Title: *Harmonize [Place]*
(a site-specific series, e.g. *Harmonize UC Berkeley, Harmonize Ghent,* etc.)
Media: Carillon, microphones, and site-specific analysis and realtime score generation
Duration: Indeterminate, minimum 5'
Location: 1-4 listening locations in the area surrounding the campanile

Description:

As the piece begins, the audience/participants, gathered at announced locations around the community, become quiet and listen as the sounds of the campanile float through the air and harmonize with the sounds of their environment.

Perhaps a truck passes, with a low rumbling sound — the campanile imitates the low tones of the truck. A group of students walk past discussing animatedly — the campanile joins their conversation.

As the campanile hears and accompanies the sonic rhythms of the environment, the (human) listeners have an unusual experience of coordination between the large-scale surrounding architecture and the intimate-scale events that happen right in front of them. The distance between the events on the ground, and the actions from the tower is reduced to a fraction of a second, and creates a feeling of unity between cause and effect.

The social role of the carillon is transformed from an institutional broadcast system into a catalyst for reflection on the events occurring within the listener's immediate proximity.

However, the campanile also hears itself from a distance creating a gradual feedback loop — and so the local events become greater and greater in importance, resonating increasingly throughout the surrounding environment.

Background:

The carillon a complex symbol within a community, simultaneously functioning as a visible monument to the power and influence of institution and patronage, and conversely as a sonic unifier of space and listeners. As a work of public art, the carillon tower broadcasts its messages to all who can see and hear — but it is unidirectional.

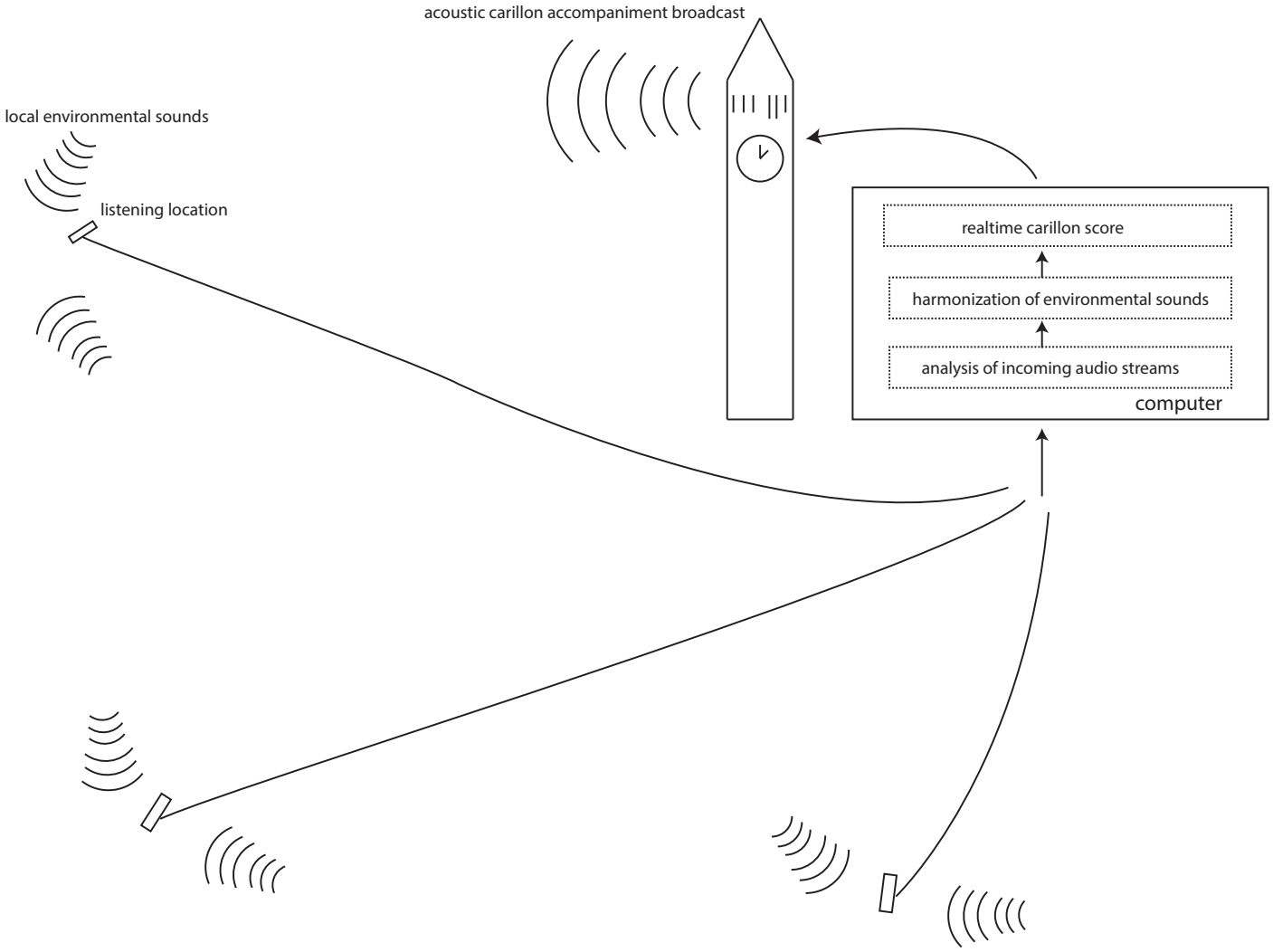
If the communication becomes bidirectional, the campanile, and all it symbolizes, begins to listen to its surroundings and responds to what it hears. …but the meaning of this is complicated as well. Is it a form of surveillance? Or a harmonization of civic, social and environmental actions? The *Harmonize* carillon series attempts the latter.

