

Version I
June 2005

SOUNDVISION

MANUAL



INTRODUCTION

L-ACOUSTICS SOUNDVISION is a proprietary 3D software program dedicated to the modeling of the entire L-ACOUSTICS product line - including V-DOSC, dV-DOSC, KUDO, ARCS, XT and MTD enclosures. Designed with a convenient, intuitive graphical user interface, SOUNDVISION allows for the calculation of sound pressure level (SPL) and coverage mapping for complex sound system or venue configurations.

Room geometry and loudspeaker locations are defined in 3D and simplified operating modes allow the user to work in 2D to rapidly enter data. According to user preference, either horizontal (plan) or vertical (cut) views can be selected to enter room coordinates or to define loudspeaker placement/aiming. SPL plus coverage mapping are then based on direct sound calculations over the defined audience geometry.

SOUNDVISION features a user-friendly interface with multiple toolboxes that allow for convenient entry of room and loudspeaker data while at the same time displaying coverage or mapping results along with 2D Cutview, Target and Source Cutview information. All toolboxes can be displayed simultaneously, providing the user with a complete control interface that allows for rapid system optimization.

Using sophisticated modeling algorithms, SOUNDVISION offers several levels of support. Due to its speed and ease-of-use, "Impact" mode is well-suited to the needs of touring sound engineers and touring sound companies. More detailed information is available in "SPL Mapping" mode, providing an invaluable tool for the audio consultant or sound designer. For the installer, the physical properties provided in "Mechanical Data" mode provide useful practical information for fixed installation applications.

Impact mode coverage is based on the -6 dB directivity over a 1-10 kHz operating bandwidth (at 5 degree angular resolution) and allows for immediate visualization of system coverage and SPL distribution. Optimum SPL contours are highlighted within the displayed -6 dB coverage pattern (filled circles corresponding to the -3 dB coverage pattern) in order to facilitate the implementation of multiple source installations. For offstage LL/RR V-DOSC or dV-DOSC arrays (or distributed sound reinforcement design using coaxial loudspeakers), the goal is to align the filled circles in order to have even coverage.

Mapping mode provides a color-coded representation of the SPL distribution over the defined room geometry and allows for visualization of the coverage of individual loudspeakers as well as the interference between multiple loudspeakers. In mapping mode, the user can select individual 1/3 octave bandwidths, unweighted or A-weighted SPL, or any frequency range between 100 – 10k Hz. Typically the 1-10 kHz bandwidth SPL mapping is considered to provide a good representation of system performance since this frequency bandwidth is primarily responsible for perceived system intelligibility and clarity.

Modeling of XT, ARCS, KUDO, dV-DOSC and V-DOSC are presented in the following sections along with an overview of the basic features and operating modes of SOUNDVISION. For further details on XT, ARCS, KUDO, dV-DOSC or V-DOSC, please refer to their respective operating manuals. For full details on SOUNDVISION, participation in a SOUNDVISION Training Seminar is recommended.

MODELING XT ENCLOSURES

Figure 1 shows SPL mappings generated using SOUNDVISION at octave band frequencies for a single I12XT enclosure, demonstrating the evenness of coverage and single point source behavior that is obtained using coaxial technology.

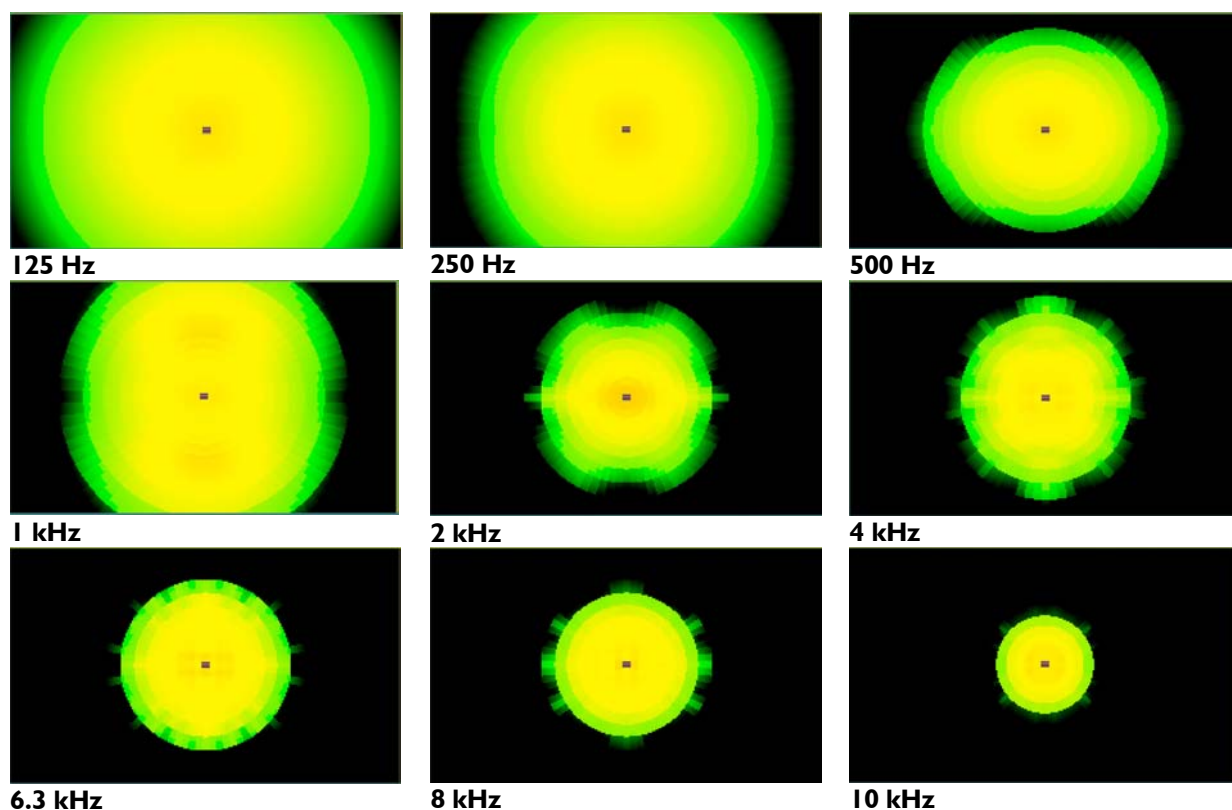


Figure 1: SPL mappings at octave band frequencies for a single I12XT enclosure (6 metre throw distance)

Figure 2 shows impact mode coverage and band-averaged SPL mappings for the single I12XT enclosure of Figure 1.

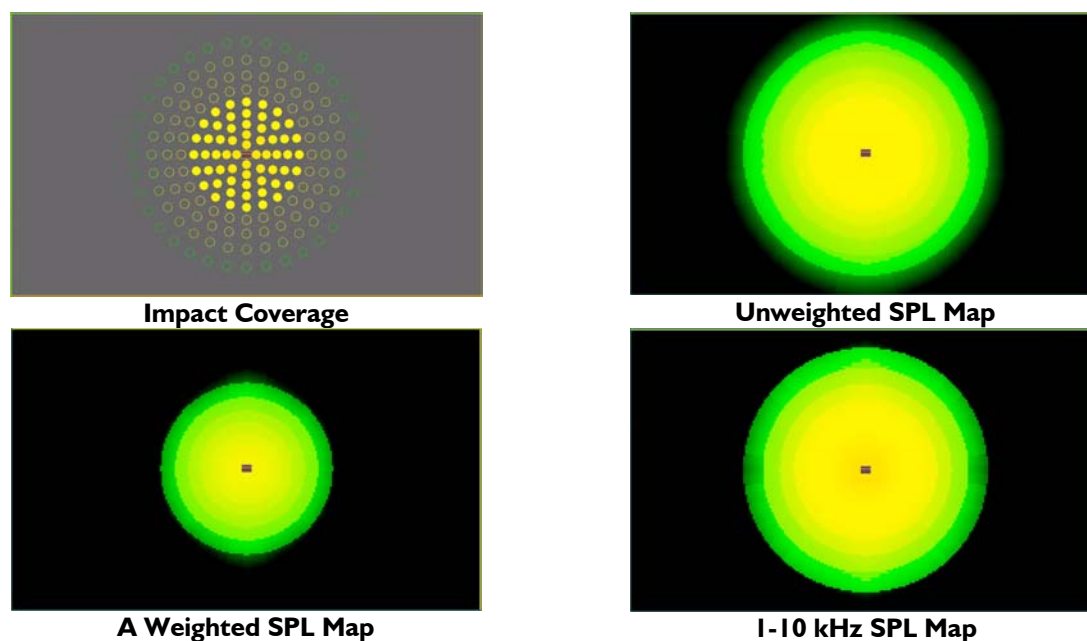


Figure 2: Impact coverage and SPL mappings (unweighted, A-weighted, 1-10 kHz bandwidth) for a single I12XT enclosure (6 metre throw distance)

Figures 3 and 4 show SPL mappings and impact coverage for a distributed system of two XT enclosures with optimum spacing (6 meter separation for a 6 meter throw distance). Interference effects occur at lower frequencies and will tend to be masked by room reverberation. At higher frequencies, more tightly-spaced comb filtering effects cannot be resolved by the ear. Essentially, the key to successful distributed system design is avoiding significant interaction throughout the critical mid band frequency range in order to reduce audible interference effects.

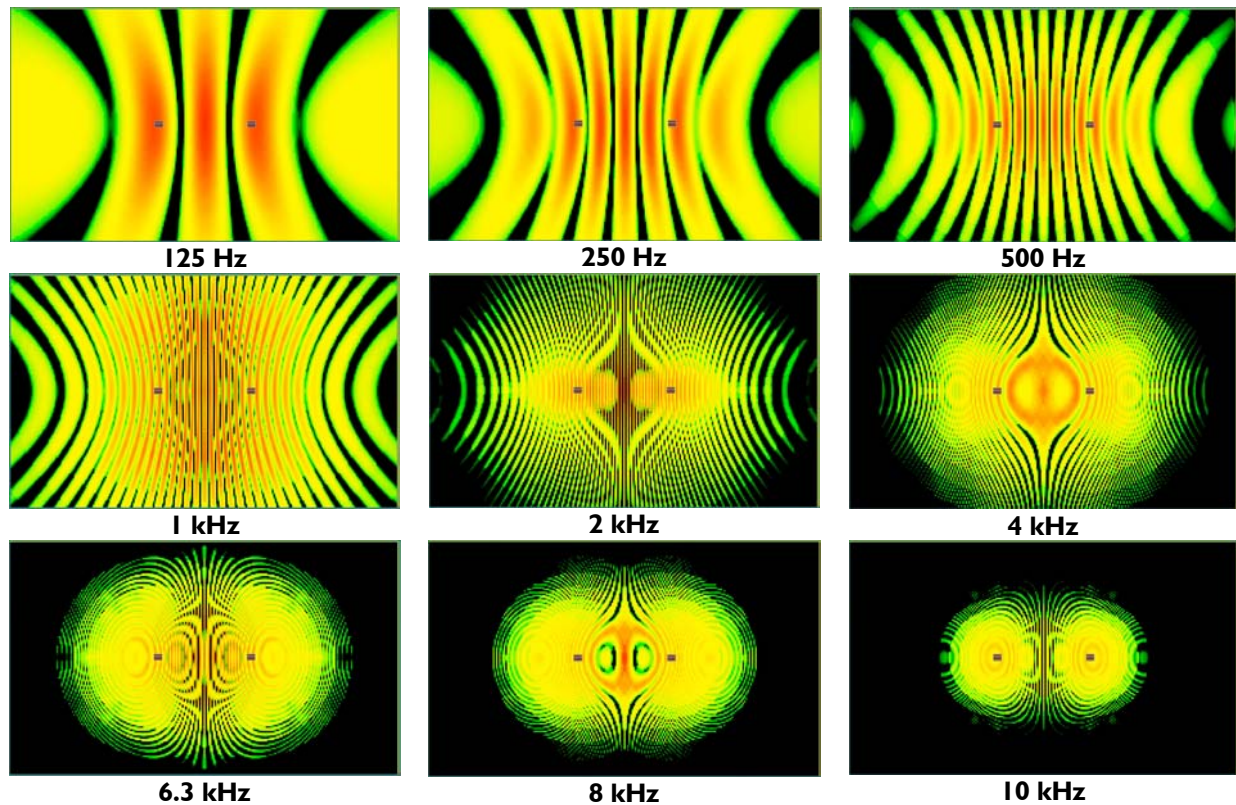


Figure 3: SPL mappings at octave band frequencies for two 112XT enclosures with optimum 6 metre spacing (6 metre throw distance)

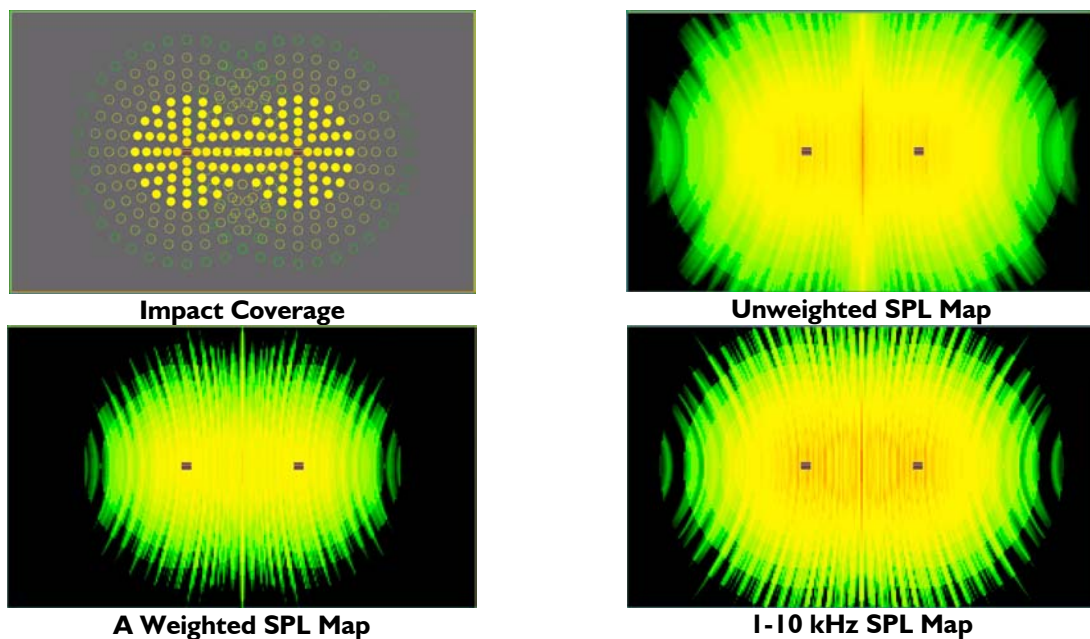


Figure 4: Impact coverage and SPL mappings (unweighted, A-weighted, 1-10 kHz bandwidth) for two 112XT enclosures with optimum 6 metre spacing (6 metre throw distance)

Figures 5 and 6 show SPL mappings and impact coverage for two I12XT enclosures with non-optimum spacing of 0.5 meters. Uneven coverage above 500 Hz demonstrates the comb filtering interference effects that arise due to path length differences as a function of listener position. Since the enclosures are physically too close together, these interference effects will be highly audible as a function of listener position in the critical mid band frequency range (500 – 2 kHz).

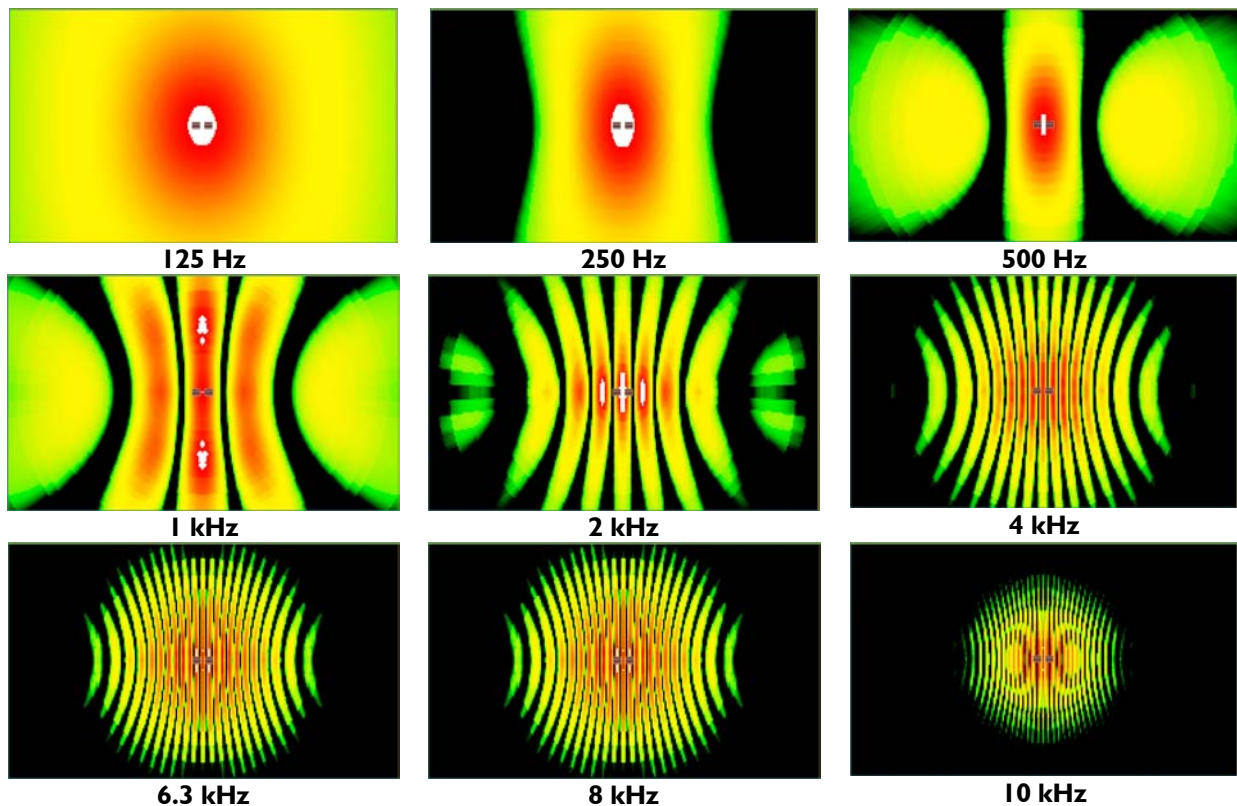


Figure 5: SPL mappings at octave band frequencies for two I12XT enclosures with non-optimum 0.5 metre spacing (6 metre throw distance)

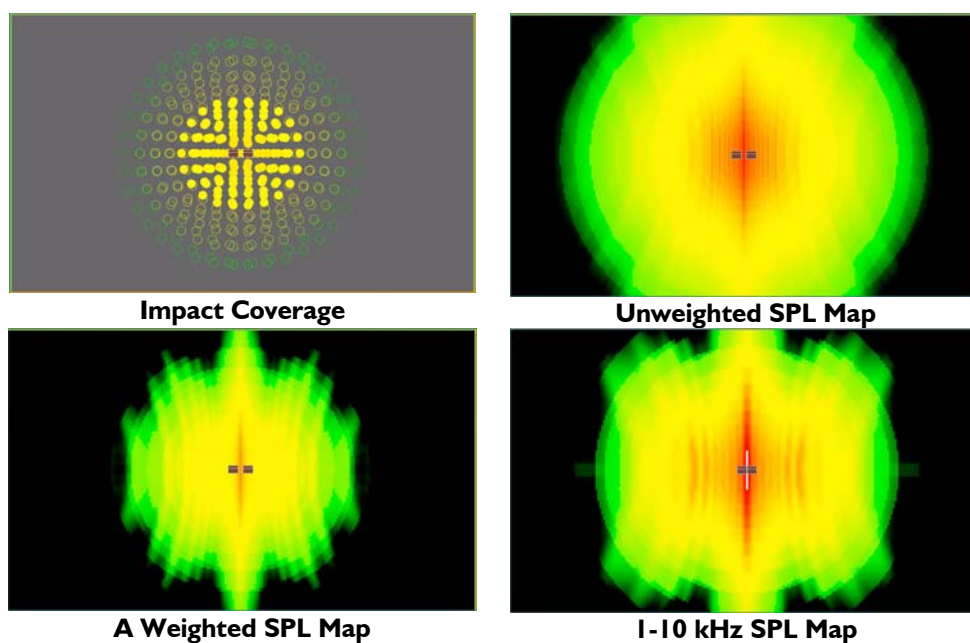


Figure 6: Impact coverage and SPL mappings (unweighted, A-weighted, 1-10 kHz bandwidth) for two I12XT enclosures with non-optimum 0.5 metre spacing (6 metre throw distance)

MODELING ARCS

Figure 7 shows plan view SPL mappings at octave band frequencies for an array of 4 ARCS enclosures in the vertical orientation (i.e., waveguides are horizontal). For this example, the ARCS array is perpendicular with a 20 metre throw distance to a target plane having dimensions of 40 x 40 metres (imagine the ARCS array flown above the target plane firing straight down). In this plan view representation, the 40 degree coverage for the array is seen to be oriented upwards and the 20 degree coverage downwards. Horizontally, the array provides 90 degree coverage (approximately 24 metres wide as seen in the plan view projection for this example) and coverage is stable and well-defined above 2 kHz while becoming progressively more omnidirectional at lower frequencies.

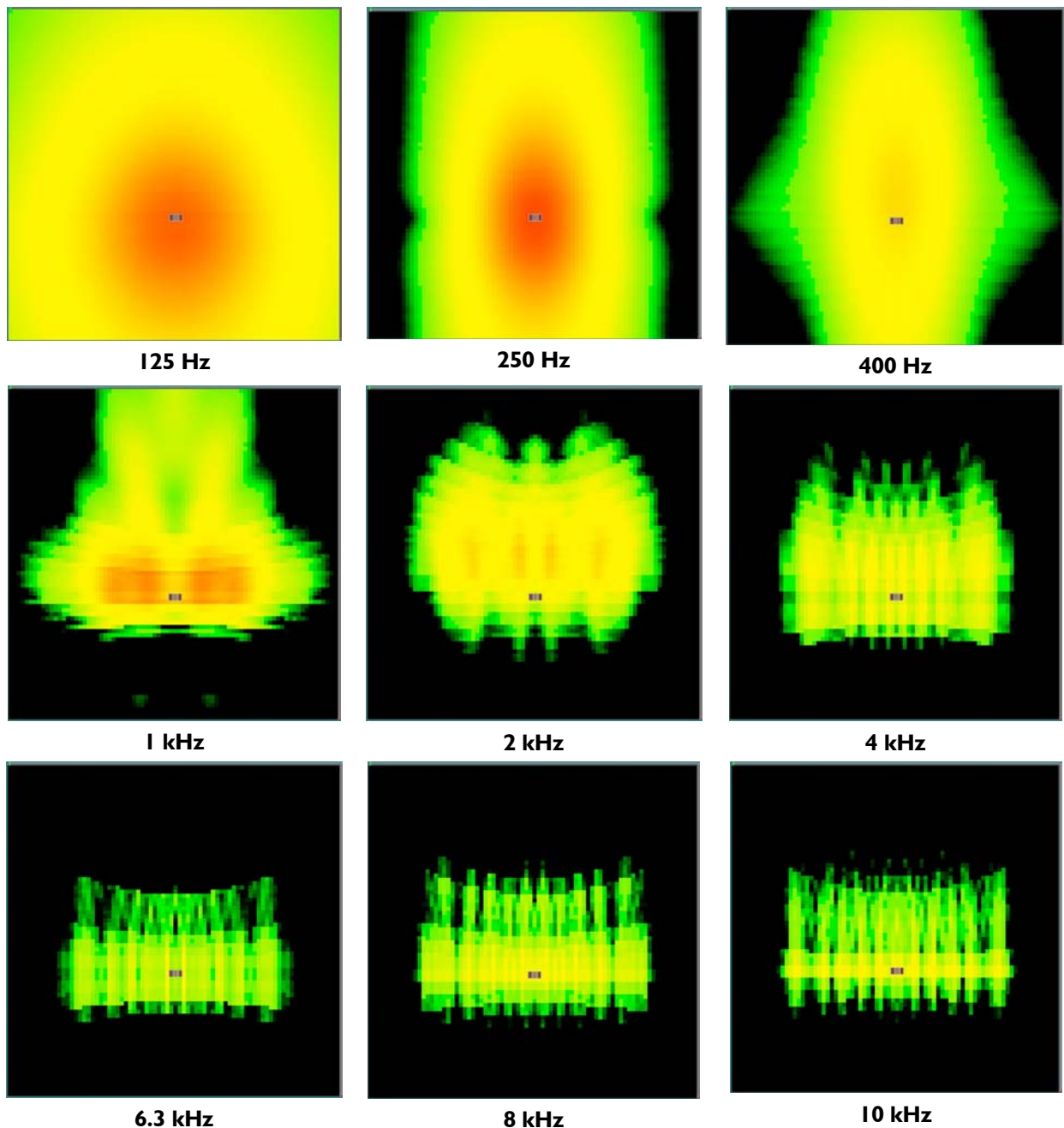


Figure 7: Plan view SPL mappings at octave band frequencies for 4 ARCS arrayed vertically (20 metre throw distance, enclosures are perpendicular to target plane with 40 degree coverage oriented upwards)

Figure 8 shows impact mode coverage and band-averaged SPL mappings for the array of 4 ARCS enclosures pictured in Figure 7. Impact coverage provides a good representation of the octave band mappings seen in Fig. 7 for frequencies higher than 2 kHz. For this reason, impact mode is considered to provide a good indication as to the overall coverage of the array in terms of clarity and intelligibility.

It is also interesting to compare the A-weighted, unweighted and 1-10 kHz SPL mappings of Figure 8 with the individual octave band mappings of Figure 7. The 1-10 kHz SPL mapping is seen to provide a good representation of the overall coverage of the array and also corresponds well with the coverage predicted in impact mode. The A-weighted SPL average provides a more strict representation of system coverage since there is more emphasis on higher frequencies while the unweighted mapping is more omnidirectional due to the inclusion of lower frequency information in the average.

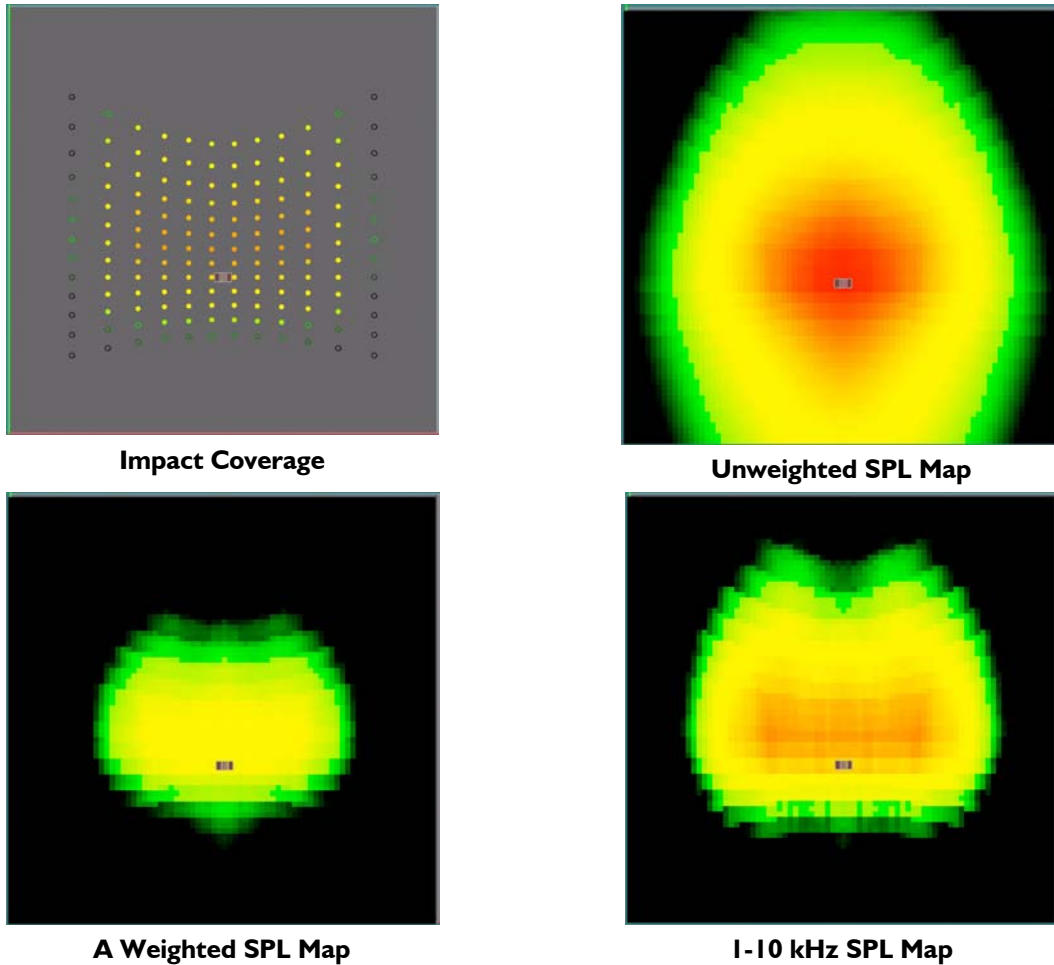


Figure 8: Impact coverage and SPL mappings (unweighted, A-weighted, 1-10 kHz bandwidth) for 4 ARCS (20 metre throw distance, enclosures perpendicular to target plane with 40 deg coverage oriented upwards)

ARCS SOUND DESIGN EXAMPLE

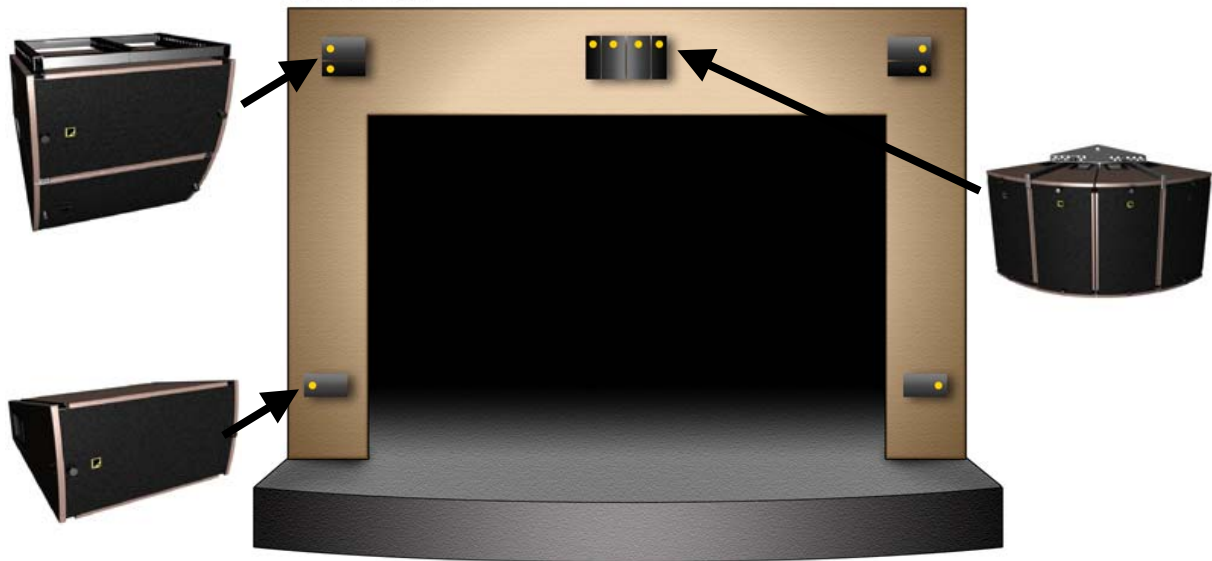
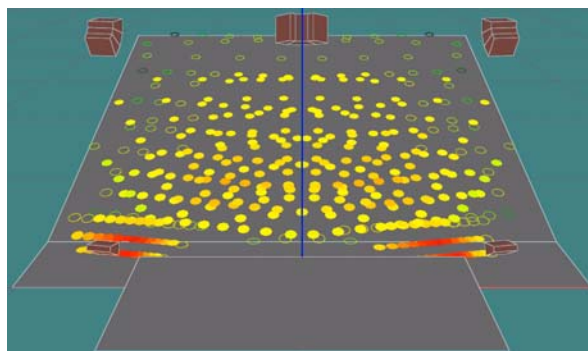
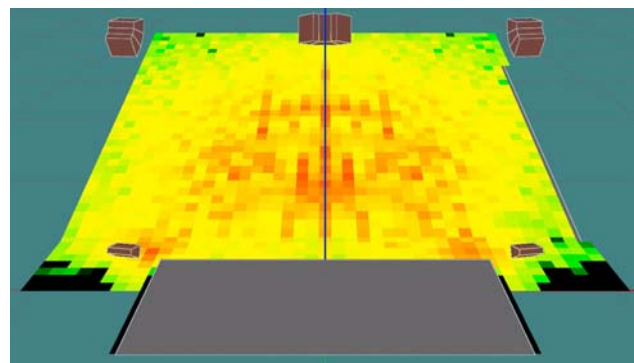


Figure 9: Theatrical Sound Design Example (proscenium-mounted LCR array with stereo infill loudspeakers, optional distributed front fill system not shown)

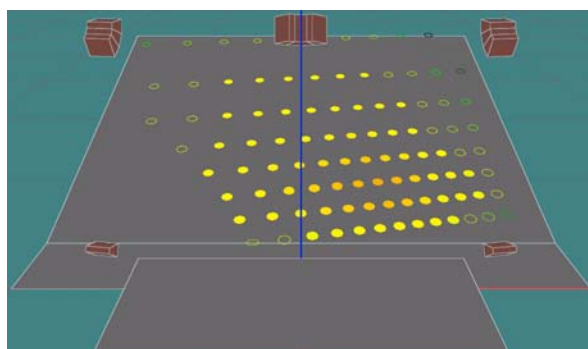
Figure 10 shows impact mode and A-weighted SPL mappings for the theatrical sound design configuration depicted in Fig. 9. For this example, the system consists of a proscenium-mounted LCR configuration with two stereo infill ARCS enclosures flown horizontally. The FOH L and R arrays consist of 3 ARCS flown horizontally in a mirror image configuration (40 degree coverage oriented onstage) and a centre cluster of 4 ARCS is flown vertically (inverted orientation).



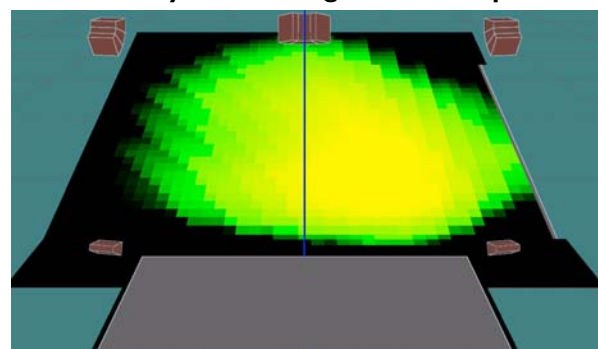
Full System Impact Coverage



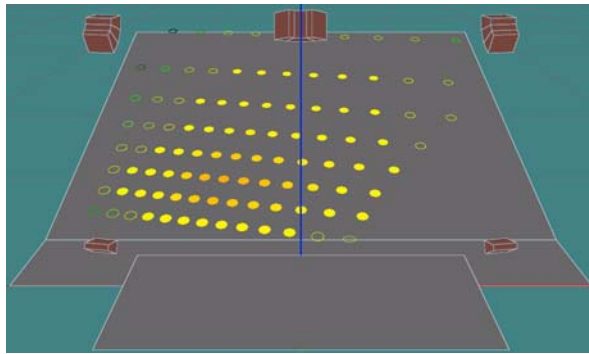
Full System A-Weighted SPL Map



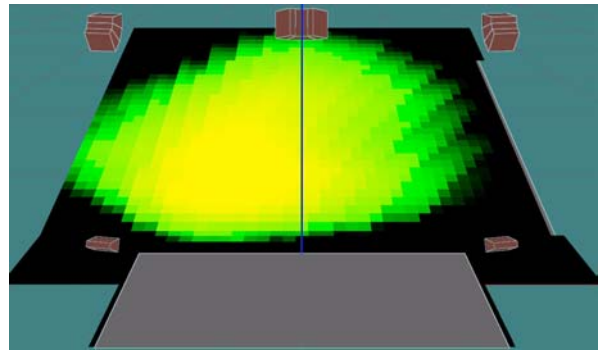
FOH L Impact Coverage



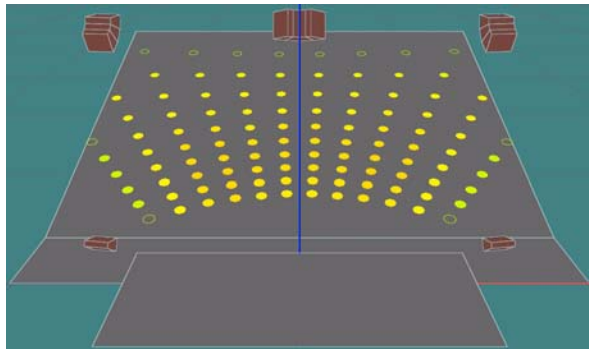
FOH L A-Weighted SPL Map



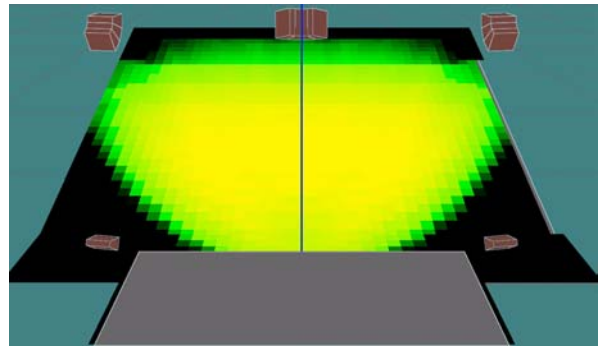
FOH R Impact Coverage



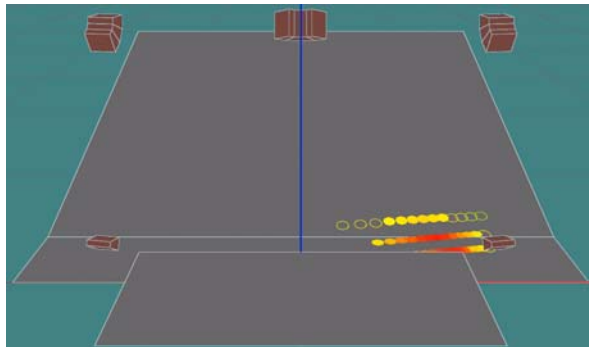
FOH R A-Weighted SPL Map



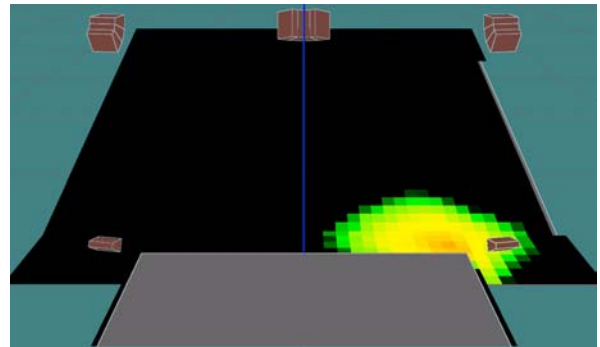
Centre Cluster Impact Coverage



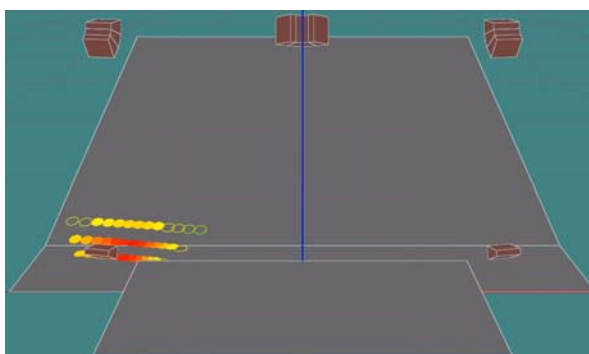
Centre Cluster L A-Weighted SPL Map



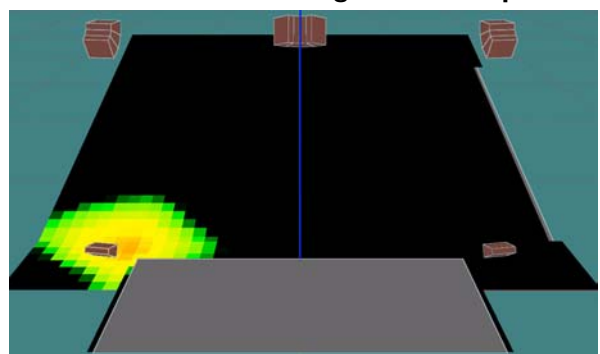
Stereo Infill L Impact Coverage



Stereo Infill L A-Weighted SPL Map



Stereo Infill R Impact Coverage



Stereo Infill R A-Weighted SPL Map

Figure 10: Impact coverage and A-weighted SPL mappings for the theatrical sound design example of Figure 9

MODELING KUDO

Geometric data for modeling KUDO in SOUNDVISION is shown in Figure 11.

