

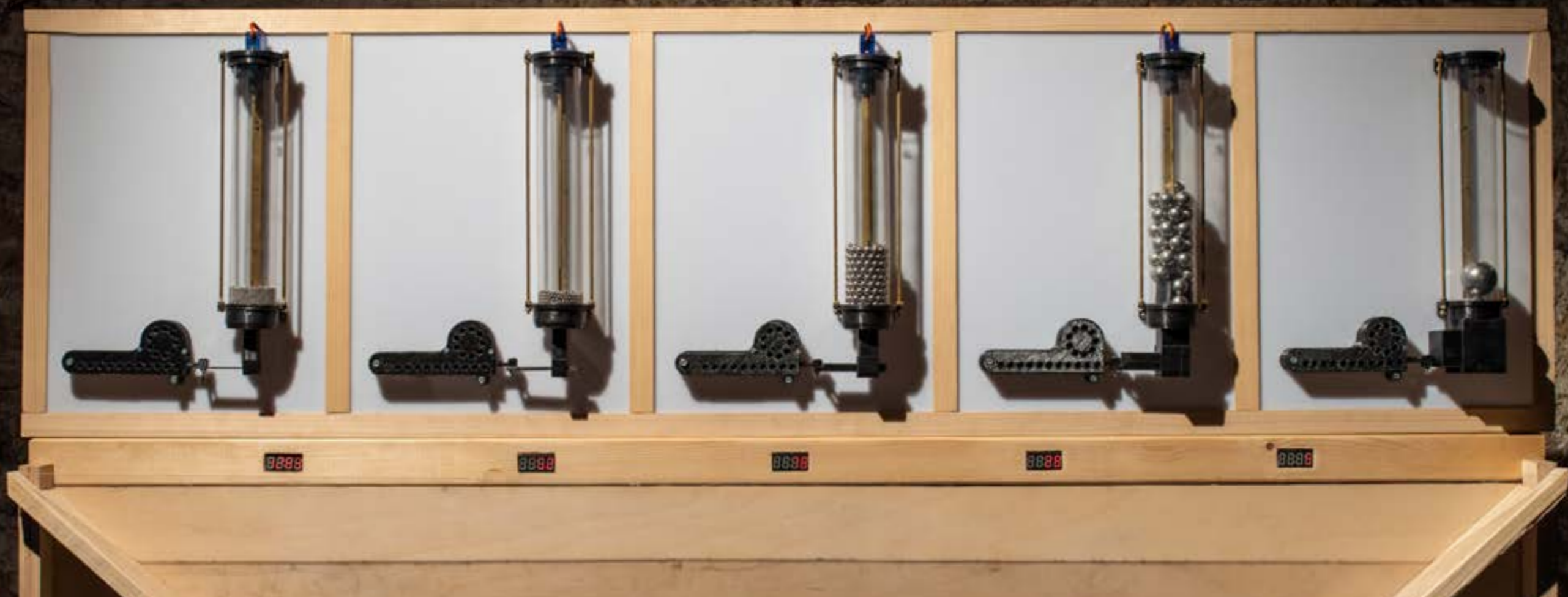
# Earthquake 3.0


Nicolas Elsig / Mathias Dessimoz



## EARTHQUAKE 3.0

Earthquake 3.0 is an art installation created for “Sur la Faille” ([www.le-cairn.ch](http://www.le-cairn.ch)), an exhibition speaking about earthquakes. This original creation, made by two visual artists Nicolas Elsig and Mathias Dessimoz, follows in near real-time the seismic activity of the Earth. Every time an earthquake happens somewhere around the globe, a metal ball with a diameter depending on the magnitude falls in a sand box. This installation makes seismic activity of the Earth visible through time.

