Invisible Lines

for trumpet and semi-fixed media

Stephen F. Lilly
(2018)

Duration Variable
7:30 to 14:00

Program Notes

In any moment, one has but a narrow perspective on what constitutes "now." So it is when realizing *Invisible Lines*. The trumpet player cannot simultaneously present all five independent streams that collectively constitute the *Invisible Lines* score; the performer must dip into each stream individually. The three topmost layers are melodic, and if one heard any one of these in its entirety, it would resemble a complete piece in and of itself. The bottom two streams are derivative—one, synthetic scales constructed from the upper layers, and the other, the breath and articulations from the upper streams devoid of pitch. The trumpet player's role is to weave together a composite work that hints at all the streams while reacting to the electronic sounds. The electronic accompaniment is a combination of synthesized sound and processed trumpet, and like the trumpet score, it consists of layers which the computer is instructed to shuffle, concatenate, and superimpose anew every time the piece is played. The title refers to the hope that although the audience may not hear any one complete stream from beginning to end, they may catch enough glimpses to connect the fragments together. Accordingly, the trumpet player and computer are tasked with constructing viable trajectories, guiding listeners through the piece.

Performance Notes

Most of the piece consists of stemless white noteheads and black noteheads, representing long and short, respectively. Long and short should be treated as relative (i.e., qualitative not quantitative—no specific ratio between long and short should be inferred). The actual rhythmic values should vary from measure to measure. Within a measure, however, all the black noteheads should be about the same length and likewise, all the white noteheads should be about the same.

There are two exceptions:

   Whole notes—white noteheads alone in a measure—which are to be performed with the fullest of breaths, i.e., the longest possible sounds on a single breath.
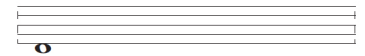
   Small, "grace" notes, which are to played as fast as possible. The example to the right has six grace notes followed by a standard white notehead; thus, the six graces would be executed as a legato run landing on the long, sustained white notehead.

Each measure should be played on a single breath. All available air does not have to be expended in every measure; rather, this just the upper limit for measure length. There is no lower limit. For instance, in the example to the right, the measure's total duration would be just a fraction of a second.
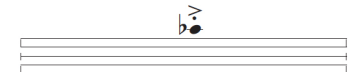
In-between measures, there should be a pause, but the length is indeterminiate and should vary from measure break to measure break. At minimum, the pause could consist of a quick breath—a fraction of a second—allowing the concatenation of several measures to form a longer phrase, should that be desired. At maximum, the pause could last up to forty-five seconds.

Each system consists of five streams: Lyrical, Polyphonic, Timbre, Scalar, and Breath. In any measure, only one stream is played, chosen by the performer. The performer may start in any stream. The measures are played sequentially—no jumping to another system or immediately repeating a bar. After each measure, the performer can either stay in the same stream or choose to switch to another (e.g., on page one, the performer could play measures 1 and 2 in the breath stream, switch to the lyrical stream for measure 3, switch to the scalar stream for

measures 4-7, and play the last two measures in the polyphonic stream). Switch streams between 1 and 5 times per page. At the end of a page, the performer can either choose to repeat it or move on to the next page—once a page is left, it cannot be returned to later in the piece. If and when a page is repeated, the performer must find new stream-measure combinations (e.g., expanding upon the example above, if page one is repeated, for measures 1 and 2 the performer could play any streams except the breath stream—measure 1 in the scalar stream and measure 2 in the polyphonic stream, for example). Every stream should be entered at least once over the course of the work. A single page, however, need not visit all five streams, and it could visit the same stream on two different occasions.

The timbre stream often uses half-valving as both a means of bending pitch as well as altering timbre. With regard to timbre, a fuzzy, throaty, less tonally-centered sound is desired, and all pitch bends—indicated by curving arrows in the direction of the bend—should be quarter-tone bends, where the bend is slowly executed over the full length of the note.
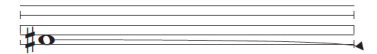
Beginning on the second system of page two, some whole notes are indicated *half-valve (erratic frequency fluctuations).* Here, the pitch bending should be executed in a quasi-random fashion—unpredictable with regard to bend direction, bend amount (although constrained to a quarter-tone above and below the written pitch), the duration of each bend, and even the number of bends in a single note.

The timbre stream includes split-tones, which are introduced on the second page. The result of "double buzzing," one part of the embouchure excites one partial in the harmonic series and another part of the embouchure excites an adjacent partial. To practice, play the top partial and then slowly shift to the lower partial. In-between the two, the desired distorted multiphonic will appear.
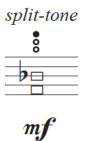
Square noteheads—in both the timbre and breath streams—indicate partials and/or fingerings, but they do not necessarily give the actual sounding pitch. For instance, many of the split-tones sound closer than the actual notated partials—at times by as much as a half-step. Do not attempt to "correct" the intonation.