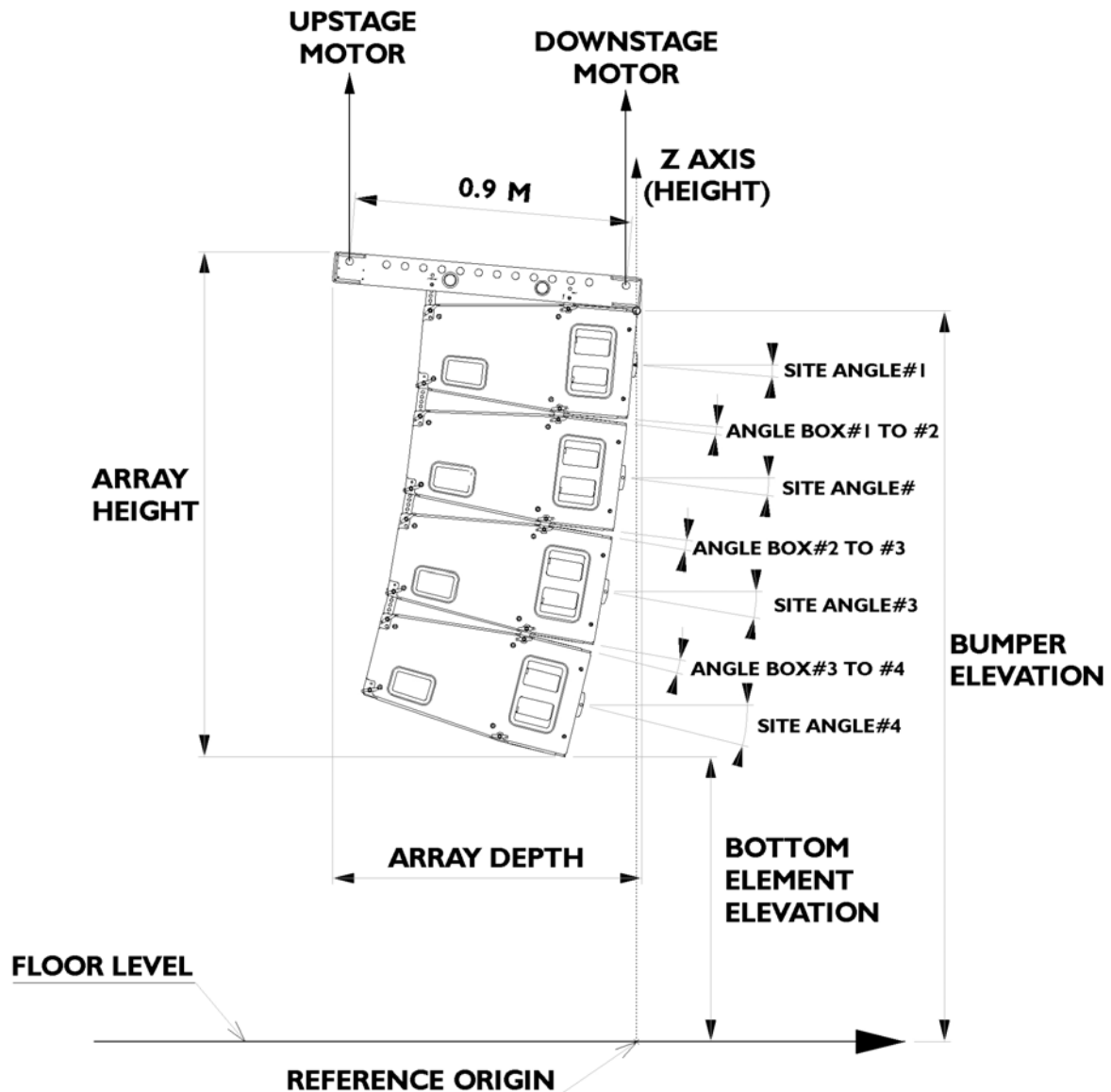


Figure 11: KUDO Geometric Data

To illustrate the coverage of KUDO, Figure 12 shows SPL mappings at octave band frequencies for an array of 8 KUDO enclosures (angles top-to-bottom = 10, 10, 9, 7, 6, 5, 4). For this example, the KUDO array is perpendicular to a target plan having dimensions of 35 x 100 meters at a 20 meter throw distance (imagine the KUDO array firing at a large wall). Coverage is stable and well-defined above 1 kHz while becoming progressively more omnidirectional at lower frequencies.

Figure 13 shows impact mode coverage and band-averaged SPL mappings for the array of 8 KUDO enclosures pictured in Figure 12. Impact coverage provides a good representation of the octave band mappings seen in Fig. 12 for frequencies higher than 2 kHz. For this reason, impact mode is considered to provide a good indication as to the overall coverage of the array in terms of clarity and intelligibility. It is also interesting to compare the A-weighted, unweighted and 1-10 kHz SPL mappings of Figure 13 with the individual octave band mappings of Figure 12. As for XT and ARCS enclosure modeling, the 1-10 kHz SPL mapping is seen to provide a good representation of the overall coverage of the array and also corresponds well with the coverage predicted in impact mode.

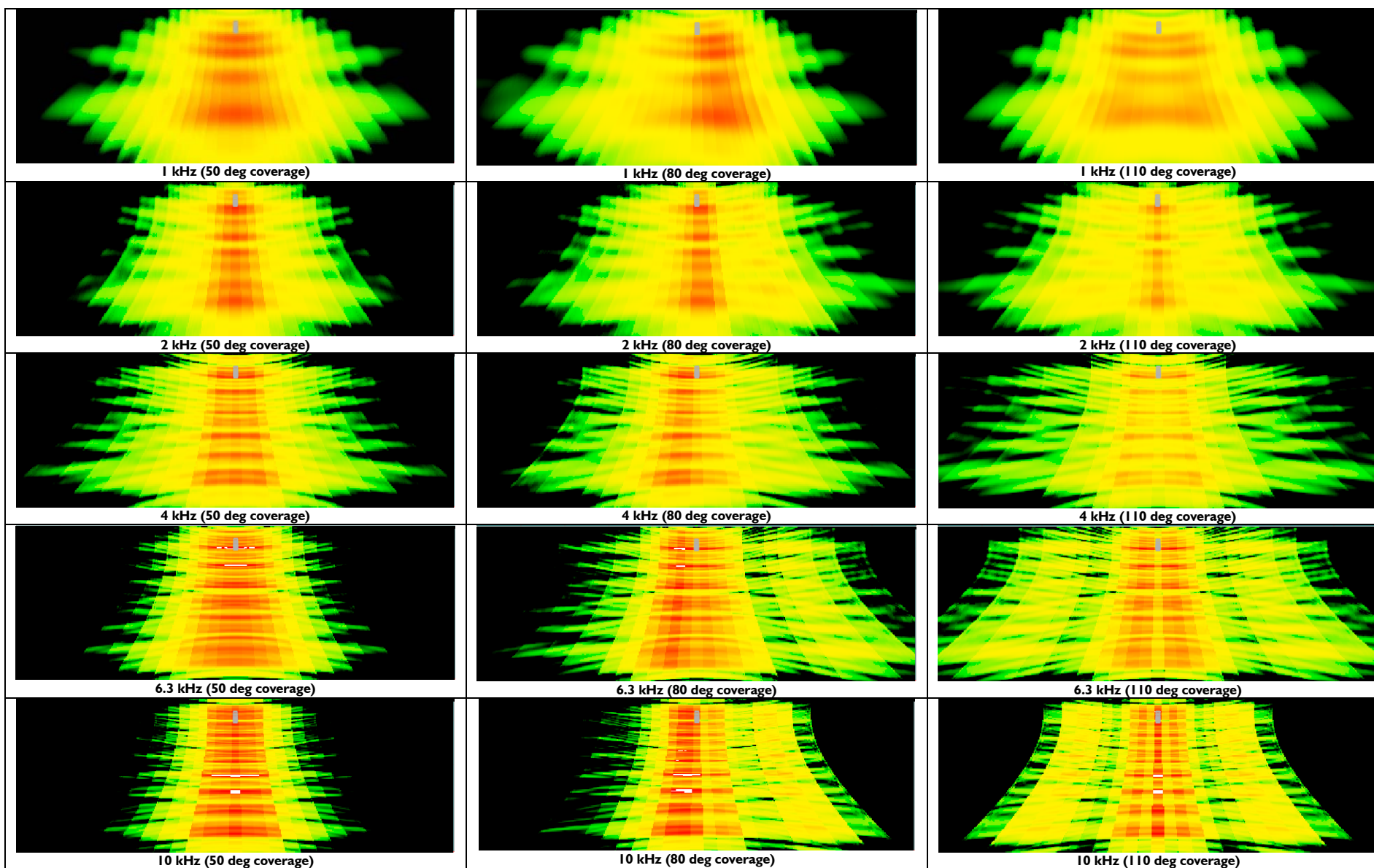


Figure 12: Plan view SPL mappings at octave band frequencies for 8 KUDO (20 meter throw distance, enclosures perpendicular to target plane)

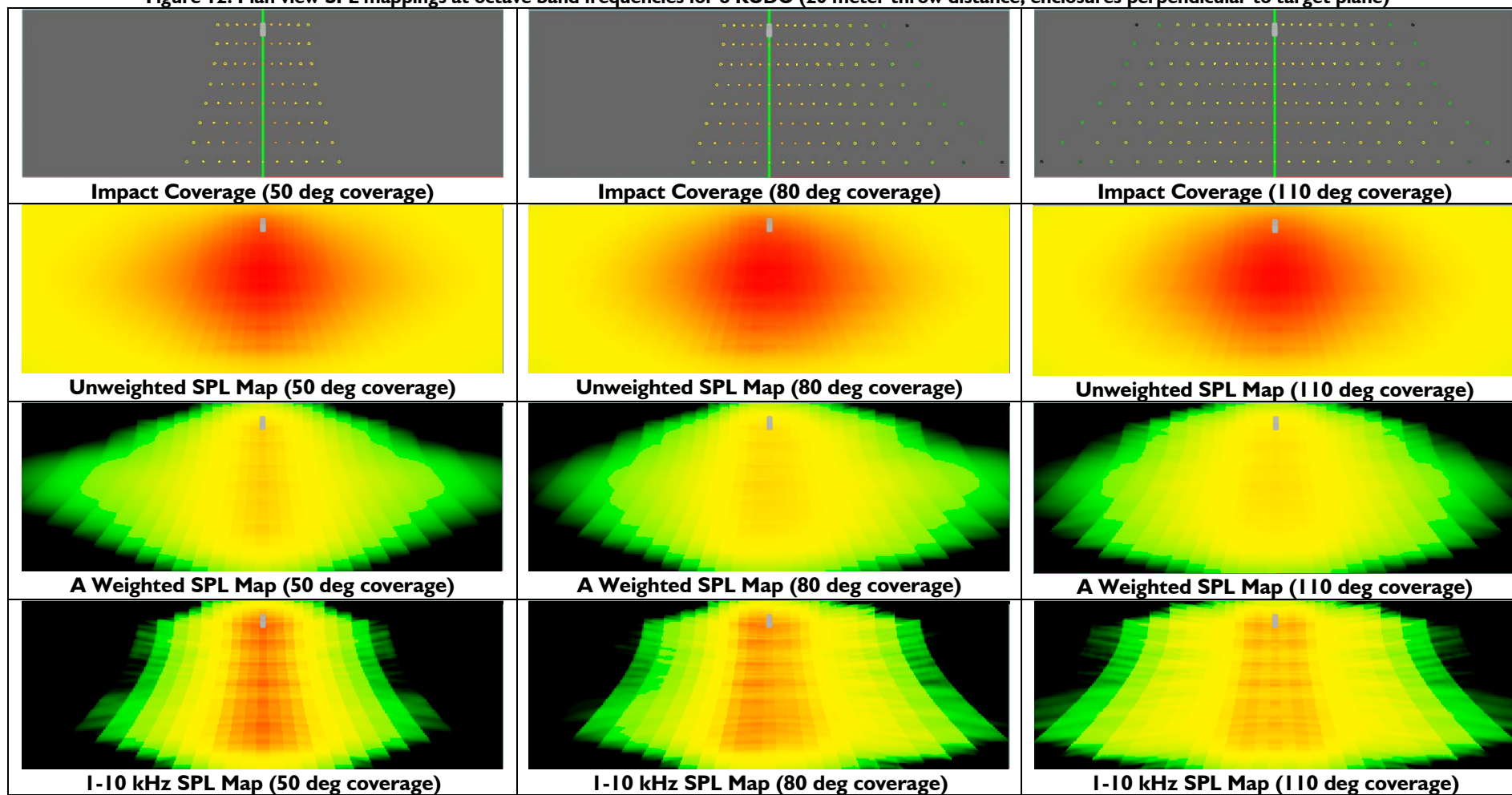


Figure 13: Impact coverage and SPL mappings (unweighted, A-weighted, 1-10 kHz bandwidth) for 8 KUDO (20 meter throw distance, enclosures perpendicular to target plane)

KUDO SOUNDVISION DESIGN EXAMPLE

The following example illustrates sound design using KUDO for a typical theatrical venue. The overall system consists of:

- Centre Cluster 8 KUDO (vertical line source array, 110 degree coverage mode)
- FOH L 10 KUDO (vertical line source array, 80 degree asymmetric LEFT)
- FOH R 10 KUDO (vertical line source array, 80 degree asymmetric RIGHT)
- Front-fill 6 MTD108a (not shown)

Figures 14 to 17 show impact mode coverage and SPL mappings for the individual and combined KUDO loudspeaker arrays of this sound design.

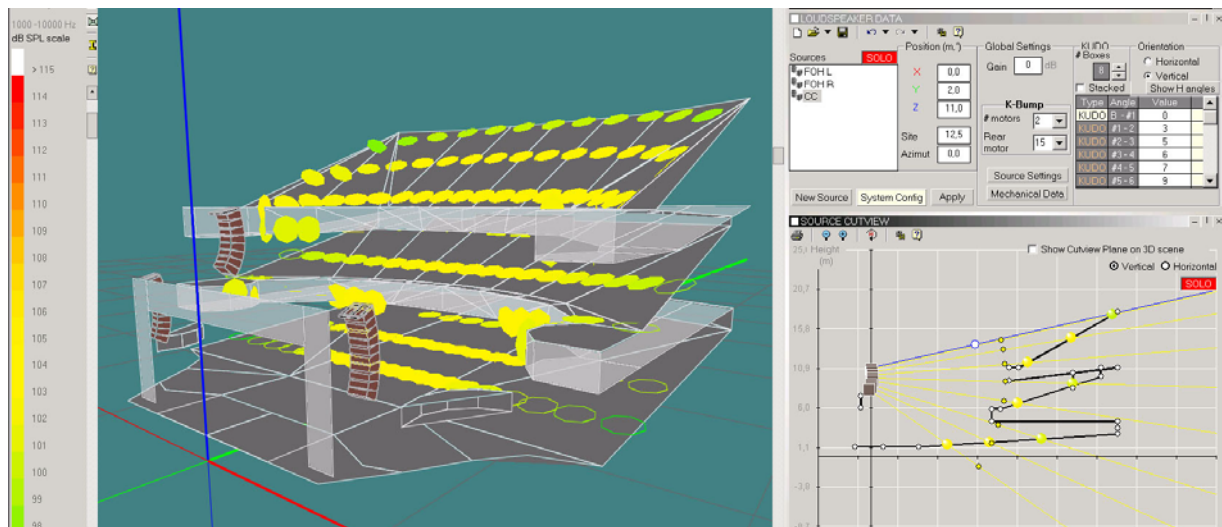


Figure 14(a) Centre cluster impact mode coverage (8 KUDO, 110 deg K-LOUVER setting)

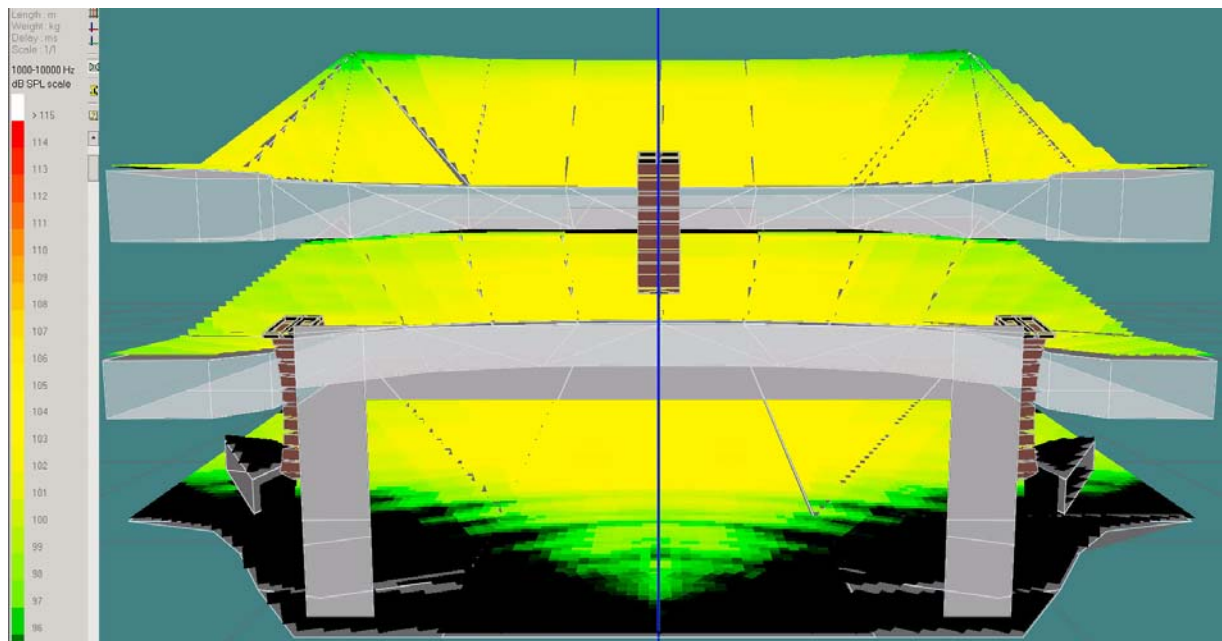


Figure 14(b) Centre cluster SPL mapping – rear view

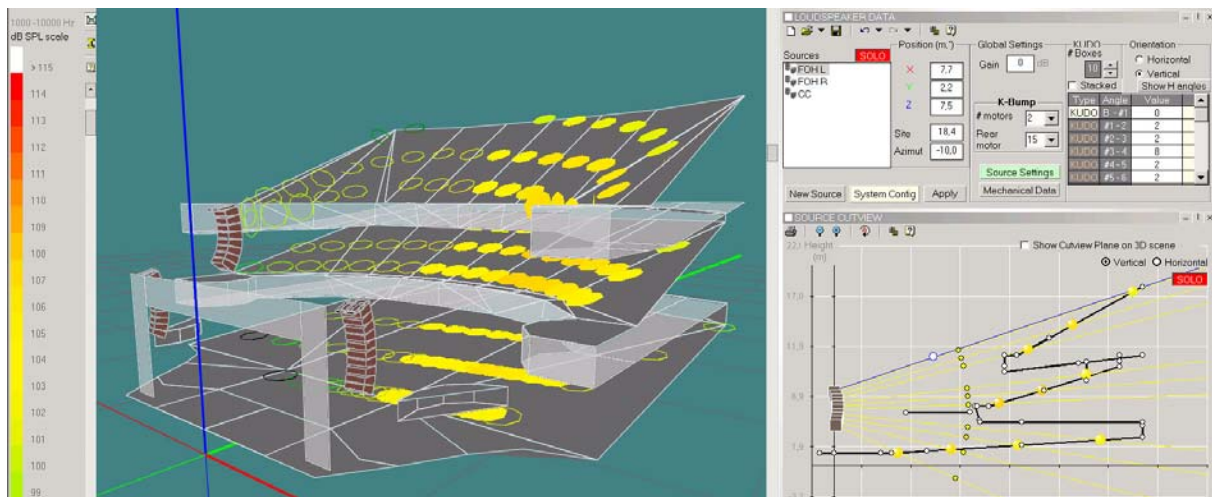


Figure 15(a) FOH L impact mode coverage (10 KUDO, 80 deg asymmetric K-LOUVER setting)

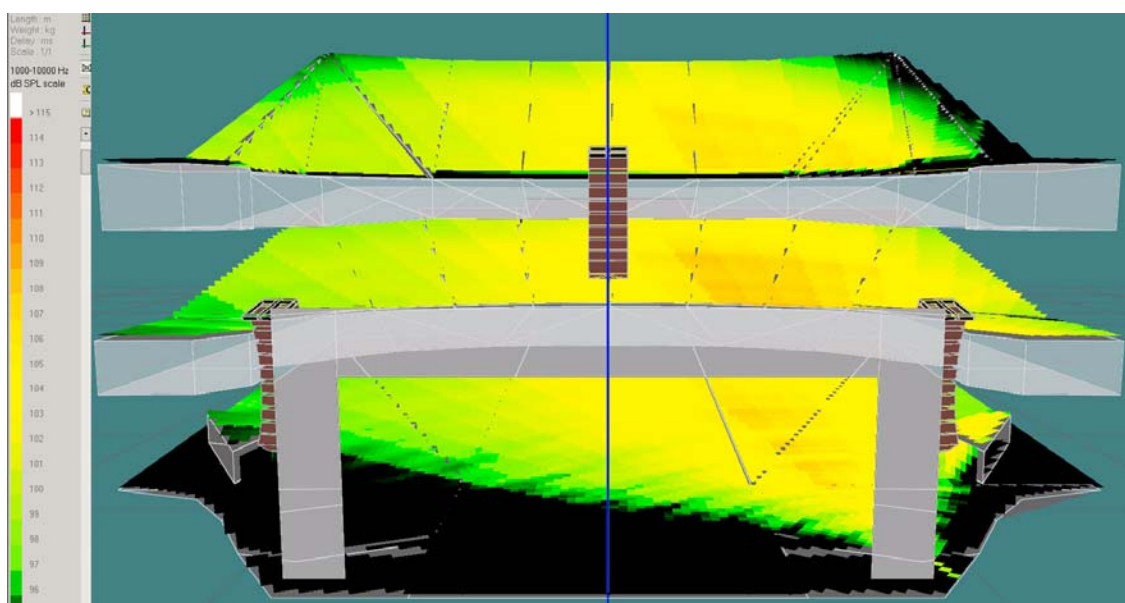


Figure 15(b) FOH L SPL mapping – rear view

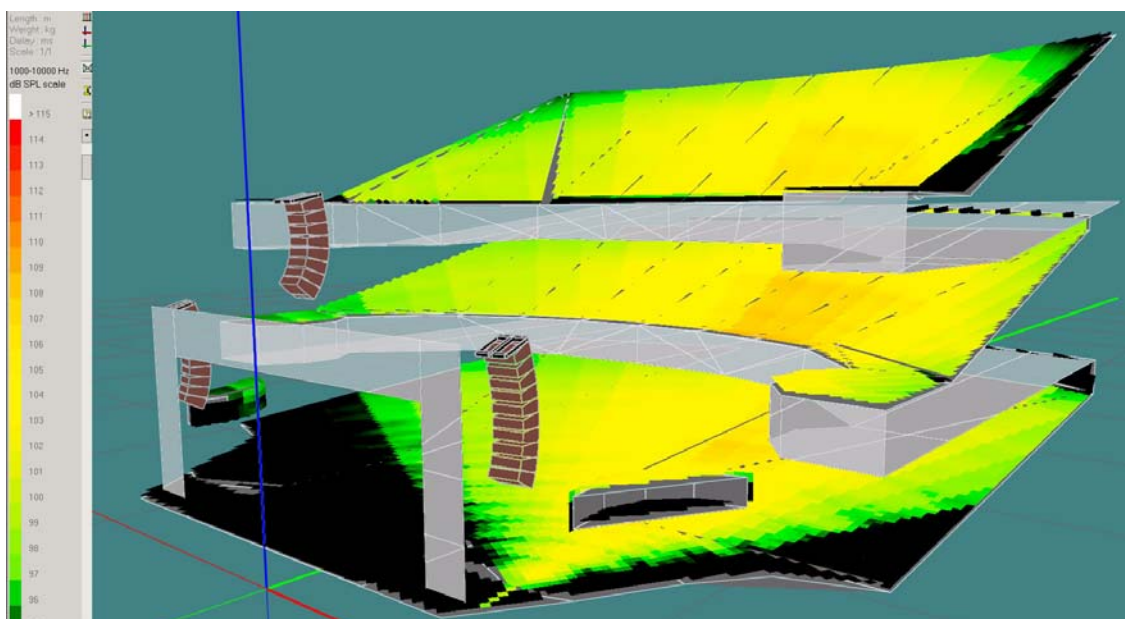


Figure 15(c) FOH L SPL mapping – perspective view

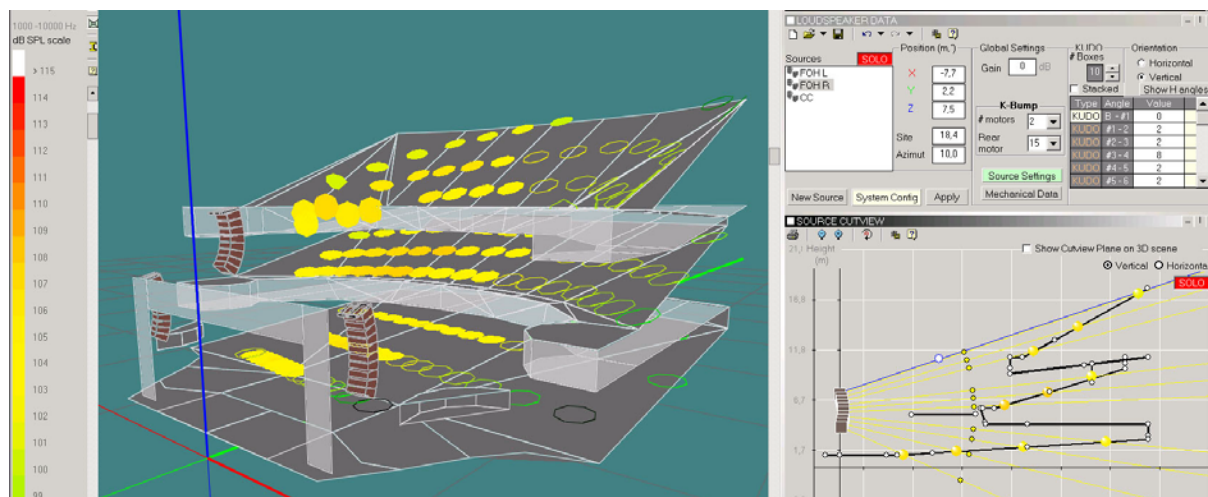


Figure 16(a) FOH R impact mode coverage (10 KUDO, 80 deg asymmetric K-LOUVER setting)

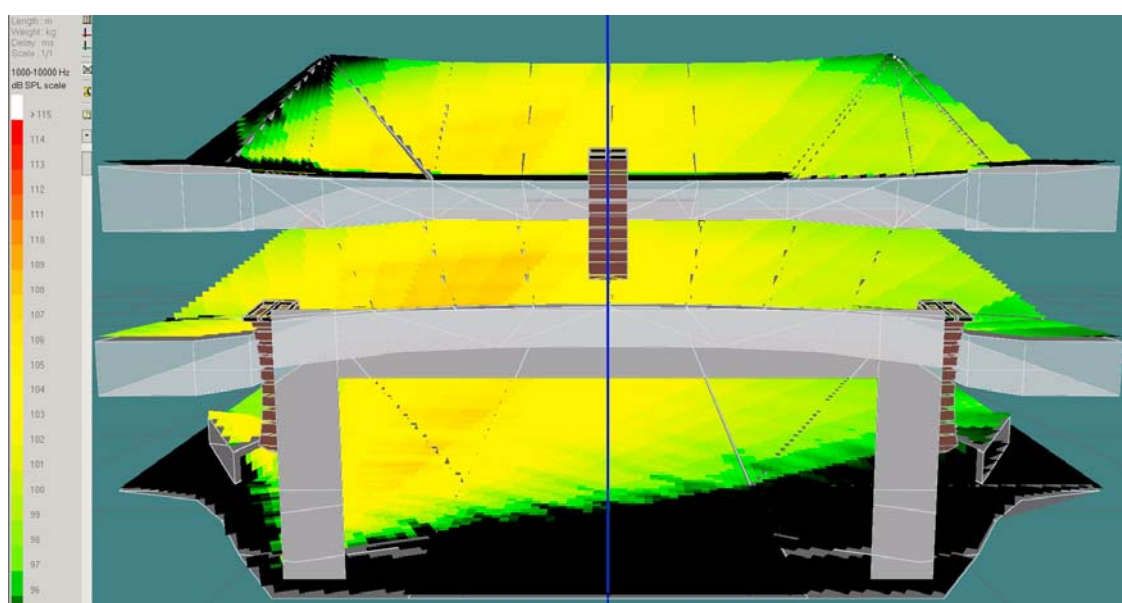


Figure 16(b) FOH R SPL mapping – rear view

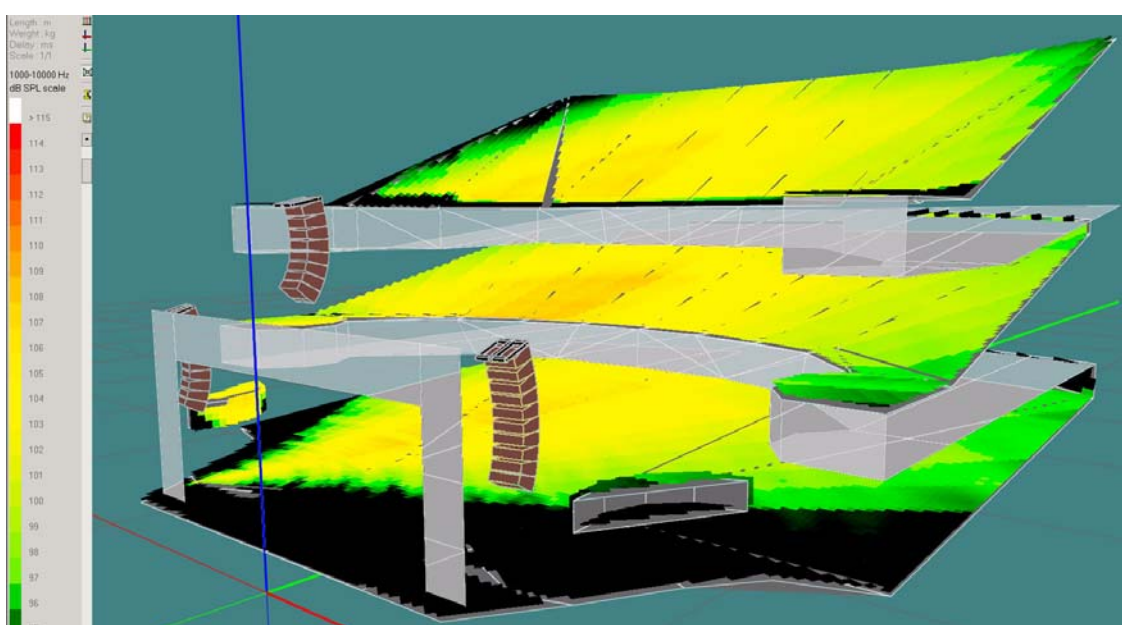


Figure 16(c) FOH R SPL mapping – perspective view

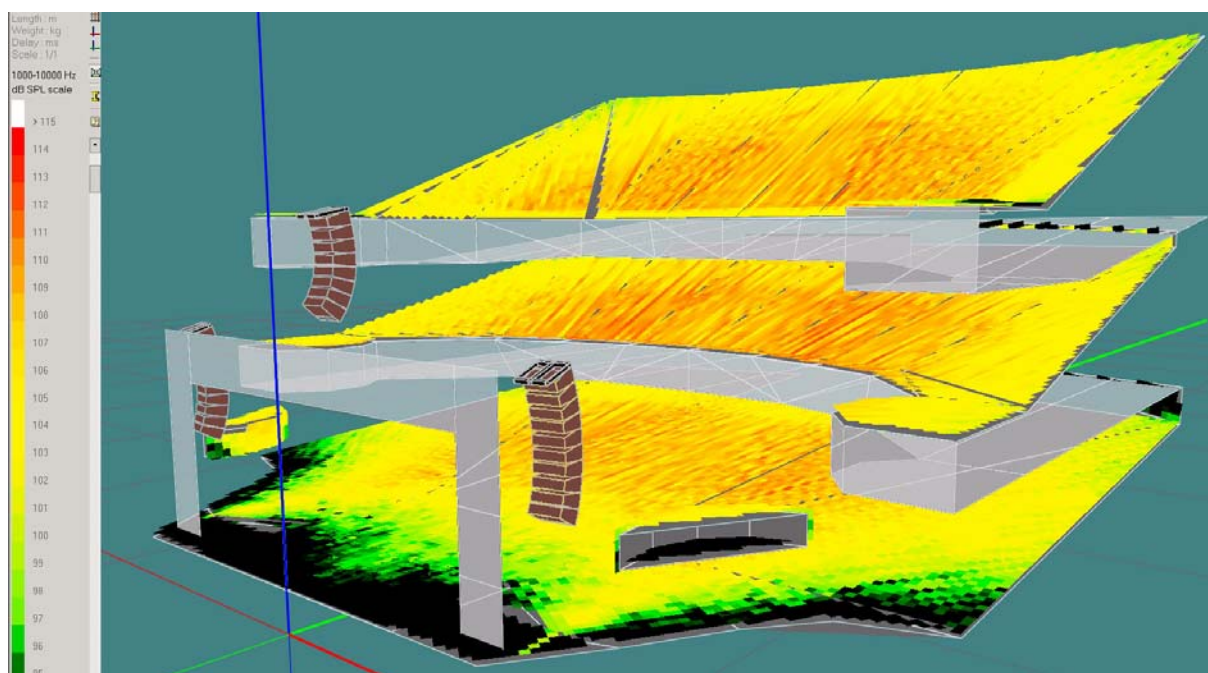


Figure 17(a) Full system SPL mapping – perspective view

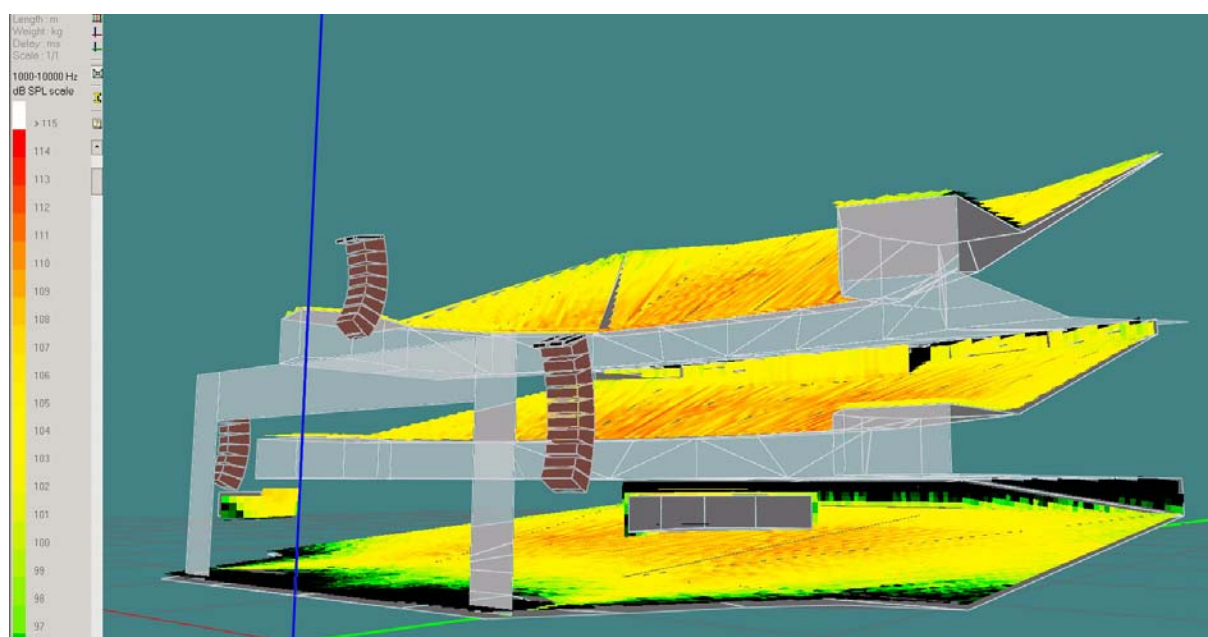


Figure 17(b) Full system SPL mapping – lower perspective view

MODELING dV-DOSC

Geometric data for modeling dV-DOSC in SOUNDVISION is shown in Figure 18.

