

Yan Maresz
Répliques
2016

Reprise Strasbourg
2019



The setup and the execution of the electroacoustic part
of this work requires a Computer Music Designer (Max expert).

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Work related information

Performance details

- June 4, 2016, Paris, Maison de la Radio, Auditorium, Festival ManiFeste-2016

Publisher : Durand

Detailed staff

- soloist: harp [augmentée]
- 2 flutes (also 1 piccolo), 2 oboes (also 1 English horn), 2 clarinets, 2 bassoons (also 1 contrabassoon), 2 horns, 2 trumpets [sourdines sèches, cup, harmon] , 2 trombones [plungers, sourdines sèches] , tuba, 2 percussionists, timpani, 10 violins, 8 second violins, 6 violas, 6 cellos, 4 double basses [au moins deux à 5 cordes]

Realisation

- Thomas Goepfer

Useful links on Brahms

- [Répliques](#) for augmented harp and orchestra (2015-2016), 16mn
- [Yan Maresz](#)

Version related information

Performance date: March 28, 2019

Documentation date: Oct. 28, 2019

Version state: valid, validation date : Jan. 13, 2021, update : May 6, 2021, 3:09 p.m.

Documentalist

(goepfer@ircam.fr)

You noticed a mistake in this documentation or you were really happy to use it? Send us feedback!

Realisation

- Yan Maresz (Composer)
- Jérémie Bourgogne (Sound engineer)
- Thomas Goepfer (Computer Music Designer)

Default work length: 16 mn

Other version(s)

- [Yan Maresz - Répliques - Creation Radiofrance \(Oct. 28, 2019\)](#)
- [Yan Maresz - Répliques - Reprise Helsinki \(Oct. 28, 2019\)](#)

Electronic equipment list

Computer Music Equipment

- 1 MacBook Pro - *Apple Laptops* (Apple)
- 1 iPad - *Tablets* (Apple)
- 1 Max 8 - *Max* (Cycling74)
- 1 Max 7 - *Max* (Cycling74)
- 1 antescofo~ - *External objects* (Ircam)
v0.92-18, Compiled on Mar 31 2016 17:38:50
- 1 MIDI Piano Interface KS1 - *MIDI Converter* (Gulbrandsen)

Audio Equipment

- 3 Loudspeaker - *Loudspeakers*
8"

Files

File	Type	Author(s)	Comment
Midi Keyboard Score	Score		
Plan	Setup		
Repliques Doc.md	Document		
Repliques_Strasbourg_2019	Patch		Updated with new soundfiles and libs
Technical Rider	Technical rider		From creation. Actuators inside Harp are not used anymore.

Instructions

Réplique by Yan Maresz, a Concerto for augmented harp and orchestra.

First version only used transducers inside the harp. Because of the poor sound power, the last version uses speakers under and above the harp. The harp has to be on a stand risers, to have place to put speakers under. A midi keyboard plays inside the orchestra to follow the conductor speed, with Antescofo.

Software

For historical and stability reasons, this piece works with 2 different instances of MaxMSP.

First instance of Max runs a Max project named `PRTM`, which is a Polyrhythmic engine written in Antescofo language. The goal is to create and control multiple variable metronomes that generate MIDI notes and audio synthesis send to the Main patch. The second Max instance is the Main patch, including Antescofo Score of the piece, realtime treatments on Harp sound, tapes, samplers, saptaitlisation, etc...

It is always recommended to use 2 different Max instances to be sure to use the right Antescofo version (v0.92-18, Compiled on Mar 31 2016 17:38:50) for the `PRTM` Engine.

Installation

- Install Max7 64 bits is used for main electronic.
- Install Max8 is used for polyrhythmic machine, named `PRTM`.
- Install Sforzando for a VST sampler used inside Max7. An installer is provided in `Repliques_for_Sidney/SFORZANDO_INSTALL` folder.
- to avoid to setup soundfile path in Sforzando, move folder "ConcertoHarpeSounds" into `/Users/Shared` directory.

Configuration

Audio

Audio loopback has to be configured to send and receive audio from/to Max7 and Max8.

