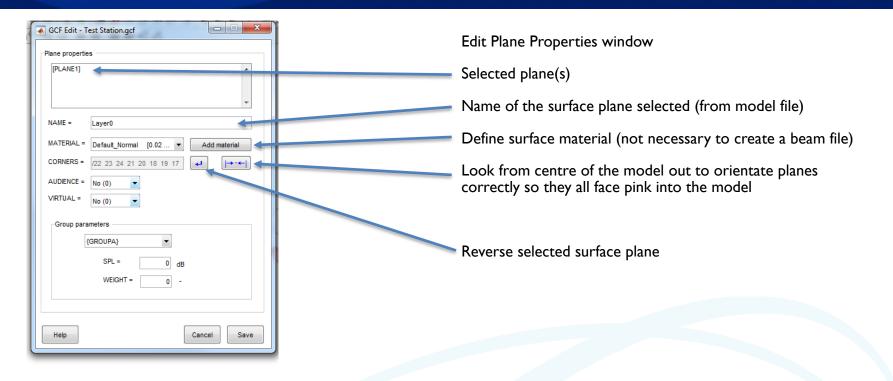
Edit plane properties window

Click on the audience plane with your mouse, if another plane is selected click again in the same place to reach the plane behind.

To select multiple planes press the space bar

Surfaces within the model should be displayed in Pink to indicate your model is orientated correctly.





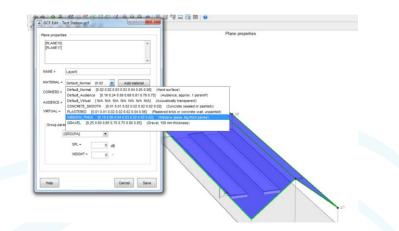


ne properties		Plane	properties
PLANE1]	*		
AME = Layer0			
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DRNERS = /22 23 24 21 20	Select material(s)	<u>\$30</u>	
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RTUAL = No (0) -	Name	Absorption coefficient (125-8k)	
NO (U)	1 OPEN	1.00 1.00 1.00 1.00 1.00 1.00 1.00	"Open window"
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Group parameters	3 ABS_10%	0.10 0.10 0.10 0.10 0.10 0.10 0.10	Frequency independent absorbtion of 10%
{GROUPA}	4 ABS_20%	0.20 0.20 0.20 0.20 0.20 0.20 0.20	Frequency independent absorbtion of 20%
	5 ABS_30%	0.30 0.30 0.30 0.30 0.30 0.30 0.30	Frequency independent absorbtion of 30%
SPL =	6 ABS_40%	0.40 0.40 0.40 0.40 0.40 0.40 0.40	Frequency independent absorbtion of 40%
WEIGHT =	7 ABS_50%	0.50 0.50 0.50 0.50 0.50 0.50 0.50	Frequency independent absorbtion of 50%
	8 ABS_60%	0.60 0.60 0.60 0.60 0.60 0.60 0.60	Frequency independent absorbtion of 60%
	9 ABS_70%	0.70 0.70 0.70 0.70 0.70 0.70 0.70	Frequency independent absorbtion of 70%
	10 ABS_80%	0.80 0.80 0.80 0.80 0.80 0.80 0.80	Frequency independent absorbtion of 80%
	11 ABS_90%	0.90 0.90 0.90 0.90 0.90 0.90 0.90	Frequency independent absorbtion of 90%
Help	12 ABS_100%	1.00 1.00 1.00 1.00 1.00 1.00 1.00	Frequency independent absorbtion of 100% (To
	13 CONCRETE_ROUGH	0.01 0.02 0.04 0.06 0.08 0.10 0.12	Concrete (unpainted, rough finish)
	14 CONCRETE_SMOOTH	0.01 0.01 0.02 0.02 0.02 0.02 0.02	Concrete (sealed or painted)
	15 BRICK	0.03 0.03 0.03 0.04 0.05 0.07 0.09	Brick (natural)
	16 BRICK_PAINTED	0.01 0.01 0.02 0.02 0.02 0.03 0.04	Brick (painted)
	•	m	· · · · · · · · · · · · · · · · · · ·

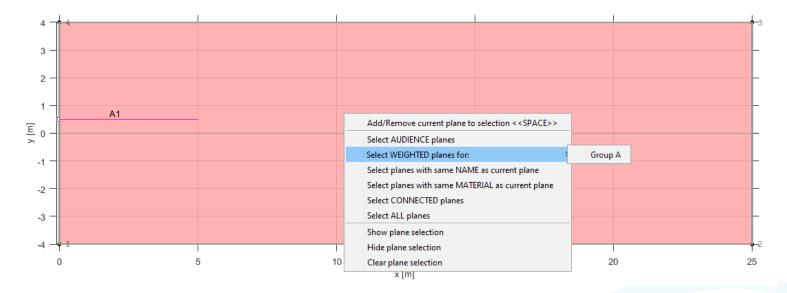
If you are looking to predict the reverberation time of the model you can add materials (Optional).

