Spatial Audio Presentation

By Jackson, Thomas and Mari

Dramaturgy

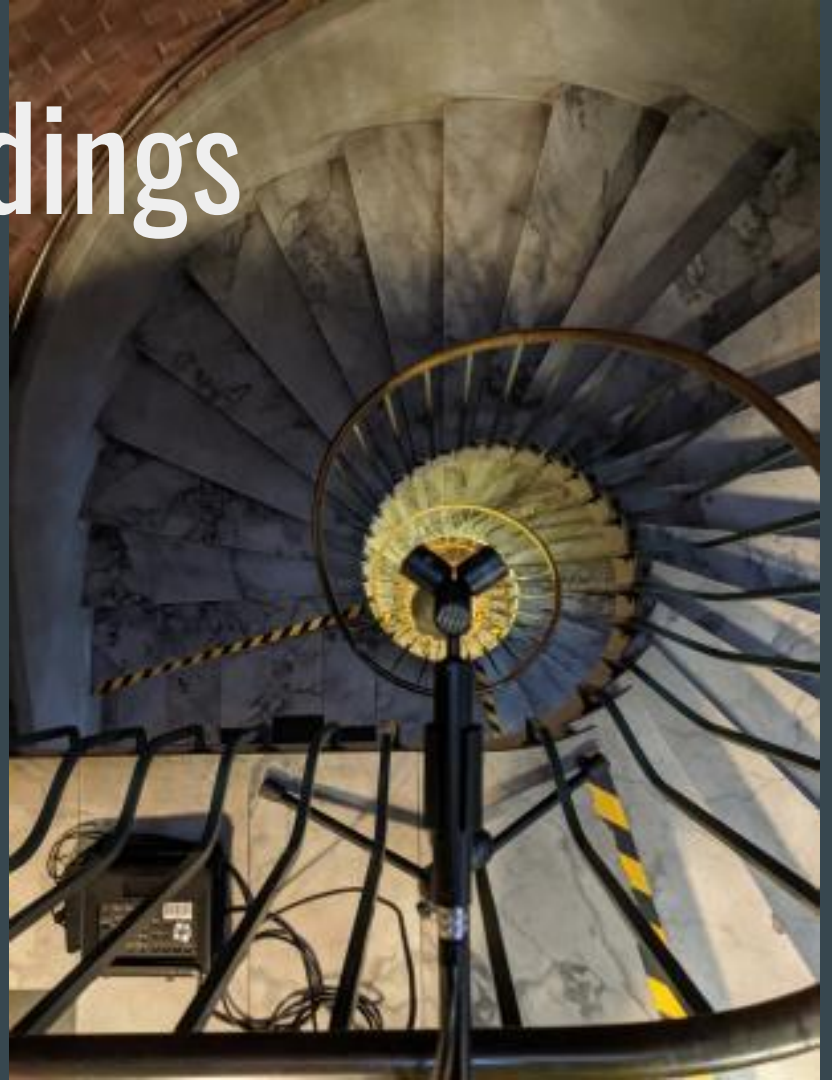
- A journey through space and time:
    1. Guitar in the rain
    2. A surreal elevator
    3. The train station
- Trying to find peace in a disturbing world
- Transitions threaded throughout

Ambisonics recordings

Soundfield microphone

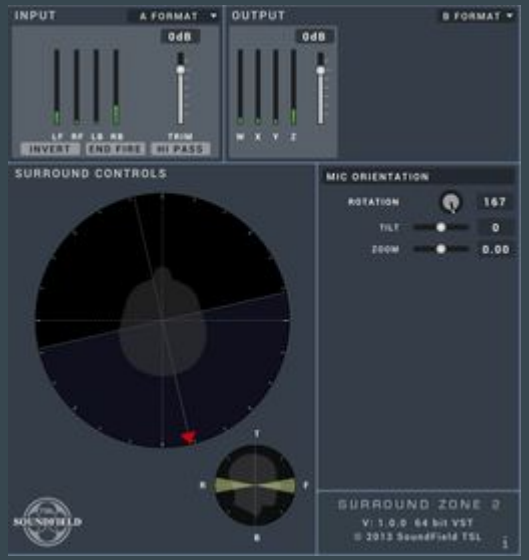
First order, A format (converted to B format)

With four microphone cardioid capsules arranged in a tetrahedron



Thomas´ section

Scene rotation



RoomEncoder

Concept

- Searching for calmness - inner turmoil
- Cyclic movements
- Introspective reflections

Aesthetic and technical choices

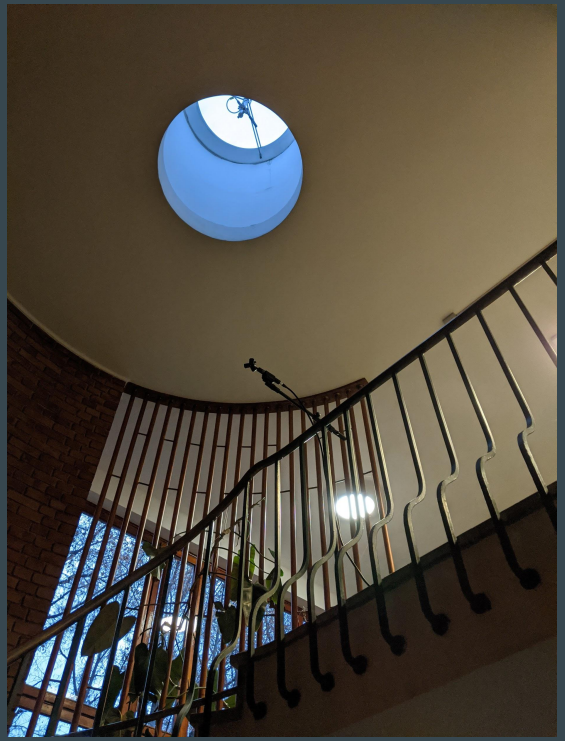
- Musical spatiality - inability to localize sounds
- Piece in a piece
- Limitations - forced and intentionally
- Spoken words

Evaluation

- The dramaturgy is in place but the technical part could use more work
- Further exploration of the aural architecture
- Limited time due to illness - stay healthy

Jackson’s section

An elevator through sound!



Some ideas...

CINEMATIC USE OF SPACE

Some composers use microphone techniques and spatial processing in a manner similar to the cinematic use of camera angle, lens perspective (width), and depth of field. Accordingly, a trend toward cinematic use of space is seen in compositions that feature dramatic contrasts between sounds that are captured close in proximity and those that are distantly reverberated. Luc Ferrari's *Presque rien no. 1* (1970) pioneered this approach. (Notably, Ferrari was also visually sophisticated and directed several important films, including his series *Les Grandes Répétitions* [The Great Rehearsals].) Another classic example of audio cinematics is *Sud* (1985) by Jean-Claude Risset. In the first example, we hear wind in the background and insects in the foreground mixed with high-pitched synthetic flutterings and resonant filter effects.