Max 7 send audio to Max 8 on channels 11 and 12

Max 8 send audio to Max 7 on channels 21, 22, 23 and 24

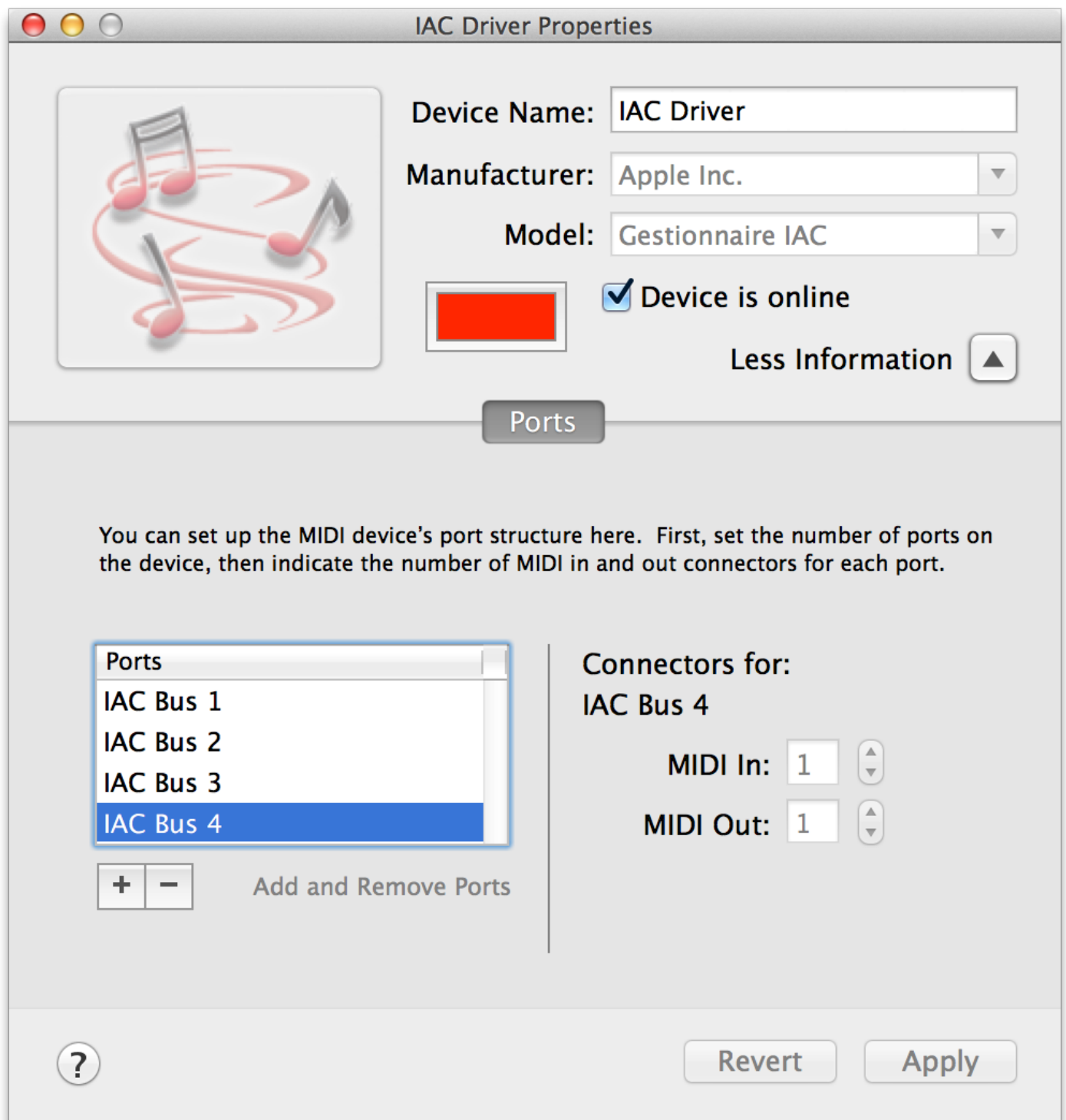
Following Settings are done with a RME Digiface.

Originally there were 6 transducers inside the harp, and a 7th on stage risers behind the harp. Even if transducers are not used anymore, the main patch still outputs 7 outputs. They are mixed together on speakers under and above the harp. The 7th should not be used.