For both split-tones as well as valve tremolos, the fingerings are given above the notes.

Fluttertonguing and valve tremolos both use the same tremolo notation. So, *fluttertongue,* and later *fltg.,* are indicated above the notes to be fluttertongued and *valve tremolo*, and later *v.t.*, are indicated along with the fingerings above the notes to be tremoloed. In cases where several measures on the same page contain fluttertonguing with no intervening valve tremolos, the *fluttertongue* or *fltg.* indication is only placed over the first note in the series.
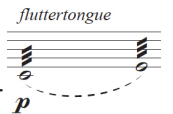
The breath stream is where the performer blows into the trumpet without buzzing or singing. All the consonant sounds, indicated below the staff, are unvoiced—no vocal chords—and should allow the performer to direct the entire air stream directly into the mouthpiece. The block noteheads and clef in parentheses indicate fingerings only and do not imply any resultant pitch. The resulting sound should be a narrow band of filtered noise that changes depending on the consonant and valve combination. The consonants used are:

t   the hard, plosive /t/ sound in English.
k   the hard, plosive /k/ sound in English.
ʃ   the /sh/ sound in English.
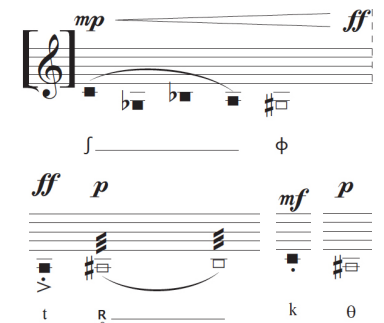
ɸ   does not exist in English, but it can be thought of as an /f/ sound using only the lips—no teeth.

θ   this is the /th/ sound in English, but it should be altered so that that lips are more pursed to direct all the air into the trumpet.

ʀ̥   is the standard German /r/ in words like *treten*. it is what's known as an uvular trill. The "trill" happens on the back of the tongue, almost in the throat, right near the uvula. The desired effect is a turbulent air stream unlike the three previous consonants. It is the unvoiced equivalent of the fluttertonguing technique—hence, the tremolo notation.

When two consonants—the first, always a plosive—are placed together under a single note, the plosive is meant to be the attack portion of the note and the other consonant is meant to be the sustain.

Horizontal arrows indicate a smooth transition from one sound to another.

The *half-valve* indication remains in effect until cancelled by the *ord.* indication.

Accidentals only affect the notes they immediately precede. Nevertheless, in an attempt to alleviate some confusion, the score makes liberal use of courtesy naturals.

While this work was written with the C trumpet in mind, it may be played on the B♭ or D trumpet. However, if performed on a transposing instrument, everything should be played as written—do not transpose.
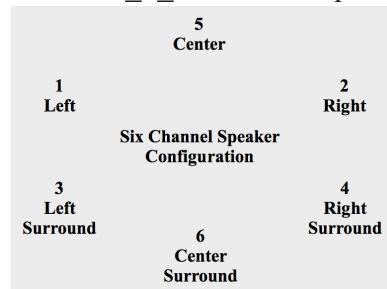
The electronics need not be started with the trumpet; they can begin before or after the trumpet starts playing, but there should be no more than a thirty second difference in start times. Also, keep in mind that the first electronic event could be a prolonged silence.

To run the electronics, requires Max 7 or later. This is a free download from cycling74.com—purchase is only required for editing and saving. There are six versions of the Max patch to accommodate different numbers and configurations of speakers:
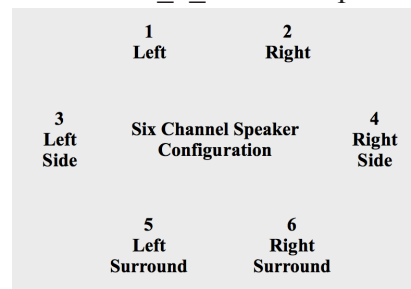
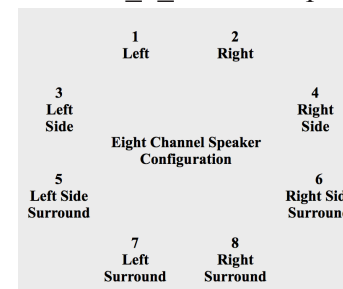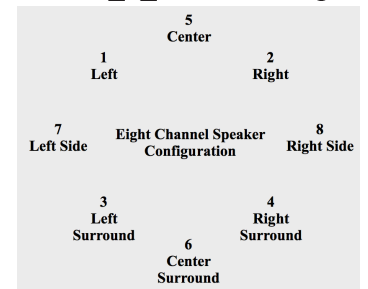MAIN_Stereo.maxpat for two-channel playback—Left (1) and Right (2)

