

# Witch Army: Augmented Wireless Roborecorder

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## 1 Program Notes

Witch Army is an immersive experience forged in the crucible of modern conflict. We are living through the rise of fascism. Intolerance and propaganda infest the internet, fanning the flames of war and hatred. At the same time, music itself is becoming ever more sanitised and bland as artists jump on the latest trends to ‘go viral’. This project explicitly rejects these pressures. Instead it aims to create music to make people think critically.

The use of cyborg instrumentation in the form of an augmented plastic recorder stands as an explicit reference to the tools of the technological apocalypse outlined in Haraway’s *Cyborg Manifesto* [1]. The lead composer/performer on Witch Army lives with music triggered epilepsy. Partial seizures, causing twitching of their fingers, are triggered by complex planned movements due to a glitch within their supplementary motor cortex. Therefore playing precisely pre-defined compositions is not possible for them. The compositional and performance process must be flexible to take advantage of their glitchy brain. Customising a wireless augmented instrument for them in the name of anti-propaganda can therefore constitute liberation on psychological, physical and political fronts.

The music for Witch Army is delivered within the context of a staged solo performance incorporating spoken word, movement and audience interaction. The music spans the full range of sound from simple acoustic melodies to complex layered harmonic progressions. The augmented recorder is used to seamlessly progress between these sound worlds. It can be both played and used to physically manipulate the live electronic setup hands free. Within the performance space, it is presented as a ritual object from a time when musical free expression was not only possible but encouraged. It thus serves as a musical antidote to propaganda, presenting an explicitly feminist stance against fascism through the compelling and collaborative power of sound.

## 2 Project Description

The aims of the project were as follows:

- 1) Research the nature of music and propaganda
- 2) Create a compelling narrative for an immersive performance to counteract propaganda
- 3) Design and build a custom wireless instrument to perform the project
- 4) A two-day in-person R&D for an interactive performance involving the composer, a dramaturg, a choreographer, a sound engineer and a lighting engineer.

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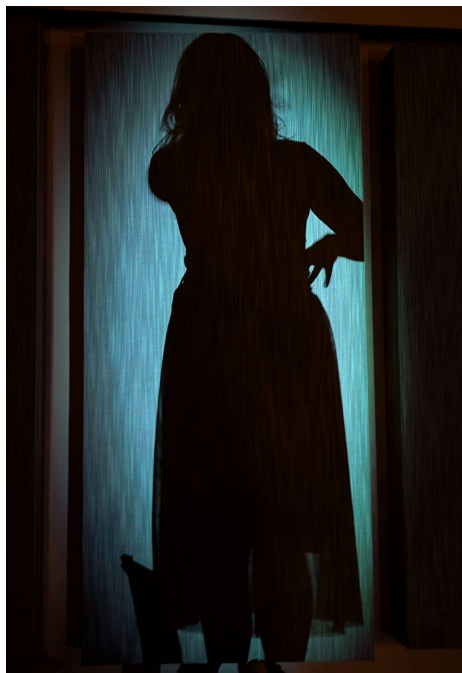


Fig. 1. Witch Army R&D 1

To this purpose, an extensive range of music used for propagandistic purposes was reviewed, from the obvious, including anthems, Wagner et al to the more eclectic. To identify the latter, thirty musical collaborators were asked the question: What music, for you, is the best example of propaganda? Taking the definition of propaganda to be: information, especially of a biased or misleading nature, used to promote a particular cause, doctrine, or point of view..

On reviewing the answers, it was determined that the most propagandistic music possessed the following qualities: simple, strong harmonies, singalong melodies and lyrics glamorising war and suffering. A strong example of music of this sort would be ‘We’ll Meet Again’, popularised by Vera Lynn during the Second World War.

“We’ll meet again  
 Don’t know where  
 Don’t know when  
 But I know we’ll meet again some sunny day”

It is noted that in the context of this or any war, the likelihood of meeting again is somewhat limited by the high death rate.

It was also noted in a separate discussion with Professor Charlie Beckett, of the Department for Media and Communications at the London School of Economics, that in his experience the addition of music was one of the most powerful ways to create propaganda from previously innocuous footage. This is likely due to the powerful and instantaneous emotional connection music creates with the viewer.

Anti-fascist music possesses these same musical and lyrical qualities. For example, Bella Ciao, the Italian partisan song whose lyrics also encourage people to die for their freedom.