Composing Electronic Music
Roads, 2015

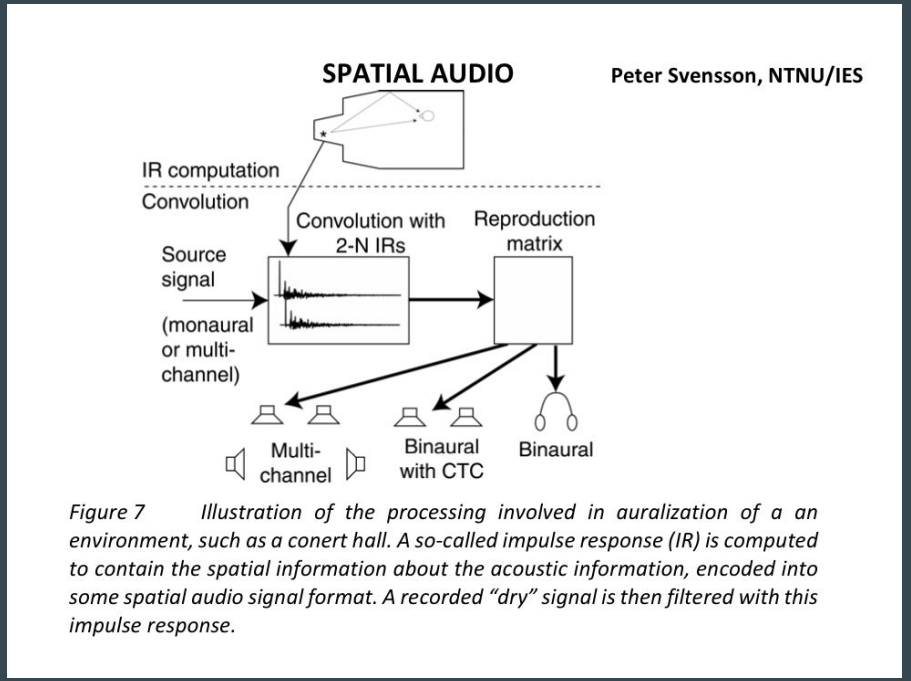
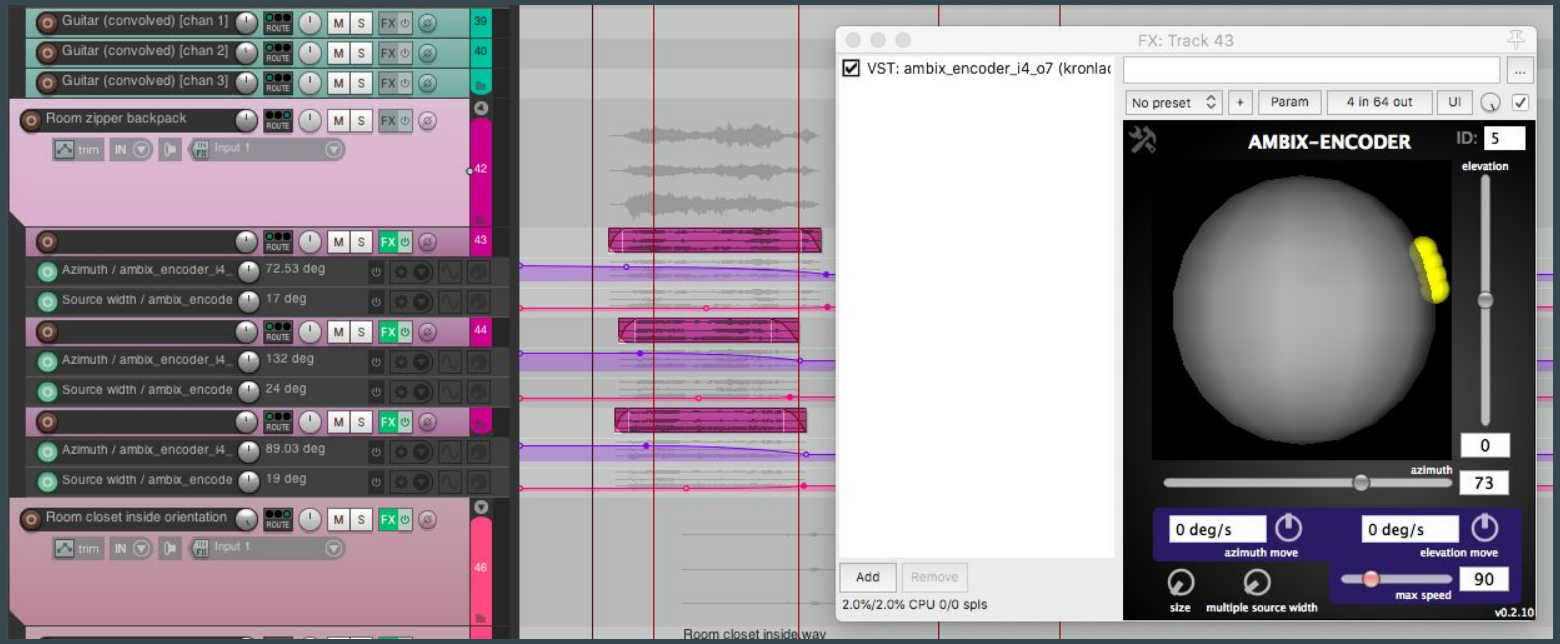


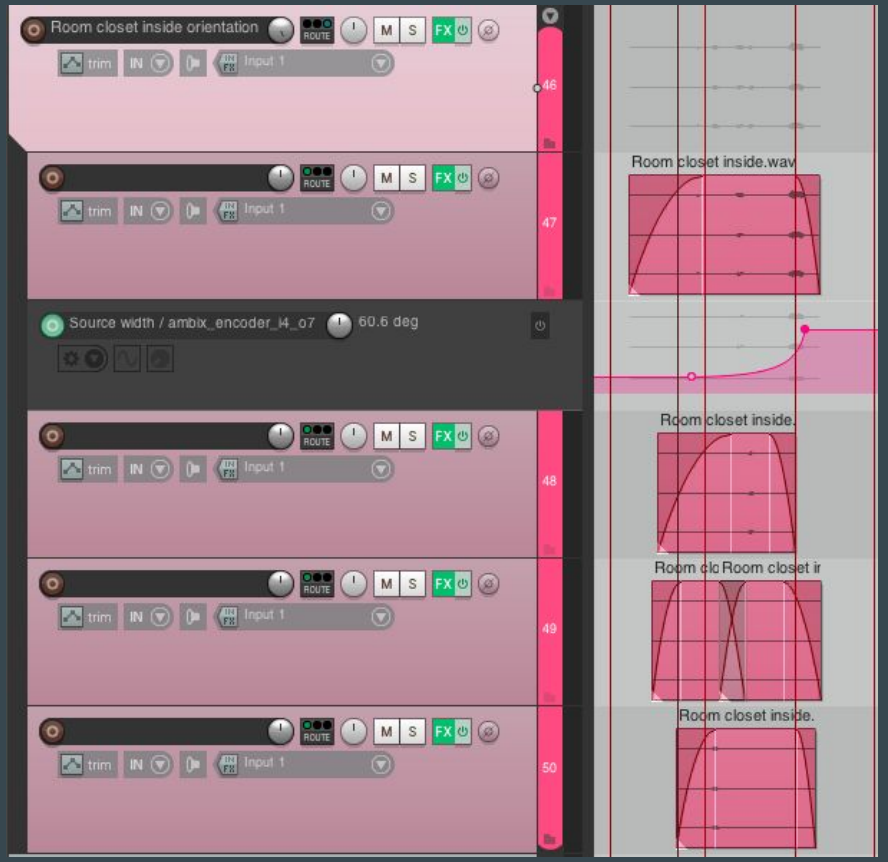
Figure 7 Illustration of the processing involved in auralization of a an environment, such as a conert hall. A so-called impulse response (IR) is computed to contain the spatial information about the acoustic information, encoded into some spatial audio signal format. A recorded "dry" signal is then filtered with this impulse response.