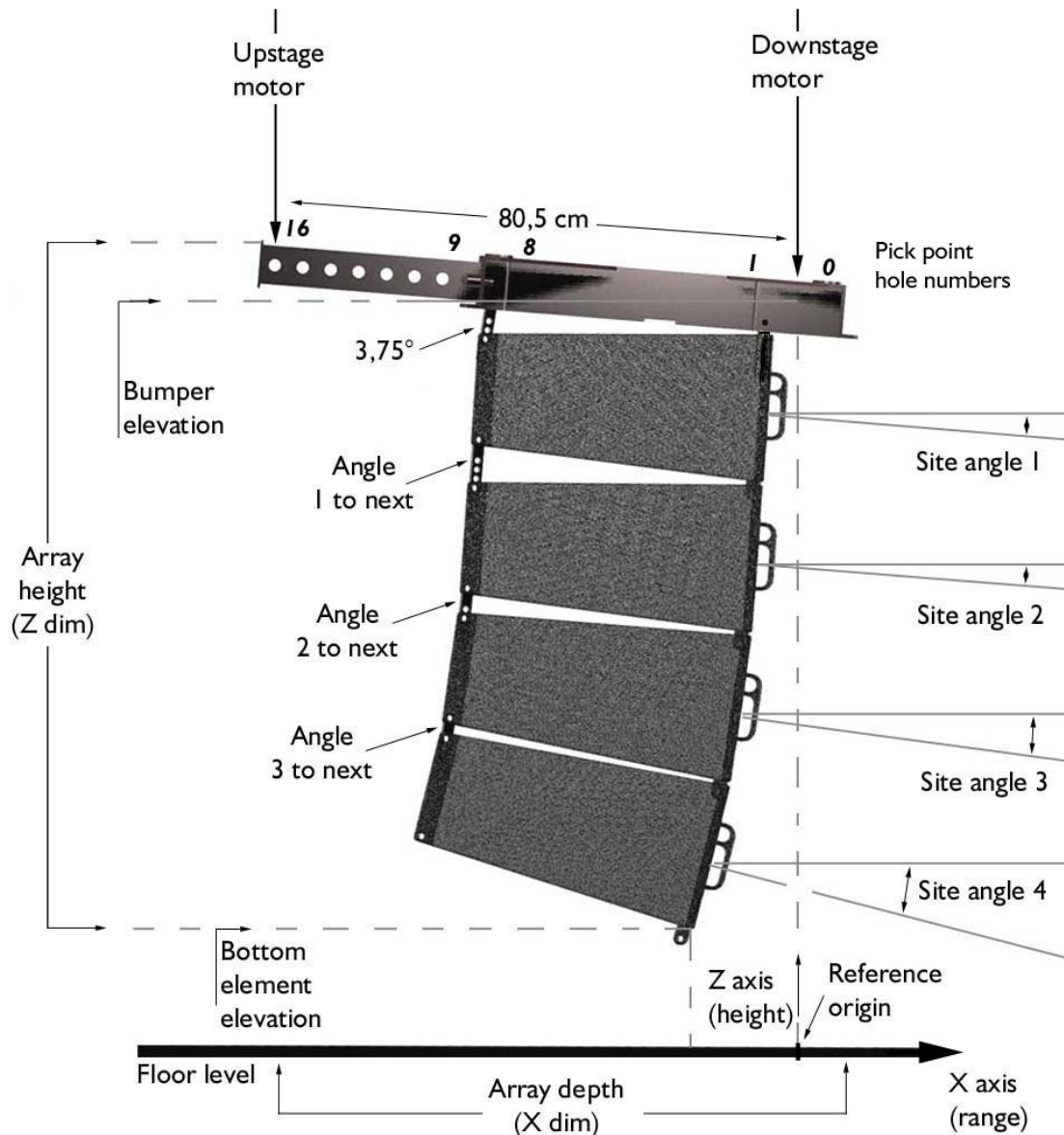
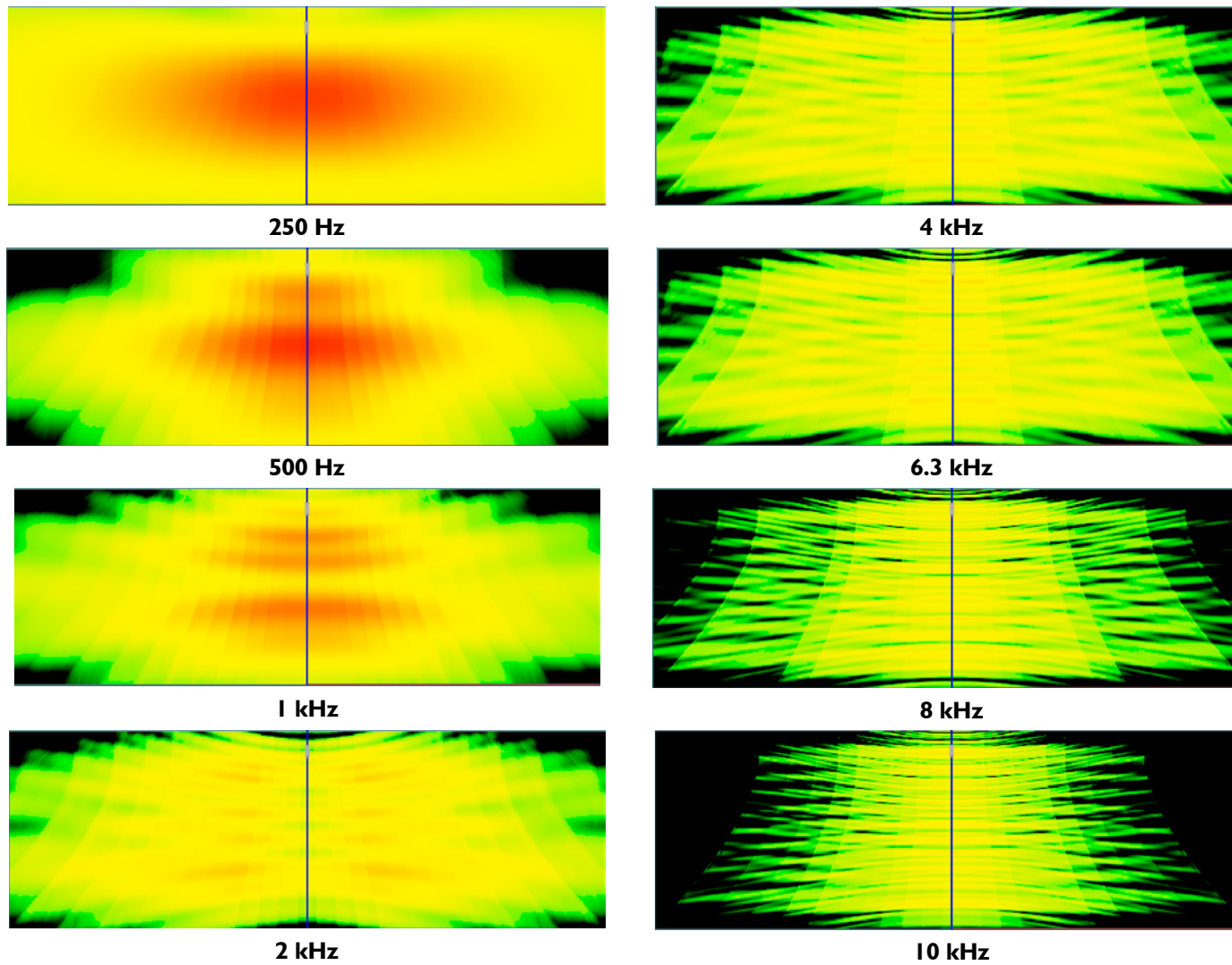


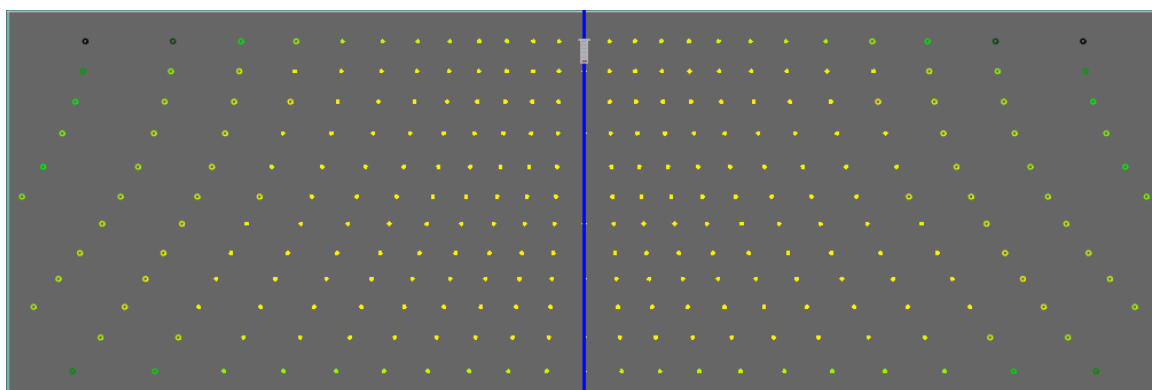
Figure 18: dV-DOSC Geometric Data

To illustrate dV-DOSC coverage, Figure 19 shows SPL mappings at octave band frequencies for an array of 12 enclosures (angles = 5.5, 5.5, 5.5, 5.5, 4.5, 3.75, 3.75, 3, 3, 3, 3). For this example, the dV-DOSC array is perpendicular to a 35 x 100 metre target plane at a 30 metre throw distance (imagine the dV-DOSC array firing at a large wall). Coverage is stable and well-defined above 1 kHz while becoming progressively more omnidirectional at lower frequencies. Figure 20 shows impact mode coverage and band-averaged SPL mappings for the array of 12 dV-DOSC enclosures pictured in Fig. 19. Impact coverage provides a good representation of the octave band mappings seen in Fig. 19 for frequencies higher than 1 kHz. For this reason, impact mode is considered to provide a good indication as to the overall coverage of the array in terms of clarity and intelligibility.

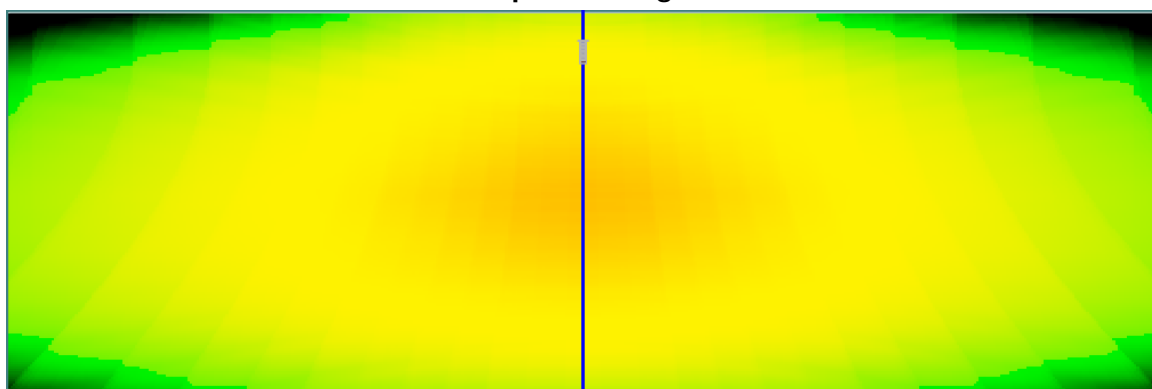
It is also interesting to compare the A-weighted, unweighted and 1-10 kHz SPL mappings of Figure 20 with the individual octave band mappings of Figure 19. The 1-10 kHz SPL mapping is seen to provide a good representation of the overall coverage of the array and corresponds well with the coverage predicted in impact mode. The A-weighted SPL mapping provides a more strict representation of system coverage since there is more emphasis on higher frequencies while the unweighted mapping is more omnidirectional due to the inclusion of lower frequency information in the average.



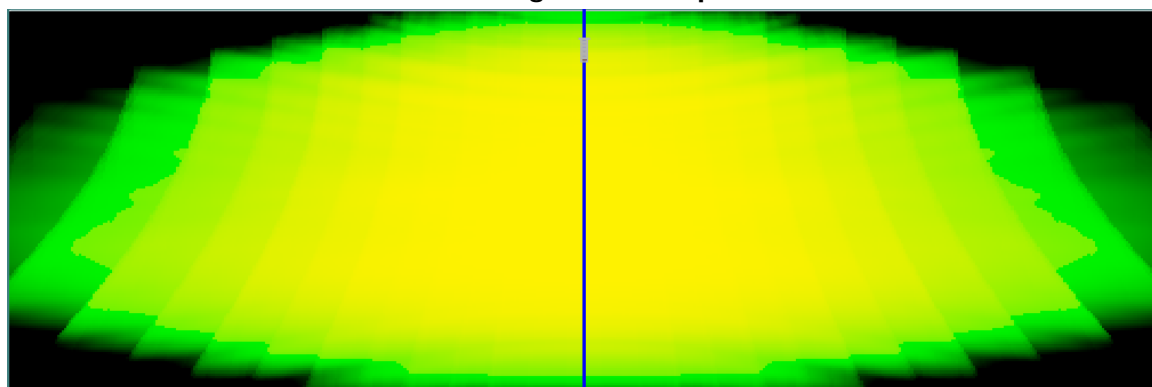
**Figure 19: Plan view SPL mappings at octave band frequencies for 12 dV-DOSC
(30 metre throw distance, enclosures perpendicular to target plane)**



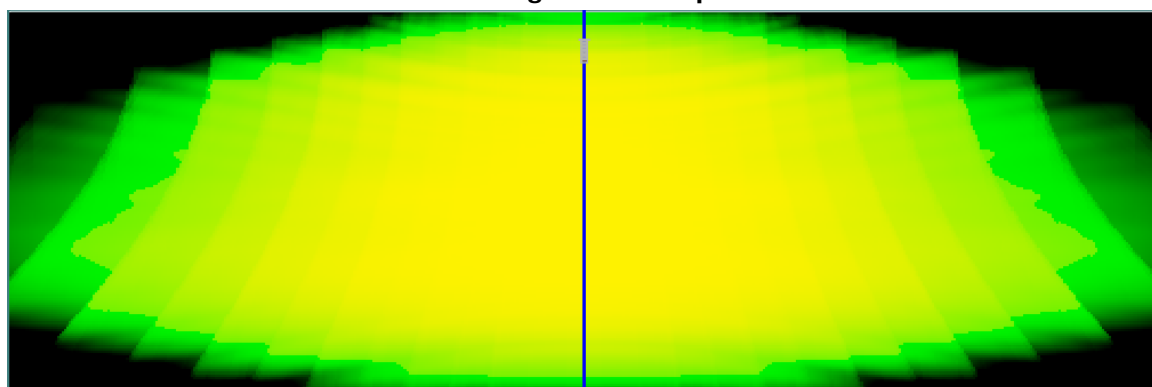
Impact Coverage



Unweighted SPL Map



A Weighted SPL Map



I-10 kHz SPL Map

Figure 20: Impact coverage and SPL mappings (unweighted, A-weighted, I-10 kHz bandwidth) for 12 dV-DOSC (30 metre throw distance, enclosures perpendicular to target plane)

MODELING V-DOSC

Geometric data for modeling dV-DOSC in SOUNDVISION is shown in Figure 21.

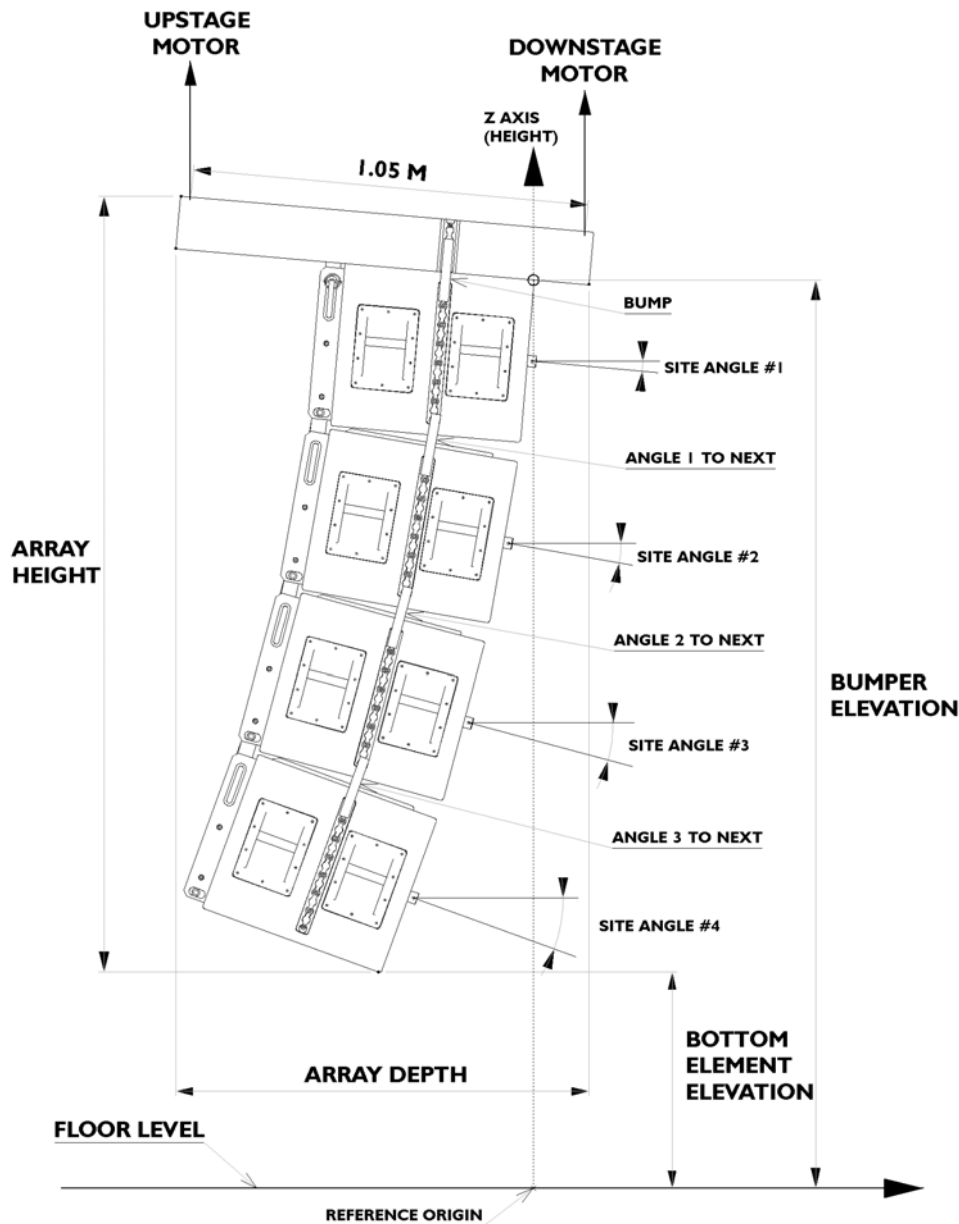
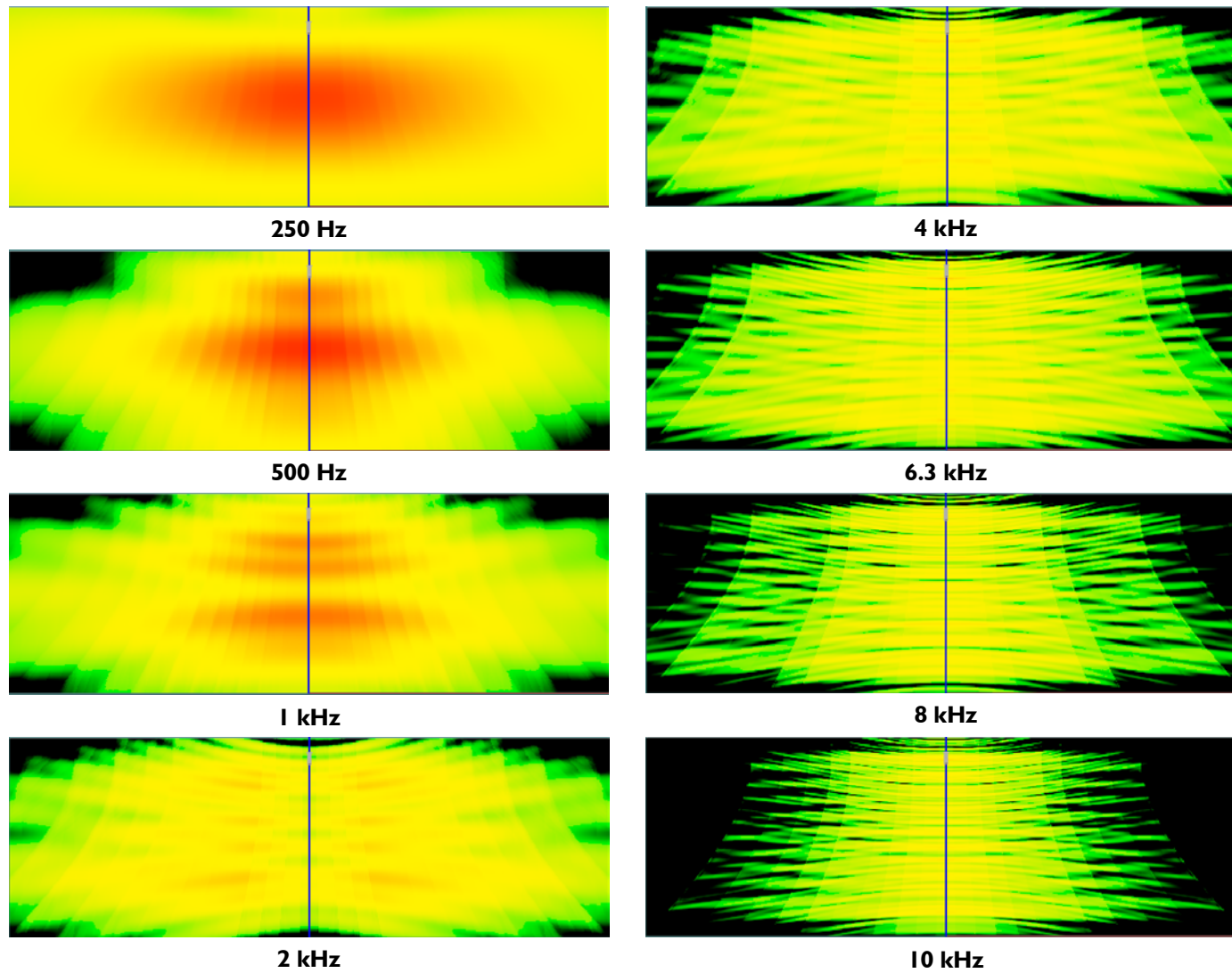


Figure 21: V-DOSC Geometric Data for SOUNDVISION

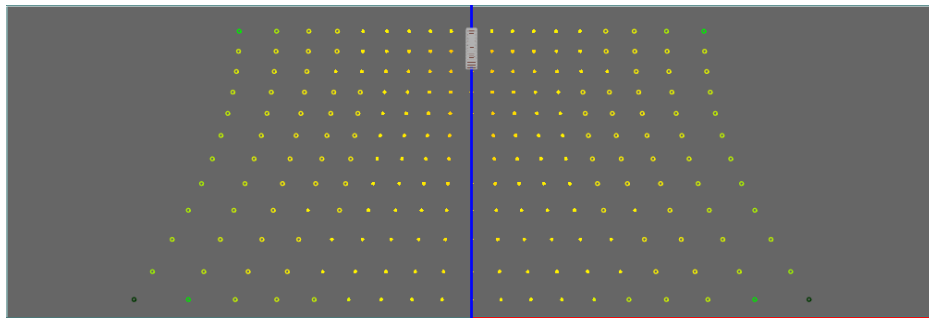
Note: V-DOSC geometric data is different in SOUNDVISION versus ARRAY 2004. In order to have consistent coordinate references for all L-ACOUSTICS products, the convention adopted for SOUNDVISION is that $X=0$ and bumper elevation coordinates are referenced to the front of the top V-DOSC and site angles are referenced to the centre of each enclosure

To illustrate the V-DOSC coverage, Figure 22 shows SPL mappings at octave band frequencies for an array of 12 V-DOSC enclosures (angles top-to-bottom = 4,4,4,4,4,4,4,4,4,3). For this example, the V-DOSC array is perpendicular to a target plan having dimensions of 35 x 100 metres at a 30 metre throw distance (imagine the V-DOSC array firing at a large wall). Coverage is seen to be stable and well-defined above 1 kHz while becoming progressively more omnidirectional at lower frequencies.

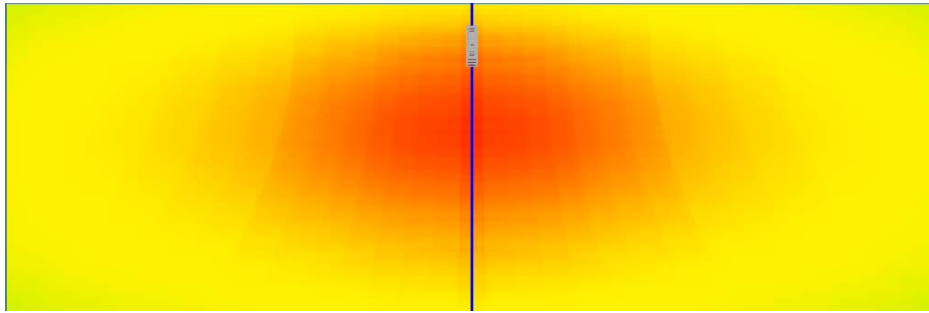
Figure 23 shows impact mode coverage and band-averaged SPL mappings for the array of 12 V-DOSC enclosures pictured in Fig. 22.



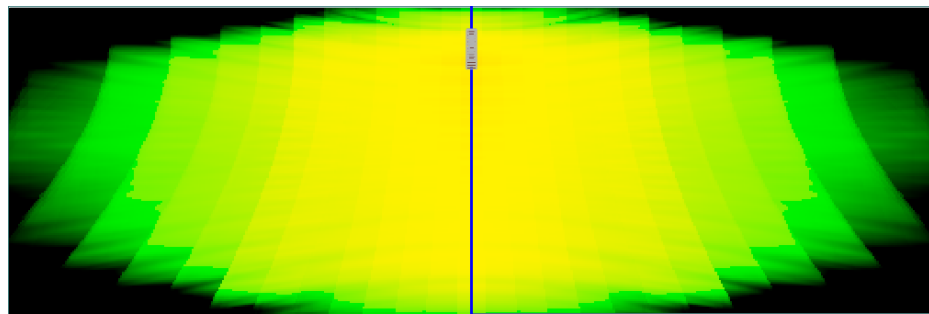
**Figure 22: Plan view SPL mappings at octave band frequencies for 12 V-DOSC
(30 metre throw distance, enclosures perpendicular to target plane)**



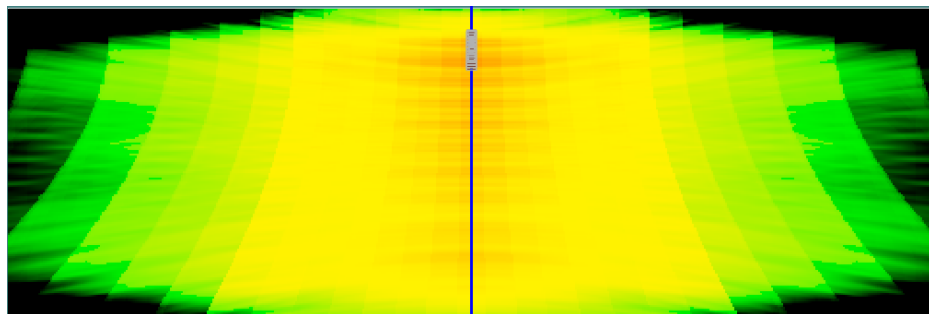
Impact Coverage



Unweighted SPL Map



A Weighted SPL Map



I-10 kHz SPL Map

Figure 23: Impact coverage and SPL mappings (unweighted, A-weighted, I-10 kHz bandwidth) for 12 V-DOSC (30 metre throw distance, enclosures perpendicular to target plane)

V-DOSC SOUNDVISION DESIGN EXAMPLES

STADIUM EXAMPLE

The following SOUNDVISION example (Amsterdam Arena, NL) shows the coverage of different elements of a stadium system consisting of: four main arrays (15 V-DOSC + 3 dV-DOSC); four distributed front fill arrays (3 dV-DOSC); one centre cluster (6 dV-DOSC); eight distributed balcony fill arrays (6 dV-DOSC).

LLL	LL	L	C	R	RR	RRR	DEL1	DEL2	DEL3	DEL4	DEL5	DEL6	DEL7	DEL8		
	15 6 8	15 6 12	6 6 6	15 6 12	15 6 8		6	6	6	6	6	6	6	6	60 78 46	V-DOSC dV-DOSC SB218

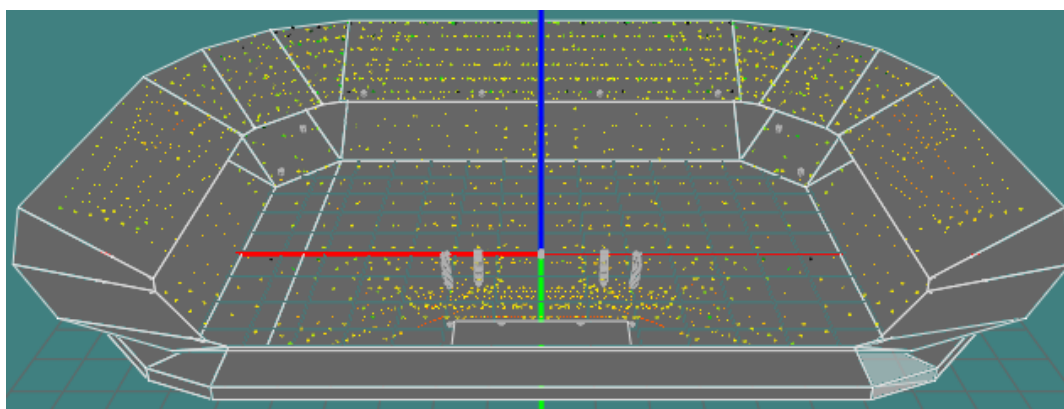


Figure 24a: Stadium example - rear perspective view of full system impact coverage

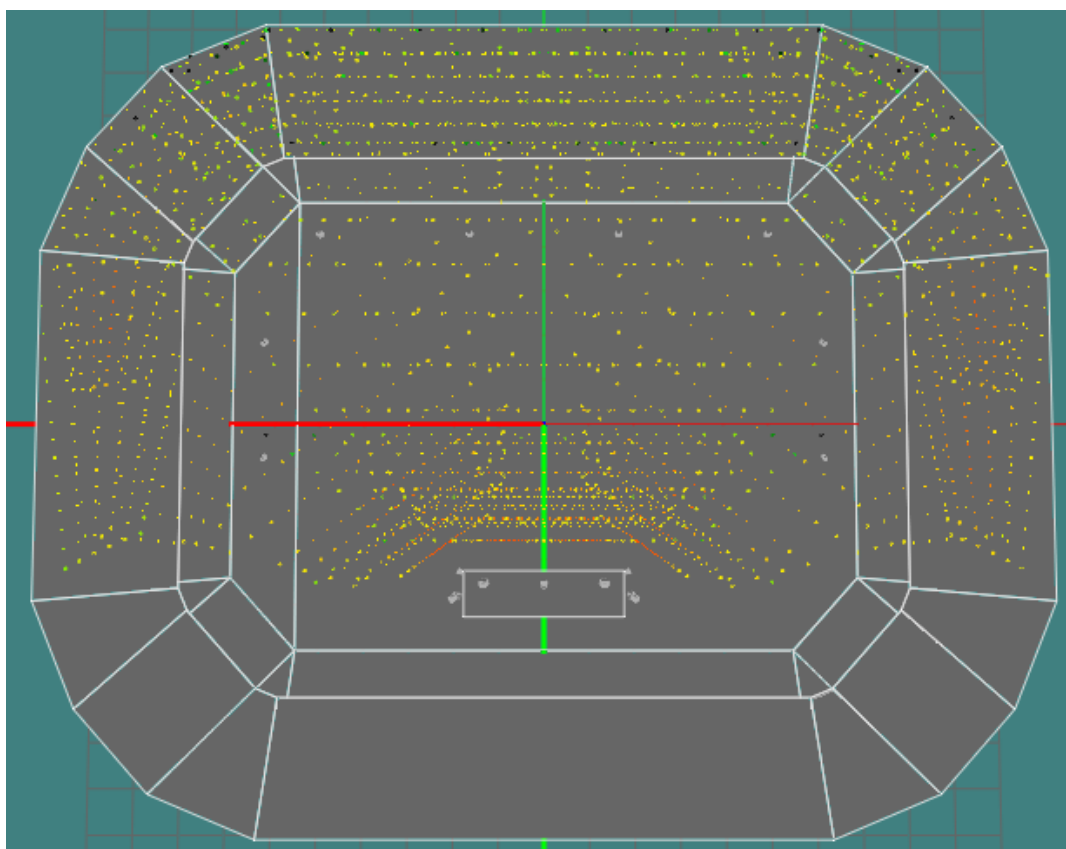
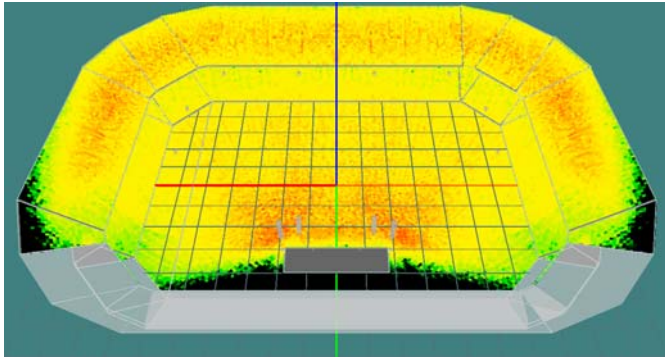
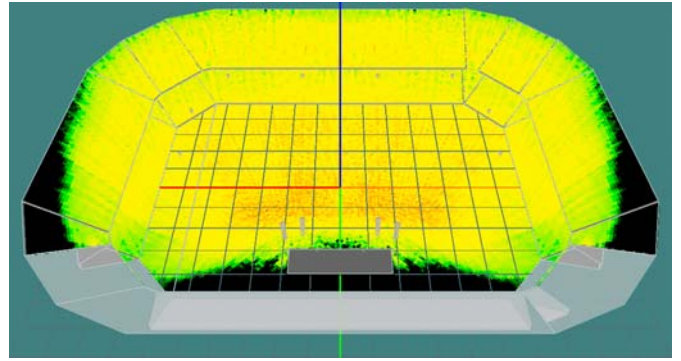


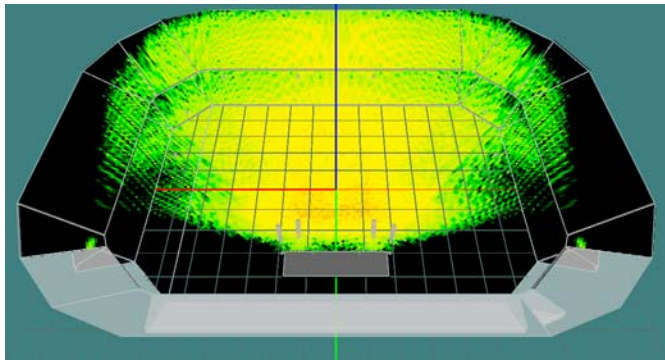
Figure 24b: Stadium example - plan view of full system impact coverage



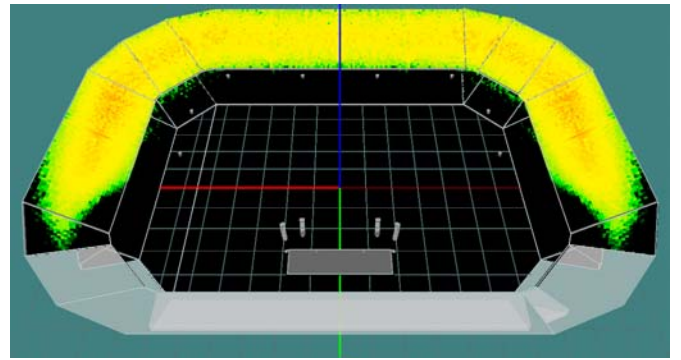
FULL SYSTEM



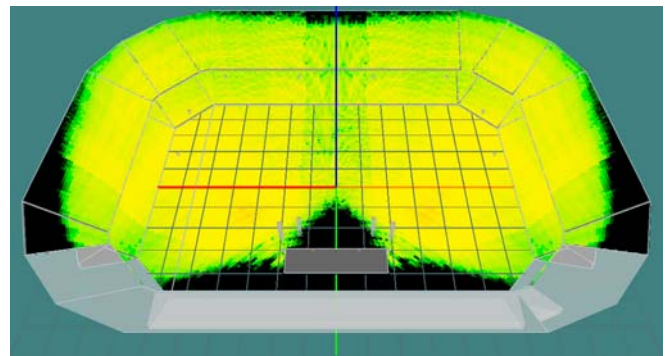
FOH + OFFSTAGE FILL: LL, L, R, RR



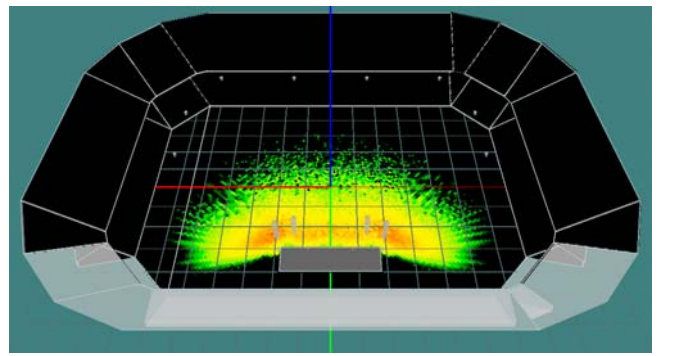
FOH SYSTEM: L, R



BALCONY FILL SYSTEM: 8 x 6 dV-DOSC



OFFSTAGE FILL SYSTEM: LL, RR



FRONT FILL SYSTEM: 4 x 3 dV-DOSC

Figure 25: Stadium example - rear perspective view of 1-10 kHz SPL Mappings

SOUNDVISION ARENA EXAMPLE

The following SOUNDVISION example (Palais Omnisport de Paris Bercy – POPB – Paris, France) shows the coverage of different elements of an arena system consisting of: two main arrays (15 V-DOSC + 3 dV-DOSC); two offstage fill arrays (12 dV-DOSC); eight distributed front fill enclosures (112XT).