“And this is the flower of the partisan

O bella ciao, bella ciao, bella ciao, ciao, ciao  
And this is the flower of the partisan  
Who died for freedom”

In order to create an antidote to propaganda, therefore, the music for this project had to encourage critical thinking. This music would therefore be the opposite in nature to the above examples while simultaneously exposing the true nature of propagandistic music and the nature of violence.

To this effect the narrative of Witch Army showcases two main musical worlds. The scene is set amid a rehearsal leading up to a fast-approaching inspection, the countdown to which forms a key part of the narrative arc. The first musical world features simple, singalong tunes. These will not be performed at NIME as they do not include use of the augmented roborecorder. Participants are asked to sing increasingly unsettling lyrics and to perform simple actions which grow more and more dystopian in nature.

This music is then contrasted with live electroacoustic, cyborg music played on an augmented plastic recorder and used to tell the real story of people living through times of war and turmoil. It is this music which is included in our submission.

To enable the project to be delivered in an impactful way with maximum theatrical effect, it was important that the augmented recorder was wireless. As already mentioned, the performer/composer of this piece lives with music triggered epilepsy. They had previously designed a custom instrument, the roborecorder, which was able to output MIDI notes in response to capacitive touch via a Teensy circuit board by using copper tape contacts stuck to the body of the instrument. This had the limitation of being wired, and not having any cc controls. This resulted in the use of multiple hardware pedals and heavy equipment to expand performance possibilities. The volume of equipment created a physical barrier to performance due to epilepsy preventing them from holding a driving licence. The large amount of equipment and its complexity also resulted in an extended setup time in soundcheck which can often be tricky for venues to accommodate. This setup was therefore designed to be as light and portable as possible to enable the artist to travel and perform with ease.

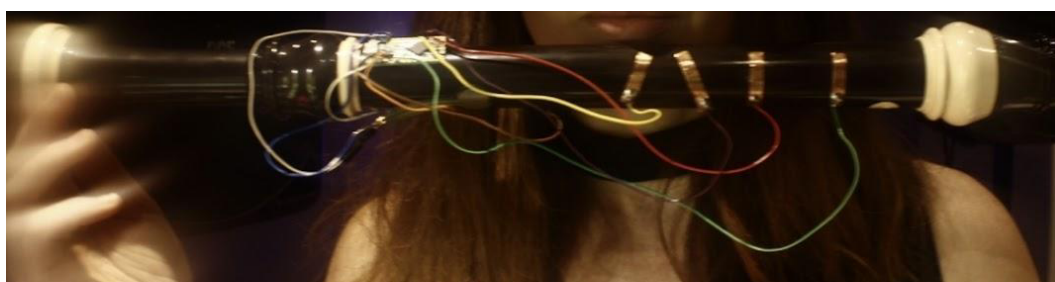


Fig. 2. Original roborecorder design featuring Teensy LC board with seven copper tape contacts

On discussion, the authors identified the key additional needs: a minimum of two cc controls. They designed a template for a new wireless roborecorder to expand the capabilities of the original instrument with two programmable cc controls, using the OSC interface of Glover software previously co-created by Mitchell for use with MiMU gloves.

An Adafruit QT Py ESP32 Pico WiFi Dev Board was connected to an Adafruit LiIon or LiPoly Charger BFF Add-on together with an 1200mAh 3.7V LiPo Battery. A SparkFun Micro 6DoF IMU Breakout was added for its inertial sensors. A Netgear Nighthawk Router was used to provide the wireless

control network. Copper tape was used to provide MIDI output control under the fingers on the recorder itself. A custom 3D printed case was designed to fit closely to the body of a plastic tenor recorder (see Figure 2).



Fig. 3. The Wireless Roborecorder

A custom Glover OSC control file was then created with adaptable MIDI controls (see Figure 3). The sensitivity of each control is adaptable via a custom threshold setting. The software would also allow multiple MIDI signals to be output from each control with customisable triggers.