Harmonize builds on the recent collaborative work *Polartide* with Greg Niemeyer, Chris Chafe, Perrin Meyer, Tiffany Ng and myself, where we began the work of creating a bidirectional relationship between the listener and the campanile, with the intention of increasing the participant's awareness of rising ocean levels.

In *Polartide,* a web-based application designed by Greg Niemeyer, sent signals to a server which looked up the water level at various polling locations, and then sent these values to a score generation server which I developed. The score generating server took each user's input and using a series of calculations,

created a musical score in realtime, displayed it in front of the carillonist as a continuously updating virtual score.

Acoustic data-flow scheme :



Technical Description:

In preparation of the piece, one or more listening locations are chosen where attendees will gather to listen/observe/participate in the performance. All listening locations should be within acoustic range of the carillon, and should also be decided based on amount of active street sounds, and historical civic events (e.g. UC Berkeley's Sproul Plaza, etc.).

At each listening location, one or more omni-directional microphones are installed, and positioned to best receive the ambient sounds at the location. The microphone signal is sent into a nearby computer, where the sound is analyzed for time and frequency content at various time scales. The analysis is then summarized into several description categories for musical content, and transmitted over the network to the central computer located at the campanile via OpenSoundControl(OSC) network protocol.

At the campanile location, the central computer takes the data coming from the listening location and generates an accompaniment score to be performed by the carillon. The score is displayed on a computer monitor positioned where typically the paper score would be placed.

To aid the effectiveness of the piece, the transmission of data should happen as fast as possible to reduce the delay between the ambient sound at the listening location and the time of arrival of the acoustic signal from the campanile. To achieve this, all computers should be on high-speed internet connections. Alternatively, it is also possible to run long XLR cables directly from the microphones to the central campanile computer, this solution may be in someways the simplest and fastest (computationally).

The performance consists of a set time for the realtime analysis system to be activated at each of the given locations. In the case of multiple listening positions, a set of time periods would likely be used, allowing the campanile to "focus" on each group of listeners in sequence, to make the correlation between the local sounds at the listening location, and those broadcast from the campanile. At certain short moments, the algorithm might combine events between locations — and it is possible that events at listening locations other than the sequential set may also magically appear to be coordinated!

Equipment list:

Option 1 (with network connection):

At campanile location:
1 - MacBook Pro laptop for realtime data interpretation and score generation
1 - External monitor for the carillonneur to read realtime score display
1 - High-speed internet connection

At each listening location:
1 - MacBook Pro laptop for realtime and analysis and network communication to campanile.
1- Audio interface (RME or similar)
1 (or more) Microphones and XLR cables
1 - High-speed internet connection

Option 2 (with direct cable connection):

At campanile location:
1 - MacBook Pro laptop for realtime analysis, interpretation, and score generation
1- Audio interface (RME or similar)
1 - External monitor for the carillonneur to read realtime score display

At each listening location:
1 (or more) Microphones and XLR cables