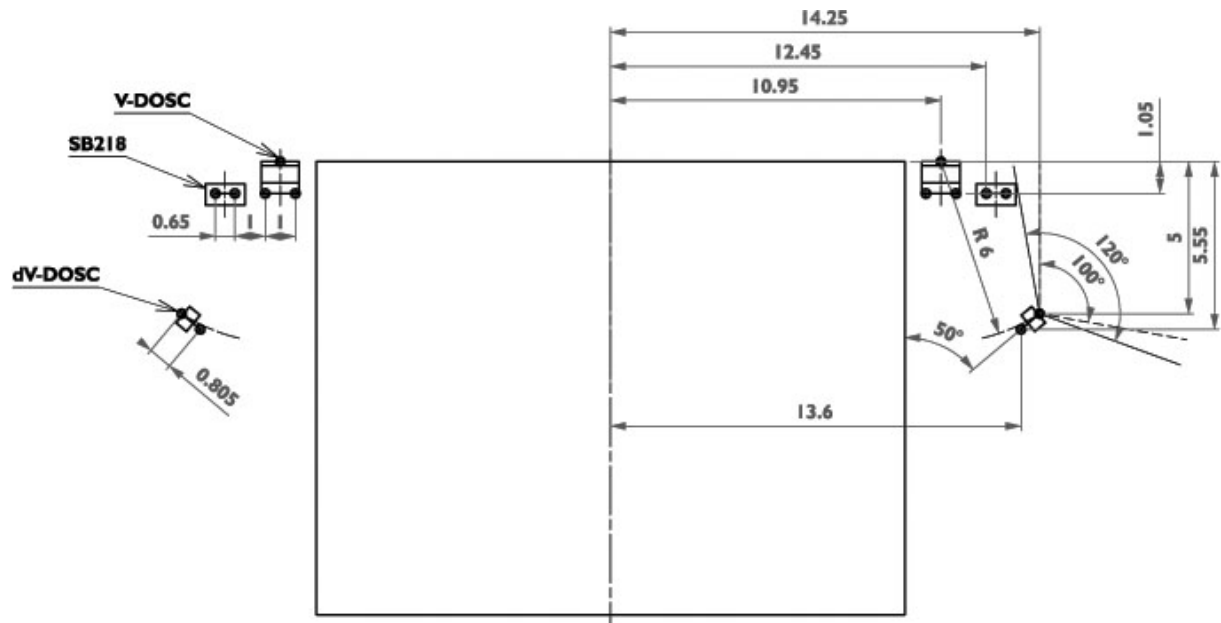


Figure 26: Arena example -rigging plot

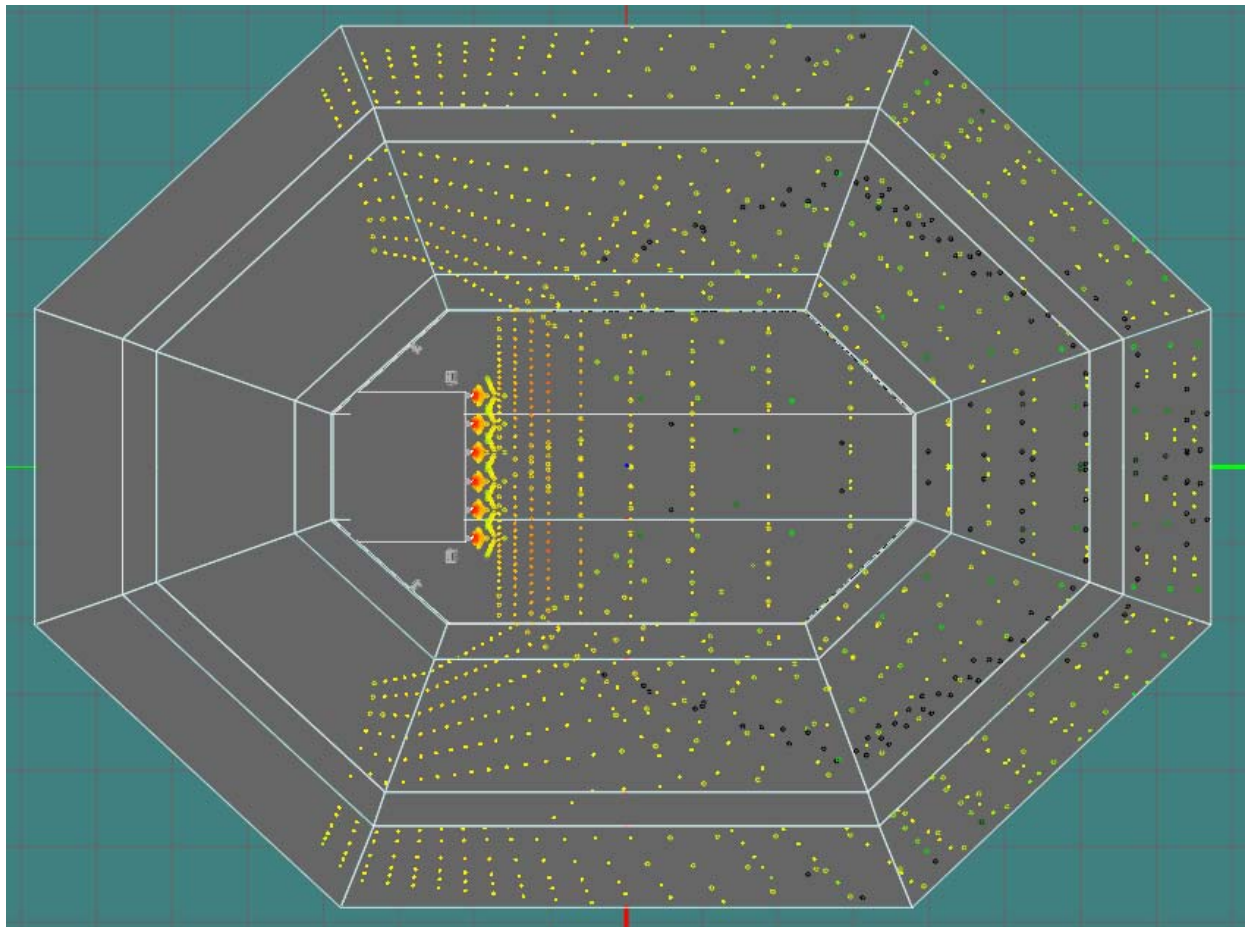


Figure 27: Arena example - plan view of full system impact coverage

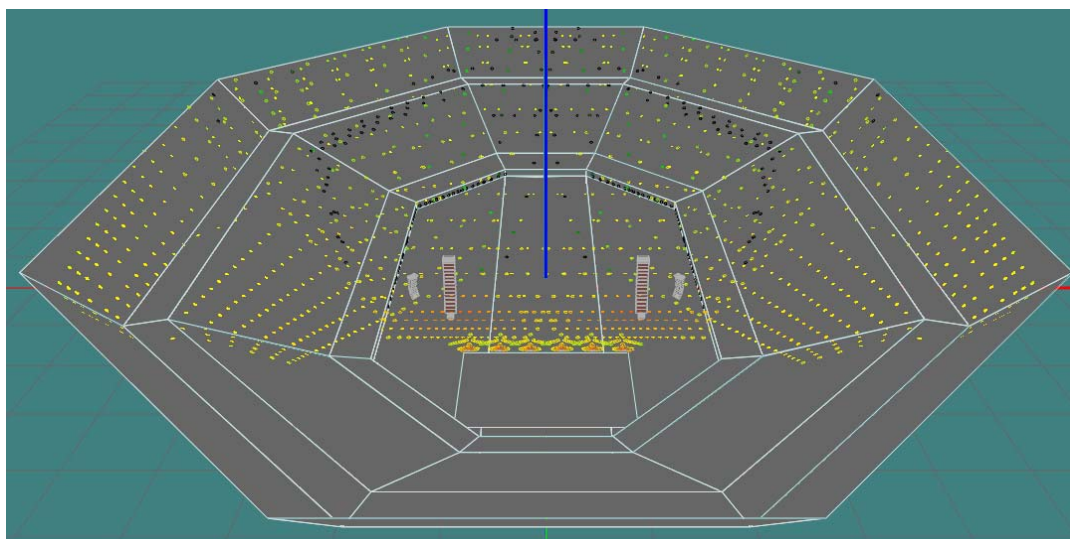


Figure 28: Arena example - rear perspective view of full system impact coverage

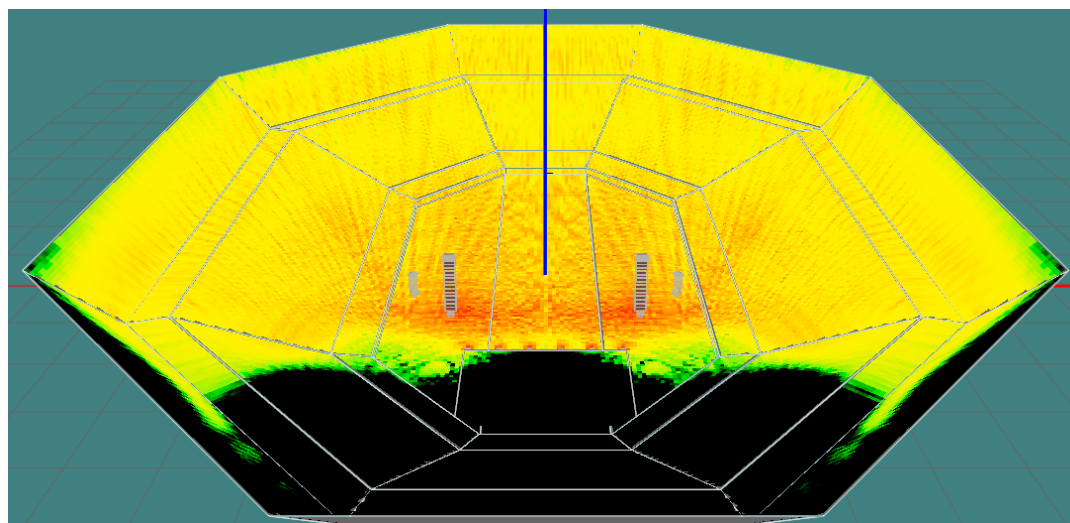
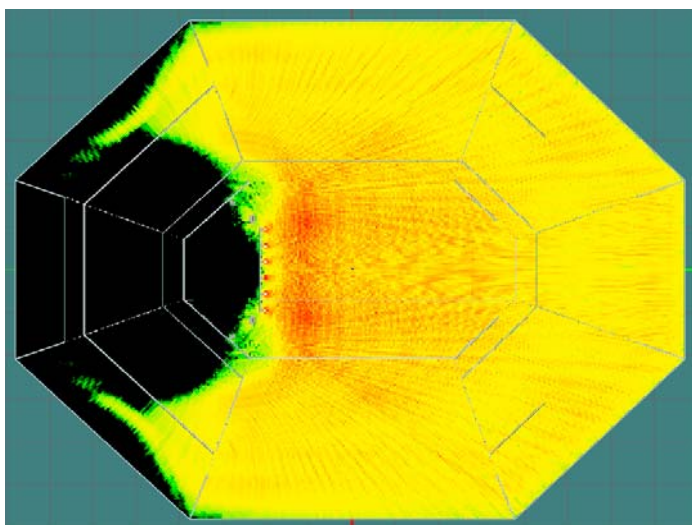
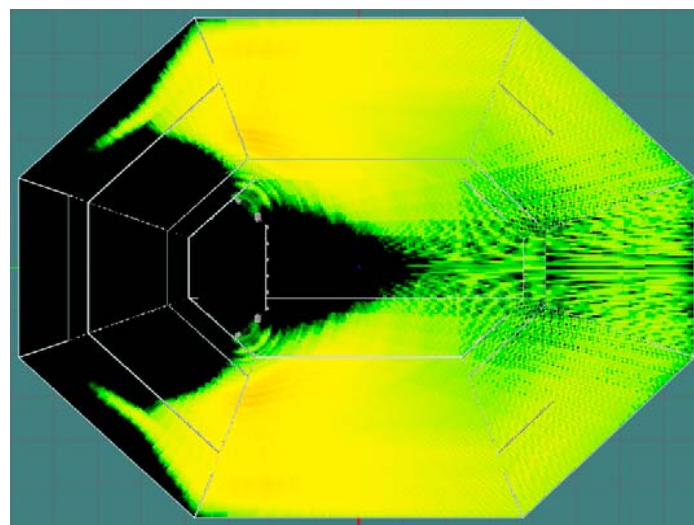


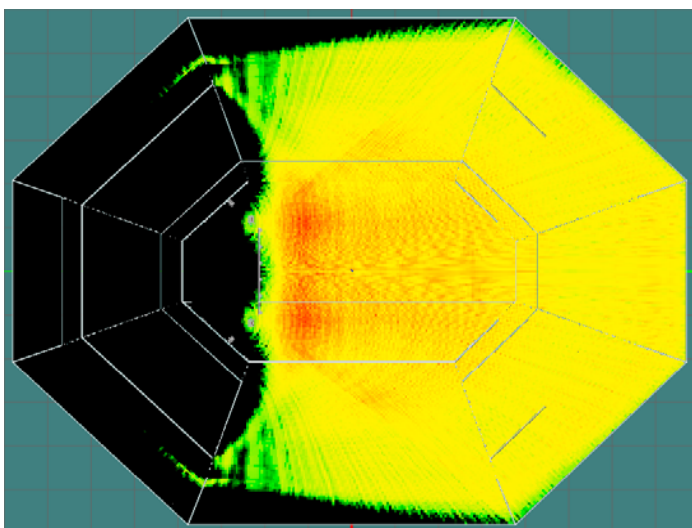
Figure 29a: Arena example - rear perspective view of full system SPL map (1-10 kHz)



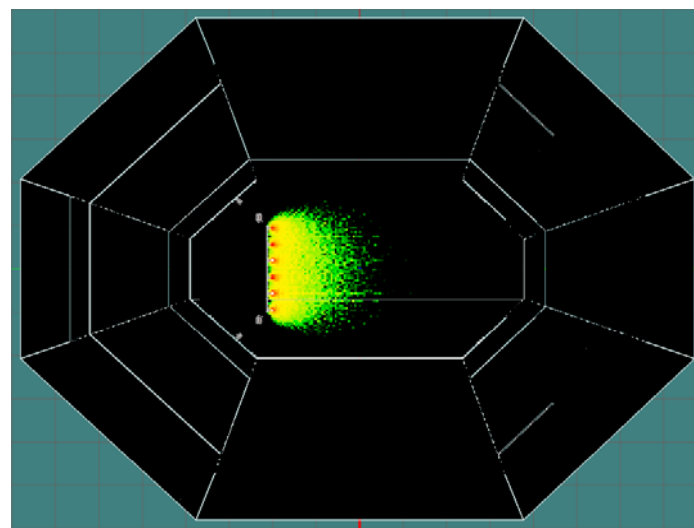
Full System



dV-DOSC Offstage LL/RR



FOH L/R



I12XT Front Fill System

Figure 29b: Arena example – plan view of 1-10 kHz SPL mapping



soundvision

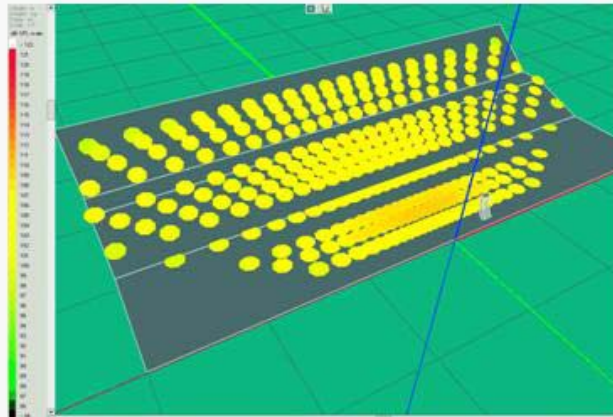
Proprietary 3D software dedicated to modeling L-ACOUSTICS products :

- Wavefront Sculpture Technology-based systems : ARCS, KUDO, dV-DOSC, V-DOSC
- Coaxial enclosures : XT, MTD

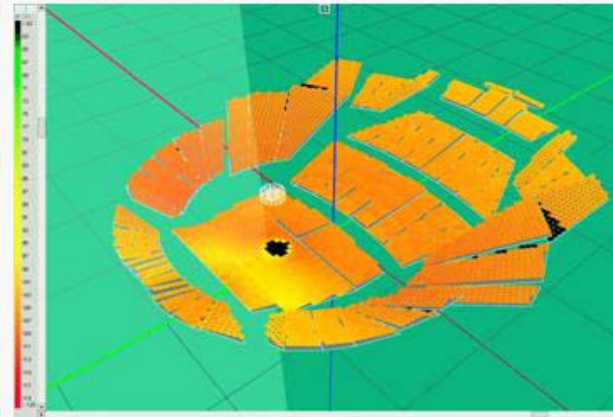
Convenient, intuitive graphical user interface

- Real-Time Coverage Simulation (Impact Mode)
- Sound Pressure Level (SPL) Calculation (Mapping Mode)

IMPACT MODE



MAPPING MODE

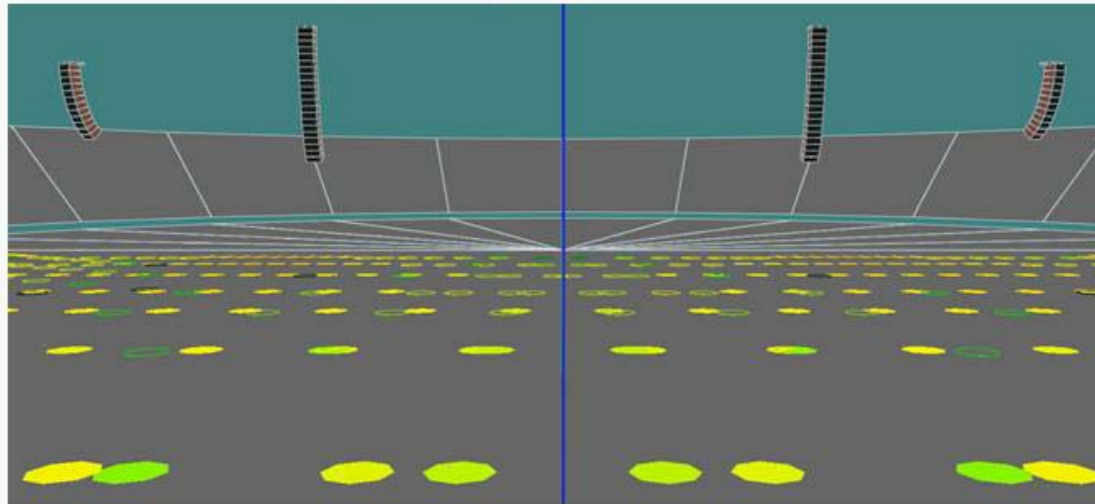




soundvision

- Room geometry and loudspeaker locations are defined in 3D
- Simplified operating modes allow rapid data entry in 2D using horizontal (plan) and vertical (cut) views of the room geometry
- SOUNDVISION assumes anechoic, freefield conditions and simulates direct sound only

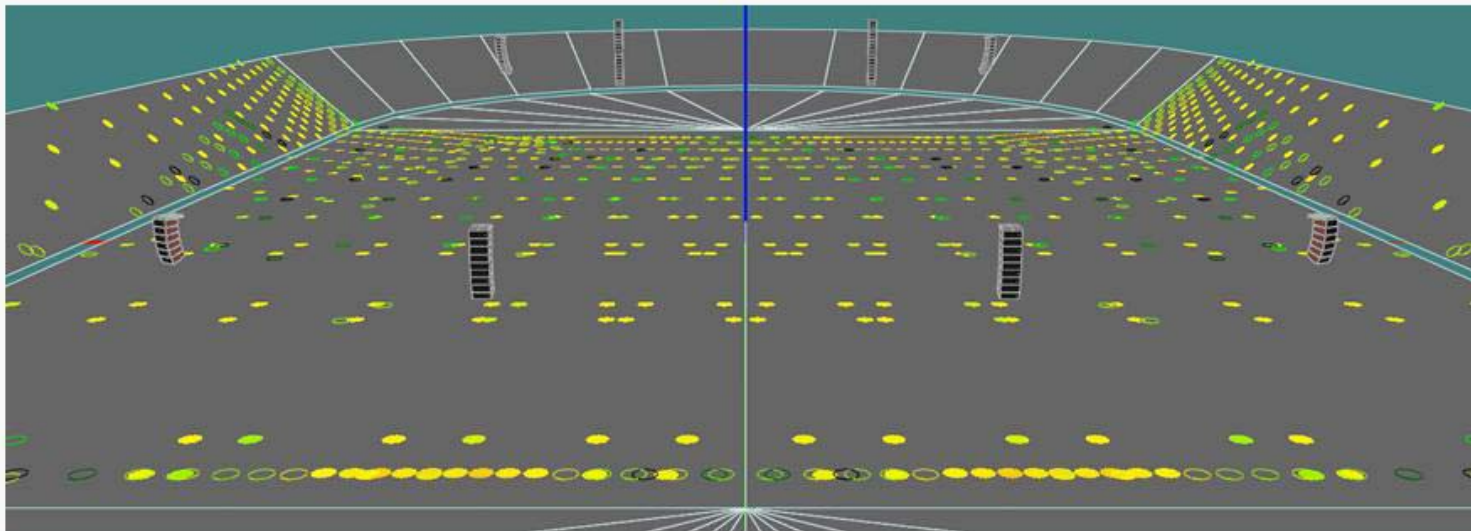
➤ *A reasonable approximation: with WST Systems, energy can be precisely focused on the audience and room acoustics neglected since less room reflections/reverberation are excited*





soundvision

- **IMPACT MODE** : for touring applications
- **SPL MAPPING MODE** : more detailed information for consultants, sound designers
- **MECHANICAL DATA / REPORT MODE** : practical information for the installation



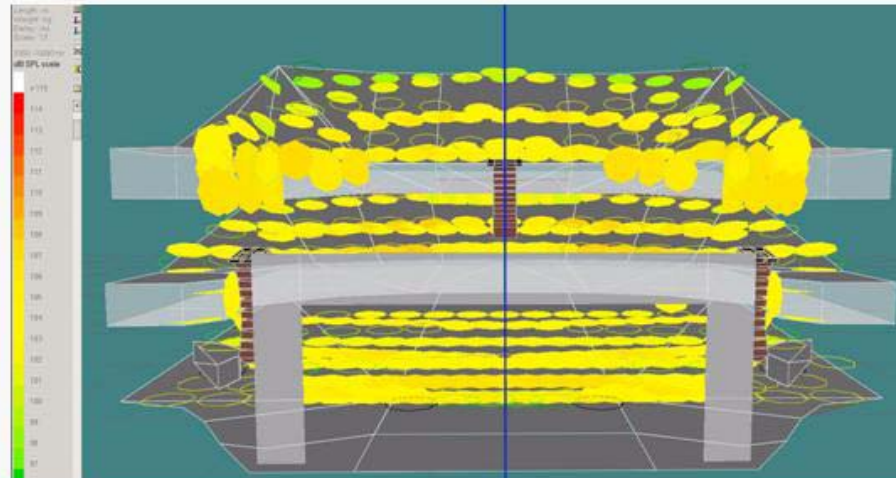


soundvision

IMPACT MODE

- Based on -6 dB directivity over 1-10 kHz bandwidth (at 5 deg resolution)
- Real time visualization of system coverage and SPL distribution
- Optimum SPL contours are highlighted within the displayed -6 dB coverage pattern (filled circles correspond to the -3 dB coverage)

For distributed sound reinforcement design using coaxial loudspeakers or multiple WST-based arrays - goal is to align filled circles to obtain even coverage



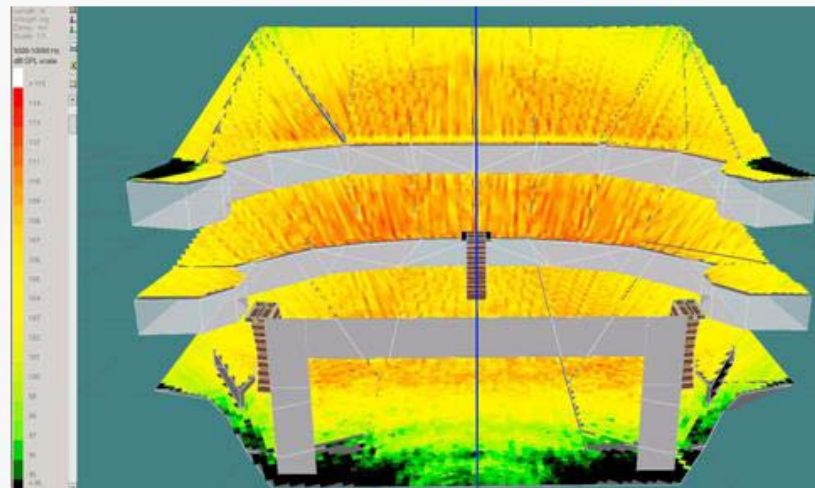


soundvision

MAPPING MODE

- Color-coded representation of SPL distribution over the defined room geometry
- Allows visualization of the coverage of individual loudspeakers or arrays and interference between multiple loudspeakers
- Can select individual 1/3 octave bandwidths, unweighted or A-weighted SPL, or any frequency range between 100 – 10k Hz

1-10 kHz frequency bandwidth SPL mapping is primarily responsible for perceived system intelligibility and provides a good representation of system performance





soundvision

- Main toolbar, file management options
- Setup Parameters: units, color scale, freq bandwidth, discretization
- 3D Room Data : defining room geometry (surface or profile mode)
- 3D Scene
- 2D Cutview
- Entering Loudspeakers
- Source Cutview
- SPL Target
- Report Data (installation parameters)
- Mechanical Data



SOUNDVISION FILE TYPES

THREE FILE TYPES :



.svd files = 3D Room and Loudspeaker (Main Toolbar Open/Save)



.svs files = 3D Room only (3D Room Data Toolbar Open/Save)



.svc files = Loudspeaker only (Loudspeaker Data Toolbar Open/Save)

Save 3D Room Data and Loudspeaker Data separately to try different loudspeaker configurations for the same 3D Audience

For touring: Loudspeaker Data (.svc file) corresponds to generic rigging plot – just drop it into a given venue (.svs file) and fine tune installation parameters



GENERAL – MAIN MENU BAR



- **New Document** creates an empty document
- **Open** a 3D Room and Loudspeaker Data file (.svd)
- **Save (Save as)** a 3D Room and Loudspeaker Data file (.svd)
- **Mapping/Coverage** changes from Coverage Mode to Mapping Mode

NOTE: In Mapping Mode, **Coverage Zone** highlights the coverage or intelligibility zone for the selected source

Mapping Options allows for adjustment of units, 3D Scene Discretization Step and Frequency Bandwidth parameters




GENERAL – MAIN MENU BAR




TOOLBOXES can be directly accessed by selecting:

 3D Room Data Toolbox

 Loudspeaker Data Toolbox

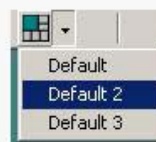
 2D Cutview Toolbox

 Source Cutview Toolbox

 SPL Target Toolbox

 Report Toolbox

 3D Scene displayed full screen



Return to default screen config
(3D Scene + toolboxes)



Options Menu / First time user



Tutorial / On Line Help / Version #

Memory load : 35% 

Computer memory load indicator

Memory load : 67% 

If red, close applications or add memory
to your computer

Memory load : 90% 



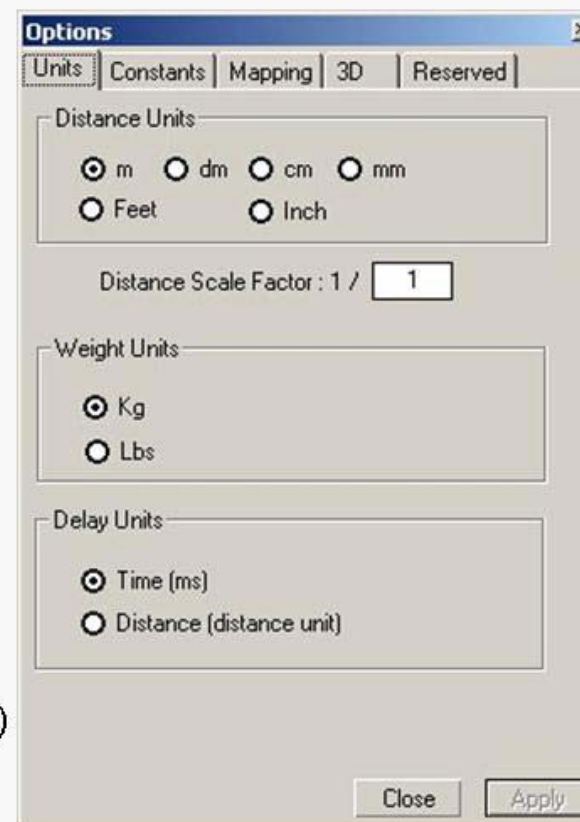
OPTIONS : UNITS

UNITS :

- Distance (metric or imperial)
- Weight (metric or imperial)
- Time (ms or selected distance unit)

SCALE FACTOR :

- Useful for scaled architectural drawings
- Enter architectural drawing coordinates directly (without converting them)
- E.g., for 1:600 scale drawing, ruler in cm set Distance Units to cm and Scale Factor to 1/600
- Enter the values read from the ruler directly (in cm)
- When finished, change back to 1/1 and meters



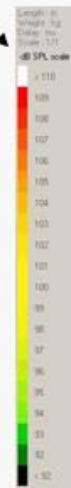


OPTIONS : CONSTANTS

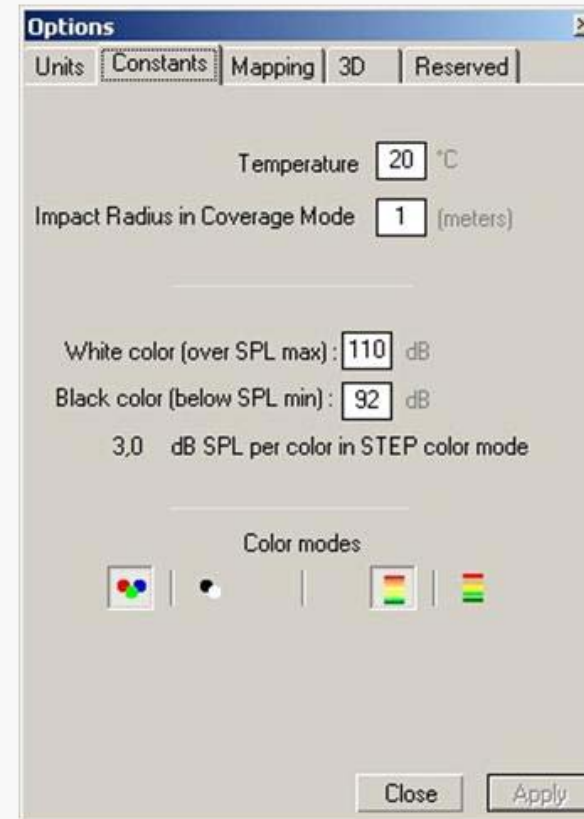
CONSTANTS :

- Temperature (degrees Celsius)
- Impact Point Radius (meters)
- SPL Max and SPL Min for the 3D Scene
 - White : SPL > defined SPL Max value
 - Black : SPL < defined SPL Min value
- Color Mode :
 - Black & White or Color
 - Degraded or Step

Degraded scale:
92-110 dB
(white > 110 dB)
(black < 92 dB)



Step mode =
3 dB per color





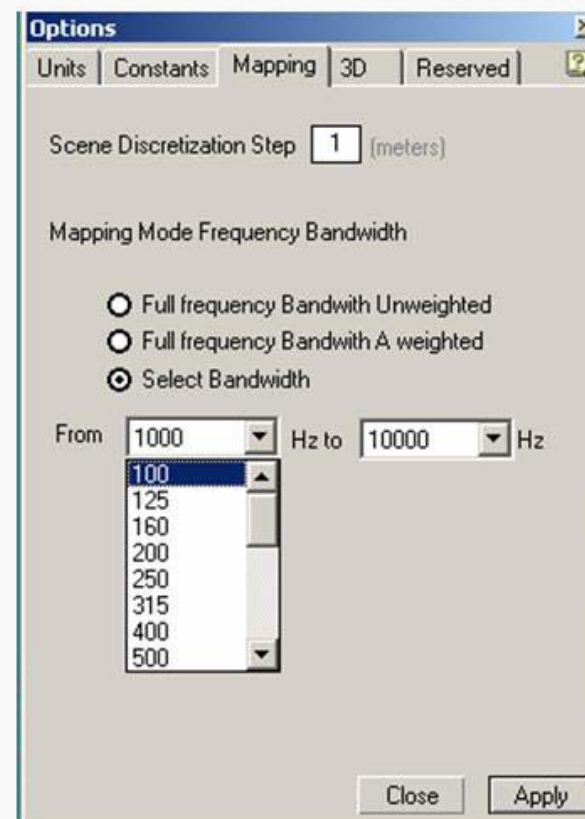
OPTIONS : MAPPING

SCENE DISCRETIZATION STEP (meters only)

- In SPL Mapping Mode, surfaces are discretized in squares with dimension = 'Step' meters per side
- Lower the value, the more detailed the mapping display (but longer calculation time)

Specify Mapping Mode Frequency Bandwidth :

- Unweighted
- A-weighted
- 1/3 octave centers : 100 – 10k Hz
- Select Bandwidth (100 – 10k Hz)





OPTIONS : 3D SCENE

HORIZONTAL GRID : Specify Maximum and Step Values for the 3D Scene (meters only)

DISPLAY ADJUSTMENT : for graphics display problems in the 3D Scene

NOTE: Optimum value for a given computer model may not be the same as the default value

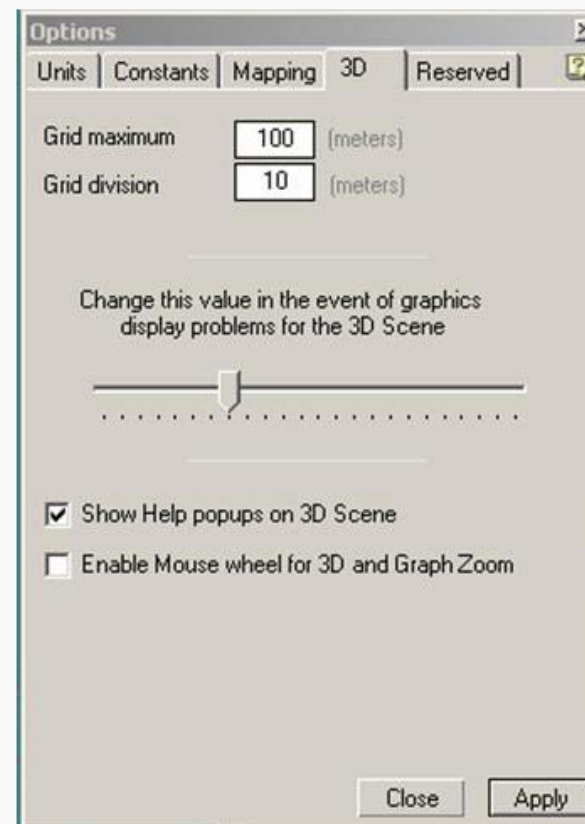
Experiment to obtain the best results

• **KNOWN DISPLAY PROBLEMS** :

3D Screen is black

3D Screen flickers while moving the mouse over it

Points are not displayed

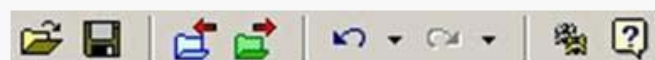
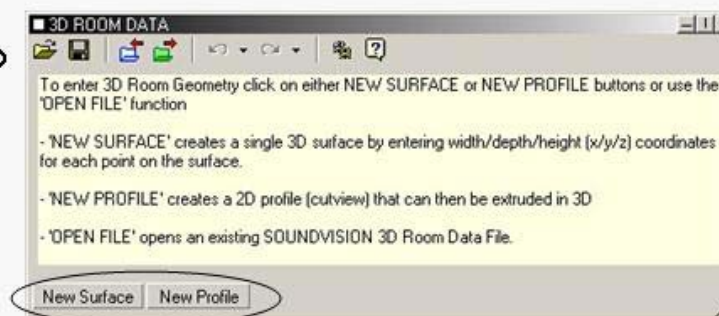




3D ROOM DATA TOOLBOX

SURFACE MODE: Enter 3D point coordinates to define the audience area

PROFILE MODE: Create 2D profile (audience section view) then extrude or revolve in 3D



Open : a 3D Room Data file (.svs)

Save : the current scene as a 3D Room Data file (.svs)

Import : a 3D audience file (text format or EASE .xar file format)

Export : a 3D audience file (text format or EASE .xar file format)

Undo : Click to Undo one operation

Redo : Click to Redo one operation

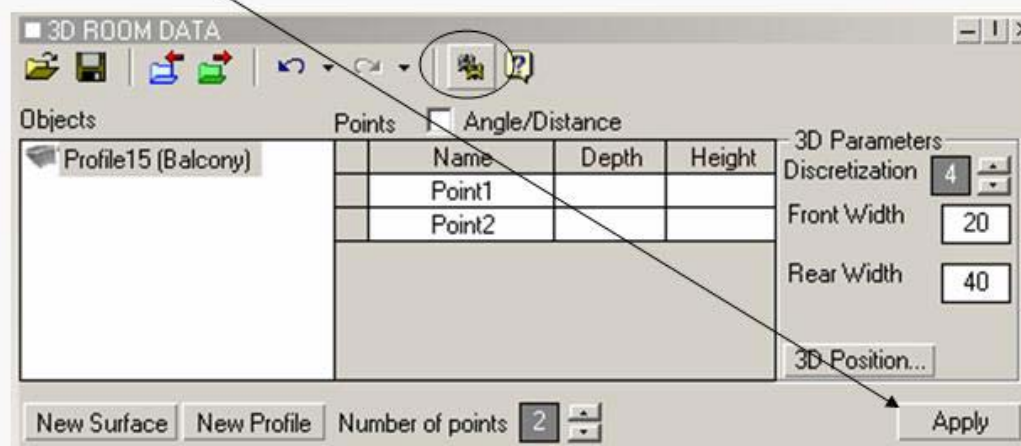
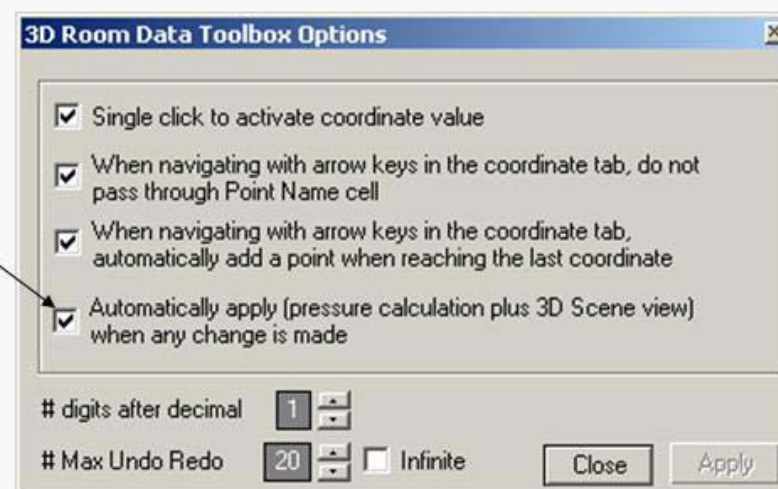
Options: Click to open the Options Menu

Help : Click to access On Line Help



3D ROOM DATA OPTIONS

- **Disable Automatic Apply** when working with many sources or in Mapping Mode (calculations can be long since they are carried out after each modification)
- Click **APPLY** in order for changes to be taken into account (if Automatic Apply is disabled)





3D ROOM DATA SURFACE OR PROFILE?

SURFACE MODE

Enter X,Y,Z coordinates to define the surface

Name	X	Y	Z
Point1			
Point2			
Point3			

Buttons: New Surface, New Profile, Number of points: 3, 3D Position..., Apply

PROFILE MODE

Create a 2D cutview of the venue (based on architectural section drawings) then give the profile a 3D volume by extruding or revolving it (based on plan drawing)

Name	Depth	Height
Point1		
Point2		

Parameters: Discretization: 4, Angle to Describe: 90, Perpendicular length: REV, ☒ Revolution

Buttons: New Surface, New Profile, Number of points: 2, 3D Position..., Apply

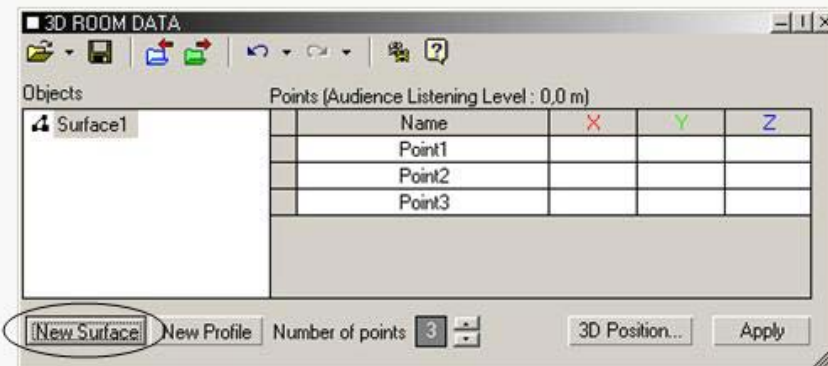
Recommendation: Use Profile Mode to design the audience geometry and Surface Mode to create any non-standard audience geometries (polygon, any plane geometry...)



SURFACE MODE

Defining a New Surface

- **Select 'New Surface'**
- Coordinates for the 3D Scene :
 - Width (X=red)
 - Depth (Y=green)
 - Height (Z=blue)
- 3 points by default
(minimum # to define a plane)
- Points, surfaces can be renamed as desired



Enter coordinates by left clicking in the tab

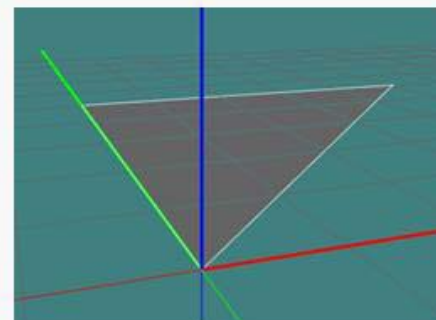
	Name	Width/X	Depth/Y	Height/Z
	Point1	0,0		
	Point2			
	Point3			

3 points define a plane and the surface orientation
One of the 3 coordinates becomes automatic
(depends on the surface orientation)

	Name	Width/X	Depth/Y	H (Auto)
	Point1	0,0	0,0	0,0
	Point2	0,0	50,0	0,0
	Point3	50,0	50,0	0,0



3D SCENE





SURFACE MODE

Adding, Deleting, Moving Points

Click: Number of points Up / Down ...