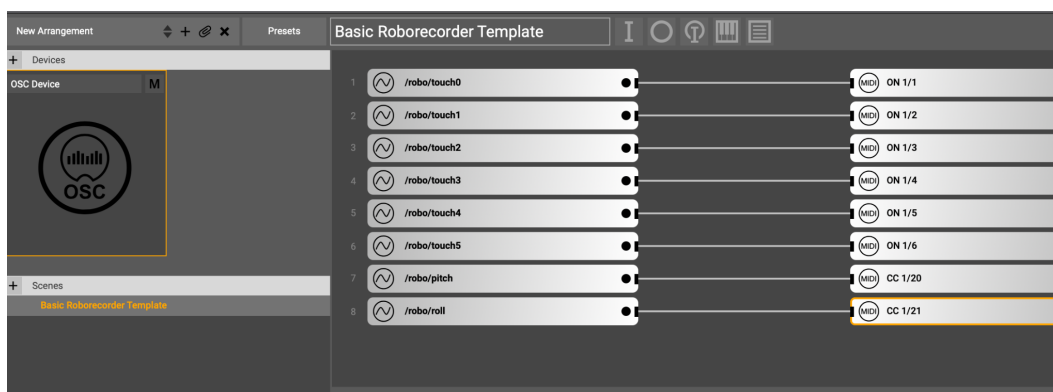


Fig. 4. Glover custom OSC interface for the roborecorder

The use of a Netgear wireless router provides secure network coverage for the performance area for a choreographed performance. The system was tested in conjunction with a Sennheiser EW-XD wireless beltback and DPA microphone. No dropouts or interference were noted.

Cc controls were mapped to pitch and roll, correlating with easily controlled playing movements. See Fig 5 for an example setup for ‘Arise’. These effect racks create a variable harmonic space in 3D, easily controllable through small movements of the player’s instrument.

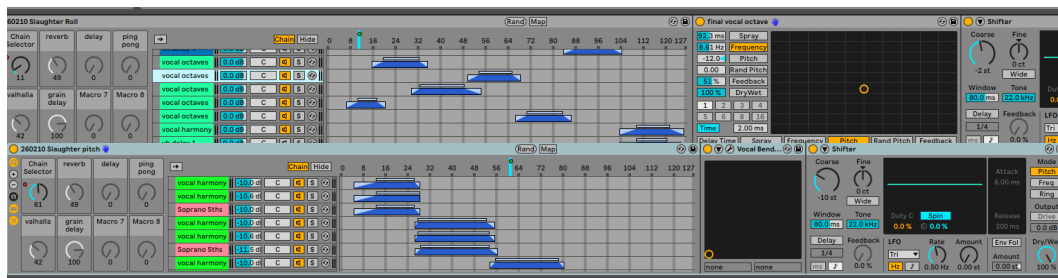


Fig. 5. Two effect racks, mapped to pitch and roll respectively, creating a 3D virtual harmonic space using Vocal Bender and Pitch shifter plugins.

The wireless roborecorder was built in a single day. This design can be adapted to any object. It provides a simple and low cost way to create augmented instruments with MIDI capability with materials coming to less than £300, not including the recorder.

### 3 Technical Notes

The attached video includes footage from day 1 of the Witch Army performance R&D. Day 2, including final video recording, is due to take place after the submission date for this conference. It includes four sections of music taken from the storytelling sections of the show. Spoken word sections have been removed.

The music starts completely acoustically with ‘Tamara’ (0.00). The music then transitions seamlessly into the amplified space with ‘Harry’ (01.26). Two effect racks and two instrument racks are controlled within Ableton, containing an array of delays, pitch altering plugins and drum racks containing samples which are triggered live by the recorder itself.

The music continues with ‘Irene’ (03.13) where the same setup is used to control reverse vocal delays and percussive samples.

Finally in ‘Arise’ a 3D live harmonic vocal soundscape is controlled by the movements of the recorder alone. This allows for the movement of the performer to convey the powerful emotions encapsulated by the lyrics, which describe a historic massacre which directly resulted from the spread of propaganda.

The wireless roborecorder provides a powerful tool for moving between the acoustic and electroacoustic space and for integrating movement into the live theatrical setting. It is worth noting that by providing cc capability on an instrument, the types of movement and relationship of the performer with the controller are fundamentally altered, due to the intimate and lifelong nature of a performer’s link to their instrument. This provides many powerful performance options.

The wireless roborecorder is only two months old and is very much at the beginning of its journey. We aim to continue the technological and artistic aims of the project in two ways. Firstly, we aim to partner with organisations to create a large-scale series of performances and installations by multiple artists addressing the theme of creating an antidote to propaganda. Secondly, we aim to explore the possibilities of applying this technology to other instruments to provide a novel and low-cost way of adding MIDI augmentation.

#### **4 Media Link(s)**

- Video: <https://youtu.be/5mDioHil12Y>

#### **Acknowledgments**

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#### **Ethical Standards**

This work fully complies with NIME's Ethical Standards, and we are not aware of any conflicts of interest relevant to the making of this work.

#### **References**

- [1] D Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, pp. 149-181)