Midi

Midi is sent from Max8 to Max7 to play Sforzando sampler, using 4 bus of IAC Midi driver:

- IAC Driver IAC Bus 1
- IAC Driver IAC Bus 2
- IAC Driver IAC Bus 3
- IAC Driver IAC Bus 4



Lemur

Create a wifi adhoc connection to use Lemur application on iPad. The lemur interface is

Replique_Strasbourg_2019/CONCERTOPATCH/LEMUR/Maresz1b.jzml . Max7 patch expects to receive OSC data from Lemur to the port 2367. Max7 sends data to display effects audio outputs levels directly onto Lemur interface. IP address and port can be changed in the patcher MIDI/OSC on the main interface.

Max7

Has to be in 64 bits. File Preferences:


- add directory "/Users/Shared/ConcertoHarpeSounds/"
- add folder Repliques_for_Sidney/Replique_Strasbourg_2019/CONCERTOPATCH


Audio settings are:

- SR: 48000

- I/O Vector Size: 256
- Signal Vector Size: 256
- Scheduler in Overdrive: on
- Audio Interrupt: off

Audio Status



CPU 20 % 

Driver

Core Audio

▼

Input Device

Digiface USB (238983...

▼

Output Device

Digiface USB (238983...

▼

Performance and Scheduler

Sampling Rate

48000

▼

I/O Vector Size

256

▼

Signal Vector Size

256

▼

Scheduler in Overdrive

✕

Audio Interrupt

✕

CPU % Limit

▶ 98

Input

Ch 1

1 Input 1

▼

Ch 2

2 Input 2

▼

Output

Ch 1

1 Output 1

▼

Ch 2

2 Output 2

▼

Audio Driver Setup

Open I/O Mappings


I/O Mappings					
Input Mapping			Output Mapping		
Ch Group			Ch Group		
1-16			1-16		
1	1 Input 1	▼	1	1 Output 1	▼
2	2 Input 2	▼	2	2 Output 2	▼
3	Off	▼	3	3 Output 3	▼
4	Off	▼	4	4 Output 4	▼
5	Off	▼	5	5 Output 5	▼
6	Off	▼	6	6 Output 6	▼
7	Off	▼	7	7 Output 7	▼
8	Off	▼	8	8 Output 8	▼
9	Off	▼	9	Off	▼
10	Off	▼	10	Off	▼
11	Off	▼	11	11 Output 11	▼
12	Off	▼	12	12 Output 12	▼
13	Off	▼	13	Off	▼
14	Off	▼	14	Off	▼
15	Off	▼	15	Off	▼
16	Off	▼	16	Off	▼


I/O Mappings					
Input Mapping			Output Mapping		
Ch Group			Ch Group		
17-32			17-32		
17	Off	▼	17	Off	▼
18	Off	▼	18	Off	▼
19	Off	▼	19	Off	▼
20	Off	▼	20	Off	▼
21	21 Input 21	▼	21	Off	▼
22	22 Input 22	▼	22	Off	▼
23	23 Input 23	▼	23	Off	▼
24	24 Input 24	▼	24	Off	▼
25	25 Input 25	▼	25	Off	▼
26	Off	▼	26	Off	▼
27	Off	▼	27	Off	▼
28	Off	▼	28	Off	▼
29	Off	▼	29	Off	▼
30	Off	▼	30	Off	▼
31	Off	▼	31	Off	▼
32	Off	▼	32	Off	▼

Max8

Audio settings are:

- SR: 48000
- I/O Vector Size: 256
- Signal Vector Size: 256
- Scheduler in Overdrive: on
- Audio Interrupt: off



CPU 11 % 

Driver

Core Audio

▼

Input Device

Digiface USB (238983...

▼

Output Device

Digiface USB (238983...