Points (audience offset : 1.8 m) ☐ Modify the Plan

Name	X	Y	Z (Auto)
Point1	0,0	0,0	0,0
Point2	0,0	50,0	0,0
Point3	50,0	50,0	0,0
Point4			0,0

Number of points

or Right Click on an existing point to add, insert or delete a point

Name	X	Y	Z (Auto)
Point1	0,0	0,0	0,0
Point2	0,0	50,0	0,0
Point3	50,0	50,0	0,0
Point4			0,0

Insert a point to position 3
Delete 'Point3'

Name	X	Y	Z (Auto)
Point1	0,0	0,0	0,0
Point2	0,0	50,0	0,0
Point3	50,0	50,0	0,0

Insert a point to position 4
Delete a point

Points (Audience Listening Level : 0.0 m) ☐ Modify the Plane

Name	X	Y	Z (Auto)
Point1	0,0	0,0	0,0
Point2	0,0	50,0	0,0
Point3	50,0	0,0	0,0
Point4	50,0	50,0	0,0

Points (Audience Listening Level : 0.0 m) ☐ Modify the Plane

Name	X	Y	Z (Auto)
Point1	0,0	0,0	0,0
Point2	0,0	50,0	0,0
Point3	50,0	0,0	0,0
Point4	50,0	50,0	0,0

Move point Point4

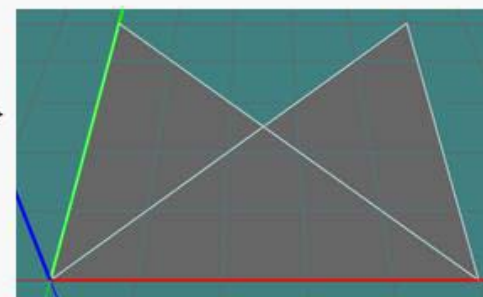
Points (Audience Listening Level : 0.0 m) ☐ Modify the Plane

Name	X	Y	Z (Auto)
Point1	0,0	0,0	0,0
Point2	0,0	50,0	0,0
Point3	50,0	0,0	0,0
Point4	50,0	50,0	0,0

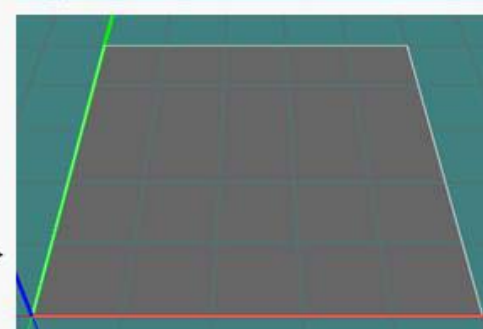
From position 4 to position 3

Points (Audience Listening Level : 0.0 m) ☐ Modify the Plane

Name	X	Y	Z (Auto)
Point1	0,0	0,0	0,0
Point2	0,0	50,0	0,0
Point4	50,0	50,0	0,0
Point3	50,0	0,0	0,0



Left Click
Drag & Drop
to change point
order





SURFACE MODE

Add an Audience Listening Level

Left-click on 'Points'

Audience Listening Level = ear height relative to floor level (or balcony / tribune level)

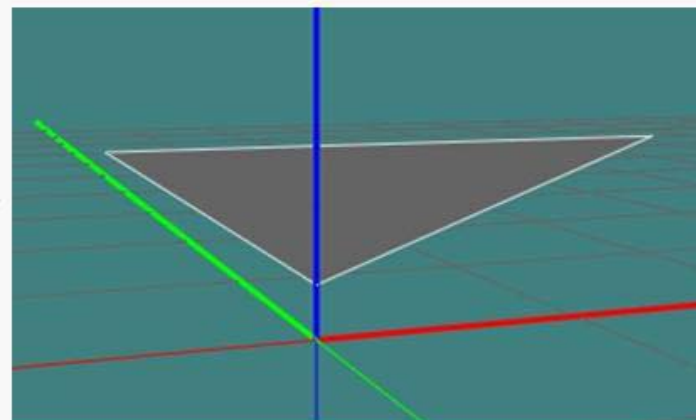
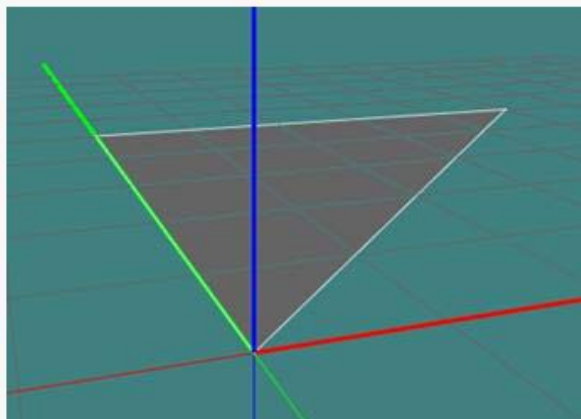
Suggested values :

Seated audience -> 1.2 metres

Standing audience -> 1.8 metres

Points (audience offset : 1,8 m) <input type="checkbox"/> Modify the Plan				
	Name	X	Y	Z (Auto)
	Point3	50,0	0,0	0,0
	Point4	50,0	50,0	0,0

Enter Audience Listening Level
<input type="text" value="1.8"/>
<input type="button" value="OK"/>





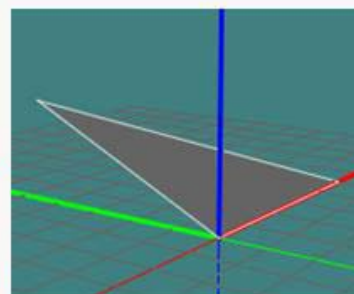
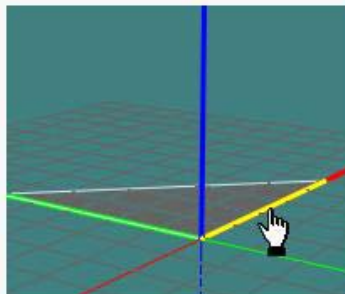
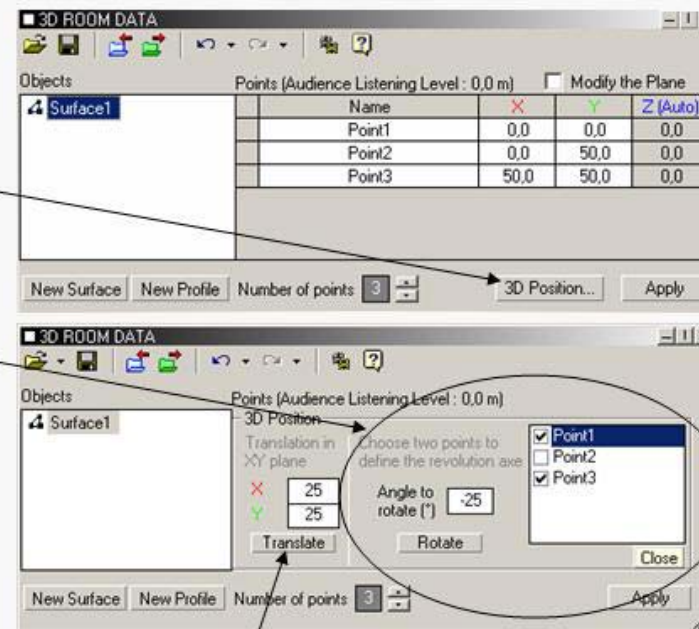
SURFACE MODE

Translate / Rotate the Surface

SELECT 3D POSITION

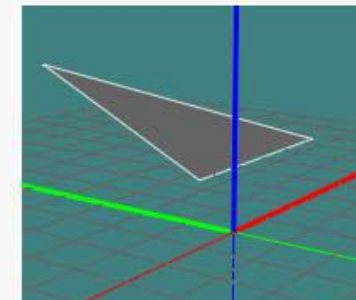
ROTATE

- Select 2 points to define a revolution axis or select a side (or two points) directly in the 3D Scene
- Enter the rotation angle in the toolbox
- Click 'Rotate'



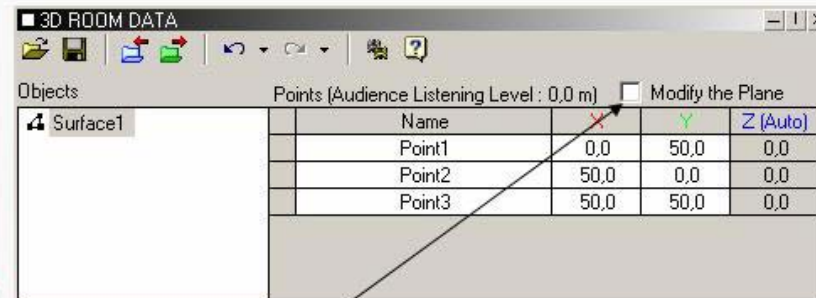
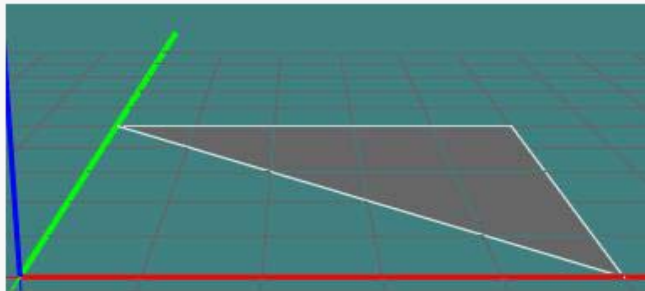
TRANSLATE

- Enter X,Y values
- Click 'Translate'





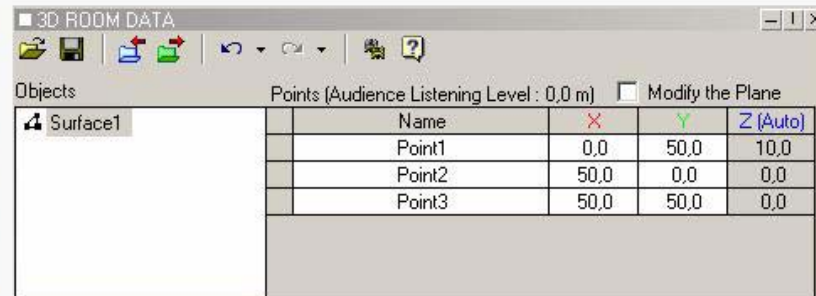
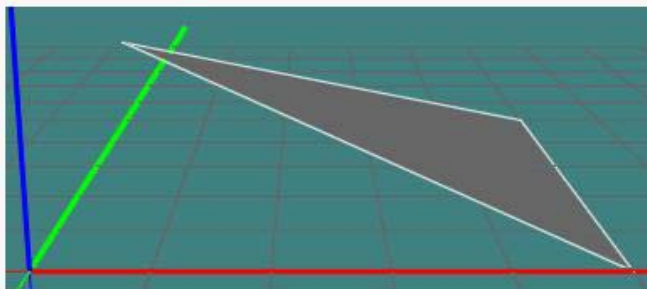
SURFACE MODE Modifying the Plane



• Select 'Modify the Plane'

☒ Modify the Plane

- The automatic coordinate opens for editing (previous values are erased)
- Modify X, Y, Z coordinates as desired
- Once the 3 coordinates are defined, the plane is modified



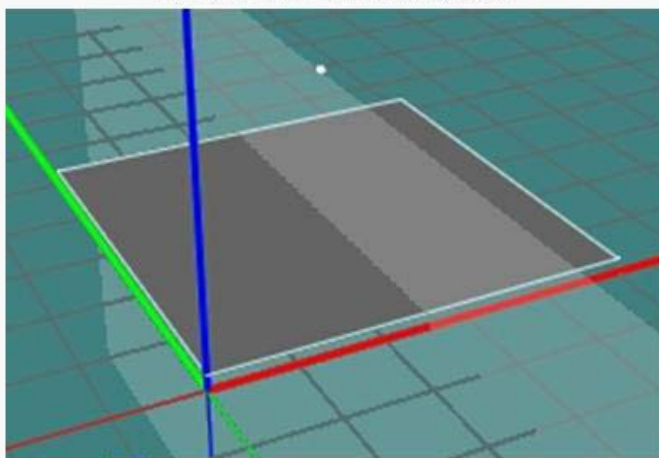


SURFACE MODE

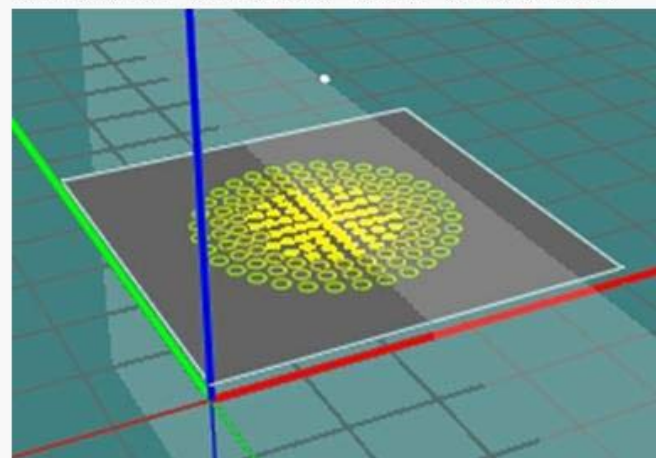
Reversing the Surface or Profile

- Enter Surface Coordinates counter-clockwise
(or from lower-to-higher height values in Profile Mode)
- Surfaces or profiles can be reversed using the additional functions menu
or **right click on the Surface in the 3D Scene**

REVERSED SURFACE



CORRECT SURFACE ORIENTATION



*If no Impact Points are displayed in the 3D Scene try reversing the Surface or Profile
Use a test loudspeaker to check surfaces before building the venue (using symmetry operations etc)*



SURFACE MODE

Other Functions: Copy/Paste, Delete, Symmetry

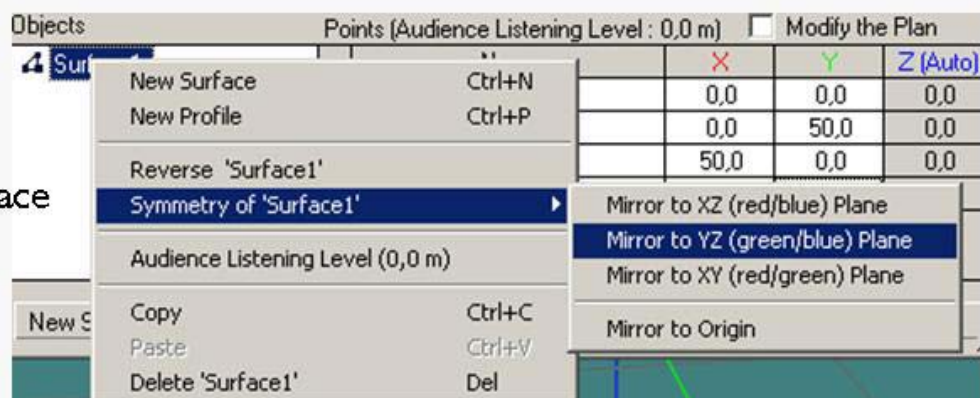
Right Click on a Surface to access the additional functions menu

SHORTCUTS

DELETE to delete the selected surface

• CTRL+KEY :

- N = New Surface
- P = New Profile
- C = Copy
- V = Paste



- 'New Surface' creates a New Surface
- 'New Profile' creates a New Profile
- 'Reverse' changes the orientation of the selected surface
- 'Symmetry' creates a new surface which is a symmetric version of the selected one
- 'Audience Offset' adds an Audience Listening Level to the selected surface
- 'Copy' the Selected Surface
- 'Paste' the Selected Surface
- 'Delete' the Selected Surface



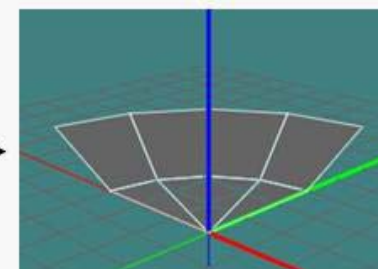
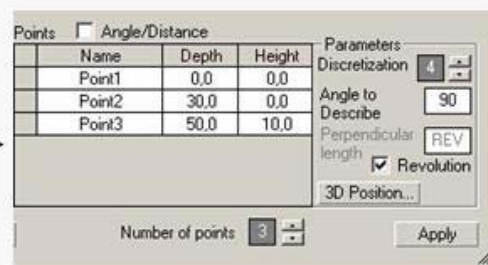
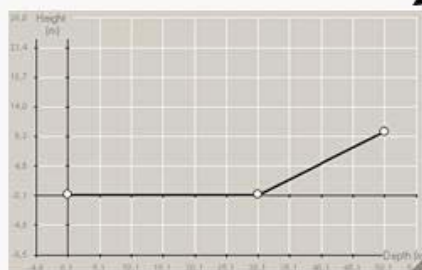
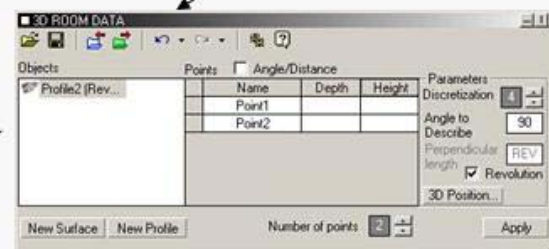
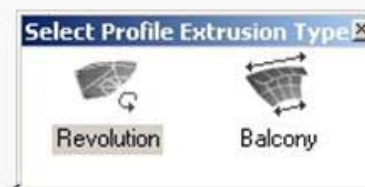
PROFILE MODE Revolution or Balcony?

Select 'New Profile' and the profile type
(**Revolution** or **Balcony**)

Enter point coordinates or use the 2D
CUTVIEW toolbox to define the profile

Only 2 coordinates required (depth/height)

After defining the 2D cutview, the profile is
extruded or rotated to create the 3D surface



2D CUTVIEW

DEFINE REVOLUTION PARAMETERS

3D SCENE

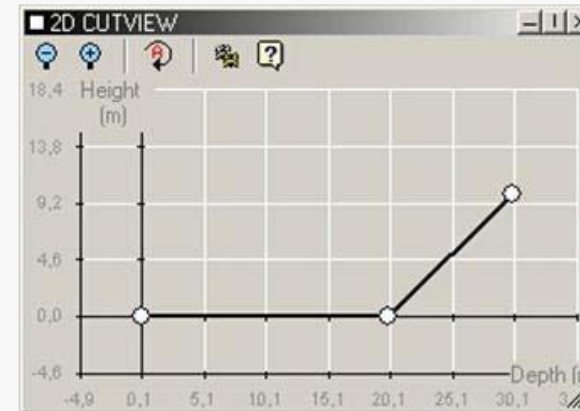


Defining Room Geometry 2D CUTVIEW

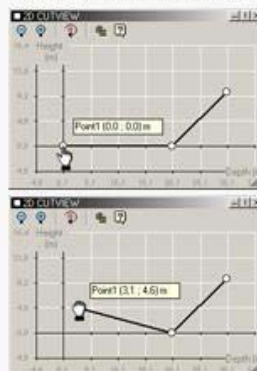
Use the 2D CUTVIEW Toolbox to quickly create 2D profiles (instead of entering coordinate values)

Left Click on the chart area to add a point at the mouse location

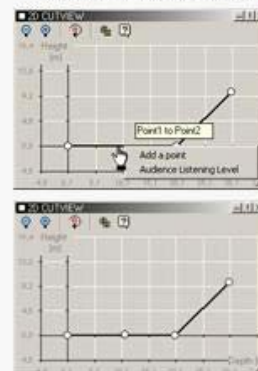
Design a profile rapidly then modify it in detail by editing the coordinate values



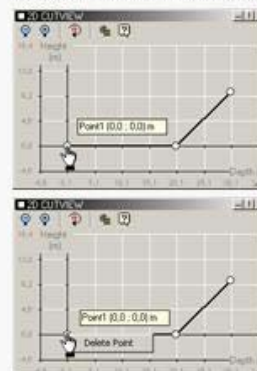
MOVE POINTS



ADD POINTS



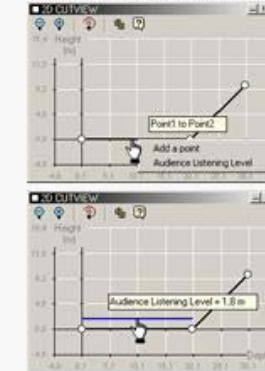
DELETE POINTS



MOVE SEGMENT



LISTENING LEVEL

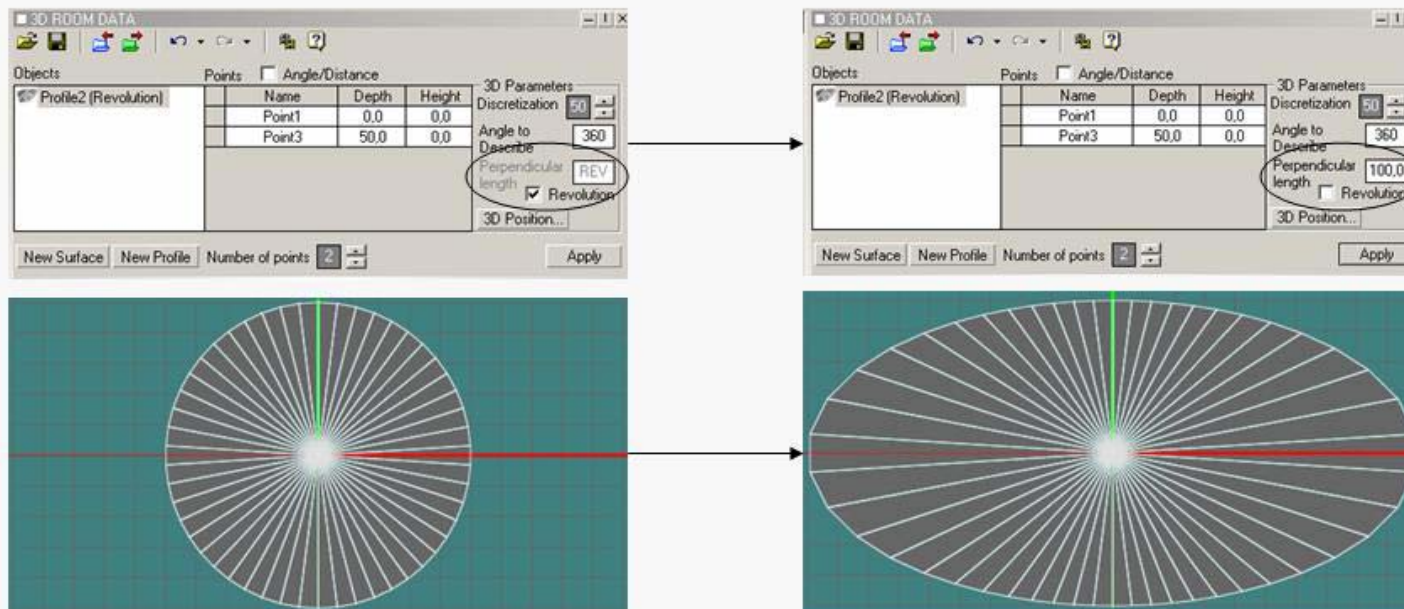


Use 'Zoom Out/In' plus Right Click / Drag & Drop to resize and pan the displayed 2D CUTVIEW



PROFILE MODE Revolution → Elliptical

De-Select 'Revolution' to change a circular revolution to elliptical
Specify the profile width at 90 deg (perpendicular length)



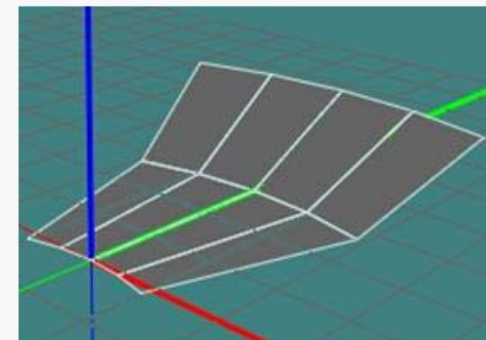
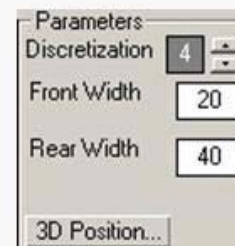
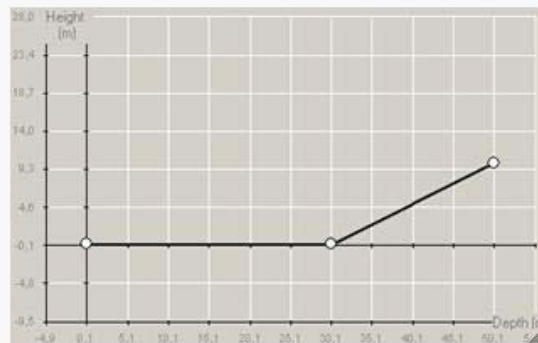
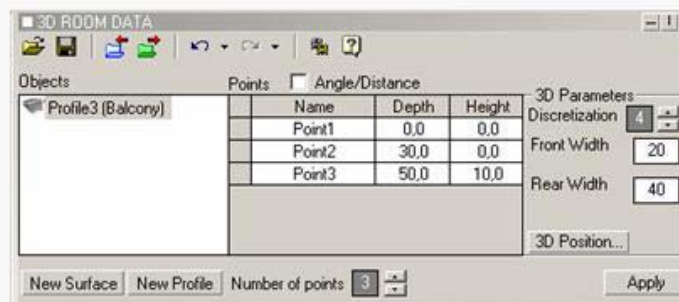
*For this example, perpendicular length = 100 meters
Initial profile depth was 50 meters → ellipse has a major axis = 2 x minor axis*



PROFILE MODE Balcony

BALCONY MODE :

Enter point coordinates or use the 2D CUTVIEW toolbox to define the profile
Extrude the profile by entering front and rear widths



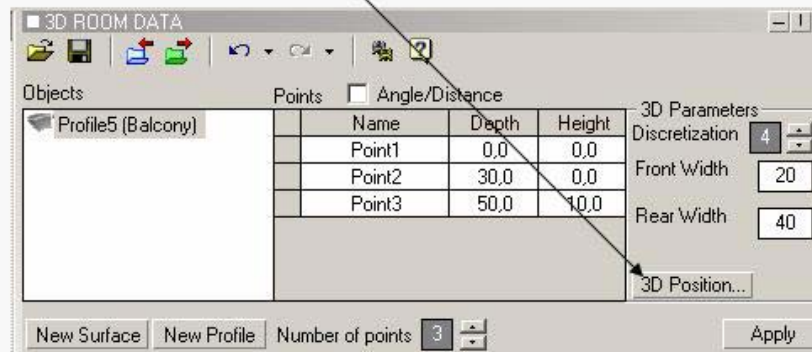
Front Width = 0 corresponds to a Revolution
Front Width = Rear Width creates a flat gradient



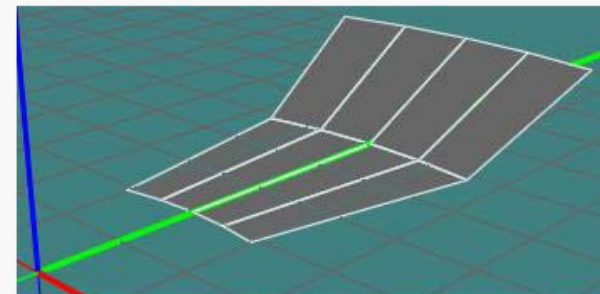
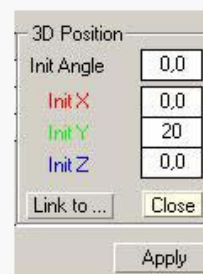
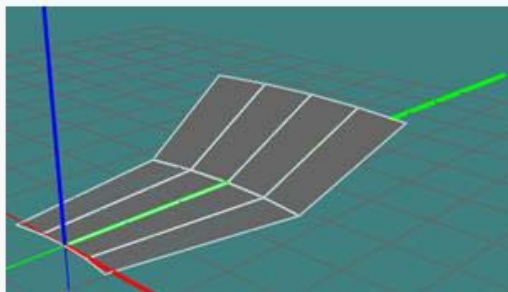
PROFILE MODE

Moving 3D Extruded Profiles

SELECT 3D POSITION to access the 3D positioning function



Specify : Width (X), Depth (Y) and Height (Z) coordinates to translate and/or initial angle to rotate the 3D Extruded Profile

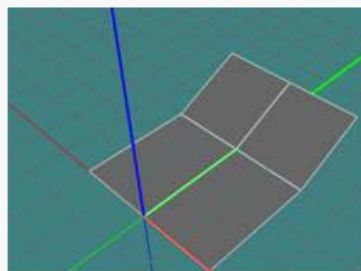




PROFILE MODE

Linking 3D Extruded Profiles

BALCONY PROFILE



3D ROOM DATA

Objects: Profile5 (Balcony)

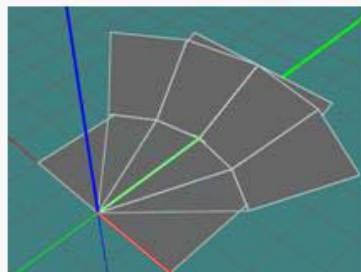
Name	Depth	Height
Point1	0.0	0.0
Point2	30.0	0.0
Point3	50.0	10.0

3D Parameters: Discretization: 2, Front Width: 40, Rear Width: 40, 3D Position...

New Surface New Profile Number of points: 3 Apply

REVOLUTION PROFILE

Created using right click +
'paste points from profile 5'



3D ROOM DATA

Objects: Profile5 (Balcony), Profile8 (Revolution)

Name	Depth	Height
Point1	0.0	0.0
Point2	30.0	0.0
Point3	50.0	10.0

3D Parameters: Discretization: 4, Angle to Describe: 90, Perpendicular length: REV, Revolution: checked, 3D Position...

New Surface New Profile Number of points: 3 Apply

3D Position

Init Angle: 0.0

Init X: 0.0

Init Y: 0.0

Init Z: 0.0

Link to ... Close

3D POSITION

3D Position

☐ Profile5 (Balcony)

☒ L ☐ R Close

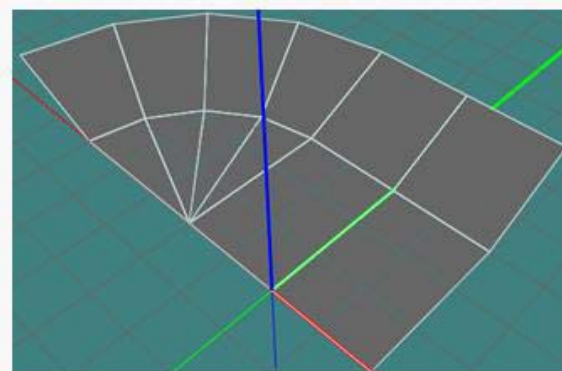
LINK

3D Position

☒ Profile5 (Balcony)

☒ L ☐ R Close

PROFILE TO LINK
(L or R)



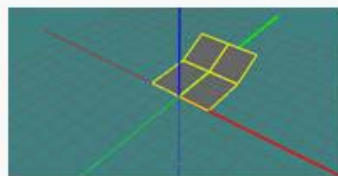
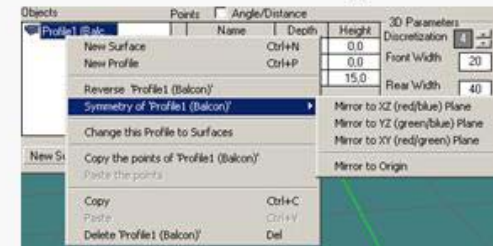


PROFILE MODE

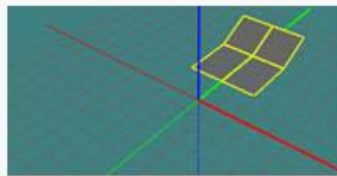
Other Functions: Copy/Paste, Delete, Symmetry

Right Click on a Profile to access additional functions

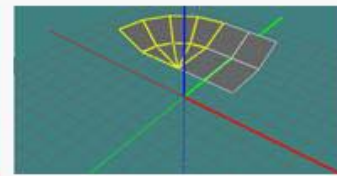
Symmetry, translation/rotation and profile linking allow the room geometry to be rapidly defined



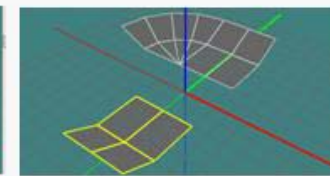
BALCONY / EXTRUDE



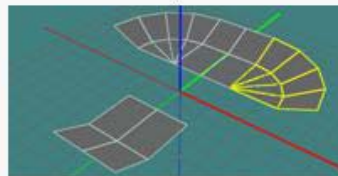
TRANSLATE



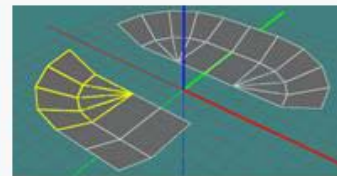
REVOLUTION / COPY POINTS



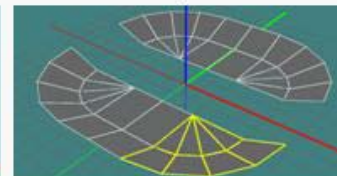
SYMMETRY (RED/BLUE)



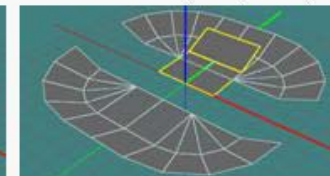
SYMMETRY (GREEN/BLUE)



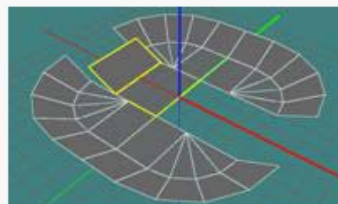
SYMMETRY (RED/BLUE)



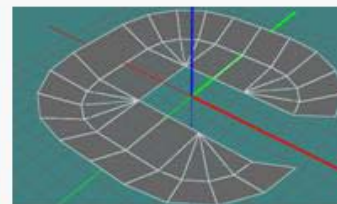
SYMMETRY (GREEN/BLUE)



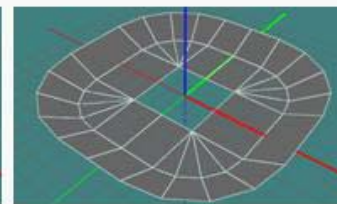
BALCONY / COPY POINTS



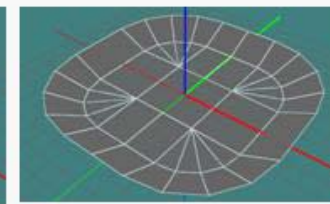
ROTATE



TRANSLATE



SYMMETRY (GREEN/BLUE)



ADD SURFACE



PROFILE MODE

Depth/Height or Distance/Angle

Depth/Height = default mode for defining point coordinates

Angle/Distance mode : for on-site room measurements using a laser rangefinder and inclinometer

- Switch to Angle/Distance by selecting the checkbox
- Define laser rangefinder height above floor level (select Position)
- Enter Angle/Distance data to define the room geometry
- Return to Depth/Height mode to modify points if necessary (move points by mouse, add an Audience Offset etc)

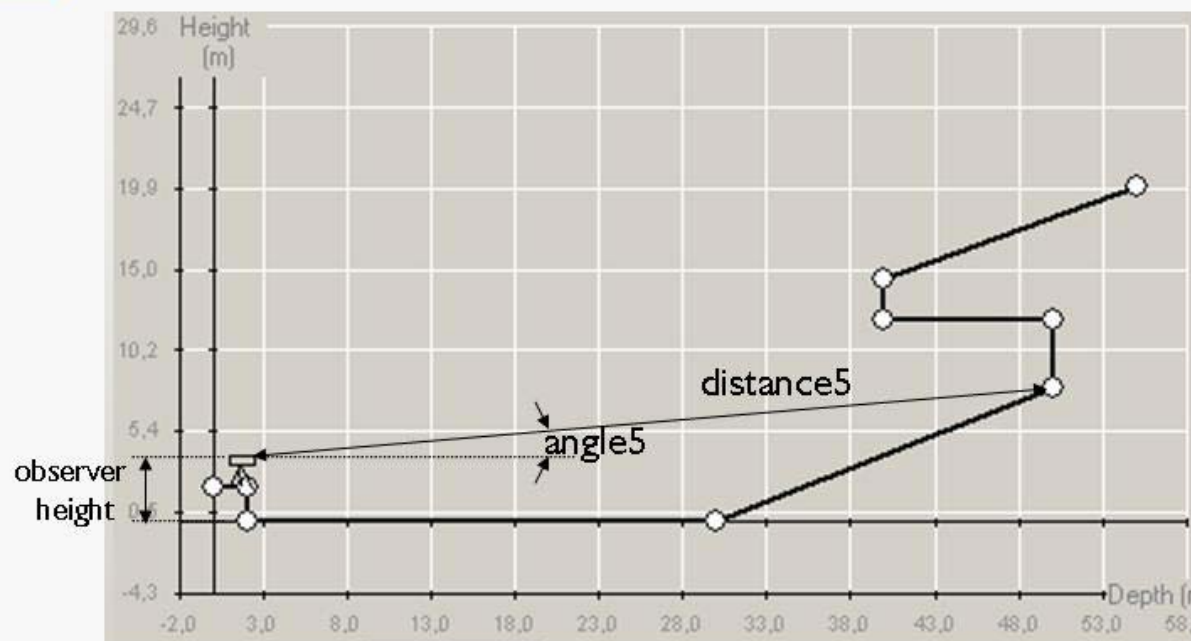
Points	<input type="checkbox"/>	Angle/Distance
Name	Depth	Height
Point1	0,0	0,0
Point2	30,0	0,0
Point3	50,0	10,0

Points	<input checked="" type="checkbox"/>	Depth/Height	Position	
		Name	Angle	Distance
		Point1	0,0	0,0
		Point2	-3,4	30,1
		Point3	9,3	50,7

Observer Position	
Observer Depth	<input type="text" value="0"/>
Observer Height	<input type="text" value="1,8"/>
<input type="button" value="OK"/>	



PROFILE MODE Distance/Angle (on site measurements)



Laser Level



Rangefinder Binoculars
(Bushnell)



Leica Disto Classic



Digital Inclinometer



3D SCENE

COORDINATE CONVENTION :

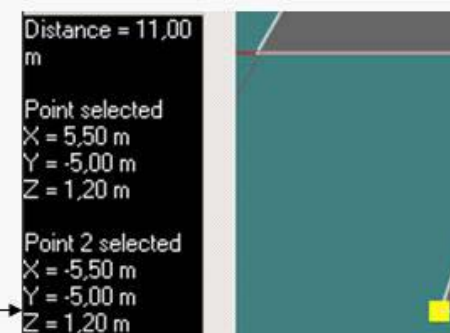
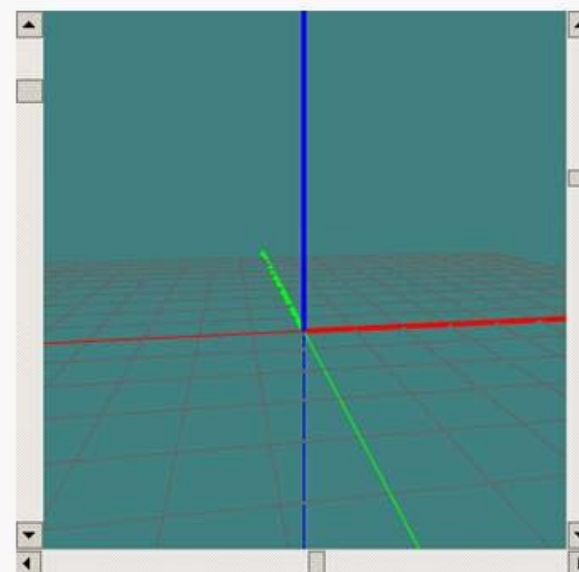
- Red = X
- Green = Y
- Blue = Z (elevation)
- Bold* = positive values

MODIFYING THE POINT OF VIEW :

- Left scroll bar = zoom / unzoom
- Down scroll bar = rotate (left / right)
- Right scroll bar = rotate (up / down)
- Right Click / drag & drop to translate or pan the scene



- PLAN
- REAR VIEW
- SIDE VIEW
- CONICAL / ISOMETRIC
- INFO ON POINTS, SEGMENTS

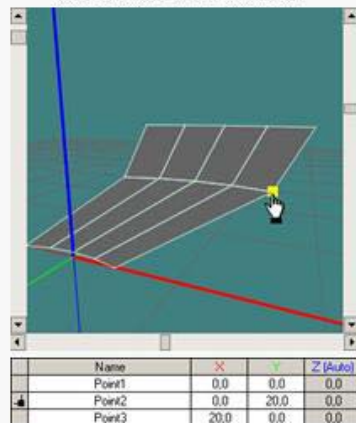




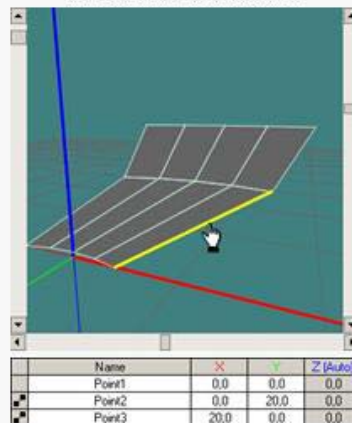
3D SCENE

Working With Points in the 3D Scene

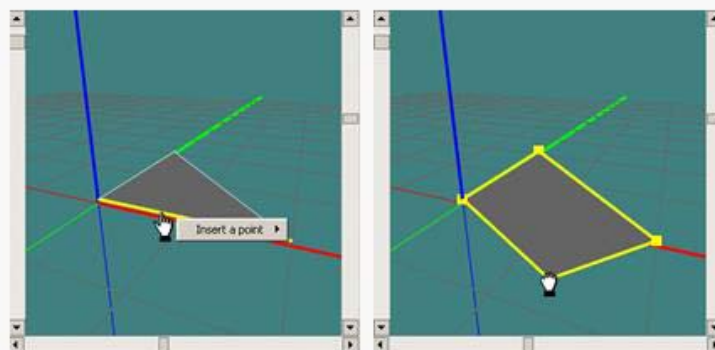
SELECT A POINT



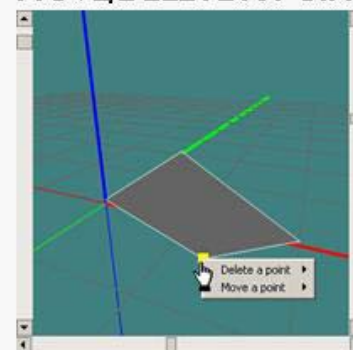
SELECT A SIDE



INSERT A POINT



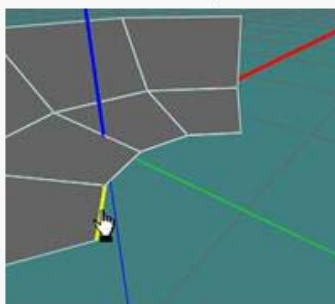
MOVE/DELETE A POINT





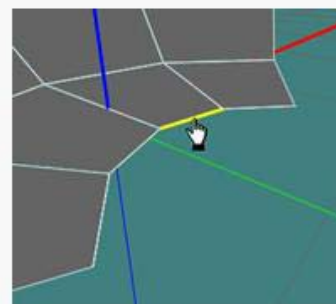
3D SCENE

Drag and Drop Points from the 3D Scene



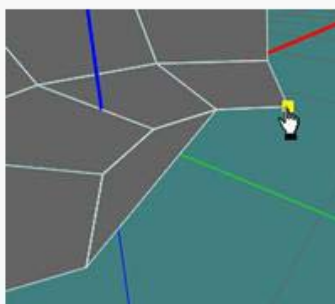
	Name	X	Y	Z (Auto)
<input checked="" type="checkbox"/>	Point1 (Side D&D)	-3.4	-4.2	0.7
<input checked="" type="checkbox"/>	Point2 (Side D&D)	-5.8	-6.6	0.7
	Point3			

- Move mouse over a Profile segment
- Left Click / Hold, Drag & Drop into the Surface coordinate tab