Select the multiple materials required from the drop down menu

Select Planes required for material addition, using the space bar if required, then use the drop down to assign materials to those planes.

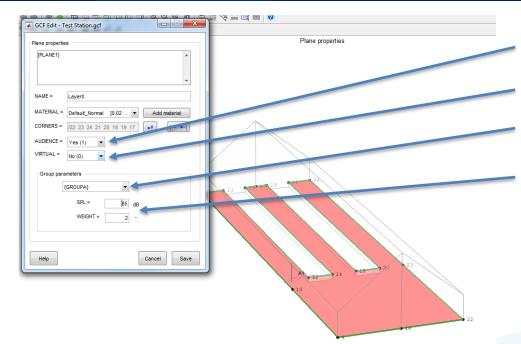






Plane Properties View – To speed up plane selection you can right click on the screen to select previously defined Audience planes, Weighted planes for each Group, select planes with the same Name, select Planes made of the same Material, select connected planes, select All planes and show/hide and clear current plane selections.





Select the floor plane and define it as an audience plane by selecting yes.

If you have built a virtual plane within your model then click here to turn it on or off.

Select which Group of Intellivox you would like to weight the planes for.

Define the SPL required and the weighting factor.

The weighting is a ratio of planes weighted within a model as explained previously. In this case we are only interested in weighting floor planes to define our beam settings.

Click on Save.

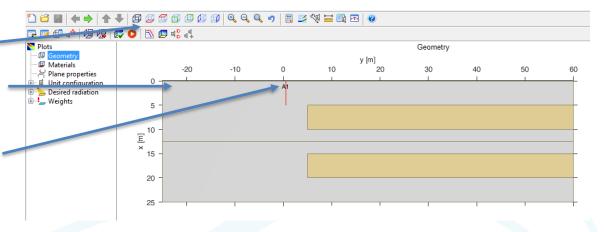




In geometry view click on XY Projection view

Now the model has been built we can see the floor area has turned grey indicating it is an audience plane.

We can also see the Intellivox is not pointing in the correct orientation.





Geometry y[m] -20 -10 0 10 20 30 40 50 60 5 - -10 -	Click on project settings and position the window so you car see it and the plan view (xy) geometry.
	Groups       ODS settings       Boundary         Boundary       Source type       DDS settings       Unt-file: C.YProgram FilesUBL ProfessionaNDOAU/CPUhtelivox-DSX380.ucf       Poston:         Boundary       DDS settings       Unt-file: C.YProgram FilesUBL ProfessionaNDOAU/CPUhtelivox-DSX380.ucf       Poston:         Boundary       DEL Intellivox-DSX(X) and AXYS (Target and Subs)       Method:       Pestrot coverage area       Flat response for: Loudspeaker V       Offset:         Destrot:       Destrot SPL drop: 0.0       dd       Offset:       0.00       m
Leaders stagged array       Method:       Restrict coverage area       Flat response for:       Loudspeaker ("	Nome         Coudspeakers (Group A)         EQ:         Set EQ           Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         EQ:         Set EQ           Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         EQ:         Set EQ           Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         EQ:         Set EQ           Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         EQ:         Set EQ           Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         EQ:         Set EQ           Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         EQ:         Set EQ           Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         EQ:         Set EQ           Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         Image: Coudspeakers (Group A)         EQ:         Set EQ
	Calculation Directivity balloon

Surface grid:

(shadowing):

Line-of-sight check

All planes

Loudsp. ref. --> Audience

Click on 'Set loudspeaker position' button, the button will change green, click on the 2d geometry and the speaker. Will be positioned Adjust the H angle between 0 and +/-180 degrees to get the correct aiming angle

Help

Cancel

ок

Grid step:

Map height audience:

0.50 m

1.50 m

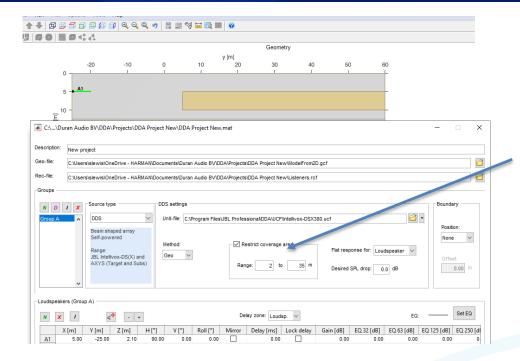
Resolution:

Radius:

2 '

1000.0 m





With our Intellivox in the correct position and height, the next thing to do is to 'restrict coverage area' as the audience plane is over 80 metres long, outside the range of a DSX380.

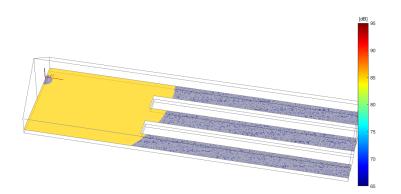
Or we could either look at using a longer array to cover the 80 metres, such as an Intellivox DSX500.

With an Intellivox DSX380 the typical throw of this unit is around 35 metres, we can change the 'restrict coverage area' to 2 to 35m.

Then click Ok and Build All

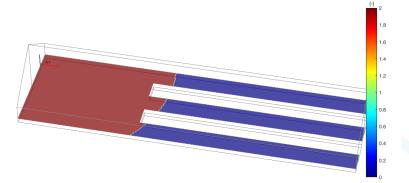


Group A: Desired direct SPL

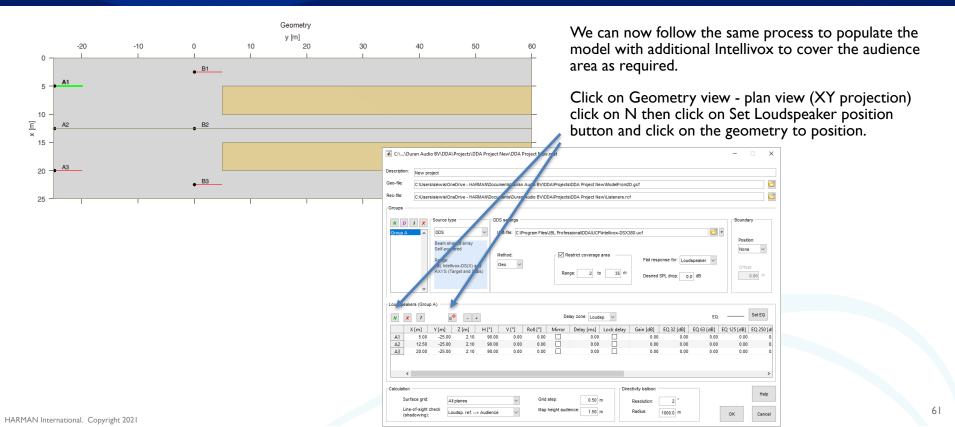


With the model built, if we look at the Desired Direct SPL and Weights we can see the clearly defined area the Intellivox is trying to cover.

