

Networked Music: Low and High Tech

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This article gathers some performances and research efforts that are devoted to networked music. Brief descriptions are used to present the ideas and opportunities that are continually arising and intriguing many musicians even though the prospect itself is difficult because of infrastructural needs and politics. There are more and more intrepid travelers willing to suffer the ‘head banging’ and communication difficulties that are part of this emerging field.

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Among the many reasons to do networked performances—one reason is to push the medium so that it gets better. Another reason: ‘We just want to play music together without all the bother of buying plane tickets and the time it takes to travel.’ (Ge Wang, founder of SL ORK at CCRMA, Stanford University)

A recent performance of *The Tuning Meditation*¹ by this author had musicians and audience at Stanford University performing together with musicians and audience at Beijing University, 6,000 miles away on 2 May 2008. The audio was beautifully clear. The composer’s image projected on screen greeted both audiences via SKYPE² from the Camargo Foundation in Cassis France. My low-tech video presence was within the high-tech CD-quality audio transmission facilitated by JackTrip³ (software developed by Chris Chafe, director of CCRMA). High-definition video was streamed using VLC Video Lan⁴ streaming software.

Since autumn of 2007, IEAR Studios of the Arts department and CARL of the Architecture department at Rensselaer Polytechnic Institute, where I teach, have been collaborating on a weekly basis with CCRMA at Stanford University. This collaboration has allowed for steady development of the Telematic medium and the formation of the Telematic Circle.⁵ The purpose of the Telematic Circle is to provide information on how to connect and how to encourage an association of new partnerships and collaborations. The Anet Summit⁶ organized by Chris Chafe at

Banff Center, 11–12 April 2008, provided a forum for papers, demos, performances and networked jam sessions.

Deep Listening Institute, Ltd. (a non-profit arts organization founded in 1985) commissioned six composers to write pieces specifically for the telematic medium using Jacktrip and iCHATav. The compositions were successfully performed on Telemergence⁷—a networked concert on 27 April 2008 between iEAR Studios, RPI, CCRMA Stanford University and VistaMuse, CIRCA at University of California San Diego—another member of the Telematic Circle.

Deep Listening Convergence:⁸ From January to June 2007, 45 musicians from three countries collaborated online using SKYPE to form a variety of ensembles with one another, improvise and to create pieces together. At the end of the online residency all the musicians were brought together under the auspices of the Deep Listening Institute, Ltd.⁹ to present three public concerts in upstate New York. All 25 pieces were developed and rehearsed during the online residency. There were no rehearsals for the concerts—only sound checks. A spin-off from this work is the Virtual Sound Exchange.¹⁰ This site is maintained with expert help available to introduce musicians to the possibility of developing collaborations with other musicians anywhere that the Internet exists.

In December 2007 a mixed reality performance involving dancers performing as avatars in Second Life¹¹ (SL) were projected on screen with a real life (RL) dancer performing in relationship to the dancers on screen. She moved slowly with great concentration and poise while the avatars zoomed around doing impossible moves on screen with spillover onto the dancer. Two musicians performed live on stage with their audio and video sent into SL and shown on screen in SL above the avatars for an SL audience. This performance took place at Northwestern University during the conference of the International Society of Improvised Music (ISIM).¹²

The above examples of networked collaborations are a few of many mixed low- and high-tech networked performances that have engaged me since 1990. The technology has ranged from video telephone with still images updating every five seconds, to Picture-Tel with ISDN lines with better audio and video updating every two seconds, to audio only on the Internet with no video for lack of bandwidth and an eight-second audio latency but easier access, to iCHATav with compressed audio and video with minimal latencies—more for the video than the audio, to Internet2 flawed with packet dropouts in addition to latencies, to JackTrip with stable low-latency CD-quality eight-channel audio and Ultra Video Conferencing from McGill University for DV quality video.

Currently (2009), *Triple Point* (a trio consisting of researchers Jonas Braasch, soprano saxophone/Virtual Microphone (ViMic); Doug van Nort, laptop processing with Granular Expanded Instrument System (GREIS); and Pauline Oliveros, digital accordion/Expanded Instrument System (EIS) plus Chris Chafe, cello/JackTrip) are exploring software development for creative decision making with an avatar/agent that will listen, guide, enhance and transform the sound of the trio and networked groups. This will be *interdependent interactivity* between humans and machines and is

supported by the National Science Foundation CreativeIT at Rensselaer Polytechnic Institute.

Latency is of course still a big issue in networked music transmissions. There are different levels of latency. There are many factors to deal with ranging from CPU power to fire walls, routers, coordination of audio and video and all manner of arcane information technology protocols and politics. I call it 'head banging', and have spent more hours than I care to count testing, checking and curbing my frustrations.

So why do it?

Another reason is because you can. JackTrip has practically eliminated significant latency for audio. Latency though is a part of the Internet and can be used very creatively. Another reason is because the rise of technology is inexorable. There is *desire*. The transmission of audio and video in both low and high quality via the Internet opens the world to otherwise impossible collaborations, a gathering of knowledge for a richer, broader musical perspective, view and exploration of the world in an expanded venue. This is the time to dream on. So we dream on!

Notes

- [1] *The Tuning Meditation* included in P. Oliveros, *Deep Listening pieces*, Deep Listening Publications, 1991, <http://www.deeplisting.org/site>.
- [2] SKYPE: VOip (voice over internet protocol), <http://www.skype.com..> SKYPE works on both MAC & PC and has point-to-point video.
- [3] JackTrip: Software developed by Chris Chafe at CCRMA, Stanford University, <http://www.ccrma.stanford.edu>.
- [4] VLC: Video Lan streaming software, <http://www.videolan.org/vlc/streaming.html>, http://wiki.videolan.org/Main_Page.
- [5] Telematic Circle, <http://www.deeplisting.org/site/telematic>.
- [6] Anet Summit, <http://www-ccrma.stanford.edu/~cc/vox/anet08>.
- [7] Telemergence: A concert of works for the telematic medium commissioned by the Deep Listening Institute, Ltd. and directed by Sarah Weaver. *The Curved Gap*, by William Swofford; *Here Right Now*, by Monique Buzzarté; *Now and Then*, by Kristin Norderval; and *Long Distance Sitting Piece #2 for Virtual Bodies and You*, by Michelle Nagai, performed by SoundWire at CCRMA Stage, Knoll Building at Stanford University, Stanford, California; VistaMuse at Center for Research and Computing in the Arts, University of California San Diego, La Jolla, California; and Tintinnabulate, IEAR Studios at Rensselaer Polytechnic Institute, Troy, New York.
- [8] Deep Listening Convergence, <http://www.deeplisting.org/site/convergence>.
- [9] Deep Listening Institute, Ltd., <http://www.deeplisting.org/site>.
- [10] Virtual Sound Exchange, <http://virtuallsoundexchange.net>.
- [11] Second Life (SL), <http://www.secondlife.com>.
- [12] International Society of Improvised Music (ISIM), <http://isim.edsarath.com>.

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