StepArray
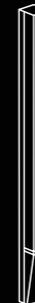
Digitally steerable column loudspeakers

Contact

www.activeaudio.fr

Info@activeaudio.fr

332 Bd Marcel Paul - CP602 - 44806 ST-HERBLAIN Cedex - FRANCE

Tel. +33 (0)2 40 46 66 64 - Fax +33 (0)2 51 80 97 97

WWW.Eureka-design.fr / Photos produits : Mary.fer.mounier

Active audio

Active audio

L'acoustique active

Acoustics and Audio

When I started the design of the StepArray range, in 2006, I wanted to create a product bringing a real improvement and differentiation with what was existing on the market at that time.

The requirements were to have a public address system delivering a perfect intelligibility in reverberant spaces.

The solution of a digitally steerable column loudspeaker came to me naturally, but I wished to bring some innovation that would make our speakers unique. The principal drawback of the products on the market is to have all the control electronics inside the loudspeakers, generating expensive price, heavy weight, and difficulty to install and set up.

The idea behind DGRC patent was to reduce the number of channels and hence being able to externalize electronics.
Now with DGRC, it becomes possible to share electronics between several columns.

StepArray became the technical window of Active Audio and we are all very proud of it.

Xavier MEYNIAL
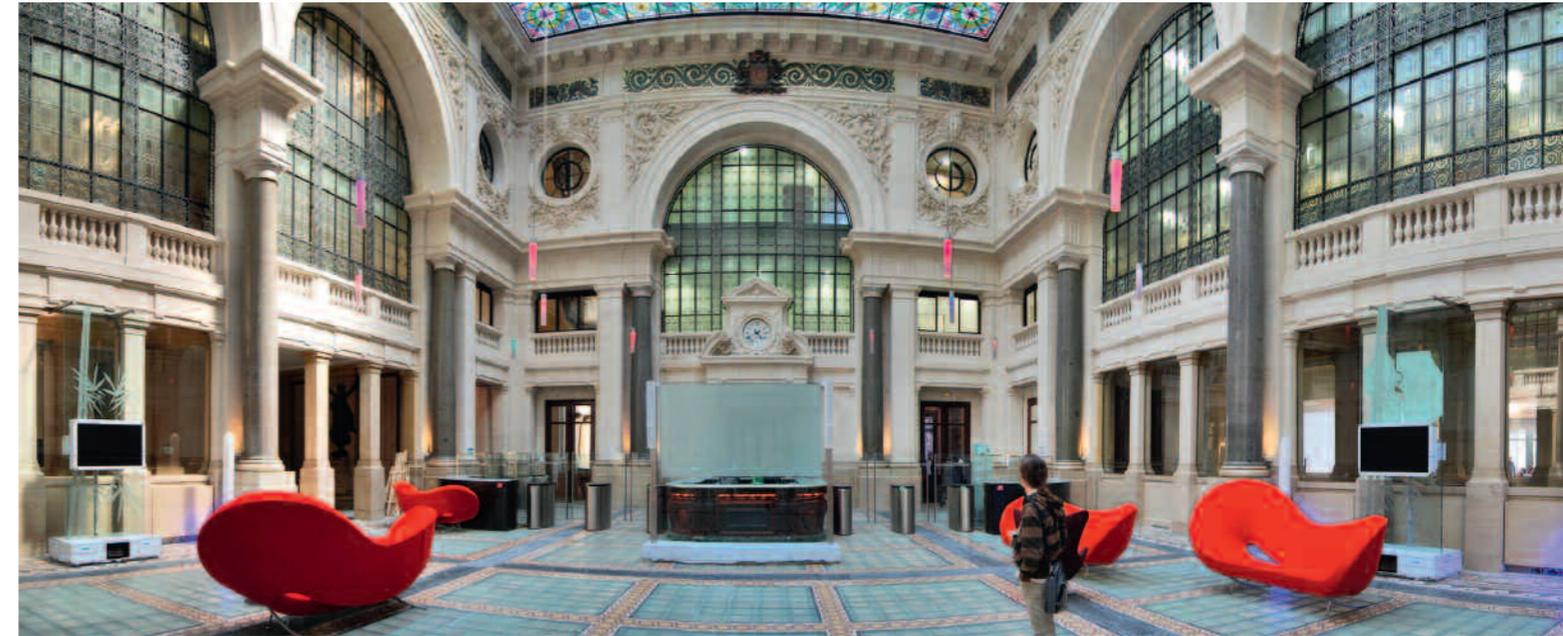
Sound reinforcement in larges volumes

Speech reinforcement in large venues must ensure perfect understanding of messages despite big reverberation time and often important noise levels.