Array A1: Weights



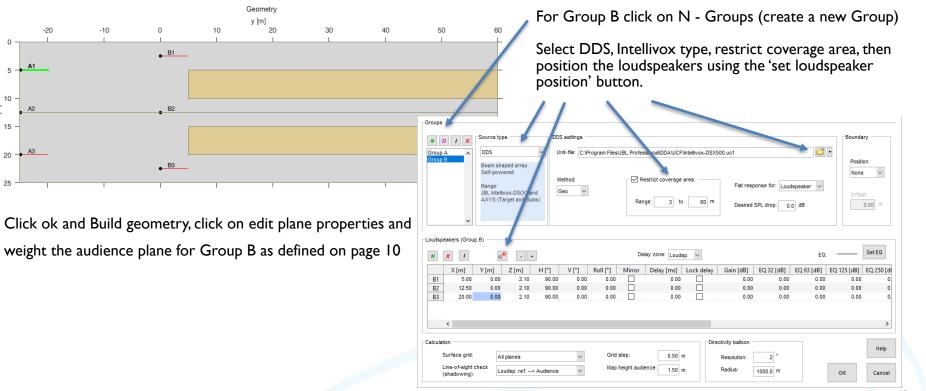






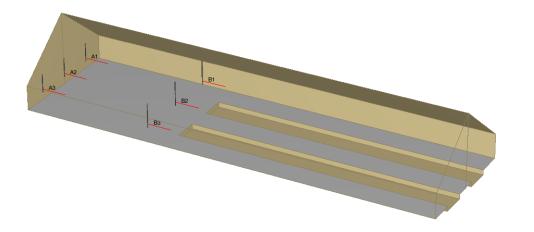
lescription: N Seo-file: C tec-file: C	lew project ::\Users\slewi	DDA\Projects\D is\OneDrive - HA is\OneDrive - HA	RMAN\Docum	nents\Duran Ai	udio BV/DDAV	Projects\DI			-					Right click on the top of any column to simultaneo change all of the values to all be the same as the selected value. i.e. change all the loudspeaker heigh
N D I Group A	DDS Bean Self- Rang JBL I AXY	m shaped array -powered	V Ur	ethod:	gram Files\JBL		irict coverage a	area	Flat resp	SPL drop: 0	dspeaker 🗸	·	Boundary Position: None Offset 0.00 m	Warning – – × This will set all values of colum Z[m] to 2.1 Continue?
X [n A1 A2 1	I           m]         Y [m           5.00         -25           12.50         -25	<b>¤</b> <sup>‡</sup> - <b>1</b> ] Z [m] 5.00 2.10 5.00 2.10 5.00 2.10	90.00	V[°] F 0.00 0.00 0.00	0.00		r zone: Louds Delay [ms] 0.00 0.00 0.00	p. V Lock delay	Gain [dB] 0.00 0.00 0.00	EQ 32 [dB] 0.00 0.00 0.00	0.00	EQ 125	Set EQ           6 [dB]         EQ 250 [dl]           0.00         0.           0.00         0.           0.00         0.	Yes No
<ul> <li>Surface</li> <li>Line-of- (shado)</li> </ul>	-sight check	All planes	-> Audience	>	Grid step Map heig	p: ght audiend	0.50 m ce: 1.50 m		ctivity balloon - Resolution: Radius:	2 ° 1000.0 m		ОК	> Help Cancel	





×



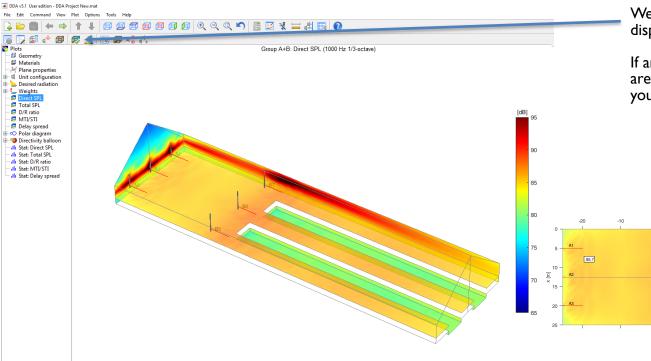


Group A – AI defines the coverage for the DSX380, adding more units to this group copies the directivity from AI. The first array within the group defines the coverage pattern, this directivity is then copied when used for A2,A3,A4 etc.

Group B has a longer throw requirement, here we have utilised Intellivox DSX500 throwing 60 metres to the end of the platform area. Again we define the coverage for the first array B1 then copy this directivity for B2 and B3.

If for example B3 was only required to cover 40 metres then this would require a new group, such as C1 with the restrict coverage set to a maximum of 40m.



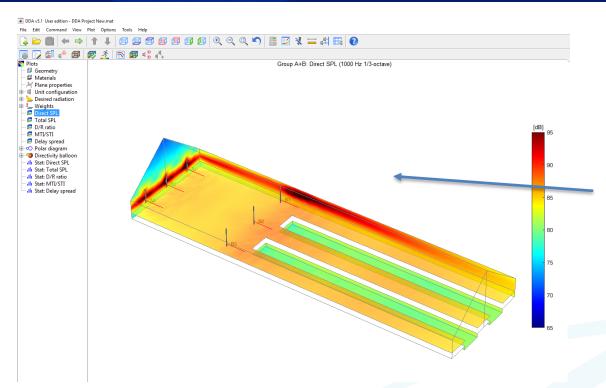


We can look at a trial run to check the dispersion of the system.