Lecture notes
Svensson, 2020

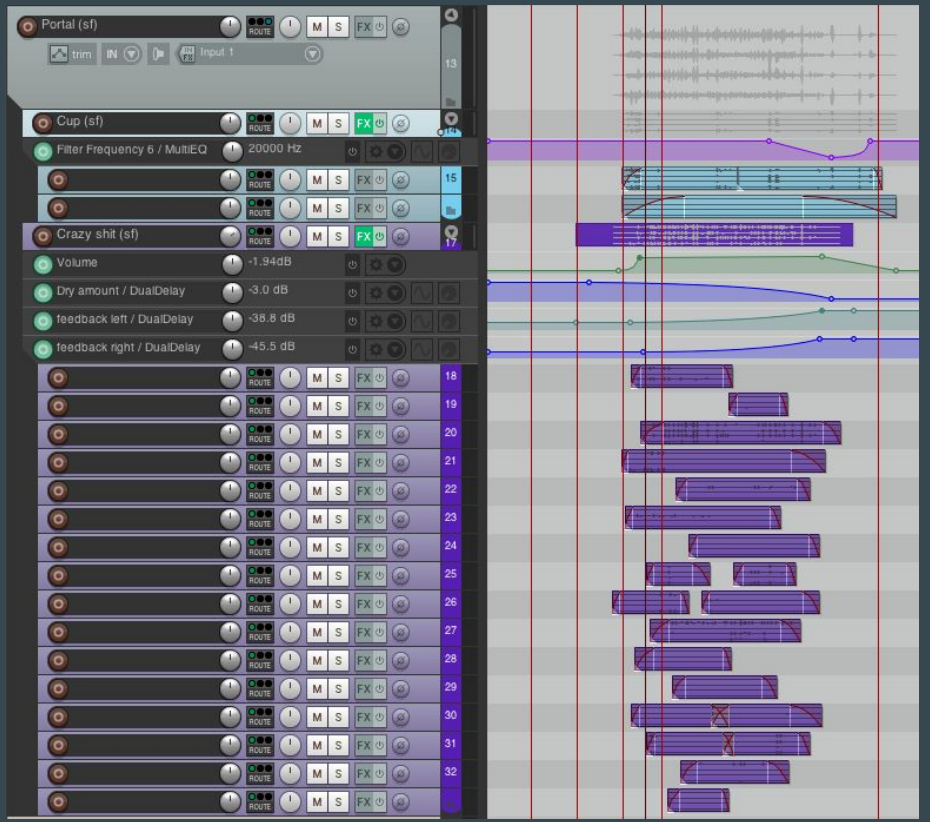
Opening a backpack



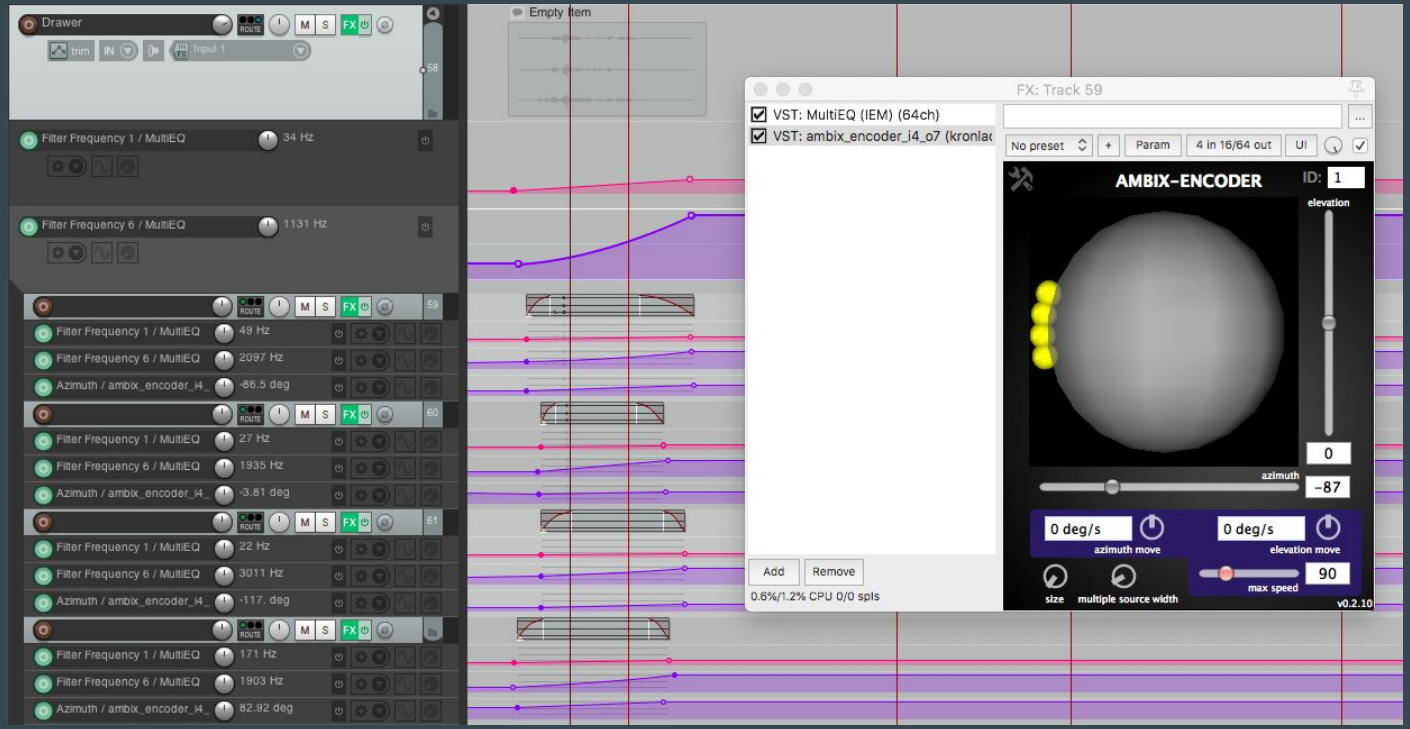
Inside a dresser



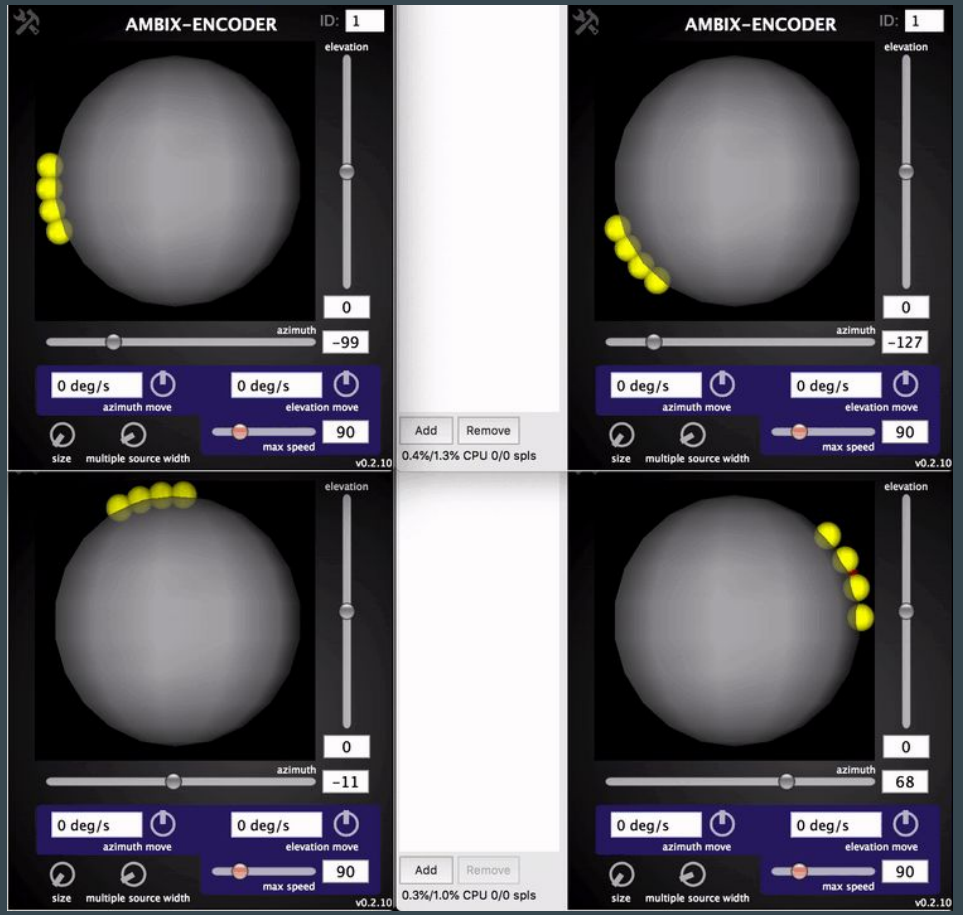
Some wild drum sticks