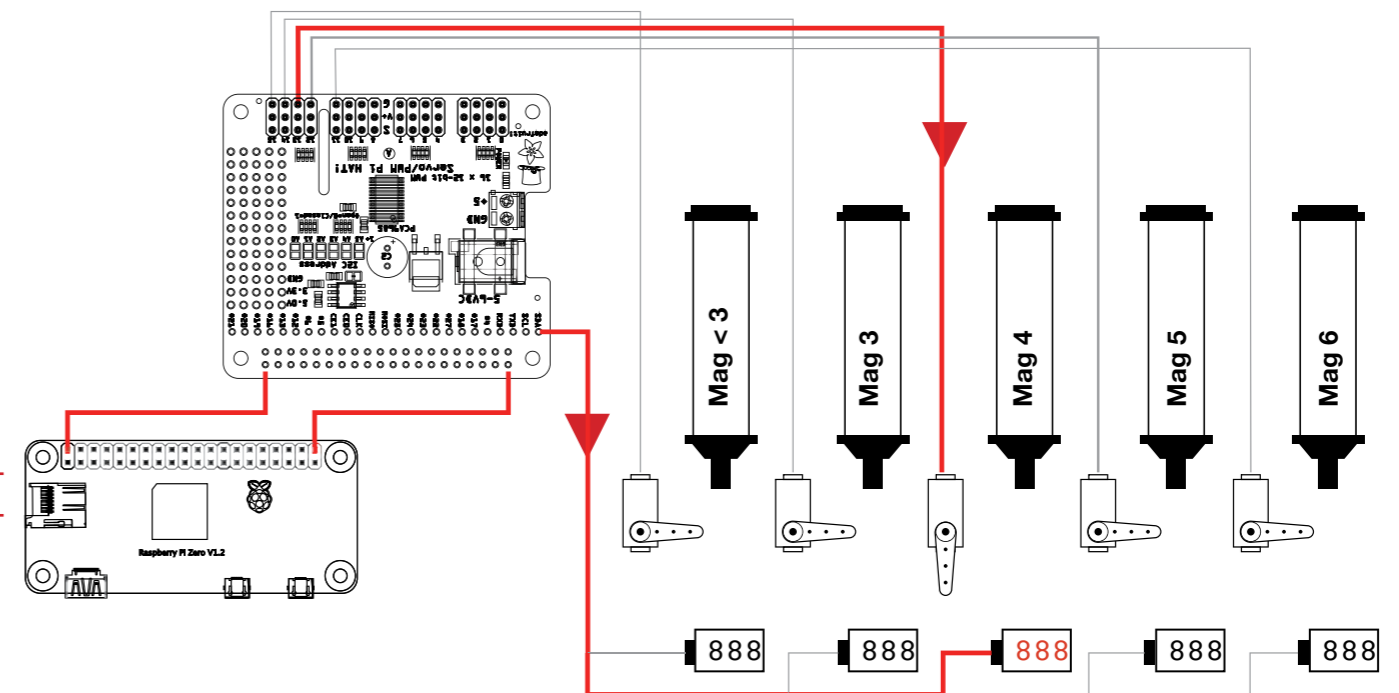


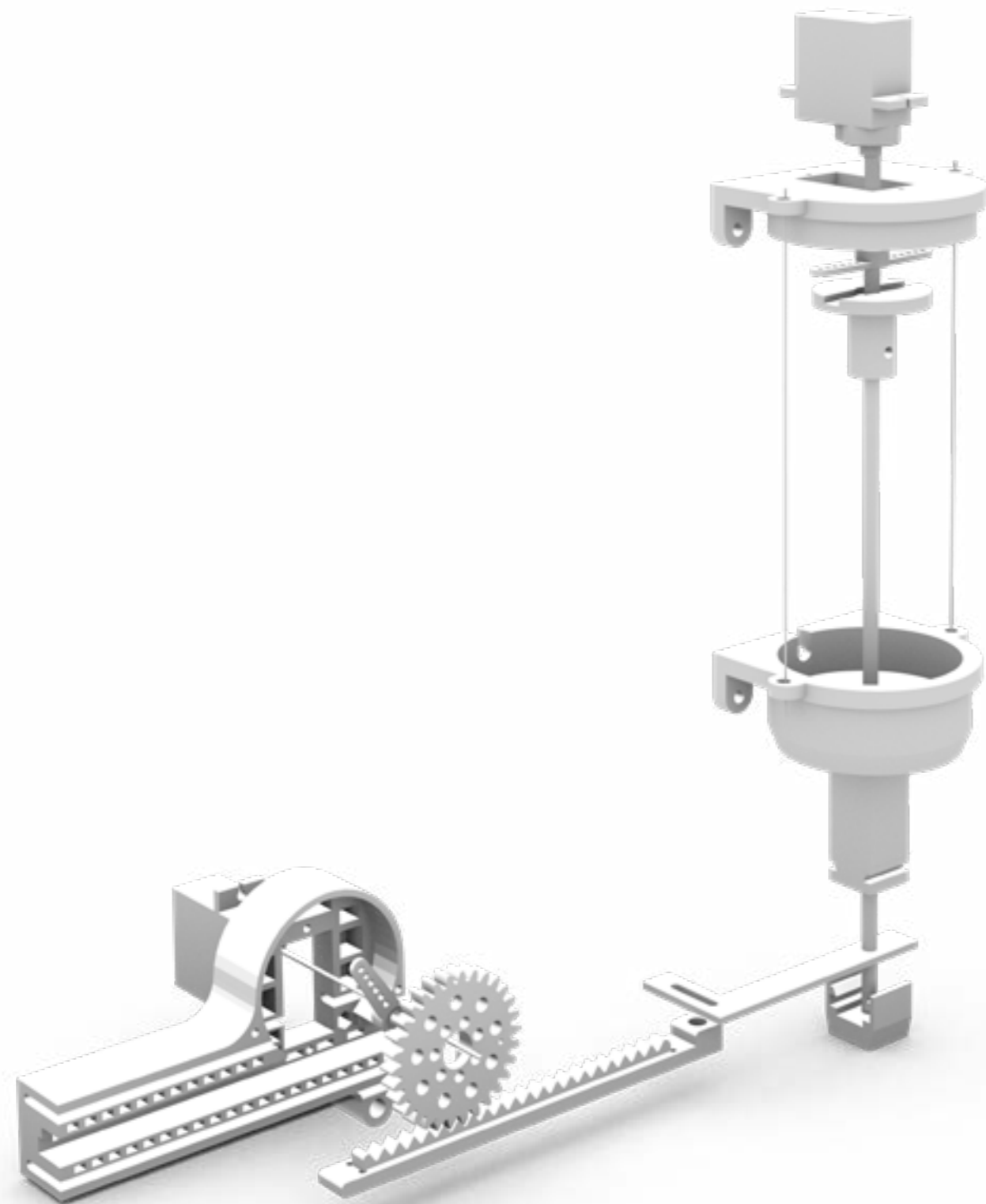
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## HOW IT WORKS