B3

If any changes to the throw or speaker type are necessary they should be made before you complete a 'full run'





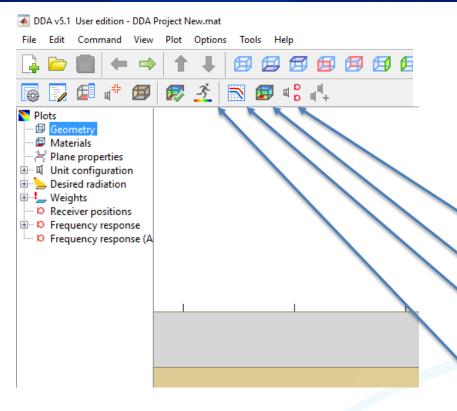
Right click on the screen gives these options

Height band plotting can be adjusted if you have multiple audience areas on different levels, such as a balcony that covers the main floor area.

	Only map AUDIENCE plane(s)
	Only map VIRTUAL plane(s)
	Only map AUDIENCE+VIRTUAL plane(s)
	Emphasize edge of audience plane(s)
	Only map planes in defined height band (0.0-5.0 m)
	Define height band
	Only plot AUDIENCE plane(s)
~	Show loudspeaker annotations
	Show impact points
~	Lighting



# **FULL RUN**



A Full Run calculates the full optimum filter settings for the Intellivox used within your DDA model.

The beam setting is also produced for use within your Intellivox and can be uploaded via WinControl. In your project folder a \*Your Project Name\*\_WinControl folder will be created which will contain a .DDA and .STK file, these files are used by WinControl to upload the beam to the Intellivox.

Once a Full Run has been completed you will also be able to access the following options.

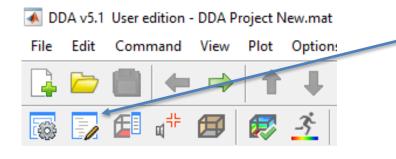
Select loudspeakers to be used for Receivers

**Check receiver Responses** 

Map Response from the array using the full calculated FIR output filters, (similar to the trial run but uses the full calculated filters).

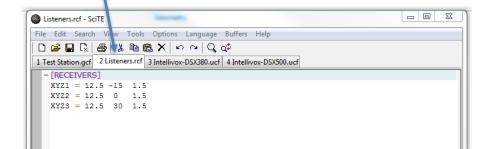
View output filters and amplifier headroom of each array





To look at receiver positions, if you click on 'edit configuration files'

a window will open, then click on the Listeners tab





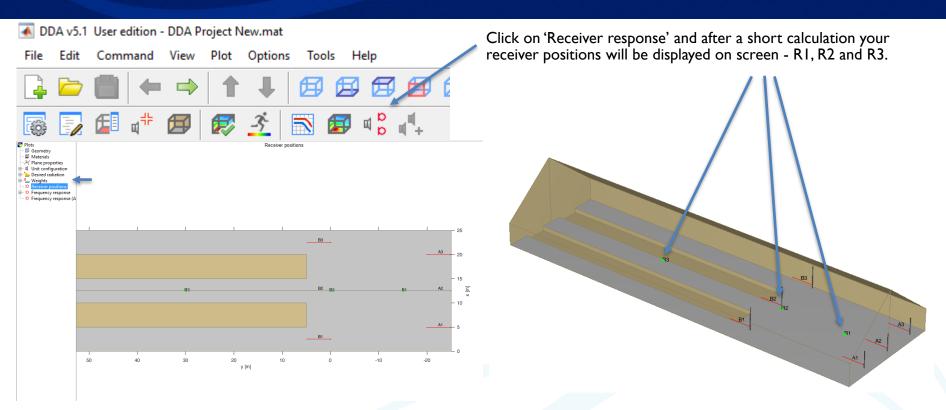
1	Statemens.rcf - SciTE		23
	File Edit Search View Tools Options Language Buffers Help		
	🗋 🖻 🖶 🗔 🎒 👗 🖻 🋍 🗙 🗠 🗠 🔍 🖓		
	1 Test Station.gcf 2 Listeners.rcf 3 Intellivox-DSX380.ucf 4 Intelliver: DSX300.ucf		
	- [RECEIVERS]		
	XYZ1 12.5 -15 1.5		
	XYZ2 = 12.5 0 1.5		
	XYZ3 = 12.5 30 1.5		
1			
	50 40 30 20 10 y [m]		
	< m >		
	Volume: 21800.0 m³ (closed model)		
	Total surface area: 6436.3 m <sup>4</sup> Total audience area: 1575.0 m <sup>4</sup>		
	Total absorption (126-8k): 128.7 128. 193.1 193.1 257.6 321.8 386.2 m <sup>4</sup> (derived from material RT (125-8k): 27.9 1.9 18.5 18.5 13.8 11.0 9.1 s (derived from absorption		
	Air absorption: Of		
	x= 12.606 y=-14.622 z= S x R = 168 x 7031 Mem: 27067 MB Grid: All planes Licensed: 108		
	x= 12.606 y= -14.622 z= S x R = 168 x 7031 Mem: 27067 MB Grid: All planes Licensed: 108		