	Name	X	Y	Z (Auto)
	Point2 (Side D&D)	-5.8	-6.6	0.7
	Point1 (Side D&D)	-3.4	-4.2	0.7
<input checked="" type="checkbox"/>	Point1 (Side D&D)	3.4	-4.2	0.7
<input checked="" type="checkbox"/>	Point2 (Side D&D)	0.0	-3.3	0.7

Same operation with another segment



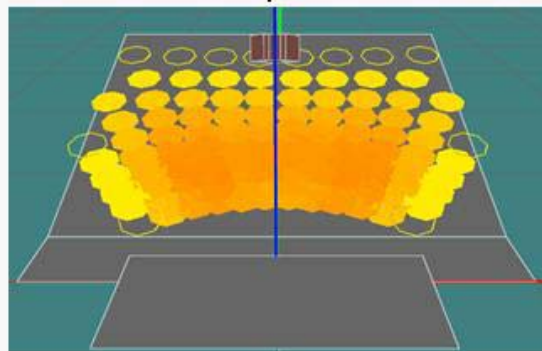
	Name	X	Y	Z (Auto)
	Point2 (Side D&D)	-5.8	-6.6	0.7
	Point1 (Side D&D)	-3.4	-4.2	0.7
	Point2 (Side D&D)	0.0	-3.3	0.7
	Point1 (Side D&D)	3.4	-4.2	0.7
<input checked="" type="checkbox"/>	Point D&D	5.8	-6.6	0.7

Same operation with a single point

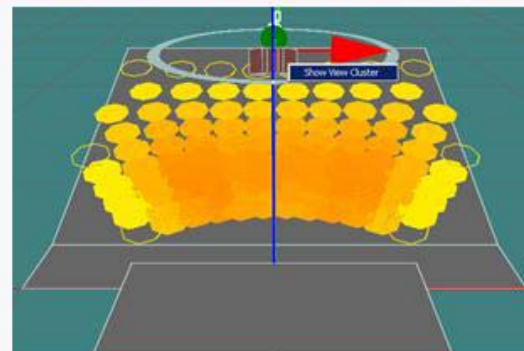


3D SCENE View Cluster

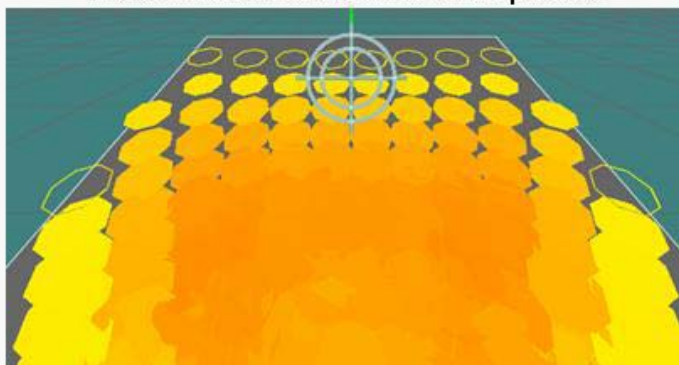
Visualize coverage from the
source's point of view



Right Click on the source in the 3D
Scene and select View Cluster



View Cluster shows coverage as if you
were located inside the loudspeaker



Right click on the 3D Scene to 'Exit View Cluster' mode

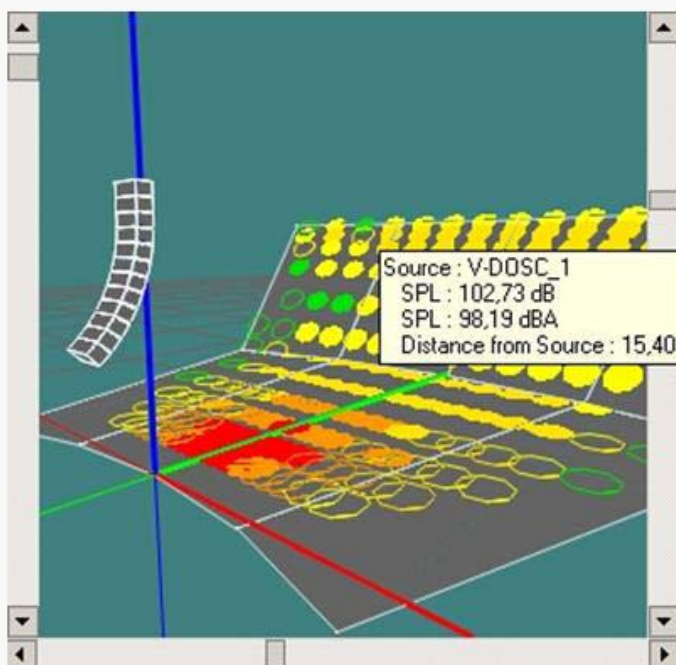


3D SCENE Obtaining Information

IMPACT MODE

Left Click on an Impact Point to obtain :

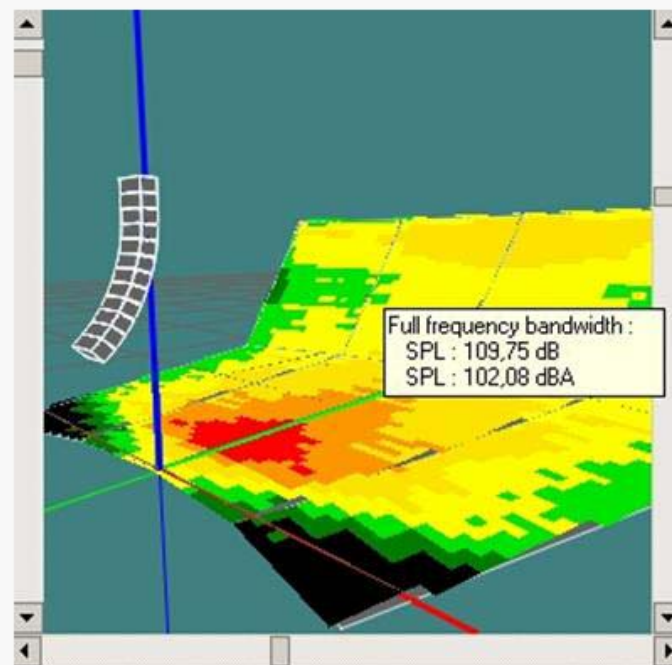
- Name of the source that creates the impact
- SPL (unweighted and A-weighted)
- Distance from the source



MAPPING MODE

Left Click on the audience area to obtain :

- Full frequency bandwidth SPL
(unweighted and A-weighted)

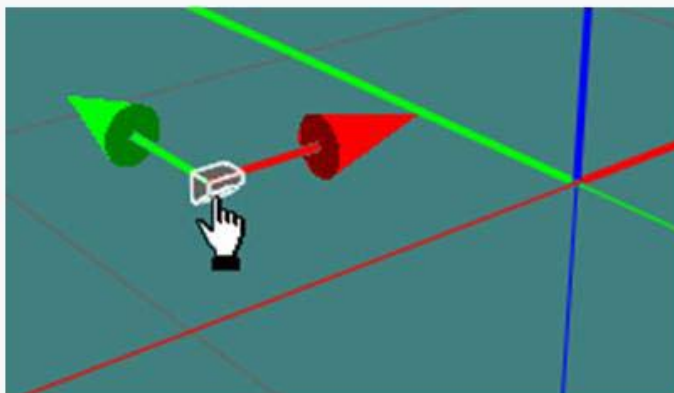




3D SCENE Moving Sources

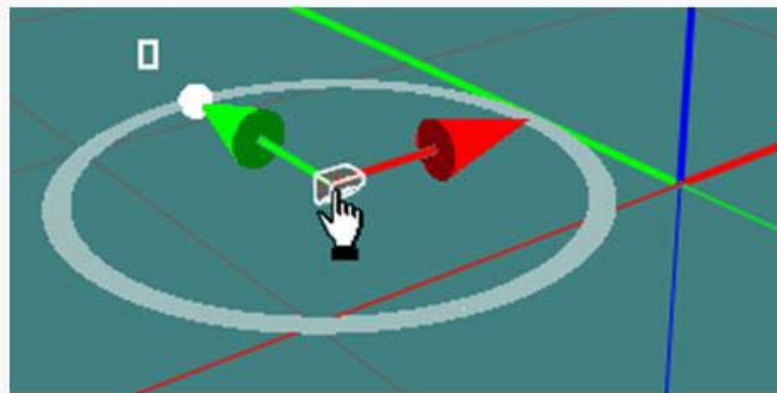
MOVING SOURCES

- Move the mouse over the source until the XY axis indicators are displayed
- Left Click, Drag and Drop to move the source



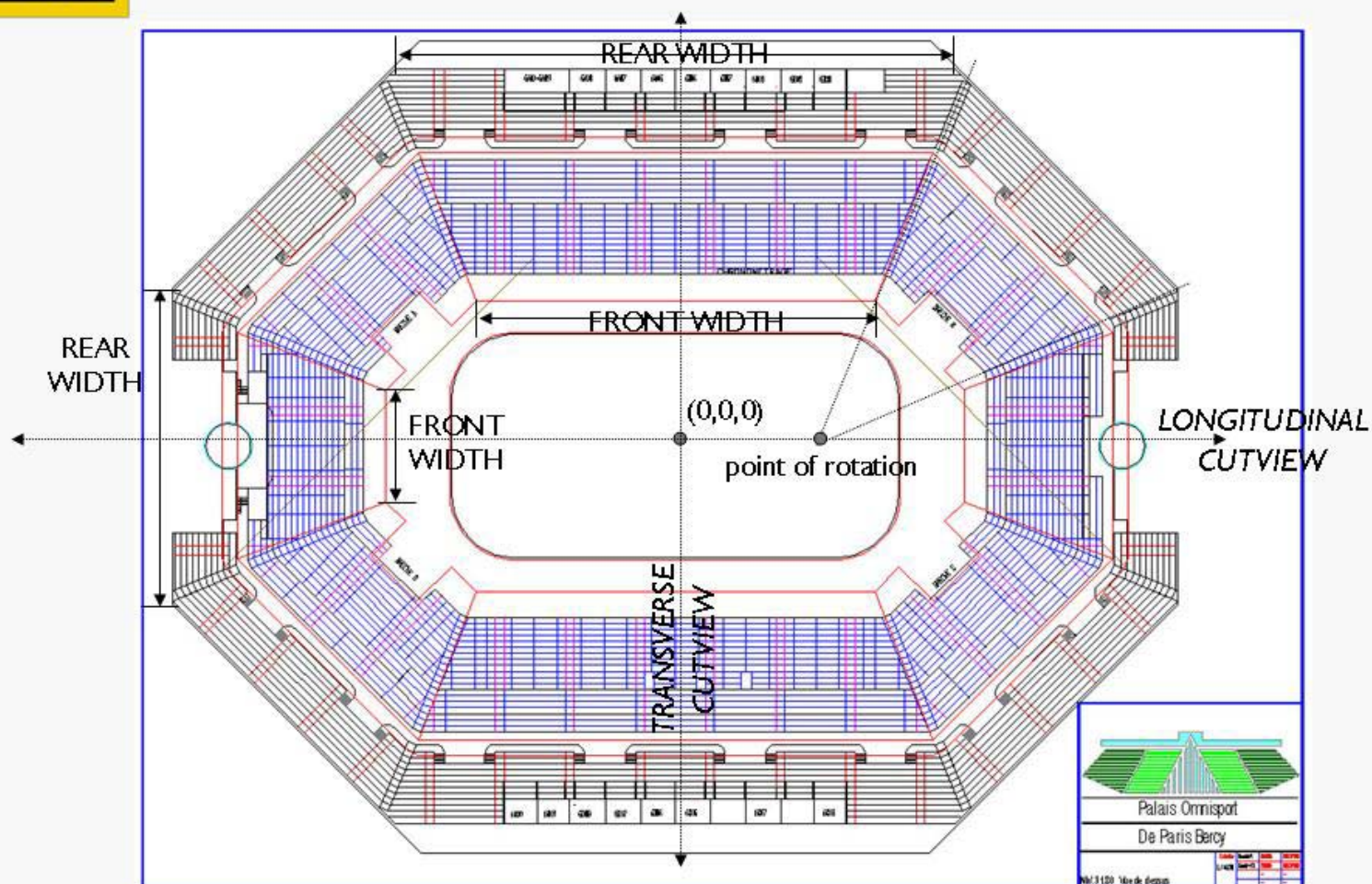
AZIMUTH ADJUSTMENT

- Left Click on the source to switch from XY Displacement to Azimuth Adjustment mode.
- Left Click, Drag and Drop to rotate the source and change its azimuth value



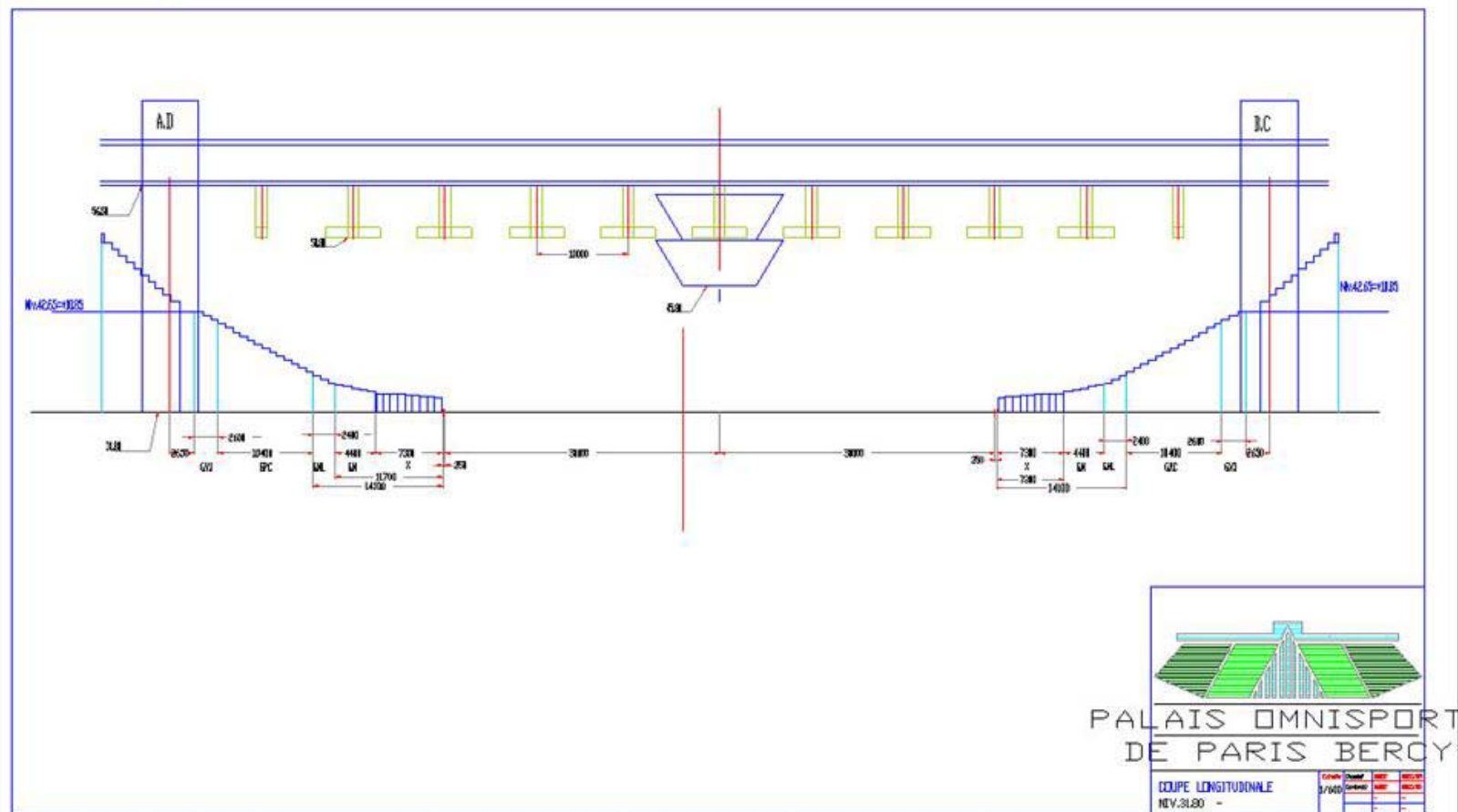


DEFINING VENUES Plan View





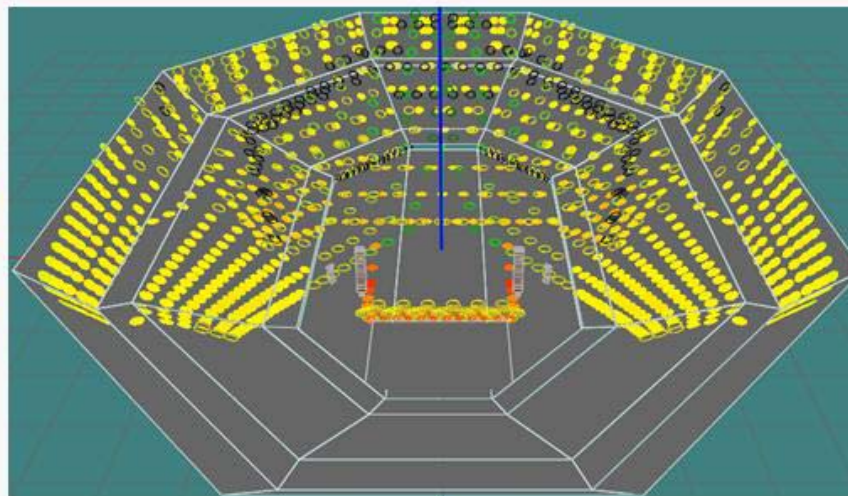
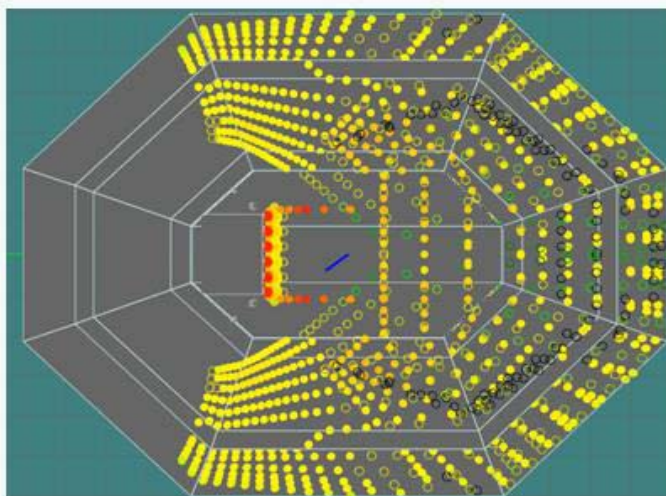
DEFINING VENUES Longitudinal Cut View





DEFINING VENUES

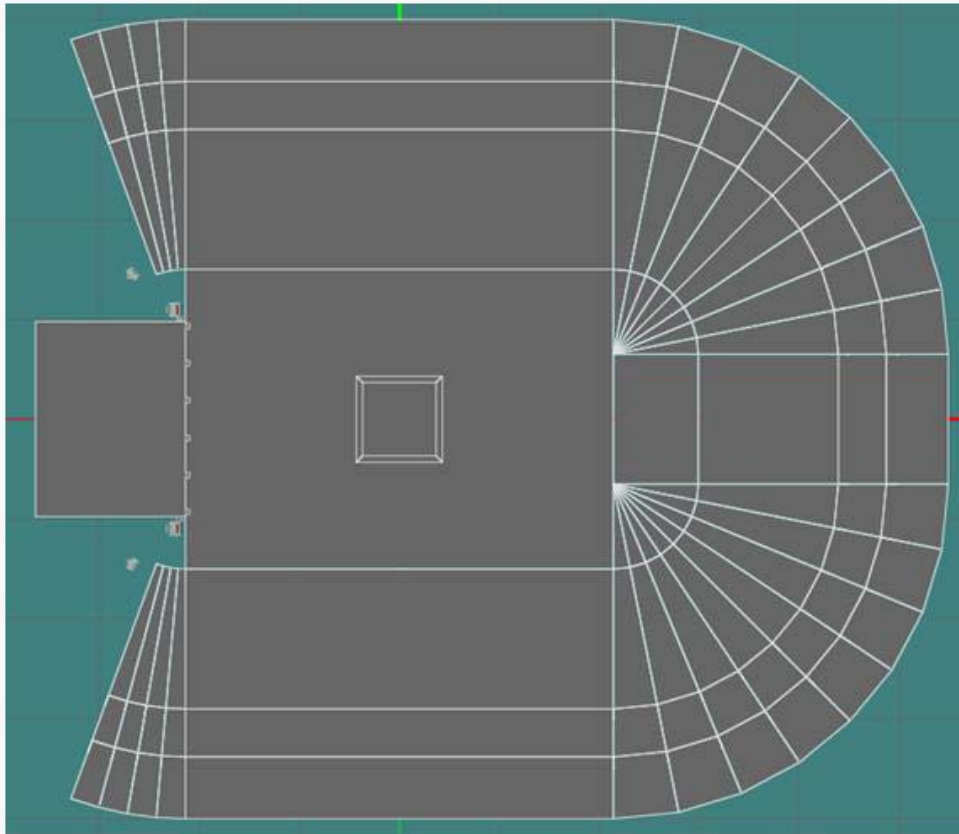
Example : Bercy





DEALING WITH CORNERS

Find the point of rotation



Hannover Arena

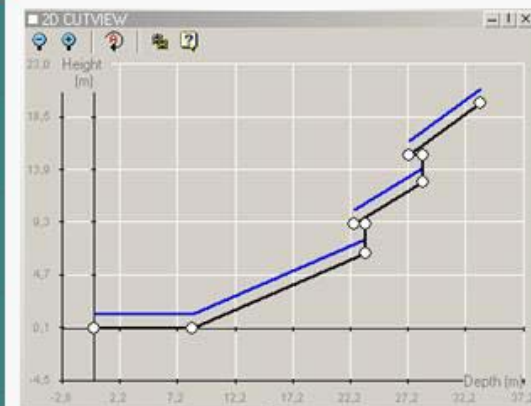
3D ROOM DATA

Objects: ☒ Points ☐ Angle/Distance

Name	Depth	Height
Point1	0.0	0.0
Point9	8.5	0.0
Point2	23.5	6.6
Point3	23.5	9.1
Point6	22.5	9.1
Point4	28.5	12.8

New Surface | New Profile | Number of points: 3

Include flat floor
section for the end

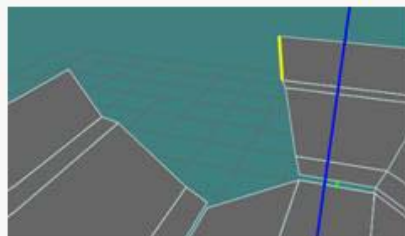




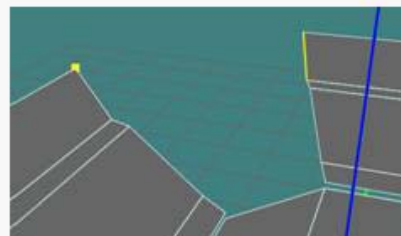
DEALING WITH CORNERS

Three point corner technique

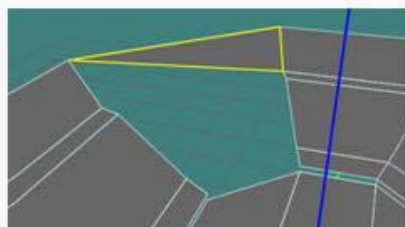
Useful technique when side and end profiles do not align exactly using 4 point surfaces



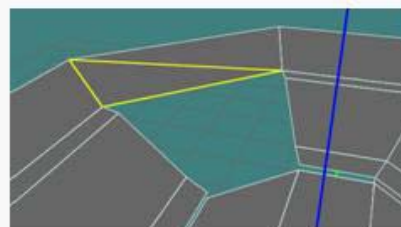
New Surface : select side



Select point



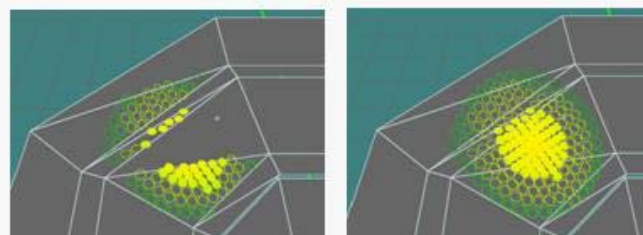
3 Point Surface



Add a second 3 Point Surface



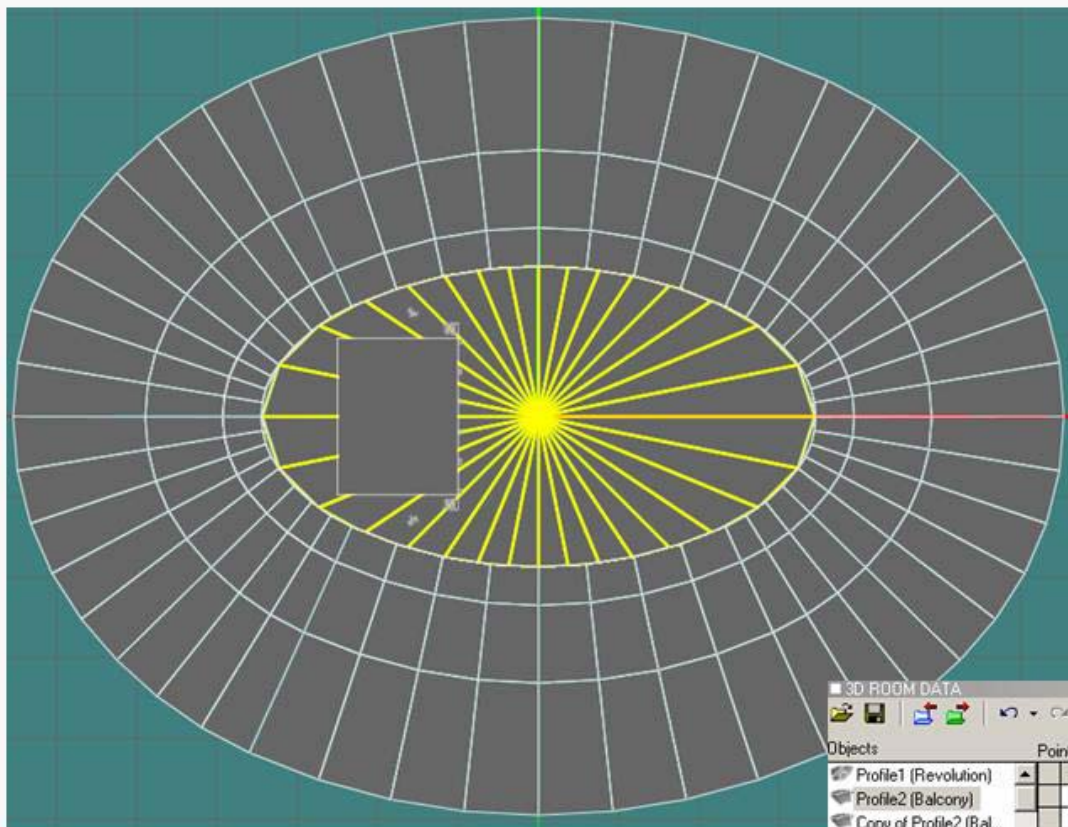
Complete the corner



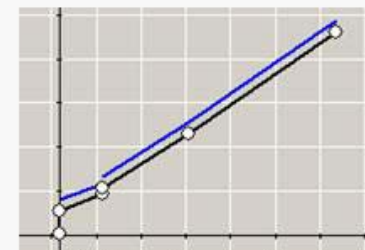
Add a test loudspeaker – reverse surfaces if necessary



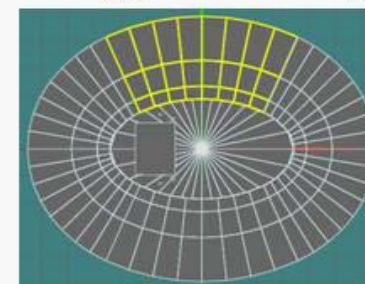
DEALING WITH CORNERS Oval Venue Types



Arene de Nimes



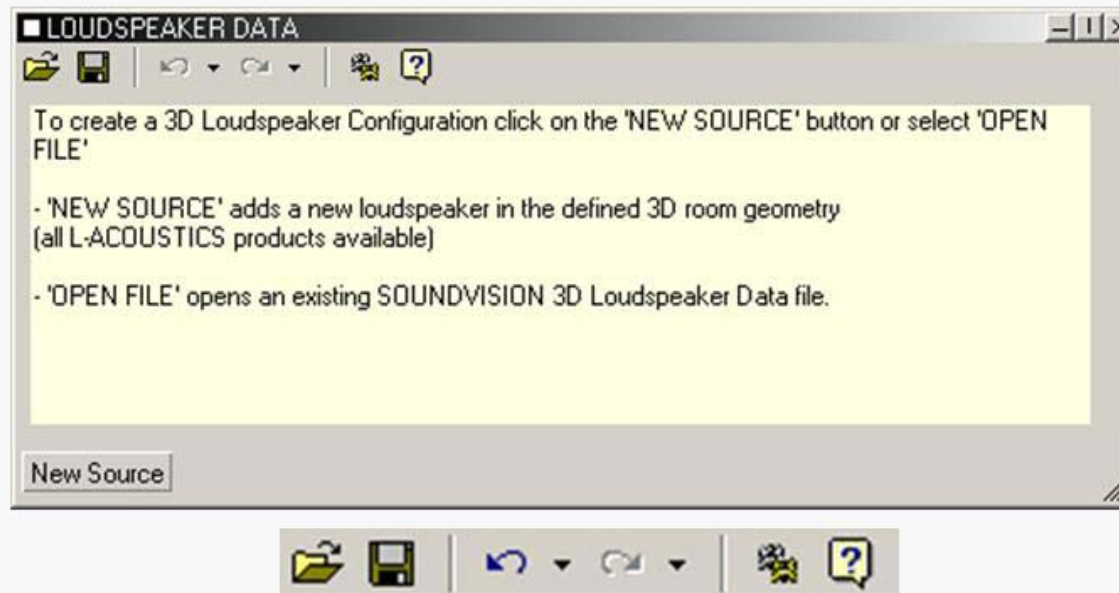
Define floor first
Adjust front/rear widths of
balcony profiles to align



3D ROOM DATA				
Objects				
Points				
Angle/Distance				
3D Parameters				
Profile1 (Revolution)	Name	Depth	Height	Discretization
Profile2 (Balcony)	Point1	0.0	0.0	8
Copy of Profile2 (Bal...	Point2	0.0	2.7	Front Width
Copy of Copy of Profi...	Point3	4.8	4.5	46.5
STAGE	Point4	4.8	5.3	Rear Width
XZ Sym of Profile2 (B...	Point5	14.5	11.4	72
XZ Sym of Copy of P...	Point6	30.9	22.7	3D Position...



LOUDSPEAKER DATA TOOLBOX



Open : Open a 3D Loudspeaker Data file (.svc)

Save : Save current data (or 'Save As' from the menu bar) as a 3D Loudspeaker file (.svc)

Undo : Click to Undo the last operation

Redo : Click to Redo the last operation

Options: Click to open the **Options Menu** for this toolbox

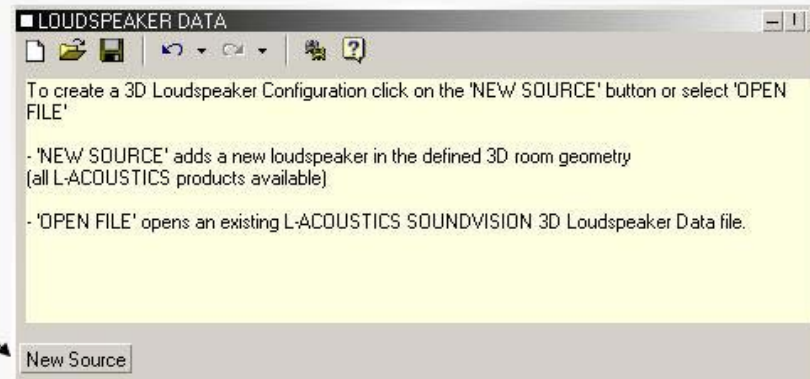
Help : Click to access Online Help for this toolbox



LOUDSPEAKER DATA New Source

Select 'New Source' in the
Loudspeaker Data Toolbox

Select the type of source to add
(WST or COAXIAL) and the
loudspeaker model





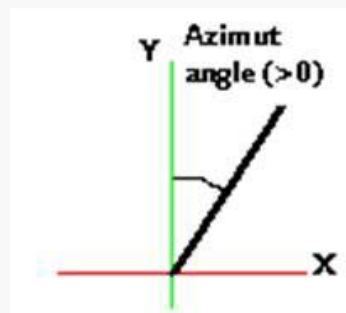
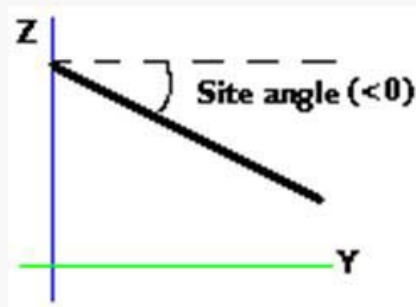
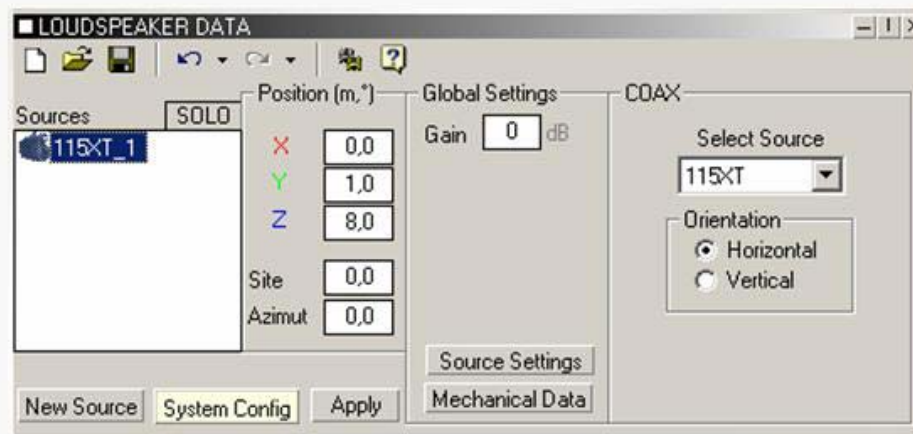
LOUDSPEAKER DATA Coaxial Sources

POSITION PARAMETERS

X, Y, Z define the source coordinates
(expressed in defined Distance Unit)

Site and Azimuth angles (in degrees)
define the source orientation

- Site = vertical angle
- Azimuth = horizontal angle





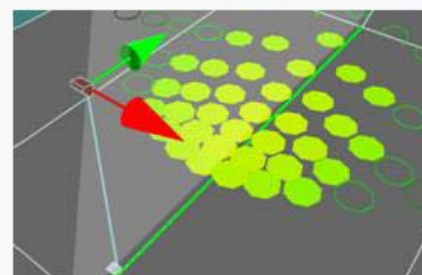
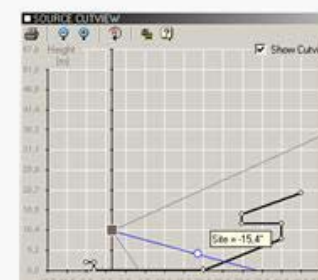
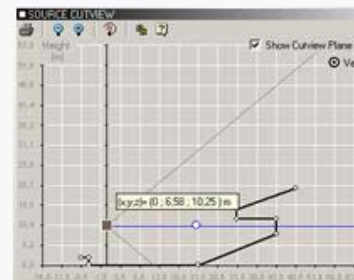
LOUDSPEAKER DATA Coaxial Sources

SOURCE POSITIONING OPTIONS

- 1) Manually enter X, Y, Z coordinates and Site, Azimuth angles in the Loudspeaker Data Position Window
- 2) Move the source in the 2D Cutview (left click on source or site angle – then drag&drop)
- 3) Right-click on room data point to open the Site Angle Tool
- 4) Move the source in the 3D Scene (left click on source, drag&drop)
- 5) Open 3D Scene Positioning Tools...