To obtain the desired intelligibility, accurate control of the directivity of the sound system is essential : the speakers should maximize the direct over reverberated sound ratio, and provide uniform sound coverage of the entire audience.

Moreover, in places where aesthetics is important, the sound system is not often welcomed. Therefore, the positioning of the speakers are often limited due to technical and architectural constraints; hence the speakers have to be discreet and very few in numbers. The use of highly directional speaker columns such as StepArray columns is the best solution to meet these requirements.

The StepArray range

StepArray column speakers ensure perfect speech intelligibility and optimal acoustic comfort, even in noisy and reverberant venues.

They are based on the DGRC (Digital & Geometric Radiation Control) principle patented by Active Audio.

The main difference of DGRC columns, compared with the other classic DSP columns, is to decrease the number of channels to be controled independantly.

Like this, it is possible to place the electronics outside the columns, which has the following key advantages :

- security : electronics can be placed in a secure room, with uninterruptible power supply (UPS)
- sharing of electronic between multiple columns
- easier installation and maintenance

StepArray advantages

- **optimal intelligibility**
- **even sound coverage**
- **acoustic comfort**
- **security**
- **easy maintenance**

NUT audio DSP

MPA6150 multichannel amplifier

The StepArray range includes :

NUT
8 x 8 digital signal processor with StepArray control

MPA6150
6 x 150 w multichannel amplifier

SA100P
1m high
flat area, 21m
3 channels
8Ω min.

SA180P
1.8m high
flat area, 40m
3 channels
8Ω min.

SA180S
1.8m high
10° area, 29m
3 channels
8Ω min.

SA250P
2.5m high
flat area, 45m
6 channels
4Ω min.

SA250S
2.5m high
12° area, 36m
6 channels
4Ω min.

SA400P
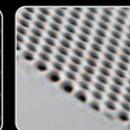4m high
flat area, 90m
6 channels
8Ω min.

