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# Audio Windows for Virtual Concerts I

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(The viewer/listener's stereo VCR must be set to 'hi-fi' mode, and a stereo headset should be used, in order to best hear the spatial sound effects in this video.)

*Keywords:* binaural directional mixing console, cscw (computer-supported collaborative work), groupware, mixel ([sound] **mix**ing **el**ement), spatial sound

*Abstract:* MAW (acronymic for **m**ultidimensional **a**udio **w**indows) is an interface for manipulating iconic sound sources and sinks in virtual rooms. Implemented as a NextStep-based application which can drive a heterogeneous combination of internal and external sound spatializers, MAW is suitable for synchronous applications like teleconferences or concerts, as well as asynchronous applications like voicemail and hypermedia.

MAW's main view is a top-down dynamic map of iconic sources and sinks in a virtual room. The sources, which might correspond to voices in a teleconference, are sound emission channels. The sink is a sound receptor, a delegate of the human listener in the virtual room.

For this demonstration, the sources are musical, synthesized by a sound module driven off a MIDI sequencer. The source->sink spatialization is performed by DSP modules, which convolve the digitized input stream with HRTFs (head-related transfer functions) that capture directional effects. Gain, which controls volume, is adjusted according to distance, direction, directivity, and size of the source and sink.

MAW's sources can move around, in response to mouse actions, keyboard arrows, menu commands, or entering data into numeric panels. The sink may also move, motivated by the same suite of manipulation techniques, or via user position updates, as strobed by a chair tracker (not shown) that uses a Polhemus sensor to gauge orientation.

Categories: Communication with Realistic Sensations, 3D Visual and Auditory Displays, VR Interaction and Navigation Techniques, Distributed VR Systems