MAIN_4.maxpat

1 Left	2 Right
Four Channel Speaker Configuration	
3 Left Surround	4 Right Surround

MAIN_6_Centers.maxpat

	5 Center	
1 Left	Six Channel Speaker Configuration	2 Right
3 Left Surround	6 Center Surround	4 Right Surround

MAIN_6_Sides.maxpat

1 Left		2 Right
3 Left Side	Six Channel Speaker Configuration	4 Right Side
5 Left Surround		6 Right Surround

MAIN_8_Sides.maxpat

1 Left		2 Right
3 Left Side	Eight Channel Speaker Configuration	4 Right Side
5 Left Side Surround		6 Right Side Surround
7 Left Surround		8 Right Surround

MAIN_8_Centers.maxpat

|	5 Center	
1 Left		2 Right
7 Left Side	Eight Channel Speaker Configuration	8 Right Side
3 Left Surround	6 Center Surround	4 Right Surround

Please note that the folder containing the necessary files for electronic playback contain these six files along with numerous support files—of both .maxpat and .wav types. Keep all of the provided files in the same folder; do not delete, rename, or reorganize any files or else the patch will fail to work as intended.

If playing back on a 5.1 system, use the MAIN_6_Centers.maxpat and pan the Center Surround channel (6) halfway between Left Surround (3) and Right Surround (4)—a similar strategy should be employed for 7.1 systems with the MAIN_8_Centers.maxpat. While this piece does not have a dedicated low frequency effects channel, a subwoofer may be employed for low-end support. In such cases, all the channels should feed the subwoofer, and care should be taken that the low frequency sounds do not overpower the mix—given a duration of 7:30, low frequency rich "thumps" start at 0:49 and low frequency sine clusters start at 3:05.

To work the Max patch, put Max in "Presentation Mode." This is done by clicking the television icon located in the lower-left toolbar—when the icon is highlighted, "Presentation Mode" is activated. To check levels, click the button labeled "Volume Tester." This will trigger one of three trumpet samples used in the piece—repeatedly clicking the button will either restart the current sample or layer in one of the others. Use the "Main Volume" slider to set the output level, which should be just below that of the unamplified trumpet playing *forte*. Once complete, click the "Reset Patch" button—it may take a few seconds to clear all sounds, and occasionally, the "Reset Patch" must be clicked multiple times to completely silence the electronics. When ready to start rehearsal or performance, enter the total duration in the indicated boxes for minutes and seconds, and then, click the button labeled "Start Patch"—again, clicking the "Start Patch" button can be done before or after the trumpet starts playing. For reference, the elapsed time will be displayed to the right of the volume slider. However, this does not imply any prearranged coordination between the electronics and the trumpet. Also, on rare occasions, the electronics will continue playing a few seconds beyond the inputted duration—beyond the point at which the elapsed time clock stops.
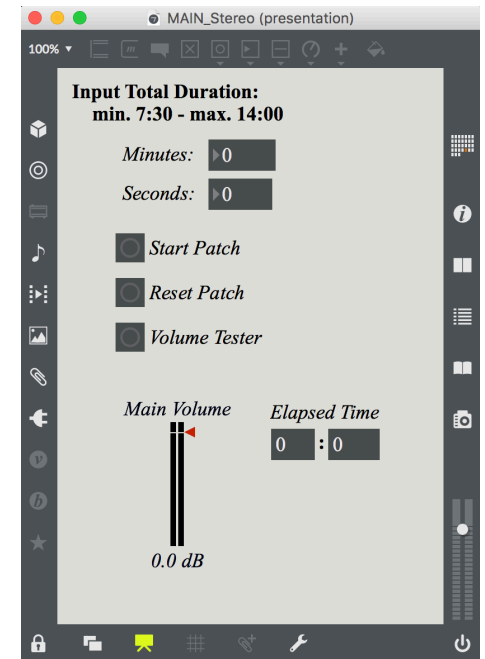
Works Referenced

Berio, Luciano. *Sequenza X*. Milan: Universal Edition, 1984.
Davis, Miles. *The Complete Concert : 1964 (My Funny Valentine and Four & More)*. New York: Columbia Records, 1992.
Erickson, Robert. *Kryl*. Baltimore, MD: Smith Publications, 1984.
Hembree, Paul. *Ouroboros and Apocryphal Chrysopoeia: aesthetics and techniques*. San Diego: University of California, San Diego, 2015.
Lachenmann, Helmut. *"...zwei Gefühle...", Musik mit Leonardo*. Wiesbaden, Germany: Breitkopf & Härtel, 2002.
Lim, Liza. *Roda—The living circle*. Berlin: Ricordi, 2017.
Reynolds, Roger. *...the serpent-snapping eye...* Leipzig: Edition Peters, 1978.
Saunders, Rebecca. *Alba*. Leipzig: Edition Peters, 2014.