Standard Color Chart

Specific RAL upon request
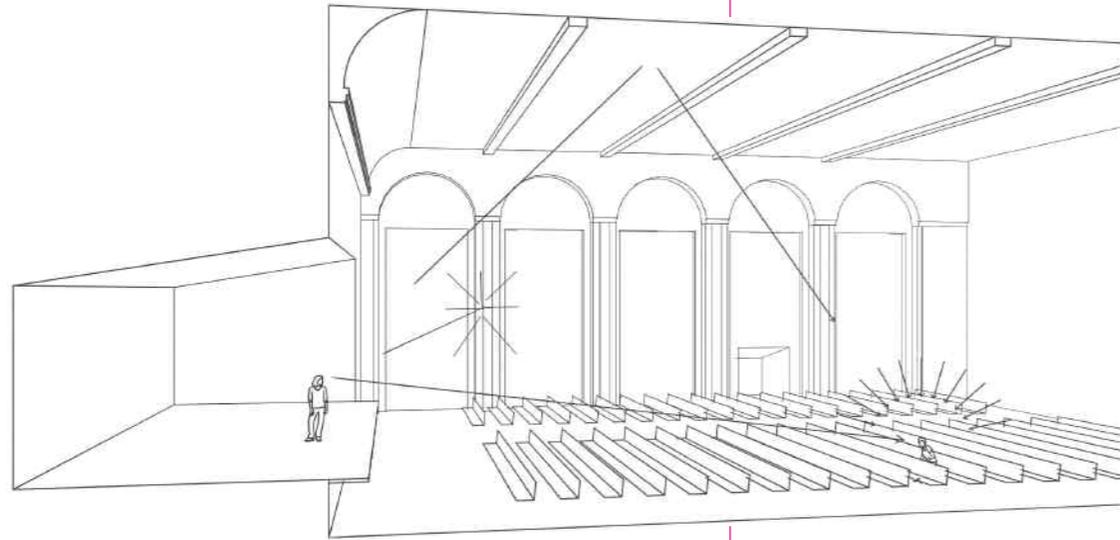
Black RAL9005   **White RAL 9016**
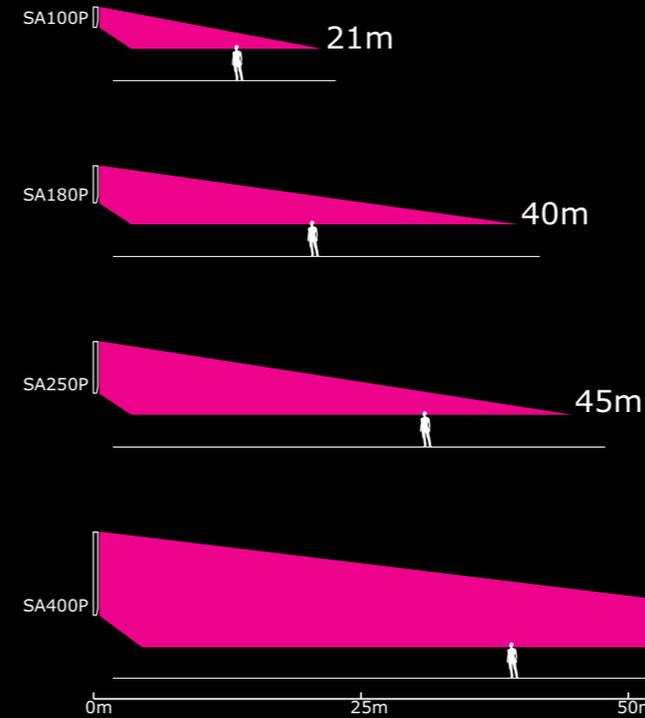
6 column models, from 1m to 4m

The StepArray columns

In room acoustics, when column speakers are highly directional, it is necessary to have several sizes of columns to fit all kind of venues.
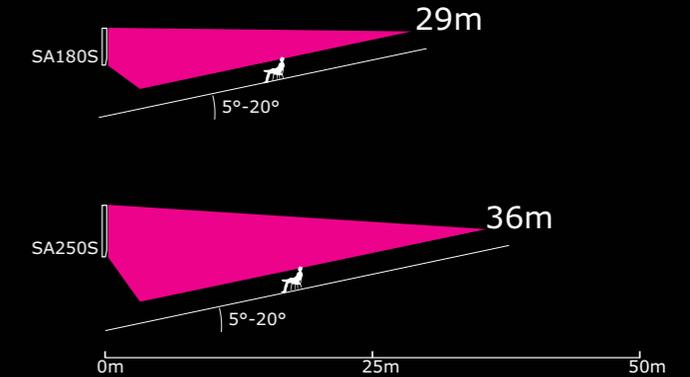
The StepArray range offers a wide variety of listening area sizes and inclinations to suit all situations.

SA100P — 21m

SA180P — 40m

SA250P — 45m

SA400P — 90m

0m   25m   50m   75m   100m

SA180S — 29m — 5°-20°

SA250S — 36m — 5°-20°

0m   25m   50m

DGRC

Digital and Geometric Radiation Control

StepArray columns enjoy the benefits of the two main existing technologies for directivity control by implementing an hybrid scheme patented by Active Audio : DGRC digital and geometric radiation control.
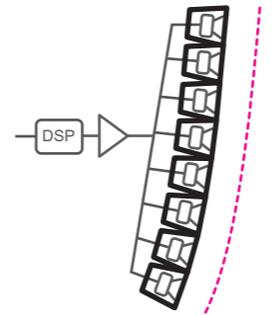Thanks to the DGRC principle, StepArray speakers are extremely directive while remaining :
• Compacts
• Affordable : fewer amplification and processing channels are needed
• Secure : all the electronics is outside the columns

Thus, all the speakers of the StepArray range provide excellent music reinforcement and speech intelligibility, even in reverberant and noisy spaces.

DGRC
• **Compact**
• **Affordable**
• **Secured : external electronics**
• **Intelligible**

DSP

Geometric Array

DIGITAL SIGNAL PROCESSOR

Electronic Array

IN

NUT
DIGITAL SIGNAL PROCESSOR

EQ
AGC
COMP
...