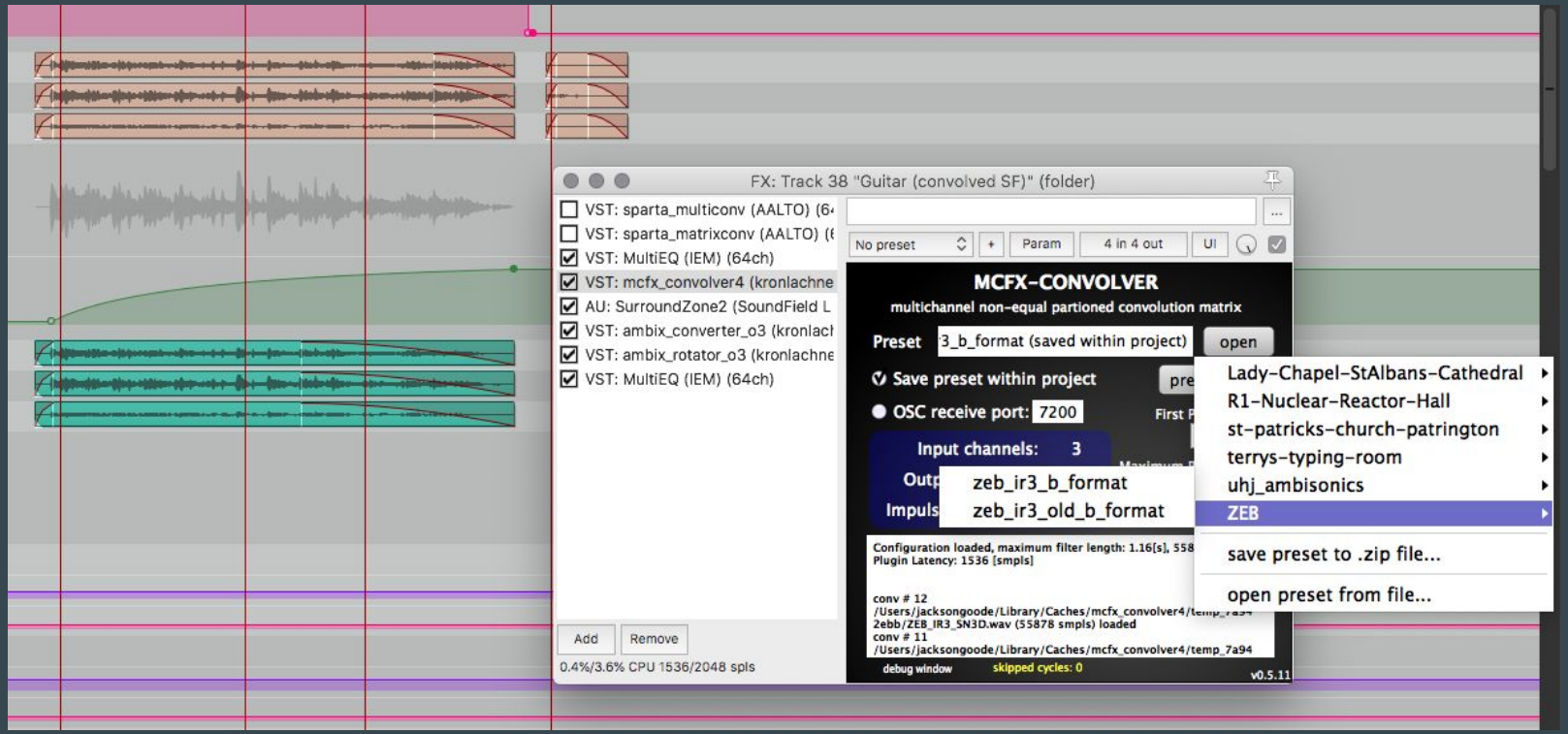
Opening a drawer



Some nice rotations

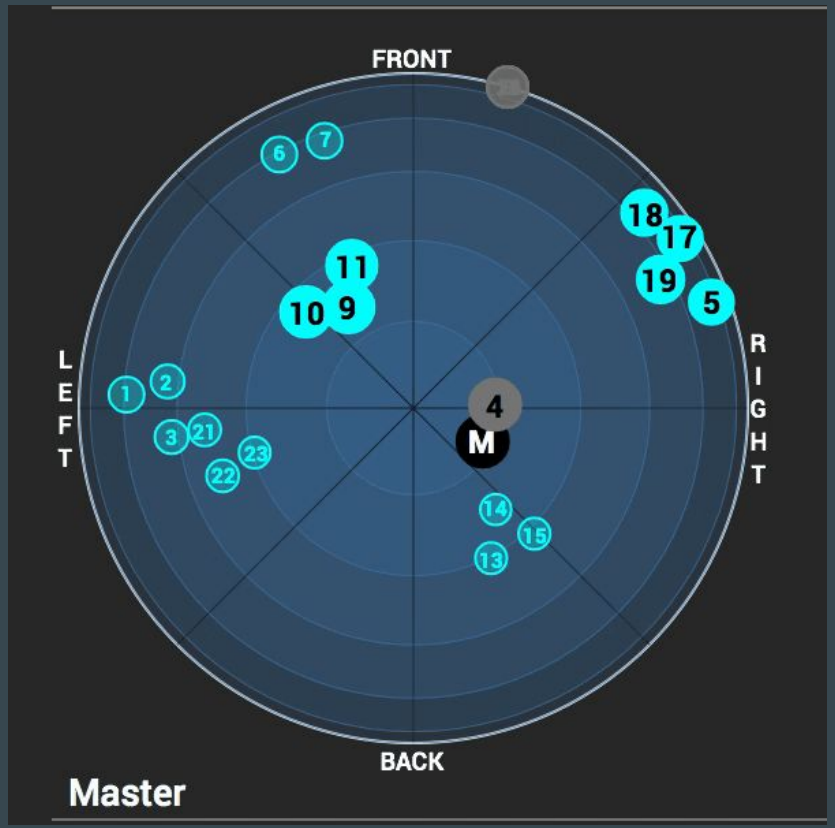


Thomas's guitar (with convolution)

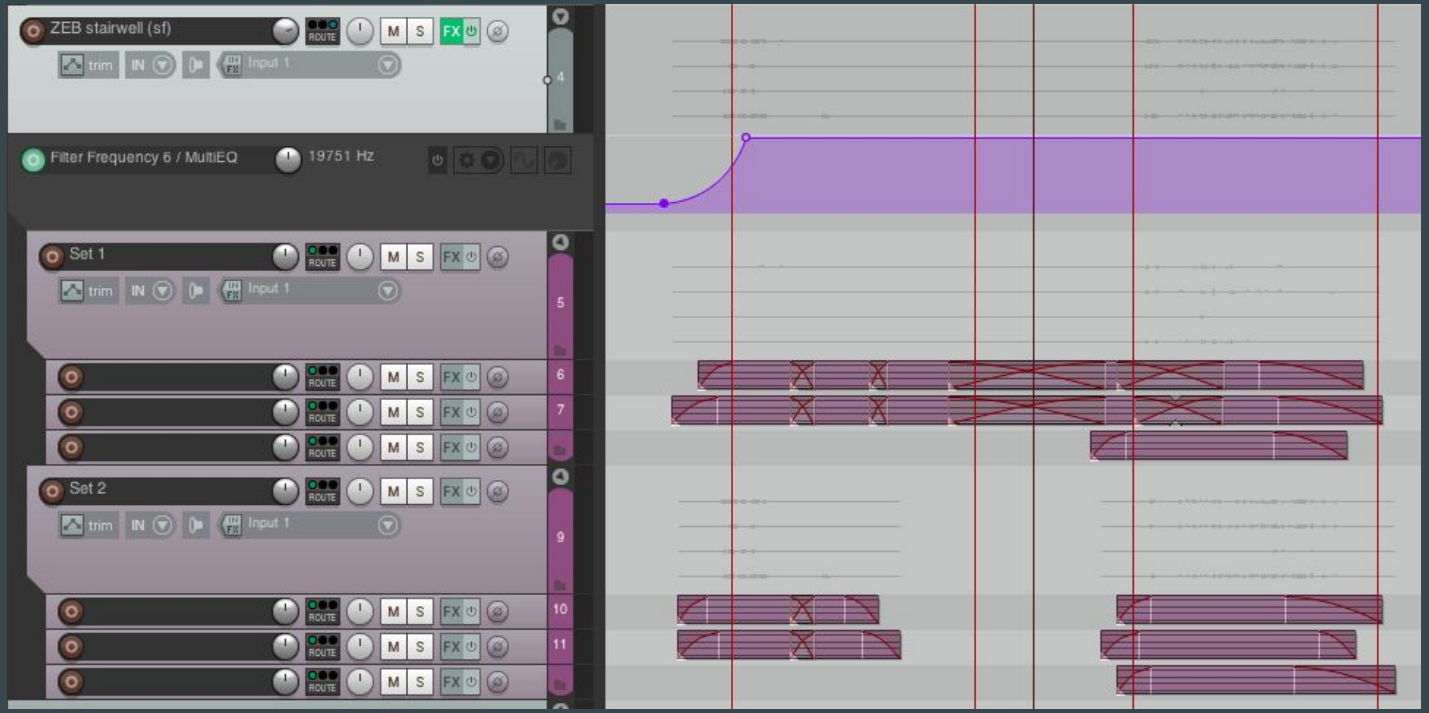


Rotating a plastic bag

Looks cool!