The reference XYZI refers to the first listener or receiver position, with the first number being the 'x' position, second 'y' and the last the height 'z', the coordinates should be separated by a space or a tab and be saved in the same format.

To identify an exact location on your model select geometry and click on XY projection view.

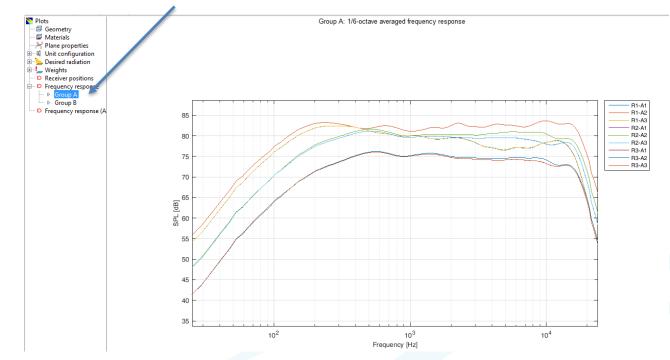
Then if you move your mouse over the model the mouse location XY parameters are identified in the lower left hand corner. Copy these coordinates into your XYZ positions to place your listeners and click on save when you have finished editing.



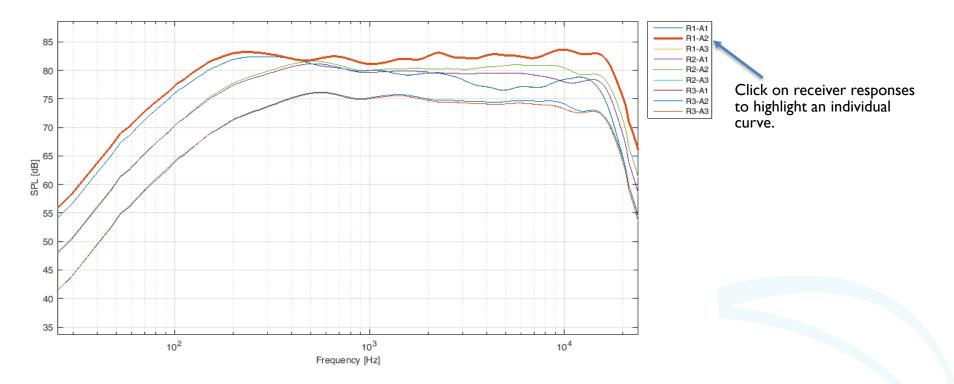




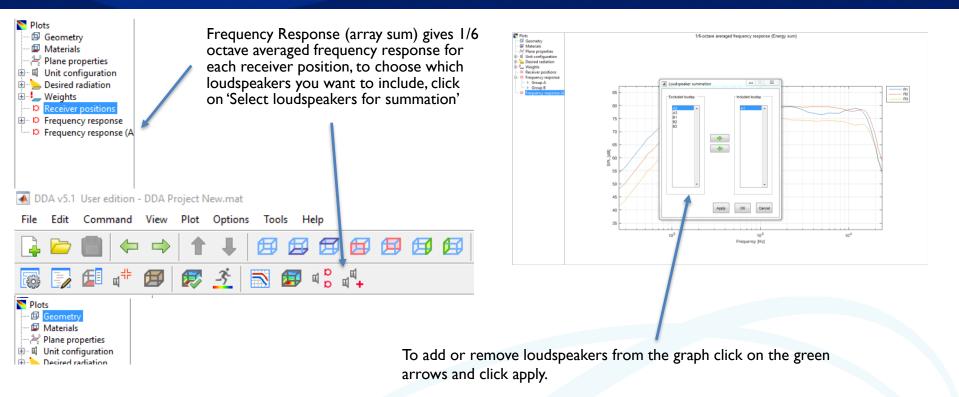
## Clicking on 'Frequency Response' shows the responses for each of the Groups used within the model













6	\land DDA v5.1	User edition -	DDA Pi	roject N	lew.mat								
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										Reverberant sound — Acoustical model:	Revised	~	Reverber statistica and Lee) for furth
										Help	ОК	Cancel	

Options Menu Opens up the following in separate pop up Windows.