STEPARRAY
DIRECTIVITY

MPA6150*
AMPLIFIER

SOUND
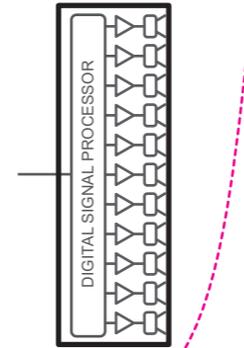
DGRC Array
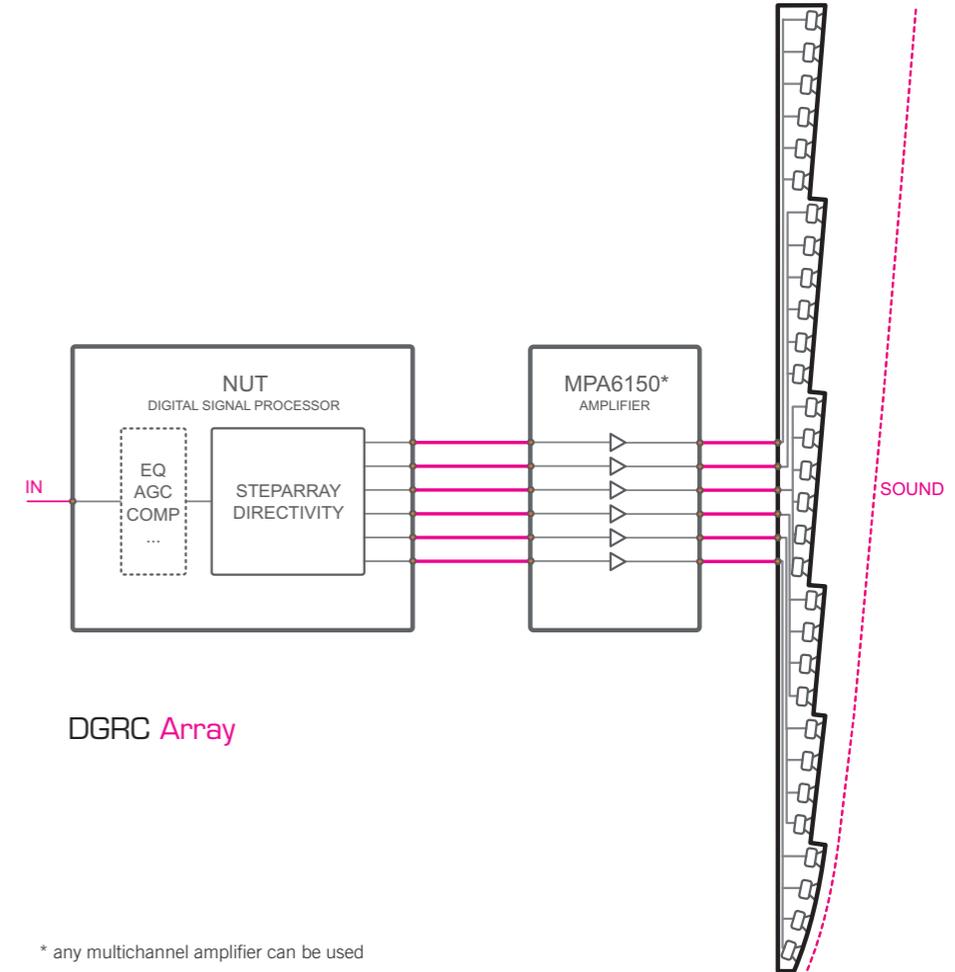
* any multichannel amplifier can be used

NUT

An audio DSP « à la carte »

NUT is a DSP processor simple of use and versatile. The user can take advantage of the full NUT power. With a simple drag'n drop, each application dedicates NUT to a specific task, allowing the user to concentrate immediately on its speciality : the reinforcement system.

NUT is accessible from a smartphone, a tablet, or a desktop computer, and settings can be made from any device having a web browser.

