

Steve Heimbecker (ca)The Qube Assemblage for Art in Motion
Artist
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Transmission and Sonic Mass**
The Turbulence Sound Matrix and FLEX

The Turbulence Sound Matrix (2008) uses wind data to diffuse and discretize sound. The TSM system consists of 8 speaker towers typically positioned in a circle around the audience, where each tower contains 8 vertical speaker positions for a total of 64 channels of discrete immersive audio. The TSM is the basis for the new, more compact, 8 X 8, 64 channel sound installation diffusion matrix "FLEX," a system scheduled for completion in Montréal in the winter of 2010/11.

The current design of the TSM and the Wind Space Architecture (WSA) "Plug and Play" Max patch software allows from 1 to 16 channels of external analogue sound to be directly input into the TSM 64 channel audio system to be discretized kinetically by cascading wind pattern data. The "PnP" software allows any external multi channel digital audio workstation (DAW), or "live" analogue mixing console, to be inserted quickly and efficiently into the TSM system hardware. Sound sources diffused can be mono, binaural, multichannel arrangements or mapping systems including Heimbecker's own Acoustic Mapping Process (1993). As importantly, the PnP design limits the processing burden of the TSM WSA primary CPU, which is engaged in the audio management of the 64 channel wind diffusion data, operating at 20 samples per second across the entire speaker array. The 128 ms latency of the system is fast enough to allow "live" mixing when using the WSA software in performances.

The WSA data does not alter the sound of the audio inserted, rather it alters the perception of the audio experience. We do not hear the wind, we hear what is touched by the wind. Cascading wind data acts like an omnidirectional carrier wave transmitting audio to the set of networked speaker outputs in the TSM/FLEX audio systems. The total cascading audio transmission is then manifest simultaneously through the synchronized wind wave patterns broadcasting a 64 point mass of fluctuating and naturally kinetic



Fig. 1: The Turbulence Sound Matrix, Elektra Festival Montreal, May 2008.
Photo: Camil Scoreteanu, conception Lévy – Elektra – 2008

multi-channel sound from user prepared audio sources. Heimbecker has a library of nearly 100 hours of wind data, thanks to his Wind Array Cascade Machine (2003) capture system.

New WSA software for both TSM and FLEX is currently being developed where each inserted voice, up to 16 voices total, will be diffused with its own 64 channel wind pattern. The new approach will create an audio mix of up to 16 layers of different 64 channel wind patterns. The source voices and the wind discretization of each voice are designed to be mixed using the auxiliary sends model of an audio mixing console, where the source audio can be mixed with the auxiliary effect from 1% to 100%. The user prepared audio sources inserted into the new WSA software are multiplied upward in a kind of multiplexing, where each independent channel of synchronized audio is expanded / discretized into 64 channels of wind synchronized kinetic audio, creating 2 fundamental layers movement and spatialization: the source arrangement, and the layers of audio wind data. In addition, the wind pattern data files can be edited (pattern, duration, direction / orientation) and looped. Also, in real time, the wind data files can be adjusted for articulation density, using parameters such as speed, and wave depth / amplitude (wind strength).

In September 2010, for both the TSM/FLEX systems, Heimbecker plans to research the integration of a high end 3D trajectory based hardware and software DAW that can be inserted directly into the software / hardware architecture of TSM/FLEX WSA. In this instance, 16 channels of vector based 3D audio arrangements will create primary temporal sound movements that access both the horizontal and vertical planes of the TSM/FLEX systems. In this 16 channel 3D format, each 8 channel speaker column of

the TSM/FLEX systems is subdivided into 2 groups of 4 speakers: creating an upper octaphonic group, and a lower octaphonic group within the speaker array. The new WSA matrix software will then diffuse the 16 voices of the 3D audio into 16 layers of 64 channel WSA diffusion and transmission.

Based upon Heimbecker's current studio practice and research with WSA, it is not expected that layering 16 wind patterns together will cause any phase distortions on original audio voices or the 3D constructs. The fluctuating wind data amplitude patterns tend to reduce or stop phase / nodes from occurring in the 360° immersion because the transmitted sonic mass from the speaker array is in constant high resolution temporal / spatial flux. The result is a system of audio creation and transmission capable of manifesting compositions that are kinetically rich, and as massive and omni present as the air itself compositions that consist of individual moving voices and fluctuating sonic masses, kinetically at ease together within the Wind Space Architecture of the TSM/FLEX systems.

References

- Heimbecker, Steve – Turbulence Sound Matrix (2008), Wind Array Cascade Machine (2003), artist website, <http://www3.sympatico.ca/qubeassm/>