

## References

[Archive of city of Utrecht](#)

The first (prototype) installation was done in 2008 in the experience of the archive of the City of Utrecht (Netherlands). The hall is a multi function room for lectures, chamber music and an experience about the history of the city of Utrecht. For the experience application the surround effect option with the Virtual Image Placement system (VIP) combined with the VAP reverberation is used to create historical sound spaces. During lectures the VAP® system act's as the public address system. On regularly basis the room is used for classical music by students of the nearby school of arts and by professional chamber music ensembles. Especially the response of the musicians is astonishing. They experience the system as being in a natural acoustical space. Based on this success decision was made to further develop and to improve the quality of the V.A.P. system.



Archive of city of Utrecht, experience hall with VAP and VIP

## The future

[The Centrum Muziek XXI](#)

The first installation of the ready VAP® system will be June 2009 in the try out hall of the stichting Muziekhuis Utrecht. The hall will be used by a number of professional chamber music ensembles to practice and to do try out performances with an audience. The VAP® system will be programmed with the acoustics of a selection of concert halls where the groups play regularly. After an intensive selection procedure, this included testing of other systems, the musicians decided for the VAP® system based on the experiences with the VAP prototype system in the archive of the city of Utrecht. Their decisions was made based on the natural sounding quality, the fact that the system acts as a virtually building acoustics solution so they can play everywhere in the room and the low costs compared to other systems in the market.

### Rental system for mobile use

This summer a mobile VAP® system will be available for rent. The first artist to use this will be Wende Sneijder a Dutch artist. She will be using the system to practice for 3 concerts in the Concertgebouw Amsterdam in August 2009. The VAP® system will be set up in another hall with the acoustics of the Concertgebouw Amsterdam.

## Specifications

### VAP System

#### Amplification

Maximum amplification per channel  
Feedback cancelling

+ 20dB  
Maximum of 40dB feedback cancelling through unique NOSTRADAMUS algorithm  
None  
15 dB SPL(A) , 20 dB SPL(LIN) @ +3dB amplification  
20 dB SPL(A) , 25 dB SPL(LIN) @ +3dB amplification

#### Time variation

System noise per channel  
System noise full system

#### VAP Diamond speaker

##### Speaker Section

Acoustic output  
Frequency response  
RC Switchable Dispersion

117 dB SPL (max) / 111 dB SPL (nominal) (Half plane)  
50Hz - 20kHz [-3dB]  
90 degrees (Vertical) x 180 degrees (Horizontal)  
Bipole  
90 degrees (Vertical) x 180 degrees (Horizontal)  
Dipole  
90 degrees (Vertical) x +90 degrees (Horizontal)  
90 degrees (Vertical) x -90 degrees (Horizontal)  
Dispersion patterns are Remote Controlled switchable

##### Drivers

MF / HF

2 x 5,25 inch / 1 inch Ultra Linear low distortion Neodenum Carbonfibre Coax driver  
8 inch Ultra Linear low distortion Keflar driver

##### LF

##### Amplifier Section

MF / HF

2 x 350Watt Class D amp with 95% efficiency  
1 x 700Watt Class D amp with 95% efficiency

##### LF

Remote Monitoring

Protocol

RS-485 / CAT-5

Load monitoring

Seperate for all drivers in the cabinet, resolution 0,1 Ohm

Temperature monitoring

Seperate for all amplifiers in the cabinet, resolution 1 degree celcius

##### Microphone Section

Microphone Type

Condenser

Pattern

Omnidirectional

Maximum acoustic input level

135 dB SPL(LIN)

Preamp

Ultra low noise design 30dB Gain line driver

Preamp maximum output level

+24 dBu

Preamp EIN

126 dB

Microphone + preamp noise floor

17 dB SPL(LIN) , 12 dB SPL(A)

##### VAP processor

##### IO

VAP channels

16

VIP channels

8

VAP inputs

16

VAP outputs

16

Auxiliary inputs

8 - maximum 32

AD/DA conversion

24 bits

AD Dynamic range

121 dB(A) / 119 dB(LIN)

DA Dynamic range

118 dB(A) / 116 dB(LIN)

SNR

117 dB(A) / 115 dB(LIN)