Position (m,°)

X	0,0
Y	0,0
Z	5,0
Site	0,0
Azimuth	0,0



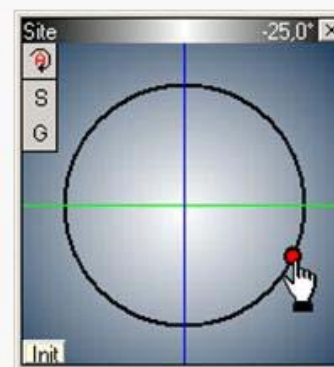
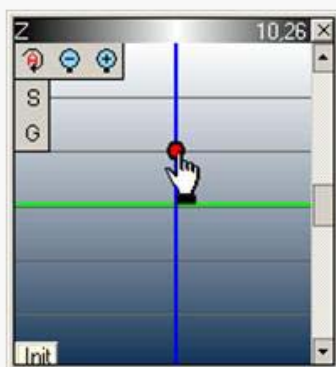
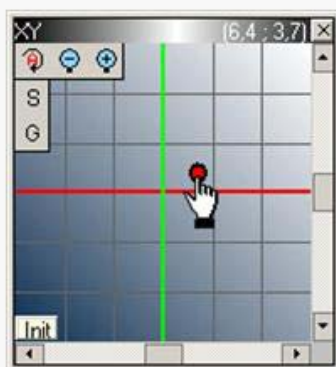


LOUDSPEAKER DATA Coaxial Sources

3D SCENE POSITIONING TOOLS

Click on X, Y, Z or Site, Azimuth labels in the Loudspeaker Data Toolbox to open the 3D Scene positioning tools

Position (m,°)	
X	0,0
Y	0,0
Z	5,0
Site	0,0
Azimuth	0,0



Selected source is displayed as a red circle

Move or rotate the source using Left Click / Drag and Drop

Value displayed in the Top Right corner of the toolbox



LOUDSPEAKER DATA Coaxial Sources

POSITIONING TOOLBAR :

'Zoom Out'

'Zoom In'

'Auto Update'



o When enabled, 3D Loudspeaker Data calculated and 3D scene refreshed while making changes to sources

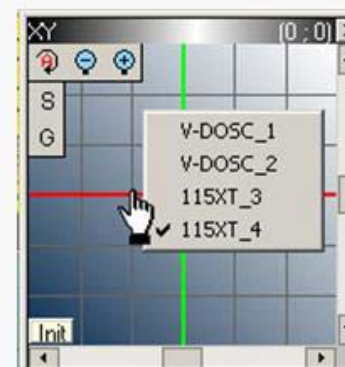
o When disabled, update performed when positioning operation is complete

'S' = **SOLO** mode

'G' = **Mechanical Data**



Switch between XY, Z, Site, Azimuth, Gain
(Right Click on Positioning Tool title bar)



Change the selected source
(Right Click on Positioning Tool background)



LOUDSPEAKER DATA Coaxial Sources

GLOBAL SETTINGS : gain (in dB) for the selected source or array

SOURCE SETTINGS : accesses additional settings (relative gain for individual arrayed loudspeakers, polarity, amp gain)

Global Settings

Gain dB

Source Settings
Mechanical Data

Individual boxes parameters in Cluster '115XT_1'

Box	Gain (dB)	INV	Amp Gain (dB)
#1	<input type="text" value="0"/>	<input type="checkbox"/>	<input type="text" value="32"/>

Reinitialize Settings Close

Vertical or Horizontal
orientation can be selected

COAX

Select Source

Orientation
☒ Horizontal
☐ Vertical

Pull Down Menu
compare different coaxial models

COAX

Select Source

115XT
112XT
MTD115b
MTD112b
MTD108a
115XT_HiQ



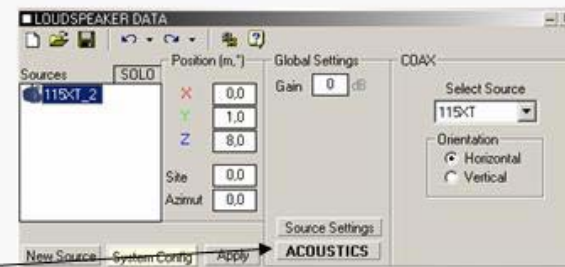
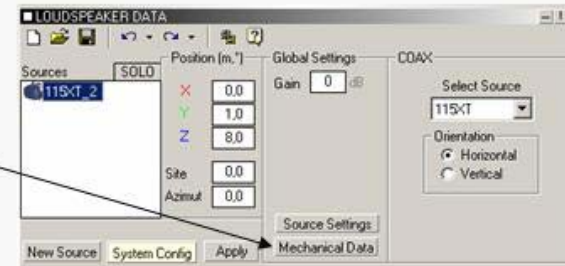
LOUDSPEAKER DATA Coaxial Sources

MECHANICAL DATA

Displays physical information for the selected source

- Maximum Dimensions
- Weight
- Rigging Load Distribution
- Site Angle Limits
- Warning Indications

Click **ACOUSTICS** to return



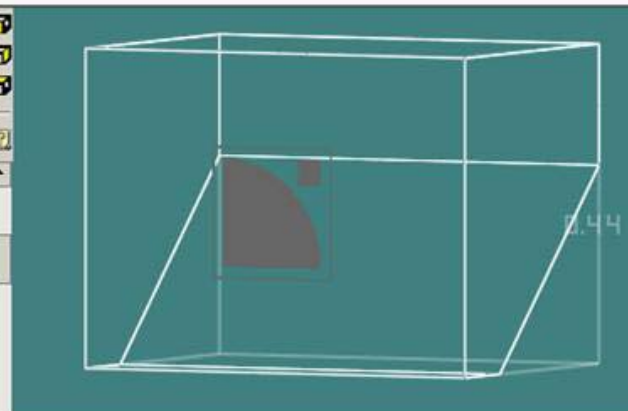
MECHANICAL DATA
(L-ACOUSTICS recommendations)
Results within 20% error

Max Dimensions (3D):

$dX_{max} = 0.58 \text{ m}$
 $dY_{max} = 0.42 \text{ m}$
 $dZ_{max} = 0.44 \text{ m}$

MECHANICAL parameters:

Array weight: 29,5 kg

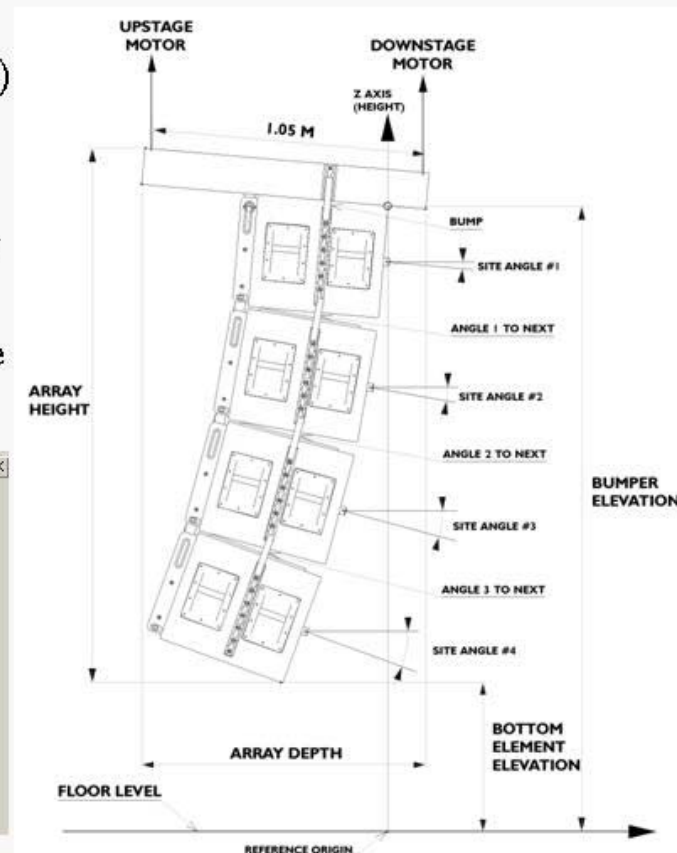
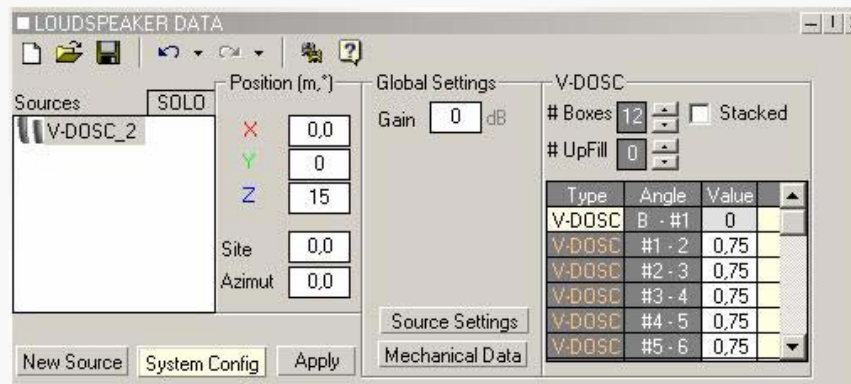




LOUDSPEAKER DATA WST Sources : V-DOSC

Select 'New Source', V-DOSC

- 12 V-DOSC (flown), 0.75 deg angles by default
- B - #1 = bumper to top V-DOSC (relative angle)
- #1-2 = angle between 1st and 2nd V-DOSC from the top, etc
- 2D Cutview Site Angles referenced to the center of the enclosure
- Elevations and reference origin at the front of the enclosure (not like ARRAY 2004)

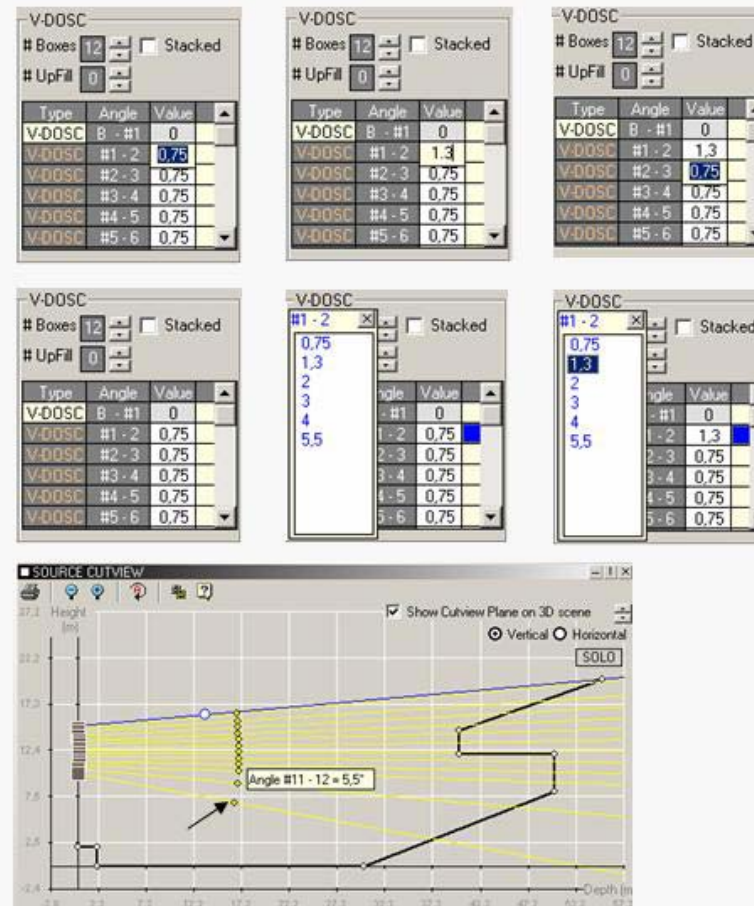




LOUDSPEAKER DATA V-DOSC : Selecting Angles

3 TECHNIQUES TO SELECT ANGLES:

- Manually enter angles in the value cell
(can enter any value since V-DOSC features a variable rigging system)
- Use the pull down menu of standard angles
(left click in the column next to the angle value to be modified to open the menu)
- Left click, drag & drop enclosure site angle references in the Source Cutview window

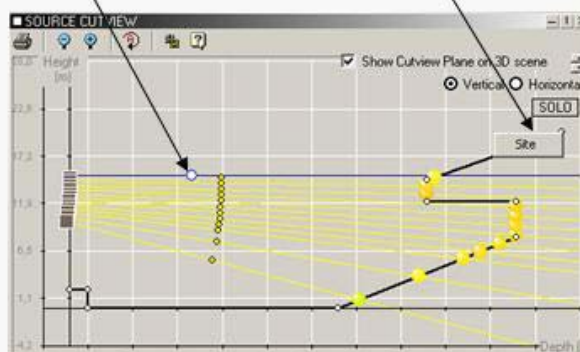
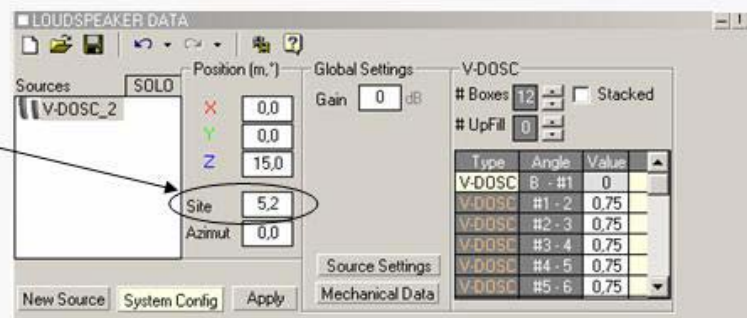




LOUDSPEAKER DATA V-DOSC : Site Angle Adjustment

TECHNIQUES TO ADJUST SITE ANGLE:

- 1) Manually enter the value
- 2) Right click on a room data point in the 2D Cutview, select SITE
- 3) Left click, drag&drop the blue site angle reference line in the 2D Cutview
- 4) Use 3D Scene positioning tools





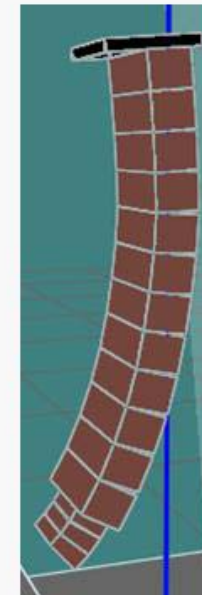
LOUDSPEAKER DATA V-DOSC : dV-DOSC Downfill

To add dV-DOSC downfill :

- Increase the # Boxes appropriately
- Left click over 'TYPE' for the bottom enclosures
- Change from V-DOSC to dV-DOSC
- Select dV-DOSC angles (3.75 deg for first dV-DOSC = tightly wrapped)

Eg: 12 V-DOSC + 3 dV-DOSC downfill

- Set # Boxes = 15
- 'TYPE' for last 3 loudspeakers changed from V-DOSC to dV-DOSC





LOUDSPEAKER DATA V-DOSC : dV-DOSC Upfill

To add dV-DOSC upfill :

- Increase # Upfill appropriately
(# Boxes updates automatically)
- Select dV-DOSC upfill angles

Note: 0 deg for bottom dV-DOSC
upfill = parallel to top V-DOSC
(3.75 deg hole during installation)

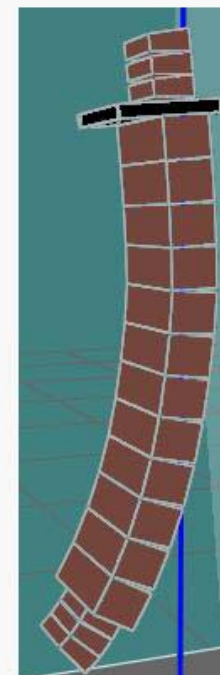
Eg: 12 V-DOSC + 3 dV-DOSC
downfill + 3 dV-DOSC upfill

V-DOSC			
# Boxes	15	<input type="checkbox"/> Stacked	
# UpFill	0		
Type	Angle	/alut	
V-DOSC #9 - 10	4		
V-DOSC #10 - 11	4		
V-DOSC #11 - 12	5.5		
dV-DOSC #12 - 13	3.75		
dV-DOSC #13 - 14	5.5		
dV-DOSC #14 - 15	7.5		

V-DOSC			
# Boxes	18	<input type="checkbox"/> Stacked	
# UpFill	3		
Type	Angle	/alut	
dV-DOSC U3 - 2	0		
dV-DOSC U2 - 1	0		
dV-DOSC U1 - 8	0		
V-DOSC B - #1	0		
V-DOSC #1 - 2	0.75		
V-DOSC #2 - 3	1.3		

V-DOSC			
# Boxes	15	<input type="checkbox"/> Stacked	
# UpFill	0		
Type	Angle	/alut	
U2 - 1	0		
U3 - 2	1		
U2 - 1	1		
U1 - 8	0		
B - #1	0		
U1 - 2	0.75		
U2 - 3	1.3		

V-DOSC			
# Boxes	18	<input type="checkbox"/> Stacked	
# UpFill	3		
Type	Angle	/alut	
dV-DOSC U3 - 2	1		
dV-DOSC U2 - 1	1		
dV-DOSC U1 - 8	0		
V-DOSC B - #1	0		
V-DOSC #1 - 2	0.75		
V-DOSC #2 - 3	1.3		





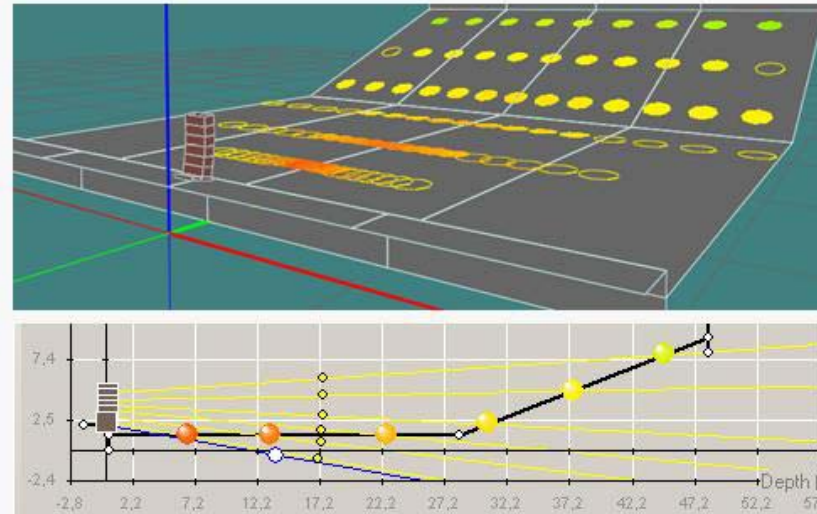
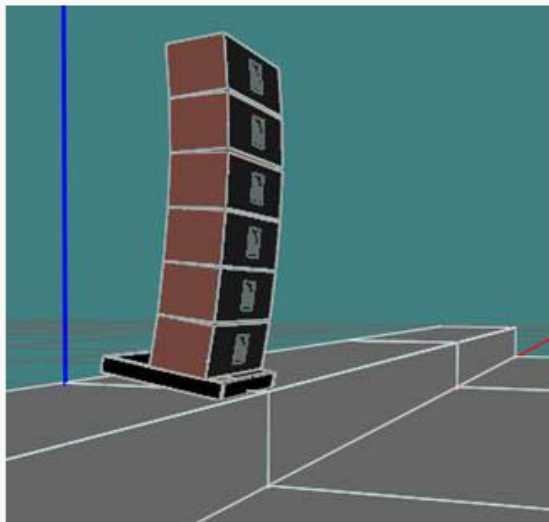
LOUDSPEAKER DATA V-DOSC : Stacked System

Select Stacked

- Enter bumper elevation and site angle
- Add 1 deg extra per angle strap value
- Example shown :

Angle straps = 2, 0.75, 1.3, 3, 2 from bottom to top

V-DOSC			
# Boxes	6	<input checked="" type="checkbox"/> Stacked	
Type	Angle	Value	
V-DOSC	U6 - 5	3	
V-DOSC	U5 - 4	4	
V-DOSC	U4 - 3	2.3	
V-DOSC	U3 - 2	1.75	
V-DOSC	U2 - 1	3	
V-DOSC	U1 - B	0	





LOUDSPEAKER DATA

V-DOSC : Mechanical Data

MECHANICAL DATA
(L-ACOUSTICS recommendations)
Results within 20% error

Max Dimensions (3D) :

dX max = 1,30 m
dY max = 1,48 m
dZ max = 5,48 m

MECHANICAL parameters :

Array weight : 1 306,8 kg
Total weight : 1 367,8 kg

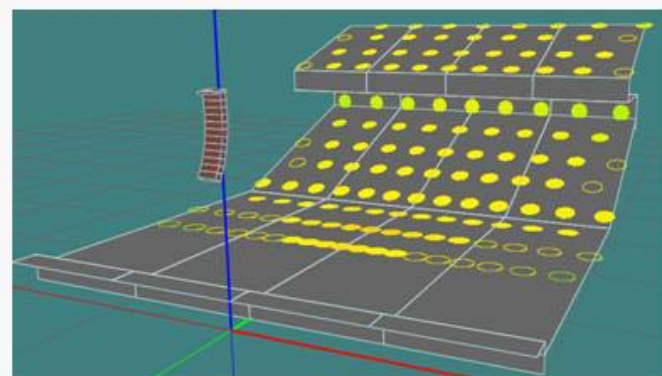
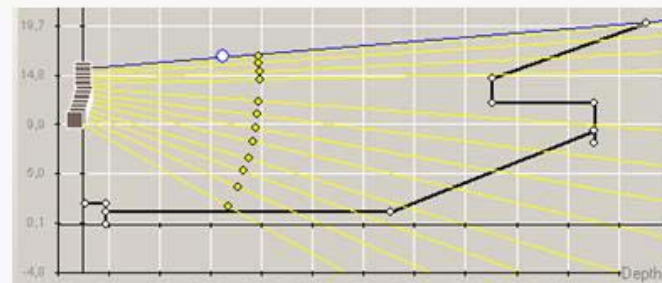
Absolute position of Center Gravity :

XG : 0,000 m
YG : -0,638 m
ZG : 12,819 m

Loads on Rigging and Motors :

Front load : 510,17 kg
Rear load : 796,63 kg
Front motor load : 667,28 kg
Rear motor load : 700,52 kg

NOTES :





LOUDSPEAKER DATA V-DOSC : Mechanical Data

SYSTEM POINTING DOWN

IMPOSSIBLE warning if FRONT MOTOR load < 0



MECHANICAL DATA
(LACOUSTICS recommendations)
Results within 20% error

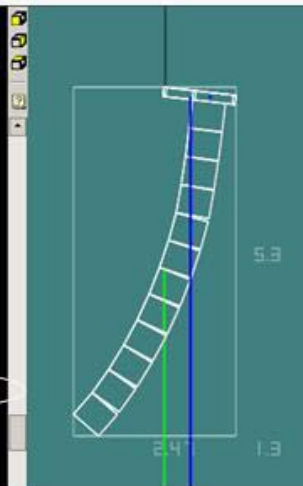
Max Dimensions (3D):
dX max = 1.30 m
dY max = 2.47 m
dZ max = 5.30 m

MECHANICAL parameters:
Array weight : 1 306.8 kg
Total weight : 1 367.8 kg

Absolute position of Center Gravity :
XG : 0.000 m
YG : -1.149 m
ZG : 12.952 m

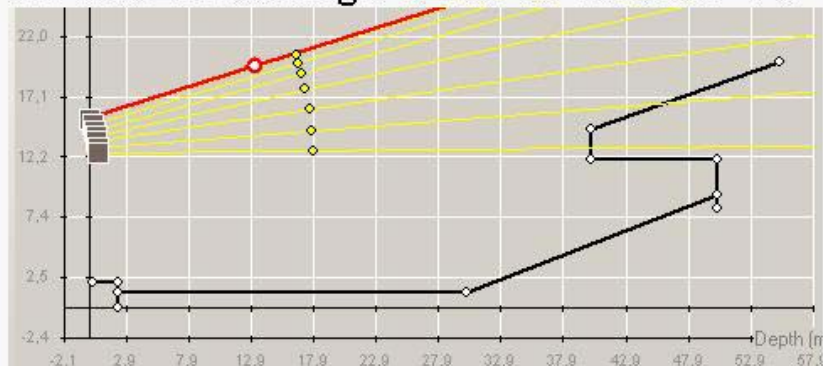
Loads on Rigging and Motors :
Front load : 0.00 kg
Rear load : 3 059.85 kg
Front motor load : IMPOSSIBLE !
Rear motor load : 1 329.95 kg

NOTES :



SYSTEM POINTING UP

IMPOSSIBLE warning if REAR MOTOR load < 0



MECHANICAL DATA
(LACOUSTICS recommendations)
Results within 20% error

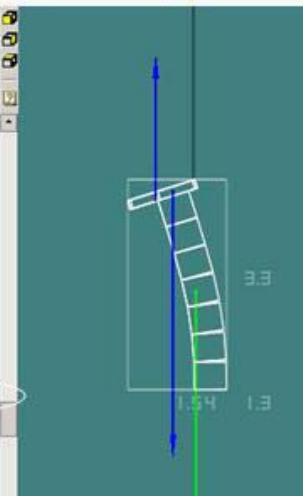
Max Dimensions (3D):
dX max = 1.30 m
dY max = 1.55 m
dZ max = 3.30 m

MECHANICAL parameters:
Array weight : 762.3 kg
Total weight : 823.3 kg

Absolute position of Center Gravity :
XG : 0.000 m
YG : -0.103 m
ZG : 13.892 m

Loads on Rigging and Motors :
Front load : 1 683.96 kg
Rear load : -821.66 kg
Front motor load : 762.541 kg
Rear motor load : IMPOSSIBLE !

NOTES :

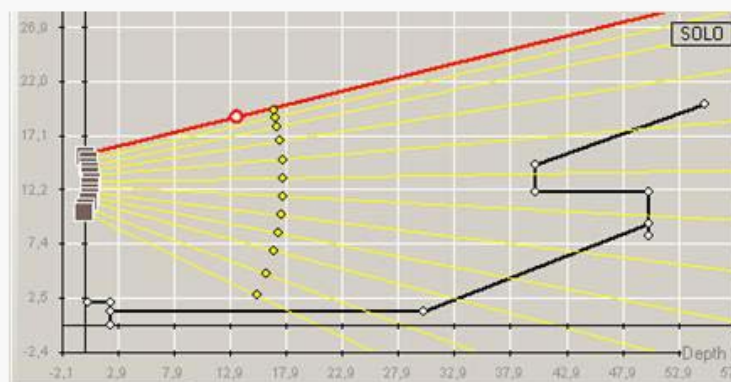




LOUDSPEAKER DATA V-DOSC : Mechanical Data

SYSTEM POINTING UP

- Avoid Front Stress Warning at all costs
(refers to BUMP angle straps)
- Additional torque due to rear ratchet strap is not accounted for
(if approaching Front Stress Warning do not over-tighten ratchet straps)



MECHANICAL DATA
(L-ACOUSTICS recommendations)
Results within 20% error

Max Dimensions [3D]:

dX max = 1,30 m
dY max = 1,38 m
dZ max = 5,58 m

MECHANICAL parameters:

Array weight : 1 306,8 kg
Total weight : 1 367,8 kg

Absolute position of Center Gravity:

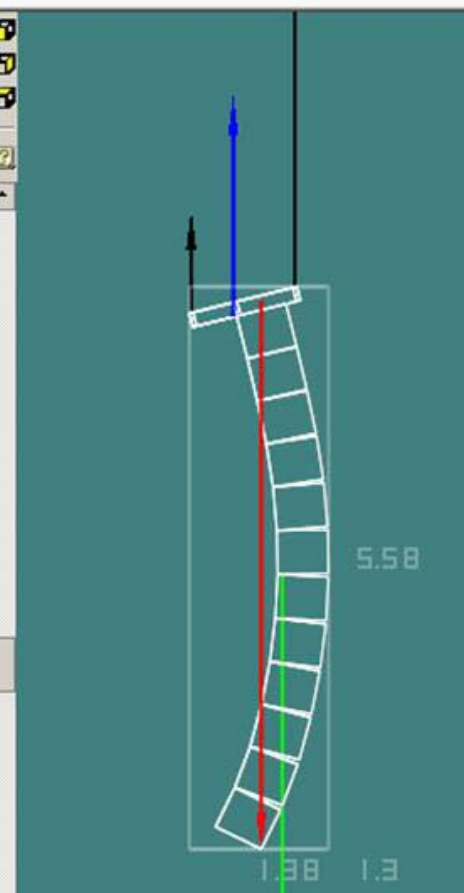
XG : 0,000 m
YG : -0,258 m
ZG : 12,782 m

Loads on Rigging and Motors:

Front load : 2 180,54 kg
Rear load : -873,74 kg
Front motor load : 1 162,09 kg
Rear motor load : 205,71 kg

!!! FRONT STRESS WARNING !!!

NOTES:



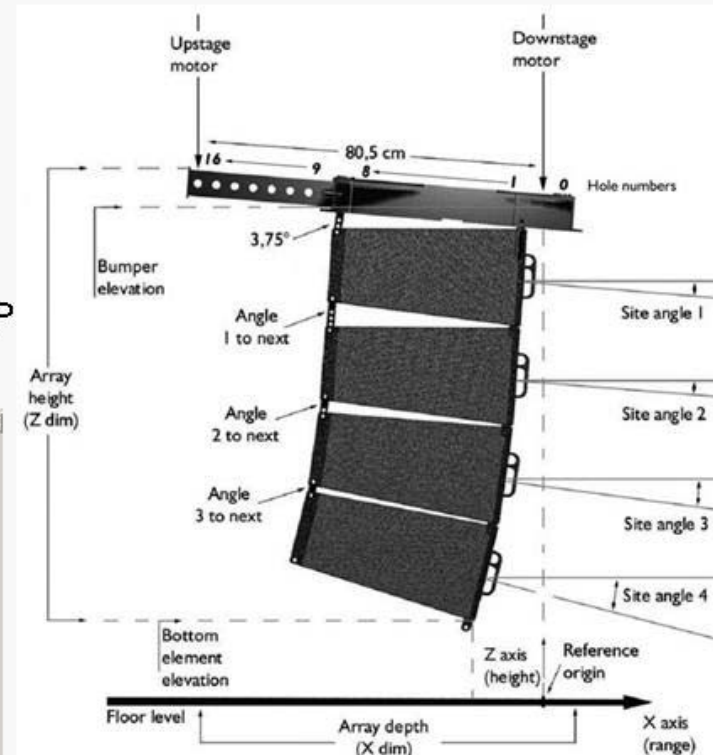
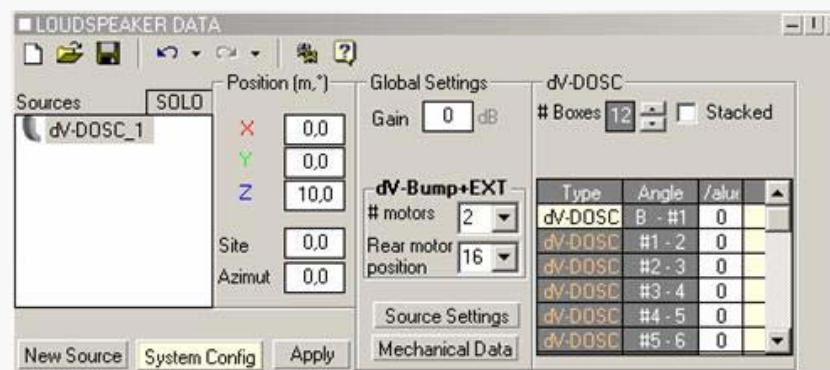


LOUDSPEAKER DATA WST Sources : dV-DOSC

Select 'New Source', dV-DOSC

- 12 dV-DOSC (flown), 0 deg angles by default
- B - #1 = bumper to top dV-DOSC

NOTE : 0 deg corresponds to relative angle
Use 3.75 deg during installation to set
top dV-DOSC site angle parallel to dV-BUMP



Selecting angles, site angle adjustment, stacked system (same as for V-DOSC)



LOUDSPEAKER DATA

dV-DOSC : Mechanical Data

2 Motor Hang : Pick Points 0 and 16 by default

MECHANICAL DATA
(L-ACOUSTICS recommendations)
Results within 20% error

Max Dimensions (3D) :

dX max = 1,06 m
dY max = 1,01 m
dZ max = 2,63 m

MECHANICAL parameters :

Array weight : 381,6 kg
Total weight : 413,6 kg

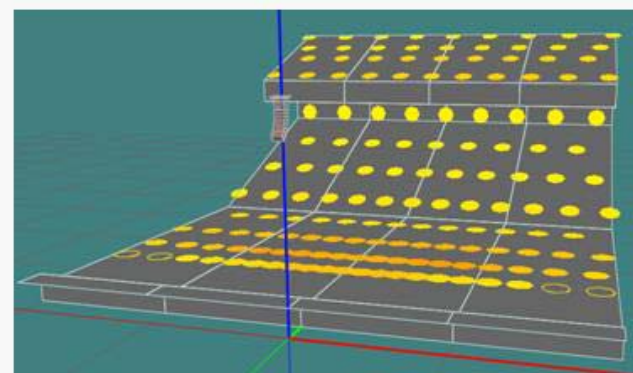
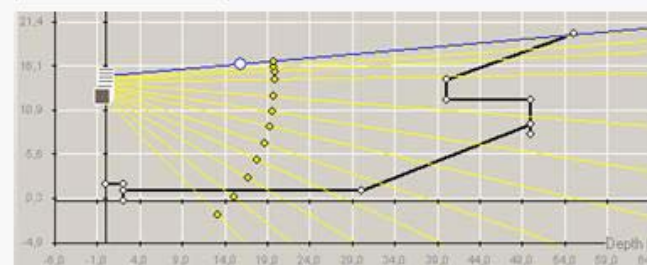
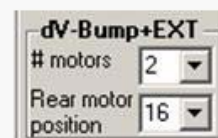
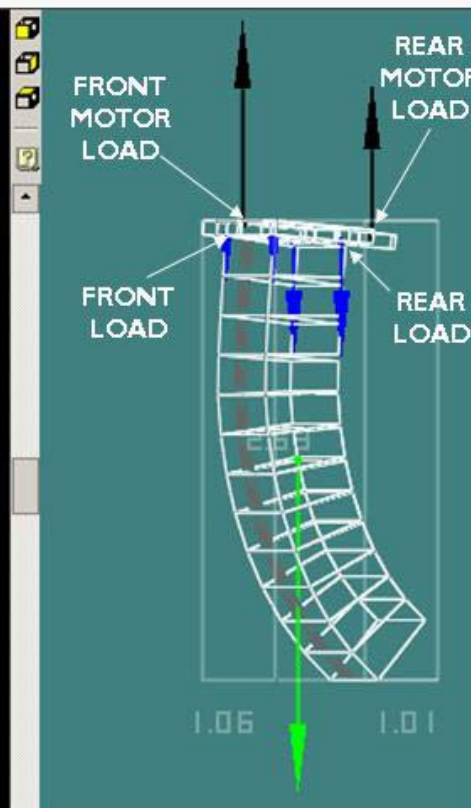
Absolute position of Center Gravity :

XG : 0,000 m
YG : -0,297 m
ZG : 13,718 m

Loads on Rigging and Motors :

Front load : 111,09 kg
Rear load : 270,51 kg
Front motor load : 234,28 kg
Rear motor load : 179,32 kg

NOTES :



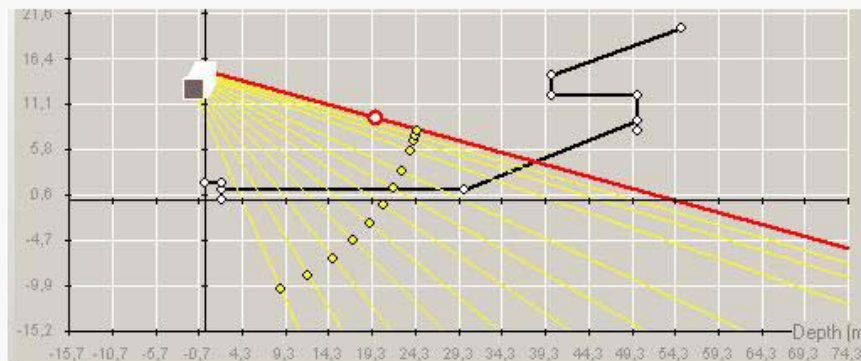


LOUDSPEAKER DATA

dV-DOSC : Mechanical Data Limits/Warnings

SYSTEM POINTING DOWN

IMPOSSIBLE warning if FRONT MOTOR load < 0



MECHANICAL DATA
(LACOUSTICS recommendations)
Results within 20% error

Max Dimensions (3D) :

dX max = 1,06 m
dY max = 1,74 m
dZ max = 2,47 m

MECHANICAL parameters :

Array weight : 381,6 kg
Total weight : 413,6 kg

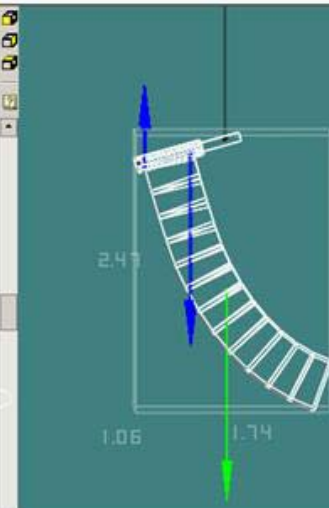
Absolute position of Center Gravity :

XG : 0,000 m
YG : -0,728 m
ZG : 13,904 m

Loads on Rigging and Motors :

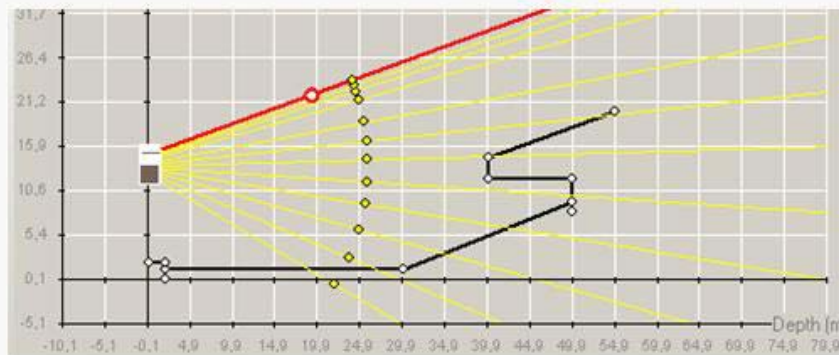
Front load : 303,48 kg
Rear load : 680,08 kg
Front motor load : IMPOSSIBLE !
Rear motor load : 414,02 kg

NOTES :



SYSTEM POINTING UP

IMPOSSIBLE warning if REAR MOTOR load < 0



MECHANICAL DATA
(LACOUSTICS recommendations)
Results within 20% error

Max Dimensions (3D) :

dX max = 1,06 m
dY max = 1,22 m
dZ max = 2,72 m

MECHANICAL parameters :

Array weight : 381,6 kg
Total weight : 413,6 kg

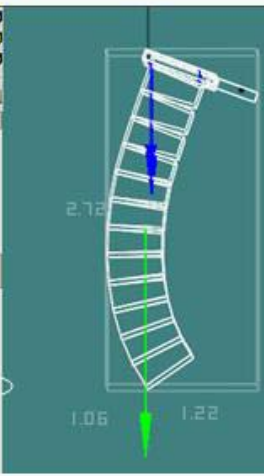
Absolute position of Center Gravity :

XG : 0,000 m
YG : 0,048 m
ZG : 13,685 m

Loads on Rigging and Motors :

Front load : 427,99 kg
Rear load : 45,39 kg
Front motor load : 110,89 kg
Rear motor load : IMPOSSIBLE !