Recording in ZEB



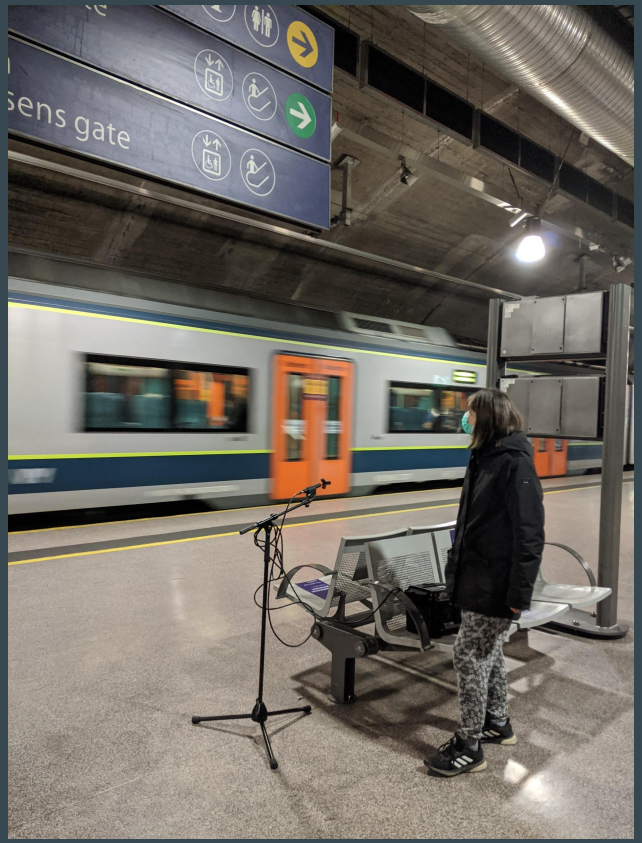
Evaluation

In reflection:

- Impossible spaces, and disorienting transitions
- Some spatial manipulations: cool in theory, boring in practice

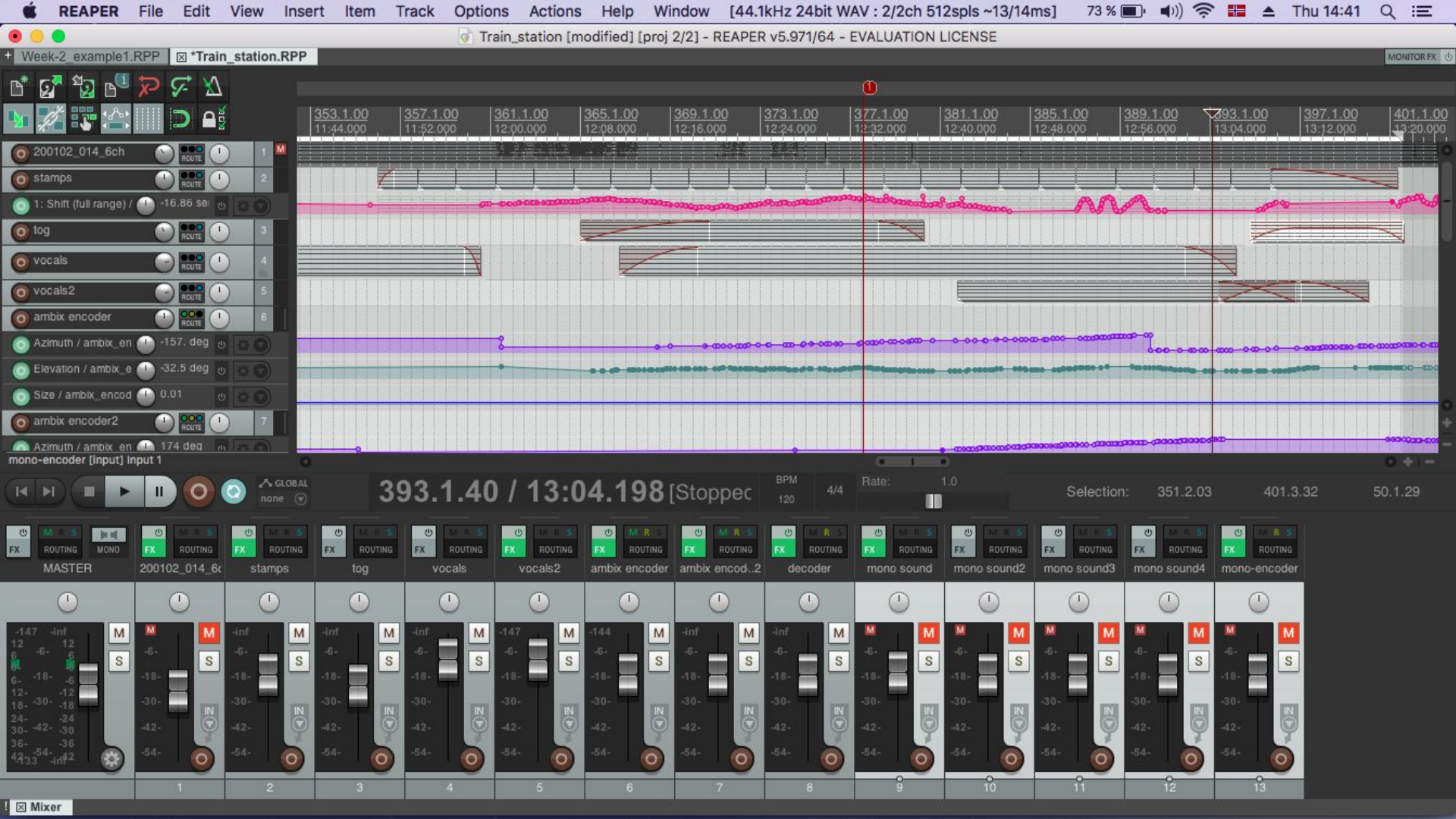
In reality....

- Some plugins are frustrating (looking at you Sparta!)
- I need a newer laptop
- Shortcuts are your friend (and worth setting up)
    - Much of this workflow changed choices both from an artistic and technical project

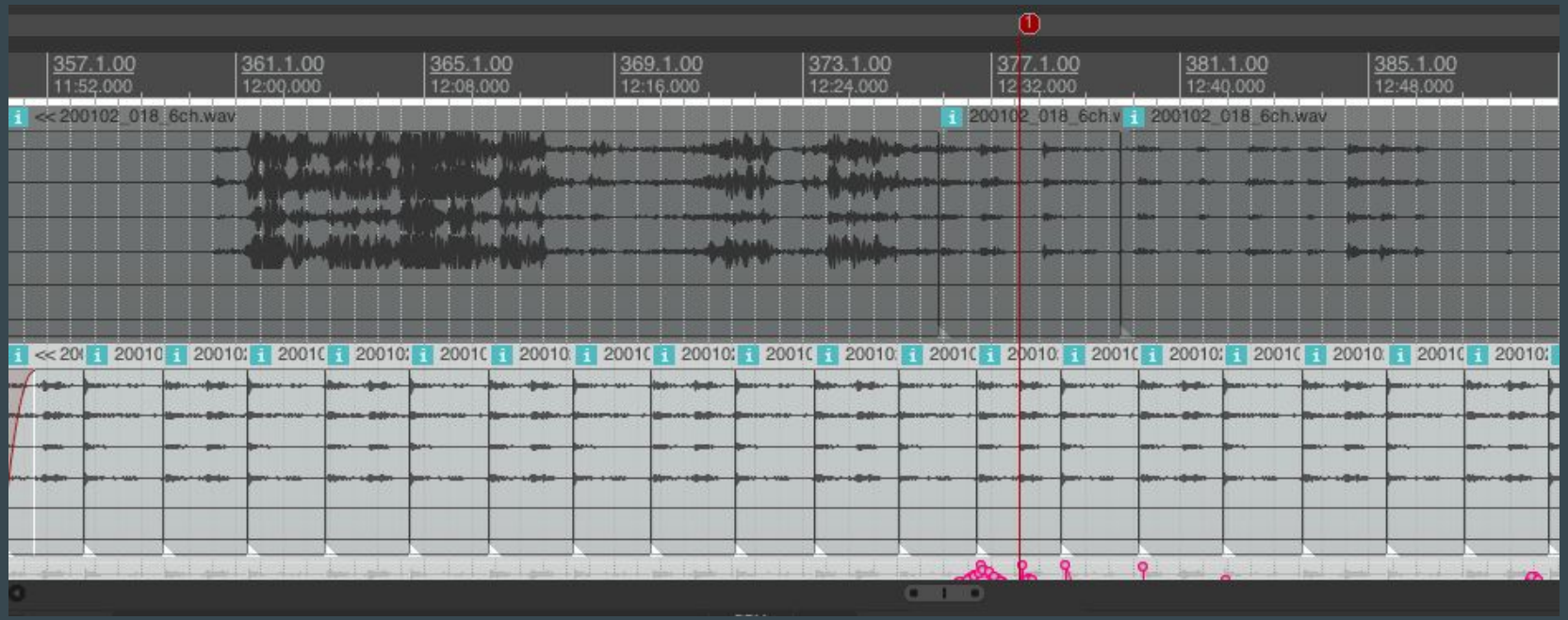


"… we can consider the following tactics when composing immersive sound-fields: an awareness of lateral reflections and late reverberation (from room acoustics), an avoidance of directionally emphasised variations in spectral content (from perception), an understanding of the space as both listener and composer, and if we wish to surround the listener with sources, the number should be significant so that our attention cannot fall on any one direction for any length of time. " (Barrett, forthcoming, p.10)