Minimum analog IO delay

64 samples / 1,3 msec

##### Processing

Processing power

29 GFLOPs

Samplerate

48kHz

internal processing

double precision 64 bits floating point

##### Interfacing

Remote control

Ethernet and RS-485

##### Remote Monitoring

Protocol

RS-485 / CAT-5

Load monitoring

Seperate for all drivers in the cabinet, resolution 0,1 Ohm

Temperature monitoring

Seperate for all amplifiers in the cabinet, resolution 1 degree celcius

##### Maintenance

System status messages

Automatic email notification

Remote maintenance

Full system control over internet

System Logging

Logging of levels / impedance / temperature

Automatic checkup

Automatic scheduled checkup measurements with email notification

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TEAMPROJECTS

ENTERTAINMENT TECHNOLOGY



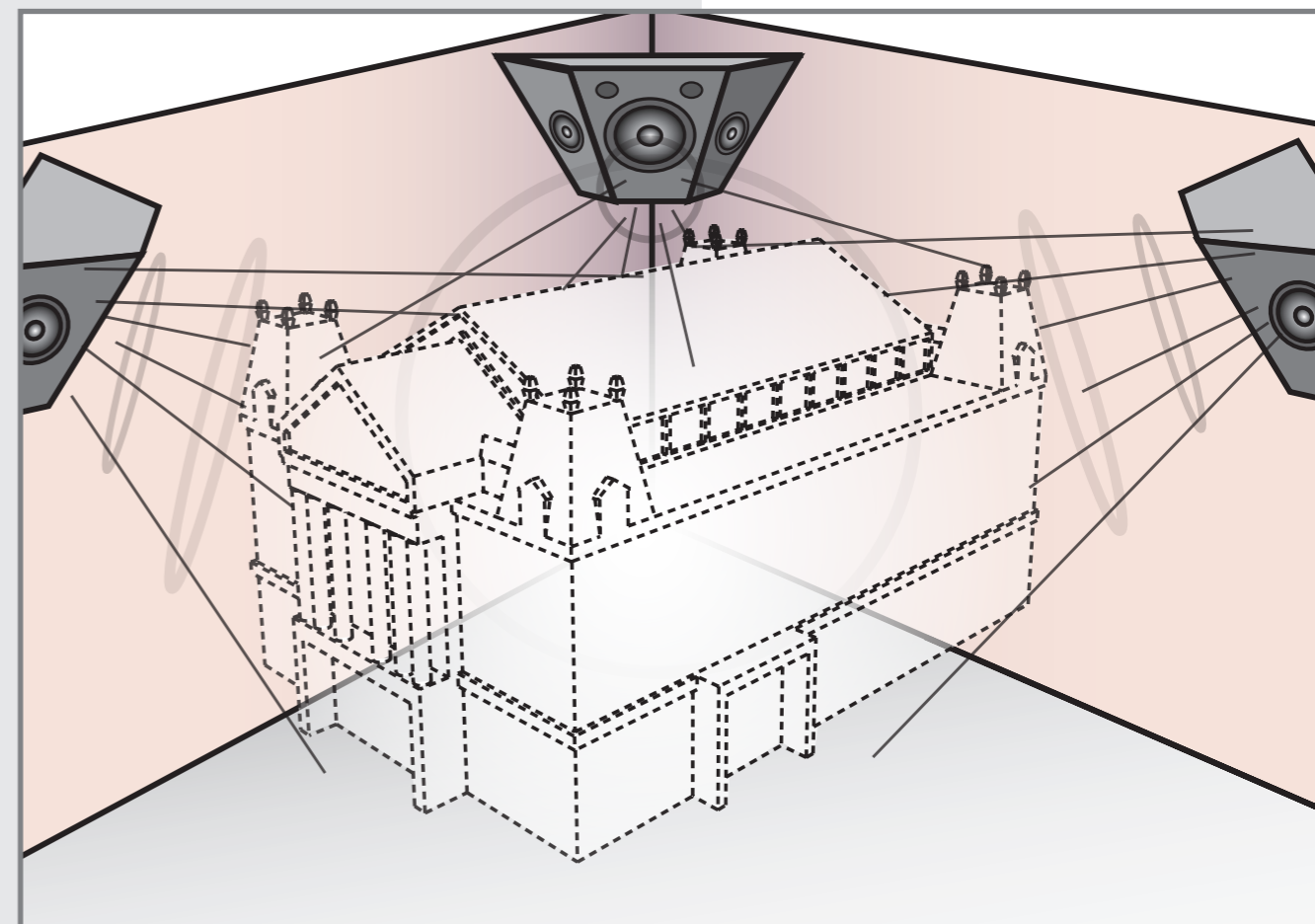
Preliminary information!