The NUT audio DSP can drive StepArray columns while also providing all the functions needed for public address systems. NUT includes everything needed in a modern installation: automix, AGC, equalization, filtering, mixing, remote control.
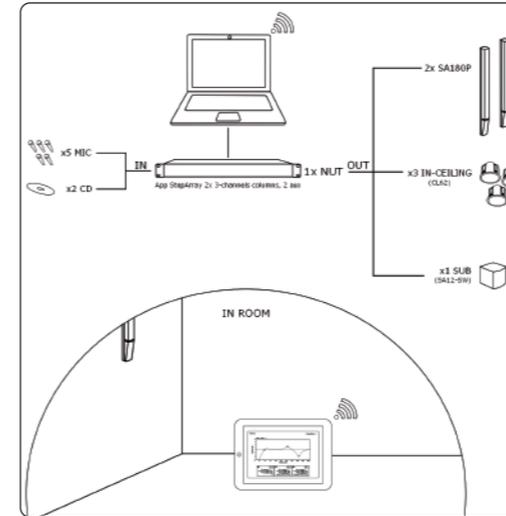
Hardware

- **8 inputs line/mic**
- **8 outputs**
- **USB/Ethernet**
- **Remote control**

Software

- **Free applications**
- **Automatic gain control**
- **Equalization**
- **Automix**
- **StepArray directivity**
- **Subwoofer management**

Installation example in a conference room

DSP applications: A processor "à la carte"

- Many applications available and free
- New applications upon request
- Take advantage of the full NUT power
- Remote control

Compatible with tablets, PC and Mac.

Nut is simple of use and doesn't need time to learn its software, what allows the user to focus on the audio.

The directivity control

The technical capabilities of StepArray directivity control are easily accessible.
StepArray directivity control is:

• Instantaneous: listen in real time the effect of your changes
• Interactive: visualize and compare levels in different areas
• simple: control the full power of StepArray with only 2 sliders

NOTICE

StepArray directivity control is available in several NUT applications. It is possible to choose the NUT application that suits the best your needs.
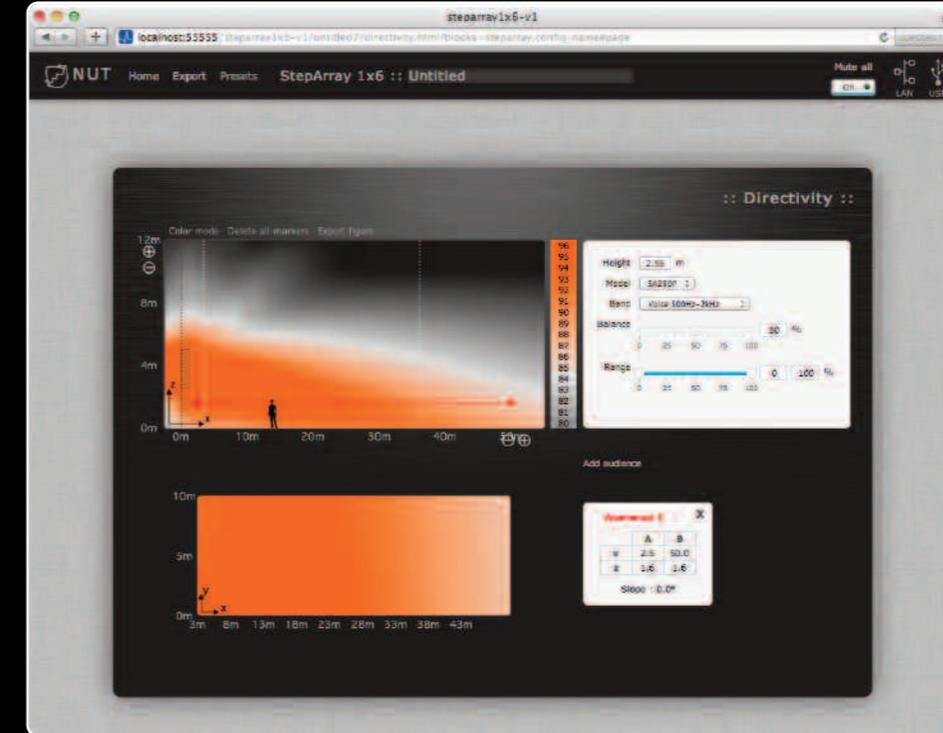
• *Manages stepped floor audiences*
• *Displays SPL maps in horizontal and vertical planes*
• *Displays SPL maps in all octave bands and in the voice band (500Hz-2kHz)*
• *Allows tuning by moving slider*

Real-World examples

The following examples are intended to help you to understand easily the StepArray system.
These installations examples are drawn from real use cases and illustrate situation you often encounter.