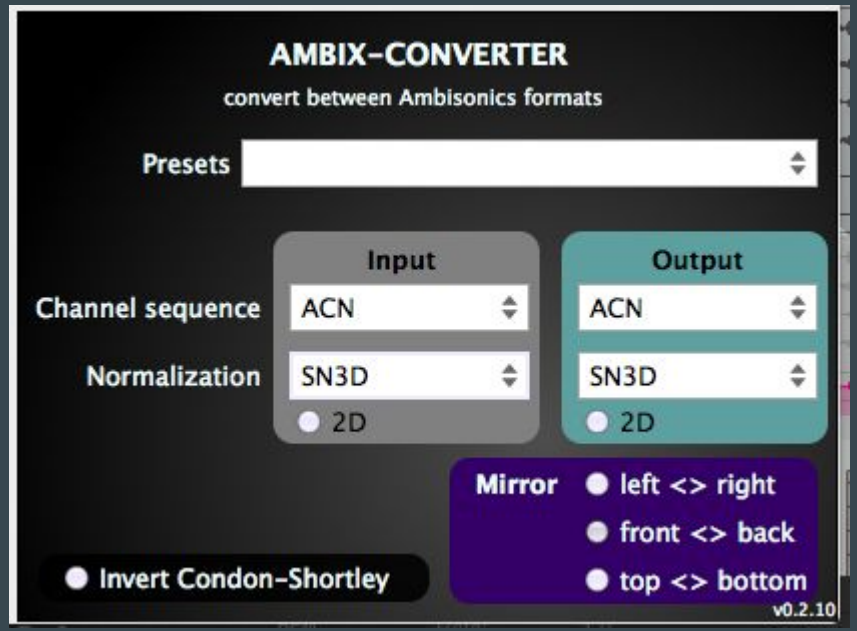
Acoustic Sculpture / Train Station

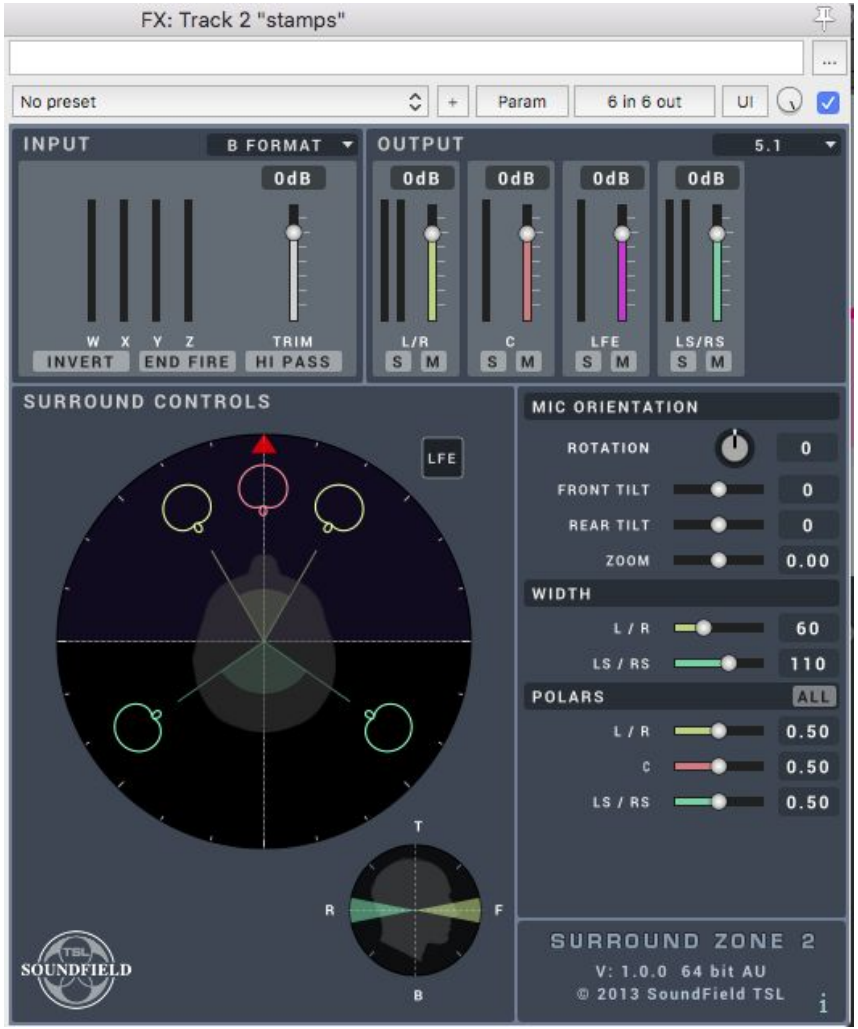

REAPER File Edit View Insert Item Track Options Actions Help Window [44.1kHz 24bit WAV : 2/2ch 512spls ~13/14ms] 73 % Thu 14:41
Train_station [modified] [proj 2/2] - REAPER v5.971/64 - EVALUATION LICENSE
Week-2_example1.RPP
*Train_station.RPP
MONITOR FX
353.1.00 11:44.000
357.1.00 11:52.000
361.1.00 12:00.000
365.1.00 12:08.000
369.1.00 12:16.000
373.1.00 12:24.000
377.1.00 12:32.000
381.1.00 12:40.000
385.1.00 12:48.000
389.1.00 12:56.000
393.1.00 13:04.000
397.1.00 13:12.000
401.1.00 13:20.000
200102_014_6ch
stamps
1: Shift (full range) / -16.86 se
tog
vocals
vocals2
ambix encoder
Azimuth / ambix_en -157. deg
Elevation / ambix_e -32.5 deg
Size / ambix_encod 0.01
ambix encoder2
Azimuth / ambix_en 174 deg
mono-encoder [input] Input 1
GLOBAL none
393.1.40 / 13:04.198 [Stoppec
BPM 120
4/4
Rate: 1.0
Selection: 351.2.03 401.3.32 50.1.29
MASTER
200102_014_6(
stamps
tog
vocals
vocals2
ambix encoder
ambix encod..2
decoder
mono sound
mono sound2
mono sound3
mono sound4
mono-encoder
Mixer

1. All of the recordings are from Nationaltheatret train station.
2. Trample sounds forms a slow beat (action sounds).
3. Reverberation from acoustic sculpture

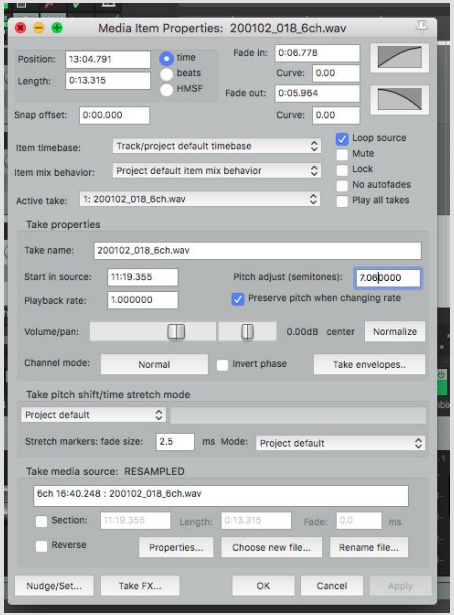


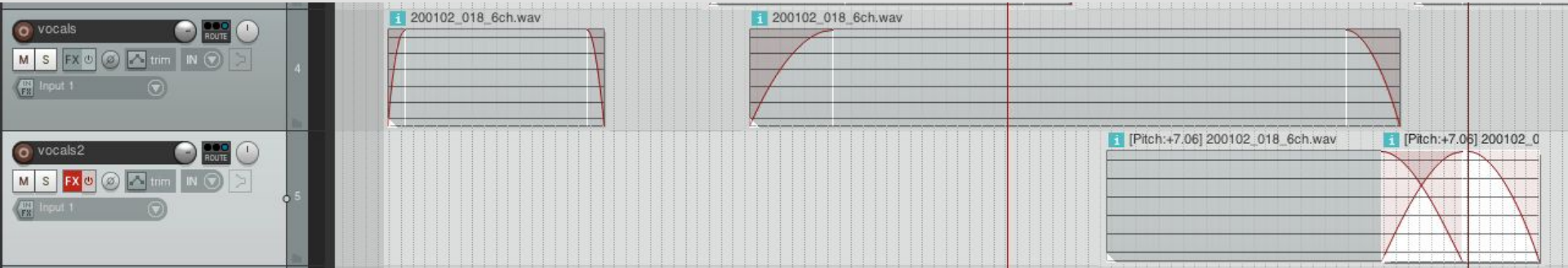

REAPER File Edit View Insert Item Track Options Actions Help Window
VST: ReaPitch (Cockos)
PITCH AUTOMATION