# xlnt V.A.P.

## Virtual

## Acoustics

## Processing



## XLNT Variable acoustic systems

## THE MUSICIANS CHOICE !



# xlnt V.A.P.

## Virtual Acoustics Processing

**Customizable acoustics.... The dream of any musician**  
**Who wouldn't want to play in the renowned acoustics of the Amsterdams Concertgebouw, the Wiener Verein, or the Sydney Operahouse?**

**Well, .....Now you can!!**

With the XLNT Virtual Acoustics Processing (V.A.P.) system, developed by the Dutch company TeamProjects, it has become a possibility to alter the acoustics of any Hall at the push of a button.

### Origin

The V.A.P. system evolved out of the XLNT MCR acoustical system, which successfully features in many concert halls and theaters all around the world. Recently, the XLNT MCR system was fitted in classical concert venues, like the Tonhalle in Dusseldorf, Germany. Other installations include the Casino Kursaal in Oostende, Belgium and the Kunstlinie theater in Almere, the Netherlands.

### XLNT V.A.P. system

Because of the demand of musicians who liked the unique feature of the MCR system: The hall acoustics really change as with building measures and orchestra and audience are in the same acoustical space. The XLNT V.A.P. system was developed for rooms in which the MCR system can't be fitted. Installation of an MCR system is limited to rooms with a content of at least 2500m<sup>3</sup>. In smaller rooms the distance between the system's microphones and loudspeakers would be too small to accomplish the target amplification of the reverberation field without colouring it.



Through use of the VAP system it's even possible to recreate the acoustics of an old church hall.

The XLNT V.A.P. system not only offers a better amplification of the reverberation field in smaller rooms, but also offers the ability to clone any other room's acoustics. And if that's not enough, the system even doubles as an highly advanced 3D surround system (V.I.P.), in which sound sources can be placed anywhere within the room.

These sources can be made to move around in the installed room or any other room's acoustics: It can create the sensation of a helicopter moving around in the acoustics of the Notre-Dame in Paris or in a small basement.

Work is in progress for many more applications of the XLNT V.A.P. system, including an extension that will allow the sound of performers to be amplified without microphones, whilst taking their position on stage in to account. The NOST Mic system

### How does it work?

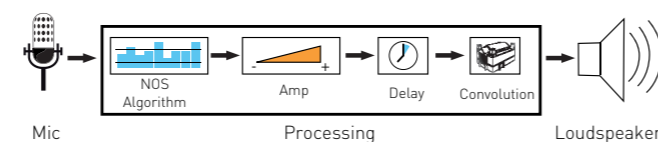
#### Reverberation

The most important property of the XLNT MCR and XLNT V.A.P. systems is it's most basic concept: sound amplification. Reverberation is nothing but the sum of sound reflected from floors, walls and ceilings.

Imagine the sound of someone's voice being absorbed by a curtain: The lack of reflections from the curtain doesn't allow reverberation to come into existence. If the curtain were a glass wall, sound reflection would occur, causing the sound to linger. This is called reverberation.

XLNT's V.A.P. system can amplify a sound with 40 dB ! by using it's revolutionary NOSTRADAMUS algorithm without getting feedback. That's why small rooms can now benefit from the superiour natural sounding MCR principle to create any desired acoustics.

To achieve this, the system uses a number of the amplification channels pictured below.



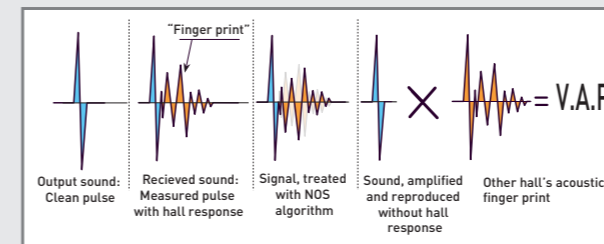
#### Acoustical fingerprints

To determine the acoustics of a room, an acoustical "finger print" (Impulse response measurement) is first made. This is done by placing a loudspeaker and a microphone at a set location. A predetermined sound pulse is played through the speaker, the microphone records this sound and all of the reverberation that occurs in the room.



By extracting the reverb information from this measurement, a specially developed algorithm is able to accurately calculate how the room will react to sound.

Using this information, the system is able to pick up the sound in a room and amplify it without coloring it or feedback occurring.



The acoustical fingerprint can also be used to adapt the acoustical properties of a room to the acoustics of another room. This is achieved by applying a technique called convolution to the amplified sound using the fingerprint as reference information.

### Components

#### Processing

The XLNT V.A.P. system uses a central processing unit. The VAP processor with double precision 64 bits floating point calculations and 24 bit AD/DA conversion. 1 VAP processor can drive a maximum of 16 VAP DIAMOND loudspeakers with integrated amplification, build in microphone and remotely controlled.