CONFERENCE rooms, amphitheaters, classrooms

StepArray system

Technical constraints

Intelligibility ● ● ●
Acoustic comfort ● ● ●
Feedback ● ● ●
Zoning ● ● ●
Reverberation ● ● ●
Aesthetic ● ● ●

2 x MICROPHONES

CD

NUT

MPA6150

SUB

SA180S

Key points
- Subwoofer output
- Excellent acoustic comfort
- Architectural integration

SA 180S

Subwoofer output

NUT delivers an optimized filtering for an optional subwoofer, which improves listening comfort for music

Material : 1 x NUT – 1 x MPA6150 – 2 x SA180S – 1 x SUB

HOUSES OF WORSHIP churches, cathedrals, mosques, temples

StepArray system

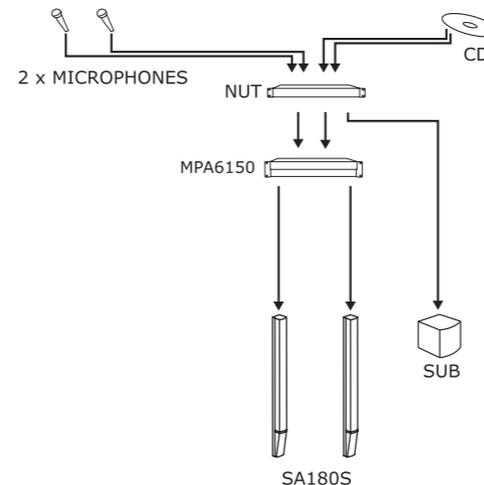### Technical constraints:

Intelligibility ● ● ●
Acoustic comfort ● ● ●
Feedback ● ● ●
Zoning ● ● ●
Reverberation ● ● ●
Aesthetic ● ● ●

5 x MICROPHONES
NUT
CD
MPA6150
NUT
MPA6150
SA100P
SA250P
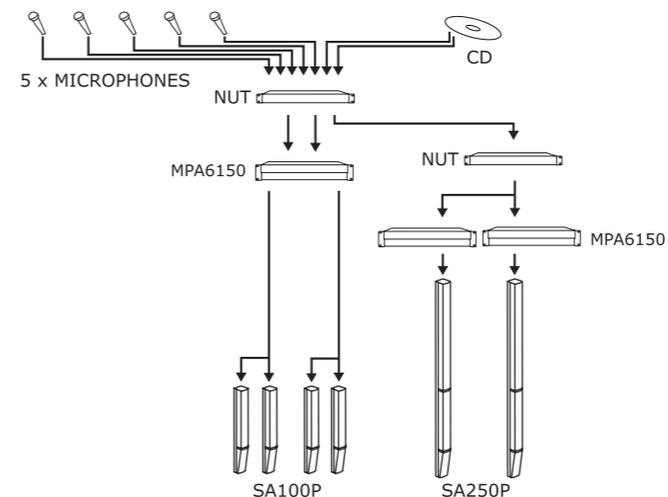
Key Points
- Amplifier sharing
- DSP sharing
- No supplementary matrix

SA 100P   SA 250P

Feedback immunity

The smart automix of NUT provides excellent feedback immunity by automatically switching microphones.

Material : 2 x NUT – 3 x MPA6150 – 4 x SA100P – 2 x SA250P

Case study
PUBLIC PLACES railway stations, airports, shopping malls

Technical constraints

Intelligibility ● ● ●
Acoustic comfort ● ● ●
Feedback ● ● ●
Zoning ● ● ●
Aesthetic ● ● ●

SA 100P **SA 180P** **SA 400P**

StepArray system

Key Points
- 3 zones
- Secured rooms for electronics
- Up to 500 meters between amplifiers and columns