▼

Performance and Scheduler

Sampling Rate

48000

▼

I/O Vector Size

128

▼

Signal Vector Size

128

▼

Scheduler in Overdrive

✕

Audio Interrupt

✕

CPU % Limit

▶0

Input

Output

Ch 1

Off

▼

Ch 1

Off

▼

Ch 2

Off

▼

Ch 2

Off

▼

Audio Driver Setup

Open I/O Mappings

I/O Mappings					
Input Mapping			Output Mapping		
Ch Group			Ch Group		
1-16 ▼			1-16 ▼		
1	Off	▼	1	Off	▼
2	Off	▼	2	Off	▼
3	Off	▼	3	Off	▼
4	Off	▼	4	Off	▼
5	Off	▼	5	Off	▼
6	Off	▼	6	Off	▼
7	Off	▼	7	Off	▼
8	Off	▼	8	Off	▼
9	Off	▼	9	Off	▼
10	Off	▼	10	Off	▼
11	11 ADAT 11	▼	11	Off	▼
12	12 ADAT 12	▼	12	Off	▼
13	Off	▼	13	Off	▼
14	Off	▼	14	Off	▼
15	Off	▼	15	Off	▼
16	Off	▼	16	Off	▼

I/O Mappings					
Input Mapping			Output Mapping		
Ch Group			Ch Group		
17-32			17-32		
17	Off	▼	17	Off	▼
18	Off	▼	18	Off	▼
19	Off	▼	19	Off	▼
20	Off	▼	20	Off	▼
21	Off	▼	21	21 ADAT 21	▼
22	Off	▼	22	22 ADAT 22	▼
23	Off	▼	23	23 ADAT 23	▼
24	Off	▼	24	24 ADAT 24	▼
25	Off	▼	25	Off	▼
26	Off	▼	26	Off	▼
27	Off	▼	27	Off	▼
28	Off	▼	28	Off	▼
29	Off	▼	29	Off	▼
30	Off	▼	30	Off	▼
31	Off	▼	31	Off	▼
32	Off	▼	32	Off	▼

Initialization routine

- Launch Replique-MASTER-2019-1a.maxpat with Max7
- Launch AntePolytRyt.maxproj with Max8
- Max7 main patch:

- * click Reset (wait few seconds)
 - * Start DSP
- Max8 PRTM patch

- * start DSP
- Max7 main patch:

- * click Reset
- * active Midi keyboard

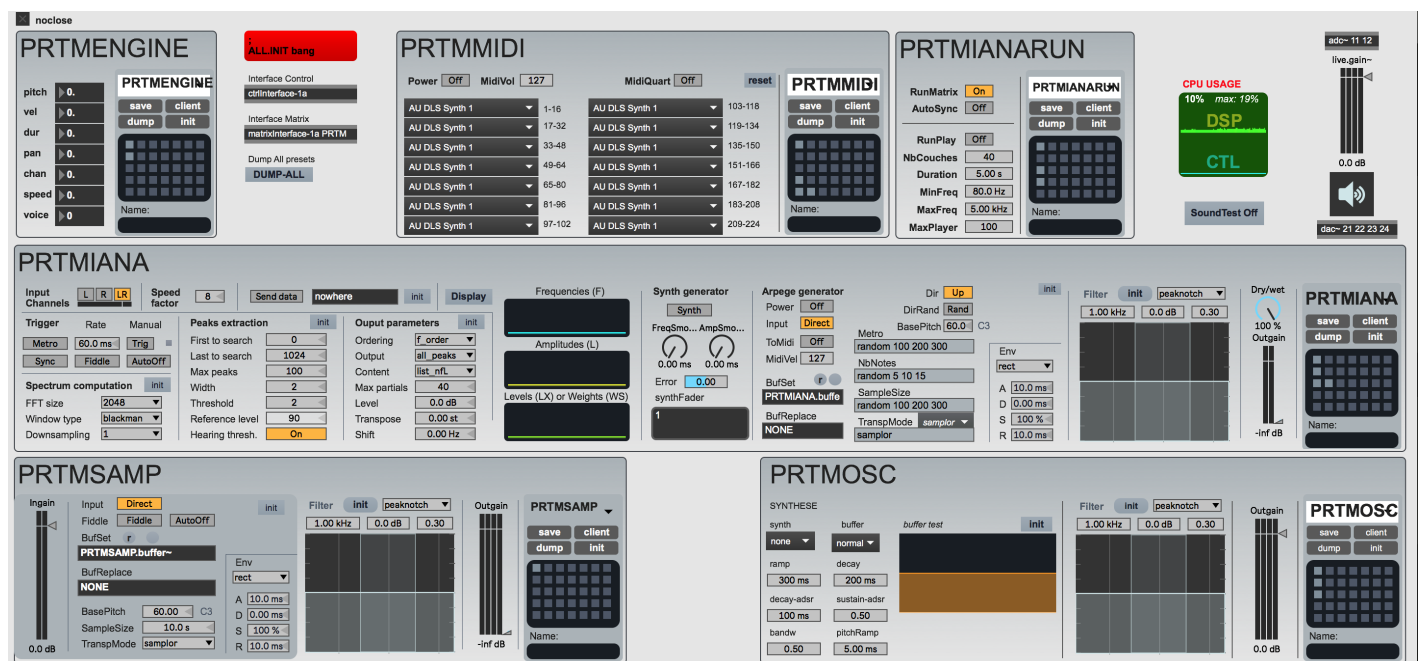
- check audio routing between Max7 and Max8