The Calculation option enables you to change the calculation from Energy sum to nterference Sum in Direct sound only.

Reverberant sound level is calculated statistically using either the Revised (Barron and Lee) or Classical (Beranek), See help file for further details.



承 DDA v5.1 User edition - DDA Project N	lew.mat					
File Edit Command View Plot	Options Tools Help					
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→      Materials     Hane properties	Use Software OpenGL		Scaling	Auto Min	Max	Step
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Desired radiation			Direct/Total SPL:	80	110	0 ~
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Prequency response (A)			Polar/Balloon	-30	0	
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Folders option sets wh folders for DDA are a			Smoothing: On	~	Palette: B-C	C-G-Y-R ∨
			Annotations			
			Length aiming v	ector:	5 m	-
			Length "flagpole	e" of data label:	2.5 m	
			1			

Help

### Plotting Menu enables you to manually set the plotting scaling

 $\times$ 

dB  $\sim$ 0

dB

dB dB ~ -0

ms

Cancel

ок

Annotations enables you to change the aiming line from the acoustic centre of the loudspeaker and the 'flagpole' which is the length of the line coming from the spot frequency measurements.



parameters											Acoustic er humidity or
Temperature:						Aira	absorption				number of
1	2	20 °C					) On (ISO 9	613-1:1996)			
Speed of sound:	343.	.4 m/s									To calculate
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ibient noise (only	used for ST	1 predictio	on) ——						_	RT@1k=1.5s (Opera RT@1k=2.0s (Conce	House, Recital Hall) rt Hall, Train station, Airport
ibient noise (only	used for ST	1 predictio	on) 500	1k	2k	4k	8k	A		RT@1k=1.5s (Opera RT@1k=2.0s (Conce RT@1k=2.5s (small H	House, Recital Hall) rt Hall, Train station, Airport louse of Worship)
ibient noise (only Ln [dB]		· .		1k 30.00	2k 27.00	4k 25.00	8k 23.00	A 37.99	7	RT@1k=1.5s (Opera RT@1k=2.0s (Conce RT@1k=2.5s (small H	House, Recital Hall) rt Hall, Train station, Airport Jouse of Worship) m House of Worship)

Acoustic environment – air parameters show the effects of air absorption and humidity on dispersion patterns.

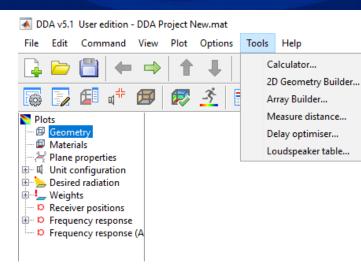
To calculate intelligibility with an 'open' model then you can manually enter the volume of the space in m<sup>3</sup>, the reverberation time in octave bands and the background noise figures.

There are various 'library' reverberation times that can be used by clicking on P

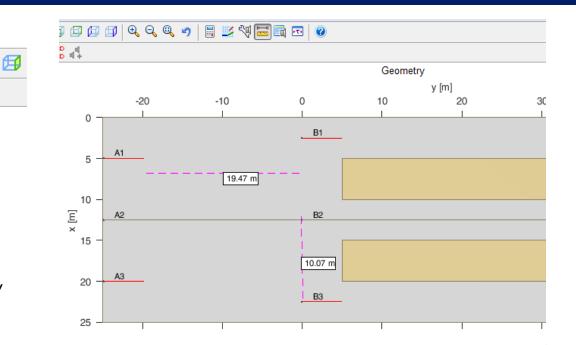
The + and – can be used to manually increase or decrease the reverberation time.

There are various NR curves available that can be used by clicking on P, (the A-weighting value only indicates the overall level and is not used in the calculation) The + and – can be used to manually increase or decrease the background noise to see its effects on intelligibility.





Measure distance works in 2d geometry view only - by clicking on a start position and an end position the measurements will be displayed on screen.



