

Chapter 11: PROJECT SUMMARY

This project demonstrates a new model for the analysis and preservation of interactive electroacoustic works. Rather than updating or transcribing older electroacoustic works for new technology, this analysis seeks to describe in detail the features and functions of the required interactive electronic systems using a format that is independent of particular technologies, devices, or specialized programming languages. Using this approach, I have so far analyzed the interactive electronic systems for four works for clarinet. My analysis is based on a combination of sources, including examination of original equipment, reverse engineering of software, close examination of scores, supporting documentation, and available literature, and direct conversations with the composers and with several performers involved in the early history of these works.

In order to promote the widest possible accessibility, I have chosen the most technologically independent format possible: text and graphics on paper. Therefore, rather than simply creating new electronic realizations of these works in a common computer music programming language, I have chosen to describe the electronics using only score examples, mathematics, schematic diagrams of generalized audio processing algorithms, and plain English. I believe this to be the most useful format for preserving the viability of such works for three important reasons: 1) the analysis itself is not subject to technological obsolescence beyond that which affects any other printed document; 2) though perhaps technically challenging, it is readily accessible to a wider range of computer music performers, engineers, and scholars regardless of programming expertise

or specialization; 3) factual errors in the analysis (if they exist) can be more easily found and corrected by subsequent researchers working from primary source materials. The possibility of peer review and accessibility to a wider audience are two features of this analysis that I hope will make it useful as a model for documenting more such works.

I have made every effort to balance the need for readability with the need for technical precision and detail. My goals are two-fold: to provide on the one hand sufficient technical detail to guide engineers creating new implementations of the required electronic systems, and on the other hand to guide performers in their interpretation and implementation of the electronics in relation to the score by providing insight into the musical relationships between performer and machine. As demonstrated by the varying levels of complexity among the four works discussed, this balance is easier to strike in some cases than in others. Musgrave's *Narcissus* and Kramer's *Renascence* are relatively simple and straightforward, while Pennycook's *Praescio IV* and Lippe's *Music for Clarinet and ISPW* require enormous amounts of supporting technical information in order to describe adequately. I hope that this project demonstrates that it is indeed possible to document even extremely complex interactive electroacoustic works without having to refer to the functions of any one specific programming language, device, or system.

I have given real-world tests to my analyses of the works by Musgrave and Pennycook by presenting new realizations of them in concert. In the case of Musgrave's *Narcissus*, I had the benefit of modeling my performance software directly on the capabilities of the composer's original instrument (on loan from co-commissioner Wendy

Rolfe). In the case of Pennycook's *Praescio IV*, I had the benefit of direct supervision (via Internet) of the composer himself. Thanks to new insights into Kramer's *Renascence* given in chapter 7, any clarinetist attempting this work may reconstruct the background tape using recorded excerpts of his or her own playing. Any new performance that takes advantage of this option will be more in line with Kramer's ideal "to have the same clarinetist's sound heard both live and on the tape."⁹⁴

The four compositions chosen for this study were selected partially for the range of technical challenges they present, but mainly because of the musical quality they embody. Historical importance from a musicological standpoint was not the principal criteria on which I selected these four works. Rather, my motivations for choosing these particular pieces came directly from a search for a viable electroacoustic repertoire.

Kramer's *Renascence* was a central part of my 1992 undergraduate honors thesis and lecture-recital at Lawrence University. My performance of that work, in its original version using "period" instruments, was a formative experience that attracted me to subsequent advanced studies in electroacoustic performance. The difficulty of performing *Renascence* in its original version finally led me to ask the composer for his thoughts on a possible digital reconstruction. His enthusiastic response to my query led to the inclusion of his piece in this document. My 1996 performance of Lippe's *Music for Clarinet and ISPW*, featuring the original NeXT/ISPW system and the composer's direct participation, was a central part of my 1996 degree-recital in partial fulfillment of a master of music degree in computer music performance and concert production at the

⁹⁴ Email from Jonathan Kramer, May 28, 2004

Peabody Conservatory of Music. The accompanying recital commentary featured an exhaustive account of my concert preparations, but very little technical analysis of the work itself or the interactive system. I hope that the analysis presented in chapter 8 atones for this oversight.

The works presented here by Musgrave and Pennycook are ones I have not previously studied in depth. Therefore, I have given them the most attention by presenting not only a formal analysis, but also new realizations to be tested in performance. The musical uses of technology employed by both Musgrave and Pennycook were formative influences on my own approach to computer technology as an expressive tool for performance. Therefore, this project is a capstone to my academic work in the field of interactive electroacoustic music, spanning twelve years and three institutions.

My analysis is only useful if other performers wish to continue presenting these works. Preliminary evidence from concert programs as well as remarks by the individual composers and other performers with whom I have had contact indicate that there is sufficient interest in these works to justify their preservation. Therefore it is worth finding solutions to the problems of technological obsolescence that impede their accessibility to a wider pool of interpreters. Technological obsolescence is a barrier not only to individual performers, but also to the entire process of repertoire creation. I base this assumption on the theory that the value of a musical work to scholars, performers, and audiences is best assessed through repeated performance, interpretation, and listening.