Earthquake 3.0 is a mechanical electronic installation. Five servo motors are surmounted by transparent tubes filled with metal balls of defined diameter. Each tube corresponds to a single magnitude. Balls of 1.5 mm in diameter represent earthquakes of magnitude less than 3, balls of 3 mm earthquake between magnitude 3 and 4, balls of 6.5 mm between magnitude 4 and 5, balls of 14 mm between magnitude 5 and 6, and finally the balls of 30 mm earthquake more than 6 in magnitude. The change in volume of balls from tube to tube is logarithmic respecting the Richter scale. All the servomotors are electronically controlled by a RaspberryPi. The microcontroller is connected by WIFI and queries every seconds to the UGS earthquake database. When a new earthquake is entered in the database, the micro controller reads back the magnitude, the time and activates one servo motor depending on the magnitude of the detected event. The servo pushes one metal ball in the sandbox. Every time a ball falls a digital counter installed beneath the tube is incremented, allowing to know exactly how many earthquakes happened since the machine is running. The balls in the sand box represents visually the distribution of seismic activity on the Earth.

Whereas earthquakes are unpredictable, the occurrence of earthquakes follows describable statistics. Therefore the number of balls for each magnitude were determined according to the seismic activity of previous years. For running the machine for a full month 24 hours a day, around 15000 of 1.5 mm balls, 2000 of 3 mm, 500 of 6.5 mm, 150 of 14 mm, 3 of 30 mm are needed.





## CONCEPT

Earthquake 3.0 is a totally original handmade concept. Mechanical pieces controlling the tube aperture were modeled with 3d software to perfectly fit each tube and printed. The electronic installation is driven by Raspberry Zero W which allows to connect numerous components such as servo motors, screens and LED's. The software controlling the installation was entirely programed by the artists in python3 using USGS json feeds as input data.

## LIST OF MATERIALS

Raspberry Pi Zero Wireless	1
Adafruit 16-Channel PWM	1
5V 10A switching power supply	1
CYS-S0009 9g Analog Servo with 1.5kg Torque /180° Rotation	9
4 Digit Segment-Display (Rot) with TM1637 driver IC	5
Cables	6
Plexiglass tubes	5
1.5mm diameter metal balls	15000
3 mm diameter metal balls	2000
6.5 mm diameter metal balls	500
14 mm diameter metal balls	150
30 mm diameter metal balls	3

## POSSIBLE ENHANCEMENT

Currently, the installation doesn't show any location or any name where the earthquake happened. This was a deliberate choice of the authors, aiming to maintain the mystery around occurring earthquakes and questioning the visitor on the unpredictabilty of earthquakes. A possible enhancement of the installation is to include a screen in the strucutre, which shows the map of the world and plots the last earthquake location.

The machine runs with the UGS database, it could be a possibility to run the machine using either other database, such as SED database for Switzerland or to use coupled database.

## **CONTACT**

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