Zone Londres

Zone Embarquement

Zone Paris

NUT

MPA6150

SA100P   SA180P   SA400P   SA100P   SA100P   SA400P
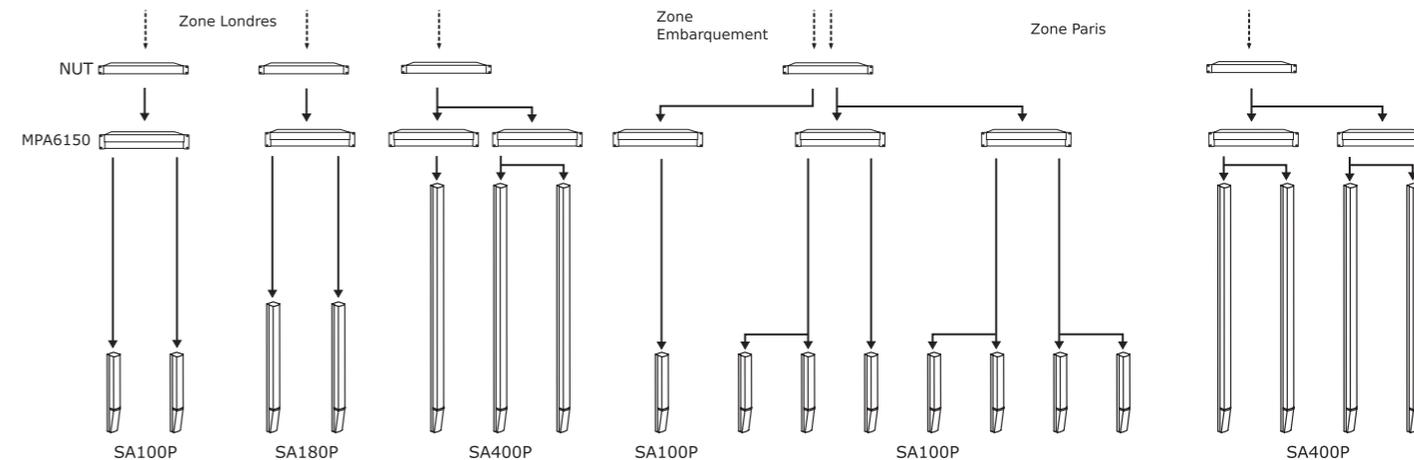
Material : 5 x NUT – 9 x MPA6150 – 10 x SA100P – 2 x SA180P – 7 x SA400P

Simulation tools

There are powerful CAD software tools that can predict the acoustics of a room and accurately model the radiation of loudspeaker arrays. These tools can calculate various acoustic index, such as reverberation time, sound pressure level, STI...

In a loudspeaker array, all loudspeakers operate in a coherent way. This must be taken into account in the modeling. To do so, software modules (DLL) which enables the CAD tools to properly simulate the StepArray columns are included in CATTAcoustic® and EASE®.
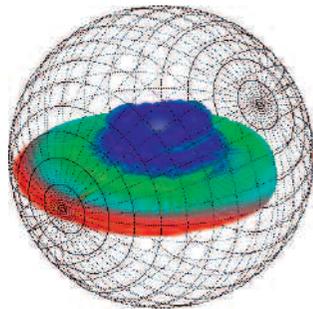
EASE® speaker modeling: SA250P, 1kHz
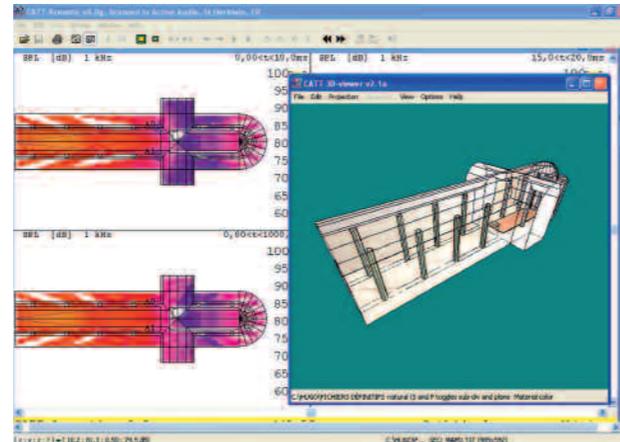
CATT - acoustic®, church

Direct field simulation for StepArray columns is also available on the NUT audio processor control software.