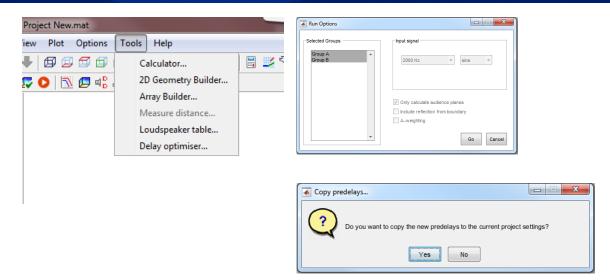


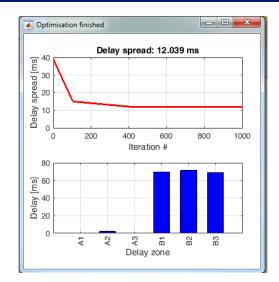
iew Plot Options	Tools Help	
- 🗗 🗇 🗇	Calculator	। 🔚 🗾 ९
🔽 💽 🔝 🖉 🖓	2D Geometry Builder	
	Array Builder	
	Measure distance	
	Loudspeaker table	
	Delay optimiser	

	1	Intellivox-DSX380								Delay [ms]	
		Intellivox-D3X300	Default 00.00	4.95	-24.82	2.20	90.00	0.00	0.00	0.00	0.00
	1	Intellivox-DSX380	Default 00.00	12.50	-24.82	2.20	90.00	0.00	0.00	0.00	0.00
	1	Intellivox-DSX380	Default 00.00	20.00	-24.82	2.20	90.00	0.00	0.00	0.00	0.00
	1	Intellivox-DSX500	Default 00.00	2.50	0.00	2.20	90.00	0.00	0.00	0.00	-1.20
	1	Intellivox-DSX500	Default 00.00	12.50	0.00	2.20	90.00	0.00	0.00	0.00	-1.20
	1	Intellivox-DSX500	Default 00.00	22.50	0.00	2.20	90.00	0.00	0.00	0.00	-1.20
		1	1 Intellivox-DSX500 1 Intellivox-DSX500 1 Intellivox-DSX500	1 Intellivox-DSX500 Default 00.00 1 Intellivox-DSX500 Default 00.00	1 Intellivox-DSX500 Default 00.00 2.50 1 Intellivox-DSX500 Default 00.00 12.50	1 Intellivox-DSX500         Default 00.00         2.50         0.00           1 Intellivox-DSX500         Default 00.00         12.50         0.00	1 Intellivox-DSX500         Default 00.00         2.50         0.00         2.20           1 Intellivox-DSX500         Default 00.00         12.50         0.00         2.20	1 Intellivox-DSX500         Default 00.00         2.50         0.00         2.20         90.00           1 Intellivox-DSX500         Default 00.00         12.50         0.00         2.20         90.00	1 Intellivox-DSX500         Default 00.00         2.50         0.00         2.20         90.00         0.00           1 Intellivox-DSX500         Default 00.00         12.50         0.00         2.20         90.00         0.00	1 Intellivox-DSX500         Default 00.00         2.50         0.00         2.20         90.00         0.00         0.00           1 Intellivox-DSX500         Default 00.00         12.50         0.00         2.20         90.00         0.00         0.00	1 Intellivox-DSX500         Default 00.00         2.50         0.00         2.20         90.00         0.00         0.00         0.00           1 Intellivox-DSX500         Default 00.00         12.50         0.00         2.20         90.00         0.00         0.00         0.00         0.00         0.00

Loudspeaker Table displays all loudspeakers used within the DDA model and various other information.

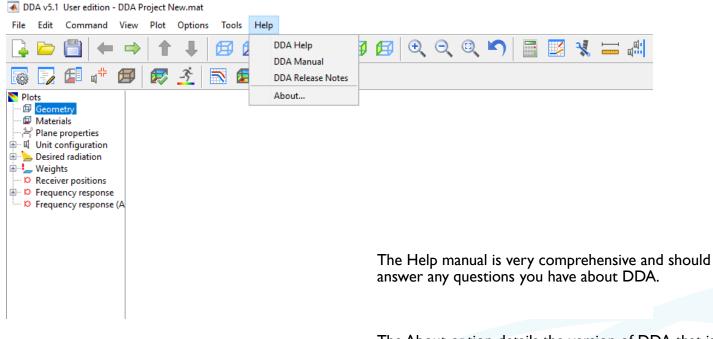






Delay optimiser is used to calculate the optimum delay between loudspeakers taking into account the rear radiated energy.





The About option details the version of DDA that is currently installed.