Notices some useless errors are displayed in Max7 console:

```
chromax: No pitch list declared for generation!
dict: index out of range for key dac3
dict: index out of range for key 1adc
dict: index out of range for key dac4
dict: index out of range for key 1adc
dict: index out of range for key dac5
dict: index out of range for key 1adc
dict: index out of range for key dac6
dict: index out of range for key 1adc
dict: index out of range for key dac7
dict: index out of range for key 1adc
```

Patch presentation

PRTM patch - Max8



Main patch - Max7

The screenshot displays the Antescofo software interface, which is used for real-time audio processing and score synchronization. The interface is divided into several sections:

- Left Sidebar:** A vertical menu with buttons for different components: noclose, p RESET&co, p DSP~, p SCRIPTING, p MIDI/OSC, p ALLSOUNDS, p BUFFERS, p COLLS, p TRAJ, p TGBAP, p MAPPING, p ENGINE, and p SAMPLORS.
- Top Center:** A large green display showing "wait....". Above it, the "Current Event" is set to "5) SCRUB TO: im0". Below the display, the "Next Event" is "Next : measure38".
- Antescofo Section:** Contains controls for the Antescofo engine, including "Antescofo ~ @inlets MIDI @outlets notenum scoreTempo TDIST midiout", "reloadscore", "Suivi Off", "antescofo message", and buttons for "start", "stop", "play", and "playFrom". It also shows "score Tempo" and "RT Tempo" both set to 60, and "Detect Note" and "Index Note" both set to 0.
- Launch Event Section:** Includes buttons for "next_label", "prev_label", "next_event", and "repeat", along with a "SuperFollower" toggle set to "Off". It also shows "IncomingOscP..." and "Incomingosc" with a value of 5678.
- CPU Usage Section:** A green display showing "CPU USAGE 15% max: 17%", with "DSP" and "CTL" indicators.
- Right Panel:** Contains numbered buttons (1) RESET, 2) DSP, 3) RESET, 4) SCORE, 5) Start from label: (with a dropdown menu showing "im0"), 6) MIDI C-1, and 7) KEYBOARD Shortcut >>>. It also features a "start from measure:" input set to 0 and a "Matrice Interface:" section with a "Mix window front" button.
- Bottom Section:** A grid of 18 audio object monitors, each with a name (e.g., 1ADC, 1DAC, 1Ryt, 1hrp, 1sin, 1bus, 2bus, 1Chr, 1comp, 1FKo, 2FKo, 1Fsh, 1Giz, 1gran, 1iana, 1ians, 2ians, 1samp, 1str, 2str, 1ampli) and a visual representation of its output (e.g., a bar graph or a waveform).

- Reset button makes a reset of both Max patches.
- Two ways to jump to a precise measure:

- * select the measure in the menu `Start from label:`
- * use the number box `start from measure:` on the blue panel to write the measure number.

- Notice keyboard shortcuts:

- * `s`: stop/start Antescofo suivi
- * `right arrow`: Antescofo next_event
- * `space bar`: Antescofo next_event
- * `up arrow`: Antescofo next_label

Performance notes

- 4 types of electronics sound:

1. Realtime effects:

- * freeze, frequency shifting, iana. Be careful to have enough microphone gain.