SA100P

Acoustical data

range ±3dB	15m
range ±5dB	21m
angle of audience	0°-5°
frequency bandwidth (-10dB)	110Hz-19kHz
horizontal opening angle	180°

Mechanical data

net weigh	9 kg
packed weight	12 kg
height	1024mm
width	124mm
depth	131mm
standard colors	white RAL9016
	black RAL9005

Electrical data

number of channels	3
Impedence	8Ω
cabling lenght	4G
connector	12 points

SA180P

Acoustical data

range ±3dB	30m
range ±5dB	40m
angle of audience	0°-5°
frequency bandwidth (-10dB)	110Hz-19kHz
horizontal opening angle	180°

Mechanical data

net weigh	17 kg
packed weight	21 kg
height	1840mm
width	124mm
depth	135mm
standard colors	white RAL9016
	black RAL9005

Electrical data

number of channels	3
Impedence	8Ω
cabling lenght	4G
connector	12 points

SA180S

Acoustical data

range ±3dB	22m
range ±5dB	29m
angle of audience	5°-20°
frequency bandwidth (-10dB)	110Hz-19kHz
horizontal opening angle	180°

Mechanical data

net weigh	17 kg
packed weight	21 kg
height	1840mm
width	124mm
depth	135mm
standard colors	white RAL9016
	black RAL9005

Electrical data

number of channels	3
Impedence	8Ω
cabling lenght	4G
connector	12 point

SA250P

Acoustical data

range ±3dB	35m
range ±5dB	45m
angle of audience	0°-5°
frequency bandwidth (-10dB)	110Hz-19kHz
horizontal opening angle	180°

Mechanical data

net weigh	24 kg
packed weight	29 kg
height	2505mm
width	124mm
depth	159mm
standard colors	white RAL9016
	black RAL9005

Electrical data

number of channels	6
Impedence	4Ω
cabling lenght	7G
connector	12 point

SA250S

Acoustical data

range ±3dB	28m
range ±5dB	36m
angle of audience	5°-20°
frequency bandwidth (-10dB)	110Hz-19kHz
horizontal opening angle	180°

Mechanical data

net weight	24 kg
packed weight	29 kg
height	2505mm
width	124mm
depth	159mm
standard colors	white RAL9016
	black RAL9005

Electrical data

number of channels	6
Impedence	4Ω
cabling lenght	7G
connector	12 points

SA400P

Acoustical data

range ±3dB	68m
range ±5dB	90m
angle of audience	0°-3°
frequency bandwidth (-10dB)	110Hz-19kHz
horizontal opening angle	180°

Mechanical data

net weight	39 kg
packed weight	46 kg
height	4096mm
width	124mm
depth	135mm
standard colors	white RAL9016
	black RAL9005

Electrical data

number of channels	6
Impedence	8Ω
cabling lenght	7G
connector	12 point

NUT

Audio data

inputs/ output	8 in / 8 out
	analog. sym.
	euroblock conn.
input/output levels	max 8Vrms
	(+20dBU)
dip-switchs	phantom on/off
inputs	mic/line levels
dynamic range	114dB
bandwidth	20Hz-20kHz (±1dB)
processing power	28 bits
	48kHz-192kHz

Mechanical data

packed weight	5.5 kg
dimension	44 x 480 x 251 mm
	rack 19"-1U

Electrical data

power supply	24V DC
	included adapt. 230V/50Hz
power consumption	< 8W
computer interface	USB (no driver)
	ethernet 10/100MB
	RS232 for remot

MPA6150

Audio data

power	6 x 100W / 8Ω
	6 x 150W / 4Ω
bridged power	3 x 300W / 8Ω
input impedance	10kΩ sym.
	20kΩ asym.
input sensitivity	1Veff
dynamic range	95dB
harmonic distorsion	0.1% @ 1kHz

Mechanical data

packed weight	14.5 kg
dimension	88 x 483 x 420 mm
	rack 19"-2U

Electrical data

mains	230V - 50Hz
	Fuse 5 Amp slow
	115V-60Hz
	Fuse 10A-T
	Connector CEE22
	Cord supplied
power consumption	80W idle
	150W prog.
	900W max.

Active audio

StepArray