#### Interface

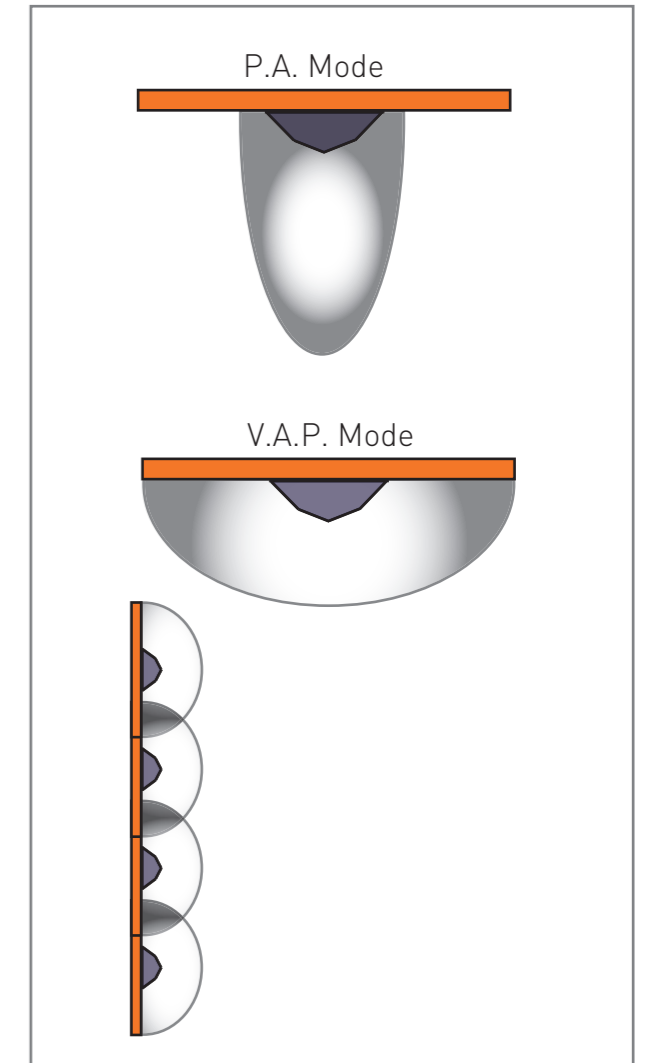
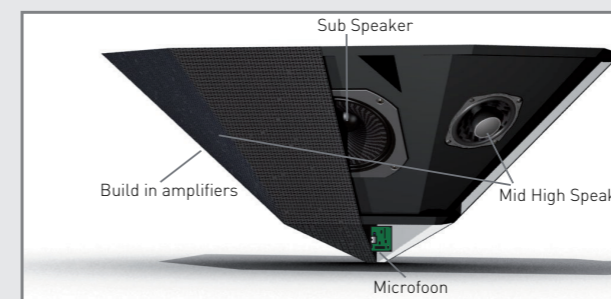
The system is controlled by a touch screen. Within a second the user can select the desired acoustics for the performance. Interfacing with the industry standard remote control systems like AMX® and Clestron® is possible or to a stage manager desk. In combination with the Virtual Image Placement option (V.I.P.) the system can be controlled with a wireless joystick.

#### Remote monitoring and maintenance

When connected to the internet the system can be checked remotely and updated. The system can measure load, temperature, log events and has the option of email notification.

#### Diamond loudspeakers

The quality of a reverberant sound field is highly depended of the amount of low frequency information and the sound field should be diffuse and spacious. One should not be possible to determinate the position of individual loudspeakers. To achieve this the VAP® Diamond loudspeakers have a separate 8 inch low driver for enough low frequency information and uses a dipole loudspeaker set up to create the diffuse and spacious sound field. For public address applications the Diamond loudspeakers can be switched remotely to P.A. mode. Each loudspeaker has build 2 in high efficiency D-class amplifiers, microphone and microphone amplification with very low noise levels.



#### Sound and Noise levels

For classical music a high dynamic range is extremely important. At quiet moments in the music the system can't be audible present. When the orchestra is playing fortissimo the system needs to be capable to amplify this without any distortion. The system has therefore a noise floor of less than 12 dB(A) and a maximum acoustic input level of 135 dB SPL(LIN).

### Applications

- Practice rooms for musicians
- Churches
- Schools for classical music
- Sound effects studios
- Theaters
- Living rooms

### Options

- Public Adress
- Surround
- Sound effects (V.I.P. module)
- NOST Mic system (under development)