AMBIX-CONVERTER
convert between Ambisonics formats
Presets
Input
Output
Channel sequence
ACN
ACN
Normalization
SN3D
SN3D
2D
2D
Mirror
left <> right
front <> back
top <> bottom
Invert Condon-Shortley
v0.2.10

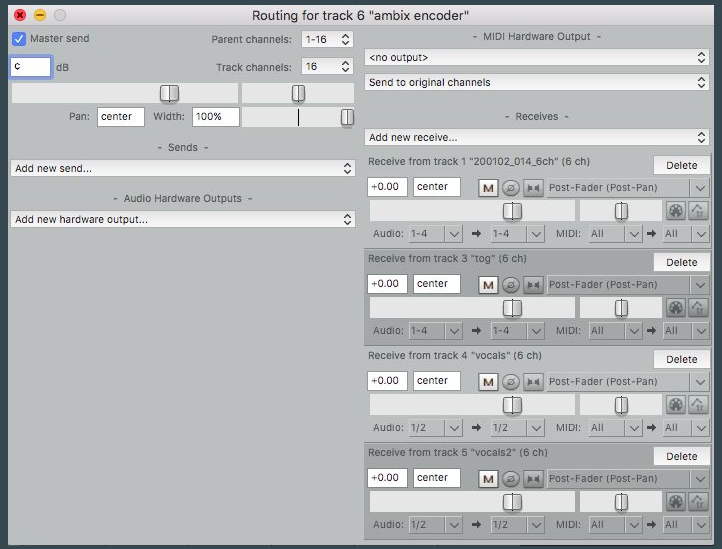

FX: Track 2 "stamps"
No preset
Param
6 in 6 out
UI
INPUT
B FORMAT
OUTPUT
5.1
0dB
W X Y Z
TRIM
INVERT
END FIRE
HI PASS
L/R
C
LFE
LS/RS
S M
SURROUND CONTROLS
LFE
MIC ORIENTATION
ROTATION
FRONT TILT
REAR TILT
ZOOM
WIDTH
L / R
LS / RS
POLARS
ALL
SOUNDFIELD
SURROUND ZONE 2
V: 1.0.0 64 bit AU
© 2013 SoundField TSL

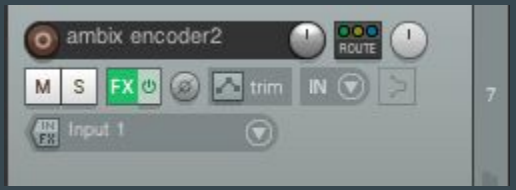
Vocal recordings from the Acoustic sculpture