2. Sampler:

- * Using Sforzando to have a library of different types of Harp sounds. Midi notes comes from PRTM or



3. Sound files:

- * Three soundfiles are stretched following the conductor speed, at measure 17, 39 and 318

- First cue `im0` : The piece starts with an electronic Introduction during the audience entrance, like a sound installation. It has to be as loud as the audience sound.
- After the entrance of musicians and conductor, the piece starts with a Cadenza for Harp and Electronic. Cues are given manually.
- Midi keyboard starts with the score, at measure 2.
- The tricky part is to have enough harp amplification for the balance with the orchestra.

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Program note

Avec *Répliques*, Yan Maresz retrouve le harpiste Nicolas Tulliez, son ancien condisciple à la Juilliard School de New York, pour une troisième collaboration après *Spirale d'énigme* et *Al Segno*. L'œuvre n'est toutefois pas, en dépit des apparences, un concerto pour harpe et orchestre. C'est plutôt une pièce pour orchestre avec harpe obligée qui aspire, selon le compositeur, à s'affranchir des deux modèles concertants dominants : d'une part, la harpe ne porte pas le discours principal, ses cabrioles virtuoses ne sont pas commentées par l'orchestre – une solution peu adaptée à la harpe, dont la puissance est limitée –, et, d'autre part, Maresz ne cherche pas non plus à établir un dialogue qui leur donnerait tour à tour la parole – ce qui serait pourtant, de son propre aveu, la meilleure solution pour entendre l'un et l'autre convenablement. Pour mieux relever le défi, Yan Maresz a collaboré avec l'équipe Acoustique instrumentale de l'Ircam-STMS qui travaille à la mise au point de SmartInstruments : une nouvelle famille d'instruments de musique dont les qualités acoustiques sont programmables. Dans le cas présent, la harpe utilisée est celle du soliste, accordée normalement, et nullement préparée. Une seule chose la distingue : elle est équipée d'un système de capteurs et de transducteurs (collés sur la caisse à la patafix). Il n'y a aucune autre enceinte acoustique utilisée dans cette pièce : la harpe est l'origine de tous les sons électroniques. Outre une électronique très localisée (tout provient du soliste), cela permet de faire rayonner ces sons électroniques avec les qualités acoustiques de la harpe. Un des bénéfices premiers de cette « augmentation » est d'abolir les limites de la harpe, tout du moins celles liées à la technique de jeu : la harpe peut être polyphonique, chromatique, microtonale, elle peut jouer des accords de quinze sons à grande vitesse, et même réaliser un crescendo sur un accord tenu, le tout avec un timbre normal de harpe, localisé dans le corps de l'instrument... Naturellement, le concept d'instrument augmenté ne va pas sans quelques contraintes : dans le cas de la harpe, il est ainsi quasi impossible de traiter en temps réel le son de l'instrument – ce qui entraînerait de désagréables effets Larsen complexes, à moins d'y consacrer un très lourd attirail informatique pour les éviter. Yan Maresz a donc pris le parti d'échantillonner le son instrumental à la volée, pour générer des réponses informatiques complémentaires. « La plupart du temps, je joue avec des sons de harpe peu ou pas transformés. Par ailleurs, la caisse de résonance de la harpe ne transmet pas efficacement les graves – nous trichons donc un peu en utilisant un transducteur fixé sur la petite estrade du harpiste. L'auto-amplification électronique de la harpe (que permettrait en théorie l'augmentation) est également très limitée. Toutes ces petites limitations seront certainement levées dans un futur relativement proche par les avancées techniques de l'équipe de recherche – mais le temps de la recherche n'est pas le même que celui de la production. Au reste, la palette de fonctionnalités est aujourd'hui largement suffisante pour le projet compositionnel de *Répliques*. Ainsi, une oreille attentive peut parfaitement distinguer si un son isolé provient directement du jeu du harpiste (il est plus clair et plus vivant, grâce aux transitoires d'attaques plus brillantes des cordes pincées) ou s'il s'agit d'un son électronique injecté (moins présent), mais lorsque le harpiste joue avec l'orchestre, les perceptions de l'auditeur sont brouillées et le phénomène gagne une grande part de mystère – que j'aime à cultiver. »

Jérémie Szpirglas

Note de programme du concert du 4 juin 2016 à la Maison de la Radio

Version documentation creation date: Oct. 28, 2019, 12:16 p.m., update date: May 6, 2021, 3:09 p.m.