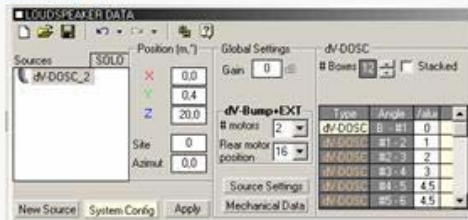
NOTES :



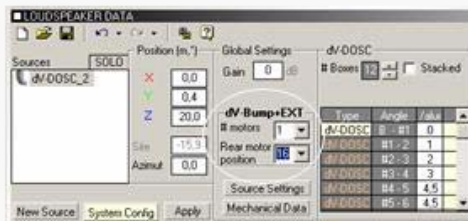
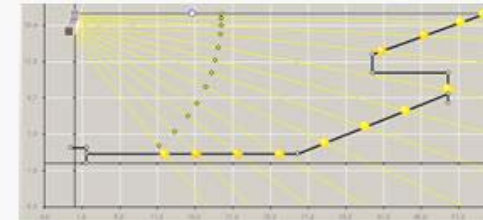


LOUDSPEAKER DATA

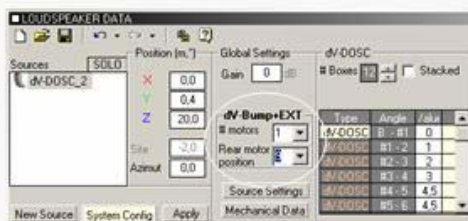
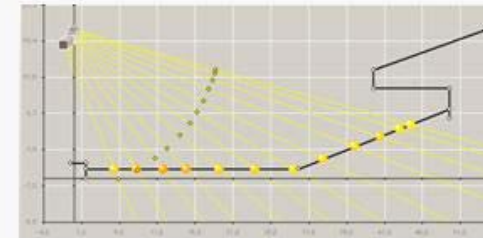
dV-DOSC : Single Point Hang



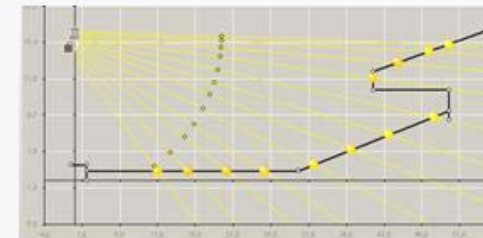
Start with 2 Point Hang
(#Motors=2)
Optimize angles, coverage etc



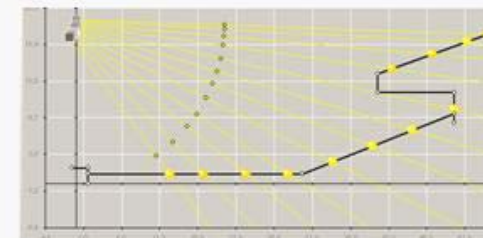
Change to Single Point Hang
(#Motors=1)
Hole #16



Change Rear Motor Position
(single point hang pick point)
to obtain coverage as close
as possible to 2 Point Hang
Hole #9



Fine tune : trim height and
angles (if necessary) to
optimize coverage
System trim increased

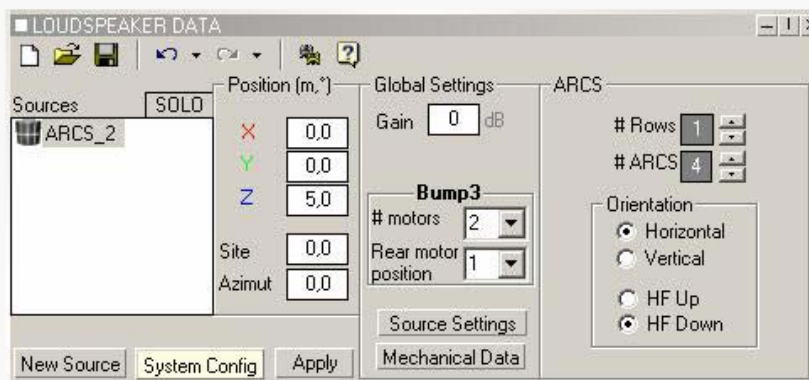




LOUDSPEAKER DATA WST Sources : ARCS

Select 'New Source' , ARCS

- 1 Row x 4 ARCS (horizontal) by default
- Orientation : Horizontal/Vertical
- HF Up/Down (horizontal)
- HF Left/Right (vertical)
- Single or two point hangs



Horizontal



Vertical

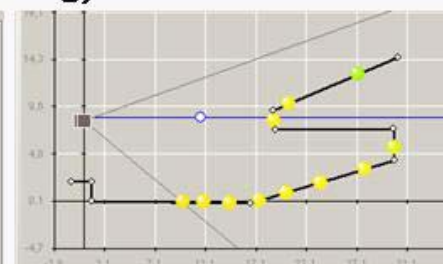
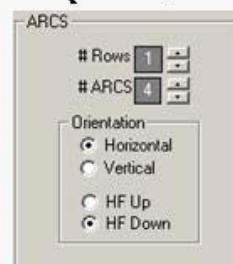
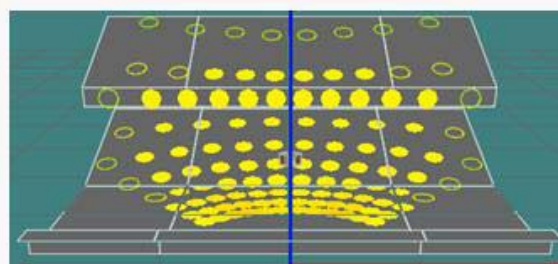


LOUDSPEAKER DATA

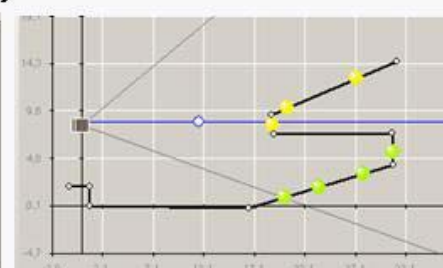
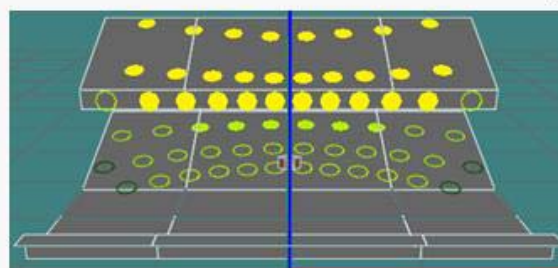
ARCS : Horizontal Line Source Array



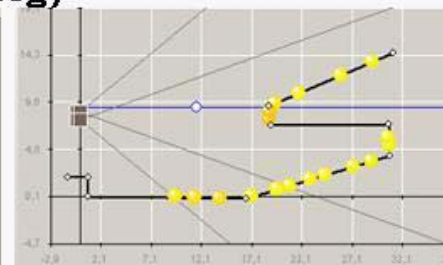
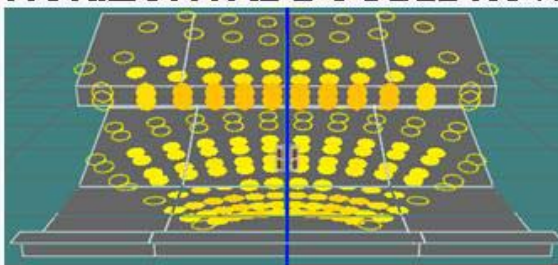
HORIZONTAL ROW : HF DOWN (+20 / -40 deg)



HORIZONTAL ROW : HF UP (+40 / -20 deg)



HORIZONTAL DOUBLE ROW : (+40 / -40 deg)



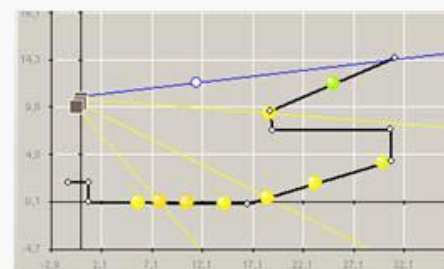
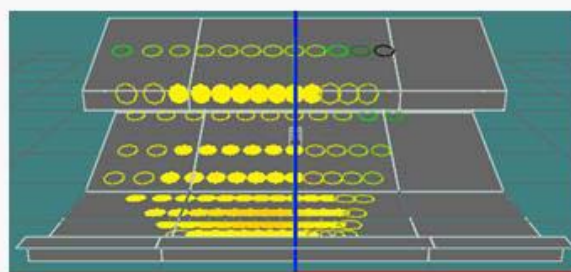


LOUDSPEAKER DATA

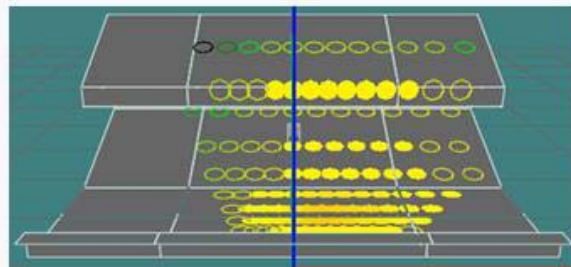
ARCS : Vertical Line Source Array



VERTICAL LINE ARRAY : HF LEFT



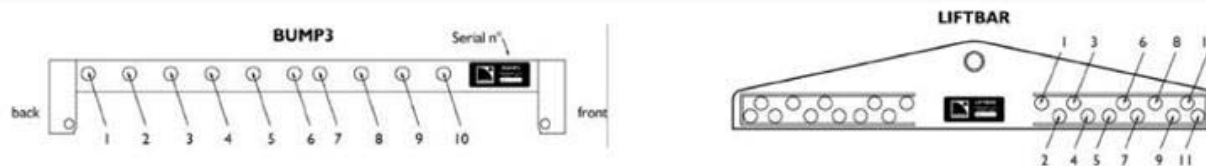
VERTICAL LINE ARRAY : HF RIGHT





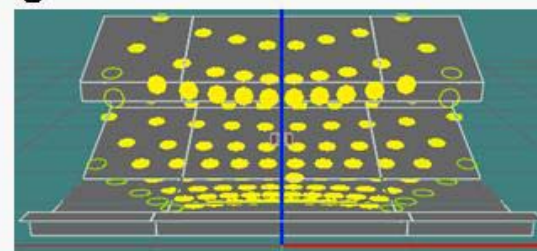
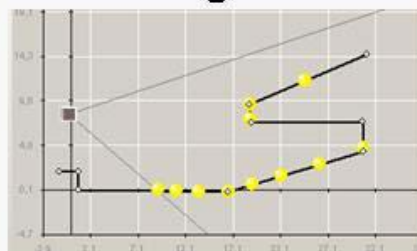
LOUDSPEAKER DATA ARCS : Single Point Hang

HOLE NUMBERING CONVENTION



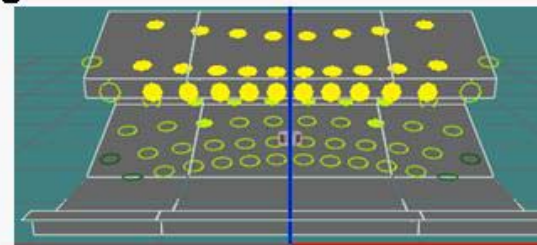
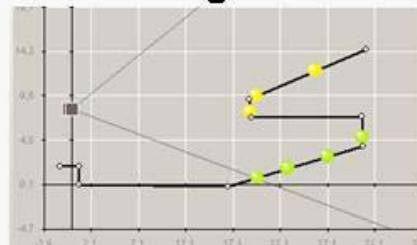
PICK POINT #2 : Site Angle = -21.4 deg

Position (m,°)		Global Settings	
X	0,0	Gain	0 dB
Y	1,2	Bump3 # motors 1 Rear motor position 2	
Z	8,5		
Site	-21,4		
Azimuth	0,0		



PICK POINT #5 : Site Angle = -0.8 deg

Position (m,°)		Global Settings	
X	0,0	Gain	0 dB
Y	1,2	Bump3 # motors 1 Rear motor position 5	
Z	8,5		
Site	-0,8		
Azimuth	0,0		



Verify actual, obtained Site Angle during installation with a digital inclinometer



LOUDSPEAKER DATA WST Sources : KUDO

Select 'New Source', KUDO

- 6 KUDO (vertical) by default



Vertical Line Source

0-10° (at 1° resolution)

Horizontal directivity :

Select 'Show H angles' to
set horizontal directivity



Horizontal Line Source

10° coverage per enclosure

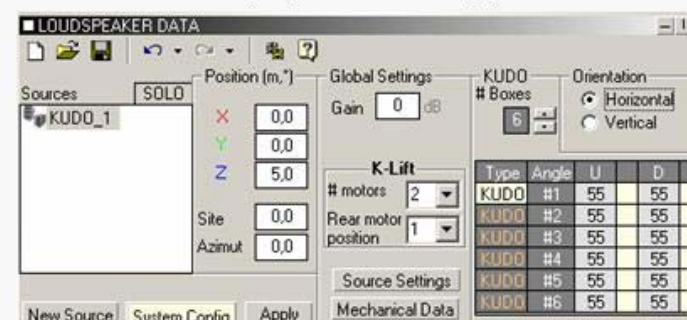
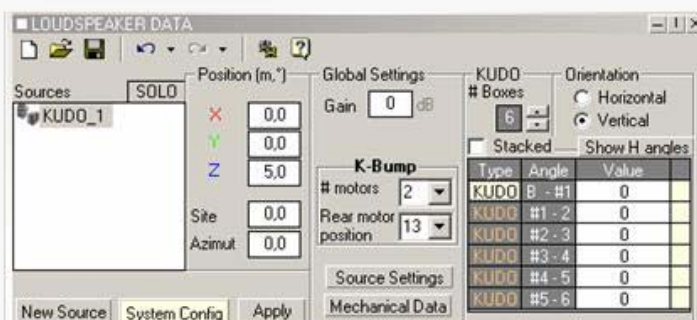
Vertical directivity :

50° (symmetric)

110° (symmetric)

25° x 55° (asymmetric - down)

55° x 25° (asymmetric - up)



Selecting angles, site angle adjustment, stacked system (same as for V-DOSC)



LOUDSPEAKER DATA

WST Sources : KUDO

Select 'New Source', KUDO

- 6 KUDO (vertical) by default

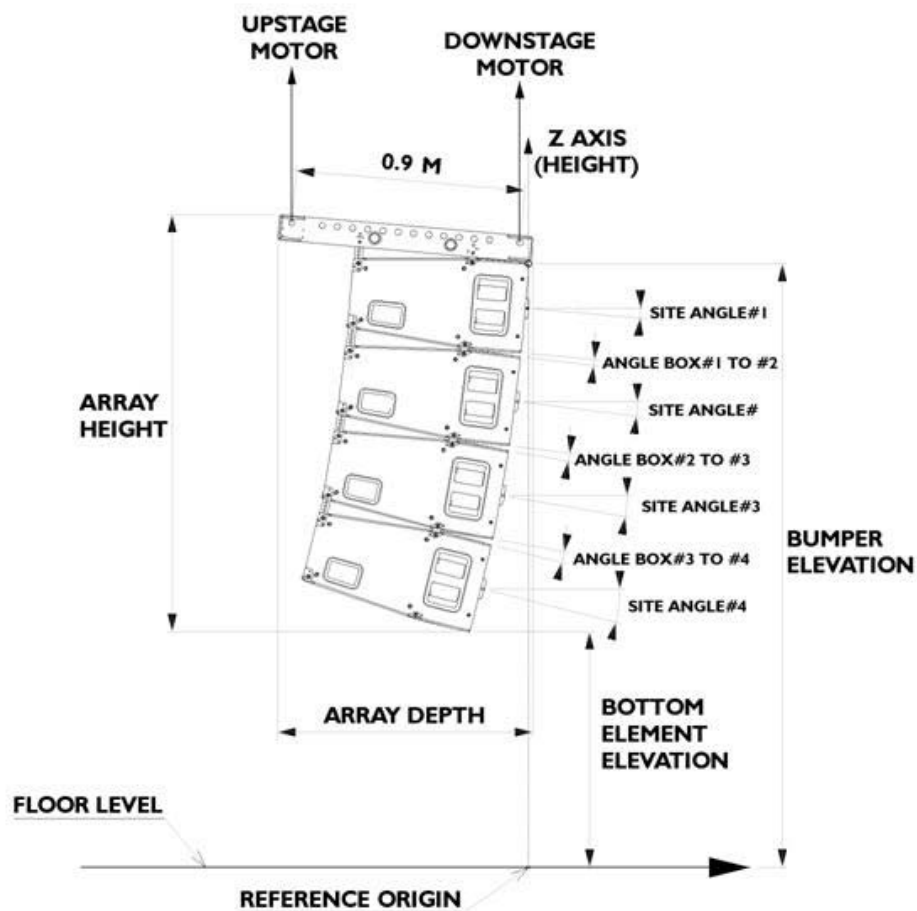


Vertical Line Source

0-10° (at 1° resolution)

Horizontal directivity :

Select 'Show H angles' to
set horizontal directivity





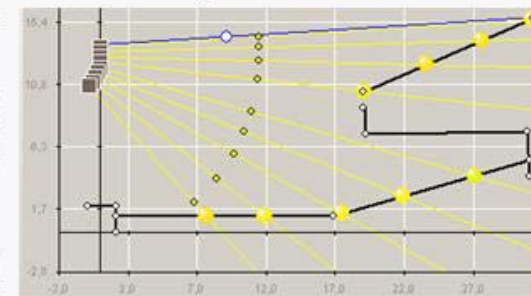
LOUDSPEAKER DATA KUDO : Vertical Line Source Array

0-10° (at 1° resolution)

Define angles:

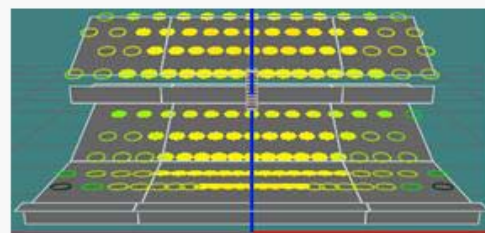
- Manually in the value table
- Use the pull down menu of standard angles
- Left click, drag & drop site angle references

KUDO			Orientation
# Boxes			<input type="radio"/> Horizontal
			<input checked="" type="radio"/> Vertical
<input type="checkbox"/> Stacked			Show H angles
Type	Angle	Value	
KUDO B - #1		0	
KUDO #1 - 2		5	
KUDO #2 - 3		3	
KUDO #3 - 4		5	
KUDO #4 - 5		10	
KUDO #5 - 6		6	



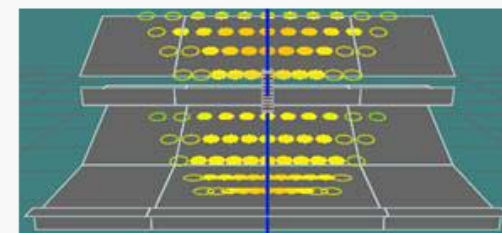
NOTE : B - #1 = K-BUMP - Top KUDO relative angle

Use 5 deg during installation to set top KUDO site angle parallel to K-BUMP, i.e., 0 deg relative angle



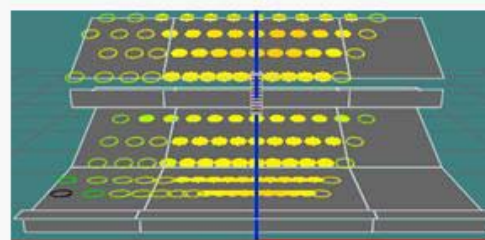
110 deg symmetric

KUDO			Orientation
# Boxes			<input type="radio"/> Horizontal
			<input checked="" type="radio"/> Vertical
<input type="checkbox"/> Stacked			Show V angles
Type	Angle	L	R
KUDO #1	55	55	
KUDO #2	55	55	
KUDO #3	55	55	
KUDO #4	55	55	
KUDO #5	55	55	
KUDO #6	55	55	



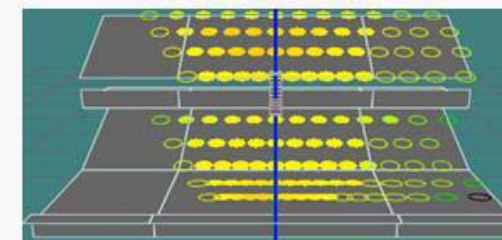
50 deg symmetric

KUDO			Orientation
# Boxes			<input type="radio"/> Horizontal
			<input checked="" type="radio"/> Vertical
<input type="checkbox"/> Stacked			Show V angles
Type	Angle	L	R
KUDO #1	25	25	
KUDO #2	25	25	
KUDO #3	25	25	
KUDO #4	25	25	
KUDO #5	25	25	
KUDO #6	25	25	



80 deg asymmetric left

KUDO			Orientation
# Boxes			<input type="radio"/> Horizontal
			<input checked="" type="radio"/> Vertical
<input type="checkbox"/> Stacked			Show V angles
Type	Angle	L	R
KUDO #1	55	25	
KUDO #2	55	25	
KUDO #3	55	25	
KUDO #4	55	25	
KUDO #5	55	25	
KUDO #6	55	25	



80 deg asymmetric right

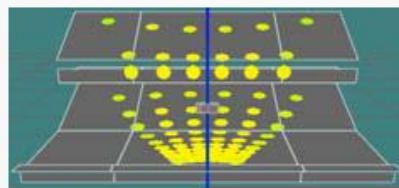
KUDO			Orientation
# Boxes			<input type="radio"/> Horizontal
			<input checked="" type="radio"/> Vertical
<input type="checkbox"/> Stacked			Show V angles
Type	Angle	L	R
KUDO #1	25	55	
KUDO #2	25	55	
KUDO #3	25	55	
KUDO #4	25	55	
KUDO #5	25	55	
KUDO #6	25	55	



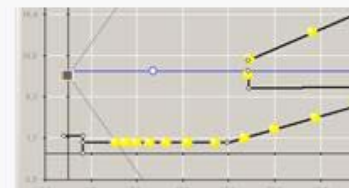
LOUDSPEAKER DATA

KUDO : Horizontal Line Source Array

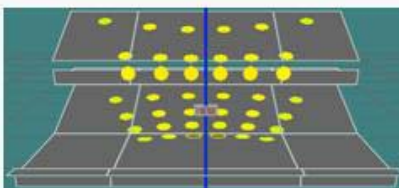
110 deg symmetric
(55 up x 55 down)



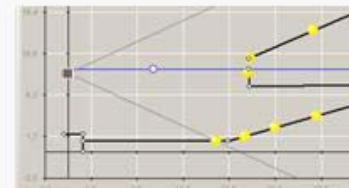
KUDO					Orientation	
# Boxes					<input checked="" type="radio"/> Horizontal <input type="radio"/> Vertical	
Type	Angle	U	D			
KUDO #1	55	55	55			
KUDO #2	55	55	55			
KUDO #3	55	55	55			
KUDO #4	55	55	55			
KUDO #5	55	55	55			
KUDO #6	55	55	55			



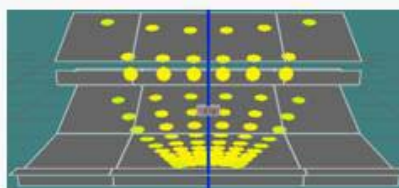
50 deg symmetric
(25 up x 25 down)



KUDO					Orientation	
# Boxes					<input checked="" type="radio"/> Horizontal <input type="radio"/> Vertical	
Type	Angle	U	D			
KUDO #1	25	25	25			
KUDO #2	25	25	25			
KUDO #3	25	25	25			
KUDO #4	25	25	25			
KUDO #5	25	25	25			
KUDO #6	25	25	25			



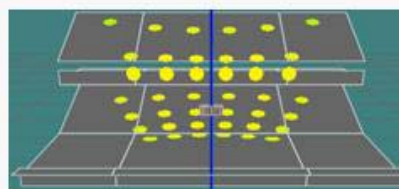
80 deg asymmetric
(25 up x 55 down)



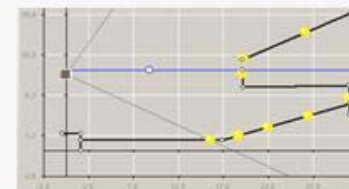
KUDO					Orientation	
# Boxes					<input checked="" type="radio"/> Horizontal <input type="radio"/> Vertical	
Type	Angle	U	D			
KUDO #1	25	55	55			
KUDO #2	25	55	55			
KUDO #3	25	55	55			
KUDO #4	25	55	55			
KUDO #5	25	55	55			
KUDO #6	25	55	55			



80 deg asymmetric
(55 up x 25 down)

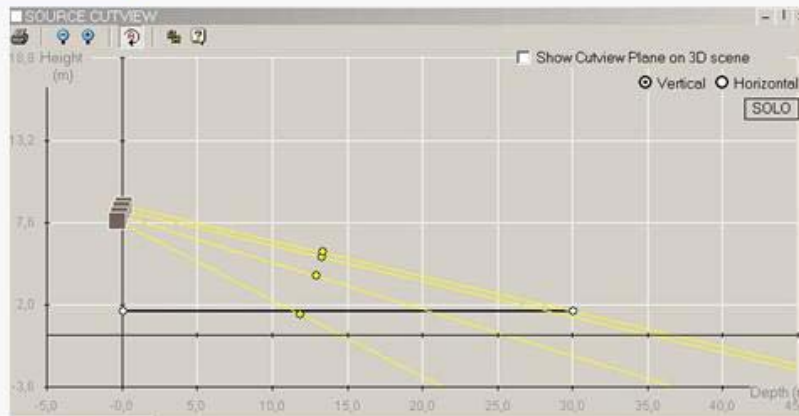


KUDO					Orientation	
# Boxes					<input checked="" type="radio"/> Horizontal <input type="radio"/> Vertical	
Type	Angle	U	D			
KUDO #1	55	25	25			
KUDO #2	55	25	25			
KUDO #3	55	25	25			
KUDO #4	55	25	25			
KUDO #5	55	25	25			
KUDO #6	55	25	25			





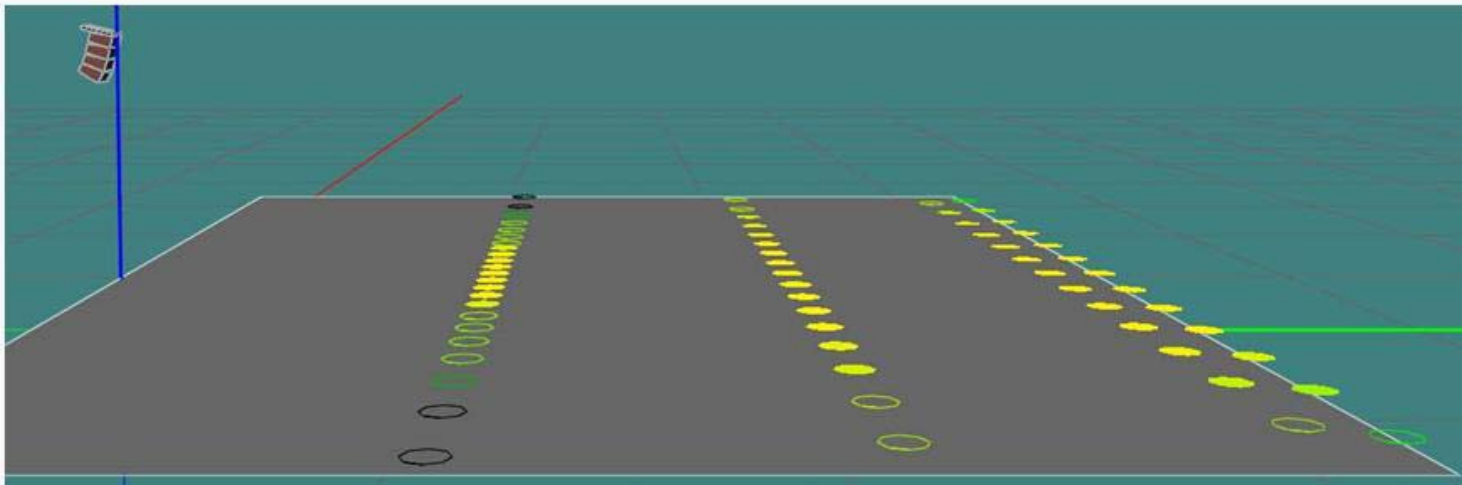
LOUDSPEAKER DATA KUDO : Installation Parameters



4 KUDO

Angles: 0, 4, 10 deg

Single point hang (hole#7)
= -13.6 site angle





REPORT DATA KUDO : Installation Parameters



SOUNDVISION

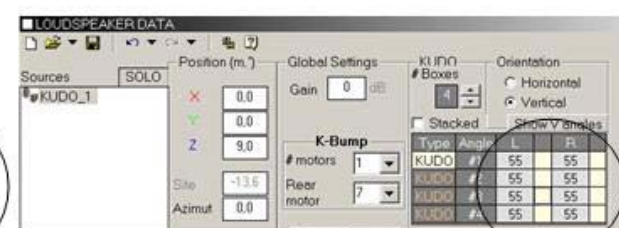
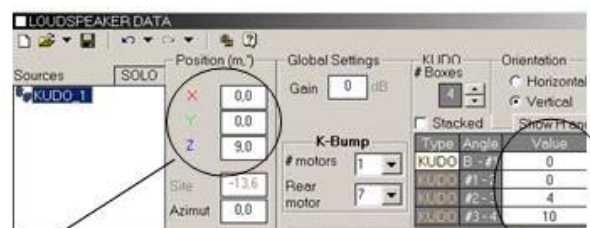
Author
File name 'rigging parameters.svd' Date 28/01/2005 File Version 1.2.0

Comments

Distance unit m
Scale factor 1
Weight unit kg
Delay unit ms

Sources : 1

KUDO_1



(X;Y;Z) = (0,00;0,00;9,00) Site: -13,6 (°) Azimut: 0,0 (°)
Gain (dB): 0 Delay: 0 # Boxes: 4

FLOWN array

#	Type	Gain (dB)	Amp (dB)	INV	Box to Box	Angles (°)	Site (°)	Angles Left	Angles Right	Bot. Z	Top Z (Both Front)
1	KUDO	0	32	Faux	B - #1	0	-13,6	55	55	8,65	9,00
2	KUDO	0	32	Faux	#1 - 2	0	-13,6	55	55	8,31	8,65
3	KUDO	0	32	Faux	#2 - 3	4	-17,6	55	55	7,95	8,29
4	KUDO	0	32	Faux	#3 - 4	10	-27,6	55	55	7,60	7,92

Mechanical Parameters:

Nb motors: 1 / Bumper: K-Bump / Rear motor position: 7
Max size of cluster (X;Y;Z) = (1,7;1,1;0,9)



REPORT DATA KUDO : Installation Parameters



SOUNDVISION

Author
File name 'rigging parameters.svd' Date 28/01/2005 File Version 1.2.0

Comments

Distance unit m
Scale factor 1
Weight unit kg
Delay unit ms

Sources : 1

KUDO_1

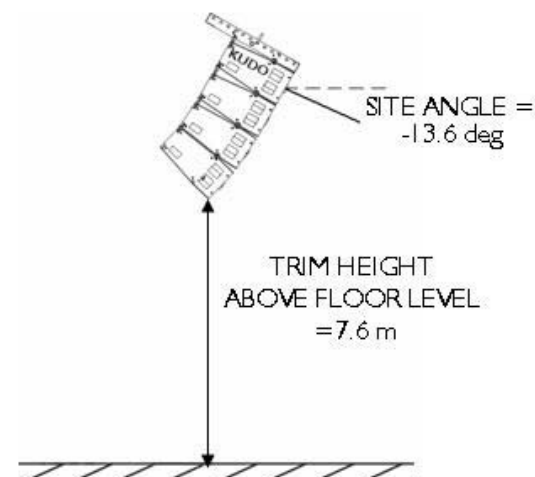
(X; Y; Z) = (0,00; 0,00; 9,00) Site: -13,6 (°) Azimut: 0,0 (°)
Gain (dB): 0 Delay: 0 # Boxes: 4

FLOWN array

#	Type	Gain (dB)	Amp (dB)	INV	Box to Box	Angles (°)	Site (°)	Angles Left	Angles Right	Bot. Z	Top Z (Both Front)
1	KUDO	0	32	Faux	B - #1	0	-13,6	55	55	8,65	9,00
2	KUDO	0	32	Faux	#1 - 2	0	-13,6	55	55	8,31	8,65
3	KUDO	0	32	Faux	#2 - 3	4	-17,6	55	55	7,95	8,29
4	KUDO	0	32	Faux	#3 - 4	10	-27,6	55	55	7,60	7,92

Mechanical Parameters:

Nb motors: 1 / Bumper: K-Bump / Rear motor position: 7
Max size of cluster (X; Y; Z) = (1,7; 1,1; 0,9)



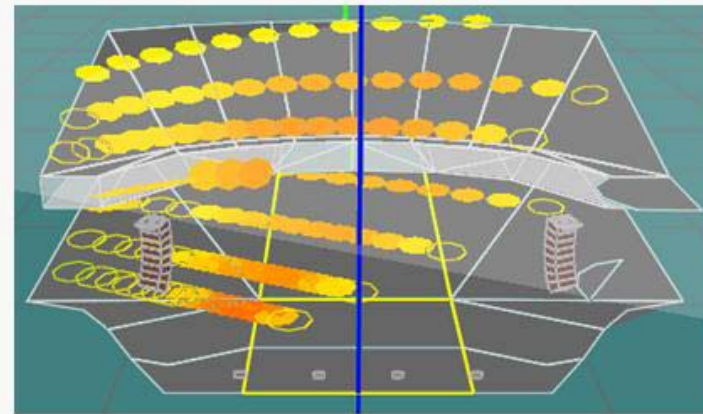
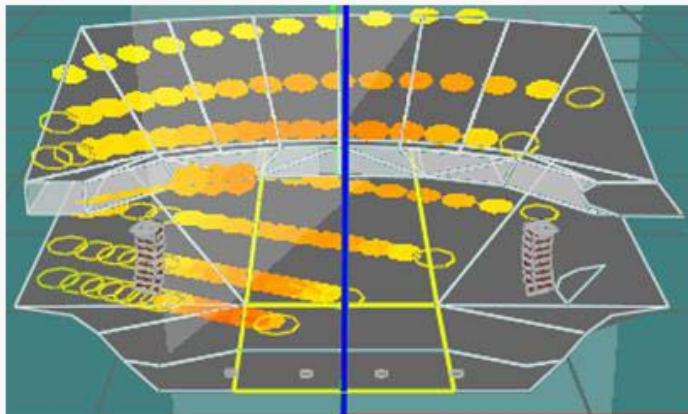
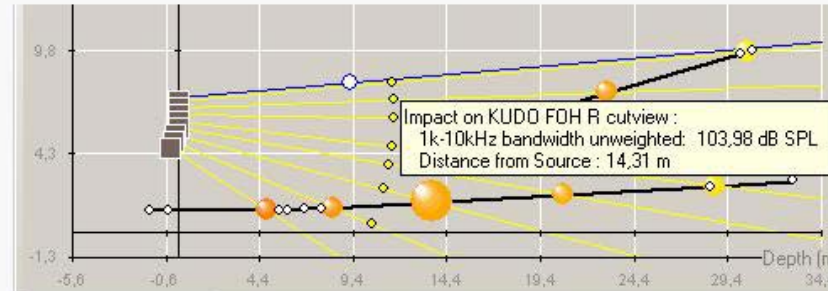
Note: 0 deg corresponds to relative angle between top KUDO and K-BUMP
(use 5 deg for the actual installation)



LOUDSPEAKER DATA Source Cutview

Left Click on Impact Points to display :

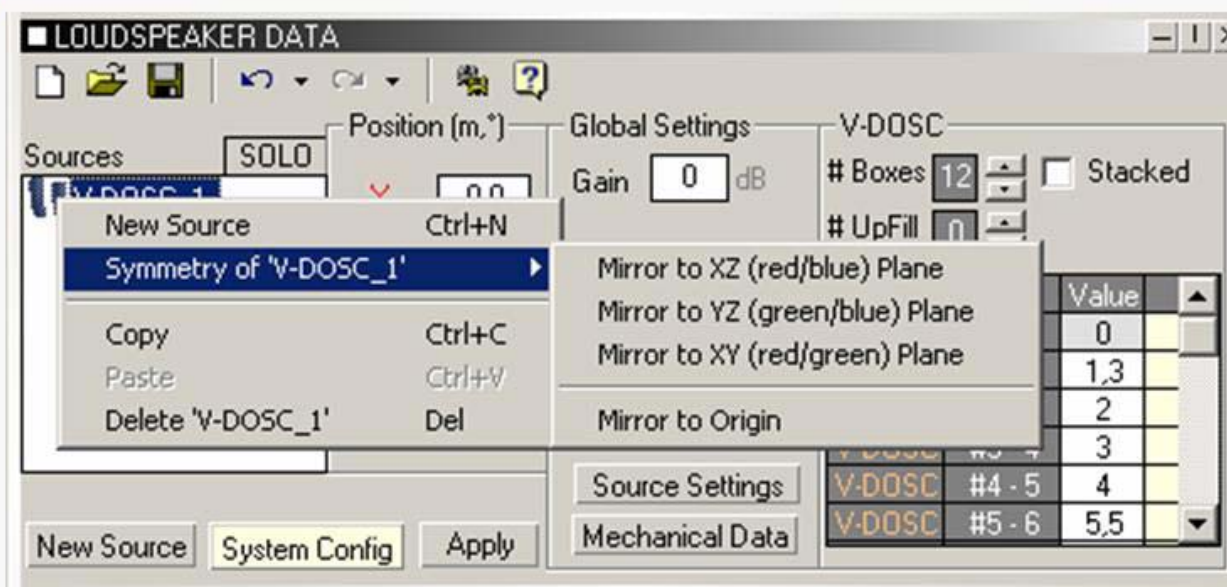
- SPL (unweighted and A-Weighted)
- Throw distance from source



*Hide/display the Cutview Plane by check/unchecking 'Show Cutview Plane on 3D Scene'
Toggle Cutview Plane : Vertical / Horizontal*



LOUDSPEAKER DATA Source Menu Additional Functions



Right Click on a source to access additional functions :

- '**New Source**'
- '**Symmetry**' create a mirror image of the source
- '**Copy**' the selected source
- '**Paste**' the selected source
- '**Delete**' the selected source

SHORTCUTS

DELETE the selected source

- CTRL+KEY :

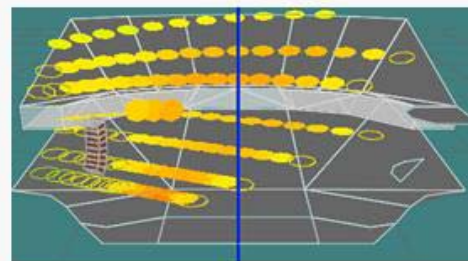
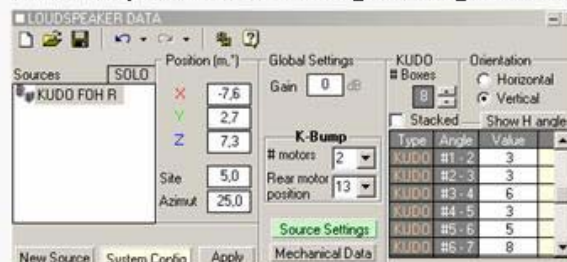
N = New Source
C = Copy
V = Paste



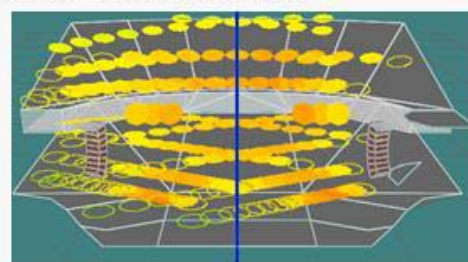
LOUDSPEAKER DATA

Source Menu Additional Functions

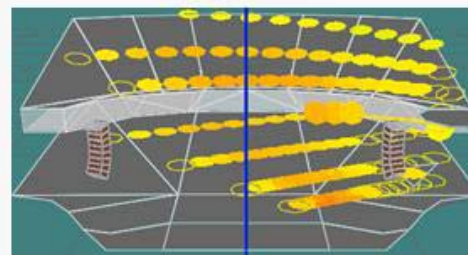
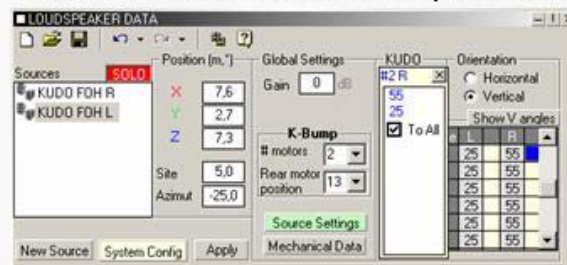
FOH R (8 KUDO: 25 deg onstage x 55 deg offstage = reverse asymmetric)



SYMMETRY OPERATION TO CREATE FOH L ARRAY



RENAME AS KUDO FOH L, SET MIRROR IMAGE K-LOUVER SETTING





LOUDSPEAKER DATA Source Settings

DEFINE :

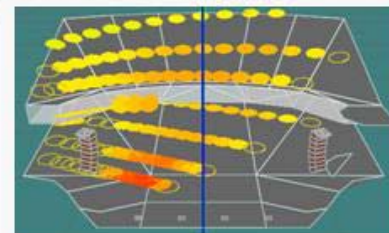
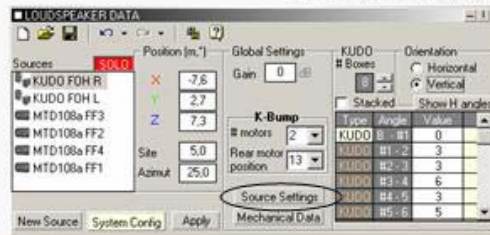
- Gain
- Amplifier Gain
- Polarity

for the selected source or individual enclosures within an array (KUDO, ARCS, dV-DOSC, V-DOSC)

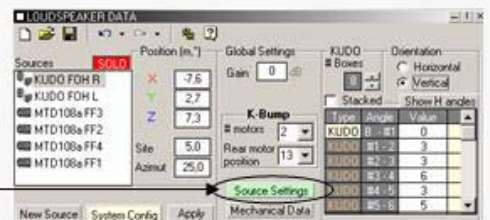
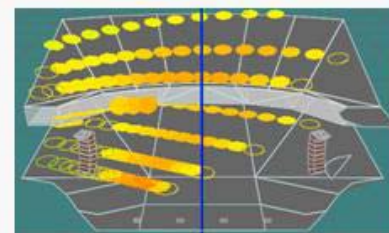
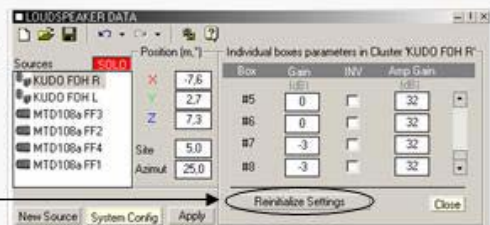
Click Reinitialize Settings to recover start values

GREEN indicates Source Settings have been modified

SELECT SOURCE SETTINGS



BOTTOM 2 KUDO attenuated -3 dB





LOUDSPEAKER DATA System Config

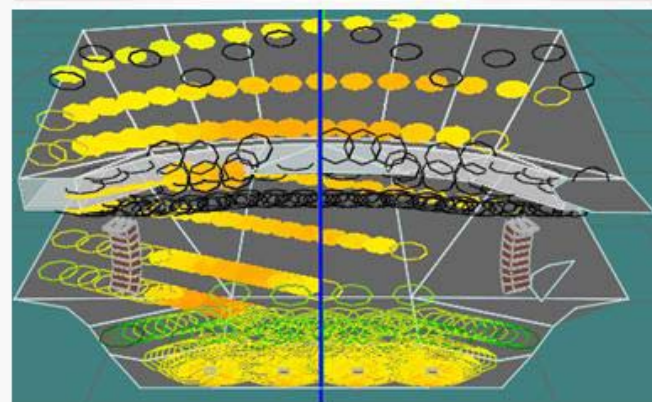
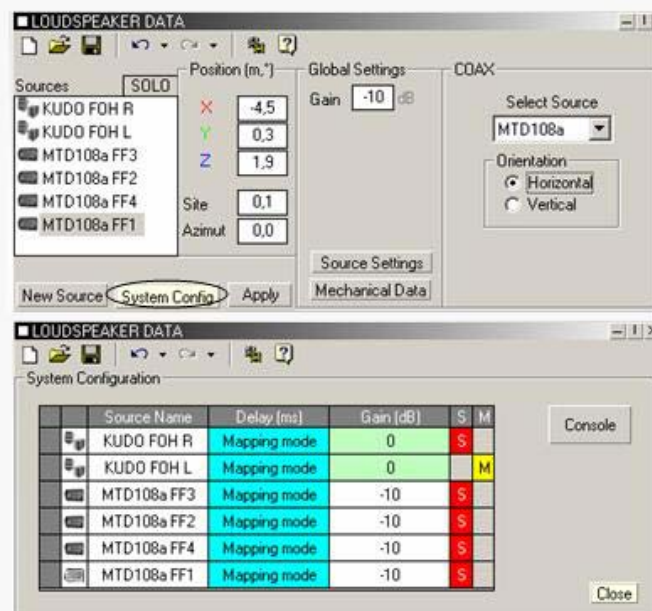
Adjust individual source (or array):

- Gain
- Delay (Mapping Mode only)
- SOLO (S) and MUTE (M) functions

Useful for optimizing coverage and SPL distribution once all sources have been placed in the 3D Audience

S (SOLO) / M (MUTE)

- Add/Remove Sources by clicking on the corresponding square





LOUDSPEAKER DATA Console

Console Output Gain = Master gain for all sources

Note: Relative gain or attenuation for individual sources is defined in the Source Settings window

Enter 'Value' or move the fader with the mouse

Select **Find Max Gain** to determine the maximum SPL over your audience area

Overloaded Sources listed and displayed in red (Source List, Source Cutview and 3D Scene)

Source Name	Delay (ms)	Gain (dB)	S	M
KUDO FOH R	Mapping mode	0		
KUDO FOH L	Mapping mode	0		
MTD108a FF3	Mapping mode	-4		
MTD108a FF2	Mapping mode	-4		
MTD108a FF4	Mapping mode	-4		
MTD108a FF1	Mapping mode	-4		