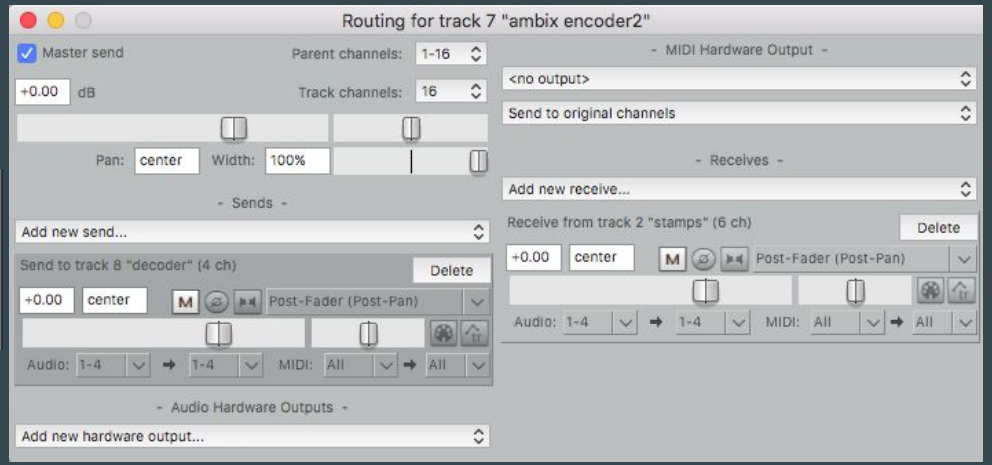


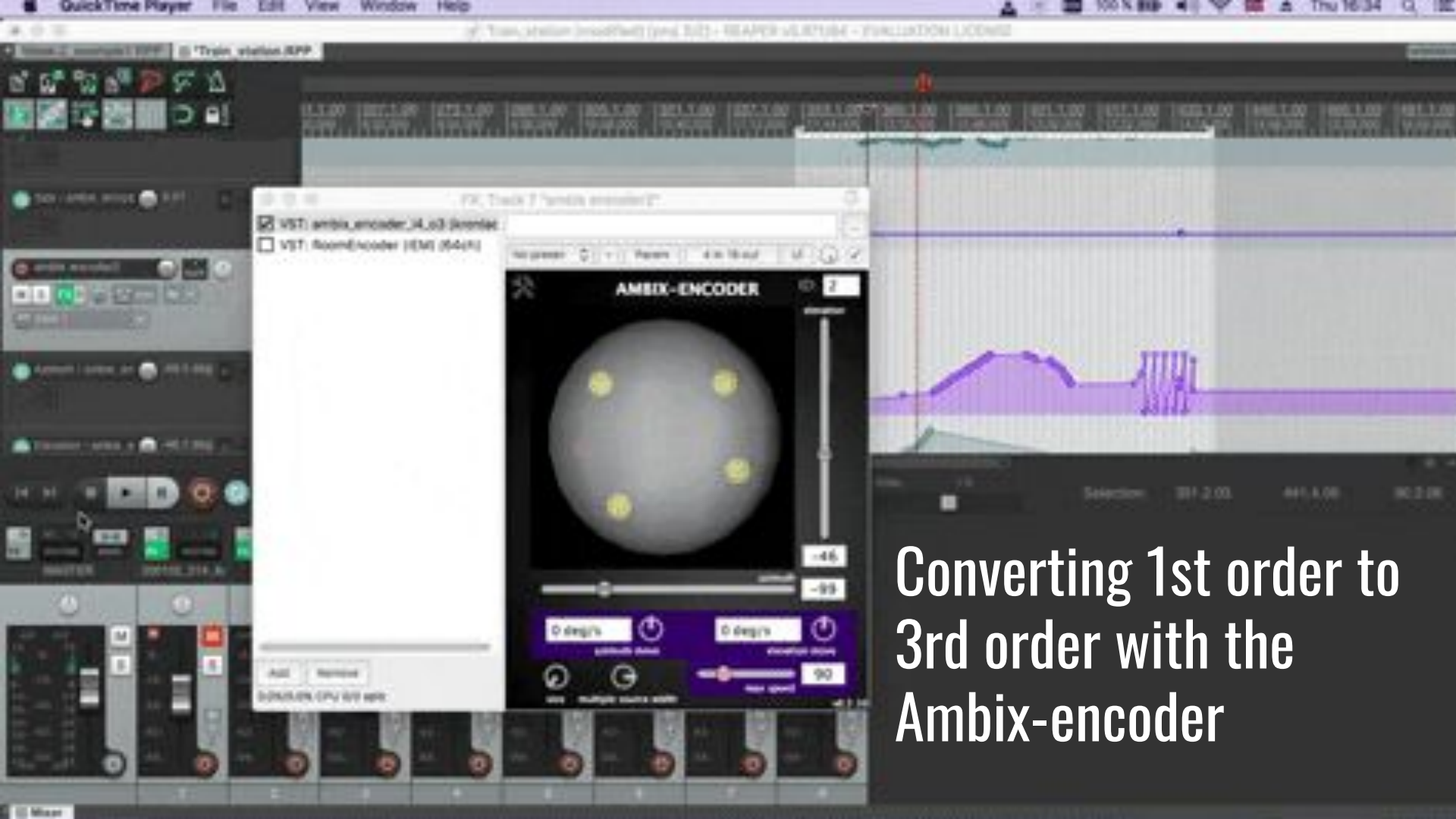


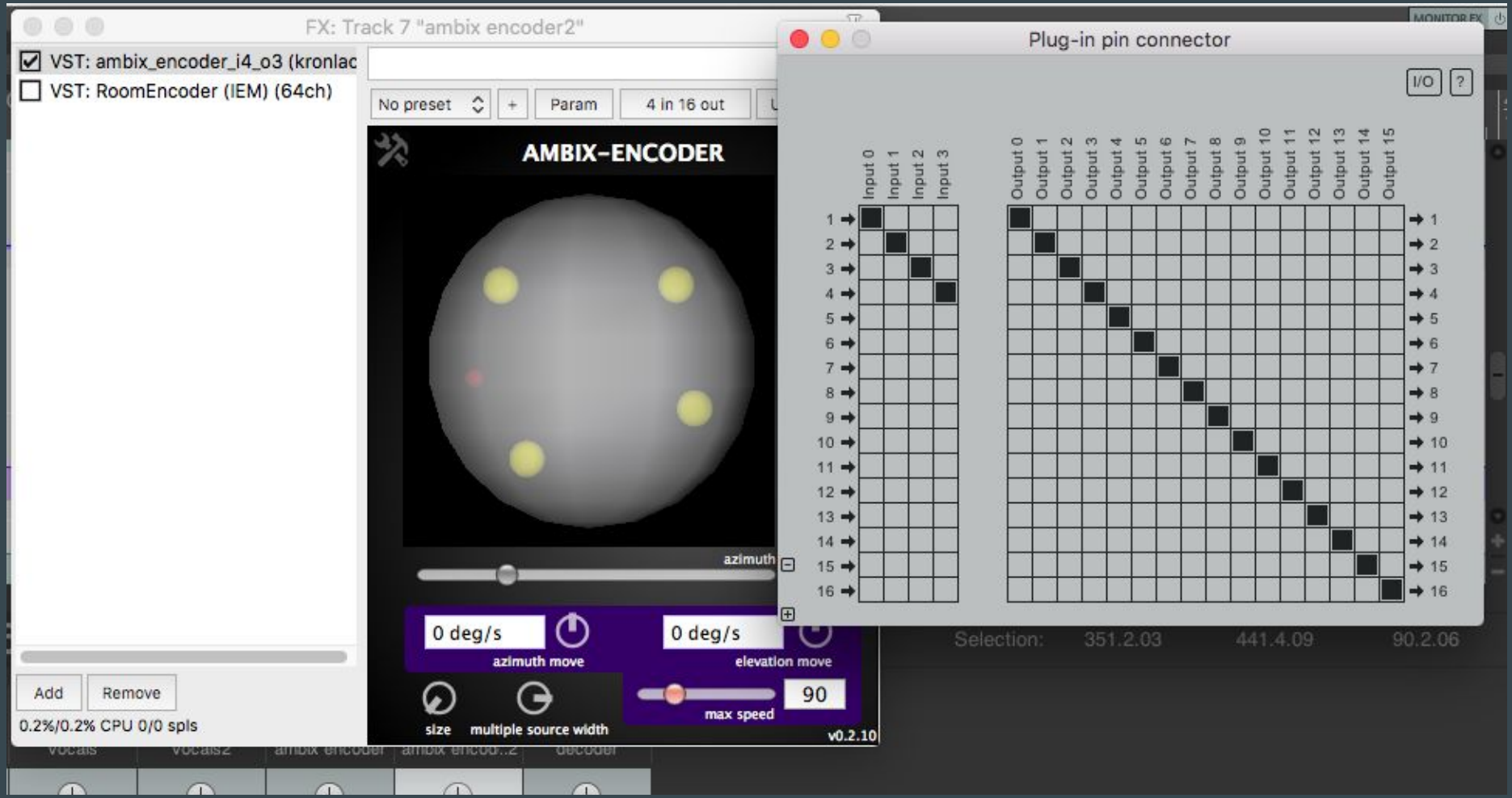

ambix encoder
ROUTE
M
S
FX
trim
IN
6
Input 1


Routing for track 6 "ambix encoder"
Master send
Parent channels: 1-16
c
dB
Track channels: 16
Pan: center
Width: 100%
- Sends -
Add new send...
- Audio Hardware Outputs -
Add new hardware output...
- MIDI Hardware Output -
<no output>
Send to original channels
- Receives -
Add new receive...
Receive from track 1 "200102_014_6ch" (6 ch)
Delete
+0.00
center
M
Post-Fader (Post-Pan)
Audio: 1-4 → 1-4 MIDI: All → All
Receive from track 3 "tog" (6 ch)
Delete
+0.00
center
M
Post-Fader (Post-Pan)
Audio: 1-4 → 1-4 MIDI: All → All
Receive from track 4 "vocals" (6 ch)
Delete
+0.00
center
M
Post-Fader (Post-Pan)
Audio: 1/2 → 1/2 MIDI: All → All
Receive from track 5 "vocals2" (6 ch)
Delete
+0.00
center
M
Post-Fader (Post-Pan)
Audio: 1/2 → 1/2 MIDI: All → All


ambix encoder2
ROUTE
M
S
FX
trim
IN
7
Input 1


Routing for track 7 "ambix encoder2"
Master send
Parent channels: 1-16
+0.00
dB
Track channels: 16
Pan: center
Width: 100%
- Sends -
Add new send...
Send to track 8 "decoder" (4 ch)
Delete
+0.00
center
M
Post-Fader (Post-Pan)
Audio: 1-4 → 1-4 MIDI: All → All
- Audio Hardware Outputs -
Add new hardware output...
- MIDI Hardware Output -
<no output>
Send to original channels
- Receives -
Add new receive...
Receive from track 2 "stamps" (6 ch)
Delete
+0.00
center
M
Post-Fader (Post-Pan)
Audio: 1-4 → 1-4 MIDI: All → All


AMBIX-ENCODER
Converting 1st order to 3rd order with the Ambix-encoder


FX: Track 7 "ambix encoder2"
VST: ambix_encoder_i4_o3 (kronlac
VST: RoomEncoder (IEM) (64ch)
No preset
+
Param
4 in 16 out
AMBIX-ENCODER
azimuth
0 deg/s
azimuth move
0 deg/s
elevation move
size
multiple source width
90
max speed
v0.2.10
Add
Remove
0.2%/0.2% CPU 0/0 spls
Plug-in pin connector
I/O
?
Input 0
Input 1
Input 2
Input 3
Output 0
Output 1
Output 2
Output 3
Output 4
Output 5
Output 6
Output 7
Output 8
Output 9
Output 10
Output 11
Output 12
Output 13
Output 14
Output 15
Selection:
351.2.03
441.4.09
90.2.06

Evaluation

- If more time, more processing of sound, e.g. EQ, compressor, more effects, etc.

- A lot of background noise in the acoustic sculpture from the escalators down to the train platform. Adds a “disturbing” background layer to the whole piece

- Could have explored hybrid recording techniques during ambisonics recording section, e.g. the use of mono microphones as explained in Barret “Spatial Music Composition” (Barrett, forthoming, p. 7)

- Many different plugins and parameters to keep track of - easy to do mistakes when you’re supposed to learn it in only two weeks with very little hands-on time

Reflections on the project in whole

- Corona restriction: limited access to portal
- Difficulties due to sickness in group
- Different kind of workflow compared to ordinary music production
- Plugins that are specific for ambisonics
- Production techniques have to be altered to work with multi-channel
- Routing is essential
- Satisfied with the final result - regarding all the struggle :D

References:

- Barrett, N. (forthcoming): “Spatial Music Composition”, in Paterson, J. & Lee, H. (Eds.), 3D Audio, Routledge
- Blesser, Barry. (2008). Aural architecture: The missing link.. The Journal of the Acoustical Society of America. 124. 2525. 10.1121/1.4782966.
- Svensson, Peter. (2020). Lecture notes.